RHO-LD-158
Informal Report

A CATALOG OF BOREHOLE LITHOLOGIC LOGS FROM THE 600 AREA, HANFORD SITE

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March 1982

Prepared for the United States
Department of Energy under
Contract DE-AC06-77RL01030

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CONTENTS

INTRODUCTION

Rockwell Hanford Operations (Rockwell) geoscientists are studying the Hanford Site subsurface environment to assure safe management operations, disposal, and storage of radioactive waste (Figure 1). As part of this effort, geoscientists have collected geotechnical data from about 3,000 boreholes drilled on the Hanford Site since the early 1900s. These boreholes have been used for subsurface geologic, hydrologic, and engineering investigation, water supply, ground-water monitoring, and natural gas production. This report is a catalog of all obtainable (about 800) lithologic logs from boreholes in a portion of the Hanford Site known as the 600 Area (see Figure 1).

Every effort was made to obtain the original borehole drilling reports and/or lithologic logs for inclusion in this report. Descriptions of the material penetrated by the borehole follow the original descriptions as closely as possible. Interpretations of the original borehole lithologic logs were avoided. Each lithologic log included in this report includes the source document or source agency from which the original logs were transcribed.

This catalog of lithologic logs is designed to complement other key data from Hanford Site boreholes. These key data include general borehole data*; a catalog of borehole geophysics†; borehole grab and core samples retained by Rockwell, Washington Public Power Supply System, and Northwest Energy Systems Company; and published and unpublished granulometric data.

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*McGhan, V. L. and D. W. Damschen, Hanford Wells, PNL-2894, Pacific Northwest Laboratory, Richland, Washington (1979).

†Blair, S. C., L. S. Blair and J. W. Lindberg, A Catalog of Borehole Geophysics on the Hanford Site, 1958 to 1980, PNL-3504, Pacific Northwest Laboratory, Richland, Washington (1981).

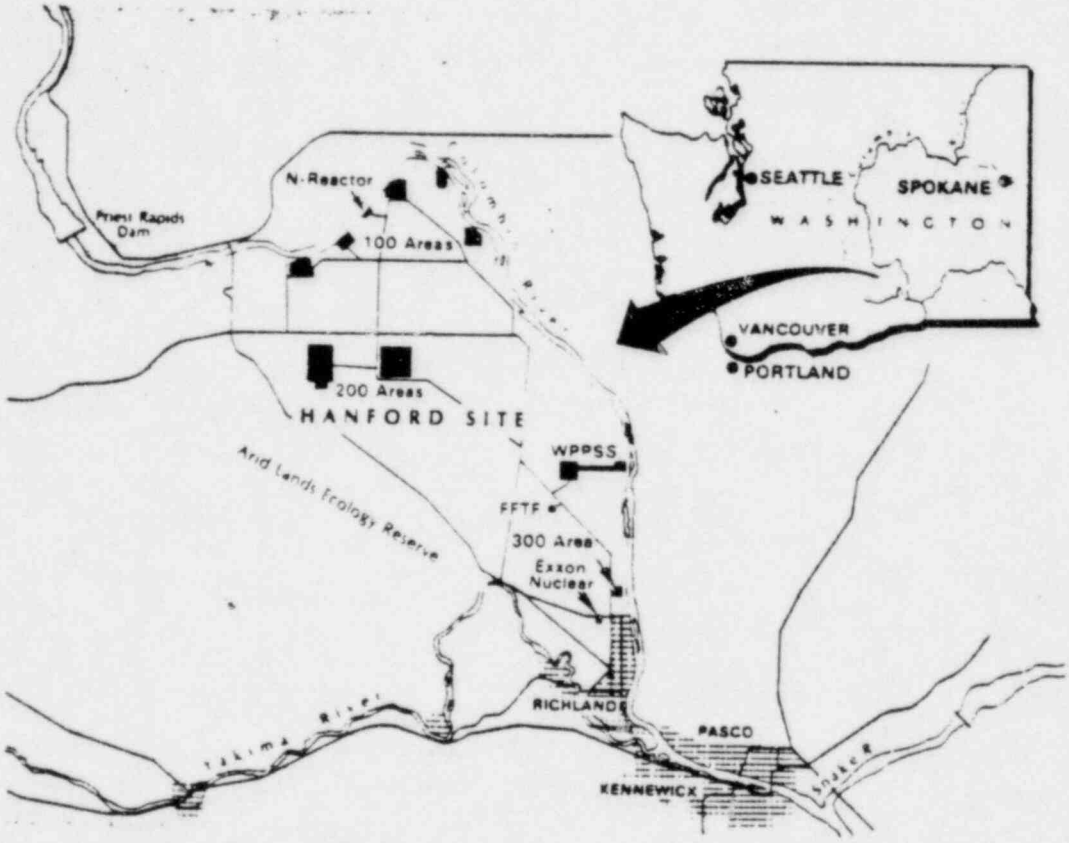

FIGURE 1. The Hanford Site Showing the 600 Area (Unshaded).*

*Eddy, P. A., Radiological Status of the Ground-Water Beneath the Hanford Project, January - December 1978, PNL-2899, Pacific Northwest Laboratory, Richland, Washington (1979).

FORMAT

FORMAT KEY

An explanation of the format used to present the lithologic logs is given below and followed by an example using Borehole 699-S6-E15B.

Borehole Designation (Other Borehole Designation):
Borehole Location:
Borehole or Ground-Surface Elevation:
Borehole Information:

Material (Source)	Thickness	Depth
Description	ft	ft

699-S6-E15B (DD-1)
Location: S6200, E14800 11/28-23G2
Casing Elevation: 363.0
Screw-feed core drill, for Corps of Engineers, 1957, foundation test boring

Material (5)	Thickness	Depth
Fine to medium sand	18	18
Sandy gravel w/cobbles	29	47
Conglomerate: poorly cemented	21	68

BOREHOLE DESIGNATION

Boreholes are designated according to the official numbering system for 600 Area Hanford facilities, which consists of three symbol groups separated by hyphens (XXX-XXX-XXX). The first symbol group for 600 Area boreholes consists of the number 99, which designates borehole structures, preceded by the number six to identify the area in which the borehole is located. The second and third symbol groups designate the nearest Hanford plant coordinate expressed in thousands of feet; the northing is the second symbol group and the easting is the third symbol group. For example, a borehole located at plant coordinates N36,350,W60,744 would

be designated 699-36-61. Boreholes located south and/or east of the plant coordinate axes are prefixed by "S" for the northing and "E" for the easting (e.g., 699-S30-E15). Multiple boreholes with the same borehole number are distinguished by a letter following the third symbol group, starting with the letter "A" and continuing in alphabetical order (i.e., 699-S30-E15A).

In parentheses following the official Hanford borehole designation are other borehole designations commonly used by Hanford contractors or Hanford-based companies. Cross-references of other borehole designations to the official Hanford designations are given in Appendix A.

BOREHOLE LOCATION

Borehole locations in the 600 Area are given in the Hanford Plant Coordinate System and the Congressional Land Grid System. Hanford plant coordinates can be computed to the statewide Lambert Coordinate System using the equation given in Equations 1 and 2. Location of 600 Area boreholes are given on Plates 1 and 2.

$$N_L = 405{,}302.04 - W_H \sin\theta + N_H \cos\theta \quad (1)$$

$$E_L = 2{,}295{,}325.01 - W_H \cos\theta - N_H \sin\theta \quad (2)$$

where

$\theta = 0° - 8$ min $- 49.577$ sec

N_H = northing on Hanford Plant grid

W_H = westing on Hanford Plant grid

N_L = northing on Washington State grid

E_L = easting on Washington State grid.

Hanford Plant Coordinate System

The Hanford Plant Coordinate System is a rectangular grid system established in 1943 to serve as a local construction base (Figure 2). Two points along the Cold Creek Road in the central Hanford Site were used as the original baseline. The most easterly point was arbitrarily designated N50000,W50000 (50,000 ft north and 50,000 ft west of an arbitrary origin). The direction to the westernmost point was designated due west. From this base, coordinates and monuments were established by surveys to the various facilities on the Hanford Site (Figure 3). Hanford Plant Coordinates given in this data catalog are reported to the nearest foot.

Congressional Land Grid

A modification of the Congressional Land Grid System used by the U.S. Geological Survey to locate boreholes is also given following the Hanford plant coordinates. The modified Congressional Land Grid uses the rectangular system for the subdivision of public lands to locate boreholes. This system is illustrated in Figure 3 using Borehole 699-32-32 and the U.S. Geological Survey location of 12/27-17J1. For that borehole, the numerals preceding the hyphen (12/27) indicate the township and range north and east of the Willamette meridian and baseline for Washington State, respectively. The first numeral after the hyphen (17) indicates the square-mile section in which the borehole is located, and the capital letter (J) indicates the 40-acre tract within that section. Within each 40-acre tract, the boreholes are numbered serially according to the order of well inventory.

BOREHOLE ELEVATION

Elevations are given in feet above mean sea level and are specified as either casing elevation or ground-surface elevation. Elevations reported are as follows:

- Accurately known from survey data and given to the nearest 0.1 or 0.01 ft

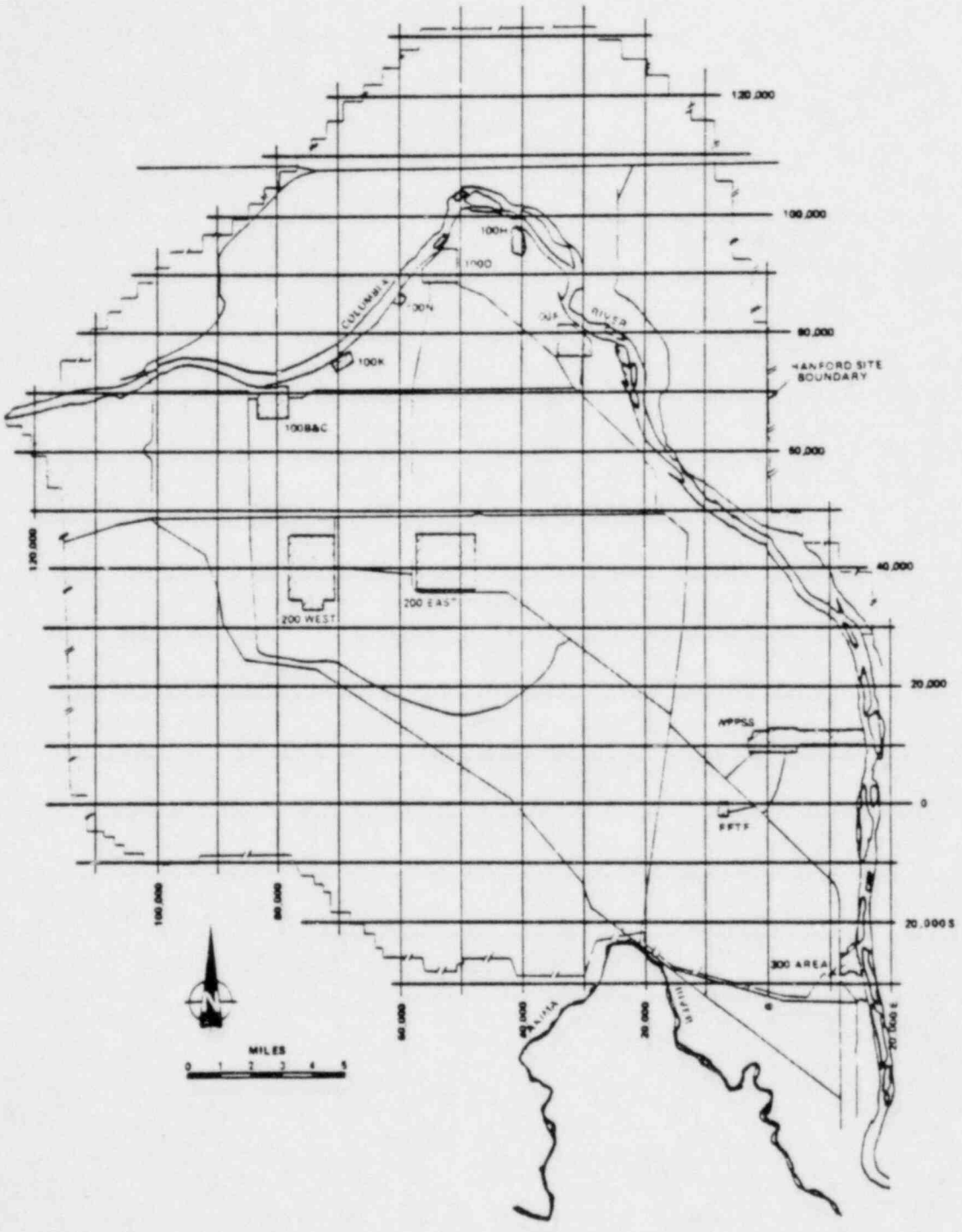

FIGURE 2. Hanford Plant Coordinate System.

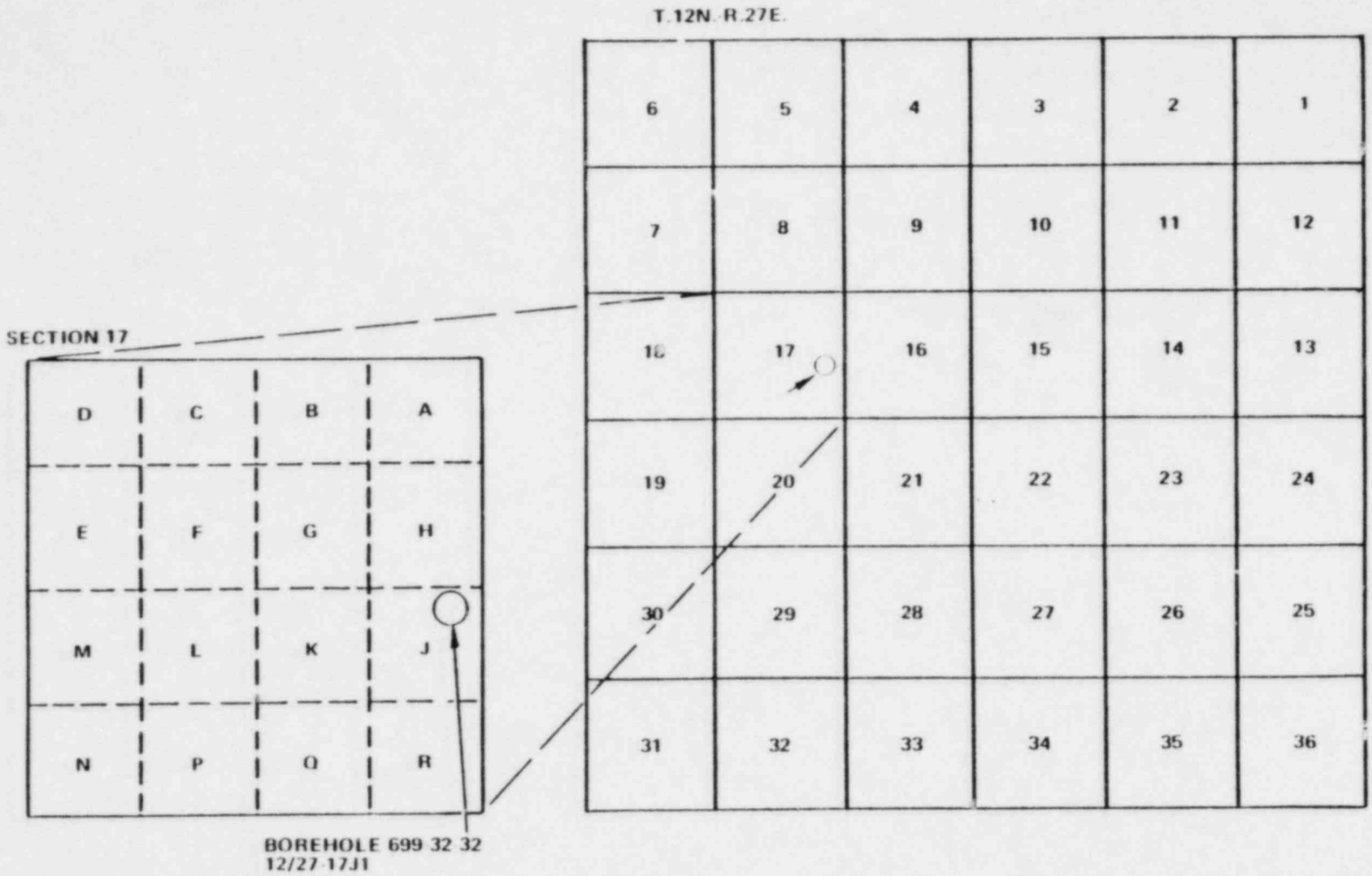

FIGURE 3. Modified Congressional Land Grid System for Locating Borehole 699-32-32 (12/27-17J1).

- Estimated to the nearest foot, if known within ±2 ft of true elevation
- Approximated from 1:62,500 U.S. Geological Survey topographic maps covering the Hanford Site.

Approximated elevations are preceded by the symbol "~."

BOREHOLE INFORMATION

Pertinent borehole information is given to supplement borehole information given in McGhan and Damschen (1979). Pertinent borehole information presented in this report includes:

- Drilling method
- Driller and drilling company*
- Borehole logger
- Original borehole owner
- Year of borehole completion
- Borehole use.

LITHOLOGIC LOGS

Lithologic logs given in this report are summarized from numerous published and unpublished sources listed on the following pages. The number preceding the source agency or source document in the table are keyed to the number in parentheses following the word "Material" in the log heading.

Descriptions of the material penetrated by the borehole follow the original descriptions as closely as possible; interpretations were avoided. Original lithologic logs were used in preference to condensed or interpreted logs except when original logs could not be found. Depth from the ground surface and thickness for each described unit are given in feet. Abbreviations, acronyms, and symbols used in log descriptions are listed in Appendix C.

*A listing of drilling companies having drilled boreholes on the Hanford Site is given in Appendix B.

SOURCE AGENCIES AND SOURCE DOCUMENTS

1. Environmental Analysis and Monitoring Department, Rockwell Hanford Operations; and Water and Land Resources, Pacific Northwest Laboratory; both Richland, Washington - Drillers' logs on file.

2. Basalt Waste Isolation Project, Rockwell Hanford Operations, Richland, Washington - Drillers' logs on file.

3. Blume, J. A. and Associates (1971), Subsurface Geologic Investigations for the FFTF Project in Pasco Basin, JABE-WADCO-07, Westinghouse Atomic Development Company, Richland, Washington.

4. Newcomb, R. C., J. R. Strand, and F. J. Frank (1972), Geology and Ground-Water Characteristics of the Hanford Reservation of the U.S. Atomic Energy Commission, Washington, U.S. Geological Survey Professional Paper 717.

5. Corps of Engineers, Seattle District - Drillers' logs on file.

6. Bechtel Corporation (1970), Site Investigation Report for the Fast Flux Test Facility, Richland, Washington, for the U.S. Atomic Energy Commission, BCL-1701, San Francisco, California.

7. Summers, W. K. (1977); FFTF Well No. 3, W. K. Summers and Associates, Socorro, New Mexico.

8. Washington Public Power Supply System (1980), Final Safety Analysis Report WPPSS Nuclear Project No. 2, Washington Public Power Supply System, Inc., Richland, Washington.

9. Hart, D. H. (1958), Tests of Artesian Wells in the Cold Creek Area, Washington, U.S. Geological Survey Open - File Report.

10. Corps of Engineers, Walla Walla District, Walla Walla, Washington - Drillers' logs on file.

11. Northwest Energy Systems Company headed by Puget Power and Light Company, Seattle, Washington - Lithology logs on file.

12. Hart, D. H. and F. J. Frank (1954), Aquifer Evaluation Test in the Gable Mountain Area, U.S. Geological Survey Open - File Report.

13. Fennix and Scisson, Inc. (1976), Ringold Identification, Correlation, and Sampling Program, Well History DH-6, 7, 8, 9, 9A, and 9B, Hanford Works, Richland, Washington, ARH-C-13, Atlantic Richfield Hanford Company, Richland, Washington.

14. Webster, C. T. (1977), Ringold Identification, Correlation, and Sampling Program, Well History DH-11, 12, 13, 13A, 14, 15, 16, 17, Hanford, Works, Richland, Washington, RHO-LD-34, Rockwell Hanford Operations, Richland, Washington.

15. Bechtel Corporation (1971), Final Soil Investigation Report for the Fast Flux Test Facility, Richland, Washington, for the United States Atomic Energy Commission, TID-25934, San Francisco, California.

16. Hanford Engineering Development Laboratory, Richland, Washington - Drillers' logs on file.

17. Atlantic Richfield Hanford Company (1976), Preliminary Feasibility Study on Storage of Radioactive Waste in Columbia River Basalts, ARH-ST-137, Atlantic Richfield Hanford Company, Richland, Washington.

18. Walters, K. L. and M. J. Grolier (1960), Geology and Ground Water Resources of the Columbia Basin Project Area, Washington, Water Supply Bulletin No. 8, Washington State Department of Conservation.

19. U.S. Water and Power Resources Service, formerly U.S. Bureau of Reclamation, Ephrata, Washington - Drillers' logs on file.

20. U.S. Geological Survey, Tacoma, Washington - Drillers' logs on file.

21. Fennix and Scisson, Inc. (1974), Basalt Aquifer Identification, Correlation, and Sampling Program, Well History DB-1, 2, 4, 5, 7, Hanford Works, Richland, Washington, Fennix and Scisson, Inc., Richland, Washington.

22. Fennix and Scisson, Inc. (1972), Hole History Core Holes DH-4 and DH-5, Hanford Works, Richland, Washington, Fennix and Scisson Inc., Richland, Washington.

23. Fennix and Scisson, Inc. (1969), Completion Report Exploratory Hole ARH-DC-1, Hanford Works, Richland, Washington, Fennix and Scisson, Inc., Tulsa, Oklahoma.

24. Fennix and Scisson, Inc. (1972), Recovery and Completion Report Hole ARH-DC-1, Hanford Works, Richland, Washington, Fennix and Scisson, Inc., Richland, Washington.

25. Fennix and Scisson, Inc. (1978), Hole History Core Hole DC-11, Hanford, Washington, RHO-BWI-C-9, Rockwell Hanford Operations, Richland, Washington.

26. Fennix and Scisson, Inc. (1977), Hole History Core Hole DC-10, Hanford, Washington, RHO-BWI-C-8, Rockwell Hanford Operations, Richland, Washington.

27. Fennix and Scisson, Inc. (1978), Hole History Rotary Hole DC-5, Hanford, Washington, RHO-BWI-C-7, Rockwell Hanford Operations, Richland, Washington.

28. Fennix and Scisson, Inc. (1977), Hole History Rotary Hole DC-3, Hanford, Washington, RHO-C-11, Rockwell Hanford Operations, Richland, Washington.

29. Fennix and Scisson, Inc. (1977), Hole History Rotary Hole DC-7, Hanford, Washington, RHO-C-1, Rockwell Hanford Operations, Richland, Washington.

30. Fennix and Scisson, Inc. (1977), Hole History Core Hole DC-2, Hanford, Washington, RHO-C-10, Rockwell Hanford Operations, Richland, Washington.

31. Fennix and Scisson, Inc. (1978), Drilling History Core Hole DC-4, Hanford, Washington, RHO-BWI-C-40, Rockwell Hanford Operations, Richland, Washington.

32. Fennix and Scisson, Inc. (1978), Hole History Core Hole DC-6, Hanford, Washington, RHO-BWI-C-13, Rockwell Hanford Operations, Richland, Washington.

33. Fennix and Scisson, Inc. (1978), Hole History Core Hole DC-8, Hanford, Washington, RHO-BWI-C-29, Rockwell Hanford Operations, Richland, Washington.

34. Green, J. (1980), Economic Geology Study and Resource Potential of the Pasco Basin, Washington and Vicinity, ESCA-TECH Corporation, Costa Mesa, California.

35. Washington State Department of Ecology, Olympia, Washington - Drillers' logs on file.

36. Webster, C. T. (1979), Basalt Aquifer Identification, Correlation, and Sampling Activities, History of Wells DB-8, DB-9, DB-10, and DB-11, RHO-LD-96, Rockwell Hanford Operations, Richland, Washington.

37. Washington Public Power Supply System (1973), Preliminary Safety Analysis Report WPPSS Nuclear Project No. 1, Amendment 5, Washington Public Power Supply Systems, Inc. Richland, Washington.

ACKNOWLEDGEMENTS

Thanks are expressed to the many individuals and companies who provided borehole information for this catalog. These include E. T. Bailey of U.S. Army Corps of Engineers for providing lithologic logs; R. W. Cross and W. H. Crowley of Rockwell Hanford Operations for preparing illustrations; P. A. Eddy and C. S. Cline of Pacific Northwest Laboratory for determining Hanford plant coordinates; W. A. Kiel of Washington Public Power Supply System for providing borehole data; D. Hedrick of Golder Associates for providing preliminary lithologic logs; R. K. Ledgerwood of Rockwell Hanford Operations for providing lithologic logs and borehole data; V. L. McGhan of Pacific Northwest Laboratory for providing drillers' logs and borehole data; and D. Newman of U.S. Water and Power Resources Service for providing lithologic logs.

BOREHOLE LITHOLOGIC LOGS

699-S31-1
Location: S30600, W725 10/28-17B1
Casing Elevation: 460.11
Cable tool, drilled by Stanbery & Robinson of the USGS for the GE Company, 1951, groundwater monitoring borehole

Material (4)	Thickness	Depth
Sand, fine to coarse	16	16
Sand, pods of clay	5	21
Sand, w/gravel	52	73
Quartz & exotic sand	12	85
Sand w/gravel	43	128
Gravel w/sand	4	132
Sand, w/some gravel	16	148
Sand w/gravel	37	185
Silt, clayey	36	221
Columbia River basalt: Wanas basalt	7	228

699-S30-E15A
Location: S30257, E14838 10/28-14G1
Casing Elevation: 400.39
Cable tool, drilled by Evans of Hatch Drilling Company for ARHCO, 1971, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel 1/4 in. to boulders	9	9
Sand & 1/4 in. gravel to cobbles	11	20
Coarse to fine black sand & 1 1/2 in. gravel	15	35
Coarse black sand to fine sand, & 1 in. gravel	5	40
Coarse black sand to fine sand w/coarse gravel	10	50
Coarse black sand w/ coarse gravel	4	54
Coarse black sand & gravel & boulders	1	55
Black sand	5	60
Black sand coarse to fine w/ 1 1/2 in. gravel	5	65
Fine brown sand w/coarse black sand & silt w/2 in. gravel	3	68
Fine brown sand w/silt & some 4 in. gravel	7	75
Fine brown sand	5	80

699-S30-E15C (DDH-3)
Location: S30383, E15232 10/28-14G3
Casing Elevation: 401.74
Cable tool (to 219 ft.) & diamond coring, drilled by Smith & Wilcox of Haden Drilling Company for GE Company & Boyles Brothers Drilling Company for ARHCO, 1970, groundwater monitoring borehole & bedrock geology investigation borehole

Material (1, 17)	Thickness	Depth
Brown sand fine	2	2
Cemented gravel & 10 in. minus cobbles	1	2
Cemented gravel w/little sand, dark gray in color	3	5
Cemented gravel & cobbles w/ trace of sand	5	10
Cemented grout & cobbles w/ trace of sand	5	15
Cemented 2 in. minus gravel w/ coarse black sand, color dark gray to black	5	20
4 in. minus gravel w/some coarse black sand & a trace of brown sand	5	25
Lightly cemented 3 in. minus gravel w/sand, color gray	5	30
3 in. minus gravel w/coarse sand & some finer sand	5	35
2 1/2 in. minus gravel & coarse sand w/little fine sand	5	40
Coarse sand w/2 1/2 in. minus gravel, trace of fine sand	5	45
3 in. minus gravel w/little sand	5	50
2 1/2 in. minus gravel w/trace of sand	5	55
2 1/2 in. minus gravel w/trace of sand, color of material gray	5	60
2 in. minus gravel w/coarse & fine sand	5	65
3 in. minus gravel w/some sand, material has a light brown color	5	70
1 1/2 in. minus gravel w/ coarse & fine sand, water color light brown	5	75
1 1/2 in. minus gravel w/some coarse & fine sand, water color light brown	5	80
1 in. minus gravel w/some coarse & fine sand, trace of silt, water color brown	5	85
1 1/2 in. minus gravel tightly packed w/light brown & blue sand	5	90
2 in. minus gravel w/green sand & a little black clay, very tightl, packed.	5	95
3 in. minus gravel w/green sand & a little black clay, very tightly packed	5	100
2 1/2 in. minus gravel w/green sand very tightly packed	5	105
2 in. minus gravel w/green sand very tightly packed	5	110
3 in. minus gravel w/little light gray sand, very tightly packed	5	115
3 1/2 in. minus gravel & white & gray sand	5	120
Greenish blue clay w/some pebbles in it (silty)	5	125
Greenish blue clay w/small pebbles & a little silty	5	130
Fine green sand w/some hard lumps of sand	5	135
3 in. minus gravel w/green sand	5	140
2 in. minus gravel w/fine sand & coarse sand	5	145
1 in. minus gravel w/fine sand & some coarse sand	5	150
4 in. minus gravel w/some greenish blue sand	5	155
1 in. minus gravel w/greenish blue sand, very tightly packed	5	160
Clayey silt	5	165
Silt & clay, dark brown	5	170
Silt & clay w/stray 1 in. gravel dark brown	5	175

Silt & clay w/blue tint to ft	20	195
2 in. minus pits of soft basalt w/coarse sand & blue clay	5	200
Basalt gravel & coarse sand w/ some clay	5	205
Basalt bedrock w/sand	5	210
Basalt bedrock	5	215
Basalt	69	284
Tuffaceous sandstone	39	323
Basalt	31	354
Altered rubble	8	362
Basalt	105	457
Tuffaceous sandstone	17	474
Black clay	1	475
Tuffaceous sandstone	8	487
Basalt	184	671
Sandstone	6	677
Highly altered rubble zone	23	700
Basalt	68	768
Clay	2	770
Altered tuff	72	842
Altered vesicular rubble zone	16	866
Basalt	253	1,119
Brown clay	17	1,136
Sandstone	8	1,144
Tuffaceous sandstone	14	1,158
Vesicular rubble zone	12	1,170
Basalt	124	1,294
Intermixed clay & sandstone, coal fragments	25	1,319
Basalt	125	1,544
Reddish oxidation zone	8	1,552
Basalt	8	1,560
Altered rubble zone	10	1,570
Basalt	1,970	3,540

699-S29-E12
Location: S29395, E12065 10/28-15A1
Casing Elevation: 387.97
Cable tool, drilled by Evans of Hatch Drilling Company, 1971, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & cobbles	3	3
Brown & black sand w/boulders & gravel	6	9
Black sand coarse, & gravel & cobbles	8	17
Coarse black sand & gravel & boulders	3	20
Black sand & gravel & cobbles	10	30
Black coarse sand & gravel	15	45
Brown sand fine to 1 1/2 in.-gravel	5	50
Fine brown sand & 1 1/2 in.-gravel w/some silt	13	63
Fine brown sand w/very little gravel	2	65
Brown sand & some silt & 1 1/2 in.-gravel	10	75
Brown sand with some 1 1/2 in.-gravel & traces of silt	5	80

699-S27-E14
Location: S27288, E13593 10/28-11L1
Casing Elevation: 399.77
Cable tool, drilled by Row, Chausse & Rumley of the USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Top soil (sandy loam), brown blow sand	5	5
Gravel & sand, boulders up to 10 in.	6	11
Boulders & sand	4	15
Coarse black basalt sand, gravel	9	24
Black basalt sand, coarse	6	30
Black basalt fine sand	5	35
Black sand & basalt	10	45
Black coarse to fine basalt sand some small gravel	10	55
70% marble size gravel, 30% sand & shale	10	65
Fine gray sand	6	71
60% gravel, all colors, fine to marble size, 40% coarse to fine gray sand. Lots of black basalt gravel & sand	7	78
Fine to coarse gray sand	3	81
Clay, sand, gravel	11	92
Shale, gravel; gravel is large marble size, binder is more like volcanic mud than shale	11	103
Shale on volcanic mud, sand, gravel the size of hen's egg	3	106
Shale on volcanic mud, more sand, less gravel, marble size	6	112
Shale, sand, gravel	6	118
Green shale	2	120
Gravel, sand	1	121
Blue shale	1	121
Gravel, sand	2	123
Blue shale	1	123
Gravel, sand	2	125
Blue shale	2	127
Gravel, sand; very fine gray sand filled up hole	2	129
Blue shale, sand	1	130
Very fine sand, pea gravel, blue shale	5	135
Shale, sand & gravel	5	140
Gray sand, gravel, shale; runs back up pipe	5	145
Fine gray sand, gravel, shale; runs back up pipe	7	152
Fine to coarse sand, gravel, shale; run back up pipe	6	158
Fine sand & gravel, clay	5	163
Green clay	2	165

699-S24-19
Location: S23965, W1874 10/27-2N1
Casing Elevation: 427.83
Cable tool, drilled by Row of the USGS, 1949, domestic water supply for gatekeeper at dam

Material (1)	Thickness	Depth
Top soil	1	1
Gravel, sand & silt; caves	3	4
Gravel, black sand & very little silt; very loose 15 to 18 ft.	14	18
Gravel, sand & silt (4 ft.), loose	6	24
Clay	1	25
Sand, silt & showing of clay	2	27
Fine white sand, some basalt chips & silt	7	34
Gravel	1	35
Fine sand, silt, & gravel	8	43
Blue shale	1	44
Coarse sand, basalt	2	46
Solid basalt	16	62
Black & white sand	3	65
Solid basalt	1	66
Sand & gravel	1	67

Solid basalt; very hard	15	80
Basalt, lode stone; magnetic force pulls bailer to side	2	83
Solid basalt	6	89

699-S23-26
Location: S22675, W25349 10/27-4K1
Casing Elevation: 424.70
Cable tool, 1944, domestic water supply

Material (4)	Thickness	Depth
Salt & silt	10	10
Gravel & sand	6	16
Basalt boulders	10	26
Coarse gravel, sand, quartz & basalt	3	29
Quartz, basalt, silt & sand	4	33
Silt, sand, yellow clay & green shale	5	38

699-S19-E13
Location: S19434, E12780 10/28-2D1
Casing Elevation: 394.65
Cable tool, drilled by Bignam of Hatch Drilling Company for ARHCO, 1971, groundwater monitor borehole

Material (1)	Thickness	Depth
75% fine brown sand, 25% silt	5	5
Brown fine sand, some silt	11	16
25% sand, 50% medium gravel, 25% small cobbles	9	25
30% sand, 40% gravel, 30% cobbles	20	45
20% sand, 70% gravel, 10% cobbles	20	65
40% sand, 60% gravel	5	70
30% sand, 70% gravel	6	76
10% silt, 40% sand, 50% gravel	4	80

699-S19-11
Location: S18738, W11013 10/27-1B1
Casing Elevation: 483.74
Cable tool, drilled by Bignam of Hatch Drilling Company for ARHCO, 1968, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand	40	40
Sand & silt	30	70
Sand & gravel	20	90
Gravel & cobbles	5	95
Sand & gravel	25	120

699-S18-E2A
Location: S18500, E2000 10/28-4D1
Casing Elevation: 434.85
Cable tool, drilled by Gaunt & Trantham of Jansen Drilling Company for GE Company, 1961, groundwater monitoring borehole

Material (1)	Thickness	Depth
Brown sand	10	10
Coarse gray sand	5	15
Coarse sand w/some gravel	5	20
Sand & gravel 1 in. & 2 in.	5	25
Gray & brown sand	5	30
Brown sand & some gravel	5	35
Brown silty sand	5	40
Brown silty sand, gravel 1 in.	5	45
Silt and sand, clay streaks, gravel & cobbles	5	50
Sand, gravel, cobble -6 in.	10	60
Sand & gravel, few cobbles	10	70
Firm sand & gravel, cobble	5	75
Sand & gravel	10	85
Sand, gravel, few large cobbles mixed in	5	90
Sand & gravel	10	100
Loose sand & gravel	10	110
Sand, gravel, few cobbles	5	115
Cemented gravel	40	155
Cemented gray sand & gravel	5	160
Gray cemented gravel	15	175
Light gray cemented gravel	5	180
Gray cemented gravel	20	200
Cemented gravel	5	205
Gray sandy silt	20	225
Gray silty sandy clay w/little pea gravel	14	244
Basalt; not too hard	1	245
Gray clay interbed	3	248
Black basalt	2	250
Basalt	5	255
Gray basalt	5	260

699-S18-E2B
Location: 435 10/28-4D2
Casing Elevation:
Cable tool, drilled by Mings of Hatch Drilling Company for RHO, 1977, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand	23	23
Sand & gravel	68	91
Gravel & sand (cemented)	65	156
Sand & gravel (cemented)	15	171
Gravel & sand	7	178
Sand & gravel (cemented)	13	191
Gravel & sand (cemented)	14	205
Gravel	5	210
Brown sticky clay	40	250
Sticky clay w/some gravel		250

699-S18-15
Location: 11/26-36N1
Casing Elevation: 1211.30
Cable tool, drilled by Durand Drilling Co. 1980, Emergency relocation center water supply well

Material (1)	Thickness	Depth
Cemented gravels	42	42
Basalt	58	100
Compact clay w/suspended rock (interbed)	56	156
Basalt	156	312
Broken pervious basalt	8	320
Basalt	15	335
Semi-hard, possibly pervious basalt	28	370
No record	630	1,000

699-S17-30A (DDH-1)
Location: 11/27-33M1
Casing Elevation: 469
Diamond boring, logged by Blume for ARCO, 1971, geologic investigation boring

Material (3)	Thickness	Depth
Alluvium	34	34
Basalt	10	44
Interbed	43	87
Basalt	22	109

699-S17-30B (DDH-2)
Location: 11/27-33M2
Casing Elevation: 467
Diamond coring, logged by Blume for WADCO, 1971, geologic investigation boring

Material (3)	Thickness	Depth
Alluvium	42	42
Basalt	2	44
Interbed	38	82
Basalt	25	107

699-S17-30C (DDH-3)
Location: 11/27-33M3
Casing Elevation: 464
Diamond coring, logged by Blume for WADCO, 1971, geologic investigation boring

Materials (3)	Thickness	Depth
Alluvium	39	39
Basalt	4	43
Interbed	36	79
Basalt	10	89

699-S16-24 (DB-7)
Location: S16279, W23534 11/27-34M1
Casing Elevation: 531.99
Diamond coring, drilled by Boyles Brothers Drilling Company & logged by Ledgerwood of ARHCO for ARHCO, 1974, bedrock geology investigation borehole

Material (2, 21)	Thickness	Depth
Basalt	26	26
Basalt	74	100
Sandstone, silty dark brown, loose green sand, micaceous	50	150
Basalt	196	346
Tuff, baked, black, vitric	18	364
Basalt	86	450
Lapilli tuff	4	454
Sand, medium to fine, w/clay	61	515
Basalt	143	778
Tuff, welded	4	782
Sandstone & tuffaceous sandstone w/clay	30	812

699-S17-25 (DDH-5)
Location: 11/27-33J1
Casing Elevation: 477
Diamond coring, logged by Blume for WADCO, 1971, geologic investigation borehole

Material (3)	Thickness	Depth
Alluvium	27	27
Basalt	6	33
Interbed	45	78
Basalt	7	85

699-S17-24 (DDH-6)
Location: 11/27-34M2
Casing Elevation: 502
Diamond coring, logged by Blume for WADCO, 1971, geologic investigation borehole

Material (3)	Thickness	Depth
Alluvium	2	2
Basalt	69	71
Interbed	43	114
Basalt	2	116

699-S17-28 (DDH-4)
Location: 11/27-33L1
Casing Elevation: 477
Diamond coring, logged by Blume for WADCO, 1971, geologic investigation borehole

Material (3)	Thickness	Depth
Alluvium	37	37
Basalt	21	58
Interbed	76	134
Basalt	11	145

699-S14-20A
Location: S14491, W19739 11/27-34A1
Casing Elevation: 492.74
Cable tool, drilled by Rodda of Bach Drilling Company for GE Company, 1958, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	100	100
Sand & gravel	15	115
Tan sand	5	120
Sand & gravel, w/cobbles at 135 ft., blue, turning to gray as go deeper	30	150
Coarse white sand	5	155
Sand & gravel	5	160
Basalt	5	165
Gray basalt, hard; getting grayer and harder as it goes deeper	7	172

699-S14-20B
Location: 11/27-34A2
Casing Elevation: 493
Air rotary, drilled by Aqua Drilling & Development Company & logged by Hodge of & for RHO, 1976, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand w/small amount gravel	25	25
Medium fine sand	30	55
Fine sand & silt	35	90
Medium to fine sand	20	110
No record	50	160

699-S14-20C
Location: 11/27-34A3
Casing Elevation: ~493
Air rotary, drilled by Aqua Drilling & Development Company & logged by Hodge of & for RHO, 1976, hydrologic investigation borehole

Material (1)	Thickness	Depth
Medium to fine sand	55	55
Fine sand & silt	30	85
Medium to fine sand	25	110
No record	50	160

699-S13-8B (Horseshoe #1)
Location: 11/25-27N1
Casing Elevation: ~2750
Cable tool, drilled & logged by Hunt, 1941, gas well

Material (34)	Thickness	Depth
Soil	3	3
Basalt	2	5
Basalt, hard	13	18
Basalt, gray	15	37
Basalt, gray	17	50
Shale	30	80
Shale, black	10	90
Black rock	36	126
Basalt, gray	104	230
Basalt	54	284
Basalt, black.	4	288
Shale, blue	75	303
Shale, brown	1	304
Shale, yellow	1	305
Shale, gray	7	312
Silicate, sticky ?	3	315
Clay, white very sticky	10	325
Basalt	1	326
Shale, white	10	336
Shale, blue	24	360
Shale, green	1	361
Basalt	1	362
Basalt, porous	4	371
Basalt	68	443
Basalt & iron	2	445
Sand, dark	5	450
Basalt, broken & conglomerate	2	452
Basalt, gray	5	457
Basalt, gray, broken & crevisy	3	460
Basalt	5	465
Basalt, black, broken	4	469
Shale, black	6	475
Basalt, black, porous	18	497
Basalt, gray, hard	3	500
Basalt, black	3	503
Basalt, gray	5	508
Basalt, brown, porous	7	515
Basalt, gray	5	520
Basalt, black; hard, porous	5	525
Basalt, black; hard, porous	7	532
Conglomerate	3	535
Basalt, black, porous	10	545
Basalt, gray; hard	5	550
Basalt, black; porous	16	566
Basalt, yellow; hard	1	567
Basalt, black	2	569
Basalt, gray; hard	5	574
Sand, black (air pocket)	1	575
Sand, black; basalt	3	578
Basalt, gray; hard	1	579
Sand, black; hard, more air	5	584
Basalt, gray; hard	11	595
Basalt, black; porous	5	600
Basalt, brown	2	602
Shale, blue; cavity, lost water	3	605
Basalt, black; porous	2	607
Basalt, black; firm	33	640
Sand, soft; black	3	643
Basalt, gray; hard	17	660
Drilling up sand; pump	4	664
Basalt, black	25	689
Basalt, black	10	699
Basalt, black; porous	41	740
Basalt, black; hard	25	765
Basalt, gray; hard	21	786
Basalt, gray; porous	57	843
Basalt, gray; hard	20	863
Basalt, gray; porous	68	935

699-S12-3
Location: S12225, W2700 11/28-29N1
Casing Elevation: 435.32
Cable tool, drilled by the USGS for GE Company, 1951, groundwater monitoring & geologic investigation borenole

Material (4)	Thickness	Depth
Sand, very fine to medium, buff, basaltic & exotic, & 25% silt	4	4
Sand & some gravel; fine to coarse sand, but predominantly coarse, is equally basaltic & exotic rock types in coarser sizes & mainly siliceous in finer; the 15% granule & pebble gravel is predominantly basalt	40	44
Sand, fine to coarse but largely coarse quartz; exotic rock types make up about 80-90% of deposit; 10% is silt	8	52
Sand & gravel; medium to coarse tan-white quartzose sand having 10% granule and pebble gravel that is 70% exotics and 30% basalt	8	60
Sand, gravelly, fine to coarse, mainly medium, siliceous sub-rounded sand carrying 35% granule & pebble gravel that is 75% exotic rock types	9	69
Sand, fine to coarse in various beds, exotic rock types & quartz; 10% granule & pebble gravel is 70% exotic rock types, some silt is present	39	108
Clay, silty, blue-green & plastic when wet, grayish-green when dry	2	110

699-S12-29
Location: S11694, W29467 11/27-28M1
Casing Elevation: 487.68
Cable tool, drilled by Wilcox & Smith of Haden Drilling Company for GE Company, 1962, groundwater monitoring borenole

Material (1)	Thickness	Depth
Medium & fine sand, trace of silt light gray w/tan film	50	50
Medium w/fine sand, trace of silt, gray	5	55
Medium w/fine sand, 1 in. gravel, trace of silt, gray	5	60
Hard cemented gravel w/trace of silt, gray; basalt gravel	15	75
Basalt gravel w/silt dark gray	10	85
Rotten basalt gravel w/silt, dark gray	5	90
Basalt gravel w/silt, dark gray; material changed at 95 ft. got lots easier	15	105
Fine cutting of basalt & fine sand	5	110
Fine cuttings of basalt w/trace of fine sand	10	120
Sand	4	124
Light blue clay w/trace of shale	1	125
Light blue clay w/fine sand	5	130
Blue shale clay, trace of sand & caliche	5	135

Sand w/blue shale clay & caliche material, gray in color	5	140
Very tightly packed sand w/ caliche & bit of basalt gravel blue gray	5	145
Very tightly packed sand w/bit of basalt gravel & clay or caliche	10	155
Shale clay & caliche, light blue in color	5	160
Light blue clay w/trace of shale & caliche	5	165
Blue clay & clay w/trace of shale & caliche	5	170
Changed to a brown & blue shale & caliche, trace of basalt	8	178
Basalt w/trace of shale, hit hard basalt at 178 ft.	12	190

699-S11-E12A
Location: S10692, E12261 11/28-27J1
Casing Elevation: 365.87
Cable tool, drilled by Hatch of Hatch Drilling Company for GE Company, 1960, groundwater monitoring borehole

Material (1)	Thickness	Depth
Small gravel, sand & silt	5	5
Gravel to 4 in., cleaner	5	10
Gravel to 3 in., sand & silt	5	15
Gravel at 6 in.	10	25
Gravel w/silt	5	30
Clean gravel to 3 in.	5	35
Gravel 3 in. & black sand	5	40
Basalt gravel	11	51
Clean black sand	4	55
Blue sand, some small gravel	5	60
Sand & gravel to 1/2 in., blue	20	80
Sand & gravel to 3 in.	5	85
Sandy gravel to 3 in.	15	100
Gravel	10	110
Clay & silt	30	140
Blue clay silt & gravel	5	145
Blue clay, and & silt & gravel	20	165
Black gravel & blue sand & silt	5	170
Blue clay, sand & silt	15	185
Brown clay, sand, & silt	10	195
Brown clay, silt & sand w/ gravel	5	200
Blue clay, sand & silt	5	205
Black gravel, blue clay.	20	225
Basalt gravel, blue clay	11	236
Basalt (hit solid basalt at 236 ft., out of it at 240 ft.	4	240
Green clay, sand & silt	15	255
Clean green & black sand	5	260
Basalt gravel & sand	5	265
Weathered basalt	5	270
Basalt	13	283

699-S11-E12B
Location: S10965, E12035 11/28-27J2
Casing Elevation: 365
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Gravel & boulders-large boulders & loose	20	20
Gravel & boulders-large boulders	15	35
Cemented gravel w/boulders	10	45
Soft sandstone	5	50
Sand & fine gravel, wood	15	65
Sand, clay, gravel	3	68
Clay, blue	4	72
Boulders & gravel	8	80
Large boulders & gravel & sand	15	95
Cement gravel w/small boulders	15	110
Cemented gravel, boulders 8 in.	15	125
Silk clay	17	142
Gravel & boulders	7	155
Gravel & boulders w/little clay	15	170
Large boulders w/cement gravel	12	182
Silk clay	33	215
Basalt	<1	215

699-S9-63B
Location: S8850, W63170 11/26-2981
Casing Elevation: 1420.01
Rotary, drilled for Walla Walla Oil, Gas & Pipeline Company, 1939, gas well

Material (35)	Thickness	Depth
Cement gravel	40	40
Broken rock	45	85
Hardpan	10	95
Broken rock	80	175
Rock	13	188
Plaster of paris	28	216
Basalt	5	221
Clay & broken rock	31	252
Porous basalt	14	278
Gray basalt	6	284
Cavey basalt	5	289
Gray basalt	23	312
Blue basalt	7	319
Gray basalt	1	320
Blue basalt	10	330
Gray basalt	74	404
Porous gray basalt	14	418
Blue basalt	16	434
Water rock & gravel	3	437
Porous basalt	4	441
Gray basalt	12	453
Gray basalt	5	458
Hard gray basalt	2	460
Gray basalt	2	462
Gray basalt	2	464
Gray basalt	12	476
Basalt	8	484
Gray basalt	4	488
Blue basalt	84	572
Gray basalt	3	574
Porous gray basalt	20	594
Gray basalt	58	652
Hard gray basalt	8	660
Gray basalt	1	661
Hard gray basalt	2	663
Gray basalt	39	702
Shale & sand	14	716
Shale	12	728
White quartz sand	10	738
Shale	12	750
Shale & sand	10	760
Shale	5	765
Shale & sand	10	775
Porous rock & hard basalt	6	781
Porous rock & gas	7	788
Black basalt	3	791
Porous basalt & gas	9	800
Black basalt	3	803
Black porous basalt	3	806
Hard black basalt	1	807

Basalt	2	809
Hard basalt	1	810
Hard black basalt	1	811
Black basalt	5	816
Gray basalt	40	856
Hard gray basalt	1	857
Gray basalt	12	869
Hard gray basalt	3	872
Gray basalt, showing of volcanic ash	1	873
Hard gray basalt	7	880
Porous basalt, volcanic ash	8	892
Porous gray basalt, some volcanic ash	6	904
Porous black basalt	14	918
Gray basalt	36	954
Hard gray basalt	32	986
Porous gray basalt	5	991
Solid gray basalt	1	992
Porous gray basalt, streaks of volcanic ash	7	999
Hard gray basalt	30	1,029
Porous basalt & shale stringers	2	1,031
Gray basalt, showing of shale	8	1,039
Gray basalt	10	1,049
Porous basalt	2	1,051
Hard gray basalt	5	1,066
Porous basalt	2	1,068
Gray porous basalt	2	1,070
Hard gray basalt	44	1,114
Broken gray basalt	5	1,119
Hard gray basalt	64	1,183
Porous basalt w/hard seams	14	1,197
Gray basalt	8	1,205
Hard basalt	5	1,210
Hard gray basalt	25	1,235
Basalt	7	1,242
Gray basalt	3	1,251
Porous basalt	4	1,257
Gray basalt	35	1,302
Hard basalt	7	1,309
Porous gray basalt	15	1,324
Solid gray basalt	3	1,327
Basalt	9	1,336
Hard basalt	19	1,355
Porous basalt	15	1,370
Gray basalt	38	1,408
Hard gray basalt	27	1,435
Porous basalt	4	1,439
Hard basalt & gray basalt	76	1,515
Porous basalt	25	1,540
Gray basalt	24	1,564
Porous gray basalt	24	1,588
Gray basalt	29	1,617
Porous basalt	29	1,646
Gray basalt, porous	11	1,657
Gray basalt	4	1,661
Porous basalt	12	1,673
Gray basalt	8	1,681
Hard basalt	5	1,686
Hard gray basalt	44	1,730
Porous basalt	17	1,747
Black basalt	20	1,767
Hard gray basalt	1	1,768
Gray basalt porous	30	1,798
Porous basalt	4	1,802
Gray basalt	4	1,806
Gray basalt	61	1,867
Hard basalt	3	1,870
Basalt, gray, black, blue	573	2,443
Sandstone	39	2,482
Basalt, gray, black	473	2,955
Shale	10	2,965
Basalt, black & gr	695	3,660

699-59-56 (Goodwin #1)
Location: S9200, W55600 11/26-27D1
Casing Elevation: +1120
Cable tool (to 295 ft.) & rotary (?), drilled by Seattle-Inland Empire Company, 1920, gas well

Material (10)	Thickness	Depth
Soil & gravel	18	18
Hard basalt	117	135
Soft yellow sandstone	45	180
Basalt, black, gray	457	637
Shale	70	707
Porous basalt - gas	45	752
Gray basalt	70	822
Porous basalt - gas	10	832
Gray basalt	13	845
Porous basalt - gas	8	853
Gray basalt	46	899
Porous basalt - gas	21	920
Gray basalt	139	1,059
Basalt	32	1,091
Red porous basalt	5	1,096
Basalt	4	1,100
Porous basalt	10	1,110
Basalt	37	1,147
Porous basalt	9	1,156
Basalt	55	1,211
Porous basalt	25	1,236
Basalt	47	1,283
Porous basalt	43	1,326
Basalt	77	1,403
Porous basalt	20	1,423
Basalt	93	1,516
Porous basalt	6	1,522
Volcanic conglomorate	12	1,534
Basalt	17	1,551
Porous basalt	4	1,555
Shale	9	1,564
Porous basalt	19	1,583
Basalt	67	1,650
Black mud or shale	10	1,660
Basalt	10	1,670
Basalt	20	1,690
Shale	25	1,715
Basalt	231	1,946
No record	182	2,128

699-58-19
Location: S8336, W18720 11/27-28D1
Casing Elevation: 503.81
Cable tool, drilled by Stanbery & Robinson of the USGS for GE Company, 1950, groundwater monitoring & geologic investigation borehole

Material (4)	Thickness	Depth
Sand	19	19
Sand w/clayey silt	5	24
Sand w/gravel	3	27
Sand, fine to coarse	5	32
Sand w/gravel	8	40
Sand	27	67
Sand w/gravel	9	76
Gravel w/sand	7	83
Sand	9	92
Gravel w/sand	8	100
Sand w/gravel	7	107
Sand, medium to coarse	5	112
Sand & gravel	27	139
Sand, fine to medium	4	143
Sand w/gravel	5	148

699-S7-E15 (CD-17)
Location: S7100, E15000 11/28-23Q1
Casing Elevation: 370.1
Cable tool, drilled for Corps of Engineers, foundation test boring

Material (5)	Thickness	Depth
Silty fine to medium sand, gray to brown	20	20
Sandy gravel w/cobbles, gray to brown	13	33
Conglomerate: sandy gravel, gray to brown poorly cemented	8	41
Conglomerate: Sandy gravel w/ cobbles, near black, moderately cemented	15	56
Gravelly sand and sandy gravel, uncemented to poorly cemented	14	70

699-S7-34
Location: S6528, W34449 11/27-20M1
Casing Elevation: 527.12
Cable tool, drilled by Stanbery & Robinson of USGS for GE Company, 1951, groundwater monitoring & geologic investigation borehole

Material (4)	Thickness	Depth
Silt & sand	4	4
Sand, 90% coarse	89	93
Sand, silty	31	124
Silt & sand	4	128
Sand & gravel	8	136
Sand, gravelly	8	144
Basalt, gray, hard	25	169
Sand, tuffaceous	23	192
Tuff, weathered into much silt & clay	69	261
Basalt, hard, black	60	321

699-S7-62A (Walla Walla #1)
Location: S7300, W62000 11/26-21N1
Casing Elevation: ~1250
Cable tool, drilled by Conservative Land Investment Company & logged by Harris, domestic water supply borehole gas discovery well

Material (20)	Thickness	Depth
Surface	16	16
Basalt	110	126
Sandstone, yellow, soft.	40	166
Basalt	340	506
Basalt, gray	12	628
Shale or clay, greenish blue	71	699
Basalt, porous & gas	20	719
Basalt porous, 5 1/2 lb. pressure	25	744
Basalt, hard	70	814
Basalt, porous, more gas	13	827
Basalt, hard	13	840
Basalt porous, more gas	8	848
Basalt, hard	46	894
Basalt, porous, more gas	21	915
Basalt alternating hard & soft, no further gas	319	1,234

699-S7-62B (Walla Walla #5)
Location: S7300, W62000 11/26-27N2
Casing Elevation: ~1250
Cable tool, drilled by Walla Walla Oil, Gas & Pipeline Company, 1922, gas well

Material (9)	Thickness	Depth
Volcanic ash & clay	12	12
Gravel & loose basalt boulders	125	137
Basalt, varying in texture & appearance	563	780

699-S7-62D1 (Blue Hen #1)
Location: S6500, W61600 11/26-27N4
Casing Elevation:
Cable tool, drilled by Blue Hen Oil Company & logged by Calvert, 1920, gas well

Material (10)	Thickness	Depth
Unconsolidated material	160	160
Basalt	455	615
Clay, gas at 705 ft.	90	705
Hard basalt	27	738

699-S7-62D2 (Walla Walla #2)
Location: 11/26-27N4
Casing Elevation:
Cable tools, drilled by Walla Walla Oil, Gas & Pipeline Company, 1917, gas well

Material (20)	Thickness	Depth
Surface	16	16
Gravel & boulders	39	55
Basalt	45	100
Loose white sand	28	128
Basalt	40	168
Blue basalt.	117	285
Broken formation	25	310
Blue basalt	80	390
Broken formation, flow of water	30	420
Blue basalt.	100	520
Granite boulder	10	530
Basalt	80	610
Green slate	90	700
Basalt & gas	30	730
Hard gray basalt	70	800

699-S6-E16A (BA-4)
Location: S5600, E16400 11/28-23J1
Casing Elevation: 345.0
Bucket auger, drilled for Corps of Engineers, foundation test boring

Material (5)	Thickness	Depth
Sandy gravel	5	5
Sandy gravel w/cobbles	16	21

699-S6-E16B (DD-7)
Location: S6000, E15800 11/28-23J2
Casing Elevation: 346.1
Cable tool & hydraulic feed core drill, for Corps of Engineers, 1961, foundation test boring

Material (5)	Thickness	Depth
Sandy gravel w/cobbles	36	36
Conglomerate: poorly to moderately well indurated	18	54

Sandstone, siltstone & clay-shale: soft	16	70
Conglomerate: poorly to moderately well indurated	31	101

699-S6-E15A (DD-2)
Location: S5800, E15000 11/28-23G1
Casing Elevation: 350.0
Screw-feed core drill, for Corps of Engineers, 1958, foundation testing boring

Material (5)	Thickness	Depth
Fluviatile gravels	25	25
Ringold conglomerate	33	58
Silty, sandy gravel-probably Ringold conglomerate	3	61
Micaceous, clean quartz sand (bluish in color)	12	73
Gravelly sand	2	75
Sand & gravel	2	77
Gravelly sand	13	90
Plastic, gray silt & fine sand	1	91
Gray micaceous sand	1	92
Hardy gray clay	2	94
Alternating silt, sand, clays in thin beds	3	97

699-S6-E15B (DD-1)
Location: S6200, E14800 11/28-23G2
Casing Elevation: 363.0
Screw-feed core drill, for Corps of Engineers, 1957, foundation test boring

Material (5)	Thickness	Depth
Fine to medium sand	18	18
Sandy gravel w/cobbles	29	47
Conglomerate: poorly cemented	21	68

699-S6-E14A (CD-11)
Location: S6435, E014211 11/28-23L1
Casing Elevation: 378.29
Cable tool, drilled by Smith of Haden Drilling Company for Corps of Engineers, 1958, foundation test boring

Material (5)	Thickness	Depth
Fine to medium slightly silty sand gray-brown	9	9
Cobbles	1	10
Sandy gravel w/cobbles gray-brown	26	36
Conglomerate: sandy gravel w/ cobbles brown-black, poorly cemented	8	44
Conglomerate: sandy gravel w/ cobbles, near black, moderate to well cemented	25	69
Conglomerate: sandy gravel w/ cobbles, dark gray, very compact	91	160
Conglomerate: sandy gravel w/ cobbles, dark gray, poorly compacted	17	177
Dominant 1/2 in. beds of gray silt with fewer 1/2 in. beds of gray fine micaceous sand & 1/4 in. beds of blue-gray clean clay compacted	11	188
Clay, blue-gray, thin bedded & compacted, 1 in. layer brown silt (old soil?)	9	197
Basalt cuttings w/trace sand; possible basalt	3	200
Basalt cuttings	2	202

699-S6-E14B
Location: S6435, E14230 11/28-23L2
Casing Elevation: 379
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	4	4
Boulders, big boulders 4 in. to 8 in.	16	20
Gravel, large & small boulders	15	35
Small gravel w/cement & boulders	15	50
Gravel & small boulders	15	65
Gravel, small boulders, some large ones	15	80
Gravel, boulders embedded in cemented sand	45	125
Cemented boulders embedded in cemented sand w/gravel	15	140
Cemented boulders	12	152
Sandy clay	3	155
Sandy clay & boulders, small boulders	27	182
Sandy clay	12	194
Basalt	11	205

699-S6-E4A
Location: S6102, E2503 11/28-21L1
Casing Elevation: 445.25
Cable tool, drilled by Row of USGS for GE Company, 1948, burial-ground groundwater monitoring borehole

Material (1)	Thickness	Depth
Gray sand	10	10
Black sand	15	25
Basalt sand	7	32
Gravel pea size, all colors sand	8	40
Gravel B&W sand	10	50
Basalt	4	54
B&W sand	23	77
Sand & gravel (clay, small amount)	23	100
Gravel, sand (all colors-hard)	3	103
Marble size gravel sand	2	105
Fine white sand	3	108
Pea to marble gravel sand	3	110
Brown & white sand	5	115
Good gravel and sand	2	117
Good gravel white sand		

699-S6-E4B
Location: S6098, E3982 11/28-21L2
Casing Elevation: 421.66
Cable tool, drilled by Row & Gentz of & for GE Company, 1953, burial-ground groundwater monitoring borehole

Material (1)	Thickness	Depth
Blow sand & top soil	5	5
Blow sand & top soil, gravel	5	10
Gravel, sand & silt	5	15
Gravel, sand, no silt	15	30
Gravel, sand, some silt	5	35
Gravel, sand, more silt	5	40
Coarse gravel w/silt	5	45
75% gravel, 25% sand	5	50
Gravel & silt	10	60
Sand, very little gravel	5	65
Coarse gravel	2	67

Sand, silt & gravel	5	72
Cemented gravel & sand	3	75
Fine white sand	5	80
90% white sand, very little gravel, silt	7	87
90% brownish red sand, very little gravel, silt	13	100

699-56-E4C
Location: S6100, E3781 11/28-21L3
Casing Elevation: 432.98
Cable tool, drilled by Row of & for GE Company, 1953, burial-ground groundwater monitoring borehole

Material (1)	Thickness	Depth
No record	15	15
Coarse sand, brown & white, gravel	5	20
Gravel & sand	5	25
Fine brown & white sand, gravel	10	35
Fine gravel & sand	20	55
Gravel, sand	10	65
Sand, gravel	15	80
Sand, gravel & silt	5	85
Heavy silt sand, some gravel	6	91
Sand, gravel, heavy silt	7	98
Heavy silt, sand, & gravel	19	117
Dark grayish-blue silt w/sand & gravel	3	120
Grayish-blue silt, sand, fine to coarse gravel; this formation lays in layers of silt & sand, then a layer of gravel	20	140
Bluish-gray silt, sand, gravel; this formation has lots of bluish-gray silt w/lots of gravel-up to 4 in.; this mud smells like rotten eggs	23	163
Bluish-gray silt, gravel, sand	17	180
Bluish-gray silt, less gravel	5	185
Sand, gravel, silt, bluish-gray	12	197
Green silt w/fine sand	3	200
Green silt w/fine sand, fine gravel	25	225
Green silt, small bits of shale, sand, small gravel	8	233
Gravel, & sand	4	237
Heavy mud w/lots of basalt gravels & some sand	18	255
Sandy bluish-green silt, very little gravel; some layers of gravel up to 2 1/2 in. diameter	20	275
Fine sand, more gravel, some blue-green silt	6	281
Slimy black mud, basalt chips & some 4 in. basalt gravel & sand	4	285
Hard cemented gravel & sand; the gravel is coated w/greenish sandy cement formation w/small gravel clinging to gravel held by this cement formation; lots of gravel have rinds 1/16 in. thick	10	295
Dark silt	5	300
Slimy black-gray mud, some wood	5	305
Gravel, sand	2	307
Black-gray slimy mud, few small gravel, very fine sand, some pieces like shale	15	322
Blue silt, gravel, sand	3	325
Blue silt, gravel, sand showing basalt formation	4	329
Hit basalt at 329 ft.; this layer of basalt is about 5 ft. thick	5	334
Mud & gravel; went into a break 334-337 ft.	1	335
Green sandy mud, gravel, & chips of basalt	2	337
Greenish blue silty sand w/small gravel imbedded in this formation; this silty sand is more like clay	20	357
Greenish-blue silty sand, w/some 4 in. gravel	10	367
Black ash & green sandy silt	3	370
Ash-basalt grindings*	5	375
Basalt grindings-black mud* * 370-385 ft. acts like small layer of basalt, then ash & gravel; it is an ash & silt formation almost hard enough to be shale, w/gravel imbedded all through it.	10	385
Ash, silty sand, gravel	8	393
Layers of gravel & green sandy silt-gravel to 395 ft. caves in-hard to mix water. Lots of these rocks in the samples cave in from about 375 ft.	22	415
Black mud, gravel, sand; 415 to 425 ft. mud is very black with ground-up basalt; I would say basalt started at 414 ft.; gravel, sand & silt is foreign, coming from 385 to 395 ft.	5	420
Reddish brown mud, gravel, sand; cuttings like top of gas reous basalt or honeycomb	10	430
Soft reddish brown basalt; cuttings like top of gastreous basalt or honeycomb	10	440
Basalt-honeycombed	15	455
Basalt-honeycomb; heavy; more dense	5	461

699-56-E4D
Location: S5734, E3767 11/28-21L4
Casing Elevation: 430.47
Cable tool, drilled by Row of & for GE Company, 1953, burial-ground groundwater monitoring borehole

Material (1)	Thickness	Depth
Top soil & sand	5	5
Sand & silt	7	12
Sandy silt	3	15
4 ft. sandy silt-1 ft. gravel	5	20
gravel & sand	40	60
Cement gravel	15	75
Cement gravel & pure gravel	12	87
Fine sand	1	88
Reddish-brown silt, sand & gravel	7	95
Yellow-brown silt, sand	7	102
Layer of gravel	2	104
Yellow-brown silt, sand	8	112
Gravel-sand-mud	3	115
Gravel-sand-blue mud	5	120
Bluish gray mud-sand & gravel	8	128
Sand-gravel-mud-slime	8	136
Gravel-sand-mud	6	142

699-S6-E4E
Location: S6446, E2727 11/28-21L5
Casing Elevation: 425.71
Cable tool, drilled by Row of & for GE Company, 1953, burial-ground groundwater monitoring borehole

Material (1)	Thickness	Depth
Blow sand & top soil	10	10
Sand	3	13
Gravel	10	23
Sand & gravel	2	25
Gravel & sand	5	30
Gravel	4	34
Sand	4	38
Gravel	2	40
Sand	3	43
Gravel	2	45
Gravel & sand	15	60
Cemented gravel & sand	8	72
Sand & gravel	4	76
Gravel & sand	3	79
White sand	1	80
Cement, gravel & sand	6	86
Sand & gravel w/light brown silt	5	91
Sand & gravel w/gray silt	7	98
Gravel & sand w/dark mud	22	120

699-S6-E4F
Location: S6595, E2950 11/28-21L6
Casing Elevation: 418.71
Cable tool, drilled by Row & Jack of & for GE Company, 1954, burial-ground groundwater monitoring well

Material (1)	Thickness	Depth
Top soil & sand	5	5
Boulders up to 10 in. diameter	10	15
Gravel & sand	35	50
Cement, gravel & sand	10	60
Fine white sand, some silt, white	7	67
White sand, gravel, white silt	8	75
White sand, gravel, white silt-very muddy	7	85
White sand, gravel, white silt	2	87
Gravel, sand tan silt, muddy; this formation has layers of gravel & layers of sand w/gravel, sand & tan silt imbedded in it; no loose white sand in this well--all sand has some silt	15	102

699-S6-E4G
Location: S6761, E4204 11/28-21L7
Casing Elevation: 423.11
Cable tool, drilled by Row & Jack of & for GE Company, 1954, burial-ground monitoring well

Material (1)	Thickness	Depth
blow sand	5	5
Sand & top soil	5	10
Gravel	20	30
Gravel, sand, heavy silt	1	33
Heavy silt	1	34
Pure gravel	1	35
Gravel & sand	10	45
Gravel & sand, white silt	15	60
Fine white sand, some silt	8	68
Gravel	2	70
Gravel, sand & grayish white silt	15	85
Brown sandy silt and gravel	17	102

699-S6-E4H
Location: 11/28-21L8
Casing Elevation: 420
Cable tool, drilled by Gentz of & for GE Company, 1954, burial-ground groundwater monitoring borehole

Material (1)	Thickness	Depth
Blow sand	3	3
Coarse gravel up to 2 in. & sand	2	5
Small & coarse gravel	5	10
Cobbles & coarse gravel	5	15
Cobbles, gravel, & gray sand	5	20
Coarse gravel	5	25
Coarse gravel, little sand	25	50
Coarse gravel up to 3 in.	5	55
Cobbles, coarse gravel	5	60
Coarse gravel, little sand	5	65
Gravel, sand & silt	2	67
Gravel, sand & silt	2	69
Coarse gravel	1	70
Coarse gravel, fine gray sand	10	80
Cobbles, gravel, little sand	5	85
Cobbles, gravel, 50% sand	5	90

699-S6-E4J
Location: 11/28-21L9
Casing Elevation: 420
Cable tool, drilled Gentz of & for GE Company, 1954, burial-ground groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	5	5
Coarse sand & gravel-gravel at 8 ft.	10	15
Coarse sand	10	25
Coarse gravel	7	32
Coarse gravel & coarse sand	3	35
Small & coarse gravel, little sand	15	50
Fine & coarse sand, coarse gravel	20	70
Fine sand	5	75
Fine sand, silt & coarse gravel	10	85
Coarse gravel & fine sand	5	90
Coarse gravel, fine & coarse sand	5	95
Fine sand & gravel	5	100

699-S5-E16A (DD-3)
Location: S5400, E16400
Casing Elevation: 351.8
Hydraulic feed core drill, drilled for Corps of Engineers, 1961, foundation test boring

Material	Thickness	Depth
Fine sand	3	3
Sandy gravel w/cobbles	26	29
Conglomerate poorly cemented	12	41
Clay-shale & sanstone: soft, interbedded	28	69
Conglomerate: poorly to moderately well cemented	26	95
Sandstone: soft w/pebbly zones	31	126

699-S5-E16B (DD-20)
Location: S4700, E16300
Casing Elevation: 351.3
Drilled for Corps of Engineers, 1967, foundation test boring

Material	Thickness	Depth
Medium to fine sand	4	4
Sandy gravel w/cobbles	35	39
Gravelly brown silt	1	40
Siltstone: sandy soft, laminated, blue to gray	8	48
Sandstone: soft, fine to medium grained, blue green with local siltstone beds	19	67
Gravel: sandy, loose	1	68
Conglomerate: moderately to well cemented, sandy	7	75
Gravel: sandy, locally poorly cemented	24	99

699-S4-E16 (DD-6)
Location: S3700, E16600 11/28-23A1
Casing Elevation: 344.80
Cable tool & rotary, drilled by Nichols & Thompson, Stampe, Huyser for Corps of Engineers, 1961, foundation test boring

Material (5)	Thickness	Depth
Gravel-sandy w/occasional cobbles	25	25
Cemented conglomerate	3	28
Poorly cemented conglomerate w/fine blue-green micaceous friable sandstone	45	73
Clay-shale, soft	5	78
Sandstone, fine, soft	10	88
Clay-shale, soft, green-gray	13	101
Sandstone	6	107
Conglomerate, poorly cemented	7	114
Sandstone & conglomerate interbedded	6	120
Conglomerate poorly cemented	30	150
Sandstone, fine, soft to very soft	6	156
Shale & basalt, boulder, cobbles & gravel	27	183
Basalt medium hard dark gray	6	189
Clay	1	190
Basalt-vesicular, hard	4	194

699-S4-E15 (CD-1C)
Location: S4000, E14800 11/28-23F1
Casing Elevation: 366.1
Cable tool, drilled for Corps of Engineers, foundation test boring

Material (5)	Thickness	Depth
Gray fine to medium silty sand	14	14
Gray sandy gravel w/ cobbles	6	20
Conglomerate: brown, poorly cemented w/cobbles	2	22
Conglomerate: brown, moderately well indurated w/cobbles	23	45
Conglomerate: black moderately cemented w/cobbles	25	70

699-S3-E12
Location: S3000, E12000 11/28-22A1
Casing Elevation: 397.90
Cable tool, drilled by McDonald & Swain of Hatch Drilling Company for GE Company, 1960, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine brown sand	10	10
Fine brown sand & silt	7	17
4 in. max. sand & large gravels	5	22
Sand & finer gravels (2 in. max.)	18	40
Heavy gravels & cobbles	2	42
Heavy gravels & sand	2	44
Heavy gravels & sand, cemented fine	1	45
Brown sand & silt w/small gravels	10	55
Cemented sand & gravel	7	62
Cemented sand & fine gravels	8	70
Cemented sand & fine gravels, more silt	7	77
Soft sandy clay & gravel	3	80
Cemented sand & gravel	30	110
Cemented sand & gravel, harder now	5	115
Cemented sand & gravel	15	130
Cemented sand & gravel-formation a little softer	5	135
Cemented sand & gravel-more silt, less gravel	3	138
Cemented sand & gravels	7	145
Sandy blue clay w/some fine gravels	15	160
Sandy blue clay w/some fine gravels-sandier now & harder	5	165
Cemented sand & gravel	5	170
Cemented sand & gravel-very hard	5	175
Could be a layer of basalt	1	176
Cemented sand & gravel-softer	4	180
Cemented sand-hard but no gravel	5	185
Cemented sand & gravel	19	204
Fine blue (or green) sand w/some small gravels	8	212
Sandy green clay w/some fine gravels	3	215
Blue sandy clay & small gravels	13	228
Sandy clay, no gravels	2	230
Blue sandy clay	15	245
Basalt	5	250
Very hard basalt	10	260

699-S3-25
Location: S2996, W24501 11/27-22D1
Casing Elevation: 523.50
Cable tool, drilled by Rodda of Bach Drilling Company, 1971, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & silt	30	30
Sand & gravel	10	40
Sand & silt	82	122
Sand & gravel	13	135
Cemented gravel	5	140
Sand & gravel	3	143
Fine sand & gravel	16	159
Sand & gravel	7	166
Fine packed sand	4	170
Packed sand & gravel	4	174

699-S2-E19A (TP-8)
Location: S1600, E18600 11/26-13N1
Casing Elevation: 357.2
Pneumatic hammer & mucking, drilled for Corps of Engineers, foundation test boring

Material (5)	Thickness	Depth
Sandy gravel	12	12
Conglomerate: brown, moderately well to poorly cemented	8	20
Medium sand: uncemented	1	21
Conglomerate: brown, poorly cemented	4	25
Conglomerate: black, well cemented	4	29
Sand: uncemented	1	29
Conglomerate: black, moderately well cemented	10	39
Conglomerate: gray, slightly cemented	2	41
Conglomerate: black, moderately well cemented	8	49
Conglomerate: gray, poorly cemented	23	72

699-S2-E19B (PA-13)
Location: S1650, E18600 11/28-13N2
Casing Elevation: 353.4
Disc auger, drilled for Corps of Engineers, 1961-62, foundation test boring

Material (5)	Thickness	Depth
Gray silt w/cobbles	3	3
Gray sandy gravel w/cobbles	6	9
Conglomerate	1	10

699-S2-E1S (CD-9)
Location: S2200, E14600 11/28-14P1
Casing Elevation: 378.50
Cable tool, drilled for Corps of Engineers, 1962, foundation test boring

Material (5)	Thickness	Depth
Gray fine to medium silty sand	20	20
Gray sandy gravel	2	22
Gray sandy gravel w/cobbles clean	16	38
Conglomerate: brown poorly cemented	23	61
Conglomerate: very poorly cemented to uncemented gravel	9	70

699-S2-8 (DH-7)
Location: S1504, W7665 11/28-18L1
Casing Elevation: 547.5
Air rotary, drilled by Soil Sampling Service & logged by Shannon & Wilson for WADCO, 1971, FFTF foundation test boring

Material (15)	Thickness	Depth
Medium dense, light brown, silty fine to coarse sand	5	5
Very dense, light brown, silty, fine sand w/minor medium sand & trace of hard, light brown silt	6	11
Very dense, tan-yellow to light brown, silty fine gravelly, fine to coarse sand w/caliche deposits	12	23
Very dense, light gray-brown, fine sand to medium sand	98	121
Very dense, light gray-brown, fine to coarse sand w/trace of fine sand	5	126

699-S2-61
Location: 11/26-18N1
Casing Elevation:
Cable tool, drilled by Colfax Oil & Gas Company, prior to 1924, gas well

Material (34)	Thickness	Depth
No record	465	465
Yakima basalt (?), basalt, gray	207	658
Shale	102	740

699-S1-E19A (BA-5)
Location: S1400, E18700 11/28-13M1
Casing Elevation: 364.7
Bucket auger, drilled for Corps of Engineers, foundation test boring

Material (5)	Thickness	Depth
Sandy silt	10	10
Weathered conglomerate	6	16

699-S1-E19B (PA-14)
Location: S1400, E18600 11/28-13M2
Casing Elevation: 355.4
Disc auger, drilled for Corps of Engineers, 1961-62, foundation test boring

Material (5)	Thickness	Depth
Silty cobbles & boulders	4	4
Gray sandy gravel.	5	9

699-S1-E19C (PA-15)
Location: S1500, E18500 11/28-13M3
Casing Elevation: 352.0
Disc auger, drilled for Corps of Engineers, 1961-62, foundation test boring

Material (5)	Thickness	Depth
Gray sandy gravel	8.5	8.5
Conglomerate	1	8.5

699-S1-7A (DH-1)
Location: S1060, W7459 11/28-18L2
Casing Elevation: 554.16
Cable tool, drilled by Hatch & Bigham of Hatch Drilling Company & logged by Farrell of Becntel for WADCO, 1969, FFTF preliminary foundation investigation borehole

Material (6)	Thickness	Depth
Wind blown sand; light brown, firm to loose, micaceous	6	6
Sand & silt; alternating beds of fine to coarse sand & silty sand, buff to gray, firm to dense, angular coarse sand grains coated with caliche, bed 0.4-3.0 ft. thick	11	17
Silty medium sand, mottled gray & tan, deeply weathered, arkosic, very dense, rounded pebbles of caliche	6	23

Medium sand; gray to brown, very dense weathered, some silt laminae, arkosic, sand fine at 78 ft.	52	76
Coarse to medium sand; gray to brown, very dense, some silt (<15%) graded bedding, lens (or dike of sandy clay at 92 ft. & 94 ft.	20	96
Sand & silty sand; interbedded fine to medium sand & silty sand, buff to brown, very dense	25	121
Gravelly silty sand*	5	126
Medium sand*	13	139
Gravelly silty sand*	11	150
Silty gravel*	20	170
Poorly graded sand*	30	200
Siltstone & conglomerate*	20	220

*descriptions incomplete

699-51-78 (DH-2)
Location: S1008, W7458 11/28-18L3
Casing Elevation: 554.29
Cable tool, drilled by Hatch & Hanson of Hatch Drilling Company (to 567 ft.) & diamond coring & logged by Farrell of Bechtel for WADCO, 1969, FFTF preliminary foundation investigation borehole

Material (6)	Thickness	Depth
Fine sand; brown to gray, firm to loose, arkosic, angular grains, occasional lenses of compact silty sand, weathered	16	16
Silty coarse sand; mottled gray & brown, deeply weathered, very dense	5	21
Fine sand & silty medium sand; buff dense, occasional lenses of coarse sand, arkosic	33	54
Silty sands*	29	83
Poorly graded sands*	4	87
Silty sands*	33	120
Poorly graded sands & silty sands*	30	150
Silty gravels & silty sands*	32	182
Poorly graded gravels*	17	199
Siltstone & conglomerate*	91	290
Silty sandstone; clayey sand w/ some gravel, dark gray, dense, slightly plastic, occasional pebbles <2 in., rounded basalt, poorly cemented	7	297
Sandstone & conglomerate; interbedded gravelly silty sand & clayey sand gravel, as above	41	338
Sandy siltstone & claystone*	219	557
Basalt conglomerate*	30	587
Gravelly clay; light green, probably contains sand lenses.	8	595
Basalt flow breccia	31	626
Basalt scoria	15	641
Basalt	8	649

*descriptions incomplete

699-51-77 (DH-3)
Location: S760, W7460 11/28-18L4
Casing Elevation: 549.52
Cable tool, drilled by Bigham of Hatch Drilling Company & logged by Farrell of Bechtel for WADCO, 1969, FFTF preliminary foundation investigation borehole

Material (6)	Thickness	Depth
Fine to medium sand; brown to mottled gray, loose to firm, arkosic, mica flakes present, basalt grains predominant (~60%) angular, basalt gravel <1 in. size at 6.5 ft., thin lenses of silt & clay	11	11
Medium to coarse sand; brown to mottled gray, dense, deeply weathered, angular grains, clasts of caliche <1/4 in. size arkosic	6	17
Slightly silty fine sand; tan to buff, dense, arkosic, angular grains; subrounded gravel clast at 72 ft., white, coarse crystalline granite	61	78
Coarse sand; buff to mottled gray, dense, some fine gravel, subangular, predominantly basalt grains	17	95
Fine to medium sand; tan to buff, dense, arkosic, slightly silty	23	118
Medium to coarse sand; buff, dry arkosic	7	125
Gravelly sand; buff to tan, little to no fines, dense; sandy gravel in layers (~0.5 ft.) thick, clasts are rounded, basalt is 50% of material	23	148
Gravelly sand; green gray, dense, particles are 50% basalt, matrix is arkosic, weathered contains some silt	12	160
Lens of coarse clean gravel	2	162
Sandy gravel; buff to gray green, contains some silt, possibly in lenses, dense	26	188
Cobble gravel; clean	3	191
Medium sand; tan, slightly mottled, little to no fines	5	196
Sandy gravel; tan, dense, little to no fines	8	204
Clayey conglomerate; sandy clayey gravel, gray green & yellow green, black lens of sandy clay, dense, low permeability, little to no cementation	3	207

699-51-70 (DH-4)
Location: S1110, W7459 11/28-18L5
Casing Elevation: 553.46
Cable tool, drilled by Bigham of Hatch Drilling Company & logged by Farrell of Bechtel for WADCO, 1969, FFTF preliminary foundation investigation borehole

Material (6)	Thickness	Depth
Fine sand; light brown, firm	5	5
Medium to coarse sand; gray & pink mottled, angular, some fine sand, rounded caliche particles, basalt 60%, loose	4	9
Fine to medium sand; gray, arkosic, subangular, 75% basalt	1	10
Medium to fine sand; tan to buff, arkosic, angular, 50% basalt, some caliche particles, bed of medium sand at 14 ft. is clean dark gray, fine sand is silty, dense	7	17

Silty medium sand; yellow buff, arkosic, deeply weathered, contains gravel particles of caliche, subrounded to subangular, dense	7	24
Fine to medium sand; tan to buff, arkosic, angular, particles predominantly basalt, some silt, dense	99	123
Gravelly sand; buff to gray, dense, lenses of silty sand, gravel is rounded to subangular, occasional clasts 4 in. size	34	157
Silty gravel; tan to gray green, matrix arkosic & deeply weathered, particles are rounded to subrounded, dense, basalt 50%, balance of quartzite, andesite porphyry & granitics	27	184
Coarse gravel & cobbles, some sand, but no fines	3	187
Silty gravel; same as 157-184 ft. interval	4	191
Sand; tan to green brown, contains lenses of gravel	12	203
Clayey conglomerate; clayey gravel, green gray to blue black, yellow streaks, lenses of sand, matrix clay sand, dense, little to no cementation	3	206

699-S1-7E (DH-5)
Location: S1058, W7310 11/28-18L6
Casing Elevation: 556.72
Cable tool, drilled by Bigham of Hatch Drilling Company & logged by Farrell of Becntel for WADCO, 1969, FFTF preliminary foundation investigation borenole

Material (6)	Thickness	Depth
Fine to medium sand; brown, firm to loose, arkosic, some coarse sand	15	15
Silty coarse sand; mottled gray & brown, very dense, deeply weathered, pink to yellow decomposed feldspar grains	5	20
Silty sand; buff, fine to coarse grained, dense, arkosic; lens of tan silt at 25.0-25.4 ft.	11	31
Medium to fine sand; gray to brown, dense, arkosic	13	44
Silty fine sand; buff to gray, dense, arkosic becoming medium grained ~62 ft.	24	68
Medium to fine sand; contains lenses of silt, buff to gray, silt lenses are tan, dense, some silt dikes <2 in. wide	15	83
Medium to coarse sand; buff to gray mottled, dense, some silt	41	124
Gravelly sand; buff to gray dense, gravel is rounded to subangular	4	128
Medium sand; buff to gray, dense	7	135
Gravelly sand; buff to gray, dense, lenses of silty sand, gravel is rounded to subangular, occasional clasts 4 in. size; basalt makes up 70% of gravel.	18	153
Silty gravel; buff to green gray, cobbles 6 in. size, rounded, dense, lenses of gravelly sand; basalt makes up 50% of clasts; alternating beds of silty gravel & sand are 1 to 2 ft. thick	39	192
Medium sand; gray green to buff, clean	5	197
Coarse sandy gravel; buff to yellow green, dense, some clayey thin lenses, gravel up to 5 in. size, rounded 50% basalt	3	200
Gravelly sand; buff to gray green, loose permeable sand from 200-202 ft.		
Silty conglomerate; green to dark gray clayey sand, gravel rounded to subrounded, 65% basalt, little to no cementation	10	210

699-S1-7F (DH-6)
Location: ~S1330, W7410S 11/28-18L7
Casing Elevation: 548.0
Air rotary, drilled by Soil Sampling Service & logged by Shannon & Wilson for WADCO, 1971, FFTF foundation test boring

Material (15)	Thickness	Depth
Medium dense, light brown, slightly silty, fine sand	5	5
Very dense, light brown, fine to medium sand w/hard, light brown, clayey silt	5	10
Very dense, light brown, slightly silty, fine to medium sand	6	16
Very dense, light gray-brown, slightly silty, fine to medium sand	39	55
Very dense, light gray-brown, fine to medium sand	35	90
Very dense, light gray-brown, fine to medium sand	23	113
Very dense, light gray, fine to medium sand w/scattered gravel increasing in content w/ depth.	14	127

699-S1-8A (DH-8)
Location: ~S1258, W7820 11/28-18M1
Casing Elevation: 547.5
Air rotary, drilled by Soil Sampling Service & logged by Shannon & Wilson for WADCO, 1971, FFTF foundation test boring

Material (15)	Thickness	Depth
Very dense, light brown, fine to medium sand & silty sand w/few seams of hard, light brown, fine sandy silt & trace of coarse sand	31	31
Very dense, light gray, fine sand w/minor medium sand	31	62
Very dense, light gray, fine to medium sand with minor coarse sand & trace of gravel to 2 in. below depth 124 ft.	66	128

699-S1-8B (DH-9)
Location: ~S1108, W7573 11/28-18M2
Casing Elevation: 547.5
Air rotary, drilled by Soil Sampling Service & logged by Shannon & Wilson for WADCO, 1971, FFTF foundation test boring

Material (15)	Thickness	Depth
Dense, light brown, fine to medium sand w/few beds to 12 in. of hard, light brown, fine sandy silt	8	8
Very dense, brown, silty, fine to medium sand	11	19
Very dense, light gray-brown, slightly silty, fine to medium sand	36	55
Very dense, light gray, slightly silty to clean, fine to medium sand	48	103
Very dense, light gray, fine to medium sand w/few laminae of hard, light brown silt & trace of gravel to 2 in. below 117 ft.	23	126

699-S1-8C (DH-10)
Location: ~S1440, W7605 11/28-18M3
Casing Elevation: 497.5
Air rotary, drilled by Soil Sampling Service & logged by Shannon & Wilson for WADCO, 1971, FFTF foundation test boring

Material (15)	Thickness	Depth
Dense to very dense, light gray, fine to medium sand	19	19
Dense, light gray, fine to medium sand w/coarse sand & trace of fine gravel to 1/2 in. below 25 ft.	10	29
Very dense, light gray, clean to slightly silty, fine to medium sand	24	53
Very dense, light gray, fine to medium sand w/trace of gravel to 1 in. max.	22	75
Very dense, light gray-brown, gravelly, to slightly gravelly, fine to coarse sand, gravel hard, subround, up to 3 in. max. w/few cobbles to 6 in.	18	93
Very dense, brown-gray, & brown, very silty, fine to coarse, sandy gravel, gravel hard, round, subround & subangular, fine to coarse (3 in. max.) w/ occasional cobbles to 6 in.	56	149

699-S1-8D (DH-11)
Location: ~S1295, W7712 11/28-18M4
Casing Elevation: 497.5
Air rotary, drilled by Soil Sampling Service & logged by Shannon & Wilson for WADCO, 1971, FFTF foundation test boring

Material (15)	Thickness	Depth
Very dense, light gray, fine to medium sand	61	61
Very dense, light gray, fine to coarse sand	9	70
Very dense, light gray, fine to medium sand, locally w/trace of silt	12	82
Very dense, light gray-brown, slightly silty to silty, fine to coarse sand & gravel, gravel hard, round, subround & minor subangular to 3 in. max. w/ occasional cobbles to 6 in.	56	138
Very dense, brown-gray, slightly silty, fine to coarse, sandy gravel, gravel hard, round, subround & subangular to 3 in. max. w/occasional cobble to 6 in.	10	148

699-S1-8E (DH-12)
Location: ~S1204, W7521 11/28-18M5
Casing Elevation: 492.5
Air rotary, drilled by Soil Sampling Service & logged by Shannon & Wilson for WADCO, 1971, FFTF foundation test boring

Material (15)	Thickness	Depth
Dense to very dense, light gray-brown, clean to slightly silty, fine to medium sand	53	53
Very dense, light gray-brown, fine to medium sand w/trace of gravel to 1 in. max.	24	87
Very dense, light gray-brown, fine to medium and w/trace of gravel to 1 in. max.	8	95
Very dense, light gray-brown, fine to coarse sandy gravel, gravel hard, round, subround & minor subangular, fine to coarse (3 in. max.) w/occasional cobbles to 6 in.	47	142
Very dense, brown-gray to brown, very silty, fine to coarse, sandy gravel, gravel hard, round, subround & minor subangular, fine to coarse (3 in. max.) w/occasional cobbles to 6 in.	6	148

699-S1-8F (DH-13)
Location: ~S1312, W7521 11/28-18M6
Casing Elevation: 492.5
Air rotary, drilled by Soil Sampling Service & logged by Shannon & Wilson for WADCO, 1971, FFTF foundation test boring

Material (15)	Thickness	Depth
Very dense, gray, clean to slightly silty fine to medium sand	64	64
Very dense, light gray-brown, slightly gravelly, fine to medium sand w/few seams of hard, brown, fine sandy silt, gravel hard, subround up to 3 in. max.	26	90
Very dense, light gray-brown, slightly silty, fine to coarse sandy, gravel hard, round & subround up to 3 in.	16	106
Very dense, brown-gray, slightly silty, fine to coarse sandy gravel w/random seams of very dense, medium brown, slightly silty, fine to medium sand & gravelly, fine to medium sand, gravel hard, round, subround & minor subangular to 3 in. max., few random cobbles up to 12 in. max.	43	149

699-S1-8G (DH-14)
Location: ~S1080, W7801 11/28-18M7
Casing Elevation: 648.0
Air rotary, drilled by Soil Sampling Service & logged by Shannon & Wilson for WADCO, 1971, FFTF foundation test boring

Material (15)	Thickness	Depth
Medium dense, brown, silty, fine to medium sand	11	11
Very dense, light gray, clean to slightly silty, fine to medium sand w/trace of fine gravel to 1/2 in. from 11-16 ft.	44	55
Very dense light gray, slightly silty, fine to medium sand, with random trace of coarse sand, few silt, 3 in. gravel seam at 68 ft. w/gravel to 3 in. max.	22	77

699-S1-8H (FFTF Well No. 3)
Location: S692, W7880 11/28-18M8
Surface Elevation: 646.5
Rotary, drilled by Layne Western & logged by Walker of Summers & Associates (to 1,448 ft.) & others for HEDL, 1977, water supply borehole

Material (7)	Thickness	Depth
Sand; buff, very fine to medium sand, 80% other sand (subrounded), 20% basalt sand (subangular), unconsolidated, frosted quartz, very mature, slightly calcerous, dark micas present	5	5
Sand, grayish buff, very fine to fine pebbles, very fine to very coarse sand, 5% gravel, 93% sand (subrounded), 2% silt & clay, unconsolidated, unfrosted quartz, submature, light & dark micas present, 60% other sand & gravel & 40% basalt & gravel, little to no weathering rinds or basalt gravel	15	20
Sand; grayish buff, very fine pebbles, very fine to coarse sand, 2% gravel, 96% sand (subrounded), 2% silt & clay, unconsolidated, unfrosted quartz, submature, dark micas present 55% other sand & gravel & 35% basalt sand & gravel, little to no weathering rinds on basalt gravel	5	25
No record	5	30
Gravelly sand; grayish buff, very fine to fine pebbles, very fine to very coarse sand, 10% gravel, 90% sand (subrounded), unconsolidated, unfrosted quartz, immature light & dark micas present, 55% other sand & gravel & 45% basalt sand & gravel, little to no weathering rinds on basalt gravel	15	45
Slightly gravelly sandy silt; grayish brown, very fine pebbles, very fine to coarse sand, 5% gravel, 35% sand (subrounded), & 60% silt & clay, compacted, frosted quartz, immature, light & dark micas present, 45% other sand & gravel & 55% basalt sand & gravel, little to no weathering rinds on basalt gravel	25	70
Sand; buff gray, very fine to fine pebbles, fine to very coarse sand, 5% gravel, 95% sand (subrounded), unconsolidated, unfrosted quartz, mature, light & dark mica present, 50% other sand & gravel & 50% basalt sand & gravel, little to no weathering rinds on basalt gravel	20	90
Sandy gravel; grayish buff, very fine to medium pebbles, very fine to very coarse sand, 65% gravel, 35% sand (subangular), unconsolidated, unfrosted quartz, immature, light & dark micas present, 60% other sand & gravel & 40% basalt sand & gravel, little to no weathering rinds on basalt gravel, sample missing from 125 to 130 ft. depth	55	145
Gravel; grayish buff, very fine to medium pebbles, very fine to very coarse sand, 90% gravel, 10% sand (subrounded), unconsolidated, immature, unfrosted quartz, dark mica present, 75% other sand & gravel & 25% basalt sand & gravel, little to no weathering rinds on basalt gravel	30	175
Gravel; buff gray, very fine to coarse pebbles, very fine to very coarse sand, 90% gravel, 7% sand (subrounded), 3% silt & clay, unconsolidated to compacted, immature unfrosted quartz, light & dark micas present, 65% other sand & gravel & 35% basalt sand & gravel, little to no weathering rinds on basalt gravel, some pebbles coated w/ iron oxides, silt and clay	35	210
Gravel; buff gray, very fine to coarse pebbles, fine to very coarse sand, 95% gravel, 5% sand (subrounded), unconsolidated, unfrosted quartz, mature, light & dark micas present, 40% other sand & gravel & 60% basalt sand & gravel, little to no weathering rinds on basalt gravel	50	260
Gravel; grayish buff, fine pebbles to small cobbles, very fine to medium sand, 92% gravel, 8% sand (subrounded) unconsolidated, frosted quartz, mature, light & dark micas present, 70% other sand & gravel & 30% basalt sand & gravel, subequal amounts of fresh & weathered gravel	130	390
Gravel; grayish buff, fine pebbles to small cobbles, very fine to medium sand, 97% gravel, 3% sand (subrounded), unconsolidated, frosta quartz, mature, light & dark micas present, 70% other sand & gravel & 30% basalt sand & gravel, subequal amounts of fresh & weathered basalt gravel	20	410

Silty gravel; blue gray, very fine to coarse pebbles, very fine to medium sand, 50% gravel, 5% sand, 45% silt & clay, compacted, immature, light & dark micas present, 40% other sand & gravel & 60% basalt sand & gravel, subequal amounts of fresh and weathered basalt gravel	15	425
Silty sandy gravel; gray, very fine to coarse pebbles, very fine to medium sand, 75% gravel, 15% sand (rounded), 10% silt & clay, compacted, frosted quartz, immature, light & dark micas present, 20% other sand & gravel & 80% basalt sand & gravel, subequal amounts of fresh & weathered basalt gravel	5	430
Gravelly silt; blue gray, very fine to fine pebbles, very fine to medium sand, 20% gravel, 5% sand (subrounded), 75% silt & clay, compacted, immature mica present, 20% other sand & gravel, 80% basalt sand & gravel, subequal amounts of fresh & weathered basalt gravel	5	435
Silty sandy gravel; dary gray, very fine to coarse pebbles, very fine to medium sand, 65% gravel, 30% sand (rounded), 5% silt & clay, unconsolidated, frosted quartz, immature, light & dark micas present, 30% other sand & gravel, & 70% basalt sand & gravel, subequal amounts of fresh & weathered basalt gravel	20	455
Gravel; grayish black, fine to coarse pebbles, very fine to medium sand, 90% gravel, 8% sand (rounded), 2% silt & clay, unconsolidated, unfrostd quartz, immature, mica present, 30% other sand & gravel & 70% basalt sand & gravel, subequal amounts of fresh & weathered basalt gravel	30	485
Silty gravel; greenish gray, very fine to very coarse pebbles very fine to medium sand, 55% gravel, 5% sand (rounded), 40% silt & clay, compacted, immature, light micas present, 5% other sand & gravel & 95% basalt sand & gravel, no weathering rinds on basalt gravel	35	510
Silty gravel; greenish gray, very fine to very coarse pebbles, very fine to medium sand, 40% gravel, 10% sand (rounded), 50% silt & clay, compacted, immature micaceous, 5% other sand & gravel & 95% bsalt sand & gravel, no weathering rinds on basalt gravel, diatomite present from 530 to 545 ft., rounded, light green tuff pebbles present from 520 to 525 ft.	35	545
Mudstone; greenish gray, very fine to medium pebbles, very fine to medium sand, 5% gravel, 20% sand (subrounded), 75% silt & clay, compacted to lithified by calcium carbonate, silt, & clay, immature, micaceous, 100% basalt, sand & gravel, no weathering on basalt gravel	10	555
Conglomerate; greenish black, very fine to very coarse pebbles, very fine to medium sand, 85% gravel, 10% sand (subangular), 5% silt & clay, compacted to lithified by silt & clay, immature, mica present, 4% other sand & gravel & 96% basalt sand & gravel, no weathering rinds on basalt gravel, interclasts of gray, well rounded tuffaceous sandstone pebbles present from 555 to 580 ft. intraclasts of gray, angular, shale pebbles present from 590 to 612 ft.	57	612
Basalt; grayish black, grading from scoriaceous to vesicular, 612 to 655 ft. dense basalt 655 to 695 ft. and very dense basalt 695 to 712 ft. concentrically banded, well rounded light gray clay pebbles (vug fillings ?) present, microphenocrysts present throughout	90	722
Conglomerate; grayish black, very fine to fine sand, 25% gravel, 5% sand (subrounded), 60% silt & clay, grading from lithified to compacted due to slight thermal metamorphism, immature, 5% other sand & 35% basalt cuttings	13	735
Clay, greenish gray, very fine pebbles, very fine to very coarse sand, 3% gravel, 10% sand (angular), 87% silt & clay, compacted, immature, slightly calcareous, 100% basalt sand & gravel	30	765
Gravelly silty sand; dark grayish green, very fine to fine pebbles, very fine to very coarse sand, 25% gravel, 45% sand (angular), 30% silt & clay, unconsolidated to compacted, immature, 100% basalt sand & gravel	20	785
Rubble zone; red-brownish black, 65% gravel, 10% sand, 25% silt & clay, angular to well rounded basalt gravel & subangular sand rests gradationally on basalt below, compacted, immature, 3% other sand & 97% basalt sand & gravel, concentrically banded, well rounded, gray clay pebbles present	33	818
Basalt, black; grading from scoriaceous to vesicular 818 to 830 ft., dense basalt 830 to 840 ft., vesicular again between 840 to 850 ft., & back to dense basalt 850 to 930 ft., clay fillings present 818 to 830 ft. & 860 to 870 ft., green tuff fragments also present 860 to 870 ft.	112	930
Rubble zone; gray, basalt rubble with clay present.	20	950
Sandstone; green tuffaceous, fine sand, basalt rubble & some clay present	8	958

Basalt; black, dense, rubble zone 958 to 970 ft.	112	1,070
Rubble zone; green, basalt rubble w/clay present	5	1,075
Clay; green, clay w/basalt cuttings present	15	1,090
Sand; green, medium sand w/basalt cuttings & some clay present	10	1,100
Sand; black coarse sand w/tuff fragments present 1,120 to 1,160 ft.	60	1,160
Basalt; black, vesicular to dense 1,160 to 1,175 ft., dense 1,175 to 1,220 ft. & 1,285 to 1,355 ft., & very dense 1,220 to 1,285 ft.	193	1,353
Clay; grayish green, basalt cuttings & green tuff fragments present	17	1,370
Silt, grayish green, clay present	50	1,420
Sand; green, coarse sand w/some silt & clay present	5	1,425
Sand; greenish black, coarse sand	6	1,431
Rubble zone; greenish black, green sandy tuff fragments present	14	1,445
Basalt; grayish black, dense	35	1,480
Basalt	155	1,635
Interbed	18	1,653
Basalt	311	1,964

699-50-7
Location: 50180, W7470 11/28-18L8
Surface Elevation: 547.6
Drilled by Bechtel for HEDL, 1972, water supply borehole

Material (16)	Thickness	Depth
Fine to medium sand	115	115
Sand & gravel	15	130
Sandy gravel	61	191
Sandy gravel & gravel	9	200
Sandy gravel	5	205
Fine to medium sand	5	210
Sand & gravel to silty gravelly sand, trace silt clay stringers	189	399

699-50-8
Location: 50180, W7970 11/28-18L9
Surface Elevation: 545.9
Drilled by Bechtel for HEDL, 1972, water supply borehole

Material (16)	Thickness	Depth
Fine to medium sand	137	137
Sand & gravel	13	150
Sandy gravel	31	181
Sandy gravel & gravel	21	202
Sandy gravel	6	208
Fine to medium sand	3	211
Silty gravel, trace clay	19	230
Silty gravelly sand	3	233
Silty gravel	5	238
Sandy clay	1	239
Silty gravel	18	257
Gravel	2	259
Silty gravel	4	263
Silty gravel, trace of clay	3	266
Silty gravel	17	283
Gravel	2	285
Silty gravelly sand	9	294

699-1-1 (1A-SP-1)
Location: N1300, W700 11/28-1781
Surface Elevation: 425.1
Air rotary, logged by Pugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, variegated brown & gray, fine to medium sand, predominantly quartz grains w/ some basalt grains	19	19
Sand & gravel, variegated brown & gray, fine to coarse sand w/brown fines, quartz & basalt grains, few fine to coarse gravels	51	70

699-1-18
Location: N1420, W1593 11/27-1401
Casing Elevation: 537.68
Cable tool, drilled by Swain & Hatch of Hatch Drilling Company for GE Company, 1958, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand-silt	5	5
Coarse sand	7	12
Coarse sand-silt	18	30
Coarse sand-silt (coarser)	15	45
Fine sand & silt	8	53
Sand-silt	12	65
Coarse sand-silt	20	85
Coarse sand-silt (some gravel)	5	90
Gravel & cobbles	3	93
Gravel	12	105
Clean gravel	5	110
Gravel	15	125
Cemented sand & gravel	30	155
Gravel	5	160
Sand-gravel	10	170
Clean gravel	1	171
Gravel	4	175
Cemented sand & gravel	5	180
Clean gravel	5	185
Cobbles & gravel	5	190
Clean gravel	5	195
Sand & gravel (softer)	5	200
Cemented sand & gravel	50	250
Sand-silt & small gravel	5	255
Basalt & mixed gravel	10	265
Basalt & mixed gravel & sand	10	275
Sand & gravel basalt	20	295
Basalt-gravel & green-brown sand	10	305
Basalt & mixed gravel	10	315
Basalt-gravel & sand	5	320
Green clay & basalt particles	30	350

699-2-E19 (DB-3)
Location: N1962, E18926 11/28-1301
Casing Elevation: 384.24
Air rotary, drilled by Burns of Aqua Drilling & Development Company for ARHCO, 1973, starter hole for core drilling

Material (1, 2)	Thickness	Depth
Fine sand w/silt	15	15
Coarse gravel w/sand	35	40
Coarse gravel & sand	70	110
Sand, silt, & clay	25	135
Coarse gravel & sand	15	150
Coarse gravel w/coarse sand	35	185
Fine sand w/silt & clay	10	195
Fine sand w/siltstone & clay	5	200
--	55	255
Coarse gravel	5	260
--	10	270
Coarse gravel & sand	5	275
--	7	282
Basalt	6	288

699-2-E14 (DB-1)
Location: N1633, E13573 11/28-1401
Casing Elevation: 388.79
Cable tool (to 325 ft.) & diamond coring, drilled by Burns of Aqua Drilling & Development Company & Boyles Brothers Drilling Company for ARHCO, 1973, geologic & hydrologic test boring

Material (1, 2, 21)	Thickness	Depth
Coarse gravel w/sand	140	140
Green clay & sand chips	15	155
Green-sand	5	160
Green sand w/clay	15	175
Coarse gravel, coarse sand	45	220
--	65	285
Green sand & gravel	36	321
Basalt	122	443
Baked tuffaceous sandstone	16	459
Basalt	155	614
Sandstone	5	619
Basalt	54	673
Tuff w/sand	6	679
Basalt	45	724
Tuff, welded sandstone	9	733
Basalt	243	976
Welded tuff & tuffaceous sandstone	14	990

699-2-1 (1A-SP-2)
Location: N2450, W1000 11/28-801
Surface Elevation: 453.6
Air rotary, logged by Pugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand variegated brown & gray fine to medium sand, predominantly quartz grains w/some basalt grains	64	64
Sand & gravel, variegated brown & gray, fine to coarse sand w/brown fines, quartz & basalt grains, fine to coarse gravels, predominantly basalt (Driller's comment: cemented gravel)	39	103

699-2-3
Location: N1900, W3325 11/28-1701
Casing Elevation: 477.14
Cable tool, drilled & logged by the USGS for GE Company, 1950, groundwater monitoring & geologic investigation borehole

Material (4)	Thickness	Depth
Sand, buff-white, subrounded, coarse in upper 3 ft. (wind-worked) & medium to fine below; sand is equally basalt & siliceous materials, but the few gravel granules are largely basalt	8	8

Sand, gravelly, medium to very coarse, high basalt composition in coarser, & high quartz in finer, grains, about 15% granule & pebble gravel that is 75% basalt	4	12
Sand, clean, medium & coarse, basaltic & siliceous, gray, subrounded	32	44
Sand, similar to just above, but higher in basalt (50 to 75%)	12	56
Sand & gravel; mixed sand of average medium size; larger grains are basaltic, & smaller are siliceous; about 30% granule & pebble gravel is predominantly basalt without weathering rinds	39	95
Gravel & sand; granule & pebble exotic gravel having a matrix of medium siliceous sand; some basalt pebbles have weathering rinds	20	115
Sand, gravelly; medium & fine quartzose, exotic, & micaceous (5%) sand having granule, pebble, & cobble gravel that is predominantly of exotic rock types	5	120
Sand, clean, medium to fine, siliceous; contains granular largely exotic gravel	7	127
Gravel, sandy; granule & pebble exotic-type gravel having an equal amount of medium clean tan-gray siliceous sand; tan silt makes up 10% of material	8	135
Sand, gravelly; mixed, averaging medium, quartzose sand carrying 20% granule, pebble, and cobble gravel in which basalt forms 60%; some basalt pebbles have weathering rinds	8	143
Gravel, sandy; granule, pebble, & cobble gravel of about equal basalt & exotic types; medium sand, carrying fine & coarse, is predominantly siliceous material; some basalt pebbles have weathering rinds	4	147

699-2-7
Location: N1529, W6824 11/28-18C1
Casing Elevation: 512.2
Cable tool, drilled by Dick of Hatch Drilling Company for PNL, 1978, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	105	105
Sand & gravel	20	125
Sand & gravel cemented	30	155
Sand & gravel	15	170
Sand & gravel cemented	30	200

699-2-33A
Location: N1813, W3282J 11/27-17B1
Casing Elevation: 536.37
Cable tool, drilled by Bach of Bach Drilling Company for GE Company, 1958, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	40	40
Heavy sand	5	45
Sand & small gravel	30	75
Sand	5	80
Sand & small gravel	8	88
Sand	32	120
Sand & gravel	4	124
Gravel, sand, clay	16	140
Cemented gravel	5	145
Cemented gravel & clay	5	150
Cemented gravel & little clay	10	160
Cemented sand, gravel & little clay	6	166
Gravel & sand, little clay	19	185
Small gravel, sand & little clay	9	194
Brown clay	28	222
Blue clay & sand	13	235
Blue sand & little clay	35	270
Green clay, little sand	5	275
Fine sand & little blue clay	8	283
Fine sand & little brown clay	10	293
Fine sand	6	299
Fine sand & little blue clay	6	305
Fine sand & small gravel	5	310
Sand & gravel, blue clay	19	329
Sand, gravel & little clay	1	330
Sand, gravel & clay	5	335
Sand, gravel, blue clay-hard pan	8	343
Sand, gravel & little blue clay	6	349
Dark gray clay, few small rocks, clay very sticky	13	362
Gray clay & gravel	18	380
Gray clay & little sandy	5	385
Gray clay & little sand	15	400
Gray clay, gravel & boulders	4	404
Gray clay, sand, few heavy gravel	6	410
Gray clay, sand & gravel	14	424
Sand & gravel, blue clay	1	425
Sand & gravel, blue-gray clay	6	431
Sand & gravel, gray clay	6	434
Sand & gravel, little gray clay	1	434
Sand, small gravel, very little gray-green clay	8	442
Sand-gravel-gray clay (very little)	9	451
Sand & gravel, little gray-green clay, about 434-452 ft.	1	452
Basalt-black basalt very solid	14	466

699-2-33B
Location: 11/27-17B2
Casing Elevation:
Cable tool, drilled by Dick of Hatch Drilling Company for RHO, 1977, hydrologic investigation borehole

Material (1)	Thickness	Depth
Fine sand, brown	28	28
Medium sand	34	62
Sand	38	100
Medium sand	10	110
Cemented sand	42	152
Cemented sand & gravel	8	160
Sand & gravel	34	194
Brown clay	21	215
Blue clay	15	230
Blue sandy clay	35	265

Blue clay	3	268
Blue sand	47	315
Blue sandy clay & gravel	20	335
Gravel	5	340
Sand	7	347
Brown clay	58	405
Gray sand	15	420
Clay & gravel	5	425
Gravel & clay	10	435
Sand & gravel	10	445
Green clay & gravel	5	450
Basalt	1	450

699-3-45
Location: N3007, W45007 11/26-12N1
Casing Elevation: 504.54
Cable tool, drilled by Jacobson of Haden Drilling Company for GE Company, 1982, groundwater monitoring borehole

Material (1)	Thickness	Depth
Silt brown in color	5	5
Silt & brown sand	10	15
Light brown sand	40	55
Fine brown sand	15	60
Fine light brown sand	15	75
Fine brown sand	20	95
Fine brown sand w/basalt gravel; hit change of material at 98 ft when into basalt gravel	10	105
Sand & 1/2 in.-gravel, brown in color	5	110
Sand & 1/2 in.-gravel, brown in color	5	115
1/4 in.-gravel down to fine brown sand	10	125
1/4 in.-gravel & fine brown sand	6	131
Honeycomb basalt	9	140
Basalt	10	150
Basalt coarse 1/2 in.	5	155
Black & rust color basalt	10	165
Hole is falling in--grouted	3	168
Rusty red rock, coarse 3/4 in.-down to fine sand size	2	170
Rusty red rock	5	175

699-4-E6
Location: 11/28-9J1
Casing elevation:
Cable tool, drilled by Egan of Bach Drilling Company for PNL, 1977, groundwater monitoring borehole

Material (1)	Thickness	Depth
80% very fine sand, 20% fine sand	(veneer)	
40% fine sand, 30% medium sand, 20% coarse sand, 10% very coarse sand	5	5
40% fine, sand, 30% medium sand, 20% coarse sand, 10% small pebbles	5	10
40% very coarse sand, 10% coarse sand, 30% medium sand, 20% small pebbles	5	15
50% coarse sand, 40% very coarse sand, 10% medium sand	5	20
50% medium sand, 40% coarse sand, 10% very coarse sand	5	25
50% medium sand, 30% fine sand, 10% coarse sand, 10% very coarse sand	5	30
40% small pebbles, 20% small cobbles, 20% medium sand, 20% fine sand; gray	14	44
50% medium sand, 30% coarse sand, 10% very coarse sand, 10% small cobbles; gray	4	48
30% silt, 40% small pebbles, 30% small cobbles; gray	2	50
30% gray silt, 40% small pebbles, 20% small cobbles, 10% very coarse sand	5	55
40% very coarse sand, 30% small pebbles, 20% small cobbles, 10% silt; gray	5	60
50% small pebbles, 30% very coarse sand, 10% small cobbles, 10% silt; gray	15	75
50% very coarse sand, 20% small cobbles, 20% small pebbles, 10% gray silt	5	80
50% coarse sand, 30% medium sand, 20% fine sand	10	90
40% very coarse sand, 30% small pebbles, 20% medium sand, 10% fine sand	5	95

699-4-1 (1A-SP-3)
Location: N3600, W1400 11/28-8L1
Surface Elevation: 466.50
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (1)	Thickness	Depth
Sand, variegated brown & gray, fine to medium sand, predominantly quartz grains w/some basalt grains	70	70
Sand & gravel, gray sand, variegated gravels, fine to coarse sand, predominantly basalt grains, some fines, gravel (Driller's comment: cemented gravel)	38	108

699-4-5 (1B-SP-2)
Location: N4100, W4900 11/28-7J1
Surface Elevation: 476.71
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (1)	Thickness	Depth
Sand, dark gray, fine to medium sand w/some coarse sand, basalt grains	60	60
Sand & gravel, gray	5	65
Sand, light gray, fine to medium sand predominantly quartz	14	79
Sand & gravel, dark brown, fine to coarse sand, fine to coarse gravel	7	86
Sand, light brown, fine sand, quartz	10	96
Driller's comment: cemented gravel	11	107

699-4-6 (1B-SP-1)
Location: N3500, W5600 11/28-7Q1
Surface Elevation: 484.00
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, variegated, gray, fine sand, basalt grains Sand, gray, fine to medium sand, basalt grains Sand, variegated gray & white, predominantly medium sand, predominantly quartz grains. . .	75	75
Sand & gravel, gray, fine to coarse sand, fine to coarse gravel	40	115

699-5-E6 (1C-SP-2)
Location: ~N5200, E5100 11/28-9H1
Surface Elevation: 422.49
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & white, fine to medium sand, basalt & quartz grains	51	51
Sand & gravel; gray, fine to coarse sand, basalt & quartz grains	9	60
Sand & gravel; brown, fine to medium sand, gravel, varied composition, silt coats Sand & gravel, brown, fine to medium sand, gravel	27	87

699-5-2 (1A-SP-4)
Location: N4750, W1800 11/28-8L2
Surface Elevation: 465.10
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, brown . . . . . (veneer)		
Sand, variegated brown & gray, fine to coarse, predominantly medium sand, occasional gravel	71	71
Sand & gravel, brown, fine to coarse sand, predominantly quartz, gravel (Driller's comment: cemented gravel) . . .	36	107

699-5-3 (1B-SP-4)
Location: N5200, W2700 11/28-8E1
Surface Elevation: 465.10
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, dark gray, fine to medium sand, basalt grains	70	70
Sand & gravel, light brown, fine sand w/some gravel, fine to coarse gravel	36	106

699-5-4 (1B-SP-3)
Location: N4600, W3800 11/28-8M1
Surface Elevation: 465.40
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, brown . . . . . (veneer)		
Sand, gray	56	56
Sand & gravel, dark gray, fine to coarse sand, basaltic, fine to coarse gravel	10	66
Sand, grayish brown, fine to medium sand, predominantly quartz	9	75
Sand & gravel, light brown, fine sand w/some silt, fine to coarse gravel (Driller's comment: cemented gravel) . . .	30	105

699-6-E16 (P-1)
Location: ~N5890, E15500 11/28-11G1
Surface Elevation: 369.4
Cable tool, drilled by Hatch Drilling Co. & logged by Shannon & Wilson for WPPSS, 1971, WNP-2 pumpstation preliminary foundation investigation boring

Material (8)	Thickness	Depth
Medium dense, light brown, slightly silty, fine sand . . .	11	11
Very dense, tan, yellow-brown, black & gray, slightly clayey, silty fine to medium, sand & gravel	28	39
Fine to medium sand	5	44
Sand & gravel; same as interval 11-39 ft.	19	63
Fine to medium sand	4	67
Sand & gravel; same as interval 11-39 ft.	32	99
Hard, tan to blue-gray, clayey silt	6	105
Very dense, light brown, slightly silty, very fine sand	5	110

699-6-E5 (1C-SP-3)
Location: N6350, E5850 11/28-9A1
Surface Elevation: 432.20
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & white, fine to medium sand, basalt & quartz grains	47	47
Sand & gravel; gray, fine to coarse sand, sand predominantly basalt; gravel predominantly basalt	49	96
Sand & gravel, brown, fine to medium sand, predominantly quartz, gravel		

699-6-1 (1B-SP-6)
Location: N6300, W600 11/28-8G1
Surface Elevation: 437.70
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, gray, fine to medium sand, basalt grains	40	40

Sand & gravel, gray, fine to coarse sand, some silt, basaltic, fine to coarse gravel	16	56
Sand & gravel, grayish brown, fine sand, fine to coarse gravel	19	75

699-6-2A (BH-137)
Location: N5500, W2000 11/28-8F1
Casing Elevation: 461.3
Air rotary (to 250 ft.), mud rotary (to 464 ft.), & diamond coring; drilled by Aqua Drilling & Development Company & Longyear Company & logged by Fugro for WPPSS, 1974, bedrock geology investigation borehole

Material (B)	Thickness	Depth
Sand, loose, light brown, fine, clean scattered roots	4	4
Sand, medium dense to very dense, gray, fine to medium clean to slightly silty, trace fine gravel	38	42
Sandy gravel, medium dense to dense, gray, fine to coarse, slightly silty	4	46
Sand, same as interval 4-42 ft.	11	57
Gravelly sand, dense to very dense, gray brown, fine to coarse, clean to slightly silty	2	59
Sand, same as interval 4-42 ft.	14	73
Sandy gravel, very dense, gray brown, fine to coarse, slightly silty, scattered to numerous cobbles	60	133
Sand very dense, brown, fine to medium, slightly silty	1	134
Sandy gravel, same as interval 73-133 ft.	10	144
Sand, very dense, light brown, fine to medium, slightly silty	3	147
Sandy gravel, same as interval 73-133 ft.	79	226
Sand, very dense, gray, fine to medium, slightly silty	8	234
Sandy gravel same as interval 73-133 ft.	15	249
Silty sand, very dense, green-gray, fine to medium	2	251
Gravel, dark gray, clayey, silty & sandy	35	286
Gravelly clay, dark gray, clay w/silt to fine sand, gravel & cobbles	19	305
Clayey gravel, brown, some silt to fine sand	9	314
Gravelly clay, brown, clay w/silt to fine sand, gravel & cobbles	30	344
Gravelly sand, dark gray to brown, fine to course sand, some gravel	31	375
Sandy gravel, dark gray to brown, gravel & cobbles, fine to coarse sand	19	394
Gravelly clay, green clay, dark gray to black gravel	16	410
Silty clay, dark olive gray, clay w/silt, some gravel	53	463
Conglomerate, light gray, basalt gravel & cobbles in dark gray, clay silt matrix, well indurated	13	476
Sandy siltstone, dark gray w/some green coloring, fine to medium sand, some clay, well indurated	21	497
Conglomerate, light gray, basaltic gravels in gray silt matrix, gravels & cobbles matrix, poorly consolidated & not always present in core	46	539
Basalt, dark gray, fine grained, scoriaceous to highly vesicular, grades to vesicular, weathered angular fragments, green clay	15	554
Basalt	7	561
Basalt scoriaceous to highly vesicular, some green clay, weathered	12	573
Basalt dark gray, fine grained, dense, unweathered, slight veining throughout	96	669
Basalt, vesicular & fractured	2	671
Siltstone, claystone & sandstone, generally well indurated	38	709
Basalt, gray, fine-grained, scoriaceous to highly vesicular flow top basalt, amygdules	31	740
Basalt, black to gray, fine grained, vesicles rare, dense, rare amygdules, plagioclase laths & irregular blebs of black glass	130	870
Basalt, dark gray, medium grained, dense, plagioclase laths to 2 mm., green clay on parting surfaces	11	881
Tuff, gray green, massive appearing ash tuff, fine lapilli present, & silty claystone, light green, micaceous, clay increases with depth	14	895
Basalt, highly vesicular, fractured basalt, green silty clay fills voids & fractures	6	901
Basalt, black, fine grained moderately vesicular, vesicle size decreasing w/depth, little clay	15	916

699-6-2B (1B-SP-5)
Location: N5600, W1600 11/28-8F2
Surface Elevation: 454.80
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (B)	Thickness	Depth
Sand, gray, fine to medium sand, basalt grains	80	80
Driller's comment: cemented gravel	24	104

699-6-2C (1A-SP-5)
Location: N5850, W2150 11/28-8F3
Surface Elevation: 459.20
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand brown . . . . . (veneer)		
Sand, variegated gray & white, fine to medium sand, basalt & quartz grains	70	70
Sand & gravel, gray sand, variegated gravels, fine to coarse sand, predominantly basalt grains, some fines, gravel (Driller's comment: cemented gravel)	37	107

699-7-E6 (1C-SP-4)
Location: ~N7490, E5560 11/28-9A2
Surface Elevation: 435.70
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & white, fine to medium sand, basalt & quartz grains	69	69
Sand & gravel; gray, fine to coarse sand, basalt & quartz grains, basaltic gravel	30	99
Sand & gravel; brown, fine to medium sand predominantly quartz grains, gravel		

699-7-E2 (1B-SP-9)
Location: ~N7400, E1550 11/28-9D1
Surface Elevation: 423.3
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, gray-brown, fine sand, basalt grains	20	20
Sand & gravel, gray, fine to coarse sand, basaltic, some fine to coarse gravel	50	70

699-7-E1A (1B-SP-7)
Location: N6800, E500 11/28-8A1
Surface Location: 421.4
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, gray, fine to medium sand, basalt grains	30	30
Sand & gravel, light brown, fine sand & some silt, minor gravel	41	71
Sand & gravel, dark brown, fine sand fine to coarse gravel		
Sand & gravel, light brown, predominantly fine sand, some silt, fine gravel		

699-7-E1B (1B-SP-8)
Location: N7000, E900 11/28-8A2
Surface Elevation: 421.5
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, dark brown, fine sand, some silt	45	45
Sand & gravel, dark brown, fine to medium sand, fine to coarse gravel	30	75

699-7-3 (1A-SP-6)
Location: N7000, W2500 11/28-8C1
Surface Elevation: 460.8
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, variegated brown & gray, fine to medium sand, some brown silt, basalt & quartz grains	66	66
Sand & gravel, gray sand, variegated gravels, fine to coarse sand, predominantly basalt grains, some fines, gravel . . .	9	75
Sand & gravel, brown fine to medium sand, quartz grains, gravel (Driller's comment: cemented gravel)	33	108

699-8-E3A (1B-SP-11)
Location: N7800, E2700 11/28-4P1
Surface Elevation: 424.8
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, gray	12	12
Sand & gravel	24	36
Sand, gray	5	41
Sand & gravel, dark grayish brown, fine to coarse sand, basaltic, some gravels	19	60
Sand & gravel, light gray, fine sand fine to coarse gravel . . .	22	82

699-8-E3B (1B-SP-12)
Location: N8100, E3100 11/28-4P2
Surface Elevation: 425.5
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, gray & white variegated, fine to medium sand, basalt grains	31	31
Gravel, basaltic	31	62
Sand & gravel brown, fine sand w/silt, fine to coarse gravel	20	82

699-8-E2C (18-SP-11A)
Location: ~N7750, E2614 11/28-4P3
Surface Elevation: 421
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, gray to dark gray, medium to fine sand	5	5
Sand & gravel, gray, medium to coarse sand w/gravel, fine to coarse gravel	25	30
Sand & gravel, brown, fine to medium sand, some silt, fine to coarse gravel	60	90

699-8-E2A (18-SP-10)
Location: N7550, E2000 11/28-4N1
Surface Elevation: 414.8
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, variegated gray & white, fine to coarse sand, basalt grains	10	10
Sand & gravel, gray-brown, fine sand, fine gravel	58	68

699-8-E2B (18-SP-10A)
Location: ~N7636, E1950 11/28-4N2
Surface Elevation: 423
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, gray	5	5
Sand & gravel, gray, fine to coarse sand, some silt, fine to coarse gravel	10	15
Sand, grayish brown, fine to coarse sand	25	40
Sand & gravel, light gray, fine to coarse gravel	29	69
Sand & gravel, dark brown, fine to medium sand, fine to coarse gravel		

699-8-8A
Location: N8319, W8167 11/28-6N1
Casing Elevation: ~488
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	82	82
Gravel & boulders	28	110

699-8-8B
Location: N8319, W8167 11/28-6N2
Casing Elevation: ~488
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	82	82
Gravel & boulders	28	110

699-8-17
Location: N8200, W7125 11/27-2Q1
Casing Elevation: 522.44
Cable tool, drilled & logged by USGS for GE Company, 1950, groundwater monitoring & geologic investigation borehole

Material (4)	Thickness	Depth
Sand, silty, medium to coarse, rounded; consists about equally of basalt, exotic rock types, & quartz	3	3
Sand; mixture of all grain sizes; rock types equally distributed as above; some granular basaltic gravel & buff silt included	10	13
Sand & gravel; medium to coarse quartz & basalt sand with 20% granule to cobble basaltic gravel	13	26
Sand, medium to coarse, clean, gray, basaltic; carries 5% rounded granules & pebbles of basalt	10	36
Sand, medium to coarse, partially cemented; consists of quartz 60%, basalt 35%, and exotic rock types 5%	28	64
Sand & gravel; medium to coarse quartzose & basaltic sand carrying 20 to 40% basaltic pebble & cobble gravel	39	103
Gravel & sand; pebble & cobble basalt & exotic-type gravel having a matrix of 30% poorly sorted quartz & basalt sand; predominantly sand in lowest 6 ft.	24	127
Sand, fine to medium, iron-stained, high in quartz w/some mica; includes some tan silt that was apparently an interbed	5	132
Sand & gravel; fine & medium light-buff sand high in quartz, w/5% mica & 10-40% pebble & cobble gravel largely of exotic rock types	12	144
Sand & gravel; pebble & cobble gravel predominantly of upriver exotic rock types w/50-90% sand that is largely fine to medium well-sorted quartz	4	148
Sand & gravel; fine to medium quartzose & micaceous sand w/an equal amount of pebble & cobble gravel consisting of 70% exotic rock types & 30% basalt	11	159
Sand & gravel; mostly medium sand, but some fine & coarse, predominantly of quartz, some mica, & up to 10% pebble & small-cobble gravel consisting of 70% exotics and 30% basalt	19	178
Sand, gravel & some tan silt; poorly sorted, or mixed beds of sorted fine to coarse, quartzose sand carrying up to 25% basalt & exotic pebble gravel & some silt	12	190
Silt, clayey, khaki; carries 10% fine sand	1	191

Sand & clayey silt; fine quartzose, micaceous sand w/25% khaki (apparently interbedded) clayey silt; zone is well laminated & partly indurated	6	200

699-8-25
Location: N7995, W25003 11/7-3N1
Casing Elevation: 509.30
Cable tool, drilled by Rodda of Bach Drilling Company for ARHCO, 1971, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & silt	25	25
Sand & gravel & cobbles (4-6 in.)	5	30
Sand & gravel	3	33
Sand & silt	22	55
Packed sand & silt	10	65
Packed coarse sand	10	75
Packed sand & silt	10	85
Sand & silt	5	90
Sand & silt, few pea gravel . . .	5	95
Sand & gravel	5	100
Boulders	5	105
Sand & gravel	25	130
Tan sand & gravel	18	148
Fine sand & gravel	16	164
Sand & gravel	1	165
Packed sand, very little gravel	6	170

699-8-32
Location: N7875, W31800 11/27-5R1
Casing Elevation: 554.39
Cable tool, drilled by the USGS for DE Company 1950, groundwater monitoring & geologic investigation borehole

Material (1)	Thickness	Depth
Sand	4	4
Sand, medium to coarse	44	48
Sand, medium	9	57
Sand, medium to coarse	7	64
Sand w/gravel to 1 in.	11	85
Sand, clayey silt	3	88
sand, some gravel	9	97
Sand	4	101
Sand, few pebbles	35	136
Sand, fine to coarse	17	153
Sand, gravel to 2 in.	11	164
Gravel, some sand	8	172
Sand w/pebbles	10	182
Gravel & sand	5	187
Sand, fine to medium	3	200
Gravel, pebbles & cobbles	4	204

699-9-E5A (BH-12B)
Location: N9148, E51120 11/28-4K1
Casing Elevation: 453.8
Air rotary (to 220 ft.), mud rotary (to 446 ft.) & diamond coring, driller by Aqua Drilling & Development, Inc. & Longyear Company & logged by Fugro for WPPSS, 1974, bedrock geology investigation borehole

Material (8)	Thickness	Depth
Sand, gray, fine to medium sand, well to moderately graded, basaltic	65	65
Gravel, gray, fine to coarse gravel, well rounded, mixed litnology	8	73
Gravelly sand, brown, fine to medium sand	27	100
Sandy gravel, gray; clayey gravel light brown clay, fine gravels, some silt; gravel, gray, clean	104	204
Sand, brown, medium to coarse sand well graded; gravelly sand, dark gray, medium sand, angular, some gravel & cobbles; gravelly sand, coarse sand, high mica content, some gravel & cobbles; sand brown, fine to medium sand, high mica content; silty sand, brown, fine sand w/silt, mica content above; sand, brown medium to coarse sand, high mica content	205	409
Clayey silt, dark olive gray-brown, some fine sand, high mica content	30	439
Silty sand, fine to medium sand, angular, basaltic	6	445
Conglomerate, gray fine to coarse gravel, basaltic, medium sand matrix, angular, well graded	14	459
Claystone, green to dark gray .	1	460
Conglomerate, same as interval 445-459 ft.	16	476
Basalt, black, fine to medium grained, slightly to non-vesicular, dense, diktytaxitic in places	18	494
Basalt, black, fine grained, highly vesicular, light green clay filling, joints & fractures	29	523
Basalt, highly vesicular, deeply weathered	7	530
Basalt, black, fine grained, slightly vesicular to non-vesicular	75	605
Tuffaceous sandstone, gray, fine to medium sand high mica content, well indurated	11	616
Claystone, silty, dark gray, poor recovery; claystone, light green, some silt, scoriaceous, basalt fragments to 10 cm. . .	13	629
Basalt, dark gray, fine grained highly vesicular to scoriaceous, dark green clay fills fractures & joints at flow top	22	651
Basalt, dark gray, fine grained, rare vesicles, dense, irregularly spaced & oriented fractures, plagioclase laths to 1 mm. . .	106	757
Basalt, high vesicular	5	762
Basalt, slightly to non-vesicular	8	770
Basalt, black, fine grained, highly vesicular, fractured, green clay fills fractures	17	787
Siltstone, green	11	798
Basalt, black, fine grained, moderately to slightly vesicular, vesicles to 5 cm.	34	832

Basalt, black, fine grained, dense rare vesicles, plagioclase phenocrysts to 4 mm.	24	864
Claystone, green baked	1	865
Basalt, black, fine grained, highly to moderately vesicular, light green clay fills vesicle & joints	29	894

699-9-E5B (1B-SP-14)
Location: N9225, E5225 11/28-4K2
Surface Elevation: 455.96
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (B)	Thickness	Depth
Sand, gray, fine to medium sand, basalt grains	76	76
Sand & gravel, gray, fine to coarse sand, fine to coarse gravel	44	120

699-9-E5C (1C-SP-5)
Location: N8700, E5200 11/28-4K3
Surface Elevation: 449.80
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (B)	Thickness	Depth
Sand, variegated gray & white, fine to medium sand, basalt & quartz grains	60	60
Sand & gravel; gray, fine to coarse sand, sand & gravel, predominantly basaltic	30	90
Sand & gravel; brown, fine to medium sand predominantly quartz grains	21	111

699-9-E4A (DB-1B)
Location: N9261, E4459 11/28-4D1
Surface Elevation: 446.1
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Sand loose, light brown, fine to coarse, slightly silty	6	6
Sand loose, gray to gray brown, fine to coarse, clean to slightly silty	9	15
Sand, medium to very dense, gray to gray-brown, fine to coarse, clean to slightly silty, scattered fine to coarse gravel	48	63
Sandy gravel, dense, gray, fine to coarse, clean	8	71
Sandy gravel, very dense (inferred from drill action)	2	73

699-9-E4B (1B-SP-13)
Location: N8700, E4150 11/28-4D2
Surface Elevation: 433.3
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (B)	Thickness	Depth
Sand, dark gray		
Sand, variegated gray, fine to medium sand, some coarse grained, basalt grains	41	41
Sand & gravel, light brownish gray, fine to coarse sand, fine gravel	19	60
Sand & gravel, dark brown, fine to medium sand, fine to coarse gravel	26	86

699-9-E2
Location: N857?, E2324 11/28-4N1
Casing Elevation: 418.09
Cable tool, drilled by Hatch of Hatch Drilling Company for GE Company, 1956, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand-silt	5	5
Sand-gravel-silt	15	20
Sand-gravel-clean	5	25
Coarse sand & clean gravel	5	30
Cobbles-same as above	5	35
Cobbles-gravel-silt	10	45
Cobbles-gravel cemented	5	50
Coarse sand & gravel-cemented	10	60
Gravel & cobbles	4	64
Cobbles, gravel cemented	6	70
Cemented gravel	5	75
Loose gravel & sand	4	79
Loose sand & gravel	6	85
Cemented sand	9	94
Cemented sand & gravel	16	110
Sand-gravel	20	130
Fine sand	5	135
Sand-gravel	5	140
Cobbles-gravel-sand & silt	5	145
Cobbles-gravel-sand	3	148
Cobbles-sand-silt	2	150
Sand-gravel	17	167
Fine sand & gravel	20	187
Sandy-blue clay	3	190
Mixed gravel, clay & sand	20	210
Hard packed gray clay w/gravel	10	220
Gray sandy clay w/gravel	5	225
Gray sandy clay	15	240
Gray sandy clay (hard)	5	245
Blue clay, gravel particles	30	275
Gray clay w/gravel (very hard)	10	285
Gray clay w/gravel and sand (hard)	15	300
Gray clay w/sand (soft)	10	310
Gray clay w/basalt particles	5	315
Green clay w/basalt particles	5	320
Green clay w/sand & basalt particles	10	330
Black clay w/varied rock	5	335
Black clay w/no rock	20	355
Black clay	10	365
Black clay w/rock particles	15	380

Black clay	20	400
Black clay w/sand-softer	5	405
Basalt gravel, sand	19	424
Basalt	30	454

699-9-3 (1A-SP-7)
Location: N8600, W3000 11/28-5N1
Surface Elevation: 468.50
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, variegated gray & brown, fine to medium sand, quartz & basalt grains	75	75
Sand & gravel, gray sand, variegated gravels, fine to coarse sand, predominantly basalt grains, some fines, gravel	10	85
Sand & gravel, brown fine to medium sand, quartz grains, gravel (Driller's comment: cemented gravel)	31	116

699-10-E12
Location: N10000, E12000 11/28-1001
Casing Elevation: 430.8E
Cable tool, drilled by Jacobson of Hader Drilling Company for BE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gray sand, fine	2	2
6 in.-gravel to fine brown sand, gravel 20%, coarse & loose	4	6
Cemented gravel	2	8
2 in. cemented gravel	2	10
3/4 in. cemented gravel	5	15
1/2 in. cemented gravel	5	20
1/4 in. cemented gravel	10	30
1 in.-gravel down to fine sand cemented color, when washed out seems to be about 10% fine sand	5	35
2 in.-gravel down to fine sand cemented color, washed out seems to be about 20% fine sand; not so tight	5	40
1 1/2 in.-gravel down to fine sand, cemented color, washed out seems to be about 25% sand	5	45
1 in.-gravel down to fine sand cemented color, washed out seems to be about 25% sand	5	50
1 1/2 in.-gravel down to fine sand cemented color, washed, seems to be about 35% sand	5	55
3 in. gravel down to fine sand w/traces of caliche; 30% sand	5	60
6 in. gravel down to fine sand w/traces of caliche; 25% sand	5	65
5 in. gravel down to fine sand, cemented color, about 25% sand & traces of caliche	5	70
1/2 in. gravel down to fine sand, dark brown color about 50% sand	5	75
1/2 in. gravel down to fine sand, dark brown color, about 50% black sand	5	80
Coarse sand w/silt binder, brown color, about 30% coarse sand; tightly packed	5	85
1 in. gravel down to fine sand w/silt binder; light brown color; about 60% fine sand; tightly packed	5	90
Coarse & fine sand w/gold and silver mica, about 85% fine sand	5	95
1/4 in. gravel down to fine sand; light brown; about 50% fine sand w/silt binder packed tightly	5	100
2 1/2 in. gravel down to fine sand; 65% coarse sand; light brown; packed tight w/silt binder	5	105
1/2 in. gravel to fine sand; light brown; about 25% fine sand w/silt binder very tightly packed	5	110
1/4 in. gravel to fine sand; light brown; about 15% fine sand w/silt binder-some mica; very tightly packed or cemented	5	115
Coarse & fine sand; about 90% fine sand w/silt binder; light brown	5	120
1/2 in. gravel down to fine sand; about 50% fine sand w/silt binder; light brown	5	125
1/2 in. gravel down to fine sand; about 50% fine sand w/silt binder; light brown; packed very tight	5	130
2 in. gravel to fine sand, about 50% fine sand w/silt binder & traces of yellow clay, light brown	5	135
1 in. gravel & some sand 90% brown or gray clay, clay at 137 ft.	5	140
1 1/4 in. gravel & some sand 90% brown or gray clay	10	150
Brown or gray clay w/some sand & gravel	20	170
1/4 in. gravel to fine sand, about 30% fine sand, light brown w/silt binder, at 172 ft. sand & gravel as before	5	175
1/4 in. gravel to fine sand, about 25% fine sand, light brown w/silt binder	5	180
1 in. gravel to fine sand, about 60% fine sand, light brown w/silt binder	5	185
2 in. gravel to fine sand, 30% fine sand, light brown w/silt binder	5	190
2 1/4 in. gravel to fine sand, about 40% fine sand, light brown w/silt binder	5	195
1 1/2 in. gravel to fine sand, about 50% fine sand, light brown w/silt binder	5	200
1 1/4 in. gravel to fine sand, about 30% fine sand, light brown w/silt binder	5	205
2 in. gravel to fine sand, about 40% fine sand, light brown w/traces white & gray clay & silt binder	5	210
Gray clay w/1 1/2 in. gravel to fine sand, about 20% sand w/traces white clay, light brown	5	215
Gray clay w/1/2 in. gravel to fine sand, about 2% sand, gray	10	225

1/2 in. gravel to fine sand, about 40% fine sand w/traces gray clay; color gray; very tightly packed	5	230
1/4 in. gravel to fine sand, about 4% fine sand w/traces gray clay, color gray, sand heaves	5	235
White sand w/traces gold & silver mica; sand heaves	15	250
White sand w/1/8 in.+ gravel blue green in color	5	255
1 in.+gravel down to white sand w/traces black clay	5	260
Gray clay w/1 in. gravel	5	265
Gray clay w/1/2 in. minus gravel	5	270
Gray clay w/1/4 in. minus gravel w/coarse sand	5	275
Gray clay w/1/2 in. minus gravel w/some black coarse sand; few pieces gravel which look like decomposed basalt	5	280
Gray clay w/1/2 in. minus gravel w/some fine sand	5	285
Gray clay w/some green clay w/1 in. minus gravel w/some fine sand in drill mud	5	290
Green clay has some 1/4 in. minus gravel w/black sand, went into green clay at 291.0 from 0070	5	295
Green & black clay	5	300
Black clay w/traces of green clay	5	305
Black clay	5	310
Black & blue clay	10	320
Blue clay	5	325
Blue shale	10	335
Blue shale clay	5	340
Sand, green in color	5	345
Basalt gravel 1 in. & black sand	5	350
Black sand w/1 1/2 in. basalt gravel, about 99% black sand, very tightly pack sand & gravel	5	355
Fine rock cutting or fine sand w/about 40% basalt chips, got a 6 in. gravel at 358 ft., bedrock at 358 ft. (basalt)	5	360
Rock cutting	8	368

699-10-E7 (1B-SP-16)
Location: N10300, E7375 11/28-3M1
Surface Elevation: 468.80
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, dark brownish gray, fine sand Sand, gray, fine to coarse sand, basalt grains	84	84
Sand & gravel, gray	46	130

699-10-E6 (1B-SP-15)
Location: N9750, E6300 11/28-4J1
Surface Elevation: 470.67
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, dark gray Sand, gray, fine to medium sand, basalt grains	105	105
Sand & gravel, gray fine to coarse sand, fine to coarse gravel Sand & gravel, brown, medium to coarse sand, fine to coarse gravel	25	130

699-10-E5A (DB-19)
Location: N10023, E4844 11/28-4K1
Surface Elevation: 466.3
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (8)	Thickness	Depth
Sand, medium dense, gray-brown to gray, fine to medium, clean to slightly silty	16	16
Sand, medium to very dense, gray fine to coarse, clean to slightly silty, scattered fine to coarse gravel	76	92
Gravelly sand, medium dense, gray-brown, fine to coarse	3	95
Sandy gravel, very dense (inferred from drill action)	1	96

699-10-E8B (1C-SP-6)
Location: N9800, E5000 11/28-4K2
Surface Elevation: 461.20
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & brown, fine to medium sand, basalt & quartz grains	75	75
Sand & gravel; as above, less quartz grains, gravel, varied composition Sand & gravel, brown, medium sand, quartz grains, gravel	47	122

699-10-E4A (DB-4)
Location: N10117, E4276 11/28-4K3
Surface Elevation: 452.2
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (8)	Thickness	Depth
Silty sand, medium dense, gray-brown, fine to coarse	5	5
Sand, medium to very dense, gray, fine to coarse sand, clean to slightly silty, scattered fine to coarse gravel	65	70
Sandy gravel, dense, gray, fine to coarse clean	6	76
Sandy gravel, very dense, light brown, fine to coarse clean	2	78

699-10-E4B (DB-6)
Location: N9944, E4078 11/28-4K4
Surface Elevation: 446.0
Hollow stem auger, logged by Shannon & Wilson, for WPPSS, 1974, WNP-1 foundation test boring

Material (8)	Thickness	Depth
Silty sand, loose, light brown, fine to medium	5	5
Sand, loose, gray to gray-brown, fine to coarse, clean to slightly silty, trace fine to coarse gravel	10	15
Sand, medium to very dense, gray to gray-brown, fine to coarse, clean to slightly silty, trace fine to coarse gravel	53	68
Sandy gravel, dense, gray-brown, fine to coarse, clean	2	70
Sandy gravel, very dense, light brown, fine to coarse, clean to slightly silty	11	81

699-10-E4C (DB-7)
Location: N9546, E3909 11/28-4K5
Surface Elevation: 446.1
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (8)	Thickness	Depth
Sand, medium dense, light brown fine, clean to slightly silty	11	11
Sand, medium to very dense, gray, fine to coarse, clean, scattered fine to coarse gravel	51	62
Gravelly sand, dense, gray, fine to coarse clean	4	66
Sandy gravel; very dense (inferred from drill action)	4	70

699-10-E4D (DB-8)
Location: N9864, E3617 11/28-4K6
Surface Elevation: 435.1
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (8)	Thickness	Depth
Sand, loose, light brown, slightly silty	3	3
Sand, medium to very dense, gray fine to coarse, clean to slightly silty, scattered fine to coarse gravel	49	52
Sandy gravel, very dense, light brown to gray brown, fine to coarse, clean to coarse, clean to slightly silty	3	55
Sand, very dense, light brown, fine, slightly silty	1	56
Sandy gravel, same as interval 52-55 ft.	2	58

699-10-E4E (DB-8A)
Location: N9869, E3623 11/28-4K7
Surface Elevation: 435.1
Rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (8)	Thickness	Depth
This interval, see 699-10-E4D	67	67
Sand, very dense, light brown, fine, clean, trace of fine gravel	1	68
Sandy gravel, same as interval 52-55 ft.	72	140

699-10-E4F (DB-8 redrill)
Location: N9869, E3612 11/28-4K8
Surface Elevation: 435
Rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (8)	Thickness	Depth
This interval, see 699-10-E4D & 699-10-E4E	140	140
Sandy gravel, same as interval 52-55 ft.	108	248
Clayey silt, hard, light tan, trace fine sand	10	258

699-10-E4G (DB-9)
Location: N10226, E3774 11/28-4K9
Surface Elevation: 443.8
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (8)	Thickness	Depth
Silty sand, loose, light brown, scattered roots	3	3
Sand, medium to very dense, fine to coarse, clean, scattered fine gravel	53	56
Gravelly sand, very dense, light gray, fine to coarse, slightly silty	3	59

699-10-E4H (DB-10)
Location: N10430, E3721 11/28-4K10
Surface Elevation: 441.1
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Sand, loose, light brown, slightly silty	3	3
Sand, medium to very dense, gray fine to coarse, clean, scattered fine gravel	55	58
Sandy gravel, very dense, gray-brown to light brown, fine to coarse, clean to slightly silty, scattered to numerous cobbles, scattering lenses of clean to silty sand about 1 ft. thick	3	61

699-10-E4J (DB-10A)
Location: N10422, E3720 11/28-4K11
Surface Elevation: 441.1
Mud rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (B)	Thickness	Depth
This interval see 699-10-E4G	61	61
Sandy gravel, very dense, gray-brown to light brown, fine to coarse, clean to slightly silty, scattered to numerous cobbles, scattering lenses of clean to silty sand about 1 ft. thick	185	246
Clayey silt, hard, light green-gray	24	270
Silt, very dense, light tan, trace of fine sand	16	286
Sandy clayey silt, hard, blue gray, fine sand	17	303

699-10-E3A (DB-3)
Location: N10044 E3439 11/28-4L1
Surface Elevation: 437.2
Air rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose to medium dense, light brown, fine	8	8
Sand, medium dense to very dense, gray-brown, fine to coarse, clean, scattered fine gravel	9	17
Gravel sand, inferred from cutting	1	18
Sand, same as interval 8-17 ft.	28	46
Sand, gravel, very dense, gray-brown, fine to coarse, slightly silty, scattered to numerous cobbles	16	62
Slightly silty to sandy gravel, very dense, light brown to gray-brown, fine to coarse, clean to silty, generally slightly silty, scattered to numerous cobbles	7	69
Sand, very dense tan, fine to coarse, slightly silty, trace fine to coarse gravel	1	70
Slightly silty to sandy gravel same as interval 62-69 ft.	5	75
Sand, very dense, light brown, clean, trace of gravel, inferred from drill action, cuttings	4	79
Slightly silty to sandy gravel, same as interval 62-69 ft.	88	167
Sand, very dense, light brown, fine, slightly silty to clean	5	172
Slightly silty to sandy gravel, same as interval 62-69 ft.	77	249

699-10-E3B (DB-11)
Location: N10357, E3464 11/28-4L2
Surface Elevation: 440.1
Air rotary & hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose, light gray-brown, fine to medium	6	6
Sand, medium to very dense, gray, fine to coarse, clean to slightly silty, scattered fine to coarse gravel	38	44
Gravelly sand, dense, gray, fine to coarse, clean to slightly silty	6	50
Gravelly sand, very dense, gray, fine to coarse, clean to slightly silty	7	57
Gravelly sand that grades to sandy gravel below 62 ft., very dense, light brown to gray-brown, fine to coarse, slightly silty to silty, scattered numerous cobbles.	190	247
Clayey silt, hard, light tan	4	251
No record	49	300

699-10-E3C (DB-17)
Location: N9600, E3477 11/28-4L3
Surface Elevation: 448.1
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Sand, loose to medium dense, light brown fine to medium, clean to slightly silty	10	10
Sand, medium dense to dense, gray to gray-brown, fine to coarse, clean, scattered fine to coarse gravel	52	62
Sandy gravel, very dense, gray, fine to coarse, clean	4	66

Sandy gravel, very dense, light brown, fine to coarse	7	72

699-10-1 (B-24)
Location: N10450, W750 11/28-9K1
Surface Elevation: 443.4
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (8)	Thickness	Depth
Loose to medium dense, gray, fine sand	16	16
Medium dense, tan, fine sandy silt	2	18
Medium dense, gray, fine to medium sand	12	30
Medium dense, gray, gravelly, fine to medium sand	20	50
Very dense, tan gravelly, fine to coarse sand & sandy gravel, slightly silty	8	58

699-10-2 (B-23)
Location: N10390, W2170 11/28-8L1
Surface Elevation: 441.2
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (8)	Thickness	Depth
Loose, tan, slightly silty, fine sand	8	8
Loose, tan, slightly silty, fine sand interbedded w/gray, fine sand layers	2	10
Very dense, gray, gravelly, fine to coarse sand, slightly silty	3	13
Medium dense, gray, fine to medium sand, scattered gravel below 22 ft.	18	31
Dense, gray, fine to coarse sand w/scattered gravel	17	38
Dense, gray, gravelly, fine to coarse sand, slightly silty	8	46
Very dense, tan, gravelly, fine to coarse sand, slightly silty; boulders at 55 ft.	13	59

699-10-3A (B-36)
Location: N9997, W3466 11/78-8M1
Casing Elevation: 451.5
Rotary (to 522 ft.) & diamond coring, drilled by Soil Sampling Service & logged by Shannon & Wilson for WPPSS, 1972, bedrock geology investigation borehole

Material (8)	Thickness	Depth
Dark gray, slightly silty, fine to coarse sandy gravel	10	10
Dark gray, fine to coarse sand w/occasional gravel & cobbles	50	60
Light brown, slightly silty, fine to coarse sandy gravel	70	130
Light brown, silty, fine to medium sand, micaceous	10	140
Light brown, slightly silty fine to coarse sandy gravel w/cobbles	10	150
Dark gray, fine to coarse sandy gravel w/cobbles & trace of silt	140	290
Green-gray, fine to coarse sand w/trace of silt	10	300
Light gray, slightly silty clay	80	380
Light gray, slightly silty fine to coarse sandy gravel	20	400
Light gray-brown, silty fine sand	50	450
Dark gray-brown, clay silt	30	480
Dark gray-brown, silty fine sand	24	504
Dark gray, slightly silty, fine to coarse sandy gravel, predominately basaltic	6	510
Basalt conglomerate, black weakly cemented sandy gravel & cobbles	26	536
Vesicular basalt, very hard, dark gray to black, highly jointed	30	576
Basalt scoria, hard to soft brown-gray intermixed w/occasional pieces of green altered tuff, highly fractured & broken (possibly flow breccia)	36	612
Vesicular basalt, very hard, dark gray to black, slightly vesicular, massive, jointed	63	675
Basalt scoria, highly broken	5	680
Tuff, medium hard to soft, tan to light gray to green	34	714
Basalt scoria, mixed or filled with tuff from above	27	741
Vesicular basalt, very hard, dark gray to black & jointed	36	777
Basalt very hard, gray to black, massive & jointed	114	891
Lapilli tuff, medium hard, dark gray to green-gray with hard zones	9	900
Basalt scoria w/gray-green tuff filling from above	5	905
Basalt scoria & vesicular basalt, very hard, dark gray, jointed	21	926
Basalt, very hard, dark gray to black w/vesicular zones	21	947

699-10-3B (2A-2P-8)
Location: N9875, W3325 11/29-8M2
Surface Elevation: 466.10
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (6)	Thickness	Depth
Sand, brown, fine sand, predominantly quartz	75	75
Sand, variegated, gray & brown, fine to medium, quartz & basalt grains		
Sand & gravel, brown fine to coarse sand, quartz grains, gravel	32	107

699-10-6 (1D-5P-1)
Location: ~N10400, W5600 11/28-66
Surface Elevation: 458.4
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; dark gray, medium to coarse sand, basalt grains	47	47
Sand; brown, fine sand, some silt		
Sand & gravel; light brown, fine to coarse sand, fine to coarse gravel	47	94

699-10-10
Location: N10014, W9862 11/27-101
Casing Elevation: ~518
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	103	103
Gravel & boulders	22	125

699-10-54A
Location: N10150, W53550 11/26-3G1
Casing Elevation: 516.40
Cable tool, drilled by Stanbery & Robinson of USGS for GE Company, 1950, groundwater monitoring & geologic investigation borehole

Material (4)	Thickness	Depth
Silt	9	9
Sand, silt & some clay	77	68
Sand w/silt	13	81
Gravel w/sand	15	96
Gravel w/sand, some silt	28	124
Sand w/silt	4	128
Sand w/gravel, some silt	8	136
Sand & gravel & sand	9	145
Gravel w/sand	8	157
Sand w/some silt	12	169
Sand w/gravel & silty clay	4	173
Clay-silt w/little sand & gravel	8	181
Gravel, some sand & silt	3	184
Silt, clayey & chalky	16	200

699-10-54B (DC-12)
Location: N10125, W53687 11/26-3G2
Casing Elevation: 516.40
Air rotary (to 206 ft.) & diamond coring, drilled by Carman water wells & logged by Little for Rockwell, 1980, deep geologic & hydrologic investigation borehole

Material (2)	Thickness	Depth
Silty very fine to fine sand 10YR6/3	10	10
Silty fine to medium sand; angular; ~60% quartz, feldspar, mica & opaques; 10YR6/4	5	15
Medium sand, angular, ~60% quartz, feldspar, mica, opaques, well sorted, 10YR7/3	5	20
Medium sand; angular; ~75% quartz, feldspar, mica; well sorted; 10YR7/3	11	31
Fine to medium sand, subangular; ~60-75% quartz, feldspar, mica; medium well sorted 10YR8/2	14	45
Medium to fine sand; subangular; ~60-75% quartz, feldspar, mica; medium well sorted 10YR8/2	6	51
Fine sand, subangular-subrounded; well sorted; ~80% quartz, feldspar, opaques; 10YR6/4	9	60
Silty fine sand, some "clots" of clay, subangular, ~60-75% quartz, clay-10YR5/3, sand-10YR6/4	5	65
Fine to medium sand, subangular, clay "clots," same color & composition as 60-65 ft.	6	71
Fine to medium sand, subangular, clayey, clay-10YR5/3, sand 10YR6/4	4	75
Clayey fine to medium sand, subangular, ~70% quartz, some pebbles & cobbles	3	78
Medium to fine sand, clayey, some pebbles & cobbles, granules basalt	2	80
Gravelly sand; sand medium to fine, quartzose; pebbles-cobbles-predominantly basalt, quartzites	3	83
Basalt granules to pebbles w/some silt & sand & pebbles to cobbles of basalt, quartzite & granites	2	85
Weathered basalt granules & pebbles, ~5% cobbles basalt	3	88
Pebble-cobble gravel, well indurated, basalt, granitics, metamorphics, quartzite . . .	4	88
Granule-pebble gravel, basaltic, some quartzite, silty	2	90
Pebble to cobble gravel; slightly sandy; ~80-90% basalt, quartz crystal fragments; some quartzites, granitics(?); hammer fragments most clasts, unweathered	5	95
Pebble to cobble gravel, ~50% basalt, purple & brown quartzites, granitics, unweathered, well rounded, fragmented by hammer	5	100

Pebble to cobble gravel; (sandy), (silty), appears to be mostly basalt, some quartz crystal fragments, quartzites, well rounded, slightly weathered, weathered mica in matrix	5	105
Sandy pebble to cobble gravel, (silty) appears to be mostly basalt, some quartzite, well rounded, weathered, sand subangular quartzose	5	110
No record	8	118
Sandy silt, gravel, pebbles to cobbles	2	120
Sandy gravel; cobbles ~50% basalt, granitics meta-sediments, quartzites; sand ~50% basalt, quartz, mica	5	125
Gravelly sand; pebble-cobble gravel, basalt, quartzites, metamorphics(?); sand ~75% quartz, basalt, abundant weathered mica	4	129
Sandy gravel; coarse-very coarse sand; pebbles-large cobbles, clay cobbles, quartzites, 50% basalt	6	135
Silty clay	5	140
Goopy clay slightly sandy & silty	5	145
Medium-coarse sand, well rounded, well sorted, very mixed lithology, some pebbles & cobbles	5	150
(Sandy) gravel; pebble-cobble; ~50% basalt, granitics, quartzites; slight weathering rinds on basalt & iron staining on others; well rounded	5	155
(Sandy) gravel, pebble-cobble; ~50% basalt, quartzites, granitics; well rounded; 1/16-1/8 in. rinds on basalt, iron staining	5	160
Sandy gravel-gravelly sand; granules-cobbles; medium to coarse sand, slight rinds on basalt; iron stained	5	165
(Silty) sandy gravel to gravelly sand, granules to cobbles, fine to very coarse sand, 1/16 1/8 in. weathering rinds on basalt, iron staining	5	170
Goopy clay, slightly sandy & silty	4	170
(Gravelly) silty fine to medium sand, gravel may be from above, subangular-rounded quartz sand	5	175
(Silty) (Sandy) clay, grayish brown	5	180
(Silty) (sandy) (gravelly?) clay, grayish brown, gravel may be from above	5	185
(Gravelly) (silty) medium to fine subangular quartz sand	3	188
Gray clay	2	190
Blue gray clay	10	200
Greenish gray clay	5	205
Greenish gray clay w/ fragments of black glass	5	210
Basalt	120	330+

699-10-99 (Rattlesnake #11)
Location: N10200, W98550 11/25-6H1
Casing Elevation: 1080
Cable tool, drilled by Spokane-Benton County Natural Gas Company, prior to 1924, gas well

Material	Thickness	Depth
Boulder, volcanic ash & gravel	18	18
Fine sand	2	20
Gravel	10	30
Porous basalt	50	80
Yellow sand w/slight mixture of clay	22	102
Clay, sand & boulders	128	230
Porous basalt	50	280
Basalt	138	418
Clay	47	465
Clay, sand & boulders	20	485
Basalt (very hard)	25	510
Gray basalt	30	540
Blue shale	10	550
Sand & boulders	10	560
Sand & broken basalt	20	580
Hard gray basalt	150	730
Hard basalt	165	895
Sand rock	5	901
Hard basalt	94	995
Slate	8	1,003

699-11-E10 (18-3P-18)
Location: ~N11400, E9525 11/28-3D1
Surface Elevation: 464.10
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; brownish gray, fine sand	38	38
Sand & gravel; variegated, fine to coarse sand, fine to coarse gravel	67	105
Sand & gravel, light brown, fine sand, some silt, gravel	25	130

699-11-E8A (18-3P-17)
Location: N10850, E8450 11/28-3F1
Surface Elevation: 453.80
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; dark brownish gray, fine to medium sand, basalt grains	40	40
Sand & gravel; gray, fine to coarse sand, basaltic gravel	40	80
Gravel; variegated, fine to coarse gravel	5	85
Silt; dark brown	5	90
Silty gravel; grayish brown, silt, fine sand, gravel	35	125

699-11-E8B (BH-143)
Location: N10564, E7879 11/28-3F2
Surface Elevation: 448.3
Air rotary (to 150 ft.), mud rotary (to 370 ft.) & diamond coring, drilled by Aqua Drilling & Development Company & logged by Fugro for WPPSS, 1974, bedrock geologic investigation borehole

Material (B)	Thickness	Depth
Gravelly sand; dark gray, medium to coarse, predominantly basaltic	60	60
Gravel; clean, gravel to cobbles, basaltic & acid igneous Sandy gravel dark gray & brown, gravel to cobbles, fine to coarse sand Sandy gravel; dark gray & brown, gravel to cobbles, fine to coarse sand, some silt & clay Sandy gravel; brown, gravel to cobbles, basaltic & acid igneous, fine to medium sand, some clay	130	190
Silty clay; brown, silt w/fine sand, some gravel	10	200
Clayey gravel; brown, clay w/some silt Silty gravel; brown, silt w/some clay Silty gravel; brown, silt w/some clay & coarse sand	120	320
Sandy clay; dark olive gray, coarse sand & some silt		
Clay; some gravel	40	360
Gravel; dark gray, clean	11	371
Conglomerate(?)	14	385
Basalt; dark gray to light gray, fine grained, highly vesicular to scoriaceous, slightly to highly weathered	46	431
Basalt; dark gray, fine grained, slightly vesicular, non-vesicular, some fracturing, dense	73	504
Tuff; light green to light green, clay, friable	4	508
Basalt; dark gray, fine grained, vesicular, weathered	54	562
Basalt; dark gray, fine grained, fractured, dense	5	567

699-11-E5 (IC-SP-7)
Location: WN11000, E4700 11/28-4G1
Surface Elevation: 458.54
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (B)	Thickness	Depth
Sand; variegated gray & white, fine to medium sand, predominantly basalt grains	75	75
Sand & gravel; gray, fine to coarse sands, predominantly basalt grains	25	100
Sand & gravel; brown, fine to coarse sand, some silt, fine gravels	21	121

699-11-E4A (DB-2)
Location: N10947, E3862 11/28-4F1
Surface Elevation: 454.0
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose, light brown, fine	6	6
Sand, loose, gray, fine to coarse, clean to silty, scattered fine gravel to gravelly	5	11
Sand, loose, gray, fine to coarse, clean to silty, scattered fine gravel to gravelly medium dense to very dense	9	20
Gravelly sand	5	25
Sand, same as interval 11-20 ft	48	73
Gravelly sand, dense, gray, fine to coarse, slightly silty	3	76
Sandy gravel, very dense, light brown, fine to coarse, clean	2	78

699-11-E4B (DB-5)
Location: N10521, E4390 11/28-4F2
Surface Elevation: 456.8
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose, brown, fine to medium	6	6
Sand, loose to medium dense, gray to gray-brown, fine to coarse, clean to slightly silty, scattered fine gravel	9	15
Sand, medium to very dense, gray to gray-brown, fine to coarse, clean to slightly silty, scattered fine gravel	56	71
Sandy gravel, medium dense to very dense, gray, fine to coarse, clean	14	85
Sandy gravel, very dense, light gray, fine to coarse, clean	5	90

699-11-E4C (DB-14)
Location: N10540, E3608 11/28-4F2
Surface Elevation: 442.3
Hollow stem auger (to 64 ft.) & air rotary, logged by Shannon & Wilson for WPPSS, 1972, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose, light tan, fine	3	3
Sand, loose, fine to coarse, clean to slightly silty, scattered fine to coarse gravel	2	5
Sand, medium to very dense, fine to coarse, clean to slightly silty, scattered fine to coarse gravel	58	63
Sandy gravel, very dense, light brown, fine to coarse, clean to slightly silty, scattered to numerous cobbles	47	110
No record	190	300

699-11-E4D (DB-16)
Location: N10691, E2788 11/28-4F4
Surface Elevation: 449.3
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose, light brown, fine	5	5
Sand, loose, gray, fine to coarse, clean to slightly silty, scattered fine to coarse gravel	5	10
Sand, medium to very dense, gray, fine to coarse, clean to silty, scattered fine to coarse gravel	55	65
Sandy gravel, dense, gray, fine to coarse, slightly silty	3	68
Sandy gravel, very dense, light brown fine to coarse, slightly silty	2	70

699-11-E4E (BH-14D)
Location: N10560, E3500 11/29-4L5
Surface Elevation: 440.5
Air rotary (to 146 ft.), mud rotary (to 436 ft.) & diamond coring, drilled by Aqua Drilling & Development Company & Longyear Drilling Company & logged by Fugro for WPPSS, 1974, bedrock geologic investigation borehole

Material (B)	Thickness	Depth
Sand; dark gray, fine to coarse sand, well graded, basaltic	60	60
Sandy gravel; dark gray gravel, light brown, medium to coarse sand, basaltic & acid igneous gravel & cobbles		
Gravel; basaltic & acid igneous, few fines	85	145
Clayey silt; brown, some basaltic & acid igneous gravel	4	149
Gravel; basaltic & acid igneous, few fines	85	234
Silty clay; brown, soft, low plasticity, some gravel & sand	61	295
Gravel; few fines, basaltic & acid igneous gravel & cobbles	30	325
Silty clay; brown, soft, low plasticity, some gravel & cobbles		
Silty clay; very dark olive gray, some gravel & cobbles	90	415
Gravel; dark gray to dark brown, basaltic & acid igneous composition, few fines	21	436
Conglomerate; gray to dark gray, basaltic, gravel & cobbles, well rounded, cobbles increase lower in section, gray to dark gray, medium angular to subangular sand w/mica common	28	464
Basalt; gray, fine grained, highly vesicular, vesicles to 2 cm., amygdules filled w/zeolites & clay	4	468
Basalt; mottled gray & dark gray, fine grained, slightly vesicular to non-vesicular, horizontal joints	15	483
Basalt; red to gray, fine grained, highly vesicular, vesicles to 3 cm., fractured, weathered, dirty white to dark green clay fills spaces between joints & fractures, clay varies w/depth	40	523
Basalt; dark gray to black, aphanitic, moderately vesicular to non-vesicular, horizontal to 45 joints	73	596
Basalt; dark gray to black, aphanitic, vesicular, gray green clay fills fractures & joints	2	598
Claystone; green to brown, highly indurated, some dark green glass		
Claystone; brown, slightly indurated, volcanic glass grains & occasional lenses of glass, grades to sandstone below	8	606
Clayey sandstone; light green, medium well sorted, subangular to angular sand, slightly indurated	9	615
Claystone; dark green, slightly indurated, grading into a light green well indurated, very hard claystone w/lenses of glass	4	619
Basalt; dark green to gray, fine grained, vesicular, clay fills fractures & joints	27	646
Basalt; dark gray to black, aphanitic, slightly vesicular to vesicular, slightly jointed, plagioclase laths	10	656

699-11-EJA (DB-13)
Location: N10580, E2479 11/28-4F5
Surface Elevation: 439.6
Hollow stem auger (to 58 ft.) & air rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Silty sand; loose, light brown, fine scattered roots	4	4
Sand loose; gray, fine to coarse, scattered fine to coarse gravel	4	8
Sand; medium to very dense, gray fine to coarse, scattered fine to coarse gravel	50	58
Sandy gravel; very dense, light brown to gray-brown, fine to coarse, slightly silty to silty, scattered to numerous cobbles	38	96
Sand; very dense, gray-brown, fine, clean	5	101
Sandy gravel; same as interval 58-96 ft.	22	123

699-11-EJB (DB-13A)
Location: N10521, E2478 11/28-4F6
Surface Elevation: 439.7
Air rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (B)	Thickness	Depth
This interval, see 699-11-EJA	123	123
Sandy gravel; very dense, light brown to gray-brown, fine to coarse, slightly silty to silty, scattered to numerous cobbles	19	142
Sand, very dense, gray brown, fine, slightly silty	10	152
Sandy gravel, same as interval 58-96 ft.	43	195
Sand, very dense, gray-brown, fine to coarse, slightly silty	5	200
Sandy gravel, same as interval 58-96 ft.	49	249
Interbedded silty clay, clayey silt & silt. Clay & clayey silt, hard, light gray-brown, trace fine gravel; silt, very dense, light gray	43	292
Clayey silt, hard, light green, fine to coarse, gravelly, trace fine to coarse sand	11	301

699-11-EJC (DB-15)
Location: N10735, E2435 11/28-4F7
Surface Elevation: 442.1
Hollow stem auger & rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-1 foundation test boring

Material (B)	Thickness	Depth
Sand, dark gray, medium to coarse sand	50	50
Sand & gravel; dark gray, medium to coarse sand, fine to coarse gravel	10	60
Sand; gray, medium to coarse sand, some gravel	10	70
Sand & gravel; dark gray to light brown, medium to coarse sand, fine to coarse gravel Sand & gravel; brown, fine to medium sand, fine to coarse gravel Silty gravel; some fine to medium sand & clay, fine gravel Gravel; dark gray-brown, few fines	180	250
Sandy clay; brown, fine to medium sand, some gravel Clayey silt; brown soft	50	300

699-11-EJD (DB-12)
Location: N10558, E2425 11/28-4F8
Surface Elevation:
Rotary, logged by Shannon & Wilson for WPPSS, 1974, smothole boring

Material (B)	Thickness	Depth
Sand; dark gray, coarse sand, basalt grains w/some quartz grains	70	70
Sand & gravel; dark gray, medium to coarse sand, gravel Sand & gravel; brown to gray, some clay	210	280
Sand & gravel; dark gray-brown-medium to coarse sand, gravel Silty gravel; brown, some fine sand Sand & gravel; gray, fine gravel some clay & silt Clayey sand; brown, fine sand	20	300

699-11-DB (B-16)
Location: N11270, W450 11/28-5G2
Surface Elevation: 420.6
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, tan, fine sandy silt & silty sand	7	7
Medium dense, tan, silty, fine to medium sand w/scattered gravel	15	22
Dense, tan, silty, gravelly, fine to coarse sand	5	27
Very dense, tan, silty, fine to coarse sandy gravel w/occasional cobbles	23	50

699-11-1B (B-14)
Location: N11490, W1060 11/29-5G5
Surface Elevation: 441.5
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, light brown, silty fine sand	2	2
Loose, light brown, silty, gravelly fine to coarse sand	8	10
Medium dense, gray, fine to medium sand w/scattered gravel	37	47
Very dense, tan, silty, sandy gravel or silty gravelly sand	11	58

699-11-1C (B-15)
Location: N11150, W1010 11/29-4G6
Surface Elevation: 426.6
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, tan, silty fine sand	4	4
Medium dense, gray, fine to medium sand w/scattered gravel	29	33
Very dense, tan, silty, sandy gravel	25	58

699-11-1D (B-19)
Location: N11000, W1410 11/29-4G7
Surface Elevation: 443.0
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, tan, silty fine sand w/scattered gray, becoming gray & fine to coarse below 1 ft.	12	12
Medium dense, gray, fine sand w/scattered gravel, gravel content increases below 45 ft.	36	48
Very dense, light brown-gray, silty sandy gravel	8	56
Very dense, tan, silty fine sand	3	59

699-11-1E (B-22)
Location: N10720, W1090 11/29-5G8
Surface Elevation: 432.5
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, brown, silty fine sand	5	5
Medium dense, gray, fine to medium sand, contains scattered gravel & becomes slightly silty below 10 ft.	22	27
Dense, gray, fine to medium sand w/scattered gravel	30	57
Very dense, tan, silty sandy gravel	2	59

699-11-1H (B-33)
Location: N11490 W1025 11/29-4G9
Surface Elevation: 441.5
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, tan, silty fine sand	1	1
Medium dense, gray, fine to coarse sand w/scattered gravel	42	43
Very dense, gray, fine to coarse sandy gravel	15	58

699-11-1J (B-34)
Location: N11490, W810 11/29-5G10
Surface Elevation: 428.1
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, tan, silty fine sand	1	1
Loose, gray, fine to coarse sand	11	12
Loose to medium dense, gray, fine to medium sand	9	21
Loose to medium dense, gray, fine to coarse sand w/scattered gravel	19	40
Dense to very dense, gray, fine to coarse sandy gravel or gravelly sand	10	50
Very dense, gray, sandy gravel	10	60

699-11-1K (B-17)
Location: N11050, W700 11/29-4G11
Surface Elevation: 424.5
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, light brown, silty fine sand w/scattered gravel & cobbles	4	4
Medium dense, brown, fine to medium sand	13	17
Medium dense, brown & gray, medium sand w/scattered gravel & cobbles	10	27
Medium dense, dark gray, gravelly, fine to coarse sand	5	32
Very dense, gray-brown, fine to coarse sandy gravel	26	58

699-11-2 (B-2I)
Location: N10690, W1830 11/28-5F1
Surface Elevation: 445.3
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (8)	Thickness	Depth
Loose, gray, fine to coarse sand w/scattered fine gravel	6	6
Medium dense, gray, slightly gravelly, fine to coarse sand w/scattered gravel	45	51
Very dense, gray, fine to coarse sandy gravel or gravelly sand, slightly silty	7	58

699-11-3 (B-1B)
Location: N10930, W2930 11/28-5E1
Surface Elevation: 447.5
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (8)	Thickness	Depth
Loose, brown, gravelly, fine to medium sand, slightly silty	3	3
Fine to medium sand w/ gravel & cobbles	1	4
Loose, gray, fine to coarse sand w/scattered gravel becoming medium dense below 20 ft.	36	40
Dense, gray, gravelly, fine to medium sand, slightly silty	11	51
Very dense, tan, slightly silty, fine to medium sandy gravel or gravelly sand	7	58

699-11-4 (1A-SP-9)
Location: N10950, W2800 11/28-5E2
Surface Elevation: 448.3
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand & gravel, brown	21	21
Sand, light brown	21	42
Sand & gravel, gray-brown	22	64
Gravel, reddish brown	29	93

699-11-5 (1D-SP-2)
Location: WN11000, W4600 11/28-6H1
Surface Elevation:
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand & gravel; dark gray to light brown, medium to coarse sand, some fine to coarse gravel	16	16
Sand; dark gray, medium to coarse sand	29	45
Sand & gravel; dark gray, medium to coarse sand, occasional gravel	15	60
Sand & gravel; brown, fine to medium sand, occasional gravel	27	87

699-11-6 (1D-SP-1A)
Location: WN10930, W5700 11/28-6G1
Surface Elevation: 461.9
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & white, fine to medium sand, some coarse grains, basalt grains	32	32
Sand & gravel; variegated gray & white, fine to medium sand, some gravels	26	58
Sand; brown	5	63
Sand & gravel; light brown, fine sand, fine to coarse gravel	52	115

699-11-45A
Location: N10900, W4474S 11/28-1F1
Casing Elevation: 578.58
Cable tool, drilled by Hatch of Hatch Drilling Company for GE Company, 1967, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & silt	165	165
Sand & gravel 1/2-2 in.	5	170
Cemented gravel 1/2-2 in.	10	180
Loose gravel 1/2-2 in.	5	185
Cobble gravel	15	200
Boulders	5	205
Boulders & cobbles	5	210
Sand, silt, coarse gravel	5	215
Cemented gravel	10	225
Sandy clay & gravel	5	230
Clay & gravel	10	240
Blue clay & gravel	15	255
Brown sandy clay	5	260
Brown sandy clay & gravel, hard	50	310
Sand, clay & basalt gravel	10	320
Sand, clay & mixed gravel	5	325
Sand clay & basalt gravel	10	335
Hard sand clay gravel	15	350
Black sand, clayey & gravel	5	355
Basalt gravel & clay	10	365
Basalt particles & sand	10	375
Basalt	5	380

699-11-45B
Location: N10934, W4473A 11/28-1F2
Casing Elevation: 578.40
Cable tool, drilled by Bigham or Hatch Drilling Company, 1967, hydrologic investigation borehole

Material (1)	Thickness	Depth
No record	29	29
Fine sand	14	43
Fine sand some silt	16	59
Fine sand	7	66
Fine sand some silt	35	101

699-12-E4 (1C-SP-8)
Location: ~N12200, E4400 11/28-4B1
Surface Elevation: 457.40
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (B)	Thickness	Depth
Sand; variegated gray & brown, fine to medium sand, poorly graded, quartz & basalt grains	80	80
Sandy & gravel; variegated gray & white sand as above, gravels	16	96
Sandy & gravel; brown, fine to medium sand, gravel	24	120

699-12-E3 (CB-16)
Location: N12205, E3460 11/28-4C1
Surface Elevation: 452.5
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose, light brown, fine	8	8
Sand, medium to very dense, gray to gray-brown, fine to coarse, clean to slightly silty, scattered, fine to coarse gravel	58	66
Gravelly sand grading to sandy gravel below 70 ft., very dense, light brown, fine to coarse, clean to slightly silty	11	77

699-12-14 (B-12)
Location: N11760, W1160 11/28-5B1
Casing Elevation: 441.80
Air rotary (to 566 ft.) & diamond coring, drilled by Soil Sampling Service & Longyear Company & logged by Shannon & Wilson for WPPSS, 1972, bedrock geology investigation borehole

Material (B)	Thickness	Depth
Loose, tan silty fine sand	1	1
Very dense, fine to coarse sandy gravel w/few cobbles to 6 in.	1	2
Loose, gray, fine to coarse sand w/scattered gravel	6	8
Medium dense, gray, fine to coarse sand & silty sand w/ scattered gravel. Sand becomes finer with depth	12	20
Medium dense, gray, fine sand	8	22
Medium dense, gray, fine to coarse sand and silty sand. Becomes finer with depth	21	43
Very dense, gray gravelly sand or sandy gravel	10	53
Very dense, gray sandy gravel and silty sandy gravel	6	59
Very dense, gray, fine sand	4	63
Very dense, variable color, fine to coarse sandy gravel	38	101
Very dense, mottled tan & gray, sandy fine to coarse gravel & cobbles	42	143
Very dense, micaceous fine sand	18	161
Very dense, sandy fine to coarse gravel & cobbles. Similar to 101-142 ft.	1	162
Very dense, micaceous, fine sand	11	173
Very dense, mottled black & green, sandy gravel w/cobbles	8	181
Very dense, green-gray, fine sand w/scattered gravel	9	190
Very dense, brown and gray sandy gravel w/cobbles	20	210
Very dense, gray, fine & medium sandy gravel	42	252
Hard gray silt and clayey silt	32	280
Medium soft, tan, silty fine sandstone	5	285
Very dense, gray to tan clayey silt	17	302
Very dense, gray to black, sandy gravel or gravelly sand	38	340
Very dense, gray-green, sandy gravel	25	365
Dense, green-gray, fine sand w/occasional scattered gravel, some thin silt lenses	19	384
Very dense, gray-green, sandy, fine to coarse gravel	29	413
Hard, brown & gray, clay, clayey silt, sandy silt & silty fine sand	27	440
Hard gray, clayey silt, local slicken sides	6	446
Hard gray, clayey silt, local grading to soft siltstone. Contains occasional partings of white pumice	7	453
Very dense, gray, very silty, fine to medium sand with seam of soft sandstone	4	457
Very dense, gray, very silty, fine sand	7	464
Very dense, gray, sandy gravel & cobbles. Predominantly basalt w/small amounts of quartz	24	488
Conglomerate: fine sandstone mixed w/gravel	7	495
Hard, gray, clayey silt w/basalt fragments	16	511
Basalt conglomerate, gravel cemented with soft, fine sandstone	14	525
Basalt flow breccia w/ estimated 30% hard green clay content	29	554
Basalt scoria	7	561
Basalt, hard dense, maroon	1	562
Basalt, very hard, dense, fresh, dark gray, highly jointed & fractured, fine to medium	68	628
Vesicular basalt, medium hard to hard, fine to medium, vesicular, dark gray, fresh locally grades to medium soft altered basalt	7	633

Flow breccia, medium hard to hard, mottled green-gray and red-brown	6	637
Tuff medium soft, altered gray-green		684
Vesicular basalt, very hard, dark gray to black, & jointed	157	841
Lapilli tuff, soft, gray-green	2	843
Claystone & siltstone, soft, gray-green	3	846

699-12-1B (B-1)
Location: N12260, W1450 11/28-582
Surface Elevation: 438.8
Cable tool, drilled by Hatch Drilling Company & logged by Shannon & Wilson for WPPSS, 1971, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, brown, silty, fine sand	2	2
Dense to very dense, brown becoming black, fine to coarse sand & gravel w/cobbles	12	14
Medium to dense, light brown to gray-brown, fine to coarse sand w/scattered fine gravel	29	43
Very dense, gray-brown, fine to coarse sandy gravel w/cobbles	19	62
Very dense, gray-brown, fine to coarse sand & gravel w/ occasional cobbles & boulders	37	99
Hard, tan-brown, fine sandy silt, fine sand w/depth	9	108
Very dense, tan, yellow-brown black & gray, slightly clayey, silty, fine to coarse sandy gravel	45	153
Sand	2	155
Sandy gravel: same as interval 108-153 ft.	22	177
Silty, fine sand	2	179
Very dense, gray-green, rust, tan & black slightly silty, fine to sandy gravel	9	188
Very dense, green, tan, brown, gray & black slightly silty, fine sandy gravel	33	221
Very dense, black-blue, green-gray & brown, silty, fine sandy gravel	30	251

699-12-1C (B-2)
Location: N12260, W1275 11/28-583
Surface Elevation: 437.6
Cable tool, drilled by Hatch Drilling Company & logged by Shannon & Wilson for WPPSS, 1971, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose brown, slightly silty, fine sand	2	2
Medium to very dense, brown to dark gray, slightly silty to clean, fine to coarse sand w/ trace of gravel; gravel content & size increases w/depth	40	42
Very dense, dark gray to black, fine to medium sand & fine to coarse gravel	5	47
Very dense, gray, slightly silty to silty, fine to coarse sand w/scattered gravel	18	65
Very dense, gray-brown, fine to coarse sand & gravel	10	75
Very dense, gray-brown, fine to coarse sand w/scattered gravel	12	87
Very dense, light brown to light gray, fine to coarse sand & gravel	11	98
Hard, brown, fine sandy silt w/ scattered sand & gravel	9	107
Very dense, brown, fine to coarse sand w/a trace of silt	5	112
Very dense, gray, slightly clayey, silty fine to coarse sand w/gravel	5	117

599-12-1D (B-3)
Location: N12260, W1100 11/28-584
Surface Elevation: 435.2
Cable tool, drilled by Hatch Drilling Company & logged by Shannon & Wilson for WPPSS, 1971, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, brown, slightly silty, fine sand	2	2
Dense, gray, fine to coarse sand & gravel w/large cobbles	3	5
Medium to very dense, gray-brown to black, slightly silty to clean fine to medium sand w/scattered coarse sand & gravel	33	38
Very dense, gray-brown-gray, fine to medium sand w/varying quantities of coarse sand & gravel & occasional slightly silty, fine sand zones	48	86
Very dense, dark gray to brown, fine to coarse sand w/gravel to 2 in.	15	101
Hard, brown, fine sandy silt	4	105
Very dense, gray-brown, slightly clayey, silty, fine to coarse sand & gravel w/occasional cobbles	45	150

599-12-1E (B-4)
Location: N12070, W1450 11/28-585
Surface Elevation: 439.4
Cable tool, drilled by Hatch Drilling Company & logged by Shannon & Wilson for WPPSS, 1971, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose to medium dense, brown, slightly silty, fine sand	3	3
Very dense, brown-gray to black, fine to coarse sand w/gravel	15	18
Medium to dense, black, fine to medium sand w/varying amount of coarse sand & gravel	19	37
Dense to very dense, black, fine to coarse sand w/fine gravel	11	48
Very dense, light brown to light gray, fine to coarse sand w/ scattered fine gravel & occasional cobbles; gravel content increased with depth	59	107
Very dense, brown & gray, slightly clayey, silty, fine to coarse sand & gravel	1	108

699-12-1F (B-5)
Location: N12070, W1275 11/28-5B6
Surface Elevation: 438.9
Cable tool, drilled by Hatch Drilling Company & logged by Shannon & Wilson for WPPSS, 1971, WNP-2 foundation test hole

Material (8)	Thickness	Depth
Loose, brown, slightly silty fine sand	2	2
Very dense, dark gray to black sand, gravel & cobbles	2	4
Medium to very dense, brown to black, fine to coarse sand w/ scattered gravel	25	29
Very dense, dark gray to black fine to coarse sand w/ occasional 2 to 3 ft. thick gravel & cobbley zones	3	32
Gravel & cobbles	3	35
Same as interval 29 to 32 ft.	23	58
Gravel & cobbles	1	59
Very dense, brown to gray-brown, fine to coarse sand & fine gravel w/occasional cobbles	36	95
Very dense, brown, fine to coarse sand w/scattered gravel	12	107
Very dense, yellow-brown, slightly clayey, silty, fine to coarse sandy gravel	8	115
Sand & gravel-layer	4	119
Same as interval 107-115 ft.	31	150

699-12-1G (B-6)
Location: ~N12070, W1100 11/28-5B7
Surface Elevation: 439.2
Cable tool, drilled by Hatch Drilling Company & logged by Shannon & Wilson for WPPSS, 1971, WNP-2 foundation test boring

Material (8)	Thickness	Depth
Loose, light brown, slightly silty fine sand	2	2
Dense, gray, medium to coarse sand w/scattered fine gravel	16	18
Very dense, gray, medium sand w/ traces of fine & coarse sand & scattered gravel to 1 in.	28	46
Very dense, dark gray, gravelly medium sand	6	52
Very dense, gray-brown, sandy, fine to coarse gravel	26	78
Very dense, gray, fine to medium sand w/scattered fine gravel & several slightly silty & coarse sandy zones	21	99

699-12-1H (B-7)
Location: N11880, W1450 11/28-5B8
Surface Elevation: 441.1
Cable tool, drilled by Hatch Drilling Company & logged by Shannon & Wilson for WPPSS, 1971, WNP-2 foundation test boring

Material (8)	Thickness	Depth
Loose to medium dense, brown, silty fine sand	2	2
Dense, gray, gravelly, fine to coarse sand	12	14
Medium to very dense, gray to black, fine to coarse sand w/scattered gravel; gravel content increases w/depth	37	51
Very dense, light brown w/some gray, slightly silty, fine to medium sandy gravel w/ occasional cobbles; cobble lense at 60 ft.	16	67
Very dense, light brown, silty gravelly, fine sand	4	71
Very dense, light brown & gray, slightly silty, fine to coarse sand & gravel w/occasional cobbles	18	89
Sand	4	103
Very dense, mottle, brown, black & gray, silty, sandy gravel	47	150

699-12-1J (B-8)
Location: N11880, W1275 11/28-5B9
Surface Elevation: 440.6
Cable tool, drilled by Hatch Drilling Company & logged by Shannon & Wilson for WPPSS, 1971, WNP-2 foundation test boring

Material (8)	Thickness	Depth
Loose to medium dense, light brown, slightly silty, fine sand	3	3
Medium to very dense, gray, fine to medium sand w/scattered coarse sand & fine gravel	16	19
Very dense, brown, slightly silty, fine sand w/seams to 2 in. of hard, fine sandy silt	7	26
Very dense, dark gray to black, fine to medium sand w/ scattered coarse sand & fine gravel	22	48
Very dense, brown, slightly silty fine sand w/scattered fine gravel	12	60
Very dense, gray-brown to gray, sandy, fine to medium gravel w/traces of coarse gravel	23	83
Very dense, gray, fine to coarse sand w/occasional slightly silty to silty, fine sand zones & occasional scattered fine gravel to 1 in.	22	105
Very dense, brown, silty sand w/gravel	1	105

699-12-1K (B-9)
Location: N11880, W1100 11/28-5B10
Surface Elevation: 439.8
Cable tool, drilled by Hatch Drilling Company & logged by Shannon & Wilson for WPPSS, 1971 WNP-2 foundation test boring

Material (8)	Thickness	Depth
Loose brown, slightly silty, fine sand	2	2
Medium dense to very dense, gray, medium to coarse sand w/traces of fine gravel	42	44
Very dense, gray sand & fine gravel	4	48
Very dense, gray, sandy gravel w/scattered coarse gravel	18	66
Very dense, gray to brown, fine to coarse sand w/scattered fine gravel	12	78
Fine to coarse gravel	5	83
Same as interval 66-78 ft.	15	98
Very dense, gray, sand, fine to coarse gravel	7	105

Brown sand	2	107
Very dense or hard, brown & gray clay, silt, sand & gravel conglomerate	11	118
Very dense, gray, silty sand & gravel w/cobbles; cemented & compact	33	151
Sand layer	3	154
Very dense, gray, fine to coarse gravel in a tightly cemented sand, clay & silt matrix	50	204
Fine to medium sand layer	5	209
Same as interval 154-204 ft.	5	214
Very dense, dark blue-gray, clayey, silty sand & gravel w/possible cobbles	36	250

699-12-1L (B-10)
Location: N12040, W1335 11/28-5811
Surface Elevation: 439.4
Cable tool, drilled by Hatch Drilling Company & logged by Shannon & Wilson for WPPSS, 1971, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, brown, silty, fine sand	3	3
Dense, dark gray-brown, fine to coarse sand w/gravel & cobbles	4	7
Very dense, light brown, fine sand	6	13
Very dense, black, medium to coarse sand w/scattered gravel throughout	14	27
Medium to very dense, brown to gray, fine to coarse sand w/scattered gravel; gravel content generally increasing w/depth	16	43
Very dense, light gray becoming light brown, fine to coarse sand & gravel w/occasional cobbles	42	85
Very dense, gray-brown, fine to medium sand with scattered coarse sand & gravel; slightly silty in places	22	107
Very dense, brown & gray, slightly clayey, silty, fine to coarse sand & gravel w/cobbles	2	109

699-12-1P (B-29)
Location: N12120, W1450 11/28-5812
Surface Elevation: 439.0
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, brown, slightly silty, fine sand	2	2
Medium dense, gray, fine to coarse sand w/scattered gravel	42	44
Very dense, fine to medium, sandy, gravel	14	58

699-12-1Q (B-30)
Location: N12120, W1190 11/28-5813
Surface Elevation: 438.7
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, brown, silty, fine sand	2	2
Loose, brown & gray, fine to coarse sand w/scattered gravel	11	13
Medium dense, gray, fine to coarse sand w/scattered gravel	5	18
Medium dense, gray, fine to medium sand w/occasional silt seams	8	26
Medium dense, gray, fine to coarse sand w/scattered gravel	4	30
Very dense, gray, fine to coarse sandy gravel; contains a few sand seams below 52 ft.	28	58

699-12-1R (B-31)
Location: N11700, W1225 11/28-5814
Surface Elevation: 443.4
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, brown, silty, fine sand	1	1
Medium dense, gray, fine to medium sand w/scattered gravel	29	30
Medium dense, brown, micaceous, fine to medium sand; occasional silt seams	5	35
Medium dense, gray, fine to coarse sand w/scattered gravel	7	48
Very dense, gray, fine to coarse sand, gravel	13	61

699-12-1S (B-32)
Location: N11700, W980 11/28-5815
Surface Elevation: 442.5
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Loose, tan, silty fine sand	1	1
Medium dense, gray, fine to coarse sand w/scattered gravel	22	23
Medium dense, gray, fine to medium sand w/occasional silt seams	7	30
Medium dense, gray, fine to coarse sand	15	45
Medium dense, gray, gravelly sand	5	50
Very dense, gray, sandy gravel	11	61

699-12-2B (B-13)
Location: N11700, W1520 11/28-5C0
Surface Elevation: 440.9
Hollow stem auger & air rotary, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Medium dense, tan to brown gray, gravelly silty, fine to coarse sand	10	10

Medium dense, gray, fine to coarse sand with scattered gravel	32	42
Very dense, brown & gray, sandy gravel	37	85
Very dense, tan micaceous, fine sand	15	100
Very dense, light brown, micaceous, fine to medium sandy gravel 3 to 4 in. max.	52	152

699-12-3 (1D-SP-4)
Location: N12150, W2500 11/28-5D1
Surface Elevation: 440.5
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; brown	2	2
Sand & gravel; gray, fine to coarse sand	24	26
Sand; brown, fine sand, micaceous	14	40
Sand & gravel; gray, medium to coarse sand, fine to coarse gravel	17	57
Sand & gravel; brown, fine sand, gravel	24	81

699-12-4A (1A-SP-10)
Location: N12100, W4100 11/28-5D1
Surface Elevation: 444.2
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, gray, fine to medium sand, predominantly basalt	29	29
Sand & gravel, variegated, brown & gray, fine to coarse sand predominantly quartz grains, few gravels	7	36
Sand, variegated brown & gray, fine to coarse sand, quartz & basalt grains	19	55
Sand & gravel, variegated gray & brown, fine to medium sand, fine to coarse gravel	28	83

699-12-4B (1D-SP-3)
Location: N11730, W3700 11/28-5D2
Surface Elevation: 448.8
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; brown	5	5
Sand & gravel; variegated gray & brown, fine to medium sand	33	38
Sand; gray, medium sand	13	51
Sand & gravel; gray	9	60
Sand & gravel; brown, fine sand, fine to coarse gravel	24	84

699-12-4C (1D-SP-3A)
Location: N11860, W3750 11/28-5D3
Surface Elevation: 445.4
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; brown	3	3
Sand & gravel; gray, fine to coarse sand, fine to coarse gravel	15	18
Sand; dark gray, fine to medium sand, basalt grains	20	38
Sand & gravel; gray, fine to coarse sand, fine gravel	22	60
Sand & gravel; light brown, fine to coarse sand, fine to coarse gravel	44	104

699-12-11
Location: N11642, W11490 11/27-1B1
Casing Elevation: 533
Mud rotary, drilled by Thompson of GSI for BNWL, 1962, shothole boring

Material (1)	Thickness	Depth
Sand	112	112
Gravel-boulders	13	125

699-13-E16 (CB-20)
Location: N12740, E15640 12/28-33N4
Surface Elevation: 378.6
Air rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (8)	Thickness	Depth
Sand, medium to dense, light brown, fine, slightly silty	18	18
Sandy gravel, occasionally grading to gravelly sand, dense to very dense, light brown, fine to coarse, clean scattered cobbles	64	82
Clayey silt, hard, brown to yellow-brown, w/varying amounts of the fine sand	16	98
Silty sand, very dense, yellow-brown, fine	15	113
Sandy gravel, very dense, yellow-gray-brown, fine to coarse, clean to slightly silty	9	121

699-13-E4A (CB-18)
Location: N12975, E3845 11/28-4B2
Surface Elevation: 455.1
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 founnation test boring

Material (8)	Thickness	Depth
Silty sand, loose, light brown, fine to medium	6	6
Sand, medium to very dense, gray-brown, fine to medium, clean to slightly silty, scattered fine to coarse gravel	63	69

Gravelly sand, dense, gray brown, fine to coarse, slightly silty, slightly gravelly above 72 ft.	10	79
Gravelly sand grading to sandy gravel, below 88 ft., very dense light brown, fine to coarse, slightly silty	12	91

699-13-E4B (1C-SP-10)
Location: N12700, E4200 11/28-483
Surface Elevation: 462.49
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand; gray, fine to medium sand, predominantly basaltic	85	85
Sand & gravel; variegated brown & gray, fine to coarse sand, some silt, gravels	15	100
Sand & gravel; brown, fine to coarse sand, predominantly fine grained, gravel	17	117

699-13-E4C (1C SP-17)
Location: N13400, E4200 11/28-484
Surface Elevation: 460.5
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand; variegated gray & white, fine to medium sand, quartz & basalt grains	72	72
Sand & gravel; variegated gray & white, fine to medium sand, quartz & basalt grains sand w/gravel	28	100
Sand & gravel; brown, fine to coarse sand, predominantly fine sand, fine gravel	22	122

699-13-E3A (CB-3)
Location: N12928, E2625 11/28-471
Surface Elevation: 442.1
Rotary, logged by Shannon & Wilson for WPPSS, 1972, WNP-4 foundation test boring

Material (B)	Thickness	Depth
This interval, see 699-13-E3B . .	50	50
Gravelly sand grading to sandy gravel below 52 ft, medium to very dense, gray, fine to coarse clean to silty	15	65
Sandy gravel, very dense, yellow gray-brown, fine to coarse, clean to slightly silty, scattered cobbles	37	102
Sand, very dense, yellow-brown, fine to medium, clean	4	106
Sandy gravel, same as interval 65-102 ft.	62	168

699-13-E3B (CB-3AA)
Location: N12929, E2618 11/28-472
Surface Elevation: 442.1
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
Silty sand; loose, light brown, fine scattered roots	4	4
Sand; medium to very dense, gray to gray-brown, fine to coarse clean to silty scattered fine to coarse gravel	41	45
Gravelly sand grading to sandy gravel below 52 ft. medium to very dense, gray, fine to coarse, clean to silty	15	60

699-13-E3C (CB-3A)
Location: N12930, E2610 11/28-473
Surface Elevation: 442.1
Rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
This interval see 699-13-E3A & 699-13-E3B	168	168
Sandy gravel; very dense, yellow gray-brown, fine to coarse, clean to slightly silty, scattered cobbles	34	202

699-13-E3D (CB-4)
Location: N13070, E3280 11/28-474
Surface Elevation: 449.ft
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose, light brown . .	2	2
Sand, loose, gray, fine to coarse, clean, scalloped fine to coarse gravel	9	11
Sand, medium dense to dense, gray, fine to coarse, clean, scattered fine to coarse gravel	48	59
Sandy gravel, medium dense to dense, gray, fine to coarse, clean	6	65
Sandy gravel, very dense, light brown, fine to coarse, clean scattered cobbles	9	74

699-13-E3E (CB-8)
Location: N12497, E2608 11/28-475
Surface Elevation: 449.6
Hollow stem auger (to 80 ft.) & rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose, light brown w/scattered roots	3	3
Sand loose, gray, fine to medium, clean, scattered fine to coarse gravel	5	8
Sand, medium dense to dense, gray, fine to medium, clean, scattered fine to coarse gravel	51	59

Slightly sandy to sandy gravel, very dense, light brown, fine to coarse, clean to slightly silty, scattered to numerous cobbles	87	148
Sand, very dense, light brown, fine clean	147	300

699-13-E3F (CB-11)
Location: N13381, E2719 11/28-4C6
Surface Elevation: 451.9 ft.
Hollow stem auger (to 76 ft.) & rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
Sand, medium dense, light brown, fine to medium, slightly silty	4	4
Sand, medium to very dense, dark gray, fine to coarse, clean to slightly silty, scattered fine to coarse gravel	53	57
Gravelly sand, dense to very dense gray, fine to coarse, slightly silty	17	45
Sandy gravel, very dense, light brown, fine to coarse, clean to slightly silty, scattered to numerous cobbles	32	97
Sand, very dense, gray-brown, fine to coarse, clean	2	99
Sandy gravel, same as interval 65-97 ft.	152	251
Clayey silt, light brown	32	283
Sandy silt, hard, light brown, fine sand cemented layers	5	288
Sandy gravel, very dense (inferred from drill action & correlation with nearby borings)	9	297

699-13-E3G (CB-12)
Location: N13175, E2775 11/28-4C7
Surface Elevation: 445.8
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
Silty sandy, loose, light brown, fine, scattered roots	6	6
Sand, medium to very dense, gray fine to coarse, clean, scattered fine gravel	50	56
Sandy gravel, very dense, gray, fine to coarse, clean	6	62
Gravelly sand grading to sandy gravel below 55 ft., very dense, light brown, fine to coarse, clean	12	74

699-13-E3H (CB-15)
Location: N12552, E2775 11/28-4C8
Surface Elevation: 442.2
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation borehole

Material (B)	Thickness	Depth
Silty sand, loose, light brown, fine to medium, scattered roots	3	3
Sand, loose, gray to gray-brown, fine to coarse, clean to slightly silty, scattered fine to coarse gravel	3	6
Sand, medium to very dense, gray to gray-brown, fine to coarse, clean to slightly silty, scattered fine to coarse gravel	44	50
Sandy gravel, very dense, gray-brown, fine to coarse, slightly silty	7	57
Sandy gravel, very dense, light brown, fine to coarse slightly silty	13	70

699-13-E3J (CB-17)
Location: N12853, E3070 11/28-4C9
Surface Elevation: 447.3
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose to medium dense, light brown, fine	4	4
Sand, medium to very dense, gray to gray-brown, fine to medium, clean to slightly silty, scattered fine to coarse gravel	52	56
Gravelly sand grading to sandy gravel below 60 ft., dense to very dense, gray-brown, fine to coarse, clean to slightly silty	10	66
Sandy gravel, very dense, light brown, fine to coarse, clean	9	75

699-13-E2A (CB-5)
Location: N13344, E2383 12/28-3DN1
Surface Elevation: 445.2
Air rotary, logged by Shannon & Wilson for WPPSS 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose, brown, fine, scattered roots	2	2
Sand, medium to very dense, gray to gray-brown, fine to coarse clean, scattered fine to coarse gravel	44	46
Gravelly sand, dense, gray-brown fine to coarse, slightly silty	6	52
Sandy gravel, very dense, light brown to gray-brown, fine to coarse, slightly silty to silty scattered to numerous cobbles w/lenses of clean to silty fine to medium sand about 12 in. thick	185	237
Clayey silt, hard, light tan, trace fine to coarse gravel, scattered calcite veins & calcite cemented nodules	8	245
Sandy silt, very dense, light brown, fine to coarse sand, scattered calcite veins	39	284
Gravelly sand, very dense, light brown, fine sand, fine to coarse gravel, slightly silty	17	301

699-13-22B (CB-13)
Location: N13175, E2434 12/28-33N2
Surface Elevation: 444.3
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-2 foundation test boring

Material (B)	Thickness	Depth
Silty sand, medium dense, light brown, fine to medium, scattered roots	6	6
Sand, medium dense to dense, gray to gray-brown, fine to coarse, clean to slightly silty scattered fine to coarse gravel	45	51
Sandy gravel, very dense, light brown, fine to coarse, slightly silty	7	58

699-13-22C (CB-14)
Location: N12551, E2475 12/28-33N3
Surface Elevation: 436.9
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
Sand, loose light gray-brown, fine, clean	5	5
Sand, loose, gray, fine to medium, clean	6	11
Sand, medium to very dense, gray, fine to medium, clean	28	39
Sandy gravel, medium dense, gray fine to coarse clean	3	4
Sandy gravel, very dense, light brown, fine to coarse, slightly silty	10	57

699-13-22D (CB-64)
Location: N13465, E2468 12/28-33N4
Surface Elevation:
Rotary, logged by Shannon & Wilson for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand; variegated gray & brown, fine to coarse sand, basalt grains	60	60
Sand & gravel; light to dark brown, fine to medium sand, gravel	200	260
Gravel; dark gray-brown, some sand		
Silt & clay; light brown to brown	30	290
Gravel; varied color	10	300

699-13-0 (TD-SP-6)
Location: N13350, W400 12/28-32Q1
Surface Elevation: 412.9
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand; brown, medium sand	30	30
Sand & gravel; brown, fine to medium sand, fine to coarse gravel	35	65

699-13-28 (B-35)
Location: N12525, W1845 11/28-30Q
Casing Elevation: 439.5
Rotary (to 475 ft.) & diamond coring, drilled by Soil Sampling Service & Longyear Company & logged by Shannon & Wilson for WPPSS, 1972, WNP-2 bedrock geologic investigation borehole

Material (B)	Thickness	Depth
Dark gray, silty, fine to coarse sand & gravel	40	40
Light grayish brown, slightly silty, fine to coarse sandy gravel	50	90
Brown, micaceous silty, fine sand	20	110
Brown, very silty, fine to coarse sandy gravel	10	120
Brown, slightly silty, fine to coarse sand & fine gravel	70	190
Light brown, silty, fine to coarse sandy gravel	10	200
Light brown, fine to coarse sand & fine gravel, trace of silt	20	220
Gray, fine to coarse sandy gravel	40	260
Light gray to gray, silt & clayey silt	30	290
Gray to green-gray, fine to coarse sandy gravel	120	410
Dark brown, silt	10	420
Dark brown to gray slightly silty clay	45	465
Basalt conglomerate, soft, dark gray to black; rounded, predominantly basaltic gravel & cobbles to 4 in. sand matrix weakly cemented	36	501
Vesicular basalt, medium hard to hard, dark gray	17	518
Basalt scoria, medium hard, dark gray to black, contains oxidized zones	27	545
Vesicular basalt, very hard, dark gray, highly jointed	81	626
Basalt scoria highly broken (possible flow breccia)	9	635
Tuff, soft, greenish gray to gray	41	676
Basalt scoria mixed or filled with tuff from above	10	686
Basalt scoria or vesicular basalt	6	692
gray to black & jointed	44	736
Basalt, very hard, gray to black, massive & jointed	109	845
Tuff, medium soft, dark gray to green	9	854
Basalt, hard, dark gray to black scoriaceous with tuff filling from above	18	872
Vesicular basalt, very hard, dark gray to black	3	875

699-13-2C (TD-SP-5)
Location: N12800, W1500 11/28-30Q
Surface Elevation: 440.9
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand & gravel; brown to dark gray, medium to coarse sand, gravel	20	20
Sand; brown to dark gray, medium to coarse sand, occasional gravel	30	50
Sand & gravel; medium to fine sand fine to coarse gravel	32	82

699-13-5 (1A-SP-11)
Location: N13250, W4500 12/29-31R1
Surface Elevation: 444.50
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, brown	4	4
Sand & gravel, brown, fine to coarse sand, gravel	11	15
Sand, variegated brown & gray, fine to coarse sand, quartz & basalt grains	35	50
Sand & gravel, variegated gray & white, medium to coarse sand, gravel (Driller's comment: cemented gravel)	36	86

699-13-13A
Location: N13257, W13105 12/27-36P1
Casing Elevation: 539
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	122	122
Gravel-boulders	18	140

699-13-13B
Location: N13257, W13105 12/27-36P2
Casing Elevation: 539
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	122	122
Gravel-boulders	18	140

699-13-64
Location: N12596, W63975 11/26-5B1
Casing Elevation: 552.07
Cable tool, drilled by Stanbery & Robinson of USGS for GE Company, 1950, groundwater monitoring & geologic investigation borehole

Material (4)	Thickness	Depth
Sand, silty medium; consists equally of basalt & exotic types	13	13
Silt, sandy & clayey; khaki silt w/fine & coarse quartz sand carrying basalt, mica, & exotic rock types	8	21
Sand, gravel, & some silt; about 50% medium subangular basaltic sand w/an equal amount of largely basaltic subangular caliche-coated pebble gravel that increases downward	24	45
Gravel, sandy; similar to lower part just above	8	52
Sand, silty; medium to coarse quartzose sand w/fine & very coarse admixtures & some tan silt	12	65
Silt, clayey; stratified tan clayey silt having 10% sand of largely quartzose & exotic types	39	104
Sand, silty; medium to fine light-buff quartzose & exotic sand w/10% mica and no basaltic grains	5	109
Gravel, sandy; granule & pebble gravel whose particles consist of 40% basalt & 60% exotic rock types	4	113
Silt, sandy; tan silt w/40% fine quartzose iron-stained sand	8	121
Gravel, sandy; granule & pebble exotic-type gravel & about 40% medium quartzose sand; most basalt pebbles have 1/16- to 1/8-in. weathering rinds	12	133
Sand, well-sorted, medium to fine rounded; 75% quartz, 15% exotic rock types, 10% mica	4	137
Sand, gravelly; poorly sorted rounded coarse to fine quartzose buff-gray sand & pebble gravel whose particles are 75% exotic rock types and 25% basalt; many basalt pebbles have weathering rinds	24	161
Basalt, black, scoriaceous; has zeolite-filled vesicles	7	168

699-14-E6P
Location: N13711, E5507 12/28-33R1
Casing Elevation: 458.44
Mud rotary & coring (basalt only), drilled by Wood & Lovdahl of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand w/gravels	45	45
Sand w/gravels coarser	15	60
Sand w/gravels	15	75
Gravels, very coarse & boulders.	15	90
Gravel & boulders	15	105
Gravel, boulders, & sand	30	135
Gravel, boulders, sand-cemented	7	142
Cemented gravel	8	150
Cemented gravel & boulders	15	165
Gravel & boulders	15	180
Gravel & some clay at 188-190 ft.	15	195
Gravel & boulders	10	205
Gravel, boulders, & sand	50	255
Clay w/gravels	15	270
Clay & gravel	10	280
Gravel, very coarse gravel at 290 ft.	25	305
Clay & sand	10	315
Sandy clay	15	330
Sandy clay w/gravels	15	345
Blue clay, sandy	15	360
Clay & gravels	43	403
Basalt	31	434
Basalt & blue clay	11	445
Basalt w/reddish brown in color	14	459
Basalt	15	474
Clay w/gravel & rocks	19	493
Basalt boulder clay w/gravel & rocks	5	500
Basalt	7	507

699-14-E6Q
Location: N13749, E5507 12/28-33R2
Casing Elevation: 457.91
Mud rotary, drilled by Wood & Lovdahl of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravels	75	75
Gravel cobbles-boulders	1	76
Gravel cobbles-boulders	3	79
Cobbles, boulders & gravel	11	90
Gravel boulders & gravel	15	105
Gravel & boulders	15	120
Cobbles, boulders, & gravel	60	180
Cobbles, gravel	3	183
Some silty clay w/gravels.	5	188
Cobbles, gravel	7	195
Gravel & boulders	10	205
Cobbles, boulders, gravel.	33	238
Sandy clay & gravel	15	253
Sand, clay w/gravel	32	270
Gravel, cobbles, boulders	32	302
Sandy clay w/gravels	28	330
Sandy, more clay	15	345
Sand clay w/gravels	15	360
Clay w/sand & gravels	42	402
Basalt	33	435
Blue clay w/gravels	14	449
Basalt	3	452

699-14-E6R
Location: N13787,E65508 12/28-33R3
Casing Elevations: 458.14
Mud rotary, drilled by Wood & Lovdahl of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel	60	60
Sand & gravels, few cobbles	15	75
Boulders, cobbles, & gravels	38	113
Cobbles, boulders, gravel	82	235
Cobbles, boulders, gravel, & clay.	1	236
Gravel & clay	49	285
Cobbles & gravel	10	295
Cobbles & boulders & gravel;	4	299
Sandy clay w/gravels	91	390

699-14-E6S
Location: N13830,E5506 12/28-33R4
Casing Elevation: 457.77
Mud rotary, drilled by Wood, Lovdahl & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel	60	60
Sand & gravel w/some cobbles	15	75
Cobbles, boulders & gravel	45	120
Cobbles, boulders & gravel, some sand	15	135
Cobbles, gravel, some sand	15	150
Cobbles, boulders, gravel	15	165
Boulders, cobbles & gravel	75	240
Sandy clay with gravels-(?) hit gray sandy clay at 247 ft.	15	255
Sandy clay with gravels-cobbles at 265 ft. (?)	15	270
Cobbles and gravel	30	300
Sandy clay with gravels	1	301
Cobbles and gravel	1	302

699-14-E6T
Location: N13869, E5500 12/28-33R5
Casing Elevation: 458.38
Mud rotary, drilled by Wood, Lovdahl & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel	60	60
Sand & gravel w/few cobbles	15	75
Sand & gravel w/cobbles & boulders	15	90
Gravel, cobbles, & boulders	15	105
Cobbles, boulders, gravel	17	122

699-14-E8 (DC-SP-1)
Location: N13800, E4000 12/28-33D1
Surface Elevation: 461.22
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand: variegated gray & brown, fine to medium sand, some silt, basalt grains, occasional gravel	86	86
Sand & gravel, brown, fine gravels, to coarse sand	29	114

699-14-E3A (CB-2)
Location: N13900, E2860 12/28-33N5
Surface Elevation: 451.6
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (8)	Thickness	Depth
Silty, sand, loose, light brown, fine to medium	4	4
Sand, medium to very dense, gray fine to coarse, clean to slightly silty, scattered fine to coarse w/one 6-in. layer of silty sand	54	58
Gravelly sand grading to sandy gravel below 60 ft., medium to very dense, gray; fine to coarse, clean to slightly silty	13	71
Sandy gravel, very dense, light brown, fine to coarse, clean	12	83
Sand, very dense, light brown, fine to medium, clean	1	84
Sandy gravel, same as interval 71-83 ft.	4	88

699-14-E3B (CB-9)
Location: N13631, E2612 12/28-33N6
Surface Elevation: 449.5
Hollow stem auger & rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (8)	Thickness	Depth
Sand; variegated gray & brown, fine to coarse sand	50	50
Sand & gravel; variegated gray & brown, fine to coarse sand, gravel Sand & gravel; brown, some clay Gravel; few fines Sand & gravel; brown, fine to coarse sand & gravel Silty gravel; brown, some clay Sand & gravel; brown, fine to coarse sand, some silt & clay, gravel	230	280
Silt & clay; light brown, very soft	10	290
Sand & gravel; variegated brown & gray	13	303

699-14-E3C (CB-10)
Location: N13643, E2790 12/28-33N7
Surface Elevation: 457.4
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (8)	Thickness	Depth
Silty sand, loose, light brown fine to medium	5	5
Sand, loose, gray, fine to coarse clean scattered fine to coarse gravel	3	8
Sand, medium to very dense, gray, fine to coarse, clean, scattered fine to coarse gravel	49	57
Sandy gravel, medium to very dense gray fine to coarse, clean.	10	67
Gravelly sand grading to sandy gravel below 66 ft., very dense light gray-brown, fine to coarse, clean	9	76

699-14-E3D (CB-19)
Location: N13571, E3389 12/28-33N8
Surface Elevation: 456.0
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (8)	Thickness	Depth
Silty sand, light brown, fine	2	2
Sand, medium to very dense, gray to gray brown, fine to medium, clean to slightly silty, scattered fine to coarse gravel	68	70
Gravelly sand, very dense, gray-brown, fine to coarse gravel, fine to medium sand, clean	4	74
Sandy gravel, very dense, light brown, fine to coarse, slightly silty	10	84

699-14-E3E (BH-142)
Location: N13,500, E2,500 11/28-33N9
Surface Elevation: 450.1
Mud rotary (to 406 ft. & diamond coring, drilled by Longyear Drilling Company & logged by Fugro for WPPSS, 1974, bedrock geologic investigation borehole

Material (8)	Thickness	Depth
Sand, dark gray, coarse, poorly graded, predominantly basaltic	49	49
Gravel; light brown & dark gray, gravel to cobbles, basaltic & acid igneous Sandy gravel; light brown & dark gray, gravel to cobbles, basaltic & acid igneous, some sand Sandy gravel; brown, gravel to cobbles, sand w/some silt & clay	56	105
Silty sand; brown, coarse sand, silt w/some clay, some gravels	20	125
Gravel; clean Clayey gravel; brown, gravel to cobbles, clay w/some silt & coarse sand Gravel; clean Sandy gravel; dark gray-brown gravel to cobbles, basaltic & acic igneous, coarse sand, some silt & clay	81	206
Gravelly sand; dark gray & light brown, coarse sand, some gravels	18	224
Sandy gravel, dark brown, gravel & cobbles, medium to coarse sand some silt & clay Clayey sand; dark gray, coarse sand silty some gravels	61	285
Gravel, dark gray-brown, slightly sandy Sandy gravel; gravel to cobbles, medium to coarse sand, some clay	50	335
Gravelly clay, green gray	20	355

Clayey silt green gray, clay w/ some fine sand & gravel		
Sandy silt; green to gray, fine to coarse sand, some clay & gravel	40	395
Gravel; clean, basaltic	11	406
Conglomerate; basaltic, acid igneous, quartzite grading to predominantly basaltic gravel to cobbles	18	444
Basalt; dark gray, fine grained, slightly vesicular	11	455
Basalt, light gray, fine grained vesicular	8	463
Basalt; gray, fine grained, highly vesicular, vesicles to 1 cm, elongated, highly fractured, light green silty clay fills fractures & joints	48	511
Basalt; dark gray to black, fine grained, non-vesicular, moderately fractured, dense	63	574
Basalt; vesicular	1	575
Tuff; light green gray to gray, clay to fine sand		
Tuff; breccia; light green gray in dark gray matrix		
Tuff; dark green-gray, clay to fine sand, less indurated than above		
Tuff; light green		
Breccia tuff; basalt fragments in tuff matrix	26	601
Basalt; light to dark gray, fine grained, scoriaceous & highly vesicular to vesicular, green silty clay fills fractures & joints, highly weathered to unweathered	23	624
No record	4	628
Basalt; highly vesicular	1	629

699-14-E2A (CB-7)
Location: N13527, E2473 12/28-33N10
Surface Elevation: 451.3
Hollow stem auger (to 74 ft.) & air rotary, logged by Shannon & Wilson for WPPSS, 1974, WNP-4 foundation test boring

Material (B)	Thickness	Depth
Silty sand, loose, light brown, fine to coarse	5	5
Sand, loose, gray fine to coarse, clean	11	16
Sand, dense to very dense, gray fine to coarse, clean	38	54
Sandy gravel, dense, gray, fine to coarse, clean	6	60
Sandy gravel, very dense, light gray-brown, fine to coarse, clean to slightly silty, scattered to numerous cobbles	174	246
Clayey silt, hard, light, brown, trace fine sand, trace fine gravel	29	275
Sand silt, very dense, light-brown, fine sand	10	285
Sandy gravel, very dense, light gray, silty fine to medium sand, fine to coarse	10	295
Sand, very dense, light brown, trace of silt, fine to medium	6	301

699-14-E2B (CB-6)
Location N13505, E2420 12/28-33N11
Surface Elevation:
Rotary, logged by Shannon & Wilson for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand, variegated gray & brown, fine to coarse sand, basalt grains	60	60
Sand & gravel; brown, medium sand, gravel	74	134

699-14-E1A (1D-SP-7)
Location: ~N14000, E600 12/28-32R1
Surface Elevation: 409.4
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand & gravel, dark gray, coarse sand, basaltic, fine to coarse gravel	20	20
Sand & gravel; brown, fine to medium sand, some silt gravel	40	60

699-14-E1B (1D-SP-8)
Location: ~N14200, E1000 12/28-32R2
Surface Elevation: 417.6
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand; gray, fine to coarse gravel	30	30
Sand & gravel; brown, fine to medium sand, gravel	8	38
Sand; dark brown, fine sand, minor gravels	6	44
Sand & gravel; light brownish gray, fine to medium sand, fine to coarse gravel	26	70

699-14-E1C (1D-SP-8A)
Location: ~N14350, E900 12/28-32R3
Surface Elevation: 421.0
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand, dark brown, fine sand, minor gravel	20	20
Sand & gravel; light brownish gray, fine to medium sand, fine to coarse gravel	76	96

699-14-5 (1A-SP-12)
Location: N14400, W4900 12/28-31R2
Surface Elevation: 442.10
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand, brown	(Veneer)	
Sand, variegated brown & gray fine to medium sand, predominantly quartz grains w/some basalt grains	48	48

Sand & gravel, brown, fine to coarse sand, predominantly quartz, gravel (Driller's comment: cemented gravel) . . .	36	84

699-14-13
Location: N13501, W13349 12/27-36N1
Casing Elevation: ~540
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	133	133
Gravel-boulders	22	155

699-14-14A
Location: N14477, W14325 12/27-36N2
Casing Elevation: ~543
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	125	125
Gravel-boulders	30	155

699-14-14B
Location: N14233 W14081 12/27-36N3
Casing Elevation: ~542
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	143	143
Gravel	12	155

699-14-14C
Location: N13989, W13837 12/27-26M4
Casing Elevation: ~542
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	138	138
Gravel-boulders	12	153

699-14-14D
Location: N3745, W13593 12/27-36N5
Casing Elevation: ~540
Mud rotary, drilled by Thompson of GSI for BNWL, 1963, shothole boring

Material (1)	Thickness	Depth
Sand	135	135
Gravel-boulders	20	155

699-14-38
Location: N14210, W37978 12/27-31Q1
Casing Elevation: 514.89
Cable tool, drilled by Bach of Bach Drilling Company for GE Company, 1958, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & silt	75	75
Sand & silt (very little silt) . .	1	76
Sand & silt	9	85
Sand & heavy silt.	5	90
Sand & heavy silt, formation changed at 90 ft. to sand w/a silt & little clay formation . .	10	102
Sand & silt	10	110
Gravel & sand (very hard to drill)	1	111
Gray hard pan; gray gravel & sand hard pan encountered & at 111 ft.	5	116
Gray gravel & sand (cemented gravel)	9	125
Sand & gravel (hard pan formation)	13	138
Sand & gravel (cemented)	22	160
Cemented sand & gravel	7	167
Sand & gravel (cemented)	2	169
Sand & gravel	10	179
Brown clay	9	188
Gray clay & little sandy	27	215
Gray clay-gravel (little)	5	220
Gray clay & few gravel	9	229
Mixed gravel-blue gray clay . . .	21	250
Blue gray clay	15	265
Gray blue clay	5	270
Gray blue clay & gravel	4	274
Blue clay & gravel & sand mixed. .	11	285
Green clay & gravel	10	295
Green clay & small gravel.	5	300
Blue-green clay (sandy)	15	315
Gray rock like basalt run into a gray & black rock (mixed) at 319 ft. it is very hard & dense	9	324
Gray rock-little clay	4	330
Gray clay	28	358
Light gray clay	7	365
Sandy gray clay	15	380
Gravel & rock	10	390
Gray & black rock	5	395
Gray & black cemented rock	17	412
Gray & black rock (cemented) . . .	8	420
Basalt	5	425

699-14-47
Location: N13628, W43717 12/26-35R1
Casing Elevation: 587.22
Cable tool, drilled by Hatch of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
Sand & silt	165	165
Gravel	8	177
Cement gravel	4	181
Small gravel & sand	5	186
Sand & silt & gravel	4	190

699-15-E13 (D8-2)
Location: N15022, E12713 12/28-34D1
Casing Elevation: 409.38
Rotary (to 312 ft.) & diamond coring, drilled by Burns of Aqua Drilling & Development Company & Boyles Brothers Drilling Company & logged by Ledgerwood of & for ARHCO, 1974, bedrock geologic & hydrologic investigation borehole

Material (1, 2, 21)	Thickness	Depth
Silt & fine sand	6	6
Gravel, coarse w/medium to coarse sand & medium to coarse w/fine to coarse sand	62	68
Silt, brown, clayey	2	70
Gravel, coarse w/sand & silt	47	117
Silt & sand w/medium gravel	5	122
Clayey silt Clay, brown, tight	2	124
Sand, fine	14	148
Gravel, coarse w/coarse sand	24	172
Silt brown	2	174
Gravel, coarse w/fine to coarse green sand	28	202
Gravel, coarse w/sand & silt	6	208
Sand & silt w/coarse gravel	4	212
Silt brown	2	214
Sand & silt	28	242
Sand, green	32	274
Sand, dark brown	24	298
Clay greenish gray	7	305
Basalt	113	418
Sandstone, tuffaceous	22	440
Basalt	152	592
Sandstone, fine black w/clay	16	608
Basalt	48	656
Lapilli tuff	4	660
Basalt	17	677
Lapilli tuff	3	680
Basalt	24	704
Tuff	4	708
Basalt	193	901
Tuff, welded lapilli	3	904
Sandstone, black glass green, tuffaceous, uncemented, clayey	20	924
Sediments	23	947
Basalt	84	1,031
Basalt	72	1,103
Basalt	68	1,171
Hard brown, black clay	1	1,172
Basalt	101	1,273

699-15-E44A (TC-SP-12)
Location: N15000, E3700 12/28-33P1
Surface Elevation: 456.95
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand: variegated gray & brown, fine to coarse sand, basalt grains	80	80
Sand & gravel; brown, fine to medium sand, predominantly fine grained	3	83
Sand; brown, fine grained, quartz sand	2	85
Sand & gravel; brown, fine sand, gravels	27	112

699-15-E48 (TC-SP-8)
Location: N14500, E3900 12/28-33P2
Surface Elevation: 458.7
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand: variegated gray & white fine to medium sand, basalt & quartz grains	66	66
Sand & gravel; variegated gray & brown, fine to coarse sand quartz & basalt grains	24	90
Sand & gravel; variegated gray & brown, fine to coarse sand predominantly quartz grains gravel	34	124

699-15-E2A (BH-144)
Location: N15050, E2500 12/28-33M1
Surface Elevation: 460.3
Rotary, logged by Shannon & Wilson for WPPSS, 1974, geologic investigation borehole

Material (8)	Thickness	Depth
Silty sand, loose, light brown	2	2
Sand, gray; fine to coarse, clean to slightly silty	67	69
Sandy gravel, very dense, light brown, fine to coarse, clean to slightly silty, scattered cobbles	15	84
Sand very dense, light gray-brown, fine, clean, gravelly near base	3	87
Sandy gravel, same as interval 69-84 ft.	66	153
Interbedded clayey silt & silty sand; silt, hard, light brown; sand, very dense light brown, fine	22	175
Sandy gravel, same as interval 69-84 ft.	57	228
Silty sand, very dense, gray-green fine	8	246
Clayey silt, hard, dark gray	12	258

699-15-E28 (TC-SP-10)
Location: N15400, E3100 12/28-33M2
Surface Elevation: 457.6
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand: dark gray, basaltic	58	58
Gravel, fine to coarse	32	90
Sand & gravel; brown, fine sand, some silt	31	121

699-15-E3C (TC-SP-16)
Location: N15100, E2600 12/28-33M3
Surface Elevation: 456.1
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand: variegated gray & white, fine to medium sand, basalt & quartz grains	10	10

Sand & gravel; variegated gray & white, fine to medium sand, basalt & quartz grains, w/gravel	5	35
Sand; variegated brown, white & gray, fine sand, basalt & quartz grains	30	65
Sand & gravel; variegated brown gray, fine to coarse sand, gravel	15	80
Sand & gravel; light brown, fine sand, gravel	32	112

699-15-22A (1D SP-3)
Location: N14800, E2100 12/28-33M3
Surface Elevation: 450.7
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; dark gray, fine to medium sand	60	60
Sand & gravel; brown medium sand fine to medium gravel	41	101

699-15-22B (1D-SP-9A)
Location: N14950, E2000 12/28-33M4
Surface Elevation: 450.4
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; dark gray, fine to medium sand, basaltic	60	60
Sand & gravel; light brownish, gray fine sand, gravel	55	115

699-15-22C (1D-SP-15)
Location: N14600, E1600 12/28-33M5
Surface Elevation: 438.2
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; gray, fine to coarse sand, basaltic	15	15
Sand & gravel; gray, fine to coarse sand, fine to coarse gravel	10	25
Sand; brownish gray, fine to medium sand	25	50
Sand; light brown, fine sand, some silt	5	55
Sand & gravel; dark brown, medium sand, gravel	33	88

699-15-15A
Location: N14815, W14963 12/27-35J1
Casing Elevation: 547.24
Cable tool, drilled by Hatch of Hatch Drilling Company for SE Company, 1960, groundwater monitoring borehole

Material (1)	Thickness	Depth
Black sand & silt	25	25
Fine sand & silt	5	30
Seemed to have thin lense of small gravel 1 in. then into a cemented sand & silt & gravel 1 in. smaller	5	35
Sand & silt, gravel 1 in. less gravel	5	40
Sand & silt, gravel up to 2 in. very small amount	5	45
Sand & silt	5	50
Sand & silt; sand caving & heaving	5	55
Sand & silt, small % gravel at 4 in.	5	60
Sand & silt	20	80
Sand & silt; coarser sand, less silt	5	85
Sand & silt	30	115
Sand & silt & 6 in. gravel, at 120 ft. gravel from 1 in. to 6 in.	5	120
Sand & silt; more silt	5	125
Brown sand & silt	5	130
Sand & silt	5	135
Sand & silt & 1/2 in. gravel	5	140
Sand & silt	5	145
Sand & silt & gravel to 6 in. at 147 ft. mit gravel & cobbles from 1/2 in. to larger, material kept heaving; at 150 ft. gravel a little smaller 3 in.	5	150
Cobbles	5	155
Gravel (clean)	5	160
Sand & gravel, small	5	165
Gravel to 2 in. some silt	5	170
Sand, silt, small gravel	10	180
Sand & silt & gravel at 3 in.	5	185
Sand & silt, gravel to 3 in.	5	190
Sand & silt, gravel to 4 in.	5	195
Sand, silt, gravel to 5 in. 205 ft.-changed to gray color from brown	10	205
Coarse sand & silt	5	210
Sand & silt, gravel to 6 in.	5	215
Brown clay & gravel to 2 in.	15	230
Brown clay & coarse sand	10	240
Firm brown clay & gravel	12	252
Blue sandy clay (firm)	3	255
Blue clay w/gravel (small)	25	280
Blue clay & gravel to 2 in. gravel larger & basalt type	5	285
Blue clay & gravel to 2 in.	20	305
Blue clay & basalt gravel	50	355
Blue clay, less gravel; softer material very little gravel	5	360
Blue clay, less gravel, very soft clay	5	365
Blue clay, small gravel	5	370
Sandy blue clay	10	380
Blue clay w/gravel 2 in. hard sandy clay w/gravel	5	385
Sandy blue clay w/gravel	15	400
Sandy blue clay w/gravel; seemed to be 2 to 3 ft. of gravel	5	405
Blue clay w/gravel up to 2 in.	15	420
Blue clay w/gravel 4 in. to 6 in. hole caved & filled w/large basalt gravels up to 6 in. diameter	5	425
Grey sticky clay w/coarse sand	5	430
Grey sticky clay, less sand	5	435
Grey hard clay	5	440
Grey hard clay w/gravel to 1 in.	5	445
Soft grey clay, very little gravel	5	450
Black soft clay	5	455
Brownish black firm clay	10	465
Blue hard clay	10	475
Blue hard clay, harder & sticky	5	480
Hard sticky light blue clay & gravel	5	485
	5	490

Hard sticky light blue clay	5	495
Hard sticky light blue clay & gravel; at 497 ft. hit clean gravel, small	5	500
Small gravel, & gray clay	5	510
Blue clay & gravel	5	515
Blue clay & gravel, more	5	520
Blue clay & fine gravel	5	525
Blue clay & coarse gravel	5	530
Gravel & blue clay	10	540
Blue clay, some gravel	5	545
Sticky blue clay & gravel	10	555
Pack brown sandy clay w/small gravel	10	565
Pack brown sandy clay-no gravel	20	585
Dark brown sandy clay	20	605
Dark brown sandy clay, some small gravel	5	610
Grey blue clay, no gravel	10	670
Grey blue clay, some small gravel	12	632
Real clean gravel up to 2 in.	3	635
Blue clay & gravel	5	640
Blue clay cemented; at 645 ft. seems to be chalky clay & some gravel, at 650 ft. seems harder-looks like some basalt gravel & some solid basalt pieces	10	650
Cemented gravel to 3 in.	17	667
Gray, black medium clean sand	3	670
Gray, black medium clean sand; sand heaves	5	675
Clean sand w/small gravel	10	685
Clean sand w/small gravel & some clay	5	690
Coarse sand & small gravel	5	695
Sand & gravel, small	5	700
Clean sand & gravel to 2 in.	4	704
Sticky blue green clay	1	705
Hard basalt	3	719
Basalt	3	722

699-15-15B
Location: N14831, W14991 12/27-3502
Casing Elevation: 648.36
Cable tool, drilled by Evans of Eaton Drilling Company for ARHCO, 1972, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine brown sand	0	1
Fine brown & coarse black sand	19	20
Fine to coarse black sand	10	30
Fine brown & black sand	15	45
Medium brown & black sand	5	50
Brown & black fine to coarse sand	10	60
Fine brown sand & black sand & 6 in.-gravel	5	65
Brown & black fine to coarse sand	18	83
Black & brown sand fine to coarse	32	115
Black & brown sand w/some 1 1/2 in. gravel	2	117
Black & brown sand w/some gravel	23	140
Black & brown sand w/6 in. gravel	4	144
Silt & brown sand w/6 in. gravel	13	157
Brown sand & gravel w/some silt	8	165

699-15-15C
Location: N14966, W14813 12/27-3503
Casing Elevation: ~645
Mud rotary, drilled by Thompson & Black of SSI for BNWL, 1963, snothole boring

Material (1)	Thickness	Depth
Silt & sand	50	50
Silt & sand w/few small boulders	30	80
Cemented sand	60	140
Sand & gravel	5	145
Sand & boulders	10	155
Loose gravel & boulders up to 8 in.	43	198
Clay	2	200
Boulders w/a little sandy clay	15	215
Gravel & sandy clay	30	245
Sand & gravel & clay	5	250
Clay	16	266
Boulders	9	275
Gravel, boulders, w/little clay	45	320
Boulders & gravel	4	324
Boulders, gravel imbedded in clay	35	359
Clay	6	365
Blue clay	15	380
Clay	4	384
Boulders & gravel imbedded in clay	11	395
Boulders imbedded in clay	33	428
Clay	12	440
Blue clay	15	455
Clay	40	495
Gravel imbedded in clay	20	515
Boulders, gravel & clay	15	530
Gravel & clay	10	540
Clay	5	545
Clay, sand & gravel a little clay	15	560
Gravel, sand w/a little clay	45	605
Sand, gravel & clay	2	607
Gravel & clay	28	635
Gravel & clay & sand	5	640
Cemented sand	10	650
Boulders & clay	21	671
Clay	7	678
Boulders	2	680
Basalt	68	748

699-15-15D
Location: N14965, W14813 12/27-3504
Casing Elevation: ~645
Mud rotary, drilled by Thomson of SSI for BNWL, 1963, snothole boring

Material (1)	Thickness	Depth
Sand	145	145
Gravel-boulders	10	155

699-15-15E
Location: N14721, W14569 12/27-3505
Casing Elevation: ~644
Mud rotary, drilled by Thomson of SSI for BNWL, 1963, snothole boring

Material (1)	Thickness	Depth
Sand	139	139
Gravel-boulders	16	155

699-15-15F (DC-7)
Location: N14901, W14831 12/27-3506
Casing Elevation: 546.16
Rotary, drilled by Century Drilling Company & logged by Fennix & Scisson for Rockwell, 1977, hydrologic & geologic investigation borehole

Material (2, 27)	Thickness	Depth
Sediments	720	720
Basalt	95	825
Interbed	85	910
Basalt	180	1090
Interbed	30	1120
Basalt	90	1210
Interbed	80	1290
Basalt	215	1505
Interbed	95	1600
Basalt flows	1121	2721
Interbed	7	2728
Basalt flows	1224	3952
Basalt flow	252	3810
Basalt flow	150	3960
Basalt	139	4099

699-15-15G (DC-8)
Location: N14956, W14862 12/27-3507
Casing Elevation: 544.52
Cable tool (to 702 ft.) & diamond coring, drilled by Nelson Drilling Company & Boyles Brothers Drilling Company for RHO, 1978, bedrock geologic investigation borehole

Material (2, 33)	Thickness	Depth
Sediments	702	702
Basalt	50	752
Basalt flow breccia	14	766
Basalt	77	843
Sandy claystone Micaceous sandstone Claystone Silty claystone Sandy siltstone ff Micaceous sandstone Siltstone	67	910
Basalt	165	1088
Sandstone & pebble conglomerate	16	1098
Basalt	111	1207
Basalt conglomerate Clay & sandstone Sandy claystone Basalt cobble conglomerate	75	1282
Basalt	223	1505
Lapilli tuff Sand Sand & clay Sandstone Silty clay Sand Clay	64	1569
Basalt	128	1697
Basalt	92	1789
Basalt	212	2001
Tuff	2	2003
Basalt	31	2034
Basalt	67	2101
Basalt	104	2217
Basalt	121	2338
Basalt	256	2604
Basalt	80	2684
Clay or lithic tuff	2	2686
Basalt	18	2704
Basalt	48	2752
Basalt	60	2812
Basalt	146	2966
Basalt	68	3225
Basalt	191	3225
Basalt	72	3297
Basalt	38	3335
Basalt	87	3422
Basalt	144	3566
Basalt	235	3801
Basalt	22	3823
Basalt	124	3907
Basalt	53	3960
Basalt	140	4100

699-15-26
Location: N15602, W26370 12/27-3301
Casing Elevation: 522.83
Cable tool, drilled by Bentz of & for GE Company, 1956, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine sand	15	15
Coarse black sand	10	25
Fine sand, little silt	10	35
Coarse sand	10	45
Coarse sand, little gravel	20	65
60% coarse gravel, 50% coarse sand	5	70
Coarse sand	8	82
Coarse gravel	8	90
Gravel, little sand	5	95
Gravel & cobbles	15	110
Boulders & gravel	10	120
Coarse gravel, "run out of boulders at 122 ft."	5	125
Coarse gravel up to 4 in.	5	130
Cobbles & gravel	5	135
Gravel up to 4 in.	5	140
Sand-coarse gravel	5	145
Coarse gravel, little sand	10	155
Coarse gravel up to 4 ft. & sand	10	165
50% sand; 50% gravel & cobbles	5	170
Coarse gravel, sand-silt	15	185
Coarse gravel, silt, sand	10	195
Cobbles & sand	5	200
Cobbles, gravel & sand	5	205
Boulders, gravel & sand	5	210
Cobbles, gravel & sand	5	215
Cobbles, gravel & fine sand	10	225
Boulders, gravel & sand	2	227
Sand & silt	18	245
Fine sand, very little silt	5	250
Fine sand	20	270
Fine red sand & gravel	5	275
Fine red sand	5	280
Sand, gravel; "gray sand at 283 ft. and gravel"	15	295
Gray sand & gravel	15	310
Gray silt, sand & cobbles	10	320
Cobbles, sand	20	340
Cobbles, gravel & sand	10	350

699-16-E5 (1D-SP-18)
Location: ~N16300, E470 12/28-33G1
Surface Elevation: 457.4
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand; gray, fine to coarse sand, basalt grains	45	45
Sand & gravel; brown gray, fine to coarse sand, fine to coarse gravel	37	82
Sand & gravel; light brown to gray, some fine sand, fine to coarse gravel	34	116

699-16-E4A (8H-1394)
Location: N15670, E3580 12/28-33L1
Surface Elevation: 459.3
Air rotary (to 290 ft.), mud rotary (to 384 ft.) & diamond coring, drilled by Aqua Drilling & Development Inc. & Longyear Company & logged by Fugro for WPPSS, 1974, bedrock geology test boring

Material (B)	Thickness	Depth
Sand, gray, fine to medium grained basaltic Silty sand; gray, fine sand w/silt Silty sand; gray, fine to medium w/silt Gravelly sand; gray, fine to coarse sand, fine to coarse gravels, basaltic, some silt Sand, dark brown, fine	89	89
Gravelly sand; light gray, fine w/some coarse sand, minor gravels, well rounded, Some silt Gravelly sand; brown, fine to coarse sand, gravel, some silt Gravelly sand; dark brown, fine to medium sand, fine gravels, well rounded Sand, dark brown, fine sand w/silt, poorly graded Gravelly sand; brown, fine to medium sand, minor gravel	56	156
Clayey gravel; dark grayish brown, clay, some silt	20	165
Gravelly sand; dark brown, fine sand, gravel, well rounded	20	185
Sancy gravel; brown, fine to coarse sand, gravel, well rounded, some clay & silt	10	195
Gravelly sand; dark brown; fine to coarse sand, fine gravel	10	205
Clayey gravel; dark greenish gray, clay w/silt, fine gravel, well rounded	10	215
Silty clay; dark greenish gray clay w/silt fine gravel, well rounded	70	285
Silty clay; greenish gray.	20	305
Gravelly sand; grayish brown fine to coarse sand, some gravel	79	384
Basalt; fine grained, cutting returns		
Basalt; black, fine grained, dense irregular & small plagioclase laths, fractures filled w/black chalcedony	14	398
Basalt; gray, fine to medium grain, few plagioclase laths & blebs	59	459
Sandstone; light green-gray medium sand		
Claystone; dark gray, pliable, grades into a massive nondescript greenish gray tuff w/depth		
Claystone-tuff, mixture, hard chalcedony at base	17	476
Basalt; redish brown to black, fine grained scoriaceous to moderately vesicular, weathered, green clay fills fractures & vesicles	25	501
Basalt, black, fine grained, moderately vesicular to non-vesicular, dense	19	520
Basalt; black, medium grained plagioclase phenocrysts to 3mm., jointing common at 45 & horizontal, clay on parting surfaces.	101	621
Basalt; black, fine to medium grained, plagioclase phenocrysts to 3mm., 45 & horizontal jointing, highly fractured, clay on parting surfaces	25	646
Tuff; gray green, silty, layers of bright green clay, poorly incurated	12	658
Basalt; dark gray, fine grained, vesicular	12	670
Basalt; black, fine grained rare plagioclase laths, to 5mm., vesicles filled w/zeolites, highly to moderately vesicular	29	699
Silty claystone; green, vesicular, basalt fragments	2	701
Basalt, same as 670-699 ft.	5	706

699-16-E4B (1C-SP-13)
Location: N16200, E3500 12/28-33L2
Surface Elevation: 459.1
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (B)	Thickness	Depth
Sand: variegated brown: & gray, fine to medium sand occasional gravel	62	62
Sand & gravel; variegated gray & white, fine to coarse sand, gravels.	28	90
Sand & gravel; gravels, fine sand, same silt		
Sand & gravel; brown, fine sand, gravel, predominantly basalt	16	106

699-16-E4C (1D-SP-11)
Location: ~N16000, E4200 12/28-33L3
Surface Elevation: 455.4
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; dark gray to brown, medium to coarse sand	50	50
Sand & gravel; dark gray to brown, medium to coarse sand, fine to coarse gravel	30	80
Sand & gravel; medium sand, fine gravel	40	120

699-16-E4D (1C-SP-19)
Location: ~N15700, E3600 12/28-33L4
Surface Elevation: 459.2
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand & gravel; gray, fine to coarse sand, predominantly basalt grains, gravel	10	10
Sand; variegated gray & white, fine to medium sand, basalt & quartz grains	70	80
Sand & gravel; variegated gray & white predominantly basalt	10	90
Sand & gravel; variegated gray & brown, fine to coarse and predominantly quartz grains gravel	28	118

699-16-E4E (1D-SP-17)
Location: ~N15700, E3700 12/28-33L5
Surface Elevation: 457.4
Air rotary logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & brown fine to medium sand, basalt & quartz grains	75	75
Sand & gravel; variegated gray & brown, fine to medium sand, gravel	15	90
Sand & gravel; light brown, fine to medium sand, gravel	25	115

699-16-E3A (BH-145)
Location: N15500, E3300 12/28-33L6
Surface Elevation: 458.4
Rotary, logged by Shannon & Wilson for WPPSS, 1974, geologic investigation borenole

Material (8)	Thickness	Depth
Silty sand, loose, light brown, fine	5	5
Sand, gray, fine to coarse, clean to slightly silty, trace fine gravel	69	74
Sandy gravel, very dense, light brown, fine to coarse, clean to slightly silty, scattered to numerous cobbles	27	101
Sand, very dense, gray-brown, fine to medium, clean	3	104
Sandy gravel, same as interval 74-101 ft.	27	131
Interbedded silty clay, clayey silt & sand; clay & silt, hard, light brown; sand, very dense, yellow-brown, fine, trace silt	10	141
Sandy gravel, very dense, gray-brown, fine to coarse, clean to silty, scattered cobbles, locally grades to very dense gravelly sand	41	182
Interbedded slightly silty to silty sand, sandy silt, clayey silt & silty clay; sand, very dense, light gray, fine; sandy silt, hard, gray-brown, slightly clayey; clayey silt & silty clay, hard, gray-brown	87	269
Conglomerate, dark gray, basaltic, green-black sand matrix	11	280

699-16-E3B (1D-SP-10A)
Location: N15550, E3000 12/28-33L7
Surface Elevation: 460.6
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; gray, fine to medium sand, basalt grains	16	16
Sand & gravel; gray, fine to coarse sand, gravel	9	25
Sand; gray, fine to medium sand, basalt grains	46	71
Sand & gravel; gray, fine to coarse sand, fine to coarse gravel	9	80
Sand & gravel; light brown, fine sand, fine to coarse gravel	53	133

699-16-51
Location: N15997, W50997 12/26-35E1
Casing Elevation: 577.90
Cable tool, drilled by Bignam of Hatch Drilling Company for ARHCO, 1969, geologic investigation borenole

Material (1)	Thickness	Depth
75% sand & 25% silt	5	5
50% sand & 50% silt	105	110
25% sand & 75% silt w/layers of brown clay 112 to 114 ft.	5	115
50% sand, 25% silt & 25% gravel	5	120
50% sand & 50% silt	15	135
Brown sand & silt, cemented	1	136
Gravel	4	140

699-17-E6 (1D-SP-13)
Location: ~N17200, E6200 12/28-33H2
Surface Elevation: 462.4
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand & gravel; dark gray medium to coarse sand	10	10
Sand; dark gray to brown, medium sand	70	80
Sand & gravel, dark gray to brown, coarse sand, fine to coarse gravel	10	90
Sand & gravel; brown, fine to medium sand, gravel	10	100
Sand; brown, medium to coarse sand	10	110
Sand & gravel; brown, medium sand, fine gravel	10	120

699-17-E5 (1D-SP-12)
Location: N16600, E5200 12/28-33H1
Surface Elevation: 453.3
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand, gray, fine to medium sand, quartz and basalt grains		
Sand, light brown, fine to medium sand	80	80
Sand & gravel; brown, fine to medium sand	25	105
Gravelly clay; brown	3	108

699-17-E3A (1C-SP-14)
Location: ~N17300, E3200 12/28-33F1
Surface Elevation: 461.60
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand & gravel; variegated gray & brown, fine to medium sand, fine gravels, predominantly basaltic	18	18
Sand variegated gray & white, fine to medium sand, basalt & quartz grains	62	80
Sand & gravel; brown, fine to medium sand, gravel	35	115

699-17-E3B (1C-SP-20)
Location: ~N16800, E3300 12/28-33F2
Surface Elevation: 461.3
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & white, fine to medium sand, quartz & basalt grains	80	80
Sand & gravel; variegated gray & brown & white, basalt & quartz grains, gravel	10	90
Sand & gravel; brown, fine sand predominantly quartz grains gravel	29	119

699-17-3 (8-20)
Location: N1660, W2500 12/28-32C1
Surface Elevation: 443.7
Hollow stem auger, logged by Shannon & Wilson for WPPSS, 1972, WNP-2 foundation test boring

Material (8)	Thickness	Depth
Medium dense to loose, tan & gray gravelly, fine to coarse sand, slightly silty	5	5
Loose, gray, fine to medium sand w/scattered gravel	10	15
Medium dense, fine to medium sand w/scattered gravel	25	40
Very dense, gray & tan fine to medium sandy gravel or gravelly sand, slightly silty	19	59

699-17-5
Location: N17450, W4500 12/28-31A1
Casing Elevation: 433.19
Cable tool, drilled by Stanbery & Robinson of USGS for GE Company, 1950, groundwater monitoring & geologic investigation borehole

Material (4)	Thickness	Depth
Sand, gravelly & silty; medium to coarse basalt forms 60-90% of the coarse, & 25-50% of the fine, grains; granule & pebble gravel is largely basalt	32	32
Gravel & sand, gray, subrounded; about equally basalt & exotic pebbles & granules carrying fine to coarse basaltic sand & 10% siliceous silt	4	36
Sand, fine to medium, quartzose, tannish-white, & layers of siliceous & basaltic granule & pebble gravel	4	40
Gravel & sand; has 10% tan silt; rounded granule & pebble gravel of 60% exotic rock types & 40% basalt accompanied by about 50% quartzose whitish-gray sub-rounded medium sand	21	61
Sand; has gravel & silt layers; medium to coarse light-tan & gray quartz & basalt sand; includes layers of silt & pebble gravel that each forms about 20% of the zone	7	68
Sand; largely medium sand, but having much fine & some coarse sand, is gray, quartzose, & subrounded; some layers of granule & pebble siliceous gravel as well as some gray silt	17	97
Gravel & sand; subrounded granule, pebble, & cobble gravel that is equally basaltic and exotic; about 50% of material is medium quartzose, arkosic, & basaltic sand	8	105

699-17-47 (DB-13)
Location: N17333, W47318 12/26-35A1
Casing Elevation: 578.77
Cable tool (to 263 ft.) & diamond coring, drilled in part by Boyles Brothers Drilling Company & logged by Ledgerwood of & for Rockwell, 197_, bedrock geology & hydrology investigation borehole

Material (1, 2, 13)	Thickness	Depth
Sandy soil	5	5
Sand	115	120
Sand, very fine	5	125
Sand	7	132
Sand & clay	8	140
Sand & little clay	10	150
Fine sand	5	155
Sand	15	170
Sand & gravel	8	178
Cemented gravel	14	192
Gray cemented gravel	27	219
Brown clay	1	220
Brown & blue clay	6	226
Blue clay, heavy	39	265
Blue clay & a little sandy	3	268
Sandy blue clay	2	270
Blue clay & gravel	5	275
Blue clay & heavy gravel	6	281
Little blue clay & gravel, very hard	9	290
Gravel	10	300
Gravel & little blue clay	9	309
Blue & gray sandy clay	6	315
Little blue clay, gravel hard pan	11	326
Gray gravel hard pan	16	342
Basalt, black	11	353
Basalt	110	463
Tuffaceous siltstone, sandstone, claystone, clay & sand, mudstone, & tuffaceous mudstone	67	536
Basalt	184	720
Tuffaceous sandstone, clay, & sandy siltstone	19	739
Basalt	8	857
Tuffstone, tuffaceous siltstone, clay, siltstone, sand	85	942
Basalt	247	1,189
Lapilli tuff, sandy clay, & sand	101	1,290
Basalt	2	1,292

699-17-70
Location: N17000, W70000 12/26-31C1
Casing Elevation: 563.18
Cable tool, drilled by Rodda of Bach Drilling Company for GE Company, 1958, groundwater monitoring borehole

Material (1)	Thickness	Depth
Silt	35	35
Silt & coarse sand	3	38
Silt & gravel	7	45
Sand & gravel	3	48
Sand, coarse gravel	2	50
Sand, gravel & boulders	5	55
Sand & coarse gravel	15	70
Sand & gravel	30	100
Sand, brown w/a good deal of mica	12	112
Sand, gravel & clay	8	120
Brown clay	10	130
Blue shale	10	140
Sand & gravel	12	152
Sand, gravel & clay	3	155
Caliche & sand	30	185
Sand, gravel & clay	5	190
Silt & sand	10	200
Silt-sand-fine gravel	10	210
Blue shale, soft	10	220
Blue shale, sand & gravel	10	230
Sand & gravel	20	250
Gray clay-soft & sticky	10	260
Gray clay	9	269
Basalt	17	286

699-17-93
Location: N17000, W93000 12/25-33D1
Casing Elevation: ~765
Cable tool, drilled by Swain of Hatch Drilling Company for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gravel, cobbles	15	15
Sand, gravel & cobbles	9	24
Large cobbles & boulders	5	29
Black basalt rock (stratum or boulder?)	1	30
Boulders-basalt	2	32
Basalt boulders	5	37
Basalt rock-gray-hard	5	42
Hard black basalt	5	47
Black basalt rock hard	7	54
Black basalt rock	1	55

699-18-E8B (1D-SP-19)
Location: ~N18400, E8300 12/28-34C2
Surface Elevation: 433.4
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand; brown . . . . . (veneer)		
Sand; variegated gray & white, fine to medium sand, quartz & basalt grains	28	28
Sand & gravel; brown, fine sand, quartz grains, gravel	32	60
Sand & gravel; light brown, fine sand, some silt, gravel	30	90

699-18-E7 (1D-SP-14)
Location: ~N17800, E7300 12/28-34D1
Surface Elevation: 462.9
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Gravel; fine to coarse gravel, some sand	15	15
Sand; dark gray, medium sand, basalt grains	65	80
Sand; brown, fine sand	5	85
Sand & gravel; light brown, fine sand, fine to coarse gravel		
Sand & gravel; dark brown, fine sand, silt some clay, fine to coarse gravel	45	130

699-18-E3A (1C-SP-15)
Location: ~N18500, E2900 12/28-33C1
Surface Elevation: 461.30
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & white, fine to medium sand, basalt & quartz grains	77	77
Sand & gravel, variegated gray & brown, fine to medium sand, gravels	3	80
Sand & gravel; brown, fine to medium sand, gravel	35	115

699-18-E3B (1C-SP-16)
Location: ~N17700, E2500 12/28-33C2
Surface Elevation: 463.20
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & white, fine to coarse sand, some fine gravels	90	90
Sand; variegated gray & white, fine to medium sand, basalt & quartz grains		
Sand & gravel; variegated gray & brown, fine to coarse sand & gravel	30	120

699-18-E3C (1C-SP-21)
Location: ~N18000, E3000 12/28-33C3
Surface Elevation: 460.5
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & white, fine to coarse sand, predominantly basalt, some quartz	70	70
Sand & gravel; brown, fine to medium sand, predominantly quartz grains gravel	55	125

699-19-E9 (1D-SP-20)
Location: ~N19000, E9400 12/28-27P1
Surface Elevation: 441.1
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand; brown	8	8
Sand & gravel; gray, fine to medium sand, gravel	37	45
Sand, variegated gray & brown, fine to medium sand	10	55
Sand & gravel; gray, fine to medium sand, gravel	25	80
Sand & gravel; brown-gray, fine sand, some silt, gravel	22	102

699-19-47A
Location: N19096, W46997 12/26-26R1
Casing Elevation: 617.18
Cable tool, drilled by Hatch of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
Sand & silt	33	33
Sand & silt, 80% silt	7	40
Sand & silt, sandy	5	45
Coarse sand	5	50
Sand & silt, coarse sand	5	55
Sand & silt	13	68
Sand & silt, gravel to 3 in., 10% gravel	2	70
Sand & silt, gravel to 3 in., 5% gravel, took 5 in. cobble at 72 ft.	5	75
Silt, 80% silt	5	80
Sand & silt, mostly silt	10	90
Sand & silt	20	110
Sand & silt, 80% silt	5	115
Sand & silt	10	125
Sand & silt, 80% silt	10	135
Sand & silt	9	144
Sand & silt, 80% silt	21	165
Sand & silt	10	175
Sand & silt, 80% silt	10	185
80% silt, gravel to 1 in. 10% . .	5	190
Sand & silt	15	205
Sand & silt (hit sand 207 ft.) . .	10	215
Gravel to 3 in.	3	218

699-19-51
Location: 12/26-26N1
Casing Elevation: 636.16
Cable tool, drilled by Bigham of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
75% sand 25% silt	10	10
60% sand 40% silt	15	25
25% sand 75% silt	5	30
50% sand 50% silt	163	193
20% silt 80% gravel	2	195

699-19-58
Location: N18953, W58250 12/26-28R1
Casing Elevation: 573.05
Cable tool, drilled by Rodda of Bach Drilling Company for GE Company, 1959, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & silt	40	40
Fine sand & silt	5	45
Sand & silt	10	55
Fine sand & silt	5	60
Sand & silt, sand is very fine	40	100
Fine sand & silt	15	115
Clay, sand & gravel	10	125
Sand & gravel	16	149
Sand, gravel, clay & boulders	6	155
Sand & gravel; went into finer gravel at 169 ft.	10	165
Granite boulder	10	175
Sand & pebble gravel	3	178
Sand & gravel, dark brown in color	7	185
Blue-gray clay-getting more blue	5	190
Blue clay	5	195
Basalt	10	205
Black basalt	5	210
Gray basalt	25	235
Black porous basalt	8	243
Gray & black basalt	7	250
Soft black rock; mud green tint at 272 ft.	9	259
Black basalt; mud brown tint from 274-275 ft., mud at 285 ft., black	13	272
Soft black rock	18	290
Hard basalt	5	295

699-19-88
Location: N19185, W57736 12/25-27M1
Casing Elevation: 544.45
Cable tool, drilled by Richards & Swain of Hatch Drilling Company for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Silt	15	15
Gravel	17	32
Silt	2	34
Gravel	11	45
Gravel-black basalt	10	55
Silt	2	57
Basalt gravel	8	65
Gravel-mixed, mostly basalt	9	74
Gravel	1	75
Small cobbles, gravel; occasionally 6 in. or 8 in. of silt	10	85
Gravel	3	88
Gravel-signs of more basalt	7	95
Cemented gravel-very hard	15	110
Cemented gravel	5	115
Cemented sand & small gravel	15	130
Sand, silt & small gravel-softer	5	135
Sand, silt, gravel	5	140
Coarse sand & silt, 150-155 ft. lighter color	15	155
Sand, silt & gravel-lighter in color	10	165
Sand, silt, gravel, light brown	20	185
Sand, silt & gravel	15	200
Sand & silt	5	205
Sand, silt, some gravel-soft	42	247
Sand & silt, some gravel	23	270
Sand, silt & gravel	30	300
Cemented sand & gravel	35	335
Sandy silt or clay	5	340
Clay-gravel	10	350
Blue clay & basalt gravel	1	351
Basalt-soft	9	360
Basalt-hard	5	365
Hard basalt	7	372
Soft basalt	1	373
Hard basalt	15	388

699-20-E12
Location: N20304, E12017 12/28-27J1
Casing Elevation: 437.25
Cable tool, drilled by Moore of Jannsen Drilling Company for GE Company, 1961, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & cobbles	5	5
Sand, gravel & cobbles	15	20
Gray sand & gravel, cobbles	10	30
Sand & gravel, cobbles	15	45
Sand & gravel, cobbles (gray 6 in.)	5	50
Sand & gravel, cobbles (gray 3 in. to 4 in.)	5	55
Sand, gravel, cobbles	10	65
Gravel, cobbles	15	80
Yellow sand & clay 3 in.	5	85
Gray sand & gravel	5	90
No record	7	97
Sand & cobbles	8	105
Cemented gravel	45	150
Coarse rock & sand	5	155
Cemented gravel	20	175
No record	5	180
Gravel & loose sand	5	185
Gravel & sand	7	192
Brown sand	15	207
Hard brown sand	11	218
Cemented gravel	7	225
Loose gravel	10	235
Loose gravel, cobble gravel	5	240
Sand & loose gravel	5	245
Sand & gravel	5	250
Sand & loose gravel	5	255
Brown & tough	10	265
Blue & tough	15	280
Blue & gray clay	20	300
Blue gravel	5	305
Blue decomposed rock	5	310
Blue decomposed rock clay	10	320
Blue clay tough	5	325
Rotten basalt	15	340
Basalt	5	345
Black basalt	12	357

699-20-E11 (10-SP-22)
Location: ~N20200, E11400 12/28-27J2
Surface Elevation: 444.5
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Gravel, cobbles at ground elevation	73	73
Sand & gravel; gray, fine to coarse sand, gravel		
Sand & gravel; variegated, gray & white, fine sand, some silt, coarse gravel		
Silty gravel; brown, minor brown sand	37	110

699-20-E10 (10-SP-21)
Location: ~N19600, E10400 12/28-27Q1
Surface Elevation:
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand & gravel; light gray, fine sand, some silt, gravel	43	43
Sand; brown, fine sand	3	46
Sand & gravel; variegated, gray & white, fine sand, some silt, coarse gravel	24	70
Sand & gravel; brown, fine sand, predominantly quartz, gravel coated w/silt	30	100

699-20-E5A
Location: 12/28-28K1
Casing Elevation:
Cable tool, drilled by Baker & Egan of Bacn Drilling Company, 1976, groundwater monitoring borenole

Material (1)	Thickness	Depth
10% coarse sand, 60% medium sand, 30% fine sand	2	2
10% cobbles, 30% medium pebbles, 30% fine pebbles, 20% coarse sand, 10% medium sand	13	15
10% medium gravel, 60% fine gravel, 30% coarse sand	5	20
10% medium gravel, 40% very fine gravel, 40% coarse sand & 10% medium sand	40	60
20% very fine gravel, 30% coarse sand, 30% medium sand, 20% fine sand	19	79
40% medium gravel, 30% fine gravel, 30% coarse sand	1	80
10% cobbles, 10% coarse gravel, 20% medium gravel, 20% fine gravel, 30% coarse sand, 20% medium sand	10	90
20% cobbles, 40% gravel, 40% sand	5	95
No record	2	97
30% small pebbles, 20% small cobbles, 40% coarse sand, 10% fine sand	3	100
50% medium sand, 30% fine sand, 20% coarse sand	6	106
40% medium sand, 30% fine sand, 20% coarse sand, 10% small pebbles	5	111
50% coarse sand, 30% medium sand, 10% fine sand, 10% small pebbles	6	117
50% medium sand, 30% fine sand, 10% coarse sand, 10% very coarse sand	6	123

699-20-E5P
Location: N20008, E4755 12/28-29K2
Casing Elevation: 467.04
Rotary, drilled by Word, Lovdahl & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand, gravel & cobbles	15	15
Sand & gravel	45	60
Sand, gravel & cobbles	20	80
Gravel, cobbles & boulders	10	90
Cobbles & boulders	9	99
Sand, gravel & some clay	6	105
Sand & gravel	25	130

Clay	14	144
Clay & gravel	6	150
Cobbles, boulders & gravel	21	171
Cobbles, boulders & gravel w/a little clay	3	174
Cobbles, boulders & gravel	7	181
Cobbles, boulders & gravel w/clay-sandy	9	190
Cobbles, boulders & gravel	50	240
Sand, gravel & cobbles	35	275
Cobbles, boulders & gravel	27	302
Sandy clay w/gravel	18	320
Basalt	34	354
Clay	16	370
Sandy clay	52	422
Basalt	6	428
Basalt & clay	28	456
Basalt	10	466

699-20-E5O
Location: N20040, E4750 12/28-28K3
Casing Elevation: 466.89
Rotary, drilled by Ward, Loveland & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel	90	90
Sand, gravel, cobbles & boulders	35	125
Sand, gravel, boulders & cobbles	10	135
Boulders, cobbles & gravels	39	174
Boulders, cobbles & gravels w/some clay	6	180
Clay w/gravels	10	190
Cobbles & gravel	20	210
Some clay-gravel-cobbles	37	247
Cobbles & boulders	8	255
Boulders & cobbles	46	301
Clay	19	320
Basalt	30	350
Clay w/basalt	6	356
Basalt	2	358
Clay	61	419
Basalt	3	422

699-20-E5R
Location: N20070, E4766 12/28-28K4
Casing Elevation: 467.47
Rotary, drilled by Ward, Loveland & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel	71	71
Sand, gravel & some cobbles	4	75
Sand, gravel & cobbles	19	94
Sand, gravel, cobbles & boulders	11	105
Cobbles & boulders	25	130
Brown clay	13	143
Gravel & cobbles	22	165
Gravel & cobbles, some clay	15	180
Gravel, cobbles & clay	15	195
Gravel & cobbles	5	200
Cobbles & boulders	101	301
Clay	19	320
Basalt	1	321

699-20-E5S
Location: N20111, E4772 12/28-28K5
Casing Elevation: 466.58
Rotary, drilled by Ward, Loveland & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel	85	85
Sand, gravel, cobbles & boulders	5	90
Sand & gravel	3	93
Sand, gravel, cobbles, boulders	27	120
Sand, gravel	16	136
Clay	4	140
Gravel & cobbles	10	150
Gravel, cobbles, boulders	15	165
Gravel & clay	7	172
Clay, gravel & cobbles	23	195
Clay & gravel	2	197
Cobbles & boulders		

699-20-E5T
Location: N20148, E4780 12/28-28K6
Casing Elevation: 467.69
Rotary, drilled by Ward, Loveland & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel	84	84
Cobbles & boulders	36	120
Gravel, cobbles & boulders	5	125

699-20-E2 (8H-141)
Location: N20341, E2477 12/28-28M1
Surface Elevation: 465.9
Mud rotary (to 470 ft.) & diamond coring, drilled by Longyear Drilling Company & logged by Fugro for WPPSS, 1974, bedrock geologic investigation borehole

Material (8)	Thickness	Depth
Gravel; variegated, gray to white, fine to coarse gravel, quartzite, acid igneous & basalt clasts; predominantly basaltic, some caliche coated gravels	33	33
Sand; variegated, gray to white, medium to coarse sand, basaltic & quartz grains		
Sand; gray, fine to medium sand, predominantly basaltic, some quartz	36	69
Gravel; gray variegated, gravel & cobbles, acid igneous & basaltic clasts, predominantly acid igneous	64	133
Clayey silt; brown, slightly plastic, very soft, some gravels	22	155
Clayey gravel; brown, acid igneous & basalt gravel to cobbles, clay w/some silt		
Gravel; variegated color, gravel to cobbles, acid igneous, quartzite & basalt, minor amounts of silt & clay	149	304

Gravel; brown, gravel to cobbles, acid igneous, quartzite & basalt		
Silty gravel; brown		
Gravel; no silt, clean, predominantly basalt w/acid igneous & quartzite clasts		
Clayey gravel; gray clay, basalt, acid igneous & quartzite, gravel to cobbles		
Sandy clay; brown-gray, some silt & gravel	9	313
Silty gravel; gray, gravel to cobbles, silt w/some clay		
Sandy gravel; brown, gravel to cobbles, acid igneous, basalt & quartzite, sand w/some silt	62	375
Gravel; clean		
Clayey silt; light brown, some gravel & sand		
Clayey silt; brown & gray green, some gravel	80	455
Clayey silt; dark brown, minor gravels		
Sandy gravel; dark gray-brown, gravel & cobbles, predominantly basaltic, some silt & clay	15	470
Conglomerate; light gray, gravel to cobbles, rounded, dark gray to green gray, medium sand, poorly indurated	13	483
Basalt; dark gray, medium grained, vesicular to highly vesicular at flow top, amygdaloidal, dense	16	507
Basalt; dark gray, fine grained, scoriaceous to highly vesicular, highly weathered, clay fills fractures & joints	33	540
Basalt; dark gray, fine to medium grained rare vesicles, dense, few fractures, plagioclase laths	70	610
Basalt; dark gray, medium grained, highly vesicular, fractured	2	612
Tuff; light gray micaceous		
Sandy tuff; gray to white, medium sand	44	656
Silty claystone; dark green to dark brown, angular, basalt fragments		
Basalt; dark gray, fine grained, highly vesicular, highly fractured, light gray-green clay fills fractures & joints	45	701

699-20-20
Location: N20389, W20390 12/27-27J1
Casing Elevation: 505.58
Cable tool, drilled by Rumley of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Black sand	33	33
Coarse black sand	12	45
Fine black sand	10	55
Fine black sand & white sand & silt	25	80
Gravel & little clay	13	93
Basalt, rocks, boulders & gravel	19	112
Basalt, rocks, coarse sand & boulders	15	127
Fine sand, rocks & silt	8	135
Fine water sand; caves	2	137
Fine sand & gravel	5	142
Gravel & fine sand	6	148
Gravel & coarse sand	2	150
Coarse sand & gravel	5	155
Gravel & rocks	3	158

699-20-39
Location: N20472, W39078 12/27-30L1
Casing Elevation: 539.98
Cable tool, drilled by Hatch of Hatch Drilling Company for GE Company, 1960, groundwater monitoring borehole

Material (1)	Thickness	Depth
Blow sand	5	5
Loose sand	10	15
Brown sand & silt	10	25
Gray coarse sand & silt, 35-40 ft. clean	25	50
Loose sand & silt, gravel to 3 in., just a streak of gravel	5	55
Loose sand & silt, 5% gravel	10	65
Fine sand & silt	10	75
Coarse gray sand & silt	10	85
Gray sand & silt	5	90
Gray sand & silt & cobbles	5	95
Gray sand & silt	15	110
Gravel, sand & cobble	5	115
Gravel 6 in., silt & sand	20	135
Large gravels, sand & silt	15	150
Coarse gravel, sand & silt	10	160
Small gravel, sand & silt	10	170
Small gravel & sand, very clean	10	180
Small & large gravel & silt	10	190
Sand & gravel w/silt	10	200
Large gravel, sand & silt	5	205
Small & large gravel, silt & sand	5	210
Small gravel, silt & sand	5	215
Loose sand & silt	10	225
Sand & silt	10	235
Sand w/more silt	5	240
Gravel & sand & silt	45	285
Sand, gravel & silt	5	290
Gravel, sand & silt	25	315
Fine sand & silt	10	325
Sand & silt	5	330
Blue clay, gravel streaks	55	385
Sand	9	394
Green clay w/gravels	16	410
Green clay w/gravel streaks	15	425
Clay	15	440
No record	5	445
Blue clay w/gravel streaks	5	450
Blue black clay	5	455
Soft sandy blue clay	15	470
Blue sand, some clay	5	475
Blue sand, some clay	9	484
Green clay w/gravel	11	495
Clay	5	500
Blue sandy clay w/gravel lenses	5	505
Sticky clay w/gravel	5	510
Softer clay	5	515
Hard, sticky clay w/gravel	15	530
Sticky clay	8	538

Sticky blue clay	30	565
Sticky blue clay w/gravel	10	575
Loose sand w/clay; at 578 ft. loose running white sand w/some clay	5	580
Sandy clay	15	595
Sandy clay w/some gravels	5	600
Gravel & sandy clay	5	605
Weathered basalt gravel & sand	5	610
Basalt	22	632

699-20-B2
Location: N19847, W82345 12/25-26M1
Casing Elevation: 614.31
Cable tool, drilled by Scott for Benson, 1929, domestic water supply borehole

Material (1)	Thickness	Depth
Clay	6	6
Sand, dry, loose	24	30
Sand, dirty	17	47
Sand, fine	11	58
Gravel, coarse	10	68
Gravel, cemented	6	74
Gravel, loose, coarse	6	80
Gravel, fine, pea-sized	5	85
Gravel, dirty	41	126
Gravel, dirty, water-bearing at 127 ft.	23	149
Sand	151	300
Gravel	4	304
Clay, blue	41	345
Basalt, black & gray	113	458
Clay, white, sandy	12	470
Sand, white, sticky	11	481
Clay, blue, sandy	66	547
Basalt, black & gray	308	855
Shale, blue	31	886
Sandstone	7	893
Shale, blue, sandy	31	924
Basalt, black, gray & red	277	1,201
Clay, yellow	2	1,203
Shale, blue, green & brown, trace of sand in uppermost 46 ft.	107	1,310
Basalt, gray & black, water level 210 ft. below surface to end of drilling	128	1,438
Sandstone, fine-grained	12	1,450
Basalt, gray & black	90	1,540
Sandstone, fine-grained	13	1,553
Basalt, gray & black	447	2,000

699-21-E2 (1C-SP-22)
Location: N20800, E2400 12/28-28M2
Surface Elevation: 473.1
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand & gravel; variegated gray & brown, fine to coarse sand, gravel, sand predominantly basalt	10	10
Sand variegated gray & white, fine to medium sand, basalt & quartz grains	60	70
Sand & gravel; variegated gray & white & brown, fine to coarse sand, gravel	20	90
Sand & gravel; brown, fine to medium sand, gravel	35	125

699-22-E2 (1C-SP-23)
Location: N22000, E2100 12/28-28E1
Surface Elevation: 470.7
Air rotary, logged by Fugro for WPPSS, 1974, snothole boring

Material (8)	Thickness	Depth
Sand; variegated gray & white, fine to medium sand, quartz & basalt grains	74	74
Sand & gravel; grayish-brown, fine to coarse sand, predominantly quartz, gravels	26	100
Sand & gravel; brown, fine sand, predominantly quartz grains, few gravels	25	125

699-22-55
Location: N21994, W5500I 12/26-27F1
Casing Elevation: 624.20
Cable tool, drilled by Bigham of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
50% sand, 50% silt	150	150
50% sand, 40% silt, 10% small gravel	5	155
25% sand, 75% gravel	5	160

699-22-70
Location: 12/26-30B1
Casing Elevation: 614.37
Cable tool, drilled by Stratton of Haden Drilling Company for GE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine brown sand	25	25
Fine light brown sand	30	55
Fine brown sand	45	100
Fine brown sand & silt	22	122
Basalt, medium hard; material had a rust color at 157 ft.	73	195
Gray clay w/some sand or rock cutting	10	205
Gray clay w/sand & gravel	5	210
Gray clay w/some sand	5	215
Gray clay w/some sand & gravel	20	235
Rock cuttings w/some gray clay & sand, 245-255	15	250
Rock cutting	5	255
Basalt chips, ¼ minus gravel, gray color	5	260
Basalt chips	10	270
Broken basalt & hard chunk of a green material	5	275
Basalt; real hard	15	290
Basalt	20	310
Basalt & some colored gravel	5	315
Basalt, medium hard	58	373

699-23-E2 (IC-SP-24)
Location: N23200, E1800 12/28-2801
Surface Elevation: 473.5
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand, variegated gray & brown, fine to coarse sand, predominantly basalt grains	77	77
Sand & gravel; brown, fine to coarse sand, quartz grains, gravel	13	90
Sand & gravel; brown, fine sand, predominantly quartz grains, gravel	35	125

699-23-7
Location: 12/28-3001
Surface Elevation:
Cable tool, drilled by Bultena of Hatch Drilling Company for PNL, 1979, groundwater monitoring borenole

Material (1)	Thickness	Depth
Coarse sand	5	5
Gravel	5	10
Sand gravel	5	15
Gravel	10	25
Very coarse sand	5	30
Gravel	20	50
Gravelly sand	10	6
Sand	6	66

699-24-1P
Location: N23576, W1355 12/28-2901
Casing Elevation: 474.55
Rotary, drilled by Ward, Loudahl & Warner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borenole

Material (1)	Thickness	Depth
Sand w/gravel	30	30
Sand & gravel w/cobbles	15	45
Sand & gravel	25	70
Sand, gravel & cobbles	72	142
Sandy brown clay	8	150
Brown sandy clay w/gravels	15	165
Brown sandy clay	5	170
Back in gravel at 170 ft.	5	175
Brown sandy clay & gravel	5	180
Clay & gravel	40	220
Clay	7	227
Clay & gravel	13	240
Sandy clay w/gravels	15	255
Sand & gravel	15	270
Gravel, boulders & cobbles	27	297
Sandy gray clay	13	310
Very thin layer of basalt	10	320
Sandy gray clay	19	339
Basalt	23	362
Sandy clay w/gravels	13	375
Sandy clay	75	450
Clay blue gray	10	460
Basalt	35	495
Basalt (hard)	42	537

699-24-10
Location: N23620, W1356 12/28-2902
Casing Elevation: 475.29
Rotary, drilled by Ward, Loudahl & Warner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borenole

Material (1)	Thickness	Depth
Gravel, sand, cobbles-boulders	15	15
Gravel, cobbles-boulders	15	30
Cobbles, gravel, boulders	45	75
Cobbles, gravel, sand	15	90
Cobbles, boulders, gravel	45	135
Cobbles, boulders	9	143
Sandy brown clay	7	150
Sandy brown clay w/gravels	20	170
Cobbles & gravel	10	180
Cobbles & gravel, some brown clay	15	195
Cobbles & gravel	13	208
Sandy clay	17	225
Gravel, cobbles & boulders	15	240
Gravel, sand w/some clay	15	255
Gravel, cobbles & boulders w/some sand	15	270
Gravel, cobbles & boulders	28	298
Brown sandy clay	14	312
Basalt	1	313
Sand, gravel & clay	29	340
Basalt	15	355

699-24-1R
Location: N23693, W1359 12/28-2903
Casing Elevation: 476.03
Rotary, drilled by Ward, Loudahl & Warner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borenole

Material (1)	Thickness	Depth
Sand & gravels	60	60
Sand, gravel & cobbles	15	75
Sand, gravel, cobbles & boulders	30	105
Sand, gravel & cobbles	15	120
Gravel, cobbles, boulders	23	143
Sandy clay w/gravels	7	150
Clay w/gravels	20	170
Gravel & cobbles	10	180
Gravel w/some clay	10	190
Gravel & clay, some cobbles	5	195
Gravel & clay	13	208
Sandy clay	17	225
Gravel & clay	15	240
Clay	21	261
Clay & gravel	4	265
Clay & gravel w/cobbles	5	270
Gravel, cobbles & boulders	29	299
Sandy clay	17	316
Basalt	1	316

699-24-1S
Location: N23731, W1360 12/28-2904
Casing Elevation: 476.27
Rotary, drilled by Ward, Loudahl & Warner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borenole

Material (1)	Thickness	Depth
Sand, gravel & boulders	15	15
Sand, gravel & cobbles	60	75
Gravel, cobbles & boulders	20	95
Sand, gravel, cobbles & boulders	10	105
Sand, gravel & cobbles	30	135
Sand & gravel	5	140
Sand & gravel & cobbles	2	142
Sandy clay & gravels	8	150
Sand clay & gravels	15	165
Record unclear, probably sand clay & gravels	5	170
Record unclear, probably gravel, cobbles & boulders	10	180
Gravel, cobbles & boulders	34	214
Sandy clay w/gravels	6	220
Gravel, cobbles & boulders	1	221

699-24-17
Location: N23654, W1357 12/29-29C5
Casing Elevation: 475.64
Rotary, drilled by Ward, Loudan & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand, gravel & cobbles	15	15
Sand & gravel	60	75
Sand, gravel & cobbles	15	90
Gravel, cobbles & boulders	15	105
Sand, gravel & cobbles	15	120
Sand & gravel	15	135
Sand & gravel, cobbles	9	144
Record unclear some sandy clay w/gravels at 144 ft.	6	150
Sandy clay w/gravels	20	170
Cobbles, boulders & gravel	37	207
Clay	3	210
Clay w/gravels	17	227
Cobbles, boulders & gravel	8	235
Cobbles & gravel, some clay	5	240
Cobbles & gravel	3	243
Sandy clay	19	262
Cobbles, gravel, some clay	8	280
Cobbles, boulders w/gravel	18	298
Clay w/gravels	2	300
Gravel & sandy clay	12	312
Basalt mixed w/clay	3	315
Basalt & clay	1	316
Sand, gravel & clay	4	320

699-24-33
Location: N23809, W33315 12/27-20P1
Casing Elevation: 524.22
Cable tool, drilled by Rumley of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine sand	17	17
Basalt sand & little gravel	8	25
Fine sand & basalt	2	27
Fine black & white sand & silt	28	55
Fine sand & silt	15	70
Coarse black & white sand & some gravel	5	75
Coarse sand & gravel	2	77
Rocks & coarse sand	9	86
Basalt, granite & rocks	4	90
Record unclear, may be fine black sand	2	92
Fine black sand	1	93
Basalt, granite & rocks	17	110
Fine black & white sand	1	111
Fine sand, basalt & gravel	5	116
Sand, rocks & boulders	3	119
Sand, rocks & boulders & gravel	1	120
Sand, rocks & gravel	6	126
Sand, rocks & gravel & little basalt	4	130
Sand, rocks, gravel & basalt	2	132
Granite, rocks, boulders & basalt	2	134
Sand, silt & rocks	6	140
Water sand & little gravel	4	144
Water sand, fine water sand	3	147
Medium sand	5	152
Medium sand & rocks	1	153
Sand & rocks	4	157
Fine black sand, rocks & basalt	1	158
Fine black sand & rocks	5	163
Coarse sand & gravel	2	165

699-24-46
Location: N23968, W45994 12/26-24N1
Casing Elevation: 691.17
Cable tool, drilled by Bach of Bach Drilling Company for GE Company, 1958, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	20	20
Sand, beginning of a little clay	5	25
Sand w/trace of clay	10	35
Sand	30	65
Coarse sand	40	105
Record unclear, may be coarse sand	5	110
Fine sand	10	120
Fine sand & a little silt	5	125
Sand & silt	10	135
Fine sand	10	145
Sand w/silt	10	155
Sand w/gravel	5	160
Heavy gravel	5	165
Gravel	10	175
Gravel-little clay mixed	5	180
Gravel-heavy, some clay mixed	5	185
Gravel-heavy	15	200
Gravel & sand w/a little silt	5	205
Fine gravel & sand	5	210
Gravel w/clay-hard packed	5	215
Gravel & sand-little clay	5	220
Muddy gravel	5	225
Sand, gravel & cobbles	5	230
Muddy gravel	5	235
Gravel & clay; cemented	10	245
Hard packed gravel & clay	30	275
Gravel & clay (hard)	10	285
Fine gravel & sand	10	295
Fine gravel & sand w/clay	5	300
Sand & silt	10	310
Sand	10	320
Sand & heavy gravel	5	325
Sand	15	340
Clay	5	345
Clay & sand, blue color	5	350
Sand-little clay, blue color	5	355
Sand-little clay	5	360
Sand, gray	15	375
Sand	5	380
Coarse sand	5	385
Sand & gravel; hard, cemented	10	395
Blue sandy clay	20	415

Blue clay, few black streaks like shale in it	10	425
Sand clay	5	430
Sandy clay	5	435
Sand, blue	5	440
Blue clay	10	450
Blue clay mixed w/brown	5	455
Brown clay	5	460
Blue clay, w/brown streaks, dense & sticky	20	480
Brownish clay, dense & sticky	5	485
Brownish clay (a little gravel)	5	490
Clay & gravel	5	495
Blue clay	35	530
Brown clay	20	550
Blue clay	55	605
Gravel & clay	5	610
Gravel-little silt	10	620
Heavy gravel	5	625
Fine gravel-silt	5	630
Gravel, cemented	20	650
Cemented gravel & sand	10	660
Sand	5	665
Sand & gravel	5	670
Broken basalt	5	675
Basalt	7	682

699-25-E2 (C-SP-25)
Location: N24700, E1600 12/28-21N1
Surface Elevation: 484.7
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Sand; brown, fine sand, predominantly quartz, minor amount of basalt grains	16	16
Sand & gravel; gray & white variegated, fine to coarse sand, predominantly basalt grains, gravel	14	30
Sand; variegated gray & white, fine to medium sand, predominantly basalt grains	45	75
Sand & gravel; variegated gray & brown, fine to medium sand, quartz & basalt grains, fine to coarse gravels	17	92
Sand & gravel; brown, fine to medium sand, predominantly quartz, gravel	43	135

699-25-55
Location: N25357, W55192 12/26-22L1
Casing Elevation: 676.55
Cable tool, drilled by Rodda of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sandy loam	18	18
Fine sand & clay	91	109
Fine gray sand & clay	1	110
Coarse gray sand & clay	25	135
Gray sand & clay	5	140
Fine gray sand & clay	70	210
Sandy clay	10	220
Gravel & boulders	3	223
Sand, gravel & boulders	13	236
Boulders	1	237
Sand, gravel & boulders	3	240
Sand & gravel	5	245
Sand, gravel & boulders	14	259
No record	11	270
Cemented gravel	5	275
Sand, gravel & boulders	3	278
Sand & gravel w/little clay	37	315

699-25-70
Location: N25258, W70080 12/26-19K1
Casing Elevation: 629.56
Cable tool, drilled by Rodda of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & clay	30	30
Fine sand & clay	100	130
Clay w/fine sand	14	144
Clay w/gravel	1	145
Gravel & clay	5	150
Clay, sand & gravel	4	154
Brown clay, very little fine sand	33	187
Gravel, mostly quartz w/very little basalt	1	188
Sand & gravel	17	205
Sand, gravel & boulders	21	226
Sand	4	230
Sand & gravel	3	233
Sand, gravel & boulders	12	245
Sand & gravel	16	261
Clay, sand & gravel	4	265
Silty sand	2	267
Sand, gravel & silty clay	7	274
Gravel, sand & silty clay	11	285
Gravel, sand & clayey silt	5	290
Clayey silt, sand & gravel; more clayey silt w/all colors gravel also light colored sand	5	295
Clayey silt, coarse gravel & sand	1	296
Sand, gravel & clayey silt	4	300
Medium gravel, sand & clayey silt	7	307
Gravel, sand & clayey silt		
Basalt gravel, pea size gravel-all colors	4	311
Fine sand	4	315
All colors medium to coarse gravel w/sand	5	320
Sand & gravel	1	321
Gravel, sand & silt	3	324
Medium to coarse gravel, sand & silt	1	325
Gravel, sand & silt	3	328
Medium gravel all colors, small amount of basalt, sand & silt	2	330
Gravel, sand & silt	2	332
Medium to coarse gravel, some basalt, sand & silt	1	333
Gravel, sand & silt	1	334
Clayey sand, very little gravel	4	338
Clayey sand & medium gravel	2	340
Gravel, all colors, some basalt & silty sand	4	344
Clayey sand, small gravel, small amount of basalt	4	348
Medium to coarse gravel, some basalt & clayey sand	2	350
Clayey sand & gravel	2	352
Clayey sand, medium gravel w/some basalt	8	360
Gravel, all colors, medium size, less clayey sand & small amount of basalt	2	362

Grayish sand, medium gravel, all colors, very small amount of basalt	3	365
Grayish sand & gravel	6	371
Gravel, some basalt & gray sand	2	373
Medium gravel, clayey volcanic ash & gray sand	2	375
Medium basalt gravel, some coarse gravel, some volcanic ash, clayey gray sand	2	377
Medium gravel, fine gray sand & some basalt	3	380
Medium gravel, gray sand w/some basalt	1	381
Sand & gravel	4	385
Sand & gravel w/a trace of volcanic ash	8	393
Sand & gravel	2	395
Varied colors of coarse sand & gravel w/a little clay	20	415
Sand & gravel w/a little clay	5	420
Sand & gravel w/a trace of volcanic ash	5	425
Gravel w/clay	5	430
Sand & gravel w/clay, more sand	10	440
Sand & gravel w/a little clay	5	445
Sand, gravel & clay; less gravel & more clay	15	460

699-25-80 (08-14)
Location: N25080, W79512 12/25-22K1
Casing Elevation: 616.13
Cable tool (to 336 ft.) & diamond coring, drilled by Rodda of USGS & Hendrickson of Boyles Brothers Drilling Company for RHO, 1980, groundwater monitoring borehole & geologic investigation borehole

Material (1, 2)	Thickness	Depth
Sandy loam	15	15
Sandy clay	18	33
Caliche, drilled hard	7	40
Sand & gravel, drilled hard, no coating on gravel	3	43
Sand & gravel, bailing are light slate	7	50
Coarse sand & silt, bailings are brown	5	55
Sand, gravel & silt, bailings are gray	16	71
Sand, gravel & boulders, mixed to a slate blue mud	9	80
Sand, gravel & boulders, had thin soft layers of sand	5	85
Sand & gravel	1	86
Sand, gravel & boulders	4	90
Silt, sand, gravel & boulders	5	95
Sand, gravel & silt	7	102
Sand, gravel & boulders	3	105
Basalt boulders	5	110
Broken basalt rock	5	115
Broken basalt & gravel	4	119
Broken basalt w/brown clay or ash	6	125
Broken basalt rock	5	130
Broken basalt rock & brown clay or ash	4	134
Broken basalt rock	4	138
Broken basalt rock w/trace of ash-like material	7	145
Broken basalt rock w/good deal of ash-like material	3	148
Broken basalt rock	6	154
Broken basalt rock w/a good deal of brown ash-like material; bailing had lumps of ash-like material	4	158
Broken basalt rock w/some ash-like material, drilled harder	7	165
Broken basalt rock w/trace of ash; drilled hard	3	168
Basalt rock; bailings are finer chips of rock, have an olive green cast	2	170
Basalt rock, bailings very dark	4	174
Basalt rock more rotten w/some ash, bailings more brown	2	176
Basalt rock, bailings are dark	2	178
Basalt rock has gas bubbles in it, possible is weathered some, also a good deal of brown ash	4	182
Basalt rock; drilled harder, bailings darker & very little coarse material, no ash & the coarse is like sand	3	185
Basalt rock; bailings show no ash & are fine & black	2	187
Basalt & rock w/a trace of hard ash; bailings are black	2	189
Basalt & rock; bailings black & show very little hard ash pieces	1	190
Basalt rock w/trace of hard ash; bailings are more brown & show more hard ash pieces	3	193
Basalt rock w/some ash; yellow & red ash, some rotten basalt, bailings are brown; some blue-green ash-like material in 200 ft. sample	7	200
Hard basalt rock, rotten basalt rock & some hard ash; bailings dark, drilled hard	4	204
Less hard basalt rock & more rotten basalt w/a hard & soft ash	4	208
Some hard basalt, mostly hard & soft ash & clay-like material	2	210
Sandy clay w/trace of red ash; bailings are yellow, mostly yellow & white lumps of ash-like material & some basalt	5	215
Sandy clay	5	220
Clay & ash of 3 colors from white to dark yellow; bailings are yellowish brown	5	225
Clay & ash; larger % of clay, ash is light in color & fairly hard, bailings are lighter	5	230
Mostly clay, a few fine lumps of ash that are almost white, bailings are lighter	5	235
Clay w/small ash lumps, bailings are light, core sample was solid & darker than bailings	5	240
Clay w/some small pieces of ash; bailings are light	5	245
Clay, ash & fine sand; mostly light colored clay, some hard light ash lumps & some very fine black & white sand; bailings are light	5	250
Clay, ash & fine sand; mostly fine black & white sand, some clay & small ash lumps; bailings are brown	5	255

Clay, ash & fine sand & basalt; fine sand is black & white, ash is mostly yellow & a few white pieces, small yellow ash balls with very dark brown coating, basalt shows gas bubbles & some are rounded	5	260
Clay, ash & fine sand; large hard ash pieces-these are nearly a soapstone, bailings are brown, clay lumps are lighter color, not so much black & white sand	5	265
Clay, ash & sand; sand is mixed with ash, ash darker than clay lumps, bailings light yellow	5	270
Clay, ash & sand; hard ash chunks, bailings light yellow	10	280
Clay, ash & sand; small ash lumps, gray sand & the small chunks of basalt are weathered or have been not, bailings light yellow	5	285
Clay, ash & sand & basalt; ash is yellow, brown, white & light pink, sand is gray, basalt is in small pieces, full of very small gas bubbles & soft; bailings are brown	5	290
Ash & basalt; hard ash & basalt, basalt is harder	2	292
No sample-bailer stuck in clay	1	293
Basalt & ash; ash caves in from about 250 ft. level until cannot tell how much at this level, about 50% of washed-out sample is basalt	2	295
Basalt & ash; ash & red basalt rock w/very small gas bubbles, bailings show red color	3	298
Ash & sand; fine ash pieces & red & black sand that appears to be volcanic, bailings red	2	300
Volcanic sand & ash; mostly sand that is round & reddish brown, bailings reddish brown	5	305
Ash & red rock; red rock w/fine gas bubbles, yellow ash like that above, bailings red	5	310
Red rock & ash; red rock w/very small gas bubbles, ash like above, bailings red	5	315
Red rock & ash; mostly red rock w/gas bubbles, few pieces black, some ash light & hard; bailings more brown	3	318
Red & black rock & ash; red & black rock with small gas bubbles, ash hard & cemented to the rock; settled fast	2	320
Red & black rock & ash; settles until cannot bail hole clean, bailings brown, drillings very fine red & black mixed w/hard ash	2	322
Rock & ash; drillings very fine, mostly black w/some fine ash, bailings darker; hard ash caved in from 225 ft. level	1	323
Ash, basalt & rock; ash is large chunks, rock ground very fine; bailings brown	2	325
Ash, basalt & rock; mostly ash, some fine ground basalt; bailings brown	1	326
Basalt, rock & hard ash; bailings black, mostly basalt rock, some rock has very fine gas bubbles, rocks black but inside of bubbles are red, rock has seams filled w/red & yellow hard ash	4	330
Basalt, rocks & ash; red & black basalt rock w/small gas bubbles, some hard ash & some soft brown ash balls, rock full of seams, bailings dark gray	2	332
Basalt, rock & ash; black rock has larger gas bubbles than the red; red rock has small gas bubbles, some full of ash; ash stuck to these rocks, few pieces very soft white ash; water nearly white white bailings black, red & yellow; at 334 ft. believe I hit ash crevice; rock is red & black w/some black chips that are solid, ash is gray, which is hard, yellow white & brown which is softer; water red white bailings gray	2	334
Black & red basalt & ash; red rock has fine gas bubbles, black basalt rock is solid, ash is light & hard; caved in at 330 ft. level	2	336
Basalt	116	452
Bright red oxidized sandstone	1	453
Fine grained green sandstone grades to tuffaceous siltstone	7	460
Green silty clay	6	466
Fine green sand w/clay	14	480
Green clay	9	489
Basalt	129	618
Baked tuffaceous siltstone	2	620
Green clay	2	622
Fine grain, green w/chlorite	16	638
Coarse to medium sand	26	664
Basalt	253	917
Gray lapilli tuffstone	7	924
Fine green sandstone	10	934
Green clay	3	937
Coarse green sand	5	942
Clay	2	944
Medium gray sand	26	972
Green clay	6	978
Sand	2	980
Clay & sand clay, green	20	1,000
Clayey sand	6	1,006
Clay, green	9	1,015
Clay, gray	6	1,021
Fine gray sand	3	1,024
Black clay	4	1,028
Welded tuff?	6	1,034
Basalt	4	1,038

699-26-E19
Location: 12/28-24N
Casing Elevation: ~380
Cable tool, drilled by Jannsen Drilling Company & logged by Warren of the USGS for Stubblefield Ranch, 1921, domestic water supply

Material (18)	Thickness	Depth
Sand	18	18
Gravel, cemented	67	85
Clay	20	105
Clay & gravel	22	127
Gravel	28	155
Boulders & gravel	6	161
Clay, black & blue	35	196
Sand	9	205
Rock, black	29	234
Rock, black & shale	6	240
Shale	17	257
Rock, black	151	408
Basalt	63	471
Clay & gravel	16	487
Shale	9	496
Rock	39	535
Basalt	2	537
Rock	2	539
Shale, black & blue	25	564
Basalt	103	667
Basalt, porous	10	677
Basalt, scoriaceous, water-bearing	15	692
Shale, blue	19	711
Sandstone, gray	9	720
Basalt, creviced, water-bearing	35	755

699-26-E1 (1C-SP-25)
Location: N25900, E1300 12/28-21M1
Surface Elevation: 475.0
Air rotary, logged by Fugro for WPPSS, 1974, shothole boring

Material (8)	Thickness	Depth
Gravel; basaltic, minor quartzite fraction	10	10
Sand; dark gray, fine to medium sand, basaltic	41	51
Sand & gravel; light brown, fine to coarse sand, some silt, gravel	39	90
Sand & gravel; light grayish brown, fine sand, silt, gravel	35	125

699-26-15A
Location: N25665, W14554 12/27-24M1
Casing Elevation: 442.64
Cable tool, drilled by Swain of Hatch Drilling Company for GE Company, 1958, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	5	5
Gravel	71	76
Cemented sand & gravel	4	80
Sand & gravel	9	89
Cemented sand & gravel	8	97
Sand & gravel, size 6 to 1 in.	5	102
Clay & fine gravel	18	120
Brown clay & gravel	5	125
Brown clay	10	135
Brown clay & gravel	5	140
Sand & silt; tan clay has peg gravel in it at 140 ft., formation at 142 ft. quite hard	5	145
Sand, silt, gravel; formation at 150 ft. is a pale green color	10	155
Blue shale, gravel; blue shale-165 ft., more gravel & less shale-180 ft.	35	190
Blue shale, gravel 1 in.	5	195
Blue shale, gravel 1-1½ in.	10	205
Clay & gravel	5	210
Sand & gravel	15	225
Gravel	12	237
Blue-gray clay w/gravel	5	242
Yellow clay, gravel; yellow clay at 242 ft.	13	255
Clay, gravel	5	260
Sand, silt & gravel	40	300
Sand & gravel	5	305
Cemented gravel	5	310
Sand	5	315
Cemented sand & gravel	30	345
Blue clay & gravel	5	350

699-26-15B
Location: N25665, W14554 12/27-24M2
Casing Elevation: 443
Mud rotary, drilled by Storey Drilling Company for GE Company, 1964, abandoned borehole

Material (1)	Thickness	Depth
Sand	3	3
Gravel, coarse; caving from about 12 ft. down	19	22

699-26-15C (DH-18)
Location: 12/27-24M3
Casing Elevation: 443
Cable tool (to 112 ft.) & diamond coring, drilled by Bultena of Hatch Company & Hendrickson of Boyles Brothers Drilling Company & logged by Lillie of & for RHO, 1980, geologic investigation borehole

Material (2)	Thickness	Depth
Silty sand, fine to medium, subangular, buff	2	2
Silty sandy gravel, both sand & gravel rounded to subrounded, variable composition gravel, 40% basalt, quartz, granites	15	17
Silty gravelly sand, sand coarse to very coarse	3	20
Silty sandy gravel, coarse to very coarse sand & cobbles dominant sizes, trace amounts of oxidized biotite & FeOx	10	30
Silty gravelly sand, coarse sand dominant size, fewer cobbles than above, trace amounts of oxidized biotite and FeOx	8	38
Silty gravelly sand, very fine to fine sand dominant size, gravel 15 to 50% basalt, quartz, granites	12	50
Silty gravelly sand, very fine to fine sand dominant size, basalt content of gravel increase to 50%	15	65

Gravelly silty sand, very fine sand, sand & gravel basaltic, oxidized biotite	5	70
Silty gravelly sand, sand coarse to fine, coarse sand dominant size, gravel composed of basalt cobbles	30	100
Silty sandy gravel, coarse sand & cobbles dominant size	2	102
Silty clayey sand, coarse sand, 30% basalt, muscovite, oxidized biotite, light brown clay	10	112
Not drilled	3	115
Silty very fine sand, good cross-bedding, fair induration, 95% basalt, mica, black	5	120
Silty medium sand, horizontal to cross-bedded, poor induration, sub-angular, basalt, quartz, feldspar, mica, yellowish brown	6	126
Medium sand, horizontal to cross-bedded, loose to poor induration, angular, well sorted, quartz, mica, dark yellowish brown	6	132
Medium sand, massive, loose to poor induration, angular, quartz, heavies, mica, dark yellowish brown	17	149
No recovery	3	152
3 in. sandy gravel, pebbles to cobbles; the rest of the run is clay, plastic, light green	5	157
Clay to claystone, massive, plastic to good induration, 157 to 158 ft. massive to disseminated $CaCO_3$, bluegreen	10	162
Sandy clayey siltsone, faint cross-bedding to massive, well indurated, disseminated $CaCO_3$, bluegreen w/ apple green cross-beds	10	172
Sandy siltsone, massive, good induration, disseminated $CaCO_3$, dark grey	5	177
Silty fine to very fine sand to sandstone, massive, good induration, sub-angular, quartz, mica, dark grayish brown w/apple green fracture fillings	5	182
Slightly silty sandstone, fine to medium sand, cross-bedded, good to well indurated, sub-angular, quartz, mica, dark grayish brown	8	185
Sandy gravel, medium sand matrix, pebble to cobble gravel, mixed lithology, green	1	186
Medium sand, fair to good induration, green	1	187
Conglomerate, massive (?), poor to good induration, pebbles to cobbles, very mixed lithology, medium sand matrix, matrix color green	10	197
No recovery	3	200
Pebble to cobble gravel, mixed lithology, no matrix	11	211
No recovery	4	215
Pebble to cobble gravel, mixed lithology, medium sand matrix	5	220
Pebble to cobble gravel, mixed lithology, no matrix	19	239
No recovery	1	240
Sandy pebble to cobble gravel, mixed lithology, matrix fine to very fine sand, green	8	248
Very fine sand, faint horizontal bedding, fair induration, green	2	250
Siltsone, faint horizontal bedding, good induration, possible ash at 252 ft., sandy near 253 ft. dark brown	3	253
Pebble to cobble gravel, fine no matrix	1	254
Fine to very fine sand, cross-bedded, fair induration, quartz, mica, light yellowish brown	5	259
Slightly pebbly medium sand, cross-bedded, unconsolidated, quartz, mica, heavies, light yellowish brown	8	267
No recovery	5	272
Medium sand, cross-bedded, unconsolidated, quartz, mica, light yellowish brown	7	279
Conglomerate, SiO_2 $CaCO_3$ cementation, medium sand matrix, pebbles to cobble., 50% basalt 50% exotics	3	276
Conglomerte, poor to fair induration, medium sand matrix, pebbles to cobbles, 50% basalt 50% exotics	10	286
Pebble to cobble gravel, loose, no matrix, yellow brown quartzite, rhyolite porphyry, granitics	3	289
Conglomerate, well cemented, ($CaCO_3$), medium sand matrix, pebbles to cobbles, 50-75% basalt, dark green	11	300
Sandy conglomerate, well cemented ($CaCO_3$), medium to fine sand, cobbles to pebbles, 50-75% basalt, granitics, quartz pebbles, brownish yellow	12	312
Pebble to boulder gravel, loose, no matrix, mixed lithology	7	319
Conglomerate, good to well indurated, fine to medium sand matrix, pebbles to boulders mixed lithology, yellowish brown	2	321
Pebble to cobble gravel, loose, no matrix, mixed lithology	1	322
No recovery	2	324
Cobble gravel, loose, no matrix, mixed lithology	1	325
Conglomerate, well cemented SiO_2, medium sand matrix, pebbles to cobbles, 50% basalt, well developed weathering rinds, dark brown	5	330

Conglomerate, well cemented (SiO_2), medium to fine sand matrix, pebbles to cobbles, 50% basalt, well developed weathering rinds, dark green	3	333
Pebble to cobble gravel, semi-cemented, medium sand matrix (basalt sand), 75-80% basalt gravel, dark green	2	335
Basalt cobble gravel, no matrix	5	340
Slightly silty sandy gravel poor induration, medium to fine sand matrix pebbles to cobbles, 50% basalt, dark green	3	343
Slightly sandy, silty gravel, poor induration, fine sand matrix, pebbles, 50% basalt, angular, dark green	2	345
Basalt cobble gravel, no matrix	4	349
Silty claystone, good induration, disseminated organic matter, massive, dark olive green to gray (at 358 down to 361.5 ft., apple green stringers)	13	362
Sandy siltstone, good induration, faint horizontal bedding, disseminated organic matter, brown	5	367
Slightly sandy siltstone, good induration, massive, disseminated organic matter, brown	5	372
Silty sand to sandstone, fair to good induration, horizontal and cross-bedding, very fine to fine sand, quartz, mica, fractured, brown	5	377
Silty sand to sandstone, fair induration, massive brown	4	381
Clay and ash, alternating beds approximately 1/4 in. thick, horizontal & cross-bedding, color range white to applegreen	3	384
Sandy siltstone, fair to good induration, massive, stringers of clay & caliche, yellowish brown, appears to be a relic soil horizon	9	393
No recovery	4	397
Sandy siltstone as 383 to 393 ft.	1	398
Fine to medium sand, poor to fair induration, massive, disseminated organics, well rounded, quartz, mica, yellowish brown	4	402
Fine sand, poor induration, cross-bedded, well sorted, well rounded, quartz, feldspar, heavies, brown	5	407
Sandy conglomerate, fair to good induration, medium sand matrix, pebbles to cobbles, sand & gravel well rounded, good weathering rinds, dark grayish brown	4	411
Sandy pebble to boulder gravel, poor to fair induration, medium sand matrix, sand sub-angular to sub-rounded, gravel subrounded, yellowish brown	38	449
Sandy siltstone, well indurated, massive, gray	3	452
Fine to medium sand, very poor induration, massive, dark yellowish brown	2	454
No recovery	4	458
Medium sand, very poor induration, no apparent bedding, sub-angular, gray to yellowish brown, slightly gravelly 460.5 to 470.5 ft.	15	473
Siltstone, good induration, massive, gray	1	474
Medium sand, poor to fair induration, no apparent bedding, yellowish brown	7	481
Claystone, good induration, massive, blue green	1	482
Clayey siltstone, well indurated, massive, very dark gray	5	487
Medium sand, very poor induration, no apparent bedding, sub-angular, mica, quartz, heavies, dark gray	4	491
Siltstone, well indurated, massive, very dark gray	3	494
Fine to medium sand, fair to good induration, no apparent bedding, sub-angular, quartz, mica, heavies, blue green	10	504
Clayey sandy siltstone, very indurated, massive, dark gray, ash from 504.4 to 504.7 ft.	8	512
Fine to medium sand, fair to good induration, abundant heavies, dark gray	4	516
Siltstone, well indurated, massive, very dark gray	3	519
Sandy siltstone gradational to fine sandstone, very well indurated, massive, very dark gray	6	525
Sandstone, fine sand, very well indurated, massive, very dark gray	6	531
Sandy siltstone, fine sand, well indurated, massive, very dark gray	6	537
Sandstone (fine sand) gradational to sandy siltstone, good to well indurated, massive, very dark gray	8	544
Fine to medium sand, good induration, cross-bedded, disseminated organics, very dark gray	2	546

Sandy siltstone, well indurated, massive, disseminated organics, very dark gray	12	558
Clayey siltstone, well indurated, massive, very dark gray	14	572
Silty claystone, well indurated, massive, black, ash at 582.3 ft.	11	583
Sandy gravel, fair to good induration, medium sand matrix, pebble to cobble gravel, 50% basalt, basalt content increases with depth	19	602
Gravel, pebbles to boulders, 100% basalt, well rounded	2	604
Highly weathered basalt flow top, green clay & $CaCO_3$, filling in fractures & vesicles	26	630

699-25-29A (Golder well #15)
Location: N26402, W29002 12/27-21L1
Casing Elevation: 517.11
Air rotary (to 165 ft.) & mud rotary, drilled by Carman Water Wells & logged by Burrell & Wilkening of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium sand	15	15
Medium sand, some fine gravel	20	35
Medium gravel, trace of medium sand & silt	80	115
Medium to fine sand w/some medium to fine gravels	15	130
Medium sandy gravel	10	140
Medium to fine sand w/some medium gravel	25	165
Coarse to fine gravel	20	185
Silty coarse to fine gravel	5	190
Coarse to fine gravel w/trace silt	5	195
Coarse to fine gravel	5	200
Gravelly silty clay	40	240
Slightly gravelly silty clay	5	245
Medium to fine gravel	35	280
No record	5	285
Same as interval 245 to 280 ft.	60	345
Slightly clayey gravel	20	365
Sandy medium to fine gravel	10	375
Medium to fine gravel	25	400
Coarse to fine gravel w/ occasional siltstone interbeds	5	405
Silty coarse to fine gravel	10	415
Gravelly siltstone	30	445
Coarse to fine gravel w/trace silt	5	450
Silty coarse to fine gravel	5	455
Gravelly siltstone	10	465
Medium to fine gravel	15	480
Silty medium to fine gravel	10	490
Slightly silty medium to fine gravel	5	495
Medium to fine gravel	30	525
Sandy medium to fine gravel	5	530
Slightly sandy gravelly siltstone	10	540
Gravelly siltstone	5	545
Silty gravel	5	550
Gravelly siltstone	20	570
Gravel & siltstone interbeds	10	580
Gravelly siltstone	20	600
Gravelly siltstone w/trace sand	5	605
Gravelly siltstone	5	610
Gravelly siltstone w/trace sand	15	625
Gravelly siltstone	10	635
Fine gravel w/siltstone interbed	15	650
Gravel w/siltstone in trace amounts	5	655
Fine gravel	30	685
Basalt	37	722

699-25-47
Location: N26494, W46998 12/26-23H1
Casing Elevation: 551.84
Cable tool, drilled by Hatch of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
Sand & silt	90	90
Cemented sand & silt	15	105
Sand & silt, 1% gravel to 3 in.	5	110
Cemented sand & silt	5	115
Sand & silt, 1% small gravel	5	120
Sand & silt	5	125
Sand & silt, 10% small gravel	5	130
Sand & silt, 20% small gravel	5	135
Coarse sand, 10% gravel to 2 in.	5	140
Coarse sand & silt	5	145
Cemented sand & silt	15	160
Cemented coarse sand & silt	5	165
Sand & silt, gravel to 2 in.	5	170
Sand & silt, 10% gravel to 2 in.	5	175
Sand & silt, gravel to 2 in.	5	180
Sand & silt, 10% small gravel	5	185
Sand & silt	30	215
Sand & silt, 20% gravel	5	220
Sand & silt, 30% gravel	5	225
Sand & silt, 70% gravel to 4 in., loose	4	229

699-25-51
Location: N25523, W51010 12/26-23M1
Casing Elevation: 675.45
Cable tool, drilled by Hatch of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
Sand & silt	65	65
Cemented sand & silt	52	117
Coarse sand & ¼ pea gravel	2	119
Cemented sand & silt	11	130
Sand & silt	10	140
Cemented sand & silt	35	175
Cemented sand & silt, 1% ¼ in. gravel	5	180
Cemented sand & silt	5	185
Cemented sand & silt, 1% ¼ in. gravel	5	190
Sand & silt, 1% ¼ in. gravel	10	200
Sand & silt	30	230
Sand & silt, gravel to 3 in., 25% gravel	5	235
Sand & silt, 80% silt	20	255
Sand & silt	10	265
Cobbles & clay	1	266

699-26-89
Location: N26000, W89000 12/25-21H1
Casing Elevation: 653.38
Cable tool, drilled by Wilcox & Smith of Haden Drilling Company for GE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine tan sand & silt	5	5
Fine sand & silt, brown in color	5	10
Silty fine sand, brown	15	25
Silty fine sand, very light tan	5	30
Silty fine sand, tightly packed, very light tan	10	40
Silty fine sand with 2 in. minus gravel	5	45
Silty fine sand & basalt gravel	5	50
Very tightly packed basalt gravel w/trace of coarse & fine sand, trace of silt, light brown	20	70
Basalt gravel w/fine sand, trace of silt	10	80
Basalt gravel w/fine & coarse sand w/trace of silt	5	85
Basalt gravel w/fine & coarse sand & silt, dark brown	5	90
Basalt gravel w/coarse & fine sand, trace of silt, dark brown	5	95
Basalt gravel, cobbles w/coarse & fine sand, trace of silt, dark brown	5	100
Basalt gravel & coarse sand w/fine sand & silt, dark brown	9	109
Clay w/some sand & gravel, brown silt	16	125
Clay w/coarse & fine sand & silt	12	137
Harder gravel w/some clay & sand & silt, brown	3	140
Gravel w/trace of silt & fine & coarse sand	5	145
Gravel w/trace of clay & silt & sand	5	150
Sand & silt & some gravel	5	155
Fine light gray sand w/5 in. minus gravel, trace of silt	5	160
4 in. minus gravel & gray sand, trace of silt	5	165
3 in. minus gravel & light gray sand, trace of silt	5	170
Gravel & sand w/light silt, light tan	5	175
3 in. minus gravel w/trace of sand & silt; 185 to 190 ft., sample is brown	15	190
Tightly packed gravel & sand w/a little silt	5	195
Sand & gravel w/trace of silt	5	200
Tightly packed sand & gravel	5	205
Tightly packed sand & gravel, trace of silt	10	215
Pea gravel & sand	15	230
Fine sand & gravel w/trace of silt, tan in color	10	240
Fine & coarse sand w/gravel & silt, tan	5	245
Fine & coarse sand w/gravel, tan	10	255
Fine sand & gravel w/coarse sand	15	270
Fine & coarse sand & gravel w/trace of silt, tan	5	275
Coarse & fine sand w/fine gravel, trace of silt, tan	10	285
3 in. minus gravel & sand; trace of silt, tan	5	290
Fine sand & gravel w/coarse sand, tan	15	305
Fine silt & gravel, some clay, tan; acts like it wants to make a change at 307 ft., looks like it is going to clay	5	310
Light tan shale clay w/some coarse sand	8	318
Black clay w/trace of coarse sand	2	320
Black clay w/little light tan shale clay	10	330
Black clay w/little shale clay	5	335
Black clay w/some shale	15	350
Black clay w/some shale & gravel	10	360
1 in. minus gravel w/some shale	5	365
Minus gravel w/some caliche	10	375
3 in. gravel w/fine sand & trace of silt	5	380
Gravel & sand, trace of silt, tan	5	385
Gravel & silty sand, tan	5	390
Gravel & sand, trace of silt	20	410
Coarse sand w/fine sand, trace of silt	9	419
Yellow clay w/little gravel	9	428
Blue clay	2	430
Black silt, trace of clay	5	435
Black silty clay	20	455
Black silty clay & some sand & gravel	5	460
Black silty clay, sand & gravel	10	470
Black sandy silt w/trace of 1 in. minus gravel	5	475
Black sand & silt; material changed at 475 ft. to blue sand then back to black sand at 480 ft.	10	485
Rotten basalt cuttings w/silt & pits of blue shale clay	5	490
Basalt cuttings & sand that came in from under shoe	5	495
Basalt cuttings & sand	5	500

699-27-4
Location: 12/28-19H1
Casing Elevation:
Cable tool, drilled by Bultena of Hatch Drilling Company for PNL, 1979, groundwater monitoring borenole

Material (1)	Thickness	Depth
Sand & gravel	119	119

699-27-8
Location: N27027, W8291 12/28-19E1
Casing Elevation: 465.67
Cable tool, drilled by McDonald & Swain of Hatch Drilling Company for GE Company, 1960, groundwater monitoring borenole

Material (1)	Thickness	Depth
Fine brown sand w/heavy gravel up to 4 in.	15	15
Material is finer now	2	17
Sand & gravels to 2 in.; 20-22 ft. larger gravels to 5 in.	8	25
Sandy gravels to 3 in.	5	30
Sand & smaller gravels to 2 in.	6	36
Coarse sand & silt	9	45
Coarse sand & silt, finer now	10	55
Sand & gravel up to 2 in.	30	85
Clean sand & gravel	5	90
Sand & gravels, run in lenses of sand for 2 or 3 ft. then gravel for 2 or 3 ft.; sometimes the gravel is clean	10	100
Sand & gravels material becoming smaller	3	103
Clean gravels to 1½ in. & sand; streaked or lensed w/clean gravels & sands	20	123
Sand & gravels to 1 in.	17	140
Fine brown sand, some silt	15	155
Soft sandy brown clay	4	159
Some gravel to sandy blue clay	1	160
Green clay, some gravels to ½ in.	5	165
Green clay	5	170
Green clay & small gravel	20	190
Sand & gravels to 1 in., clay lenses, very light formation not cemented 200-229 ft.	55	245
Clay w/small gravel	5	250
Green clay w/gravel	18	268
Tan clay some gravels to ½ in.	2	270
Tan clay-hard	5	275
Tan clay, darker	5	280
Tan clay, w/gravels	25	305
Coarse brown sand w/gravels to ½ in., clay lenses	3	308
Coarse sand w/gravels to ½ in., tan clay lenses	7	315
Coarse sand w/gravels to 1 in., tan clay lenses	5	320
Record unclear, coarse sand w/gravel, tan clay lenses, sandier from 322-327 ft.	5	325
Same stuff only blue in color	2	327
Sand & gravels to 1 in. w/blue clay lenses	3	330
Green sand & small gravel, hard	5	335
Green sand & small gravel	5	340
Green sand & small gravel, getting softer	5	345
Sand & gravels to 1 in.	10	355
Green clay, hard & sticky w/small gravels	5	360
Brown clay, hard & sticky w/small gravels	5	365
Brown clay, soft, w/small gravels	10	375
Brown & green soft clay w/small gravel	10	385
Light gray soft clay	25	410
Tan clay w/some gravels to ½ in.	5	415
Tan clay w/some gravels to ½ in.; very, very sandy	5	420
Tan clay, very sandy, no gravels	5	425
Fine brown sand & silt	2	427
Fine brown sand & silt, gravels to ½ in.	13	440
Fine brown sand & silt, gravels to 3/4 in.	2	442
Fine brown sand & silt, gravels to 3/4 in., inconsistent streaks of soft sticky tan clay	3	445
Record unclear; fine brown sand & silt, gravels to 3/4 in., or soft sticky tan clay	10	455
Sticky blue clay	3	458
Green sandy clay	2	460
Blue clay	16	476
Blue clay some gravels to ½ in.	9	485
Blue clay, softer now, no gravel	5	490
Blue clay, hard & soft streaks	5	495
Blue clay, hard	10	505
Hard sticky clay	5	510
Blue clay	15	525
Dark blue clay	5	530
Dark blue clay, hard sticky	5	535
Dark blue clay, greenish tint	5	540
Dark blue clay; this clay (527-560 ft) runs in streaks at being hard & sticky or soft & a little bit sandy, there is no pattern for the streaks in thickness or for how many feet they last	20	560
Dark blue clay w/basalt rock	5	565
Basalt	12	577

699-28-23 (Golder Well #49)
Location: N27895, W23284 12/27-22F1
Casing Elevation: 528.98
Air rotary (to 146 ft.) & mud rotary, drilled by Carman Water Wells & logged by Luoreent of Golder Associates for NESCO, 1980, geologic investigation borenole

Material (11)	Thickness	Depth
Fine sand, trace silt	5	5
Medium to fine sand, trace silt & gravel	5	10
Medium to fine sand, trace gravel	10	20
Medium to fine sand	20	40
Coarse to fine sand & gravel	5	45
Coarse sand & coarse to fine gravel	5	50
Coarse sand & coarse to fine gravel, trace silt	5	55
Coarse sand & coarse to fine gravel	5	60
Coarse sand & coarse to fine gravel, trace silt	5	65
Coarse to medium sand, trace gravel	10	75

Medium to fine sand, trace silt	15	90
Coarse to fine sand & medium to fine gravel	5	95
Coarse to fine sand & gravel, trace silt	5	100
Coarse to fine sand, trace gravel & silt	5	105
Coarse to fine sand, trace gravel	10	115
Coarse to fine sand & gravel, trace silt	15	130
Coarse to fine sand & gravel	5	135
Gravelly coarse to fine sand	5	140
Coarse to fine sand, some gravel	5	145
Coarse to fine gravel	55	200
Coarse to fine gravel, cemented w/calcite or aragonite	15	215
Coarse to fine gravel, some sand & silt, trace clay	5	220
Sandy silt, some clay & gravel	10	230
Fine sand & silt, trace clay & gravel	5	235
Fine sand & silt, trace clay	5	240
Fine sand & silt, some clay	10	250
Fine sand & silt, some clay; & silty clay	10	260
Coarse to fine sand & silt, some clay, trace gravel; & silty clay	5	265
Medium to fine sand, some silt trace clay; & silty clay	5	270
Coarse to fine sand & fine gravel, trace clay & silt	30	300
Coarse to fine sand & fine gravel, some silt, trace clay	10	310
Coarse to medium sand & fine gravel	5	315
Coarse to medium sand & coarse to fine gravel	10	325
Coarse to medium sand & coarse to fine gravel, trace silt & clay	45	370
Coarse to medium sand, some silt & gravel, trace clay	5	375
Coarse to fine sand & silt, some gravel, trace clay	5	380
Coarse to fine sand, some silt	5	385
Coarse to fine sand, trace silt	10	395
Medium to fine sand, trace silt	5	400
Gravelly coarse to fine sand, trace silt & clay	5	405
Coarse to fine sand & fine gravel, trace silt & clay	5	410
Coarse sand & fine gravel	5	415
Coarse sand & fine gravel, trace silt	20	435
Coarse to fine sand, some gravel	5	440
Medium to fine sand	5	445
Coarse to fine sand	20	465
Coarse to fine gravel & clayey silt	5	470
Silty coarse to fine sand, trace clay & gravel; & silt, trace clay	5	475
Silty coarse to fine sand, trace clay & gravel; & siltstone	10	485
Fine sand, some silt; & siltstone	5	490
Medium to fine gravel & clayey silt	10	500
Coarse to fine sand & fine gravel; & clayey silt	5	505
Coarse to fine gravel & sand, some silt & clay	5	510
Coarse to fine gravel & clayey silt	5	515
Coarse to fine gravel, trace silt & clay	5	520
Coarse to fine gravel & clayey silt	10	530
Coarse sand & coarse to fine gravel, some silt, trace clay	30	560
Gravelly coarse to fine sand & silt, trace clay	5	565
Silty coarse sand & medium to fine gravel, trace clay	5	570
Medium to fine sand & silt, trace clay	5	575
Gravelly medium to fine sand & silt, trace clay	5	580
Gravelly medium to fine sand & silt, some clay	5	585
Gravelly medium to fine sand & silt, some clay; & siltstone	5	590
Medium to fine sand & silt, some gravel & clay; & siltstone	5	595
Gravelly medium to fine sand & silt, some clay	5	600
Gravelly medium to fine sand & silt, some clay; & siltstone	10	610
Gravelly medium to fine sand & silt, some clay	5	615
Coarse to fine sand & medium to fine gravel, some silt & clay	5	620
Coarse to fine sand & medium to fine gravel, some silt, trace clay	5	625
Coarse to fine sand & medium to fine gravel some silt, trace clay; & silty clay	5	630
Fine gravel & siltstone	5	635
Coarse sand & medium to fine gravel	40	675
Coarse sand & coarse to fine gravel & siltstone	5	680
Siltstone & medium to fine gravel	5	685
Coarse to fine sand & fine gravel; & siltstone (cemented)	40	725
Coarse to fine sand & fine gravel	5	730
Basalt	25	755

699-28-27 (Golder well #14)
Location: N28274, W26657 12/27-21A1
Casing Elevation: 532.10
Air rotary & mud rotary, drilled by Carman Water Wells & logged by Lubrecht, Wilkening & Findley of Golder Associates for WESCO, 1979, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand	25	25
Fine to medium gravel	10	35
Fine to medium sand	20	55
Fine to medium gravel	5	60
Gravelly fine to medium sand grades to gravel at 65 ft.	5	65
Fine to medium gravel	10	75
Fine sand	15	90
Sandy fine to medium gravel	10	100
Gravelly sand	5	105
Fine to medium gravel	15	120
Fine sand	5	125
Fine to medium gravel	5	130
Medium sandy gravel	5	135
Gravel	5	140
Fine sand	10	150

Fine to medium gravel	15	165
Sandy gravel	10	175
Gravel	5	180
Sandy gravel	10	190
Gravelly sand	5	195
No recovery	65	260
Silty fine gravel	5	265
Medium gravel w/some silt	10	275
Coarse to fine sand	20	295
Medium to fine gravel	20	315
Medium to fine sand	10	325

699-28-40
Location: N27696, W40297 12/2F-1901
Casing Elevation: 559.44
Cable tool, drilled by Gentz of & for GE Company, 1956, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	25	25
No record, probably sand	10	35
Sand, little silt	10	45
Coarse sand, little silt	5	50
Coarse sand	15	65
Coarse sand, little silt	10	75
Coarse sand	5	80
No record, probably coarse sand	5	85
Sand, little silt	5	90
Coarse sand; some gravel	5	95
Coarse sand	5	100
No record, probably coarse sand	7	107
Coarse gravel, little sand	3	110
Coarse gravel	5	115
Gravel, cobbles	5	120
Gravel, boulders	5	125
Gravel & boulders, some silt	5	130
Cobbles, gravel, sand, little silt	10	140
Gravel & cobbles	12	152
Boulders	5	157
No record	3	160
Cobbles, gravel, little silt	5	165
Cobbles, gravel	10	175
Cobbles, gravel & silt	5	180
Small & coarse gravel-silt	5	185
Small & coarse gravel up to 4 in.	5	190
Small & coarse gravel up to 4 in. & fine sand	5	195
Sand & gravel, little silt	5	200
Cobbles, gravel & sand	7	207
Cobbles, gravel & fine sand	3	210
Fine & coarse sand	5	215
Small & coarse gravel & sand	5	220
Gravel, sand; little silt	10	230
Gravel up to 5 in., sand, little silt	5	235
Cobbles, sand, little silt	5	240
Gravel, sand & silt	15	255
50% silt - 50% sand & gravel	5	260
50% sand; silt & gravel	5	265
Sand, little silt	15	280
No record; probably sand	5	285
Fine sand	5	290
Red sand, little gravel	10	300
Coarse gravel & sand; gravel up to 4 in. at 302 ft.	12	312
Blue clay	3	315
Gray clay	22	337
Fine gray sand	3	340
Gray sand & silt	10	350
Coarse gravel, very little silt & sand	10	360
Coarse gravel & sand	17	377
Blue clay, small gravel	18	395
Blue clay	5	400
Gray clay	33	433
Blue clay & small gravel	2	435
Brown clay	12	447
Gray & green clay & gravel	8	455
Clay & fine gray sand	5	460
Fine sand, gravel	5	465
Sand, gravel, clay	5	470

699-28-49
Location: N27865, W49037 12/26-2301
Casing Elevation: 671.45
Cable tool, drilled by Bigham & Hatch of Hatch Drilling Company for ARHCO, 1969, groundwater monitoring well

Material (1)	Thickness	Depth
Sand	5	5
Silty sand	2	7
50% silt, 50% sand	18	25
75% silt, 25% sand	5	40
25% silt, 75% sand	5	45
50% silt, 50% sand, 1/2 in. lenses of brown clay 87 ft. to 87 1/2 ft.	45	90
25% sand, 75% silt	5	95
50% sand, 50% silt; 3 in. lense brown clay 122 ft.	30	125
75% sand, 25% silt	5	130
50% sand, 50% silt	5	135
25% gravel, 50% sand, 25% silt	10	145
Coarse sand & silt	15	160
Sand & silt	15	175
Sand & silt, cemented	40	215
Sand & silt	15	230
Sand & silt, small gravel 15% to 1 1/2 in.	5	235
Sand & silt, small gravel 15% to 1/2 in.	5	240
Sand & silt, small gravel 25%, one large piece 4 in.	5	245
Sand & silt, small gravel	5	250
Cobbles to 6 in., assorted gravels, some silt	4	254

699-28-52A
Location: N28015, W51563 12/26-2301
Casing Elevation: 684.67
Cable tool, drilled by Lueck of Haden Drilling Company for GE Company, 1958, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	90	90
No record; probably sand	35	125
Sand	10	135
Coarse sand	10	145
Sand	85	230
Coarse sand	15	245
Sand & fine gravel	5	250
Sand	5	255
Gravel	5	260
Sand	2	262
Gravel	2	264

Cemented gravel	5	270
Gravel	5	275
Cemented gravel	10	285
Gravel	3	288
Cemented gravel	2	290
Gravel	1	291
Cemented gravel	4	295
Sand & gravel	15	310
Sand & fine gravel	5	315
Sand & gravel	5	320
Sand, rock; cemented sand, rock and gravel	20	340
Sand, & gravel	5	345
Black sand & gravel	5	350
Sand & gravel	5	355
Sand, clay & gravel	5	360
Fine sand & clay	5	365
No record	5	370
Sand, clay & gravel	5	375
Sand, gravel & clay	10	385
No record	5	390
Gravel & clay	10	400
Clay & gravel	5	405
Cemented gravel & clay	5	410
Cemented clay & gravel	5	415
Blue clay & gravel	30	445
Clay & gravel	5	450
Sandy blue clay	10	460
Blue clay	15	475
Yellow clay	15	490
Yellow clay, turning blue	5	495
Blue sandy clay	30	525
Sandy (clay?)	5	530
Sandy clay	10	540
No record	5	545
Fine sand	3	548
Clay & gravel	12	560
Sandy (clay?)	5	565
Sandy clay	15	580
Clay	5	585
Gravel	1	586
Clay & gravel	4	590
Sand & gravel; 595-601 ft. layers of gravel & clay	10	600
Blue clay & gravel	5	605
Blue clay & sandy(?)	5	610
Sandy blue clay	5	615
Sandy clay	5	620
Clay, gravel & sand	15	635
Gravel, some sand	1	636
Cemented blue clay & gravel	14	650
Layers of sand & cemented gravel	5	655
Sand & gravel	5	660
Brown clay; 660-666 ft. gravel & water	5	665
Sandy brown clay	5	670
Brown clay	5	675
Sandy water	5	680
Mostly fine sand; sandy clay	5	685
Basalt	10	695
Record unclear, probably basalt	10	705
Basalt	5	710
No record, probably basalt	5	715

699-28-52B
Location: 12/26-23D2
Casing Elevation: ~685
Cable tool, drilled by Dick of Hatch Drilling Company, 1978, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	265	265
Cemented sand & gravel	10	275
Sand & gravel	20	295
Sand	85	380
Fine sand	20	400
Brown clay	5	405
Brown sand clay	5	410
Brown sand, some clay	10	420
Sand	39	459
Clay	109	568
Blue sandy clay	70	620
Blue sandstone	50	670
No record	25	695
Brown clay	5	700
Sand	5	705
Gray sand	5	710
Black sand	25	735
Basalt	5	740

699-28-55
Location: N23017, W55005 12/26-22C1
Casing Elevation: 675.50
Cable tool, drilled by Bignam of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
Clay	5	5
Fine sand	5	10
50% sand, 50% silt	65	75
25% sand, 75% silt	5	80
50% sand, 50% silt	30	110
25% gravel, 75% coarse sand; 112-117 ft., pea gravel, 75% coarse sand	7	117
Sand	3	120
75% silt, 25% sand	5	125
25% silt, 75% sand	5	130
75% silt, 25% sand	5	135
50% sand, 50% silt	70	205
50% sand, 50% silt, hard	20	225
50% sand, 50% silt	33	258
Sand	1	259
Brown clay	1	260
Sand	5	265
25% gravel & small cobbles	1	266
75% large gravel, 25% silt	1	267
75% gravel and cobbles, 25% sand & silt	1	268

699-29-78
Location: N29379, W77727 12/25-13N1
Casing Elevation: 647.05
Cable tool, drilled by Wilcox & Smith of Hadin Drilling Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine brown sand	25	25
Fine brown sand w/fine gravel	5	30
1/4 in. gravel & fine brown sand	10	40
Fine sand w/little coarse sand & silt, tan	15	55
Silt, fine sand w/little coarse gravel, tan	10	65
Fine sandy silt, tan	10	75
Fine sand & silt, brown	40	115
Fine sand & silt	10	125

3 in. minus cemented gravel & sandy silt, tan	5	130
Fine sandy silt & gravel, tan	5	135
3 in. gravel & coarse sand w/little silt, dark brown	5	140
2 in. minus gravel & coarse sand w/little silt, dark brown	5	145
2 in. minus cemented gravel w/coarse sand, tan	5	150
2 in. minus possible basalt gravel w/coarse sand	5	155
2 in. minus gravel w/fine & coarse sand, little silt, tan	5	160
3 in. minus gravel w/fine & coarse sand, little silt, tan	5	165
Coarse & fine sand w/3/4 in. minus gravel, trace of silt, tan	10	175
Fine sand & silt w/3 in. minus gravel	10	185
Fine sand & silt w/3 in. minus gravel, tan	5	190
2 in. minus gravel w/coarse & fine sand & silt, tan	5	195
2 in. minus gravel w/fine sand & silt, light tan	5	200
Fine mica sand w/1 1/2 in. minus gravel & coarse sand, tan, trace of silt	10	210
Fine mica sand w/1 1/2 in. minus gravel & coarse sand, tan	5	215
Fine mica sand w/1 1/2 in. minus gravel & coarse sand	5	220
Fine mica sand w/1 in. minus gravel & coarse sand	5	225
Fine mica sand w/1 in. minus gravel & coarse sand, tan	5	230
2 in. minus gravel & sand w/little silt, tan	5	235
2 in. minus gravel & sand w/some silt, tan	5	240
2 in. minus gravel & fine & coarse sand, tan, trace of silt	5	245
2 in. minus gravel & coarse sand w/little silt	15	260
1 in. minus gravel & coarse sand w/little silt	5	265
2 in. minus gravel w/some coarse & fine sand, tan	10	275
2 in. minus gravel w/ coarse & fine sand, trace of silt, tan	5	280
2 in. minus gravel w/coarse & fine sand, trace of silt, brown	5	285
2 in. minus gravel w/fine & coarse sand & silt, brown	10	295
2 in. minus gravel w/fine & coarse sand, silt	10	305
Fine gray sand w/a little 2 in. minus gravel, trace of silt, brown	5	310
Fine gray sand w/stray gravel, trace of silt, brown	5	315
Fine gray sand w/trace of gravel & silt, brown	5	320
2 in. minus gravel w/sand & trace of silt, brown	5	325
2 in. minus gravel w/sand & trace of silt	5	330
2 in. minus gravel w/sand & trace of silt, brown	5	335
2 in. minus gravel w/sand & trace of silt	14	349
Silty clay w/little gravel	4	353
Fine & medium sand w/trace of 1 in. minus gravel & seams of hard silt, greenish color	2	355
Silty sand w/gravel, milky	5	360
Sandy silt w/trace of gravel, brown	5	365
Sand & silt w/some gravel, brown	12	377
Silty clay, some gravel, brown	3	380
Silty clay w/trace of sand, tan	5	385
Silty clay, tan	20	405
Silty clay, light tan	5	410
Sandy silt, tan	9	419
2 in. minus gravel w/fine sand, trace of silt, tan	1	420
2 in. minus gravel w/some fine & coarse sand, trace of silt	5	425
2 in. minus gravel w/trace of silt	5	430
2 in. minus gravel w/trace of silt, tan	10	440
Silty tan clay w/some coarse sand	5	445
Silty black clay	5	450
Silty black clay w/some coarse sand	7	457
Silt blue shale clay	3	460
Blue shale clay w/some coarse sand & pea gravel	10	470
Blue clay & pea gravel	20	490
Blue clay & shale w/some pea gravel	5	495
Silty tan clay w/fine sand	9	504
Fine light tan sand	16	520
Fine sand & gravel w/trace of silt, tan	5	525
Fine sand w/silt, trace of pea gravel, brown	5	530
Fine sand w/some silt, tan, w/some brown sand	15	545
Fine sand & some silt w/some brown gravel	5	550
Fine sand & some silt w/some gravel	5	555
Fine sand & some silt w/gravel, brown	11	566
Blue shale clay w/1 in. minus gravel (volcanic tuff?)	4	570
Blue clay w/1 in. minus gravel	16	586
Blue clay, no gravel, layer of shale clay	2	588
Basalt w/trace of shale clay; bed rock at 588 ft.	2	590
Basalt	10	600

699-30-16 (Golder Well #87)
Location: N30440, #16255
Casing Elevation: 438.18
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NESCO, 1980, geologic investigation borenole

Material(11)	Thickness	Depth
Medium to fine sand & coarse gravel, trace silt	10	10
Medium to coarse gravel, trace silt	5	15
Fine sand & medium to coarse gravel, trace silt	5	20
Fine sand & silt, trace medium to coarse gravel	5	25
Fine sand & silt, trace fine to medium gravel	5	30
Fine to coarse gravel, trace fine sand & silt	5	35
Fine to medium sand & medium to coarse gravel, trace silt	5	40
Medium to coarse gravel, some fine to medium sand	5	45
Fine to medium sand & medium to coarse gravel	5	50
Medium to coarse gravel, trace fine sand	5	55
Fine to medium sand, trace medium gravel	5	60
Fine to medium sand & medium to coarse gravel	11	71

699-30-25A (Golder Well #13)
Location: N29863, #24770 12/27-15N1
Casing Elevation: 544.37
Air rotary (to 200 ft.) & mud rotary, drilled by Carman Water Wells & logged by Lubrecht & Wilkening of Golder Associates for NESCO, 1980, geologic investigation borenole

Material (11)	Thickness	Depth
Fine sand	25	25
Fine to coarse sand	5	30
Fine to coarse sand w/minor pebbles	35	65
Sandy fine gravel	5	70
Sandy fine to medium gravel	5	75
Sandy fine to coarse gravel	5	80
Fine to coarse gravel	10	90
Sandy fine to coarse gravel	5	95
Medium gravel	5	100
Sandy fine to coarse gravel	5	105
Gravelly fine to medium sand	5	110
Sandy gravel	10	120
Fine to medium sand	5	125
Sandy fine to coarse gravel	50	175
Sandy fine to medium gravel	35	215
Gravel w/trace sand	15	230
Gravel	15	245
Gravel w/some sand	5	250
Silty sand	10	260
Fine sand & silt w/some clay	5	265
Slightly gravelly sand & silt w/some clay	10	275
Fine sand & silt w/some clay	5	280
Gravelly coarse sand w/some silt	10	290
Fine to medium gravel	33	323

699-30-25B (Golder Well #13A)
Location: N29772, #24782 12/27-15N2
Casing Elevation: 540.64
Mud rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NESCO, 1980, geologic investigation borenole

Material (11)	Thickness	Depth
Medium to fine sand, some silt	20	20
Medium to fine sand	10	30
Medium to fine sand, trace coarse gravel	5	35
Medium to fine sand, trace medium gravel	5	40
Medium to fine sand	10	50
Medium to fine sand, trace silt & medium gravel	10	60
Medium to fine sand, trace silt & gravel	5	65
Medium to fine sand & coarse gravel, trace silt	20	85
Medium to fine sand, some gravel, trace silt	10	95
Medium to fine sand & medium to fine gravel	10	105
Medium to fine sand, trace gravel	5	110
Medium to fine sand	5	115
Medium to fine sand & medium to fine gravel, trace silt	5	120
Fine sand & medium to coarse gravel, trace silt	15	135
Fine sand & medium to coarse gravel	5	140
Medium to fine sand & medium to coarse gravel	20	160
Sandy medium to fine gravel	10	170
Medium to fine sand & medium to coarse gravel	15	185
Coarse to fine gravel, trace coarse to fine sand	75	260
Coarse to fine gravel, trace coarse to fine sand+& silt	5	265
Coarse to fine gravel, some silt, trace coarse to fine sand	5	270
Coarse to fine gravel, trace coarse to fine sand	5	275
Coarse to fine sand & silt, some coarse to fine gravel, trace clay	5	280
Coarse to fine gravel, some coarse to fine sand, some silt, trace clay	5	285
Coarse to fine gravel, some coarse sand	105	390
Coarse to fine gravel, some coarse sand, trace silt	10	400
Coarse to fine gravel, some coarse to fine sand & silt	10	410
Coarse to fine gravel, some coarse sand, trace silt	23	433

699-30-25C (Golder Well #78)
Location: N29832, #24750
Casing Elevation: 543.33
Air rotary (to 204 ft.) & diamond coring, drilled by Wallace Drilling Company & logged by Lubrecht, Wilkening & MacLeod of Golder Associates for NESCO, 1980, geologic investigation borenole

Material (1)	Thickness	Depth
Fine to medium sand	25	25
Medium to coarse sand, trace fine gravel	15	40
Medium to coarse sand, trace fine to medium gravel	5	45
Medium to coarse sand	10	55
Medium to coarse sand, trace medium gravel	10	65
Fine to coarse gravel, trace coarse sand	10	75
Fine to coarse gravel, some medium to coarse sand	5	80
Medium to coarse sand & fine to coarse gravel	15	95
Medium to coarse sand & fine to medium gravel	5	100
Medium to coarse sand, some fine to medium gravel	5	105
Fine to coarse gravel, trace coarse sand	10	115
Medium to coarse sand	5	120
Fine to medium gravelly medium to coarse sand	5	125
Fine to medium gravelly fine to coarse sand, trace silt	5	130
Fine to coarse gravelly fine to coarse sand, trace silt	5	135
Fine to coarse sand & fine to coarse gravel, trace silt	5	140
Fine to coarse gravelly fine to coarse sand, trace silt	5	145
Fine to coarse gravel, some sand, trace silt	5	150
Fine to coarse gravel, some sand, trace silt	5	155
Fine to coarse gravel & fine to coarse sand	5	160
Fine to coarse gravel, some sand, trace silt	5	165
Medium to coarse gravelly medium sand	5	170
Medium sand & medium to coarse gravel	5	175
Medium sand, some fine to coarse gravel	5	180
Medium sand & fine to coarse gravel	20	200
No recovery	5	205
Pebble gravel	3	208
Sandy pebble gravel	30	238
No recovery	1	239
Fine sandy siltstone	9	248
Silty fine sandstone w/locally alternating siltstone & sandstone	5	253
Medium sand	2	255
Sandy pebble conglomerate	4	259
Fine sandy siltstone	13	272
Fine sandstone	8	280
No recovery	2	282
Fine sandstone	4	286
No recovery	2	288
Fine sandstone	2	290
No recovery	4	294
Sandy gravel	4	298
Sandy pebble cobble conglomerate	26	324
Siltstone	1	325
Sandy pebble conglomerate	2	327
Medium sand	2	329
Sandy pebble cobble conglomerate	23	352
Fine sandy siltstone	2	354
Sandy pebble conglomerate	1	355
Pebbly sandstone	2	357
Sandy pebble conglomerate	4	361
Slightly cobbly, pebbly sand	17	378
Medium sand	21	399
No recovery	9	408
Sandstone	6	414
Sandy pebbly conglomerate	7	421
Pebbly sand	5	426
Silty sandstone	2	428
Medium sandstone	36	464
Sandy siltstone	1	465
Silty sandstone	9	474
Siltstone	2	476
Sandstone	1	477
Sandy siltstone	22	499
Silty sandstone	4	503
Sandy siltstone	2	505
Siltstone	9	514
Fine sandy siltstone	1	515
Silty sandstone	5	520
Sandy pebbly conglomerate	5	525
Sandstone	5	530
Sand pebble conglomerate	3	533
Sandstone	4	537
Sand pebble conglomerate	3	540
Sandy siltstone	4	544
Silty sandstone	7	551
Sandy siltstone	2	553
Silty sandstone w/localized lenses of sandy siltstone	11	564
Silty sandstone	11	575
Fine sandy siltstone	1	576
Same as interval 564 to 575 ft.	5	581
Fine sandy siltstone	4	585
Fine sandstone	6	591
Siltstone	19	610
No recovery	4	614
Fine to medium sandy siltstone	17	631
Medium to fine sandy siltstone grading to & from silty sandstone	3	634
Silty sandstone	6	640
Sandy conglomerate	29	669
No recovery	5	674
Sand pebble conglomerate	4	678
Siltstone	6	684
Siltstone, trace sand & fine gravel	6	690
Basalt	21	711
Basalt breccia	8	719
Basalt	21	740

699-30-47
Location: N29697, W46998 12/25-14R1
Casing Elevation: 671.30
Cable tool, drilled by Hatch of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
Sand	5	5
Sand & silt	70	75
75% sand & 25% silt	5	80
50% sand & 50% silt	8	88
Large gravel	1	89
50% sand & 50% silt	51	140
Sand & silt, 5% small gravel	5	145
Sand & silt, 1% small gravel	5	150
Sand & silt	9	159
Brown clay	1	160
Sand & silt	5	165
Sand & silt, 1% gravel to 1 1/2 in.	5	170

Sand & silt, 50% gravel small	5	175
Sand & silt, 60% gravel to 1 1/2 in., loose	6	181
Sand & silt, 80% gravel to 3/4 in.	9	190
Sand & silt, 80% gravel to 3 in.	10	200
Sand & silt, gravel coarse	18	218
Brown clay	9	227
Coarse sand, 60% gravel to 1/1/2 in.	3	230
Sand & silt, one cobble 5 in.	5	235
Several cobbles	5	240
Cemented sand & silt	5	245
Sand & silt, cobbles to 5 in.	6	251

699-30-51
Location: N29997, W50997 12/25-14N1
Casing Elevation: 695.90
Cable tool, drilled by Hatch of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
Sand & silt	20	20
Cemented sand & silt	10	30
Sand & silt	10	40
Cemented sand & silt	5	45
Sand & silt	10	55
Cemented sand & silt	5	60
Sand & silt	10	70
Cemented sand & silt	5	[illegible]
Sand & silt	80	155
Small gravel	2	157
Coarse sand & silt, gravel to 2 in.	5	162
Sand & silt, 2% small gravel	3	165
Coarse gravel	15	180
Coarse sand & silt	5	185
Coarse sand & silt, 2% loose, small gravel	10	195
Cemented coarse sand & silt	16	211
Sand & silt, 50% coarse gravel	34	245
Sand & silt, 50% gravel to 3 in.	5	250
Cemented sand & silt	10	260
Cemented sand & silt, small gravel	10	270
Cemented sand & silt, cobbles, gravel 4 in.	5	275

699-30-55
Location: N30021, W55000 12/25-15L1
Casing Elevation: 634.21
Cable tool, drilled by Bignam of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
Sand	5	5
50% sand, 50% silt	30	35
75% sand, 25% silt	5	40
50% sand, 50% silt	46	86
25% sand, 75% silt	10	96
50% sand, 50% silt	30	126
75% silt, 25% sand	5	130
50% sand, 50% silt	5	135
75% coarse sand, 25% fine sand & silt	5	140
50% sand, 50% silt	100	240
50% sand, 50% silt, some gravel	5	245
50% sand, 50% silt	20	265
60% sand, 40% silt	5	270
50% sand, 50% silt	5	275
75% sand, 25% silt	5	280
50% gravel, 25% sand, 25% silt	5	285

699-31-8 (Golder Well #51)
Location: N30886, W8221 12/29-18P1
Casing Elevation: 476.37
Air rotary to 125 ft. & mud rotary, drilled by Carman Water Wells & logged by Hansen & Burrell of Golder Associates for NESCO, 1980, geologic investigation boreholes

Material (1)	Thickness	Depth
Fine to medium sand, trace silt	10	10
Fine to coarse gravel & medium to coarse sand, trace silt	40	50
Fine to medium sand, trace silt	15	65
Fine to medium sand, some gravel, trace silt	5	70
Fine to coarse sand & coarse gravel, trace silt	5	75
Fine to coarse sand & gravel, trace to some silt	50	125
Fine to coarse gravel, some sand, trace silt	15	140
Gravelly fine to medium sand, some silt	10	150
Fine to coarse gravel, some sand & silt	5	155
Fine to coarse gravel & silt, some sand & clay	10	165
Clayey silt, some gravel & sand	10	175
Clayey siltstone, some gravel & sand	15	190
Clayey silt, trace gravel, some sand	5	195
Silty fine to medium gravel, trace clay	5	200
Coarse sand & fine to medium gravel, trace silt	40	240
Sandy fine to coarse gravel, trace silt	5	245
Silty fine to coarse gravel, some sand	5	250
Sandy silt, some clay, trace gravel	5	255
Sandy silt, some clay	5	260
Clayey fine to coarse sand & silt	5	265
Clayey silt, some sand	10	275
Fine to coarse sand & silt, some clay	10	285
Silty fine to medium gravel & fine to coarse sand, trace clay	5	290
Fine to medium sand & silt trace clay & gravel	15	305
Fine to coarse sand & fine to medium gravel, trace silt	45	350
Fine to coarse sand & fine to medium gravel, trace silt, & siltstone	5	355
Siltstone; medium to coarse sand & sand & fine gravel	10	365
Siltstone	15	380
Fine to coarse sand & silt, trace gravel	15	395

Fine to coarse sand & fine to medium gravel, trace silt	30	425
Silty fine to coarse sand & gravel	5	430
Sandy silt, some gravel	20	450
Sandy silt, trace gravel; & siltstone	55	505
Siltstone, trace gravel	20	525
Fine sand & silt	15	540
Fine to medium gravel, some silt, trace coarse sand	5	545
Siltstone & fine to medium gravel, trace sand	25	570
Basalt	25	595

699-31-11 (Golder well #50)
Location: N31263, W11373 12/27-13K1
Casing Elevation: 481.72
Air rotary (to 163 ft.) & mud rotary, drilled by Carman Water Wells & logged by Burrell & Hanson of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Sandy fine to coarse gravel	10	10
Coarse gravel, trace sand & silt	5	15
Sandy fine to coarse gravel	30	45
Fine to coarse gravel, trace sand	5	50
Fine to coarse gravel, some sand	5	55
Medium to coarse sand & fine to coarse gravel	10	65
Medium to coarse sand, trace gravel	10	75
Sandy fine to coarse gravel	10	85
Medium to coarse sand, trace gravel & silt	5	90
Medium to coarse sand & fine to coarse gravel, trace silt	5	95
Fine to coarse gravel, some sand, trace silt	15	110
Medium to coarse sand, some gravel, trace silt	5	115
Fine to coarse gravel, some sand, trace silt	5	120
Medium to coarse sand, trace gravel & silt.	5	125
Fine to coarse sand & gravel, trace silt	5	130
Fine to coarse gravel, trace sand	5	135
Fine to coarse sand & gravel	10	145
Fine to coarse sand & trace gravel	5	150
Fine to coarse sand & gravel	5	155
Fine to coarse gravel, trace sand	5	160
Fine sand & silt, trace gravel & clay	5	165
Fine gravel, some sand & silt, trace clay	5	170
Fine silt & sand, some gravel, trace clay	5	175
Fine to coarse sand & silt, trace clay	15	190
Fine to coarse sand & silt, trace clay; & siltstone	5	195
Siltstone, trace sand	10	205
Coarse sand & fine to coarse gravel, trace silt	40	245
Sandy fine to coarse gravel, trace silt	45	290
Sandy silty fine to coarse gravel	25	315
Fine to coarse gravel, some sand & silt	15	330
Sandy fine to coarse gravel, trace silt	10	340
Fine to coarse gravel, trace sand & silt	180	520
Fine to coarse gravel & silt, some sand, trace clay	15	535
Siltstone, some sand, trace clay; fine to coarse gravel, some sand	5	540
Fine to coarse gravel, some sand; & siltstone	10	550
Fine to coarse gravel, some sand; & silt, some sand, trace clay	10	560
Basalt	45	605

699-31-23 (Golder well #12)
Location: N31490, W23174 12/27-15L1
Casing Elevation: 540.64
Air rotary (to 140 ft.) drilled by Carman & Bynum of Carman Water Wells & Longyear Drilling Company & logged by Findley, Lubrecht & Roman of Golder Associates for WESCO, 1979, geologic investigation borehole

Material (11)	Thickness	Depth
Medium sand w/some gravel	30	30
Gravel w/some fine to coarse sand	10	40
Very coarse gravel w/some sand	10	50
Very coarse gravel w/coarse sand	3	53
Gravelly coarse sand	7	60
Medium to fine sand	20	80
Pebbly medium to fine sand	5	85
Medium to fine sand w/some pebbles	5	90
Medium to fine sand	5	95
Coarse gravel	10	105
Gravel w/some sand	10	115
Sandy gravel	10	125
No recovery, probably gravels	15	140
Fine to coarse gravel	10	150
Gravel	15	165
Fine gravel	5	170
Gravel	35	205
Clayey silt, scattered gravel	10	215
Clayey silt	38	253
Medium to fine gravel w/some sand & silt	45	298

699-31-31
Location: N30507, W30678 12/27-16M1
Casing Elevation: 529.32
Cable tool, drilled by Gentz of & for GE Company, 1956, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine sand	10	10
Gravel-sand	5	15
Fine black sand-gravel	25	40
No record	10	50
Cobbles & gravel	10	60
Boulders-cobbles-gravel	10	70
Cobbles & gravel	5	75
Fine & coarse sand	7	82
Small & coarse gravel	3	85

Cobbles & gravel	15	100
Small & coarse gravel	5	105
Boulders	7	112
Boulders-cobbles	8	120
Cobbles, gravel, little silt	15	135
Boulders	7	142
Boulders, gravel, little silt	8	150
Cobbles, gravel, silt	5	155
Coarse gravel & sand	5	160
No record	3	163
Cobbles, gravel, fine sand	9	172
Cobbles, gravel, sand, little silt	3	175
Boulders	2	177
Cobbles, gravel, sand & silt	3	180
Cobbles, gravel & silt	5	185
Sand-gravel	5	190
Cobbles-gravel	10	200
Sand, gravel, & silt	12	212
Sand, silt & clay	8	220
Silt, clay & small gravel	15	235
Sand & silt	5	240
Sand, very little silt	5	245
Gray sand, very little clay	10	255
Blue clay	5	260
Blue clay & fine sand	5	265
Clay, sandstone & silt	10	275
Sand & gravel	5	280
Sand, silt & gravel	15	295
Gravel, sand & silt	5	300
Gravel, up to 6 ft.	10	310
Gravel, clay & sand	10	320
Sand-little silt	5	325
Sand, little silt, gravel	5	330
Sand, little silt	5	335
Gravel & sand	10	345
Sand-silt	5	350
Sand-gravel	10	360
Sand, little silt	5	365
Sand & gravel	5	370
Gray clay, little gravel	5	375
Sand & silt	15	390
Fine gray sand	5	395
Gravel, sand	12	407
Fine & coarse sand	3	410
Fine sand	15	425
Gray clay	10	435
Clay, little gravel	5	440
Gray clay	5	445
Clay	15	460
Clay-little gravel	15	475
Brown clay	5	480
No record	5	485
Brown clay	10	495
Gray clay	10	505
Silty gray clay	15	520
Brown silty clay	10	530
Gray clay & small gravel	10	540
Sand & silt	5	545
Soft sandstone	5	550
Brown silty clay	15	565
Sand, gravel & basalt; formation has a green color	8	573
Fine sand, gravel, cobbles up to 6 in.	2	575
Coarse sand, gravel, cobbles	5	580
Cobbles, gravel & sand, w/little clay or silt	5	585
No record	2	587
Cobbles, gravel & sand	6	593
Formation is like cement; cobbles, gravel, & sand	6	599
Clay	21	620
Clay, sand, small gravel	13	633
Sand, gravel, & silt	5	638
Sand, gravel, & shale	2	640
Sand, blue shale	9	649

699-31-53A
Location: N31111, W52977 12/26-150'
Casing Elevation: 706.14
Cable tool, drilled by Jurke of Haden Drilling Company for GE Company, 1958, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	36	36
Silty sand	44	80
Fine sand	10	90
Sand-some clay	30	120
Fine sand	30	150
Sand & gravel	10	160
Medium sand	3	163
Sand	2	165
Medium sand	4	169
Medium sand-trace of clay	1	170
Coarse sand	5	175
Medium sand	7	182
Cemented medium sand	8	190
Few gravel & medium sand	5	195
No record	6	201
Medium sand	18	219
Trace gravel medium sand	1	220
Medium sand	4	224
Few cobbles medium sand	1	225
No record	5	230
Trace of clay, medium sand	27	257
Trace of clay, sand	3	260
Trace of clay, sand & gravel	10	270
Gravel	13	283
Drills like clay traces, sand & gravel	1	284
Cemented sand	13	297
Conglomerate (cemented gravel)	13	310
No record (probably conglomerate)	3	313
No record (probably conglomerate)	2	315
Changing to cement gravel	5	320
Layers of conglomerate & cement gravel	6	326
Sand & gravel	4	330
Layers of sand & gravel & cemented gravel	5	335
Some $CaCO_3$--mostly gravel	5	340
Gravel & sand	4	344
Cemented layers, sand & gravel	1	345
Cemented layers, sand & gravel contains some cobbles	5	350
Cemented layers, sand & gravel	4	354
Gravel & cobbles	6	360
Gravel, a few cobbles, some cementing	3	363
Heaving sand, gravel, enough clay to make permeability low	2	365
Sand, gravel, little clay	5	370
Sand, gravel & clay	30	400
Cemented gravel	25	425
Clay, sand & gravel	5	430
Blue clay	52	482
Black clay	5	487

699-31-53B
Location: N31160, W52964 12/26-15J2
Casing Elevation: 707.83
Cable tool, drilled by Lueck of Haden Drilling Company for GE Company, 1959, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	30	30
Silt & sand	10	40
No record	30	70
Cemented sand	23	93
Cemented clay & sand	27	120
Little clay-fine sand	20	140
Sand	10	150
Gravel	10	160
Fine gravel & sand	20	180
Sand	35	215
Sand & gravel - some cobblestone	15	230
Sand & clay	30	260
Medium sand	10	270
Gravel	18	288
Conglomeration	18	306
Cemented gravel	6	312
Conglomeration	6	318
Gravel	10	328
One boulder-sand & gravel-layers of cemented gravel	12	340
Cemented sand & gravel layers	12	352
Sand & gravel some cemented	10	362
Sand & gravel little clay	3	365
Sand & gravel layers of clay	30	395
Sandy clay layers cemented gravel	8	403
Cemented gravel	7	410
Sand & gravel some cemented	8	418
Sand-clay & gravel cemented	12	430
Clay	1	431

699-31-65
Location: N30536, W65357 12/26-17K1
Casing Elevation: 683.09
Cable tool, drilled by Hatch of Hatch Drilling Company for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	5	5
Sand-silt	187	192
Sand-coarse, little silt	13	205
Sand-fine, little silt	5	210
Sand & gravel to 1/2 in.	13	223
Sand-clay & fine gravel	7	230
Sand-silt	5	235
Coarse sand & gravel	6	241
Sand-silt	4	245
Clean coarse sand-gravel	10	255
Clean gravel 1/4 to 1 1/2 in.	15	270
Clean gravel 1/2 to 1 1/4 in.	15	285
Clean gravel 1/4 to 3 in.	5	290
Cemented gravel 1/4 to 1 1/2 in.	20	310
Gravel, sand & silt	10	320
Sand, silt & gravel to 3 in.	15	335
Sand, silt, & fine gravel	20	355
Cemented gravel	5	360
Sand, silt, gravel	30	390
Sand & silt	8	398
Yellow clay	2	400
Yellow clay w/gravel particles	25	425
Cemented sand	10	435
Cemented sand w/gravel	5	440
Sandy clay	5	445
Sandy clay & gravel	5	450

699-32-1B (Golder Well #86)
Location: N32062; W17582 12/27-14K1
Casing Elevation: 452.64
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand, trace silt	10	10
Fine sand & silt	20	30
Fine sand & medium to coarse gravel, some silt, trace clay	5	35
Fine to medium sand & fine to coarse gravel, trace silt	5	40
Fine to medium sand & some fine to medium gravel	5	45
Fine sand & silt, trace medium gravel	10	55
Fine to medium sand, some medium to coarse gravel	5	60
Fine to coarse gravel, some fine to medium sand	10	70
Fine to medium sand & fine to coarse gravel	5	75
Fine to medium sand & medium to coarse gravel	6	81

699-32-22
Location: N32000, W21995 12/27-15Q1
Casing Elevation: 517.55
Cable tool, drilled by Rodda of Bach Drilling Company, 1971, groundwater monitoring borehole

Material (1)	Thickness	Depth
Silt & gravel	5	5
Black sand & gravel	10	15
Black sand	15	30
Sand & gravel	120	150
No record	10	160
Sand & silt	11	171

699-32-26 (Golder Well #48)
Location: N31647, W26279 12/27-16J1
Casing Elevation: 520.59
Air rotary (to 150 ft.) & mud rotary, drilled by Carman Water Wells & logged by Lubrecht of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine sand & silt	10	10
Fine sand	25	35
Coarse to fine sand & medium to fine gravel, trace silt	5	40
Gravelly coarse to fine sand, some silt	5	45
Coarse to fine sand & medium to fine gravel, trace silt	15	60
Sandy medium to fine gravel, trace silt	5	65
Coarse to fine gravel, trace sand & silt	5	70
Medium to fine gravel, trace sand & silt	5	75

Coarse to fine gravel, trace silt	5	80
Sandy silty medium to fine gravel	5	85
Coarse to fine sand & gr[illegible], trace silt	15	100
Gravelly coarse to fine sand, trace silt	5	105
Coarse to fine [illegible] & fine gravel, [illegible] silt	5	110
Co[illegible] fine gravel, trace sand & silt	5	115
Coarse to fine sand & medium to fine gravel, trace silt	5	120
Coarse to fine sand & medium to fine gravel, trace silt & clay	5	125
Coarse to fine sand & medium to fine gravel	5	130
Coarse to fine sand & gravel	5	135
Coarse to fine sand & medium to fine gravel	5	140
Gravelly coarse to fine sand	15	155
Coarse sand & coarse to fine gravel	40	195
Coarse to medium gravel, trace fine gravel	10	205
Coarse sand & coarse to fine gravel, trace silt & clay	5	210
Coarse to fine sand & medium to fine gravel, some silt & clay	5	215
Silty coarse to fine sand & medium to fine gravel, some clay	5	220
Coarse to fine sand & silt, some clay, trace gravel	5	225
Medium to fine sand & silt, some clay, trace gravel	5	230
Coarse to fine sand & silt, some clay, trace gravel	15	245
Coarse to fine sand & silt, trace clay; & clay	10	255
Coarse to fine sand & silt, some clay, trace gravel	5	260
Coarse to fine sand, some silt, trace clay & gravel	10	270
Coarse to fine sand & fine gravel	5	275
Coarse to fine sand; & fine sand & silt, trace clay	5	280
Silty coarse to fine sand & medium to fine gravel, some clay	10	290
Coarse to fine sand & silt, some clay & gravel	15	305
Silty coarse to fine sand & fine gravel, trace clay	10	315
Coarse sand & silt, some clay, trace gravel	15	330
Coarse to fine sand & fine gravel	5	335
Coarse to fine sand & medium to fine gravel	10	345
Coarse to fine sand & gravel	15	360
Coarse to fine sand & gravel, trace silt	10	370
Coarse to fine sand & gravel, trace silt & clay	5	375
Coarse to fine sand & medium to fine gravel	20	395
Coarse to fine sand & medium to fine gravel, trace silt	10	405
Coarse to fine sand & fine gravel	20	425
Coarse to fine sand, trace gravel; & clay, trace silt	10	435
Coarse to fine sand, trace gravel, silt & clay; & siltstone.	10	445
Sandy siltstone, trace gravel	5	450
Sandy siltstone; & fine sand & silt, trace clay	10	460
Sandy siltstone; & fine sand, some silt, trace clay	25	485
Coarse to fine gravel, trace sand; & sandy siltstone.	5	490
Coarse to fine sand & fine gravel; sandy siltstone.	5	495
Sandy siltstone; & fine sand & silt, trace clay & gravel	100	595
Sandy siltstone & fine gravel	15	610
Coarse to medium sand & coarse to fine gravel	10	620
Coarse to medium sand & coarse to fine gravel; & siltstone; & clay, some silt	5	625
Coarse to medium sand & fine gravel; & siltstone	10	635
Coarse to fine sand, trace silt; & siltstone	10	645
Coarse to fine sand, trace silt & clay; & siltstone	50	695
Basalt	20	715

699-32-32A (Golder Well #71)
Location: N31870, W31489 12/27-1701
Casing Elevation: 520.83
Rotary, drilled by Carman Water Wells & logged by Wilkening & Burrell of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand & silt	5	5
Fine to medium sand, trace silt & gravel	5	10
Fine to medium sand, trace silt	5	15
Fine to medium sand & medium to coarse gravel, trace silt	20	35
Fine to medium gravel, trace silt	5	40
Fine to coarse sand & gravel, trace silt	5	45
Fine to coarse sand & medium to coarse gravel, trace silt	15	60
Fine to coarse gravel, trace silt	5	65
Fine to medium sand & fine to coarse gravel, trace silt	5	70
Fine to coarse sand & gravel, trace silt	5	75
Medium to fine sand & fine to coarse gravel, trace silt	5	80
Fine to coarse gravel, some sand, trace silt	10	90
Fine to coarse sand & gravel, trace silt	5	95
Fine to medium sand & fine to coarse gravel, some silt	10	105
Fine to coarse sand & fine to medium gravel, trace silt	5	110
Fine to medium sand & fine to coarse gravel, trace silt	5	115
Fine to coarse gravel, trace sand	10	125
Medium to coarse gravel, trace sand	10	135
Fine to coarse gravel	5	140

Fine to coarse gravel, trace sand	5	145
Medium to coarse gravel, trace sand	15	160
Fine to coarse gravel, trace sand	10	170
Medium to coarse gravel	5	175
Fine to coarse gravel, trace sand	5	180
Fine to coarse gravel	5	185
Fine to coarse gravel, trace sand	5	190
Coarse sand & fine to medium gravel	5	195
Coarse sand & fine to coarse gravel	75	270
Coarse sand & fine to coarse gravel, trace silt & clay	20	290
Fine to coarse sand & gravel, some silt, trace clay	20	310
Fine to coarse sand & fine to medium gravel, some silt, trace clay	5	315
Fine to coarse sand & fine to medium gravel	30	345
Coarse sand & fine to medium gravel	5	350
Fine to coarse sand & fine gravel, trace silt & clay	5	355
Fine to coarse sand & fine to medium gravel, trace silt & clay	5	360
Sandy medium to fine gravel, some silt, trace clay	5	365
Fine to medium sand & gravel, some silt, trace clay	5	370
Fine to coarse gravel, some sand	5	375
Fine to coarse gravel, some sand, trace silt	5	380
Fine to coarse gravel, some sand & silt, trace clay	5	385
Fine to medium sand & gravel some silt, trace clay	5	390
Medium to coarse sand & fine to coarse gravel	20	410
Gravelly fine to coarse sand	5	415
Fine to coarse gravel, some sand	5	420
Fine to medium gravel	10	430
Fine to coarse sand & fine to medium gravel, trace silt & clay	50	480
Fine to coarse gravel, trace sand	25	505
Siltstone, trace sand	10	515
Siltstone, trace sand & gravel	10	525
Siltstone, trace sand	15	540
Siltstone, trace sand, some gravel	5	545
Siltstone, trace sand	5	550
Siltstone, trace sand, some gravel	30	580
Fine to medium gravel, some sand, trace silt	10	590
Fine to medium gravel, some sand, trace silt; & siltstone	10	600
Fine to medium gravel, some sand; & siltstone	35	635
Fine to medium gravel, some sand, trace silt	25	660
Siltstone; & fine to medium gravel, some sand, trace silt	60	720
Basalt	60	780

699-32-42
Location: N32470, W42450 12/25-12W1
Casing Elevation: 517.42
Cable tool, drilled by Bigham of Hatch Drilling Company, 1968, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	25	25
Coarse sand & pea gravel	20	45
No record	5	50
Silt	5	55
Sand & silt	10	65
Cobbles	10	75
Sand & gravel	5	80
Coarse, sand & pea gravel	5	85
Sand & gravel	35	120
Gravel	5	125

699-32-43
Location: N32128, W42649 12/26-13G1
Casing Elevation: 516.62
Cable tool, drilled by Bigham of Hatch Drilling Company, 1968, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & silt	20	20
Sand	5	25
Pea gravel	10	35
Coarse sand w/gravel	30	65
Coarse sand w/pea gravel	15	80
No record	5	85
Cobbles or small boulders	5	90
Cobbles	5	95
Sand & gravel	32	127

699-32-49A
Location: N31983, W48959 12/26-14G1
Casing Elevation: 713.47
Cable tool, drilled by Bigham of Hatch Drilling Company for ARHCO, 1969, geologic investigation borehole

Material (1)	Thickness	Depth
50% sand, 50% silt	5	5
75% sand, 25% silt	5	10
80% sand, 20% silt	5	15
50% sand, 50% silt; 6 in. layer of gravel at 18 ft.	55	70
40% sand, 60% silt	5	75
50% sand, 40% silt	5	80
50% sand, 50% silt	105	185
60% sand, 40% silt, little gravel	5	190
60% sand, 40% silt	5	195
50% sand, 50% silt	10	205
25% sand, 75% silt	5	210
50% sand, 50% silt	20	230
25% sand, 75% silt	5	235
80% sand, 20% silt	5	240
90% sand, 10% silt	5	245
50% sand, 50% gravel	5	250

699-32-49B
Location: 12/26-14G2
Casing Elevation:
Cable tool, drilled by Hatch of Hatch Drilling Company for ARHCO, 1970, groundwater monitoring

Material (1)	Thickness	Depth
Sand	10	10
Sand & silt	10	20
Hard sand & silt	15	35
Sand	10	45
Sand & silt	125	170
Sand & silt; 1% gravel to 2 in.	5	175
Sand & silt; 3 in. lense of clay at 207 ft.	50	225
Cemented sand & silt	5	230
Sand & silt	5	235
Sand & silt; 50% gravel to 4 in.	5	240
Cemented cobbles	9	249
Cemented gravel to 3 in.	2	251
Cemented gravel	2	253
Cemented sand & silt & gravel	12	265
Sand & silt	20	285
Sand & silt; gravel to 1 1/2 in.	5	290
Sand & silt; gravel to 4 in.	2	292
Cemented sand & silt; small gravel	5	297
Sand & silt; gravel	2	299
Sand & silt	1	300
Sand & silt; small gravel	7	307
Sand & silt	2	309

699-32-62
Location: N31974 W61980 12/26-16E1
Casing Elevation: 707.09
Cable tool, drilled by Gage of Bach Drilling Company for GE Company, 1960, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine sand	40	40
No record, probably fine sand	15	55
Fine sand	85	140
Hard gravel	5	145
Hard packed sand	15	160
Hard packed sand, just a little brown clay in it	20	180
Fine hard packed sand; seems to have a little brown clay in it	10	190
Fine packed sand; still hard pack w/a little brown clay or silt in it	10	200
Hard packed sand & clay; this sand has more brown clay in it	15	215
Fine sand	8	223
Cemented gravel; at about 220 ft. hit some hard gravel & cobbles, seems to be cemented w/a brown material; brown clay	22	245
Cemented gravel; more dense with clay, somewhat larger gravel, cemented in gray or blue like material	15	260
Cemented gravel; same kind of formation as before but less cemented	5	265
Cemented cobbles; in some larger cobbles, they aren't cemented as much as the gravel	5	270
Brown soil w/gravel	10	280
Gravel, little clay	15	295
Sand & gravel	5	300
Sand & gravel	50	350
Gravel & sand; hard packed	30	380
Sand & gravel; hard packed	10	390
Sand & gravel	13	403
Yellow clay	7	410
Blue clay	48	458
Sand & clay	12	470
Sand & clay; fine silty sand at 470 ft., a little clay	5	475
Fine silty sand	10	485
Silty sand	7	492
Silty sand w/small gravel	9	501

699-32-70A
Location: N32065, W70345 12/26-18G1
Casing Elevation: 666
Cable tool, drilled by Swain of Hatch Drilling Company for GE Company, 1957, abandoned borehole

Material (1)	Thickness	Depth
Fine sand & silt	15	15
Sand & silt	15	30
Fine sand & silt	5	35
Fine sand-silt, some small gravel	30	65
Fine sand-silt	15	80
Sand-silt	15	95
Fine sand & silt	40	135
Sand-silt	5	140
Fine sand-silt & clay	40	180
Sand, silt & gravel, 1/4-1 in.	5	185
Gravel, 1/4-1 in.	5	190
Dark brown sand hard packed	5	195
Dark brown sand & small gravel, softer	5	200
Dark brown sand, silt & gravel, soft	5	205
Dark brown sand, silt, clay & gravel	10	215
Sand & gravel, hard packed	5	220
Sand-gravel-silt, hard packed	10	230
Sand-gravel, gravel content increasing, 1/4-2 in.	5	235
Sand & gravel	5	240
Sand & gravel, 1/2-4 in.	5	245
Clean coarse sand	5	250
Sand & gravel	5	255
Cemented sand & gravel	3	258
Cemented sand	7	265
Cemented sand, softer	5	270
Sand & gravel	10	280
Cemented sand & gravel	10	290
Sand & silt & gravel particles	5	295
No record	5	300

699-32-70B
Location: N32085, W70345 12/26-18G2
Casing Elevation: 666.61
Cable tool, drilled by Swain of Hatch Drilling Company for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	5	5
Gravel, some cobbles	5	10
Sand & gravel	14	24
Fine sand & silt w/streaks of small gravel	48	72
Fine sand & silt	112	184
Cemented sand & small gravel	14	198
Sand, silt & clay	21	219
Cemented sand, silt & gravel	13	232
Cemented sand & gravel w/layers of clean large gravel to 4 in.	13	245
Cemented sand	35	280
Cemented sand & small gravel	15	295
Sand & gravel	15	310
Sand & large gravel to 3 in.	5	315
Sand & silt	5	320
Cemented sand & silt	10	330
Cemented sand & small gravel	5	335
Cemented sand & gravel	5	340
Sand & silt; small gravel, softer	10	350

699-32-72
Location: N32481, W72041 12/26-18E1
Casing Elevation: 668.16
Cable tool, drilled by Bentz of & for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	48	48
Sand, little silt	72	120
50% sand, 50% silt	30	150
Sand, very little silt	5	155
No record	5	160
50% silt, 50% sand	25	185
Sand & small gravel; small gravel at 187 ft.	5	190
Sand & coarse gravel	5	195
Sand, silt & gravel	5	200
Sand & silt	42	242
Sand, cobbles & gravel	8	250
Cobbles, gravel & sand	5	255
Gravel & sand	5	260
Cobbles, gravel, fine sand; cement gravel from 275-279 ft.	20	280
Gravel up to 4 in. fine sand	5	285
Gravel, sand & silt	10	295
Fine & coarse sand, gravel	5	300
Sand & gravel up to 4 in.	15	315
Sand & gravel	15	330
Sand, gravel & cobbles	10	340
Sand & gravel, little silt	5	345
Sand, cobbles, gravel, little silt	10	355
Cobbles, gravel, sand & silt	12	367
Gravel & sand	3	370
Sand, stone	5	375
Fine sand	10	385
Fine sand & small gravel	15	400
Coarse gravel, fine sand	5	405
Sand, gravel, little silt	7	412
Clay; light gray clay at 412 ft.	8	420
Tan clay	10	430
Gray clay	7	437
Blue clay	8	445
Clay	5	450
No record	2	452
Sand & gravel	2	454
Boulders	6	461
Cobbles, gravel, sand	46	507
Gravel up to 5 in., sand	10	517
Cobbles, gravel & sand	13	530
Small gravel & sand	7	537
Fine sand, gravel up to 2 in.	13	550
Gravel, sand	5	555
Fine sand & silt	5	560
Fine sand	10	570
Clay, some small gravel	2	572
Basalt	8	580

699-32-77
Location: N31812, W77032 12/25-13E1
Casing Elevation: 653.74
Cable tool, drilled by Ford of USGS for GE Company, 1951, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil & mostly sand	6	6
Sand & clay	3	9
Sand; sand & little clay	4	13
Sand, gravel, clay & a little silt	4	17
Sand, gravel, clay & a little silt; struck gravel at 17 ft.	3	20
Sand and a little gravel		
Sand, small gravel & a little clay	5	25
Sand & clay; sand w/mixture of yellow clay	10	35
Sand & a little clay; sand w/a mixture of yellow clay	15	50
Coarse sand & gravel	8	58
Coarse sand & a little yellow clay	3	61
White sand	4	65
Fine sand & clay	15	80
Sand & clay	40	120
Sand & clay; sandy clay	5	125
Clay & very fine sand; sandy clay	5	130
Clay & sand; sandy clay	6	136
Sand & gravel	6	142
Sand, gravel & clay	61	203
Gravel, sand & clay to sand, gravel & clay	9	212
Sand, gravel & clay	3	215
Sand, clay & a little gravel; more clay & sand, a little gravel	14	229
Sand, gravel & clay	13	242
Sand, gravel & clay to gravel, sand & clay	16	258
White sand & a little gravel	4	262
Coarse sand & a little gravel	6	268
Sand, gravel & a little clay	15	283
Sand, gravel & a little clay; white sand, gravel & traces of clay	7	290

699-33-6 (Golder Well #52)
Location: N32508, W6139 12/28-18G1
Casing Elevation: 503.31
Air rotary (to 129 ft.) & mud rotary, drilled by Carman Water Wells & logged by Lubrecht of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium sand	5	5
Medium to coarse sand & fine to medium gravel	5	10
Fine & coarse gravel, some sand	15	25
Medium sand, trace gravel	20	45
Medium sand, some gravel	5	50
Medium sand, trace gravel	5	55
Medium to coarse sand & fine to medium gravel	5	60
Fine to coarse gravel, trace sand	5	65
Medium to coarse sand & fine to medium gravel	15	80
Medium sand, trace gravel	5	85
Medium sand	5	90
Medium sand, trace gravel	5	95
Fine to coarse sand, trace gravel & silt	5	100
Fine to coarse sand & gravel, trace silt	5	105
Fine to coarse sand, some gravel, trace silt	10	115
Fine to coarse sand & gravel, trace silt	5	120
Fine to coarse gravel, some sand, trace silt	5	125
Fine to coarse sand & gravel, trace silt	5	130
Gravelly medium to coarse sand, trace silt	10	140
Sandy fine to coarse gravel	10	150
Medium to coarse sand, trace gravel	10	160
Medium to coarse sand	5	165
Medium to coarse sand, trace gravel	10	175
Fine sand & silt, some clay	5	180
Coarse to fine sand & silt, some clay	5	185
Medium to fine sand & silt, trace clay (siltstone in part)	10	195
Fine sand & silt, trace clay (siltstone in part)	5	200
Medium to fine sand & silt, trace clay	5	205
Coarse to fine sand & silt, trace clay; & medium to fine sand & silt, trace clay (siltstone in part)	10	215
Coarse to fine gravel, some sand	50	265
Silty sandy coarse to fine gravel, some clay	5	270
Gravelly fine sand & silt, trace clay	5	275
Silt & clay, trace sand	40	315
Medium to fine gravel, some sand, trace clay & silt	5	320
Medium to fine gravel, some sand (cemented)	30	350
Medium to fine gravel, some sand, trace silt & clay (cemented)	5	355
Coarse to fine gravel, some sand (cemented)	15	370
Medium to fine gravel, some sand, trace clay & silt (cemented)	10	380
Coarse to fine sand & silt, some gravel & clay	5	385
Coarse to fine sand & silt, some clay, trace gravel	5	390
Medium to fine gravel, some sand & silt, trace clay	5	395
Medium to fine gravel, some sand (cemented)	35	430
Medium to fine gravel, some sand, trace silt & clay (cemented)	5	435
Medium to fine gravel, some silt (cemented)	5	440
Medium to fine gravel, some sand (cemented)	20	460
Medium to fine gravel, some sand, trace silt & clay	5	465
Coarse to fine sand & fine gravel, some silt, trace clay	5	470
Medium to fine sand & silt, some clay, trace gravel	10	480
Silt, trace sand & clay	5	485
Silt, some sand, trace clay	10	495
Silt, some sand & clay	5	500
Silt, some clay, trace sand	5	505
Clayey silt, trace sand	10	515
Fine to coarse sand & silt, trace clay	5	520
Siltstone, some sand, trace clay	20	540
Medium to coarse sand, trace silt	10	550
Medium to coarse sand, trace silt & siltstone	5	555
Fine to medium sand, some silt (cemented)	15	570
Basalt	21	591

699-33-14 (Golder Well #30)
Location: N32129, W14322 12/27-13E1
Casing Elevation: 473.23
Air rotary (to 120 ft.) & mud rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand, trace silt	10	10
Fine to coarse sand & fine to medium gravel, trace silt	10	20
Fine to coarse gravel, some sand	10	30
Fine to coarse sand & gravel	10	40
Fine to coarse sand, trace gravel	5	45
Fine to medium sand, trace silt	5	50
Fine to coarse sand & fine to medium gravel, trace silt	15	65
Fine to medium sand, trace silt	5	70
Fine to coarse sand & gravel	5	75
Fine to medium gravel, trace sand	5	80
Fine to medium sand, trace gravel	15	95
Fine to coarse gravel, some sand	5	100
Fine to coarse sand, trace gravel	5	105
Fine to coarse sand & gravel	5	110

Fine to coarse gravel, trace sand	25	135
Medium sand & fine to medium gravel, trace silt	5	140
Fine sand & silt, trace gravel & clay	10	150
Fine sand & silt, some clay, trace gravel	10	160
Fine sand & silt, some clay	5	165
Fine sand & silt, some c trace gravel	5	175
Fine sand & silt, some clay	10	185
Fine to coarse gravel, some sand, trace silt	65	250
Fine to coarse sand & gravel, trace silt	5	255
Fine to coarse gravel, some sand, trace silt	30	285
Fine to coarse gravel, some sand, trace silt & clay	5	290
Fine to coarse gravel, some sand, trace silt	35	325
Fine to coarse gravel & sand, some silt	10	335
Fine to medium sand	15	350
Fine to medium sand & silt, some clay, trace gravel	15	365
Fine to medium sand & silt, trace gravel & clay	5	370
Fine to coarse sand & silt, some clay	15	385
Fine to coarse sand & silt, trace clay	5	390
Sandy fine to coarse gravel, trace silt	15	405
Fine to coarse gravel, some sand, trace silt	35	440
Fine to coarse sand, some gravel, trace silt	10	450
Fine to coarse sand & silt, trace gravel & clay	10	460
Fine to coarse sand & silt, some clay	5	465
Fine to coarse sand & silt, trace gravel & clay	5	470
Fine to coarse sand & fine to medium gravel, trace silt	5	475
Fine to coarse sand	5	480
Silty fine to coarse sand, trace gravel & clay	25	505
Fine to medium sand & silt, some clay	5	510
Silty fine to coarse sand, trace gravel & clay	10	520
Fine to coarse sand & fine gravel, some silt, trace clay	5	525
Fine to coarse sand & fine gravel, some silt, trace clay; & clayey silt	5	530
Fine to coarse sand & fine gravel, some silt, trace clay	10	540
Silty fine to coarse sand, trace gravel & clay	10	550
Basalt	23	573

699-33-21A (Golder Well #10)
Location: N32745, W21416 12/27-15H1
Casing Elevation: 500.22
Air rotary (to 155 ft.) & mud rotary, drilled by Carman Water Wells & logged by Lubrecht & Wilkening of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Silt	15	15
Gravelly sand	10	25
Sandy gravel	30	105
Gravelly medium sand	10	115
Sandy gravel	5	120
Sandy cobbly gravel	10	130
Gravelly sand	15	145
Cobby sandy gravel	30	175
Gravelly clay	30	205
Clayey gravel	10	215
Gravel	60	275
Slightly sandy gravel	5	280
Slightly sandy & clayey gravel	5	285
Slightly sandy gravel	5	290
Gravel	35	325
Clayey gravel	10	335
Sandy clayey gravel	10	345
Gravel	80	425
Gravelly clay	5	430
Slightly gravelly clay	5	435
Gravelly clay	5	440
Gravel	10	450
Gravelly sand	5	455
Slightly gravelly sand	10	465
Sand	5	470
Slightly gravelly sand	5	475
Gravelly sand	25	500
Sandy clay	10	510
Gravelly clay	45	555
Clay	5	560
Gravelly clay	10	570
Gravelly conglomerate	30	600
Conglomerate w/siltstone interbeds	5	605
Conglomerate	10	615
Basalt	20	635

699-33-30 (Golder Well #7)
Location: N33127, W29955
Casing Elevation: 522.48
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand, trace silt & medium gravel	10	10
Medium to fine sand & medium to fine gravel, trace silt	5	15
Fine to coarse gravel, trace fine sand & silt	5	20
Fine to coarse sand & coarse to fine gravel, trace silt	5	25
Medium to fine sand, trace silt & medium gravel	10	35
Medium to coarse sand, trace silt & medium to coarse gravel	5	40
Fine to coarse sand & medium to fine gravel, trace silt	5	45
Medium to fine sand & medium to fine gravel, trace silt	10	55
Fine sand & medium to fine gravel, some silt	5	60
Fine to coarse gravel, trace fine to coarse sand	5	65

Fine to medium gravel, trace fine to coarse sand	5	70
Fine to coarse gravelly fine sand & silt	5	75
Fine to coarse gravel, trace fine to coarse sand & silt	5	80
Fine to medium gravel, some fine to coarse sand	5	85
Fine to coarse gravel, trace coarse sand	5	90
Fine sand & silt, trace fine gravel	5	95
Fine to medium gravelly fine sand & silt	5	100
Fine to coarse gravel, some medium to coarse sand	5	105
Medium to coarse sandy fine to coarse gravel	5	110
Medium to coarse sand & medium to fine gravel	5	115
No recovery	5	120
Medium to fine sand, trace medium to coarse gravel	5	125
Medium to fine sand & medium to fine gravel	10	135
Medium to fine sand & fine gravel	5	140
Medium to fine sand & fine to coarse gravel	10	150
Fine to coarse gravel, trace medium to fine sand	5	155

699-33-38
Location: N33380, +38175 12/27-1881
Casing Elevation: 535
Cable tool, drilled by Rodda of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine gray sand, very soft	15	15
Sand & clay; fine gray sand, very soft	5	20
Fine gray sand, very soft	13	33
Sand	9	42
Sand & gravel; struck gravel & boulders at 42 ft.	1	43
Different colored gravel & boulders	4	47
Gravel & boulders	20	67
Boulders	19	86
Coarse sand	4	90
Boulders	7	97
Sand, gravel & boulders	13	110
Boulders	2	112
Gray sand	5	117
Boulders & gravel	2	119
Boulders	2	121
Sand, gravel & boulders	7	128
Boulders	2	130

699-33-42
Location: N32794, W42256 12/26-12H2
Casing Elevation:
Cable tool, drilled by Hatch of Hatch Drilling Company, 1968, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	5	5
Sand & silt	5	10
Sand	10	20
Coarse sand & gravel to 1 1/2 in.	10	30
Coarse sand	5	35
Coarse sand & gravel to 4 in.	5	40
Coarse sand & gravel	5	45
Sand & silt	5	50
Sand & silt, gravel to 2 in.	20	70
Coarse sand & silt	15	85
Coarse sand & silt, gravel to 3 in.	5	90
Sand & silt	2	92
Sand & silt (sticky like clay)	8	100
Sand & silt	5	105
Sand & gravel, some clay; sand & gravel to 4 in. at 107 ft.	8	113
Cobbles & gravel	2	115
Clean gravel	5	120
Sand & gravel to 2 in.	4	124

699-33-56
Location: 12/26-15C1
Casing Elevation: 717.03
Cable tool, drilled by Burke of Haden Drilling Company for SE Company, 1958, groundwater monitoring borehole

Material	Thickness	Depth
Topsoil, sand	5	5
Sand	160	165
Medium sand	5	170
Medium sand & gravel	5	175
Coarse sand	15	190
Fine sand	10	200
Medium sand	39	239
Fine sand	16	255
Medium sand	10	265
Medium & fine gravel	5	270
Medium sand	5	275
Sand & gravel	10	285
Cemented gravel	20	305
Cobbles & gravel	10	315
Cemented gravel & cobbles	5	320
Cobbles & gravel	30	350
Gravel, sand & clay	5	355
Gravel & sand	5	360
Sand & gravel	40	400
Sandy clay (yellow)	5	405
Blue clay	5	410
Sandy blue clay	5	415
Blue clay	25	440

699-33-86 (RRL-1)
Location: 12/25-19H1
Casing Elevation:
Mud rotary, drilled by Pigley Drilling Company & logged by Little of & for RHO, 1980, geologic investigation borehole

Material (2)	Thickness	Depth
Dune sand	5	5
Gravelly fine to medium sand	10	15
Slightly gravelly fine to medium sand	10	25
Fine sand	40	65
No record	5	70
Fine sand	10	80
Sandy gravel, cobbles to boulders	10	90
No record	10	100
Slightly silty sandy pebble to boulder gravel	20	120
Sandy silty gravel	5	125
Pebbly fine to medium sand	5	130
Slightly sandy to sandy granule to cobble gravel	10	140
Sandy pebble to cobble gravel; to gravelly very fine to medium sand	20	160
Silty very fine to fine sand	10	170
Sandy pebble to cobble gravel	10	180
Slightly sandy pebble to boulder gravel	10	190
Slightly sandy pebble to boulder gravel, possibly cemented w/caliche	4	194
Sandy pebble to boulder gravel	6	200
Slightly sandy pebble to boulder gravel	42	242

699-34-20 (Golder Well #17)
Location: N33522, W20494 12/27-19A1
Casing Elevation: 500.74
Air rotary, drilled by Carman Water Wells & logged by Lubrecht of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
No recovery, probably silt &/or other fines	25	25
Fine to medium gravel	5	30
Sandy fine gravel	40	70
Sandy fine to medium gravel	10	80
Silty sandy medium gravel	10	90
Medium sand	10	100
Medium gravel	5	105
Medium sand	15	120
Gravelly medium sand	25	145
Fine to coarse gravel	35	180
No recovery	5	185
Fine to coarse gravel	5	190
Clayey silty fine to coarse gravel	10	200
Gravelly clayey silt	5	205
Clayey siltstone, trace very fine sand	5	210
Clayey siltstone	15	225
Clayey silty fine to coarse gravel	10	235
Fine to medium gravel	45	280
Fine to medium gravel interbedded w/clayey silt	10	290
Fine to medium gravel	35	325
Clayey gravelly silt	20	345
Fine to medium gravel	55	400

Fine to medium gravel, interbedded w/clayey silt	10	410
Sandy fine gravel, interbedded w/clayey silt	10	420
Fine gravelly very fine to fine sand, interbedded w/clayey silt	5	425
No record	15	440
Fine to medium gravel w/scattered siltstone	5	445
Fine to medium gravel	5	450
Sandy fine to medium gravel	30	480
Fine gravelly sand	20	500
Fine sandy gravel	50	550
No recovery	5	555
Siltstone	10	565
Fine sandy gravel w/siltstone interbeds	30	595
Gravelly fine to medium sand	5	600
Fine sandy gravel	15	615
Basalt	30	645

699-34-19 (Golder well #85)
Location: N23920, W19105 12/27-1402
Casing Elevation: 506.65
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for WEICO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Medium to fine sand	10	10
Medium to fine sand, trace silt	10	20
Fine to medium sand & fine to coarse gravel, trace silt	5	25
Fine to medium sand & fine to medium gravel, trace silt	10	35
Fine to coarse gravel, trace silt	5	40
Medium to coarse gravel, trace fine sand	5	45
Medium to fine sand & medium to coarse gravel, trace silt	5	50
Medium to coarse sand, some medium to coarse gravel	10	60
Fine to coarse gravel, some fine to medium sand, trace silt	5	65
Medium to fine sand, trace silt	5	70
Fine to coarse gravel, some fine sand, trace silt	5	75
Fine sandy fine to coarse gravel, trace silt	5	80
Fine to medium sand & fine to coarse gravel, trace silt	15	95
Fine to coarse gravel	5	100
Fine to medium sand & fine to coarse gravel, trace silt	10	110
Fine to medium sand, some coarse gravel	10	120
Medium to coarse gravelly fine to medium sand	10	130
Fine to medium sand & medium to coarse gravel	5	135
Medium to coarse gravelly fine to medium sand	5	140
Medium to coarse gravel, some fine to medium sand	5	145

699-34-39A
Location: N34094, W38996 12/27-1801
Casing Elevation: 537.07
Cable tool, drilled by Row of & for BE Company, 1953, groundwater monitoring borehole

Material (1)	Thickness	Depth
No record	125	125
Boulders 2 ft. thick; formation is made up of boulders, when I go through one I have to rock up hole until I get a shelf out into the next boulder, am using lots of mud from well 321-3 to fill up crevices	4	129
Sand, gravel	3	132
Sand & gravel	2	134
Boulder	4	138
Gravel & sand; after bailing at 150 ft., hole caved in 9 ft.; think I hit basalt at 149 ft., hole caved before I could test	12	150
Gravel & sand	4	154
Sand, gravel, drilling out old cave	1	155
Fine to coarse sand & gravel	5	160
Gravel & sand	2	162
Gravel & sand	3	165
No record; found some small pieces of wood at 166 ft.; must have hit basalt and it lies on a slant, pipe is bent 8 ft. from bottom of hole	2	167

699-34-39B
Location: N34044, W38951 12/27-1802
Casing Elevation: 535.60
Cable tool, drilled by Rodda of & for BE Company, 1953, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine gray sand, very soft	25	25
Sand	17	42
Gravel & boulders	33	75
Boulders	6	81
Gravel & boulders	33	114
Bed rock	1	115

699-34-41A
Location: N671 12/26-1201
Casing Elevation:
Cable tool, drilled by Rodda of Bach Drilling Company for ARHCO, 1970, abandoned borehole

Material (1)	Thickness	Depth
Sand & silt	25	25
Sand & silt & cobbles	5	30
Sand & silt	31	61
Cobbles, very little sand	9	70
Cobbles, gravel & sand	22	92
Sand & gravel	53	145
Sand & silt	5	150
Boulders	5	155
Sand & gravel	4	159
Boulders	3	162
Gravel or boulders	1	163

699-34-41B
Location: N34200, W41209 12/26-12R2
Casing Elevation: 870.89
Cable tool, drilled by Rodda of Bach Drilling Company for ARHCO, 1970, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & silt	61	61
Sand & gravel	80	141
Sand & silt & boulders at 148 ft.; hit boulders in loose sand at 148.5 ft.	8	149
Boulders	11	160

699-34-42
Location: N33554, W41778 12/26-12R3
Casing Elevation: 840.20
Cable tool

Material (1)	Thickness	Depth
Sand	5	5
Sand & silt	35	40
Sand & gravel	75	115
Sand, silt & gravel	15	130
Sand & gravel; sand comes in; 160 ft. to 175 ft. (or maybe 182 ft.) much more sand than gravel, sand runs from coarse to very fine and silty	45	175
No record, probably sand & gravel	7	182
Fine sand & gravel; white sand came up on the perforator; after perforating hole filled up to 137 ft.; black fine sand	1	183

699-34-51
Location: N33873, W51282 12/26-1401
Casing Elevation: 736.76
Cable tool, drilled by Gentz of & for SE Company, 1956, groundwater monitoring borehole

Material (1)	Thickness	Depth
Dune sand & basalt & white sand, dune sand, basalt & white sand w/lots of silt	25	25
Black & white sand, w/very small amount of coarse gravel	1	26
Black & white sand	1	27
Black & white sand & gravel; fine black & white sand w/quite a few coarse gravels & some silt	3	30
Black & white sand & little gravel	5	35
Black & white sand & clayey silt	14	49
Clayey silt & black & white sand	4	53
Gray & black sand & gravel; at 53 ft. gray & black sand, fine gravel & clayey silt	11	64
Gray & black sand, clayey silt; more clayey silt 70-75 ft.	26	90
Gray sand, black & white sand	6	96
Clayey silt, gray & black sand	4	100
No record, probably clayey silt, gray & black sand	5	105
Clayey silt, gray & black sand	5	110
Clayey silt, gray & white sand; gray & white sand, showing fine gravel & clayey silt	5	115
No record, probably gray & white sand, clayey silt	2	117
Gray & white sand, clayey silt	3	120
Gray sand & tan silt mud	20	140
Black & white sand, tan silt, mud	75	215
Black & white sand, tan silt, mud, 50% basalt & small gravel	5	220
Coarse sand & gravel (fine), silt & 35% basalt	5	225
No record	2	227
Fine gravel & coarse sand, 25% silt	6	233
Gravel, black & white sand & silt, at 234 ft. picked up fine gravel; 50% basalt chips, very little sand, 25% silt	2	235
Gravel, basalt chips, 50% sand & silt; gravel coarser, about size of hen eggs	1	236
Gravel, basalt chips, 50% sand (black & white) very little silt; less gravel, more black & white sand, 50% basalt, very little silt	4	240
Black & white sand, very little gravel, silt	4	244
Black & white sand, silt & caliche	6	250
Fine brown & white sand, lots of silt & caliche	8	258
Fine black & white sand, silt & caliche	2	260
Fine black & white sand, pea size gravel and silt; 260-275 ft. layers of black & white sand, silt & gravel up to egg size; black & white sand, basalt chips, silt & caliche	10	270
Basalt chips, small gravel & silt	3	273
Basalt chips, pea gravel, black & white sand & silt	2	275
Black & white sand	3	278
Fine black & white sand (80%), silt, basalt chips, pea to egg size gravel and some caliche	7	285
Pure clay, core sample	2	287
Heavy clay & basalt chips; 286-289 1/2 ft. pure clay	3	290
99 1/2% fine black & white sand-silt, 1/2% coarse sand	3	293

Fine black & white silt & sand 99 1/2% with 1/2% gravel	2	295
80% fine black & white silt & sand 20% course sand & gravel	3	298
Black & white sand & silt, 4 in. boulder & gravel	2	300
Black & white sand & silt, boulders & gravel	2	302
4 in. of gravel, sand basalt chips & silt	3	305
Gravel, sand, basalt chips & silt binder	5	310
Heavy gravel, silt, sandy binder	5	315
Gravel & sandy silt binder	10	325
Medium gravel, basalt, black & white sand	5	330
Gravel, basalt, black & white sand	2	332
Medium gravel, basalt	1	333
Medium to coarse gravel, gray sand, white & black sand, basalt	2	335
Coarse gravel & sand	3	338
Coarse gravel, basalt, gray sand	1	339
Quartzite, medium basalt, gravel, medium gravel & gray quicksand	1	340
Medium to coarse gravel, basalt gray sand	4	344
Gravel, basalt & clay silt	1	345
Coarse gravel & basalt	2	347
Mostly coarse gravel, some medium & basalt, less clayey silt	3	350
Coarse gravel, basalt, gray sand & clayey silt	3	353
Coarse basalt rocks; coarse rocks, basalt rocks, all colors gravel, basalt gravel	2	355
Fine gray sand, black & white sand; also medium gravel, basalt gravel	2	357
Medium gravel, basalt gravel, gray sand, black & white sand	2	359
Medium basalt gravel & gray water sand; medium gravel all colors	1	360
Coarse basalt gravel, some gray water sand	5	365
Coarse gravel, basalt rocks, gray water sand or quicksand	5	370
Lots of rocks & basalt rocks, medium gravel, basalt gravel, some gray sand	2	372
Gravel & fine sand; water gravel fine to 3 in., fine to coarse sand, some clay & silt	8	380
Fine to coarse gravel, fine to coarse sand, clay & silt; 380-381 ft. core sample showed fine gray sand	5	385

699-34-88
Location: N34404, W88207 12/25-10N1
Casing Elevation: 632.82
Cable tool, drilled by Gentz of & for GE Company, 1956, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sandy loam	12	12
Sand & silt	20	32
Fine sand, silt & clay	11	43
Black & white sand, silt, & very little gravel	12	55
Black & white sand, gravel & silt	5	60
Sand, gravel, & silt	3	63
Sand, clay & some gravel	10	73
Sand & gravel w/some clay	2	75
Sand, gravel, boulders & some clay	15	90
Dark brown clay, basalt boulders & silt	15	105
Clay & boulders	13	118
Sand, silt, & clay	7	125
Sand, silt, clay, gravel & boulders	10	135
Sand, silt, & clay	7	142
Sand, silt, gravel & boulders	10	152
Sand, gravel, boulders & clay	15	167
Sand, gravel & some silt	8	175
Sand, gravel & rocks	10	185
Silt & sandy gravel	9	194
Silt, sandy gravel & some basalt	13	207
Some silt, sand, gravel & rocks	10	217
Sandy gravel, rock & some silt	8	225
Coarse sand, gravel, rock & silt	3	228
Sand, silt & gravel	35	263
Medium & coarse gravel	3	266
Sand, gravel, & silt	42	308
White sand, silt, some gravel	3	311
White sand, silt, gravel	4	315
White sand, some silt, 60% medium gravel	2	317
Black & white sand, coarse gravel & silt	11	328
Sand, gravel, silt & some clay, dark brown	9	337
Sand, silt, gravel, & some clay, light brown	3	340
Sand-gravel & silt	5	346
Sand, gravel, & silt	1	347
50% sand, 30% silt, & 20% gravel	8	355
Sand, gravel & silt, & clay	3	358
Gravel 50%, clay 40%, sand 10%, light brown	4	362
Gravel 40%, sand 40%, clay 20%, dark brown	10	372
Gravel 40%, sand 40%, clay 20%, dark brown	3	375
Coarse gravel 50%, sand 40%, silt 10%	7	382
50% gravel, 30% sand, 10% silt & clay	3	385
80% gravel, 5% sand, 15% silt & clay	16	401
Gravel 50%, sand 20%, silt & clay 20%	4	405

Gravel 25%, sand 50%, silt & clay 25%	6	411
75% sand, 15% silt, 10% gravel	11	422
90% clay, 10% gravel	3	425
100% clay	1	426
Clay, light brown	7	433
Blue clay	43	476
Sand or ash	4	480
Basalt & sand	5	485
Sand, ash, or clay, & small basalt gravel	18	503
Light brown ash or clay	2	505
Light brown ash or clay & small gravel	5	510
Light brown fine sand, ash or clay & small gravel	16	526
Brown ash	1	527
95% gray sand & 5% silt	10	537
Sand, gravel, & silt	2	539
60% sand, 30% gravel, & 10% silt	4	543
40% sand, 40% gravel & 20% silt	4	547
60% gravel, 20% silt, 20% sand	4	551
50% clay, some ash, & 50% sand	14	565
Gravel, sand & silt	1	566
50% sand, 50% silt	9	575
60% sand, 40% silt; sample in jar settled out as 50% sand, 50% silt, w/a thin layer of clay	5	580
60% sand, 40% silt	4	584
50% gravel, 30% sand, 20% silt	5	589
45% sand, 50% silt, 5% gravel	1	590
50% sand, 50% silt	13	603
50% fine sand, 50% brown silt	9	612
50% coarse sand, 50% silt	2	614
45% fine sand, 50% chocolate brown silt or ash, 5% gravel	20	634
50% fine sand, 50% silt	1	635
50% sand, 50% silt	2	637
75% sand, 15% silt, 10% gravel	5	642
50% sand, 30% gravel, 20% silt	7	649
Basalt	39	688

699-35-3 (Golder Well #53)
Location: N35004, W3062 12/29-1701
Casing Elevation: 486.26
Air rotary (to 125 ft.) & mud rotary, drilled by Carman Water Wells & logged by Lubrecht & Burrell of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium to fine sand, trace silt	20	20
Coarse to fine sand & gravel	5	25
Coarse gravel	5	30
Coarse to fine gravel, some sand, trace silt	5	35
Gravelly coarse to fine sand, trace silt	5	40
Coarse to fine sand, trace gravel	5	45
Coarse to medium sand, trace gravel	5	50
Coarse to fine sand & gravel	5	55
Coarse to fine gravel, some sand, trace silt	5	60
Gravelly medium to fine sand & silt, some clay	10	70
Coarse to fine gravel, trace sand	5	75
Coarse to fine gravel, trace sand & silt	5	80
Coarse to fine sand & gravel	5	85
Coarse to fine sand & gravel, trace silt	10	95
Sandy coarse to fine gravel, trace silt	5	100
Medium to fine sand, some gravel	5	105
Fine gravel, some sand, trace silt	10	115
Coarse to fine sand & gravel, trace silt	5	120
Sandy coarse to fine gravel	10	130
Fine to coarse gravel, trace sand	20	150
Fine to coarse gravel, trace sand & silt	10	160
Fine sand & silt, some gravel, trace clay	10	170
Fine to coarse gravel, some sand, trace silt	5	175
Fine to coarse gravel, trace sand	45	220
Fine to coarse gravel, some sand, trace silt	10	230
Gravelly fine sand & silt	20	250
Fine sand & fine to coarse gravel, some silt	5	255
Gravelly fine sand & silt	15	285
Fine sand & fine to coarse gravel, some silt	5	290
Fine to coarse gravel, trace sand & silt	10	300
Fine to coarse gravel, trace sand	40	340
Fine to coarse sand, gravel, trace silt	10	350
Fine to coarse gravel, trace sand, silt & clay	5	355
Fine to coarse gravel, some silt, trace sand & clay	5	360
Gravelly fine sand & silt, trace clay	5	365
Fine to coarse gravel, some sand, trace silt	5	370
Gravelly fine sand & silt, trace clay	5	375
Fine sand & silt, some gravel, trace clay	35	410
Fine sand & silt, some clay	5	415
Fine sand & silt, some clay, trace gravel; & siltstone	45	460
Basalt	20	480

699-35-9
Location: N34700, W9175 12/29-7N1
Casing Elevation 499.83
Cable tool drilled by Stanbery & Robinson of USGS for GE Company, 1950, groundwater monitoring & geologic investigation borehole

Material (4)	Thickness	Depth
Sand, fine to medium	4	4
Sand & gravel	41	45
Medium sand	4	49
Sand & gravel	15	64
Sand	13	77
Sand w/clay & silt	11	88
Sand & gravel	28	116
Sandy, light tan silt	1	117
Sand & gravel	16	133

Silt & clay	4	137
Sand w/gravel	11	148
Sand, medium grained	17	165
Silt & gray clay	11	176

699-35-16 (Golder Well #29)
Location: N34831, W15715 12/27-12R1
Casing Elevation: 457.83
Air rotary (to 103 ft.) & mud rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for NESCO, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand w/trace silt	15	15
Fine to coarse gravel w/trace sand	5	20
Fine to coarse sand w/trace gravel	10	30
Fine to coarse gravel w/trace sand	10	40
Fine to coarse sand, some gravel, trace silt	15	55
Fine to coarse gravel, some sand, trace silt	5	60
Fine to coarse sand & gravel, some silt, trace clay	5	65
Fine to coarse sand, some gravel, trace silt	5	70
Fine to coarse [illegible] gravel, trace silt & clay	10	80
Medium sand, trace gravel & silt	10	90
Fine to coarse gravel, trace sand	5	95
Fine to coarse sand & fine to medium gravel, trace silt	5	100
Fine to coarse sand & gravel, trace silt	3	103
Fine to coarse gravel, trace sand	22	125
Fine to coarse gravel, trace sand; & fine to medium sand & silt; trace clay	15	140
Fine to coarse sand & silt, trace clay & gravel	15	155
Fine to coarse sand & silt, trace clay	5	160
Fine to coarse sand & silt, trace clay & gravel	5	165
Fine to coarse sand & silt, trace clay	5	170
Fine to medium gravel, trace sand	10	180
Fine to coarse gravel, trace sand	60	240
Fine to coarse gravel, some sand, trace silt	20	260
Fine to coarse sand & fine to medium gravel trace silt	15	275
Fine to coarse sand & silt, trace gravel	5	280
Sandy fine to medium gravel, trace silt	5	285
Fine to medium gravel, some sand, trace silt	5	290
Fine to coarse sand & fine to medium gravel, trace silt	50	340
Fine to coarse sand & fine to medium gravel trace silt & clay	5	345
Fine to coarse sand & silt, some gravel, trace clay	10	355
Gravelly fine to coarse sand & silt, trace clay	5	360
Fine to coarse sand & fine to medium gravel, trace silt & clay	5	365
Fine to coarse sand, some gravel, trace clay	5	370
Fine to coarse sand, some silt, trace gravel & clay	5	375
Fine to coarse sand, some gravel & silt	5	380
Fine to coarse sand, some gravel, trace silt	40	420
Fine to coarse sand & gravel, trace silt	15	435
Fine to coarse gravel, trace sand	30	465
Fine to coarse gravel, some sand, trace silt	15	470
Fine to coarse sand & gravel, some silt, trace clay	5	475
Fine to coarse sand, some gravel & silt, trace clay	5	480
Fine to coarse sand & gravel, some silt, trace clay	15	495
Fine to coarse sand & gravel, some silt	5	500
Fine to coarse gravel, some sand, trace silt	20	520
Coarse sand, some gravel	5	525
Gravelly coarse sand	5	530
Gravelly coarse sand, trace silt	5	535
Fine to coarse gravel, some sand	10	545
Basalt	20	565

699-35-19A (Golder Well #8)
Location: 12/27-1401
Casing Elevation: 473.92
Air rotary (to 124 ft.) & mud rotary, drilled by Bynum of Carmen Water Wells & Boyles Brothers Drilling Company & logged by Pingley, Larkin & Wilkening of Golder Associates for NESCO, 1979, geologic investigation borehole

Material (11)	Thickness	Depth
No record	10	10
Gravel & cobbles	10	20
Sandy gravel	5	25
No recovery	5	30
Sandy gravel	50	80
Slightly clayey sandy gravel	10	90
Sandy gravel	5	95
Clayey gravel	5	100
Clayey sandy gravel	15	115
Slightly sandy & clayey gravel	5	120
Sandy clayey gravel	4	124
Slightly clayey, slightly sandy gravel	6	130
Slightly clayey, sandy gravel	5	135
Clayey sandy gravel	15	150
Slightly sandy gravelly clay	4	154
Clayey silt w/some gravel	6	160
Silty clay	15	175
Slightly gravelly silty clay	5	180
Gravelly silty clay	15	205
Silty clayey gravel	5	210
Medium to coarse gravel	3	240
Silty clayey gravel	10	250
Gravel, some sand	10	260
Gravel, some sand	5	260
Sand & gravel	5	265
Silty some gravel	5	270
Coarse to fine sand	10	285
No recovery	15	305

Coarse sandy gravel	55	160
Clayey silt	10	170
Clayey silt w/some sand	15	185
Sandy medium gravel w/some sand	15	405
Silty medium gravel w/some clay	5	410
Gravelly silt w/some clay	5	415
Silty gravel	5	420
Coarse sandy silt	5	425
Silty coarse sandy gravel	15	440
Clayey silt	93	533
Basalt	23	556

699-35-21 (Golder Well #S-6)
Location: 12/27-24M3
Casing Elevation: 511.7
Air rotary, (to 250 ft.) & mud rotary, drilled by Carmen Water Wells & logged by Ingram of Golder Associates for NESCO, 1981, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to coarse sand & fine to medium gravel	5	5
Sandy fine to medium gravel	5	10
Fine to coarse sand & fine to medium gravel	5	20
Medium to coarse sand & fine to medium gravel	5	25
Fine to coarse sand & fine gravel	10	35
Fine to coarse sand & fine to medium gravel	5	40
Fine to medium sand	5	45
Fine sand, trace silt	5	50
Fine to medium sand & fine gravel	5	55
Fine to medium gravel, some sand	10	65
Sandy fine gravel	5	70
Fine to medium gravel, some sand	20	90
Sandy fine to medium gravel	5	95
Fine to medium sand & fine gravel	5	100
Medium to coarse sand & fine gravel	5	105
Fine to coarse sand, some fine gravel	10	115
Gravelly fine to coarse sand	5	120
Gravelly medium to coarse sand	5	125
Fine to medium gravel	5	130
Medium to coarse sand & fine gravel	10	140
Fine to medium gravel, some sand	10	150
Fine to coarse sand & fine gravel	10	160
Sandy fine to coarse gravel	5	165
Fine to coarse gravel, some sand	5	170
Fine to medium gravel, some sand	5	175
Fine to coarse gravel, some sand	10	185
Sandy fine to coarse gravel	20	205
Medium to coarse sand & fine to medium gravel	5	210
Sandy fine to medium gravel	10	220
Sandy fine to coarse gravel	10	230
Fine to medium sand & fine to medium gravel	5	235
Fine to medium sand, trace gravel	20	255
Fine to medium sand, some gravel	5	260
Silty fine to medium sand	5	265
Sandy silt	20	285
Sandy fine to medium gravel, trace silt	15	300
Silt, some medium to coarse sand, trace fine gravel	5	305
Silt & fine to coarse sand, trace fine gravel	10	315
Silt, trace sand	10	325
Silt	20	345
Silt, trace sand	30	375
Silt	10	385
Gravelly silt	5	390
Medium to coarse sand & fine gravel	20	410
Medium to coarse sand & fine gravel, trace silt	5	415
Silt & fine gravel	10	425
Silt & some medium to coarse sand	15	440
Silty fine to coarse sand	5	445
Silt, some fine to medium sand	5	450
Silt, trace fine sand	20	470
Silt, trace clay	20	490
Silt, some sand, trace clay	5	495
Silt, trace clay	5	500
Medium to coarse sand, some silt	5	505
Sandy fine to medium gravel	65	570
Basalt	245	815

699-35-27 (DB-4)
Location: N34673, W27437 12/27-10E1
Casing Elevation: 531.07
Cable tool (to 633 ft.) & diamond coring, drilled by Bignam of Hatch Drilling Company & Boyles Brothers Drilling Company for ARHCO, 1973, geologic & hydrologic test boring

Material (1, 2)	Thickness	Depth
No record	10	10
Black sand	34	44
Ringold	11	55
Clean gravel & cobbles; very clean	5	60
Loose gravel & cobbles	20	80
Ringold	15	95
Sandy silt	30	125
Ringold (clay)	105	230
Brown sandy silt	11	241
Blue clay; hard	9	250
Ringold	50	300
Blue clay & gravel	11	311
Black sand	4	315
Blue clay, sand, & gravel	5	320
Sand, clay, gravel	5	325
Black sand, some blue clay	10	335
Black sand, some blue clay & little gravel	10	345
No record	20	365
Blue clay, small gravel	5	370
Blue clay, sand, & small gravel	15	385
Hard, sticky, blue clay	20	405
Hard, sticky, blue clay, some small gravel	20	425

Gray-blue clay, hard & sticky	20	445
Gray-blue clay, sticky-hard	35	480
Brown & gray clay	10	490
Gray clay, hard & sticky	15	505
Brown clay, some black sand	15	520
Blue clay & gravel	10	530
Blue clay, gravel & cobbles	40	570
Blue clay, some gravel	10	580
Blue clay, gravel & cobbles	20	600
Gravel, cobbles, & blue clay	2	602
Boulder	2	604
Gravel, cobbles, & blue clay	1	605
Blue clay, sand, gravel, & cobbles	10	615
Blue clay, broken basalt; hit broken basalt at 618 ft. I think, cutting show basalt pieces	10	625
Broken basalt	8	633
Basalt	123	756
Interbed; tuffaceous sandstone & clay	52	808
Basalt	184	992
Interbed; tuff	24	1,016
Basalt	115	1,131
Interbed; tuff, tuffaceous sandstone, clay & cobble conglomerate	93	1,224
Basalt	141	1,365
Interbed; tuff & sand	38	1,403

699-35-29 (Golder Well #74)
Location: N34519, W28252
Casing Elevation: 534.36
Air rotary (to 140 ft.) & mud rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine sand & silt	5	5
Medium to fine sand & medium to coarse gravel, trace silt	10	15
Medium to fine sand, trace gravel	10	25
Medium to fine sand	15	40
Medium to fine sand, trace gravel	5	45
Medium sand & medium to coarse gravel, trace silt	5	50
Medium to fine sand & medium to coarse gravel, trace silt	25	75
Medium to fine sand, trace gravel & silt	5	80
Medium to fine sand & coarse to fine gravel, trace silt	5	115
Medium to coarse gravel, some sand, trace silt	5	120
Medium to fine sand, trace gravel & silt	10	130
Medium to fine sand & gravel, trace silt	5	135
Medium to fine sand & coarse to fine gravel	5	140
Medium to coarse gravel, trace silt & clay	5	145
Coarse to fine gravel	70	215
Coarse to fine gravel, trace silt & clay	10	225
Medium to fine sand, trace gravel, silt & clay	10	235
Medium to fine sand, trace silt & clay	5	240
Medium to fine sand, some silt, trace clay	5	245
Medium to fine sand, some silt, trace gravel & clay	5	250
Medium to fine sand, trace gravel	5	255
Medium to fine gravel, trace silt & clay	75	330
Medium to fine sand & gravel, trace silt & clay	25	355
Medium to fine sand & fine gravel, trace silt & clay	25	380
Medium to fine sand & coarse to fine gravel trace silt & clay	20	400
Fine sand & gravel, some silt, trace clay	30	430
Fine sand & medium to fine gravel, some silt, trace clay	5	435
Medium to fine sand, trace silt & clay	20	455
Medium to fine sand, trace silt & clay; & siltstone	25	480
Fine sand, trace silt & clay; & siltstone	45	525
Medium to fine sand & fine gravel	60	585
Medium to fine sand & gravel	10	595
Medium to fine sand, trace silt & clay	5	600
Medium to fine sand & gravel, trace silt & clay	5	605
Basalt	50	655

699-35-66
Location: N34860, W28758 12/26-8P1
Casing Elevation: 725.65
Cable tool, drilled by Hatch of Hatch Drilling Company for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	10	10
Sand-gravel	10	20
Gravel-loose	10	30
Gravel-sand	5	35
Sand-silt	220	255
Sand-mixed rock or gravel	5	260
Sand-gravel	30	290
Sand-gravel-clay	5	295
Sand-gravel	5	300
Cemented gravel	30	330
Cemented gravel & sand	5	335
Sand-silt-gravel	63	398
Yellow sandy clay	12	410
Blue sandy clay	15	425
Black sandy clay w/mica	5	430
Black sandy clay, coarse sand	10	440
Black sand & silt	5	445
Black sand & silt-yellow clay	5	450
Yellow clay w/gravel particles	2	452

699-35-70
Location: N34523, W69988 12/25-701
Casing Elevation: 693.72
Cable tool, drilled by Row of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil	5	5
Black & white sand-loam	15	20
Lots of black sand, medium gravel, loam mud	5	25
Lots of black sand, small gravel, loam mud	8	33
Black & white sand & loam mud	21	54
Black & white sand, small amount of gravel & loam mud	6	60
Gray sand & tan silt mud	17	77
Fine to medium gray sand, tan silt mud	88	165
Fine sand & some clay	5	170
Fine sand & more clay	2	172
Fine sand & lots of clay	3	175
Fine sand & less clay	4	179
Fine gray sand & heavy clay mud	24	203
Gray sand & clayey silt	15	218
Medium to coarse basalt gravel w/a small amount of gray sand & clayey silt & some colored gravel	5	223
Gray sand, clayey silt & some medium basalt gravel	2	225
Clayey silt, gray sand & some basalt	5	230
Clay & some basalt gravel	5	235
Clay & basalt	5	240
Clayey silt, gravel & gray sand	8	248
Gray sand, medium gravel, some basalt & very little clayey silt	19	267
More medium gravel, w/some basalt, clayey silt & gray sand	1	268
More clayey silt, gray sand, medium gravel	4	269
Clayey silt, medium to coarse gravel, gray sand	1	270
Medium gravel, some basalt gravel, clayey silt & gray sand	2	272
Medium to coarse gravel w/basalt, gray sand & clayey silt	3	275
Medium gravel, gray sand & caving in clayey silt	2	277
Medium gravel & gray sand	5	282
Medium gravel, some coarse gravel & gray sand	2	284
Medium gravel, basalt & gray sand	1	285
Medium gravel, gray sand & clayey silt	2	287
Gray sand, basalt & gravel	1	288
Medium basalt gravel, gray sand	3	291
Gray sand & gravel	2	293
Gray sand & medium gravel, some basalt	2	295
Clayey silt, little medium gravel	3	298
Clayey silt & less gravel	3	301
Clayey silt & medium gravel	1	302
Clayey silt, gray sand & some medium gravel & basalt	2	304
Clayey silt, less gravel & less basalt, some fine gray sand	1	305
Clayey silt, basalt gravel, medium gravel-all colors & fine gray sand	5	310
Clayey silt, gray sand, medium gravel	3	313
Clayey silt, fine gray sand & some medium gravel & little basalt	2	315
More medium gravel clayey silt, fine gray sand & some basalt	3	318
Medium gravel, clayey silt & fine gray sand	2	320
Gray sand & medium gravel	1	321
Medium gray sand & medium gravel	1	322
Clayey silt, medium gravel & some gray sand	3	325

699-35-78
Location: N35478, W78190 12/25-1201
Casing Elevation: 660.55
Cable tool, drilled by Row of USGS for GE Company, 1950, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil & sand, some gravel	5	5
Sand & gravel	15	20
Coarse sand, fine sand, silt, gravel	15	35
Gravel, silt, sand	5	40
Gravel, sand, less silt	4	44
Gravel & sand	13	57
Gravel, silt & sand	3	60
Sand & silt	10	70
Fine sand & silt	45	115
Clay & sand	5	120
Clay, very fine sand, few small basalt chips	5	125
3 ft. clay & sand; 2 ft. sandy silt	5	130
Sand & silt	5	135
Clay & very fine sand	5	140
Clay & volcanic shot sand	5	145
Gravel, silt & sand	5	150
Gravel, 3 ft. clay & gravel 2 in.	5	155
Gravel, sand, lots of silt	5	160
Gravel & sand	5	165
Gravel & sand, trace of silt	6	171
Gravel & sand	4	175
Gravel & sand, tan silt	9	184
Gravel, sand & gray-tan silt	6	200
Gravel, sand & tan silt	20	220
Gravel up to 4 in., sand & silt	5	225
Gravel up to 10 in., sand & silt	5	230
Gravel, sand & silt	25	255
Gravel, sand, silt	10	265
Gravel, sand, silt	7	272
Gravel, sand, less silt	7	279

699-36-60 (Golder Well #100)
Location: N35506, E02989 12/28-791
Casing Elevation: 465.68
Air rotary, drilled by Carman Water Wells & logged by MacLeod of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine sand	15	15
Fine to coarse gravel, some medium to coarse sand	5	20
Fine to coarse gravel, some fine to coarse sand	5	25
Fine to coarse gravel, some coarse sand	15	40
Coarse sand & fine to coarse gravel	5	45
Coarse sand & fine to medium gravel	40	85
Medium to coarse gravel, some medium sand	5	90
Fine to coarse gravel, some medium to coarse sand	30	120
Fine to medium sand & fine coarse gravel, trace silt	5	125
Fine to coarse sand, some silt	5	130
Silt, some fine to medium sand	5	135
Silt, trace fine sand	5	140
Silt, some fine sand	10	150
Silt, some fine sand, trace medium gravel	10	160
Silt, some fine sand	5	165
Fine sand, some silt, trace clay	10	175
Fine sand, trace silt	10	185
Fine sand & medium gravel, trace silt	50	235
Fine sand, some medium gravel, trace silt	5	240
Fine sand	5	245
Fine sand, trace silt	5	250
Fine sand, some silt	10	260
Silt, some fine sand	5	265
Silt	60	325
Basalt	50	375

699-36-1 (Golder Well #54)
Location: N36376, W1343 12/28-8K1
Casing Elevation: 485.34
Air rotary (to 146 ft.) & mud rotary, drilled by Carman Water Wells & logged by Lubrecht of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine sand, some silt, trace gravel	5	5
Medium to coarse sand & fine to coarse gravel	5	10
Medium to coarse sand & medium to fine gravel, trace silt	5	15
Fine to coarse sand & gravel, trace silt	5	20
Medium to coarse sand & fine to medium gravel, trace silt	10	30
Fine to coarse sand & gravel, some silt	5	35
Coarse sand & fine to medium gravel, trace silt	20	55
Fine to coarse sand & fine to medium gravel, some silt	5	60
Coarse sand & fine to medium gravel, trace silt	5	65
Gravelly medium to coarse sand, trace silt	5	70
Sandy fine to medium gravel, some silt	15	85
Fine sand & silt, trace gravel	5	90
Fine to coarse sand & fine to medium gravel, trace silt	10	100
Sandy fine to coarse gravel, trace silt	10	110
Fine to coarse sand & gravel, trace silt	5	115
Medium to coarse sand & fine to coarse gravel	5	120
Coarse to fine gravel, some sand, trace silt	5	125
Coarse to fine sand, some gravel, trace silt	5	130
Coarse to fine sand & gravel	20	150
Coarse to fine gravel, trace sand	20	170
Clayey silt	5	175
Coarse to fine gravel, trace sand	5	180
Coarse to fine gravel	15	195
Coarse to fine gravel, trace silt & clay	15	210
Coarse to fine gravel, some sand & silt, trace clay	10	220
Gravelly fine sand & silt, some clay	15	235
Coarse to fine gravel, some sand & silt, trace clay	10	245
Sandy silty coarse to fine gravel; & silt & clay	10	255
Sandy silty coarse to fine gravel; & fine sand	15	270
Sandy silty coarse to fine gravel	5	275
Basalt	25	300

699-36-2 (Golder Well #111)
Location N35893, W2204 12/28-8L1
Casing Elevation: 480.33
Air rotary, drilled by Carman Water Wells & logged by Nebbit & of Golder Associates for WESCO, 1980, geologic investigation borehole

Material	Thickness	Depth
Fine to medium sand, trace fine gravel	5	5
Fine to coarse gravel, some fine to coarse sand	5	10
Fine to coarse sand & fine to coarse gravel	5	15
Fine to coarse sandy, fine to coarse gravel	5	20
Fine to coarse gravel, some fine to coarse sand	5	25
Fine to coarse sand & fine to coarse gravel	5	30
Fine to coarse gravelly, fine to coarse sand	5	35
Fine to coarse sand & fine to coarse gravel	5	40
Fine to coarse sand, trace fine to coarse gravel	5	45
Fine to coarse sand, some fine to coarse gravel	10	55
Fine to coarse sand, some fine to coarse gravel	5	60

Fine, sandy silt, trace clay	15	75
Fine, sandy silt, trace clay, some gravel	5	80
Fine, sandy silt, trace clay	5	85
Fine to medium gravel, some fine to coarse sand	5	90
Fine to coarse sandy, fine to coarse gravel	10	100
Fine to medium gravel, some fine to coarse sand	5	105
Fine to coarse sand & fine to coarse gravel	5	110
Fine to coarse sand & gravel	10	120
Fine to coarse gravel, some fine to coarse sand	5	125
Fine to coarse gravel, trace fine to coarse sand	10	135
Fine to coarse gravel, some fine to coarse sand	5	140
Fine to coarse gravel, trace fine to coarse sand	5	145
Fine to coarse gravel, some fine to medium sand	5	150
Fine to medium sandy, fine to coarse gravel	10	160
Fine to	5	
Fine to coarse gravel, some fine to coarse sand	10	175
Fine to coarse sand & fine to coarse gravel	5	180
Fine to coarse gravel, trace fine to medium sand	5	185
Fine to coarse gravel, some fine to coarse sand	10	195
Fine to coarse gravel, trace fine to coarse sand	5	200
Fine to medium gravelly, fine to medium sand	15	215
Fine sand & silt, trace clay	35	250
Fine sand & silt, trace of clay & siltstone cuttings	14	264
Fine sand & silt, trace clay	6	270
Fine sand & silt, trace clay & weathered basalt ?	28	298
Basalt	10	308

699-36-10 (Golder Well #115)
Location: N36394, W10251
Casing Elevation: 526.39
Air rotary, drilled by Carmen Water Wells & logged by MacLeod & MacRae of Golder Associates for NESCO, 1981, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand	15	15
Fine to coarse gravel, some medium to coarse sand	5	20
Fine to coarse sand & fine to coarse gravel	15	35
Medium to coarse sand, some fine to coarse gravel	5	40
Fine to coarse sand & fine to coarse gravel	10	50
Fine to coarse sandy fine to coarse gravel	15	65
Medium to coarse sand & fine to medium gravel	35	100
Fine to medium sand, trace fine gravel	10	110
Fine to coarse sand	10	120
Fine to coarse sand, some fine to medium gravel	5	125
Medium to coarse sand & fine to medium gravel	5	130
Medium to coarse sandy fine to medium gravel	5	135
Medium to coarse sand & fine to coarse gravel	5	140
Fine to medium gravelly fine to coarse sand	10	150
Medium to coarse sandy fine to medium gravel	10	160
Coarse sandy fine to medium gravel	5	165
Medium to coarse sandy fine to medium gravel	10	175
Fine to coarse sand & fine to medium gravel	5	180
Fine to coarse sand, some fine to medium gravel	5	185
Fine to medium gravelly medium to coarse sand	5	190
Fine to coarse sand & fine to medium gravel	5	195
Medium to coarse sand, trace fine gravel	5	200
Fine to coarse sand, some fine gravel	5	205
Fine to medium sandy silt, trace clay	10	215
Silt, some fine to medium sand, trace clay	5	220
Medium to coarse sand & fine to coarse gravel	15	235
Medium to coarse sand, some fine to medium gravel	5	240
Fine to medium gravel, some medium to coarse sand	5	245
Fine to medium gravel, some coarse sand	5	250
Fine to medium gravel, some coarse sand	5	255
Medium to coarse sandy fine gravel	10	265
Medium to coarse sandy fine to coarse gravel	5	270
Fine gravelly fine to coarse sand	5	275
Silty fine to medium sand, trace clay	5	280
Clayey silt, trace fine to medium sand	5	285
Clayey silt, trace fine sand	5	290
Fine sand, trace silt	5	295
Fine to medium sand, trace silt	10	305
Fine to medium sand	10	315
Fine to Medium gravelly fine to medium sand	5	320
Fine to medium sand, some fine to coarse gravel	5	325
Fine to medium sand	10	335
Fine to coarse sand, some fine gravel	5	340
Fine to coarse sand, some fine to medium gravel	5	345
Fine to coarse sand, some medium to coarse gravel	10	355
Fine to coarse sand, some fine to coarse gravel	10	365
Fine to coarse sand	5	370
Fine to coarse gravelly fine to coarse sand	5	375
Fine to coarse sand, trace fine gravel	5	380

Fine to coarse gravelly fine to coarse sand	5	385
Silty fine to medium sand	5	390
Silty fine to coarse sand	5	395
Silt, trace fine to coarse sand & clay	5	400
Fine to medium sand, some silt	5	405
Fine to coarse sand, trace fine gravel	5	410
Fine to coarse sand, trace silt	5	415
Fine to medium sand	5	420
Fine to medium sand, some fine to medium gravel	5	425
Fine to coarse gravelly fine to coarse sand	5	430
Fine to coarse sand, some fine to coarse gravel	10	440
Fine to coarse gravel & fine to coarse sand	5	445
Fine to coarse sandy fine to coarse gravel	5	450
Fine to coarse gravel	15	465
Fine gravel	5	470
Fine to coarse gravelly silt	10	480
Silt, some fine to coarse gravel	10	490
Silt, some fine sand & fine gravel, trace clay	10	500
Silt, some fine sand, trace clay	25	525
Fine to medium sandy silt, trace clay	5	530
Fine sandy silt, trace clay	10	540
Silty fine sand	10	550
Basalt	53	603

699-36-17 (Golder well #6)
Location: N36408, W17029 12/27-11K2
Casing Elevation: 440.44
Air rotary (to 197 ft.) & mud rotary, drilled by Carman of Carman Water Wells & logged by Lubrecht of Golder Associates for WESCO, 1979, geologic investigation borehole

Material	Thickness	Depth
Very fine sand	5	5
Fine to medium gravel, some sand	50	55
Fine to medium sand	10	65
Gravelly sand	5	70
Sandy gravel	25	95
Very fine to fine sand	5	100
Sandy gravel	15	115
Silty gravelly clay	5	120
Silty clay	5	125
No recovery	5	130
Silty clay	5	135
Sandy clayey silt	5	140
Silty sand	5	145
Sandy, fine gravel	40	185
Coarse sandy gravel	5	190
Coarse sand	5	195
Coarse sand w/some gravel	5	200
Coarse sand w/silt & gravel	5	205
Coarse to fine gravel	50	255
Slightly sandy gravel	55	310
Sand w/some clay	5	315
Silty clay & sand	55	370
Clayey gravel	5	375
Slightly clayey gravel	2	377
Gravel	18	395
Sand w/some gravel	5	400
Sand & clay w/gravel	15	415
Clay w/some gravel	10	425
Sand w/clay & some gravel	25	450
Silty clay w/some gravel	30	480
Basalt	28	508

699-36-21 (Golder well #84)
Location: N35780; W20625 12/27-10R1
Casing Elevation: 486.74
Air rotary, drilled by Carmen Water Wells & logged by Burrell of Golder Associates for WESCO, 1981, geologic investigation borehole

Material(11)	Thickness	Depth
Fine sand & silt, trace medium gravel	5	5
Fine to coarse gravel, some fine to coarse sand	5	10
Fine to coarse gravel	5	15
Fine to coarse gravel, trace coarse sand	5	20
Fine to coarse gravel; trace coarse sand & silt	5	25
Fine to coarse gravel, trace coarse sand	15	40
Fine to coarse sand & fine to medium gravel, trace silt	15	55
Fine to medium gravelly, fine to coarse sand, trace silt	5	60
Fine to coarse sandy, fine to medium gravel, trace silt	5	65
Fine to gravelly, fine to coarse sand	5	70
Fine to coarse sand, some fine to medium gravel	5	75
Fine to medium gravelly fine to coarse sand	5	80
Fine to coarse gravel; trace fine to coarse sand & silt	5	85
Medium sand, trace coarse gravel	5	90
Medium sand, some medium to coarse gravel	10	100
Fine to coarse gravel; trace coarse sand & silt	10	110
Fine to coarse sand & fine to medium gravel, trace silt	10	120

699-36-27 (Golder well #70)
Location: N35913, W26581 12/27-9Q1
Casing Elevation: 532.30
Air rotary (to 190 ft.) & mud rotary, drilled by Carman Water Wells & logged by Wilkening & Burrell of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium to fine sand & coarse gravel, trace silt	5	5
Fine to coarse gravel some sand, trace silt	25	30
Fine to medium sand, trace gravel	10	40
Sandy fine to coarse gravel	10	50
Fine to coarse gravel, some sand	5	55
Fine to coarse gravel, some sand, trace silt	5	60
Fine to coarse gravel, trace sand	30	90
Fine to coarse sand & gravel, trace silt	5	95

Fine to coarse sand, trace gravel	5	100
Fine to medium sand, trace gravel & silt	10	110
Fine to coarse gravel, some sand	20	130
Fine to coarse sand & gravel	5	135
Fine to medium sand, trace gravel	5	140
Fine to coarse sand & gravel	5	145
Fine to coarse sand & gravel, trace silt	15	160
Fine to coarse gravel, some sand	10	170
Fine to coarse gravel, some sand, trace silt	10	180
Fine to medium gravel	30	210
Gravelly fine sand, some silt, trace clay	5	215
Fine sand, some silt & gravel, trace clay	5	220
Fine sand, some silt & gravel	15	235
Fine sand, some silt, trace gravel	5	240
Fine to coarse gravel, some sand & silt	5	245
Fine to coarse gravel, trace sand & silt	50	295
Sandy silty fine to coarse gravel	5	300
Fine to medium gravel, trace silt & sand	15	315
Fine to medium gravel, some silt, trace silt	10	325
Sandy silty fine to medium gravel	5	330
Fine sand, some silt, trace gravel	15	345
Gravelly fine sand, some silt	10	355
Fine to medium gravel, trace sand & silt	10	365
Silty fine sand, trace gravel	5	370
Fine to medium gravel, some sand & silt	5	375
Fine to medium gravel, some sand & trace silt	5	380
Sandy silty fine to medium gravel	5	385
Fine to medium sand, some silt	15	400
Fine sand, some silt, trace clay	15	415
Gravelly fine sand, some silt, trace clay	10	425
Fine to medium sand, some silt, trace clay & gravel	5	430
Fine sand, some silt, trace clay	35	465
Fine sand, some silt, trace clay & gravel	5	470
Fine sand, some silt, trace clay	5	475
Fine sand, some silt, trace clay & gravel	5	480
Silty fine to medium sand, trace clay	5	485
Fine to coarse sand & silt	5	490
Fine to coarse sand, trace clay	5	495
Silty fine to coarse sand, trace clay	10	505
Siltstone	10	515
Fine to medium sand & silt, some clay	5	520
Fine to coarse sand, trace silt	5	525
Fine to coarse sand, trace gravel	15	540
Fine to medium gravel, trace sand & silt	5	545
Fine to medium gravel, some sand, trace silt & siltstone	5	550
Fine sand, some silt, trace clay & gravel	20	570
Fine to medium gravel, trace sand & silt	20	590
Fine to medium gravel, trace sand	5	595
Basalt	50	645

699-36-46P
Location: N36195, W45612 12/26-12W1
Casing Elevation: 705.45
Mud rotary, drilled by Ward & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravels	75	75
Sand, gravels & some clay	45	120
Sand, gravel & clay	171	291
Cobbles, boulders & gravel	97	388
Cobbles boulders, gravel, clay	2	390
Clay sand & gravel	72	462
Basalt & clay	3	465
Basalt boulders w/clay	15	480
Gravel & cobbles w/clay	15	495
Gravel & cobbles w/little clay	11	506
Gravel cobbles w/clay	19	525
Cobbles & gravel	2	527
Clay-gravel	22	549
Basalt	14	563

699-36-46Q
Location: N36234, W45607 12/27-12W2
Casing Elevation: 704.66
Mud rotary, drilled by Ward & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel	90	90
Sand & gravel w/clay	180	270
Sand-gravel-clay-some cobbles	15	285
Cobbles & boulders	30	315
Gravel cobbles & boulders	2	317
Cobbles & boulders	40	357
Clay & gravel & sand	18	375
Clay & gravel	10	385
Clay sand & gravel	45	430
Boulders & gravel	1	431
Boulders w/clay	21	452

699-36-46R
Location: N36273, W45603 12/28-12W3
Casing Elevation: 705.13
Mud rotary, drilled by Ward, Loudan & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel	75	75
Sand, gravel & clay	205	280
Sand, gravel, w/clay & few cobbles	5	285
Boulders, cobbles	15	300
2 ft. boulders & cobbles	5	305
Boulders & cobbles	53	358
Sand, gravel w/clay	24	382

699-36-46S
Location: N46010, W48559 12/26-12M4
Casing Elevation: 704.33
Mud rotary, drilled by Ward, Loucani & Varner of Pitcher Drilling Company for BNWL, 1966, groundwater monitoring borenole

Material (1)	Thickness	Depth
Sand & gravel	15	15
Sand & gravel w/few cobbles	15	30
Sand & gravel	45	75
Sand & gravel w/clay	225	300
Cobbles & boulders	5	305
No record	7	312

699-36-61A
Location: N36365, W60704 12/26-9L1
Casing Elevation: 748.11
Cable tool, drilled by Row of USGS for BE Company, 1948, groundwater monitoring borenole

Material (1)	Thickness	Depth
Blow sand	5	5
Sand & basalt gravel	18	23
Basalt gravel & black & white sand, & mud	7	30
Basalt sand & mud	15	45
Black & white sand, & mud	35	80
Black & white sand, & lots of mud	40	120
Black & white sand, mud & clay	80	200
Black & white sand, small gravel, mud & clay	5	205
Black & white sand, less mud & clay	5	210
Black & white sand, more mud & clay	15	225
Black & white sand, some rock, mud & clay	5	230
Black & white sand, mud & clay	8	238
Fine black & white sand, & less mud	7	245
Fine black & white sand, & more mud	15	260
Fine white sand, lots of mud, & trace of black sand	30	290
Fine white sand, & thick clay mud	5	300
Fine white sand, & lots of mud, & trace of black sand	24	324
Medium gravel & coarse white sand	1	325
Gravel, sand & silt	44	369
Small rocks, gravel sand & mud	1	370
Gravel & white sand	13	383
Gravel-fine to coarse-all colors & sand-fine to coarse black & white	7	390

699-36-61B
Location: N36463, W60685 12/26-9L2
Casing Elevation: 749.26
Cable tool, drilled by Bach of Bach Drilling Company for BE Company, 1959, groundwater monitoring borenole

Material (1)	Thickness	Depth
Sand	10	10
Fine gravel	25	35
Fine gravel (silt)	5	40
Coarse sand	15	55
Sand	5	60
Coarse sand	5	65
Fine sand	30	95
Sand & silt	10	105
No record	20	125
Fine sand	20	145
Fine sand & one cobble	5	150
Silt	5	155
Hard silt w/sand	5	160
Sand & silt	10	170
Silt & fine sand	10	180
Clay streaks	5	185
Fine gravel	5	190
Silt	5	195
Silt & clay	20	215
Silt & sand	10	225
Silt & clay	10	235
Clay & silt	5	240
Silt & clay	5	245
Hard streaks-sand & clay	5	250
Sand & clay	15	265
Sand & silt	5	270
Sand & clay	20	290
Sand & silt	5	295
Silt & clay	15	310
Fine gravel	5	315
Clay & gravel	30	345
Gravel	10	355
Mixed gravel & clay	5	360
Sand	10	370
Fine sand	5	375
Cobbles	5	380
Sand & clay	20	400
Yellow clay	10	410
Blue clay	25	435
Black sand & clay	5	440
Black sand	8	448
Blue clay	12	460
No record	10	470
Blue clay, & gravel	25	495
Hard, cemented basalt gravel w/little clay	10	505
Cemented gravel; formation same as above w/some blue clay	15	520
Fine sand	5	525
No record	5	530
Hard packed gravel	10	540
Hard cemented gravel	5	545
Basalt rock	15	560
Harder basalt	8	568

699-36-93
Location: 12/25-9M1
Casing Elevation: 644.77
Cable tool, drilled by Trantham & Gaunt of Jansen Drilling Company for BE Company, 1962, groundwater monitoring borenole

Material (1)	Thickness	Depth
Dry real fine silt	5	5
Silt & fine sand	20	25
Silt & fine sand, more sand than silt	5	30
Brown sand	10	40
Silt w/moisture	5	45
Sand & gravel, cobble 5 in.	15	60
Brown silt, sand & gravel to 2-3 in.	10	70
Sand & gravel to 3 in.	10	80
Multi-colored sandy silty clay mixed w/gravel	5	85
No record but was sampled	5	90

4-5 in. of sand in bottom of core barrel around 90-93 ft., brown sand & gravel up to 4 in.	20	110
Brown silty & sandy clay	5	115
Sandy clay & gravel up to 4 in.	5	120
Gray sand & gravel to 1 in.	5	125
Small gravel & brown sand	5	130
Coarse gray sand, some gravel	5	135
Hit some large cobbles in gray sand at 136-140 ft.	5	140
Fine brown sand	10	150
Light silt, sand, gravel & cobble-core barrel hit a boulder at 154 ft.	5	155
Silt, sand, & gravel up to 3-4 in. - broke core barrel about 155 ft.	5	160
Sand & gravel 3-5 in.	5	165
Sand & gravel up to 4 in.	5	170
Silt, sand, gravel & some cobbles	5	175
Cemented gravel	5	180
Sand, gravel, few cobbles	10	190
Sand & gravel	5	195
No record	5	200
Silt, sand & gravel, some cemented	5	205
Fairly hard cemented gravel	5	210
Loose silt, sand, & gravel	10	220
A little cemented silt, sand, & gravel	5	225
Light brown cemented gravel, more binding material than before	5	230
Fairly hard cemented gravel	10	240
Cemented gravel	10	250
Cemented gravel; formations have hard layers	5	255
Cemented gravel	25	280
No record	3	283
Hit hole in formation, shows no increase or decrease in water static	4	287
Cemented gravel	58	345
Loose silt, sand & gravel	5	350
Cemented gravel	40	390
Light gray clay	2	392
Gray clay w/gravel	3	395
Light gray clay & large cobble; hard drilling	5	400
Light gray clay some gravel	5	405
Light gray sticky, still a few gravel & cobble; hit real sticky clay at 408 ft., pretty tough to drill	5	410
Dark gray silty clay; hit dark gray silty at 410 ft. - drills good	5	415
Hard cemented gravel; hit hard layer at 418 ft.	5	420
Sticky blue clay w/gravel	5	425
Blue & brown clay	5	430
Gravel, cemented gravel	2	432
Silt & sand	3	435
Cuttings are multi-colored, mostly dark gray, but very fine; drills like a solid material, but not definitely a basalt	7	442
Clay	1	443
Cuttings are a multi-colored, mostly dark gray, but very fine; drills like a solid material, but not definitely basalt	6	449
Blue silty clay	1	450
Gray silty clay	14	464
Gray	1	465
Silty sticky clay w/some gravel	10	475
No record	5	480
Sticky silty clay	5	485
Gray sticky silty clay	5	490
Blue sand rock or clay, hard layer	1	491
Hard blue green sand, drilled like sand rock	15	506
Black sand	4	510
Black sand & blue clay	5	515
Light brown clay w/some grit	15	530
Yellow clay w/decayed rock & gravel; clay is very sticky	5	535
Gray sand, clay	5	540
Gray sand, little silt	5	545
No record, probably as above	2	547
Sand, rock; something hard at 547 ft.	3	550
Gray sand w/gravel & basalt cuttings; look like basalt cutting mixed w/gray sand, drills hard enough	5	555
Cemented gravel	25	580
Brown silty clay	5	585
Silty clay w/some gravel	5	590
Silty sandy clay	10	600

Brown sand & silt	5	605
Brown sand	5	610
Sand, rock; think I hit basalt at 613 ft.	3	613
Sand, rock; drills as hard as basalt	2	615
Silty sandy clay	5	620
Brown sand, some pea gravel	5	625
Brown sand, some gravel, gravel fairly firm	15	640
Brown sand & gravel, some silt	5	645
Brown silt, sand, gravel, clay	5	650
Sand & silt, gravel	5	655
Sand, silt, clay & gravel; hard & soft streaks	10	665
Gravely silty sand (dominantly quartz, some mica)	5	670
More gravel, sand, quartz & mica	10	680
Sticky reddish brown silt, sand & gravel	6	686
Black basalt; hard formation	14	700

599-37-4 (Bolger well #11)
Location: N16816, W0441?
Casing Elevation: 488.87
Air rotary, to 107 ft.; & diamond coring, drilled by Carman Water Wells & Diamond Drilling Company & logged by MacLeod & Baumof of Bolger Associates for NESCO, 1981, geologic investigation borehole

Material (11)	Thickness	Depth
Fine sand	5	5
Fine to coarse gravel, some coarse sand	20	25
Medium to coarse sand & fine to coarse gravel	10	35
Medium to coarse sand, some fine to coarse gravel	10	45
Medium to coarse sand, some fine gravel	5	50
Medium to coarse sand, some fine to medium gravel	5	55
Medium to coarse sand & fine to coarse gravel	5	60
Fine to coarse gravel, some coarse sand	5	65
Fine to coarse gravel, trace fine sand	5	70
Fine to coarse gravel, some fine sand	5	75
Fine sand & fine to coarse gravel	5	80
Fine to coarse gravel, some fine sand	5	85
Fine to coarse gravel	10	95
Fine to coarse gravel, some fine sand	5	100
Fine sand & fine to coarse gravel	7	107
Medium to coarse gravel	9	116
Sand pebble conglomerate	27	143
Silty sandstone	30	173
Fine to medium sandstone	3	176
Silty fine to medium sandstone	1	177
Fine to medium sandy siltstone	2	179
Fine to medium sandstone	5	184
Fine to medium sandy siltstone	1	185
Fine to medium sandstone	3	188
Fine to medium sandy siltstone	4	192
Fine to medium sandstone	2	194
Silty fine to medium sandstone	1	195
Fine to medium sandy siltstone	2	197
Fine to medium sandstone	1	198
Fine to medium sandy siltstone	3	201
Fine sandy, clayey siltstone	23	224
Basalt	46	270

699-37-15 (Golder Well #18)
Location: N36812, 416491 12/27-12K1
Casing Elevation: 440.48
Air rotary (to 145 ft.) & mud rotary, drilled by Carman Water Wells & logged by Lubrecht & Wilkening of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Silty sand	5	5
Fine gravel	10	15
Gravelly fine to medium sand	10	25
Fine to medium gravel	5	30
Sandy fine to medium gravel	5	35
Fine to medium sand	5	40
Sandy fine gravel	5	45
Sandy fine to medium gravel	5	50
Gravel, minor sand & silt	5	55
Sandy fine to medium gravel	15	70
Gravelly fine to medium sand	15	85
Sandy fine to medium gravel	5	90
Gravelly fine to medium sand	5	95
Sandy fine to medium gravel	10	105
Gravelly medium sand	5	110
Clayey silt w/trace sand	15	125
Gravelly clayey silt	15	140
No recovery	5	145
Medium to fine gravel	15	160
Coarse to fine gravel	5	165
Sandy coarse to fine gravel	5	170
Coarse to fine gravel	5	175

699-37-16 (Golder Well #47)
Location: N36838, 425837 12/27-8M1
Casing Elevation: 442.37
Air rotary (to 105 ft.) & mud rotary, drilled by Carman Water Wells & logged by Wilkening of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium to fine sand, some silt	5	5
Medium to fine sand, trace silt	15	20
Coarse to fine gravel, some sand, trace silt	5	25
Coarse to fine sand, some gravel, trace silt	5	30
Coarse to fine gravel, some sand, trace silt	5	35
Coarse to fine sand & gravel, trace silt	5	40
Coarse to fine sand, trace gravel & silt	5	45
Coarse to fine sand & gravel, trace silt	30	75
Coarse to fine sand, some gravel, trace silt	5	80
Coarse to fine gravel, trace sand & silt	10	90
Coarse to fine sand & gravel, trace silt	5	95
Coarse to fine gravel, trace sand & silt	10	105
Coarse to fine gravel	45	150
Coarse to fine gravel, trace silt & sand	5	155
Coarse to fine gravel, some sand & silt, trace clay	35	190
Coarse to fine sand, some silt, trace clay & gravel	10	200
Coarse to fine sand & silt, trace clay & gravel	5	205
Coarse to fine sand & gravel, some silt, me clay	10	215
Coarse to fine sand & silt, some gravel, trace clay	5	220
Coarse to fine sand & silt, trace gravel & clay; & siltstone	25	245
Medium to fine sand & silt, trace gravel & clay; & siltstone	5	250
Coarse to fine sand & silt, trace gravel & clay; & siltstone	15	265
Coarse to fine sand & silt, some gravel, trace clay; & siltstone	5	270
Coarse to fine sand, some silt, trace gravel; & siltstone	25	295
Coarse to fine sand & medium to fine gravel, some silt, trace clay; & siltstone	10	305
Coarse to fine sand & medium to fine gravel & trace siltstone	55	360
Coarse to fine sand & gravel & trace siltstone	60	420
Basalt	10	430

699-37-22 (Golder Well #80)
Location N37437, 422064 12/27-10Q1
Casing Elevation: 478.21
Air rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine sand, some silt & medium to coarse gravel, some cobbles	5	5
Fine to coarse gravel, some fine to coarse sand	10	15
Fine to coarse gravel	5	20
Fine to coarse gravel, some fine to coarse sand	15	35
Fine to coarse sand & fine to medium gravel	5	40
Fine to medium gravel, some fine to coarse sand	5	45
Fine to coarse sand	5	50
Fine to coarse sand, trace fine gravel & silt	5	55
Fine to medium gravelly fine to coarse sand	5	60
Fine to coarse sand & fine to coarse sand	5	65
Fine to coarse gravel, some fine to coarse sand	5	70
Fine to coarse sand, trace fine gravel	5	75
Fine to coarse gravel, some fine to coarse sand, trace silt	5	80
Fine to coarse sandy, fine to coarse gravel, trace silt	5	85
Medium to coarse sand, fine to coarse gravel, trace of silt	5	90
Fine to medium gravelly, medium to coarse sand	5	95
Fine to coarse gravelly, medium to coarse sand	5	100
Fine to coarse sand & fine to medium gravel, trace silt	5	105
Fine to coarse sand, trace fine gravel	5	110
Fine to coarse sand, fine to medium gravel, trace of silt	5	115

699-37-25 (Golder Well #75)
Location N37305, W24851 12/27-10F1
Casing Elevation: 501.27
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine sand & silt, some fine to medium gravel	5	5
Fine to coarse sandy, fine to coarse gravel	10	15
Fine to coarse gravel, some fine to coarse sand	5	20
Fine to coarse gravel, trace fine to coarse sand	5	25
Fine to coarse gravel, trace coarse to fine sand	10	35
Fine to coarse gravel, trace coarse to fine sand & silt	5	40
Coarse sand, some fine gravel	5	45
Fine to coarse sand	5	50
Fine to coarse sand, trace silt	5	55
Fine to coarse sand, trace coarse gravel	5	60
Fine to coarse sand, some fine gravel	10	70
Fine to coarse sand, trace fine gravel	5	75
Fine to coarse sand & fine to coarse gravel	15	90
Fine to coarse sandy, fine to coarse gravel, trace silt	10	100
Medium to coarse sand	5	105
Fine to coarse gravelly, medium to coarse sand, trace silt	10	115
Medium to coarse sand & fine to coarse gravel, trace silt	10	125
Medium to coarse sandy, fine to coarse gravel, trace silt	5	130
Medium to coarse sandy, fine to coarse gravel	5	135

699-37-13
Location: N37063, W42874 12/26-12A1
Casing Elevation: 690.17
Cable tool, drilled by Gentz of & for SE Company, 1955, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine sand	10	10
Black sand & some gravel	10	20
Black soil	10	30
Black sand little gravel	10	40
Fine black sand	20	60
Fine sand-little silt	70	130
75% sand 25% silt	15	145
Black sand	5	150
75% sand 25% silt	20	170
50% sand 50% silt	10	180
Sand & silt	10	190
Coarse gravel	5	195
Gravel & cobbles	25	220
Boulders & gravel	20	240
Fine black sand	5	245
Fine black sand & coarse sand	10	255
Cobbles & gravel	8	263
Sand, silt & small & coarse gravel	2	265
Coarse sand, little silt	10	275
Coarse sand & gravel	5	280
Fine sand-coarse gravel	5	285
Blue clay	10	295
Sand & gravel	5	300
Sand-very little gravel	5	305
50% sand 50% gravel	10	315
Sand & small & coarse gravel	23	338
Blue clay	17	355
Brown clay	20	375
Blue clay	5	380
Sand, silt & clay	5	385
Black sand on gravel	15	400
Gray clay	5	405
Light gray clay	15	420
Brown clay	5	425
Sand & gravel	8	433
Sand, little gravel	2	435
Sand, gravel & cobbles	10	445
Sand, silt, little gravel & cobbles	5	450
Sand, silt, gravel, cobbles & clay	5	455
Sand, silt, gravel, basalt & cobbles	5	460
Sand, gravel & cobbles	5	465
Cobbles, gravel, sand & silt	5	470
Gray clay	10	480
Coarse gravel & sand	7	487
Gravel, sand & clay	8	495
Gravel, sand & silt	5	500
Gravel, sand & basalt	9	509
Basalt	8	517

699-37-82A
Location: N37018, W41989 12/25-11F1
Casing Elevation: 636.75
Cable tool, drilled by McDonald & Swain of Hatch Drilling Company for SE Company, 1960, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine brown sand & silt	5	5
Coarser now some gravels (1¼ in. max)	5	10
Coarse sand & heavy gravel (4 in. max)	10	20
Coarse sand & finer gravel	2	22
Coarse sand & cobbles	2	24
Fine brown sand & silt	71	95
Gravel	7	102
Coarse sand & gravel (1 in. max)	13	115
Coarse sand & gravel (material is larger)	5	120
Heavy gravel & cobbles	5	125
Sand & gravel (cemented material smaller)	5	130
Cemented sand & gravel	2	132
Sand, silt & gravel 1 in. max	8	140
Sand, silt & gravel, 1 in. max, gravel clean in streaks	1	141
Sand, silt & gravels 1 in. max	29	170
Sand & gravels w/clay streaks; soft brown clay; 6 in.-2 ft. thick; fine brown runny sand streaks (mostly clay)	5	175
Streaks of soft brown clay 6 in.-2 ft. thick; streaks fine brown runny sand; more & larger gravels now	5	180

Sand & gravel w/clay streaks; soft brown clay 6 in.-2 ft. thick; streaks of fine brown running sand	10	190
Fine sand & gravel	5	195
Fine sand & gravel (hard)	5	200
Fine runny sand & gravel (1 in. max)	20	220
Brown sand	5	225
Fine brown sand & gravel	2	227
Fine brown sand & some gravel to 3 in.	3	230
Streaks of very sandy clay, fine brown sand & gravel to 2 in.	10	240
Fine sand & small gravel	5	245
Fine sand & gravels	7	252
Fine sand & gravels up to 1 in.	23	275
Fine sand & gravel	13	288
Sand & silt & small gravels	3	291
Sandier now; sand, silt & small gravel	3	294
Sand, silt & small gravel	16	310
Sand & small gravel	10	320
Sand & silty small gravel to 1 in.	5	325
Sand & silty small gravel to 1 in.; sandier now	3	328
Sand & silty small gravel to 1 in.	17	345
Sand & small gravel	7	352
Sand & silt & small gravels	30	382
Sand, silt & small gravels to 1 in.	16	398
Coarse brown sand	2	400
Clay w/sand	15	415
Blue clay	25	440

599-37-828

Location: N37000, 481999 12/25-11E2
Casing Elevation: 526.07
Cable tool, drilled by Hatch & McDonald of Hatch Drilling Company for BE Company, 1960, groundwater test boring

Material (1)	Thickness	Depth
Sand & silt	5	5
Coarse sand & silt	5	10
Coarse gravel to 4 in. clean	5	15
Clean gravel, small to 4 in.	5	20
Sand & silt	45	65
Sand & silt (finer)	10	75
Cemented sand & silt	20	95
Broken gravel, 3 & 4 in.	5	100
Gravel & silt	2	102
Gravel, sand & silt up to 4 in.	11	113
Gravel, sand & silt to 4 in.; cobble gravel	7	120
Gravel, sand & silt large; cobble gravel	1	121
Clean gravel up to 2 in.	9	130
Gravel w/sand, silt	15	145
Gravel w/sand, silt; more silt	10	155
No record, but sampled	5	160
Cobbles, gravel, coarse sand & silt	10	170
Sand, silt & clay, streaks of clay & loose sand	3	173
Sand, silt & clay	4	177
Real hard-clean gravel	1	178
Sand, silt & clay	2	180
Large gravel, sand & silt	5	185
Some clay streaks, large gravel, sand & silt	15	200
No record, but sampled	5	205
Sand, silt & small gravel	5	210
Gravel, clay; streaks sand & silt	10	220
Streaks of clay & clean sand	10	230
No record, but sampled	10	240
Gravel to 2 in., clean sand	10	250
Gravel to 2 in., clean sand, coarser sand	20	270
Fine sand & small gravel, 80% sand	5	275
Sand & gravel	10	285
Sand & gravel (2 in. max)	5	290
Sand & gravel; streaks of clean sand	5	295
Sand & gravel	30	325
Clean sand & gravels to 2 in.	15	340
Clean sand & gravels to 4 in.	5	345
Clean sand & gravels; sandier now	5	350
Clean sand & gravel-silt	10	360
Clean sand & gravel-silt, coarse sand & silt	5	365
Sand, silt & gravel	30	395
Brown sandy clay	5	400
Gray clay	10	410
Gray clay sticky	8	418
Gray clay, very dark gray now, not sticky	5	420
Green clay	10	430
Clay	15	445
Blue gray clay	13	458
Black blue sand	7	465
Blue sticky clay	5	470
Light blue clay	10	480
Blue, hard, sticky clay	5	485
No record, but sampled	5	490
Dark green, sticky, hard, clay	10	500
Small gravel, sand & clay	10	510
Large gravel, sand & clay	15	525
Assorted gravels, green sand, black sand & gravels	15	540
Sand & silt, more sand & little silt	10	550
Sand & silt	5	555
Coarse sand & silt	5	560
Sand & silt & clay	5	565
Sand & clay	5	570
No record, but sampled	5	575
Clay & sand	5	580
Clay w/sand & gravel	10	590
Clay	5	595
Clean sand	5	600
Clean sand, darker color	5	605
Basalt	22	627

599-37-820

Location: 12/25-11F3
Casing Elevation: 636
Air rotary, drilled by Aqua Drilling Company & logged by Ledgerwood for ARHCO, 1976, groundwater test boring

Material	Thickness	Depth
Sand, silt, gravel	10	10
Sand, large gravel	5	15
Fine to medium sand, small gravel	10	25
Fine sand	5	30
Fine sand & silt	10	40
Silt & very fine sand	5	45
Fine sand & silt	35	80
Silt & very fine sand	5	85

Silt, very fine sand, streaks of clay	10	95
Silt, fine sand, small gravel	5	100
Silt, fine to medium sand, gravel	5	105
Sand-coarse gravel	10	115
Fine sand w/silt & coarse gravel	5	120
Fine sand w/silt & medium to coarse gravel	15	135
No return	15	150
Medium to fine sand w/gravel	10	160
Medium to fine sand w/gravel & silt	15	175
Fine sand w/silt & medium gravel	20	195
Very fine sand w/silt & ground-up gravel	15	210
Gravel w/very fine to medium sand & silt	5	215
Very fine to medium sand w/silt & gravel	10	225
Very fine to medium sand w/small to medium gravel	10	235
Gravel w/medium sand	5	240
Gravel w/very fine to medium sand & silt	5	245

*Borehole may go to 282 ft. but the record is unclear after 245 ft.

699-37-82D
Location: 12/25-11F4
Casing Elevation: 4636
Air rotary, drilled by Aqua Drilling & Development Company & logged by Hodge of & for ARHCO, 1976, hydrologic investigation borehole

Material	Thickness	Depth
Muddy, gravelly fine sand	35	35
Muddy, fine sand	25	60
Fine to medium sand	10	70
Fine sand & silt	25	95
Small cobbles, medium gravel, fine sand & silt	5	100
Coarse gravel, fine to medium sand	5	105
Fine to medium sand w/medium to coarse gravel	5	110
Fine to medium gravel	5	115
Fine to medium gravel w/fine sand	25	140
Fine gravel w/fine to medium sand	5	145
Fine to medium sand	10	155
Fine to medium sand w/fine gravel	10	165
Medium cobbles w/medium to fine gravel	5	170
Medium & fine cobbles	21	191

699-38-8D (Golder Well #65)
Location: N27750, E375 12/28-8H1
Casing Elevation: 469.63
Air rotary to 127 ft. & mud rotary, drilled by Carman Water Wells & logged by Lubrecht & Hansen of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand, trace silt	5	5
Fine to medium sand, trace gravel & silt	5	10
Fine sand & fine to coarse gravel, some silt	5	15
Fine to coarse sand & gravel, trace silt	35	50
Silty fine to coarse sand & gravel	10	60
Fine to coarse sand & gravel, some to trace silt	80	140
Coarse to fine gravel, trace sand, silt & clay	30	170
Gravelly fine sand & silt, some clay	5	175
Fine sand & silt, some gravel & clay	5	180
Fine sand & silt, some gravel & clay (blue clay of lower Ringold)	25	205
Gravelly fine sand & silt some clay	10	215
Fine sand & silt, some gravel & clay	8	223
Basalt	47	270

699-38-9 (Golder Well #99)
Location:
Casing Elevation:
Air rotary, drilled by Carman Water Wells & logged by MacLeod of Golder Associates for NESCO, 1980, geologic investigation borehole

Material(11)	Thickness	Depth
Fine sand	15	15
Fine sand & medium gravel	5	20
Fine to coarse sand, some coarse gravel	15	35
Medium to coarse sand & fine to coarse gravel	80	105
Fine sand & medium gravel	5	110
Fine sand	5	115
Fine sand & medium gravel	5	120
Fine to coarse gravel, trace fine sand	20	140
Fine sand & fine to coarse gravel	5	145
Gravel, some fine sand	15	160
Fine sand & fine to coarse gravel	25	185
Fine sand & fine to coarse gravel, trace silt	5	190
Silt some sand & gravel	5	195
Silt, some sand	5	200
Silt	50	250
Basalt	90	340

699-38-1 (Golder well #102)
Location:
Casing Elevation:
Air rotary, to 128 ft., & diamond coring, drilled by Carman Water Wells & Diamond Drilling Company & logged by MacLeod & Braunof of Golder Associates for NESCO, 1980, geologic investigation borehole

Material(11)	Thickness	Depth
Fine sand	15	15
Fine sand & fine to coarse gravel	10	25
Fine to coarse gravel, some coarse sand	45	70
Medium to coarse sand & fine to coarse gravel	30	100
Fine to coarse gravel, trace fine to coarse sand	10	110
Fine to coarse gravel, some fine to coarse sand	5	115
Fine to coarse sand & fine to coarse gravel	5	120
Fine to coarse gravel, trace fine to coarse sand	10	130
Fine to coarse sandy to fine to coarse gravel	5	135
Fine to coarse gravel, trace fine to coarse sand	3	138
Pebble gravel w/local zones of sandy pebble gravel	14	152
Sandy pebble conglomerate	17	169
Silty sandstone	1	170
Gravelly fine to medium sandstone	12	182
Fine sandy siltstone	9	191
Silty fine to medium sandstone	1	192
Fine sandy siltstone	22	214
Basalt	53	267

699-38-9 (Golder well #113)
Location: N37754, W8541 12/28-7E1
Casing Elevation: 503.63
Air rotary, drilled by Carman Water Wells & logged by Nesbit & MacLeod of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand, some fine to medium gravel	5	5
Fine to coarse gravel, trace medium to coarse sand	10	15
Fine to coarse gravel, some fine to coarse sand	10	25
Medium to coarse sand, some fine to coarse gravel	10	35
Medium to coarse sandy, fine to coarse gravel	10	45
Fine to coarse gravelly, medium to coarse sand	5	50
Fine to coarse sand, trace fine to medium gravel	5	55
Fine to coarse sand	10	65
Fine to coarse sand, trace fine to medium gravel	5	70
Fine to coarse sand, some fine to coarse gravel	5	75
Fine to coarse sand, trace fine to coarse gravel	5	80
Fine to medium gravelly, fine to coarse sand	5	85
Fine to coarse sand & fine coarse gravel	5	90
Fine to coarse sandy, fine to coarse gravel	5	95
Fine to coarse gravel, some fine to coarse sand	5	100
Fine to coarse sand & fine to coarse gravel	5	105
Fine to coarse gravel, some fine to coarse sand	15	120
Fine to coarse sandy, fine to coarse gravel	5	125
Fine to coarse gravel, some fine to coarse sand	15	140
Fine to coarse sand & fine to coarse gravel	5	145
Fine to coarse gravel, trace fine to coarse sand	5	150
Fine sand & silt, trace fine gravel & clay	5	155
Silt, some fine sand & coarse sand, trace clay	5	160
Silt, some fine sand, trace clay	20	180
Fine to coarse gravel, some fine to coarse sand	10	190
Fine to coarse sand & fine to coarse gravel	5	195
Fine to coarse gravel, some fine to coarse sand	5	200
Fine to coarse gravel, trace fine to coarse sand	25	225
Fine to coarse gravel, trace fine to coarse sand & clay	10	260
Fine to medium sand	15	275
Fine to medium sandy, fine to medium gravel	10	285
Fine to medium gravel, some fine to medium sand	15	300
Fine to medium sand & fine to medium gravel	5	305
Fine to medium gravel, some fine to medium sand	20	325
Fine to medium sand & fine to medium gravel	5	330
Fine to medium gravel, some fine to medium sand	20	350
Fine to medium sand	5	355
Silty, fine sand	5	360
Fine to medium sand	15	375
Silty, fine to medium sand	20	395
Fine to medium sand	15	410
Fine, sandy silt	10	420
Fine, sandy silt, trace clay	25	445
Silt, some fine sand, trace clay	50	495
Basalt	50	545

699-38-15 (Golder well #4)
Location: N37541, W14504 12/27-12E1
Casing Elevation: 452.50
Air rotary (to 150 ft.) & mud rotary, drilled by Carman of Carman Water Wells & Pisicka of Boyles Brothers Drilling Company & logged by Wilkening, Findley & Lubrecht of Golder Associates for NESCO, 1979, geologic investigation borehole

Material (11)	Thickness	Depth
No record	10	10
Sandy cobbly gravel	15	25
Sandy gravel & cobbles	10	35
Sandy cobbly gravel	5	40
Sandy gravel w/lenses of sand	5	45
Slightly sandy gravel	5	50
Sandy gravel	5	55
Silty gravelly sand	10	65

Silty gravelly sand to silty sandy gravel	5	70
Sandy gravel	48	118
Slightly gravelly clay	2	120
Clay	10	130
Clayey gravel	20	150
Medium gravel w/some silty fine sand	63	213
Silty sandy gravel	5	218
Sandy silt w/some clay	15	233
Sandy gravel w/some silt	5	238
Silty sand w/some clay & fine gravel	10	248
Clayey silt w/some fine sand	5	253
Silty gravel w/some clay	15	268
Medium gravel some fine sand	25	293
Silt w/fine sand & small shards of basalt	19	312
Clayey silt w/small shards of basalt	13	325

699-38-19 (Golder Well #27)
Location: N38237, W18504 12/27-11F1
Casing Elevation: 462.18
Air rotary (to 130 ft.) & mud rotary, drilled by Carman Water Wells & logged by Wilkening of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
No record	10	10
Gravelly silty fine sand	5	15
Sandy silty coarse to fine gravel	10	25
Sandy coarse to fine gravel	20	45
Slightly silty sandy coarse to fine gravel	5	50
Gravelly fine sand	5	55
Fine sand	10	65
Slightly silty sandy coarse to fine gravel	5	70
Slightly cobbly silty sandy coarse to fine gravel	5	75
Gravelly medium to fine sand	5	80
Silty medium to fine sand	5	85
No record	5	90
Gravelly medium to fine sand	25	115
No record	10	125
Silty sandy coarse to fine gravel	5	130
Slightly gravelly clayey silt	20	150
Gravelly clayey silt	5	155
Slightly clayey silty medium to fine gravel	5	160
Medium to fine gravel w/trace clay & silt	5	165
Medium to fine gravel	90	255
Clayey silty medium to fine gravel	6	261
Slightly clayey & silty medium to fine gravel	4	265
Medium to fine gravel	45	310
Clayey fine gravel	10	320
Slightly sandy clayey fine gravel	5	325
Gravelly sandy clay	5	330
Slightly gravelly sandy clay	30	360
Slightly clayey sandy fine gravel	5	365
Clayey gravelly fine sand	5	370
Slightly gravelly sandy clay	5	375
Slightly gravelly clay w/trace sand	5	380
Slightly gravelly clay	5	385
Clayey silty fine sand w/trace gravel	5	390
Clayey silty fine sand	5	395
Slightly gravelly clayey silty fine sand	20	415
Clayey silty fine sand w/trace gravel	10	425
Sandy silty clay	25	450
Sandy silty clay w/trace gravel	10	460
Clayey silty fine gravel	5	465
Slightly gravelly silty clay	5	470
Slightly gravelly clay	5	475
Gravelly clay	20	495
Basalt	25	521

699-38-34A (Golder Well #46)
Location: N38231, W34136 12/27-8F1
Casing Elevation: 529.19
Air rotary (to 120 ft.) & mud rotary, drilled by Carman Water Wells & logged by Lubrecht of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand, trace silt	5	5
Silt, trace sand	5	10
Medium to fine gravel, some sand	10	20
Coarse to fine sand, some gravel, trace silt	5	25
Coarse to fine sand & coarse to fine gravel	10	35
Coare to fine sand & fine gravel; drilling characteristics indicate boulder	5	40
Coarse to fine sand & gravel	5	45
Coarse to fine sand & fine gravel	5	50
Coarse to fine gravel, trace sand	5	55
Coarse to fine sand & gravel, some silt	10	65
Coarse to fine sand & gravel	10	75
Coarse to fine sand, trace gravel	5	80
Coarse to fine sand & gravel, trace silt	10	90
Coarse to fine sand & medium to fine gravel, trace silt	5	95
Coarse to fine sand & gravel	5	100
Coarse to fine sand & fine gravel	5	105
Coarse to fine sand & medium to fine gravel	5	110
Coarse to fine sand & medium to fine gravel, trace silt	5	115
Coarse to fine sand & gravel, trace silt	5	120
Medium to fine sand, trace gravel, silt & clay	10	130
Medium to fine sand & silt, some clay	5	135
Medium to fine sand & silt, some clay; & friable siltstone chips	10	145
Medium to fine sand & silt, trace clay	5	150
Medium to fine sand, some silt, trace clay	5	155
Medium to fine sand, trace silt	5	160
Coarse to fine sand	5	165
Coarse to fine sand, trace silt & gravel	10	175
Fine sand & silt trace clay	15	190
Silty medium to fine sand, trace clay	35	225

Medium to fine sand, some silt, trace clay	5	230
Medium to fine sand, some silt, trace clay	15	245
Medium to fine sand & silt, trace clay	5	250
Medium to fine sand, some silt, trace clay	10	260
Medium to fine sand & silt, trace clay	15	275
Coarse to fine sand & fine gravel, trace silt & clay	10	285
Coarse to fine sand & fine gravel	15	300
Coarse to fine sand & medium to fine gravel	25	325
Coarse sand & coarse to fine gravel	30	355
Basalt	25	375

699-38-66
Location: N37965, W64978 12/26-881
Casing Elevation: 753.33
Cable tool, drilled by Dawson for GE Company, 1959, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gravelly sand	10	10
Sandy silt	15	25
No record, but sampled	9	34
Sandy silt	50	84
Silty sand	31	115
Sandy silt	20	135
Silty sand	30	165
Silty sand, hard packed	5	170
No record	15	185
Silty sand	5	190
No record	28	218
Sand	16	234
Hard packed silt	6	240
No record	5	245
Sandy silt	16	261
Brown sand	3	264
Sandy silt; soft packed sand & silt	2	266
Sandy silt	16	282
Cemented gravel	2	284
Sandy gravel	11	295
No record	16	311
Sandy gravel	24	335
No record	10	345
Sand & gravel	5	350
No record	5	355
Sandy, silty gravel	10	365
No record	6	371
Sandy, silty gravel	4	375
No record	7	382
Heaving sand, gravel	3	385
No record	7	392
Brown clay w/fine gravel	3	395
No record	8	403
Brown clay	3	406
Blue clay	4	410
No record	10	420
Blue clay	5	425
No record	12	437
Sandy clay (gravel at 443 ft.)	12	449
Gravel & black sand	1	450
Gravel & colored sand; sand gray	5	455
Gray sand	5	460
Gray sand, some gravel 2 in. size	3	463
Gray sand & gravel	7	470
Gray fine sandy gravel	5	475
Gray sand & gravel	9	484
Basalt gravel; medium hard w/soft streaks of brown sand coming in under shoe; black & gray mixed	1	485
Medium hard basalt gravel	5	490
Sand & basalt gravel	4	494
Hard basalt gravel	1	495
No record	8	503
Hard basalt gravel, some sand	2	505
No record	11	516
Gravel & sand, hard basalt	4	520
No record	6	526
Basalt rock	4	530
Hard basalt	6	536

699-38-70
Location: N38142, W70226 12/26-781
Casing Elevation: 710.67
Cable tool, drilled by Swain of Hatch Drilling Company for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	4	4
Small gravel	6	10
Sand silt & gravel	10	20
Silt coarse sand	8	28
Sandy silt	5	30
Sand-silt	5	35
Sandy silt	5	40
Sand-silt & gravel	10	50
Sand-silt	15	65
Sand-small gravel	5	70
Sand-coarse & clean	2	72
Clean sand	3	75
Sand-silt	40	115
Sand-silt (hard packed)	10	125
Sand-silt	60	185
Sand-silt-small gravel	15	200
Sand-silt	15	215
Sand-silt-soft-more clay than sand	10	225
Clay & small gravel	5	230
Small gravel & clay	10	240
Clay	5	245
Clay-gravel	5	250
Sand-silt-gravel	10	260
Sand-gravel	10	270
Gravel-clean gravel	5	275
Sand-gravel; using bentonite	5	280
Clean sand & gravel	5	285
No record	1	286
Sand-gravel	19	305
Silt-gravel, a little more silt	5	310
Sand-silt, gravel-clay	5	315
Sand, silt & gravel	5	320
Sand, silt & gravel (hard packed)	5	325
Sand, silt & gravel	5	330
Sand-gravel	10	340
Clean coarse sand	5	345
Fine clean sand	5	350
Clean sand	5	355
Sand	5	360
Sand-small gravel	5	365
Sand-hard packed	5	370
Sand-softer-very fine	5	375
Sand-silt-very fine	10	385
Sand-gravel	5	390
Sand	5	395
Fine sand & silt	5	400
Fine sand & silt (little more silt)	12	412

699-39-82 (Golder well #68)
Location: N39123, E2094 12/128-H01
Casing Elevation: 404.89
Air rotary, drilled by Carman water wells & logged by Hansen & Burrell of Golder Associates for WEICO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Fine sand, some silt, trace gravel	5	5
Fine to coarse gravel, some sand, trace silt	10	15
Fine to coarse sand & gravel, trace silt	10	25
Fine to coarse gravel, some sand, trace silt	5	30
Sandy fine to coarse gravel, trace silt	5	35
Fine to coarse sand & gravel, trace silt	5	40
Fine to coarse gravel, some sand, trace silt	5	45
Sandy fine to coarse gravel, trace silt	10	55
Fine to coarse gravel, some sand, trace silt	5	60
Fine to coarse gravel, trace sand & silt	10	70
Fine to medium sand & fine to coarse gravel, trace silt	5	75
Fine to coarse sand & gravel, trace silt	10	85
Fine to coarse gravel, trace sand	30	115
Fine to coarse gravel	5	120
Fine to coarse gravel, trace sand & silt	5	125
Fine sand & silt, trace gravel & clay; white ash	5	130
Fine sand & silt, trace gravel & clay	5	135
Gravelly fine sand & silt, trace clay	15	150
Silty fine sand & fine to coarse gravel, trace clay	5	155
Fine to medium gravel, trace sand & silt	10	165
Gravelly fine sand & silt, some clay	10	175
Gravelly fine sand & silt, some clay; white ash	10	185
Basalt	60	245

699-39-1 (Golder well #99)
Location: N38708, W700 12/28-8G1
Casing Elevation: 476.89
Air rotary, drilled by Carman water wells & logged by MacLeod of Golder Associates for WEICO, 1980, geologic investigation borehole

Material	Thickness	Depth
Fine sand	15	15
Fine sand & medium gravel	5	20
Fine coarse sand, some coarse gravel	15	35
Medium to coarse sand & fine to coarse gravel	80	105
Fine sand & medium gravel	5	110
Fine sand	5	115
Fine sand & medium gravel	5	120
Fine to coarse gravel, trace fine sand	20	140
Fine sand & fine to coarse gravel	5	145
Gravel, some fine sand	15	160
Fine sand & fine to coarse gravel	25	185
Fine sand & fine to coarse gravel, trace silt	5	190
Silt, some sand & gravel	5	195
Silt, some sand	5	200
Silt	50	250
Basalt	90	340

699-39-2 (Golder well #100)
Location: N38974, W1712 12/28-8G3
Casing Elevation: 467.57
Air rotary to 97 ft & diamond coring, drilled by Carman water wells & Diamond Drilling Company & logged by MacLeod & Baunof of Golder Associates for WEICO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Fine to medium sand	5	5
Fine to coarse gravel, trace fine to coarse sand	5	10
Fine to coarse sandy, fine to coarse sand	5	15
Fine to coarse gravel, some fine to coarse sand	10	25
Fine to coarse sand, & fine to coarse gravel	10	35
Fine to coarse sandy, fine to coarse gravel	25	60
Fine to coarse gravel	5	65
Fine to coarse sand & fine to coarse gravel	15	80
Fine to coarse gravel, trace fine to coarse sand	15	95
Fine to medium sand & fine to coarse gravel	5	100
No recovery	6	106
Fine to medium sand & fine to coarse gravel	28	134
No recovery	3	137
Fine to medium sandy, fine to coarse gravel	24	161
No recovery	2	163
Medium to coarse gravel w/local zones of fine to medium sandy gravel	12	175
No recovery	3	178
Medium to coarse gravel	2	180
No recovery	2	182
Medium to coarse gravel w/local zones of sand & gravel	2	184
No recovery	1	185
Medium to coarse gravel	1	186
Slightly silty sandstone w/alternating layers of sandstone & sandy siltstone	12	201
Silty, fine to medium sandstone to fine to medium siltstone w/local zones of slightly silty sandstone	24	225
Sandy siltstone	5	230
Sandy siltstone w/some clay	28	258
Basalt	49	307

699-39-? (Golder well #128)
Location: N39100, #6820 12/28-7C1
Casing Elevation: 492.37
Air rotary, drilled by Carman Water Wells & logged by Nesbitt of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium, gravelly, fine sand	5	5
Fine to medium gravel, some fine to coarse sand	25	30
Fine to coarse sandy, fine to medium gravel	5	35
Fine to medium gravel, some medium to coarse sand	10	45
Fine to medium gravel, some fine to coarse sand	5	50
Fine to coarse sand & fine to medium gravel	5	55
Fine to coarse sand, some fine gravel	5	60
Fine to medium gravel & medium to coarse sand	5	65
Fine to coarse sand, trace fine gravel	10	75
Fine to coarse sand, some fine gravel	5	80
Fine to coarse sand, some fine to medium gravel	10	90
Fine to medium gravel, some fine to coarse sand	5	95
Fine to coarse sand & fine to medium gravel	5	100
Fine to medium gravel, trace fine to coarse sand	15	115
Fine to coarse gravel, & fine to medium sand	5	120
Fine to coarse gravel, some fine to medium sand	5	125
Fine to coarse gravel, trace fine to coarse sand	5	130
Fine to coarse gravel, some fine to coarse sand	10	140
Silt, trace fine sand & clay	5	145
Silt, trace clay	8	153
Basalt	107	260

699-39-12 (Golder well #2)
Location: N38605, #12331 12/27-12G1
Casing Elevation: 531.36
Air rotary, drilled by Walkup of Aqua Drilling & Development Company & logged by Howe of Golder Associates for NESCO, 1979, geologic investigation borehole

Material (11)	Thickness	Depth
Fine sand & silt	3	3
Cobbles, boulders, sand & gravel	89	92
Black, medium to coarse sand	4	96
Sand & gravel	9	105
Brown, coarse, mottled sand	31	136
Gravel w/gray sand	8	144
Sand w/gravel	10	154

699-39-20 (Golder well #59)
Location: N38699, #22147 12/27-10D1
Casing Elevation: 475.83
Air rotary (to 144 ft.) & mud rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine sand, trace silt	5	5
Medium to fine sand & coarse to fine gravel	10	15
Medium to coarse gravel	10	25
Medium to fine sand, trace gravel	5	30
Medium to fine sand, trace gravel & silt	5	35
Medium to fine sand	5	40
Medium to fine sand, some gravel, trace silt	10	50
Medium to fine sand & medium to coarse gravel, trace silt	5	55
Medium to coarse gravel, some sand, trace silt	5	60
Medium to coarse sand & gravel, trace silt	5	65
Medium to coarse gravel	10	75
Fine sand & medium to coarse gravel	5	80
Medium to coarse sand & gravel, trace silt	10	90
Medium to coarse sand & gravel	10	100
Gravelly medium to fine sand	5	105
Medium to fine sand & medium to coarse gravel	25	130
Gravelly medium to fine sand	5	135
Fine sand & silt, trace clay	10	145
Silt, some sand, trace clay	5	150
Fine sand & silt, trace clay	10	160
Fine sand & medium to coarse gravel, trace silt & clay	5	165
Coarse to fine sand & gravel, trace silt & clay	5	170
Fine sand & coarse to fine gravel, trace silt & clay	5	175
Medium to fine gravel, some sand, trace silt & clay	5	180
Coarse to fine gravel	5	185
Medium to fine gravel, some sand	10	195
Coarse to fine gravel	10	205
Coarse to fine gravel, trace sand	5	210
Fine sand & fine to coarse gravel, trace clay	5	215
Coarse to fine sand & gravel	5	220
Coarse sand & coarse to fine gravel	10	230
Medium to fine sand & medium to coarse gravel, trace clay	5	235
Medium to coarse gravel, some sand	5	240
Medium to coarse gravel, trace sand & clay	5	245
Coarse sand & medium to fine gravel, trace silt & clay	5	250
Medium to coarse gravel, trace sand & silt	5	255

Medium to coarse gravel, trace sand	10	265
Fine sand & medium to coarse gravel, trace silt & clay	5	270
Medium to fine gravel, trace sand	5	275
Medium to fine gravel	5	280
Medium to fine gravel, trace sand	15	295
Medium to coarse sand & coarse to fine gravel, trace silt	5	300
Coarse to fine gravel	5	305
Coarse to fine gravel, trace sand	5	310
Medium to coarse gravel, trace sand & silt	5	315
Medium to coarse gravel, some silt, trace clay	5	320
Medium to fine sand & fine gravel, some silt, trace clay	5	325
Fine sand, trace silt & clay	20	345
Fine sand, trace silt, clay & gravel	10	355
Fine sand, trace silt & clay	5	360
Fine sand & silt, trace clay	60	420
Fine sand & silt, trace clay & gravel; & siltstone	5	425
Fine sand & silt, trace gravel, some clay; & siltstone	5	430
Fine sand & silt, some clay; & siltstone	5	435
Fine sand & silt, some clay, trace gravel; & siltstone	10	445
Fine sand & silt, trace gravel & clay; & siltstone	25	470
Fine sand & silt, some clay, trace gravel; & siltstone	10	480
Fine sand & silt, trace clay; & siltstone	5	485
Fine gravel	10	495
Gravel, trace clay	5	500
Basalt	20	520

699-39-39
Location: N39044, W38851 12/27-7C1
Casing Elevation: 536.65
Cable tool, drilled by Rodda of Bach Drilling Company, 1970, groundwater monitoring borehole

Material (1)	Thickness	Depth
Top soil	1	1
Gravel, sand, silt	4	5
Sand & gravel	55	60
Cobble gravel, very little fine gravel or sand	5	65
Cobbles too large to go in 6 in. casing, very little material between them	3	68
Cobbles & gravel	2	70
Coarse gravel & sand	9	79
Cobbles, too large to go in 6 in. casing, very little material between them	6	85
Sand & gravel	30	115
Sandy clay & gravel	5	120
Ringold clay	5	125
Clay	40	165
Gray clay	20	185
Sandy brown clay	15	200

699-39-79
Location: N39198, W38751 12/28-11A
Casing Elevation: 573.82
Cable tool, drilled by Rumley of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine sand & silt	13	13
Fine sand	7	20
Basalt, gravel & sand	5	25
Basalt & some gravel	3	28
Basalt & gravel	4	32
Basalt, gravel & rocks	3	35
Basalt & rocks	4	39
Basalt, rocks & some granite	4	43
Black sand & gravel	7	50
Basalt, gravel & sand	8	58
Basalt, gravel, sand & some rocks	9	67
Fine black sand	11	78
Black sand, rocks & basalt	9	87
Clay & fine sand	5	92
Silt & sand	8	100
Coarse sand & silt	25	125
Silt & fine sand	10	135
Silt, fine sand & some clay	6	141
Caliche cemented zone, sludge has changed color	8	149
Fine sand, silt & clay	9	158
Gravel, basalt, sand, silt & clay	2	160
Gravel, basalt, silt & clay	2	162
Fine sand & gravel	3	165
Sand & gravel	5	170
Sand, rock & gravel	13	183
Basalt, gravel & sand	4	187
Coarse sand, rocks & gravel	8	195
Sand, gravel & rocks	30	225
Fine & coarse sand & gravel	10	235
Clay, sand & gravel	15	250
Gravel, rocks & sand	10	260
Cemented sand, rocks & gravel	5	265
Fine sand, rock, gravel & boulders	2	267
Fine sand, gravel & rocks	3	270
Fine water sand & gravel	8	278
Coarse sand & gravel	17	295

699-39-82
Location: N38600 W82400 12/28-11G1
Casing Elevation:
Cable tool, drilled by Evans of Hatch Drilling Company for Rockwell, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
20% coarse sand, 40% medium sand, 20% fine sand, angular, brown, white, black, 10% silt brown	8	8
40% large pebbles, 30% small pebbles, 10% medium cobbles, subrounded, black, gray, brown, 20% sand, angular, brown, black, gray, yellow, white	12	20
20% large pebbles, 30% small pebbles, 10% medium cobbles, subrounded, black, gray, 20% coarse sand, 10% fine sand, angular, brown, black, white, yellow, 10% silt brown	13	33
Boulder	<1	33

699-19-103
Location: 12/25-6P1
Casing Elevation:
Air rotary, drilled by Aqua Drilling & Development Company & logged by McGhan of PNL for ARHCO, 1976, hydrologic investigation borehole

Material (1)	Thickness	Depth
Fine sand & silt	17	17
Caliche & gravel	3	20
Fine sand & gravel to 1½ in.	5	25
Fine to coarse sand & gravel to 2 in.	5	30
Fine to medium sand & gravel to ¾ in.	5	35
Fine to medium sand & gravel to 1¼ in.	10	45
Fine to medium sand to 1 in.	35	80
Fine to medium sand & gravel to 1¼ in.	5	90
Fine to medium sand & gravel to 1 in.	5	100
80% fine to medium sand, 20% pea gravel	5	105
60% fine to medium sand, 40% gravel to 2 in.	5	110
20% fine to coarse sand, 80% gravel to 2 in.	5	115
80% fine to coarse sand, 20% pea gravel	5	120
Clay	5	125
Silty clay, few small gravels	5	130
Silty clay	8	138
Weathered basalt	2	140
Basalt	21	161

699-40-1
Location: N39849, W670 12/29-481
Casing Elevation: 437.77
Cable tool, drilled by Trantham & Daunt of Jansen Drilling Company for AE Company, 1961, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & gravel up to 3 in.; big cobble a foot & a half down	5	5
Sand, gravel & cobble	20	25
Silt, sand, gravel & cobble 4 to 6 ft.	5	30
No record	10	40
Sand, gravel, cobble	5	45
Sand, gravel, cobble (large)	10	55
Pulled back to 35 ft., redrilled		
Sand-gravel; cored	5	30
Gravel; cored	5	35
Sand-gravel; cored	5	40
Pulled back to 35 ft., redrilled		
Gravel, cobbles; cored	5	40
No record except "had scattered boulders from 45 to 55 ft."	17	57
Sand & gravel up to 5 & 6 in.	13	70
Brown sand & 4 in. gravel	6	76
Some sand, 30% gravel	4	80
Sand & gravel up to 4 in.	5	85
Brown loose sand & gravel	5	90
Brown sand & gravel	5	95
No record	5	100
Brown sand & gravel	10	110
Brown cemented sand	10	120
Cemented gravel	5	125
Sand & silty clay w/gravel	10	135
Silty sand & hard layers	5	140
Hard sticky clay & gravel	15	155
Sandy clay; at 158 ft. there is a thin layer of fine sand	5	160
Sandy clay w/large broken rock	5	165
Brown clay w/pieces of brown rock	6	171
Cemented gravel	49	220
Brown sand & some gravel	5	225
Sand & gravel	5	230
Sand & gravel, mostly sand	5	235
Sand & rock	10	245
Sandstone w/gravel	5	250
Silty sandy clay	5	255
No record	5	260
Sandy clay	5	265
Silty sandy clay w/small gravel	10	275
Brown & gray silty clay	10	285
Gray sticky clay	10	295
Dark gray clay w/gravel	5	300
Dark gray sticky clay & gravel	5	305
Dark grey silty clay & gravel	11	316
Basalt; "drilled down to 319 ft., 2 ft. in basalt"	4	320
Basalt hit crevice at 348 ft.	30	350
Basalt rock is in layers of hard & soft; interbed noted between 355 ft. & 360 ft.; last foot real soft? clay interbed; interbed between 364-365 ft.	15	365
Black rock, broken, has hard & soft spots	3	368
Black basalt, has hard & soft spots	2	370
Black rock, still having soft layers	5	375
Dark gray basalt	13	388
Black basalt, rock tightening up, no soft layers noted, and specifically no soft layers 401 ft. to 408 ft.	32	420

699-40-2 (Golder well #98)
Location: N40303, W2493 12/29-801
Casing Elevation: 464.37
Air rotary, drilled by Carman Water Wells & logged by Macleod of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Fine sand, some medium gravel	5	5
Fine to coarse gravel, trace medium to coarse sand	30	35
Fine to coarse gravel, some coarse sand	55	90
Medium to coarse sand, some medium gravel	10	100
Fine to coarse gravel, some medium to coarse sand	15	115
Medium sand & fine to coarse gravel	30	145
Medium sand, trace gravel	10	155
Silt, trace fine sand	40	195
Fine to medium sand & fine to coarse gravel	55	250
Fine to medium sand, some fine to coarse gravel	10	260
Fine to medium sand & fine to coarse gravel	30	290
Fine to medium sand, trace medium gravel	5	295
Fine to medium sand, some silt	5	300
Silt, trace sand	15	315
Silt, trace sand & clay	5	320
Silt, trace clay	35	355
Basalt	50	405

699-40-6 Golder well #109)
Location: N39870, W881 11/29-601
Casing Elevation: 487.84
Air rotary, drilled by Carman Water Wells & logged by Nebbett of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Fine to medium sand & fine to coarse gravel	5	5
Fine to coarse gravel, trace fine to coarse sand	10	15
Fine to coarse gravel, some fine to coarse sand	15	30
Fine to coarse gravelly, fine to coarse sand	10	40
Fine to coarse sand, some fine to medium gravel	10	50
Fine to coarse sand, trace fine to coarse gravel	5	55
Fine to coarse sand, some fine to medium gravel	5	60
Fine to coarse gravel, trace fine to coarse sand	5	65
Fine to coarse sand & fine to coarse gravel	10	75
Fine to coarse sandy, fine to medium gravel	5	80
Fine to coarse sand, trace fine gravel	5	85

Fine to coarse sand & fine to medium gravel	5	100
Fine to coarse gravel, some fine to coarse sand	5	105
Fine to coarse sandy, fine to coarse gravel	5	110
Fine to coarse sand, trace fine to medium gravel	5	115
Fine to coarse gravelly, fine to coarse sand	5	120
Fine to coarse gravel, some fine to coarse sand	20	140
Fine to coarse gravel, some fine to coarse sand & silt	5	150
Silt, some fine sand, trace clay	83	233
Basalt	50	283

699-40-12A
Location: 12/27-12D1
Casing Elevation:
Cable tool, drilled by Harlen of Hatch Drilling Company & logged by Cochran of & for RHO, 1978, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sandy gravel	28	28
Slightly gravelly sand	2	30
Very coarse sand	28	58
Silty sand	7	65
Slightly gravelly silty sand	25	90
Gravelly silty sand	3	93
Slightly gravelly silty sand	2	95
Silty coarse sand	14	109
Pebble gravel	6	115
Silty sandy gravel	15	130
Pebble gravel	7.5	137.5
Slightly cemented coarse sand	0.5	138
Medium sand	3	141
Sandy pebble gravel	2	143
Coarse sand & gravel interbedded	2	145
Medium to coarse sand	5	150
Sandy gravel	2	152
Pebble gravel	3	155
Gravelly medium sand	3	158
Slightly gravelly sandy silt	7	165
Clayey silt	5	170
Sandy silt	10	180
Slightly gravelly silty sand	15	195
Silty sandy gravel, iron stained	5	200
Slightly gravelly silty sand	8	208
Slightly gravelly sand	2	210
Sandy gravel	3	213
Silty sandy gravel	2	215
Slightly gravelly silty sand	5	220
Coarse sand	4	224
Silty sand to sandy silt	6	230
Sandy silt	5	235
Silty sand or sandy silt	5	240
Silty sand	25	265
Fine to coarse sand	7	272
Gravelly medium sand	3	275
Sand	10	285
Slightly gravelly sand	1	286
Slightly gravelly silty sand	16	302
Gravelly silty sand	3	305
Slightly gravelly silty sand	5	310
Silty sand	5	315
Slightly gravelly silty sand	20	335
Sandy silt	5	340
Slightly clayey silt, grayish brown	5	345
Slightly clayey silt, dark blue	15	360
Slightly clayey silt, grayish brown	5	365
Medium sand, clean	20	385
Slightly gravelly medium sand	5	390
Slightly silty sand	20	410
Silty sand	5	415
Sandy silt, greenish brown to greenish blue	15	430
Clayey silt, blue-green	45	475
Sandy silt	10	485
Coarse sand	5	490
Silty sand	5	495

699-40-12B (Golder Well #3)
Location: N39784, W11711 12/27-12B1
Casing Elevation: 817.04
Air rotary (to 148 ft.) & diamond coring, drilled by Walkup of Aqua Drilling & Development Company & Warner of Diamond Drill Bit Company & logged by Rowe of Golder Associates for WESCO, 1979, geologic investigation borehole

Material (11)	Thickness	Depth
Sand, some silt	3	3
Gray cobbles & boulders w/sand & gravel	50	53
Dark gray, coarse to medium sand	6	59
Gray to black sand w/gravel	18	77
Gray gravel w/sand, some cobbles	3	80
Brownish sand w/fluvial cobbles	4	84
Gray coarse cobbles & silt	13	97
Brown sand	2	99
Gray gravel	1	100
Brown clay w/little gravel	6	106
Brown gravel & sand w/clay & little gravel	6	112
Fine to medium gravel, some clay	6	118
Gravel & sand	4	122
Brown gravel w/sand	1	123
Gray fine to medium gravel; brown gravel w/sand; coarse gravel	10	133
Coarse brown gravel to finer gravel w/sand; lighter sand w/gravel; very little gravel; lots of brown sand	15	148
Cobbly gravel	15	163
No recovery	2	165
Cobbly gravel	2	167
Slightly silty mudstone	5	172
Slightly sandy siltstone, claystone grading to claystone	4	176
Claystone w/siltstone interbedded grading to siltstone w/clay interbeds	5	181
Interbedded claystone & siltstone	5	186
Sandstone w/conglomerate interbedded	6	192
Conglomerate	2	194
No recovery	2	196
Silty sandy conglomerate	4	200
Unconsolidated gravel	3	203
Conglomerate	9	212
Pebble-cobble conglomerate	4	216
Gravelly cobbly conglomerate	10	226
No recovery	2	228
Gravelly cobbly conglomerate	1	229
Siltstone	3	232
Silty claystone	14	246
Clayey, silty sandstone	2	248
Silty, sandy claystone	2	250
Silty sand w/sandy silt interbeds	10	260
No recovery	5	265

Silty sandstone w/interbeds of sandy siltstone	1	266
No recovery	7	273
Silty sand w/localized gravels	4	277
Sandy gravelly conglomerate	8	285
No recovery	1	286
Sandy gravelly conglomerate	10	296
Slightly cobbly gravelly conglomerate	5	301
Sandy cobbly pebbly conglomerate	10	311
No recovery	1	312
Gravelly conglomerate	5	317
No recovery	3	320
Pebble conglomerate	4	324
Silty claystone	4	328
Claystone grading to gravelly sand	2	330
Sand	2	332
No recovery	2	334
Same as interval 330-332 ft.	2	336
Conglomerate	5	341
No recovery	9	350
Claystone	4	354
Silty sandstone & sandy siltstone	18	372
No recovery	4	376
Clayey siltstone	7	383
Pebbly conglomerate	9	392
Gravel	5	397
No recovery	11	408
Fine sandy siltstone	9	417
Claystone	5	422
No recovery	5	427
Same as interval 417-422 ft.	11	438
Claystone grades to silty claystone	4	442
No recovery	4	446
Claystone w/ash bed 457 ft.	15	461
Breccia: 80% clays & 20% angular basalt clasts	5	466
Basalt	20	486

699-40-12C (Golder Well #19)
Location: N39872, W11888 12/27-1282
Casing Elevation: 514.29
Air rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium gravel w/some sand	5	5
Coarse gravel, trace coarse sand	5	10
Medium gravel	5	15
Medium & fine gravel, trace of silt	5	20
Coarse to fine gravel, trace of silt	10	30
Fine gravel, trace of medium gravel	5	35
Fine gravel	5	40
Fine gravel, trace of medium gravel	5	45
Fine gravel, some coarse sand	15	60
Medium gravel, some coarse sand	5	65
Coarse sand, trace gravel	5	70
Coarse sand, some coarse gravel	5	75
Coarse sand & medium gravel	5	80
Medium gravel	5	85
Medium gravel, trace silt	5	90
Medium gravel, trace sand	5	95
Clay, some gravel	5	100
Silty clay, trace gravel	5	105
Coarse sand, some gravel, trace clay	5	110
Coarse sand & medium gravel	5	115
Medium gravel, trace sand	5	120
Medium gravel, trace silt	5	125
Medium gravel, trace sand & silt	5	130
Medium gravel, trace silt	5	135
Coarse gravel & sand, trace silt	5	140
Medium sand & gravel, trace silt	5	145
Medium sand; some gravel & silt	10	155
Coarse sand, some gravel, trace silt	5	160
Medium gravel, trace of sand & silt	5	165
Silt & some fine gravel, trace of sand	15	180
Sandy coarse to fine gravel, trace of silt	50	230
Silt w/some fine to medium gravel, trace sand	30	260
Medium sand, some silt & fine gravel	5	265

699-40-12D (Golder Well #X6)
Location: 12/27-1283
Casing Elevation: 513.23
Air rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for NESCO, 1980, foundation test boring

Material (11)	Thickness	Depth
Fine to coarse sand & fine to coarse gravel	35	35
Fine to coarse sand, some gravel	5	40
Fine to coarse sand	50	90
Fine to coarse sand & fine to coarse gravel	10	100
Fine to medium sand	20	120
Fine to coarse sand & fine to coarse gravel	10	130
Fine to coarse sand, some fine to medium gravel	10	140
Fine to coarse sand	15	155
Fine to coarse gravel	5	160
Fine to coarse sand & fine to coarse gravel	5	165
Fine to medium sand	5	170
Fine to medium sand & silt	20	190
Fine to coarse sand, some silt, some gravel	10	200

699-40-12E (Golder Well #X7)
Location: 12/27-1284
Casing Elevation: 518.28
Air rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for NESCO, 1980, foundation test boring

Material (11)	Thickness	Depth
Fine to medium sand	5	5
Fine to coarse sand & fine to coarse gravel	50	55
Fine to coarse sand	20	75
Gravelly fine to coarse sand	10	85
Fine to coarse sand & fine to coarse gravel	10	95
Gravelly fine to coarse sand	20	115
Fine to coarse sand & fine to coarse gravel	25	140
Fine to coarse gravel	5	145
Gravelly fine to medium sand	5	150
Fine to medium sand, some fine to coarse gravel	10	160
Fine to coarse sand & fine to coarse gravel	5	165
Fine to coarse sand	5	170

Fine sand & silt	20	190
Fine sand & fine to medium gravel, some silt	5	195
Medium to coarse gravel, some sand	5	200

699-40-12F (Golder well #X8)
Location: 12/27-1285
Casing Elevation: 521.81
Air rotary, drilled by Carman Water Wells & logged by Lubrecht of Golder Associates for NESCO, 1980, foundation test boring

Material (11)	Thickness	Depth
Medium to fine sand, some silt	10	10
Coarse to fine sand & coarse to fine gravel, some silt	15	25
Coarse to fine sand & coarse to fine gravel	5	30
Coarse to fine sand & coarse to fine gravel, some silt	5	35
Coarse to fine sand & coarse to fine gravel	10	45
Coarse to fine sand	40	85
Coarse to fine sand & coarse to fine gravel	15	100
Fine sand & silt, & silty clay	5	105
Fine sand & silt, some medium to fine gravel & silty clay	5	110
Fine sand & silt	10	120
Coarse to fine gravelly coarse to fine sand	5	125
Coarse to fine sand & coarse to fine gravel	5	130
Coarse to fine sand & coarse to fine gravel, some silt	10	140
Coarse to fine sand & coarse to fine gravel	25	165
Coarse to fine gravelly coarse to fine sand	10	175
Clayey silt, some fine sand	25	200

699-40-12G (Golder well #X9)
Location: 12/27-1286
Casing Elevation: 520.23
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NESCO, 1980, foundation test boring

Material (11)	Thickness	Depth
Fine sand	5	5
Medium to fine sand & medium to coarse gravel	10	15
Medium to fine sand & medium gravel	20	35
Medium to fine sand	30	65
Medium to fine sand, some silt	10	75
Medium to fine sand	10	85
Medium to coarse sand	5	90
Medium to fine sand & medium to coarse gravel	15	105
Medium to fine sand & medium to coarse gravel, some silt	5	110
Medium to fine sand, some silt	5	115
Medium to fine sand, some medium gravel	5	120
Fine sand & medium to coarse gravel	20	140
Fine sand & medium to coarse gravel, some silt	5	145
Fine sand & medium to coarse gravel	30	175
Fine sand & silt	11	186

699-40-12H (Golder well #X10)
Location: 12/27-1287
Casing Elevation: 519.19
Air rotary, drilled by Carman Water Wells & logged by Wilkening of Golder Associates for NESCO, 1980, foundation test boring

Material (11)	Thickness	Depth
Medium to fine sand, some gravel	5	5
Coarse to fine gravel	5	10
Coarse to fine sand, some gravel	5	15
Coarse to fine gravel, some sand	5	20
Coarse to fine gravel	10	30
Coarse to fine sand	5	35
Coarse to fine sand & coarse to fine gravel	10	45
Medium to fine sand	40	85
Coarse to fine sand & coarse to fine gravel	10	95
Coarse to fine sand & silt, some gravel	10	105
Medium to fine sand, some silt	15	120
Medium to fine sand, some silt, some gravel	20	140
Medium to fine sand, some silt	15	155
Coarse to fine sand & coarse to fine gravel	20	175
Medium to fine sand & silt	15	190
Medium to fine sand & silt, some gravel	10	200

699-40-13 (Golder well #1)
Location: N29829, #12977 12/27-1202
Casing Elevation: 507.86
Rotary (to 129 ft.) & diamond core, drilled by Aqua Drilling & Development Company & Connors Drilling Company & logged by Howe, Wilkening & Lubrecht of Golder Associates for NESCO, 1979, geologic investigation borehole

Material (11)	Thickness	Depth
Cobbles & boulders w/sand & gravel	20	20
Black medium sand	74	94
Gravel & sand w/cobbles	6	100
Soft brown claystone w/sand, silt & gravel	2	102
Sandy gravel w/occasional gravel	26	128
Cobbles w/some gravel	34	162
Claystone w/some silt	3	165
Siltstone w/trace clay & sand	3	168
Fine sands w/trace clay	5	173
Siltstone	5	178
Sandstone	5	183
Conglomerate	1	184
Medium-coarse sand	2	186
Conglomerate	43	229
Claystone to silty claystone	5	234
Sandstone	3	237
Sandy siltstone	3	240
Sandstone	22	262
Conglomerate	14	276
No recovery	5	281
Sandstone	10	291
Conglomerate	5	296
No recovery	10	306
Conglomerate	20	326
Sandstone	12	338
Claystone	22	360
Sandstone	14	374

No recovery	11	386
Mixed conglomerate claystone	5	390
Sandstone	2	392
Gravel	1	393
Sandstone	10	403
No recovery	2	405
Sandstone w/siltstone band	9	414
Conglomerate	4	418
Interbedded siltstone & sandstone	10	428
Sand	1	428
Claystone - silty claystone	34	462
Ash	1	462
Tuffaceous? claystone	1	463
Claystone	15	478
Sand	1	479
Clay w/gravel	1	479
Claystone	5	484
Sand	7	491
Basalt	19	510

699-40-20 (Golder well #26)
Location: N39940, W19896 12/27-11D1
Casing Elevation: 476.53
Air rotary (to 97 ft.) to mud rotary, drilled by Carman Water Wells & logged by Wilkening & Burrell of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Coarse to fine sand	15	15
Silty coarse to fine sand	7	22
Coarse to fine gravel w/trace silt	21	44
Sandy silt	7	51
Sandy medium to fine gravel w/trace silt	34	85
Slightly sandy medium to fine gravel w/trace silt	15	100
Slightly sandy medium to fine gravel	5	105
Medium to fine gravel	5	110
Medium to fine gravel w/trace silt	10	120
Medium to fine gravel w/trace sand	15	135
Medium to fine gravel w/trace silt	5	140
Gravelly silt	15	155
Silty medium to fine gravel	5	160
Medium to fine gravel w/trace silt	5	165
Slightly sandy medium to fine gravel w/trace silt	5	170
Medium to fine gravel w/trace sand	10	180
Medium to fine gravel	5	185
Medium to fine gravel w/trace sand	5	190
Slightly silty medium to fine gravel w/trace sand	5	195
Medium to fine gravel	30	225
Medium to fine gravel w/trace sand	5	230
Slightly silty medium to fine gravel	20	250
Gravelly silt	10	260
Silty medium to fine gravel w/trace sand	5	265
Medium to fine gravel w/trace silt	5	270
Medium to fine gravel	5	275
Medium to fine gravel w/trace silt	5	280
Medium to fine gravel	5	285
Medium to fine gravel w/trace sand	5	290
Slightly silty medium to fine gravel	10	300
Silty medium to fine gravel	5	305
Silty medium to fine gravel w/siltstone interbeds	5	310
Silty clayey medium to fine gravel	10	320
Gravelly clay	10	330
Silty clayey medium to fine gravel	5	335
Clayey silty medium to fine gravel	10	345
Slightly silty medium to fine gravel	5	350
Slightly silty medium to fine gravel w/trace sand	5	355
Medium to fine gravel w/trace silt	10	365
Slightly silty medium to fine gravel	10	375
Slightly sandy gravelly clay	31	406
Sandy clay	9	415
Sandy gravelly clay	15	430
Slightly sandy clay	5	435
Sandy gravelly clay	5	440
Slightly sandy gravelly clay	5	445
Slightly sandy clay	5	450
Sandy clay	5	455
Sandy gravelly clay	5	460
Clayey fine gravel	10	470
Gravelly clay	5	475
Medium to fine gravel	5	480
Medium to fine gravel w/trace clay	5	485
Medium to fine gravel	5	490
Basalt	20	510

699-40-21 (Golder well #27)
Location: N40093, W21445 12/27-10A1
Casing Elevation: 471.26
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Coarse to fine sand, trace medium to coarse gravel, trace silt	5	5
Fine to coarse gravel	25	30
Medium to coarse gravelly, medium to fine sand, trace silt	10	40
Medium to coarse sand	5	45
Medium to coarse sand, trace medium to coarse gravel	5	50
Medium to coarse sand	5	55
Medium to coarse sand & medium to fine gravel	5	60
Medium to fine gravel, some coarse sand, trace silt	10	70
Medium to coarse sand & medium gravel, trace silt	5	75
Medium to coarse sand & medium to coarse gravel	5	80
Medium to coarse sand & medium to fine gravel	5	85
Medium gravel, trace coarse sand	5	90
Medium to fine gravel, trace coarse sand	5	95
Medium to fine sand & medium to coarse sand	5	100

599-40-32 (Golder well #45)
Location: N39627, 422434 12/27-881
Casing Elevation: 923.79
Air rotary (to 115 ft.) & mud rotary, drilled by Carman Water Wells & logged by Lubrecht of Golder Associates for NEICO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium to fine sand	5	5
Coarse to fine sand & medium to fine gravel, trace silt	5	10
Silty coarse to fine sand, trace gravel	5	15
Coarse sand & coarse to fine gravel, trace silt	5	20
Sandy coarse to fine gravel	5	25
Coarse to fine sand & medium to fine gravel	5	30
Coarse to fine sand & medium to fine gravel, trace silt	20	50
Coarse to fine sand & gravel	10	60
Coarse to fine sand & medium to fine gravel, trace silt	10	70
Coarse to fine sand & gravel, trace silt	10	80
Silty coarse to fine sand, some gravel	5	85
Coarse to fine sand & medium to fine gravel, trace silt	10	95
Sandy coarse to fine gravel	5	100
Coarse to fine sand & gravel	10	110
Coarse sandy medium to fine gravel	10	120
Coarse to fine sand & medium to fine gravel & boulders	10	130
Coarse to fine sand & medium to fine gravel, trace silt & clay	5	135
Medium to fine sand & silt, some clay, trace gravel; & clay, some silt	20	155
Medium to fine sand & silt, some clay	40	195
Medium to fine sand & silt, some clay, trace gravel	30	225
Silty medium to fine sand, trace clay & gravel	5	230
Medium to fine sand & silt, trace clay & gravel	5	235
Coarse to fine sand & silt, trace clay & gravel	10	245
Coarse to fine sand & silt, trace clay, some gravel	5	250
Gravelly coarse to fine sand & silt	5	255
Coarse sand & medium to fine gravel	10	265
Coarse sand & medium to fine gravel, trace silt & clay	5	270
Coarse sand & medium to fine gravel	15	285
Coarse sand & medium to fine gravel, trace silt & clay	5	290
Coarse sand & fine gravel	10	300
Coarse sand & medium to fine gravel, trace silt & clay	10	310
Coarse sand & medium to fine gravel	12	322
Basalt	47	370

599-40-33A
Location: N40404, 423426 12/27-801
Casing Elevation: 918.26
Cable tool, drilled by Chausse of USGS for SE Company, 1949, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & boulders	12	12
Sand, gravel & boulders	1	13
Sand & boulders	1	14
Sand, gravel & boulders	18	32
Boulders, sand & gravel	8	40
Gravel & sand	33	73
Gravel, sand & silt	23	96
Medium gravel, black & white sand, small amount of silt	4	100
Medium & coarse gravel, black & white sand & gray binder	2	102
More medium gravel, some coarse gravel & very small amount of black & white sand	4	106
Medium gravel & gray silty sand	4	110
Mostly sand & clay w/some gravel	5	115
Mostly clay w/some sand	5	120
Clay & ash	30	150
Clay, ash & sand	10	160
Clay	3	163
Gray clay, no sand	2	165
Blue green clay	10	175
Gray clay & some small gravel	13	188
Gravel, boulders, sand & clay	30	218
Small gravel in gray clay	14	232
Gravel & clay	2	234
Sand & gravel	24	258
Basalt	5	263

599-40-33B
Location: 12/27-802
Casing Elevation: 918
Air rotary, drilled by Aqua Drilling & logged by Hodge of S for RHO, 1976, hydrologic investigation borehole

Material (1)	Thickness	Depth
Small gravel w/medium to fine sand	20	20
Small gravel, medium to coarse	10	30
Small gravel w/medium to fine sand	10	40
Small, medium & coarse gravel w/medium to fine sand	10	50
Medium gravel w/medium to fine sand	5	55
Medium to fine sand w/small amount of gravel	5	60
Coarse gravel w/medium to fine sand	10	70
Fine to medium sand w/small amount gravel	10	80
Fine to medium sand w/small amount medium gravel	5	85
Coarse gravel w/medium to fine sand	10	95
Medium gravel w/medium to fine sand	5	100
Medium to fine sand,	5	105
Small cobbles, coarse gravel & medium sand	5	110
Small cobbles, coarse gravel & mud	10	120
Clay	40	160

699-40-33C
Location: 12/27-5D3
Casing Elevation: 518
Cable tool, drilled by Wings of Paton Drilling Company, Rockwell, 1977, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand & boulders	8	8
Sand, gravel & boulders	35	43
Gravel w/sand	7	50
Gravel & sand	27	77
Sand, gravel w/clay	10	87
Cemented sand & gravel	10	97
Boulders	3	100
Sand gravel	16	116
Gray/brown clay	29	145
Brown sand clay	33	178
Silt, sand & clay	22	200
Sand & silt	5	205
Sand gravel	15	220
Sand gravel w/clay	24	244
Brown clay & gravel	11	255
Gravel	5	260
Sand gravel	23	283
Basalt	1	283

699-40-62
Location: N40300, +61500 12/26-4N1
Casing Elevation: 747.7d
Cable tool, drilled by Rodda of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Top soil	3	3
Sand, gravel & silt	7	10
Sand, gravel, boulders & silt	2	12
Sand, gravel & silt	13	25
10% silt, 40% sand & 50% gravel	6	31
25% fine gravel, 25% silt & 50% sand	4	35
Sand & silt	5	40
10% silt, 90% sand, mostly coarse	19	59
15% silt, 85% sand, gray in color, mostly coarse	11	70
25% silt & 75% sand, sand still coarse & gray	15	85
30% silt & 70% sand which is mostly coarse	10	95
40% silt & 60% sand which is finer	10	105
35% silt & 65% sand	8	113
30% silt & 70% sand, sand coarser	12	125
35% silt & 65% sand, sand finer	5	130
25% silt & 75% sand, sand fine & gray	25	155
30% silt & 70% sand, some coarser sand w/fine sand	10	165
15% silt & 85% sand, sand coarse	5	170
20% silt & 80% sand, sand 50% fine & 50% coarse	25	195
40% silt & 60% sand, sand mostly fine	8	203
Coarse sand & pea gravel-80%, 20% fine sand & 20% silt	4	207
80% sand & 20% silt	8	215
35% silt & 65% sand-fine	15	230
25% silt & 75% sand	10	240
20% silt & 80% sand, sand coarser	7	247
Sand & silt	1	248
25% silt & 75% sand	2	250
40% silt & 60% sand, sand is finer	10	260
30% silt, 70% sand, sand a little coarser	5	265
70% sand, 30% silt, sand is mostly fine	8	273
20% clay & 80% sand which is finer	27	300
20% silt & 80% sand	12	312
15% silt, 30% gravel & 55% sand, sand is fine to coarse	5	318
20% silt, 20% sand, 60% gravel & boulders; gravel & boulders stuck together w/a light colored silt or clay, a few gravel showed a lime coating	7	325
10% silt, 40% sand, 50% gravel; sand is mostly fine & very light color, gravel is 10% basalt & 90% others, very little gravel over 1 in.	8	330
10% silt, 60% gravel, 30% sand; gravel is pea gravel & sand is fine	2	332
30% silt, 40% gravel, 30% sand; gravel is larger & stuck together w/very light colored silt or clay	10	342
25% sand, 50% gravel, 25% silt; gravel is pea gravel	2	344
60% gravel, 30% sand, 10% silt, gravel getting larger	11	355
50% gravel, 25% sand, 25% silt; gravel mostly fine	5	360
50% gravel, 25% sand, 25% silt; gravel coarse	6	366
30% gravel, 20% silt, 50% sand; sand is fine & comes in when drilling	4	370
20% gravel, 20% silt, 60% sand which is light color & mostly fine	4	374
85% clay, 15% coarse sand	1	375
100% clay, light brown w/light gray & dark brown streaks	9	384

699-40-34A (RRL-2A)
Location: 12/25-3R1
Casing Elevation:
Mud rotary, drilled by Finley Drilling Company & logged by Little of & for RHO, 1980, geologic investigation borehole

Material (2)	Thickness	Depth
Dune sand	6	6
Sandy pebble to boulder gravel	10	16
Sandy pebble to cobble gravel	5	21
Gravelly fine to medium sand	59	80
Cobble to boulder gravel	16	96
Slightly gravelly silty fine sand	12	108
Silty fine sand	10	118
Sandy pebble to cobble gravel	3	121
Slightly gravelly fine to medium sand	20	141
Silty fine sand	7	148
Gravelly silty fine sand	5	153
Small silt or clay lense	1	154
Same as interval 148 to 153 ft.	4	158
Silty sandy cobble gravel	10	168
Silty sandy pebble to cobble gravel	4	172

Sandy pebble to cobble gravel . .	5	177
Sandy pebble to cobble gravel w/small sand lenses	5	182
Same as interval 172 to 177 ft. .	11	193
Gravelly medium sand	15	208
Sandy pebble to boulder gravel . .	5	213
Silty fine sand	1	213

699-40-848 (RRL-28) 12/25-3R2
Location:
Casing elevation:
Cable tool (to 114 ft) & mud rotary, drilled by Shippingfield of Hatch Drilling Company & Conen of McDonald Drilling Company & logged by Lillie of & for Rockwell, 1981, geologic investigation borehole

Material (2)	Thickness	Depth
Silty, medium to coarse sand . . .	5	5
Silty, gravelly, coarse to medium sand	10	15
Silty, fine to medium sand	5	20
Slightly gravelly, silty, medium sand	10	30
Silty, medium to fine sand	5	35
Silty, fine sand	25	60
Fine, sandy silt	5	65
Silty, fine sand	5	70
Slightly gravelly, silty, fine sand	10	80
Sandy, silty gravel	10	90
Slightly gravelly, silty, medium sand	5	95
Gravelly, silty, medium sand . . .	20	115
Silty, sandy, cobble to boulder gravel cemented 134 to 152 ft.	45	160
Fine, sandy silt, consolidated	45	205
Slightly sandy, slightly silty, coarse gravel	45	250
Sandy, silty, coarse gravel . . .	16	266
Fine sand, loose	12	278
Sandy, silty, cobble gravel . . .	22	300
Cemented sandy, silty, cobble gravel	18	318
Sandy, clayey silt	5	323
Clayey, silty, cemented gravel, brown	29	352
Sandy, gravelly clay, tan	14	366
Sandy, silty, slightly clayey, cobble gravel	51	417
Blue-green clay	42	459
Blue-green clay, some yellow stringers	32	491
Green clay	7	498
Clayey gravel to gravelly clay	17	515
Very coarse, basalt gravel	5	520
Gravelly, blue-green clay	5	525
Sandy, silty, slightly clayey, cobble gravel	25	550
Blue-green clay	34	584
Sandy, gravelly, blue-green clay	7	591
Clayey, sandy gravel	9	600
Gravelly, gray clay	3	603
Basalt	4	603

699-41-1A
Location: 12/28-6P1
Casing Elevation:
Cable tool, drilled by Bultema of Hatch Drilling Company for PNL, 1979, groundwater monitoring borehole

Material (1)	Thickness	Depth
Medium to fine sand	5	5
Sandy cobble gravel, poorly sorted	19	24
Sandy gravel, poorly sorted . . .	6	30
Coarse gravel, poorly sorted . . .	10	40
Sandy gravel, poorly sorted . . .	10	50
Sand & clay gravel	5	55
Sandy gravel, poorly sorted . . .	5	60
Medium to fine sand, gray	5	65
Sandy small pebble gravel	5	70
Medium to fine sand	5	75
Medium to coarse gravelly sand, buff	5	80
Coarse sand to sandy grit gravel .	8	88

699-41-5 (Golder well #110)
Location: N40620, W4940 12/28-6R1
Casing elevation: 481.30
Air rotary, drilling by Layman Water Wells & logged by Nesbett of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Fine to medium sand	5	5
Fine to coarse gravel, some fine to coarse sand	10	15
Fine to coarse sand & fine to coarse gravel	5	20
Fine to coarse gravel, trace fine to coarse sand	5	25
Fine to coarse gravel, some fine to coarse sand	5	30
Fine to coarse sandy, fine to coarse gravel	5	35
Fine to coarse gravelly, fine to coarse sand	5	40
Fine to coarse gravel, trace fine to coarse sand	5	45
Fine to coarse sand & fine to medium gravel	15	60
Fine to coarse sandy, fine to medium gravel	5	65
Fine to coarse sand & fine to medium gravel	5	70
Fine to coarse sandy, fine to coarse gravel	10	80
Fine to medium gravel, some fine to coarse sand	15	95
Fine to medium sand, trace fine to medium gravel	5	100
Fine to coarse sand & fine to coarse gravel	5	105
Fine to coarse gravel, trace fine to coarse gravel	5	110
Fine to coarse sandy, fine to coarse gravel	5	115
Fine to coarse sand & fine to coarse gravel	5	120
Fine to coarse gravel, trace fine to coarse sand.	15	135
Fine to coarse sandy, fine to coarse gravel	5	140

Fine to coarse gravel, some fine to coarse sand, trace silt	15	155
Silt, some sand, trace fine to medium gravel & clay	5	160
Silt, some sand, trace clay	65	225
Basalt	48	273

699-41-10 (Golder well #5)
Location: N41403, +9614 12/28-6M1
Casing Elevation: 502.33
Air rotary, drilled by Marsh of Aqua Drilling & Development Company & logged by Pingley of Golder Associates for WEIDO, 1979, geologic investigation borehole

Material (ft)	Thickness	Depth
Medium sand	8	8
Medium to coarse sand	5	13
Sandy pebble gravel	20	33
Medium sand	20	53
Coarse gravelly sand	5	58
Sandy gravel	8	66
Medium to coarse sand w/some gravel	7	73
Medium sand	10	83
Medium to fine gravel; medium to fine gravel w/some coarse sand	15	98
Gravelly medium to coarse sand	10	108
Medium to fine sand	10	118
Sandy silt w/some clay	5	123
Gravelly medium sand	5	128
Fine sand	5	133
Fine gravel; sandy gravel	10	143
Fine sand	5	148
Sandy gravel	5	153
Medium gravel	7	160
Medium sand	8	168
Coarse gravel	8	176
Silty medium sand	3	179
Medium to fine gravel	4	183
Medium to fine sand	10	193
Sandy gravel	4	197
Sandy silt	4	201
Fine sand	5	206
Clayey silt	1	207
Medium to fine sand	3	210
Sandy silt interbedded w/clayey silt	62	272
Basalt	21	293

699-41-18 (Golder well #104)
Location: N41053, +640 12/28-6P2
Casing elevation: 512.78
Air rotary, drilling by Carman Water Wells & logged by Nesbett of Golder Associates for geologic investigation borehole

Material (ft)	Thickness	Depth
Fine to medium sand	5	5
Medium to coarse gravel, some fine to coarse sand	5	10
Fine to coarse sandy, fine to coarse gravel	10	20
Fine to coarse gravel, trace medium to coarse sand	5	25
Fine to coarse gravel, some medium to coarse sand	5	30
Medium to coarse sandy, fine to coarse gravel	5	35
Medium to coarse sand & fine to coarse gravel	5	40
Medium to coarse sand, some medium to coarse gravel	5	45
Medium to coarse sand, trace fine to medium gravel	5	50
Medium to coarse sand	10	60
Fine to medium gravelly, fine to coarse sand	5	65
Coarse sand & fine to medium gravel	5	70
Fine to coarse sand, some fine to medium gravel	5	75
Medium to coarse sand, some fine to medium gravel	5	80
Fine to medium gravelly, fine to coarse sand	5	85
Medium to coarse sand & fine to medium gravel	5	90
Fine to coarse sand & medium to coarse gravel	5	95
Fine to medium sand, trace fine gravel	5	100
Fine to medium gravel, trace medium to coarse sand	5	105
Medium to coarse gravel, some coarse sand	10	115
Fine to coarse gravel, some medium to coarse sand	5	120
Fine to medium gravel, some fine to coarse sand	5	125
Fine to coarse gravel & fine to coarse sand	5	130
Medium to coarse gravel, some fine to medium sand	5	135
Fine to coarse sand & fine to coarse gravel	5	140
Medium to coarse gravel, trace fine to medium sand	5	145
Fine to coarse gravel, trace fine to medium sand	5	150
Fine to medium sandy, fine to coarse gravel	10	160
Fine to coarse gravel, some fine to medium sand	10	170
Fine to medium sandy, fine to coarse gravel	5	175
Fine to medium sandy, fine to coarse gravel, trace clay	5	180
Fine to medium sandy, fine to coarse gravel	5	185
Fine to medium sand	20	205
Fine to medium sand, trace medium to coarse gravel	5	210
Fine to medium sandy, trace medium to coarse gravel	5	215
Fine to medium sand & medium to coarse gravel	5	220
Medium to coarse gravel, some fine to medium sand	20	240
Fine to medium sand & medium to coarse gravel	5	245
Fine to medium sand, some medium gravel	5	250
Fine to medium sand, & medium to coarse gravel	15	265
Fine to medium sand, trace silt	15	280
Fine to medium sand, some silt	5	285
silt, some clay, trace fine sand	5	290
Silt, some fine sand & clay	10	300
Fine, sandy silt, some clay	5	305
Silt, some fine sand & clay	15	320
Silt, some clay	60	380
Basalt	50	430

699-41-20 Golder well #21
Location: N41487, W19741 12/27-2M1
Casing Elevation: 485.27
Air rotary (to 100 ft.) & mud rotary, drilled by Carman water wells & logged by Wilkening of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (ft)	Thickness	Depth
Fine sand & silt	5	5
No sample	5	10
Silty sand	5	15
Sandy cobbly coarse gravel	25	40
Sandy silty coarse gravel	40	80
Slightly gravelly silty fine sand	5	85
Gravelly silty fine sand	8	93
Sandy silt	7	100
Slightly sandy medium gravel	10	110
Medium gravel	10	120
Slightly sandy medium gravel	10	130
Sandy medium gravel	10	140
Slightly sandy medium gravel	5	145
Medium gravel	10	155
Sandy medium gravel w/trace silt	5	160
Sandy medium gravel	5	165
Medium gravel w/cobbles	5	170
Sandy medium gravel	10	180
Medium gravel w/trace sand	5	185
Medium gravel; cemented at 196	16	205
Slightly sandy medium gravel	10	215
Gravelly silt	5	220
Slightly sandy, gravelly silt	5	225
Gravelly silt	5	230
Sandy silt	5	235
Sandy gravelly silt	25	260
Sandy silty medium to fine gravel	5	265
Slightly sandy silty medium to fine gravel	5	270
Silty medium to fine gravel	5	275
Slightly silty medium to fine gravel	5	280
Slightly silty & sandy medium to fine gravel	10	290
Slightly sandy, silty medium to fine gravel	10	300
Slightly sandy & silty medium to fine gravel	10	310
Slightly sandy, silty medium to fine gravel, cemented	15	325
Slightly silty medium to fine gravel w/trace sand	5	330
Medium to fine gravel	10	340
Medium to fine gravel w/trace silt	5	345
Slightly silty medium to fine gravel, cemented	5	350
Medium to fine gravel	5	355
Slightly silty medium to fine gravel	5	360
Silty medium to fine gravel	5	365
Clayey medium to fine gravel	5	370
Sandy gravelly clay	10	380
Sandy clay	5	385
Slightly gravelly & sandy clay	5	390
Slightly gravelly clay	5	395
Slightly gravelly, sandy clay	5	400
Slightly sandy clay	10	410
Slightly gravelly, sandy clay	5	415
Slightly sandy clay	5	420
Gravelly clay	5	425
Clayey medium to fine gravel	30	455
Slightly clayey medium to fine gravel	5	460
Clayey medium to fine gravel	5	465
Basalt	32	497

699-41-23
Location: N40692, W20976 12/27-3P1
Casing Elevation: 466.50
Cable tool, drilled by Rumley of USGS for SE Company, 1948, groundwater monitoring borehole

Material (ft)	Thickness	Depth
Sand, rocks & boulders	10	10
Basalt rocks & boulders	9	19
Basalt & boulders	1	20
Basalt rocks & boulders	10	30
Basalt, rocks & boulders & fine black sand	3	33
Basalt & black sand; basalt, rocks & boulders & fine black sand	6	39
Fine black & white sand; basalt, rocks & boulders & fine black sand	4	43
Basalt, rocks & fine sand	20	63
Gravel & rocks; basalt, rocks & fine sand	2	65
Sand, rocks & boulders & basalt	10	75
Coarse sand, rocks & basalt; sand, rocks, boulders & basalt & coarse sand	10	85
Gravel & rocks	10	95
Fine sand, fine gravel, sand & silt	6	101
Sand & gravel	9	110
Coarse sand, gravel & basalt	10	120

699-41-25 Golder well #22
Location: N40642, W20981 12/27-3N1
Casing elevation: 468.37
Air rotary, drilling by Carman water wells & logged by Burrell of Golder Associates for NESCO, 1980, geologic investigation borehole

Material	Thickness	Depth
Fine to medium sand, trace fine gravel	5	5
Fine to medium sand & fine to coarse gravel, trace silt	10	15
Fine to coarse gravel	5	20
Fine to coarse gravel, some coarse sand	5	25
Fine to medium gravelly, medium to coarse sand	5	30
Fine sand	5	35
Fine to coarse sand & fine to medium gravel	5	40
Fine to coarse sand & fine to coarse gravel	15	55
Fine to medium gravelly, fine sand & silt	5	60
Medium sand, some medium gravel	10	70
Medium to coarse sandy, fine to coarse gravel, trace silt	10	80
Medium sand, some medium to coarse gravel	5	85
Medium to coarse sand & fine to medium gravel	5	90
Medium to coarse sand & fine to medium gravel, trace silt	5	95
Medium to coarse sandy, fine to medium gravel	5	100
Medium sand, trace fine to medium gravel	5	105

699-41-31 (Golder Well #44)
Location: N41030, W20731 12/27-4M1
Casing Elevation: 504.63
Air rotary (to 140 ft.) & mud rotary, drilled by Carman Water Wells & logged by Wilkening of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium to fine sand & silt	5	5
Coarse to fine sand & gravel, trace silt	5	10
Medium to fine sand, trace silt	5	15
Coarse to fine sand & gravel, trace silt	35	50
Coarse to medium gravel, trace sand & silt	10	60
Coarse to fine sand & gravel, trace silt	10	70
Coarse to fine gravel, some sand, trace silt	10	80
Coarse to fine sand & gravel, trace silt	20	100
Medium to fine sand, trace silt & gravel	5	105
Coarse to fine sand & gravel, trace silt	5	110
Medium to fine sand, trace silt & gravel	5	115
Medium to fine sand, some silt, trace gravel & clay	10	125
Fine sand & silt, trace clay & gravel	20	145
Fine sand & silt, some clay	10	155
Fine sand & silt, trace clay	80	235
Fine sand & silt, some clay	5	240
Medium to coarse gravel, trace sand & clay	70	310
Basalt	25	335

699-41-32 (Golder Well #73)
Location: N41717, W29880 12/27-4M2
Casing Elevation: 481.25
Air rotary (to 176 ft.) & diamond coring, drilled by Carman Water Wells & Wallace Drilling Company & logged by Lubrecht of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Silt & trace sand	15	15
Medium to coarse sand & gravel, trace silt	5	20
Fine to medium sand	10	30
Medium sand & fine to coarse gravel	5	35
Gravelly fine to coarse sand	5	40
Fine to coarse sand & gravel	45	85
Fine to coarse sand & gravel, trace silt	15	100
Gravelly fine to coarse sand	15	115
Fine to coarse sand & gravel	15	130
Fine to coarse sand, some gravel	10	140
Fine to coarse gravel, some sand	5	145
Gravelly fine to coarse sand	10	155
Fine to coarse sand & gravel	21	176
Sandy cobble gravel	8	184
Fine to medium sand	1	185
Sandy conglomerate	1	186
Fine to medium sand	4	189
No record	1	189
Sandy pebble-cobble gravel	5	194
Fine to medium sand	3	197
Sandy gravel	7	204
Gravelly muddy fine to medium sand	2	206
Fine to medium sand	17	224
No recovery	1	225
Fine to medium sand	5	230
Gravelly fine to medium sand	1	231
Slightly gravelly fine to medium sand	1	232
Gravelly mudstone	1	233
Same as interval 231-232 ft.	11	244
No record	1	244
Slightly gravelly fine to medium sand	6	250
Sandy pebbly conglomerate	2	252
Fine to medium sand	3	255
Sandy gravel & gravelly medium sand	4	259
Medium to coarse sand	4	263
Sandy cobble gravel	1	264
Sandy siltstone	6	270
Silty fine sandstone	1	270
Siltstone	4	274
Sandy siltstone	7	287
Silty fine to medium sandstone	2	289
Silty sandstone	10	299
No record	1	300
Muddy gravel	2	302
Sandy siltstone	8	310
Silty sand	12	322
Silty fine sandstone	3	325
Fine to medium sand	2	327
Fine to medium sandstone	2	329
Medium sand	5	334
Muddy fine sand	6	340
Muddy medium to coarse sandstone	2	342
Muddy fine sandstone	14	356
Sandy pebble conglomerate	1	357
Medium to coarse sandstone	1	358
Sandy pebble conglomerate, sand interbeds at 374 ft.	14	382
Sandy pebble-cobble conglomerate	9	391
Sandy pebble gravel	4	395
Sandy pebble-cobble gravel	7	402
Sandy pebble conglomerate	10	412
Sandy pebble-cobble conglomerate	2	414
Sandy pebble-cobble gravel	4	418
Sandy pebble-cobble conglomerate	3	421
Medium to coarse sandstone	1	422
Sandy pebble-cobble conglomerate	4	425
Basalt, vesicular at top	38	464

699-[illegible] J
Location: 12/29-5L1
Casing Elevation:
Cable tool, drilled by Bultena of Hatch Drilling Company for PNL, 1979, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil	2	0
Medium sand, buff	20	20
Sandy pebble gravel	10	30
Sandy cobble gravel	25	55
Sandy pebble gravel	10	65
Sandy cobble gravel	2	67
Coarse black sand	12	79
Medium black sand	6	85
Medium to very coarse black sand	10	95

699-42-3 (Golder well # 116)
Location: N41990, W2225 12/28-5L1
Casing elevation: 444.27
Air rotary, drilled by Carman water wells & logged by MacLeod & Mac Rae of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Fine to medium sand	10	10
Fine to coarse gravel, some fine to coarse sand	10	20
Fine to coarse gravel, trace medium to coarse sand	5	25
Fine to coarse gravel, some medium to coarse sand	35	60
Fine to coarse gravel, trace medium to coarse sand	15	75
Fine to coarse gravel, some medium to coarse sand	15	90
Fine to coarse gravel, trace medium to coarse sand	5	95
Fine to coarse gravel, some medium to coarse sand	20	115
Clayey silt, some fine to coarse gravel	5	120
Clayey silt	20	140
Clayey silt, trace fine sand	10	150
Silt, some clay, trace fine sand	10	160
Fine to medium sand & silt, trace clay	5	165
Silty fine to medium sand, trace clay	10	175
Fine to coarse sand, some fine to coarse gravel & silt, trace clay	5	180
Fine to medium sand, trace silt	10	190
Fine to medium sandy silt, trace clay	20	210
Silt, some fine sand, trace clay	20	230
Silty gravel, some fine sand	5	235
Fine to medium sand & fine to medium gravel, trace silt	5	240
Fine to coarse sand & fine to coarse gravel	15	255
Fine to coarse, gravelly fine, to coarse sand	5	260
Fine to medium sand	5	265
Fine to coarse gravelly, fine to coarse sand	10	275
Fine to medium gravel, some fine to coarse sand, trace silt	5	280
Fine to coarse gravel, trace fine to coarse sand & silt	5	285
Fine to coarse sand & fine to coarse gravel, trace silt	5	290
Fine to coarse sand, some fine to medium gravel, trace silt	30	320
Fine to coarse, sandy silt, trace clay	10	330
Fine to coarse sandy silt, trace clay & gravel	5	335
Fine to coarse, sandy silt, trace clay	5	340
Silt, some fine to coarse sand, trace fine gravel & clay	10	350
Fine to coarse sand & silt, trace fine gravel & clay	5	355
Fine to coarse sand & silt, trace clay	5	360
Silt, trace fine sand & clay	10	370
Silt, some fine to medium sand, trace clay	5	375
Silt, some clay, trace fine to medium sand	5	380
Clayey silt, trace fine to medium sand	10	390
Silty clayey, trace fine to coarse sand	10	400
Basalt	20	420

699-42-10 (Golder well #112)
Location: N41347, W9682 12/27-1Q1
Casing elevation: 495.80
Air rotary, drilling by Carman water wells & logged by Nesbitt & MacLeod of Golder Associates for WESCO, 1980, geologic investigation borehole

Material	Thickness	Depth
Fine to medium sand, some fine to coarse gravel	5	5
Fine to coarse gravel, trace fine to coarse sand	10	15
Fine to coarse gravel, some fine to coarse sand	10	25
Fine to coarse gravelly, medium to coarse sand	5	30
Fine to coarse sand, some fine to medium gravel	25	55
Fine to coarse sand & fine to coarse gravel	5	60
Fine to coarse sandy, fine to coarse gravel	5	65
Fine to coarse gravel, some fine to coarse sand	5	70
Fine to coarse sand & fine to coarse gravel	5	75
Fine to coarse sand, trace fine to medium gravel	5	80
Fine to coarse sand, some fine to medium gravel	5	85
Fine to coarse sand & fine to coarse gravel	5	90
Fine to coarse gravelly, fine to coarse sand	5	95
Fine to coarse sand, some fine to medium gravel	10	105
Fine to coarse sand, trace fine gravel	10	115
Fine to coarse sand	10	125
Fine to coarse sandy, fine to coarse gravel	15	140
Fine to coarse gravel, some fine to coarse sand	5	145
Fine to coarse sandy, fine to coarse gravel	20	165
Fine sand & silt, trace fine to medium gravel	5	170
Silt, some fine sand, trace clay	40	210
Basalt, trace clay	10	220

699-42-12A
Location: N42474, W11725 12/27-1K1
Casing Elevation: 514.27
Cable tool, drilled by Swain of Hatch Drilling Company for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	10	10
Gravel-cobbles	8	18

No record	1	19
Gravel-small cobbles	1	20
Cemented gravel	7	27
Gravel-cobbles	4	31
Gravel	6	37
Gravel-cobbles	11	48
Sand-gravel	8	56
Black coarse sand	12	68
Black-basalt-sand	12	80
Small gravel	5	85
Black basalt, sand & gravel	3	88
Black basalt, sand & mixed gravel	2	90
Black sand-small mixed gravel	8	98
Clean mixed sand	17	115
Sand-small gravel	15	130
Layers of sand & cemented gravel	10	140
Cemented gravel	2	142
Cemented sand	16	158
Sand-gravel-softer	2	160
Cemented sand & gravel	10	170
Softer sand & gravel	5	175
Clean gravel	7	182
Sand & gravel	3	185
Cemented sand & gravel	5	190
Sand & small gravel	7	197
Sand & gravel	3	200
Cemented sand	5	205
Sand, gravel & silt	5	210
Sand-silt	13	223
Sand-silt (conglomerate)	12	235
Sand-silt-gravel (conglomerate)	10	245
Conglomerate (more clay)	5	250
Conglomerate	25	275
Brown clay	10	285
Blue clay	43	328
Basalt	12	340
Basalt-very hard	10	350

699-42-12B
Location: 12/27-1K2
Casing Elevation: 814
Air rotary, drilled by Aqua Drilling & logged by Hodge of & for RHO, 1976, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sandy gravel	15	15
Sandy pebble gravel, fine to medium sand	15	30
Slightly sandy pebble gravel	5	35
Gravelly medium sand	5	40
Fine to medium sand	10	50
Gravelly medium sand	20	70
Sandy pebble gravel	20	90
Gravelly fine to medium sand	20	110
Sandy pebble gravel, some cobbles	35	145
Gravelly fine sand	5	150
Slightly gravelly, silty very fine sand	5	155
Muddy, sandy gravel	5	160
Sandy pebble & cobble gravel	15	175
Fine to medium sand	5	180
Sandy pebble gravel	10	190
Gravelly fine to medium sand	15	205
Fine to medium sand	5	210
Sandy cobble & pebble gravel	10	220
Fine to medium sand	25	245
Silty clay	15	260

699-42-12C
Location: 12/27-1K2
Casing Elevation: 814
Air rotary, drilled by Aqua Drilling & logged by Hodge of & for RHO, 1976, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sandy gravel	20	20
Sandy pebble & cobble gravel	15	35
Medium to fine sand	15	50
Gravelly fine to medium sand	20	70
Sandy pebble & cobble gravel	20	90
Gravelly fine to medium sand	10	100
Slightly gravelly fine to medium sand	15	115
Gravelly fine to medium sand	5	120
Sandy pebble & cobble gravel	5	125
Gravelly fine to medium sand	10	135
Sandy pebble & cobble gravel	5	140
Fine to medium sand	5	145
Sandy pebble & cobble gravel	10	155

699-42-21 (Golder Well #25)
Location: N41641, W21298 12/27-3J1
Casing Elevation: 463.95
Air rotary (to 118 ft.) & mud rotary, drilled by Carman Water Wells & logged by Wilkening & Burrell of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Silty sand	5	5
Slightly sandy & silty coarse to fine gravel	20	25
Slightly silty coarse to fine gravel	10	35
Slightly silty & sandy coarse to fine gravel	5	40
Coarse to fine gravel	15	55
Slightly sandy coarse to fine gravel	5	60
Slightly silty & sandy coarse to fine gravel	5	65
Slightly silty coarse to fine gravel	10	75
Sandy silty coarse to fine gravel	5	80
Sandy coarse to fine gravel	5	85
Gravelly coarse to fine sand	10	95
Slightly silty gravelly coarse to fine sand	5	100
Gravelly coarse to fine sand	5	105
Gravelly silty coarse to fine sand	5	110
Gravelly coarse to fine sand	8	118
Slightly sandy medium to fine gravel	7	125
Coarse to fine gravel	5	130
Slightly sandy coarse to fine gravel	15	145
Coarse to fine gravel	5	150
Medium to fine gravel	15	165
Slightly sandy medium to fine gravel	20	185
Slightly sandy, silty medium to fine gravel	10	195
Slightly silty & sandy medium to fine gravel	50	245
Slightly silty medium to fine gravel w/trace sand	5	250
Slightly silty & sandy medium to fine gravel	5	255

Slightly silty medium to fine gravel w/trace sand	6	261
Slightly sandy, silty medium to fine gravel	9	270
Silty medium to fine gravel	5	275
Silty sandy medium to fine gravel	5	280
Slightly sandy, silty medium to fine gravel	15	295
Sandy, silty medium to fine gravel	15	310
Slightly silty clayey medium to fine gravel	5	315
Silty & clayey medium to fine gravel	5	320
Silty medium to fine gravel	5	325
Gravelly sandy silt	20	345
Silty sandy gravel	5	350
Silty clayey gravel	5	355
Slightly sandy, clayey, silty gravel	5	360
Silty clayey gravel	5	365
Slightly clayey gravel	5	370
Gravelly clayey silt	15	385
Gravelly silty sand	30	415
Clayey gravel	25	440
No sample	5	445
Clayey gravel	5	450
Slightly clayey sandy gravel	5	460
Basalt	19	479

699-42-27 (Golder well # 31)
Location: N42249, W26586 12/27-4Q1
Casing elevation: 462.84
Air rotary, drilled by Carman Water Wells & logged by MacLeod of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (ft)	Thickness	Depth
Fine sand & silt	5	5
Fine to coarse sand, some silt & gravel	25	30
Fine to coarse sand, trace silt, some gravel	5	35
Fine to medium gravel, trace silt, some fine to coarse sand	10	45
Fine sand, some silt, trace gravel	5	50
Fine to coarse gravel	10	60
Fine to medium sand	5	65
Fine to medium sand & fine to medium gravel	25	90
Fine to medium sand	10	100

699-42-29 (Golder well #42)
Location: N42414, W29029 12/27-4F1
Casing Elevation: 455.22
Air rotary (to 120 ft.) & mud rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (ft)	Thickness	Depth
Medium to coarse sand & fine to coarse gravel	5	5
Sandy fine to coarse gravel	5	10
Medium to fine sand, trace gravel	10	20
Medium sand & medium to coarse gravel	10	30
Fine to coarse gravel, some medium to coarse sand	10	40
Medium to fine sand & fine to coarse gravel, trace silt	10	50
Fine to coarse gravel, some sand	5	55
Medium to coarse sand & fine to coarse gravel	5	60
Fine to coarse sand & fine to coarse gravel, trace silt	50	110
Siltstone, trace sand & gravel	10	120
Gravelly, fine to coarse sand, trace silt	10	130
Fine to coarse sand & gravel, trace silt	5	135
Sandy fine to coarse gravel, trace silt	5	140
Fine to coarse gravel, some sand, trace silt	15	155
Coarse sand, some silt, trace gravel	5	160
Fine to coarse sand & fine to medium gravel, trace silt	5	165
Fine to coarse sand, some gravel, trace silt	5	170
Silty fine to coarse sand, trace clay	10	180
Fine to coarse sand & silt, trace gravel & clay	15	195
Fine to coarse sand, some silt, trace gravel & clay	15	210
Fine to coarse sand, trace silt, gravel & clay	20	230
Fine to coarse gravel, trace silt, sand & clay	20	250
Fine sand & silt, trace clay & gravel	5	255
Coarse to fine sand & silt, trace clay & gravel	45	300
Silty coarse to fine sand, trace gravel & clay	5	305
Coarse to fine sand & silt, trace clay & gravel	40	345
Fine to coarse gravel, trace sand & silt	15	360
Fine to coarse gravel & sand, trace silt	15	375
Fine to coarse sand, some silt, trace gravel	5	380
Coarse to fine sand & silt, trace clay & gravel	10	390
Coarse sand & fine gravel, trace silt	10	400
Coarse sand & fine to medium gravel, trace silt	15	415
Coarse sand & fine gravel, trace silt	15	430
Basalt	30	460

699-42-30 (Golder well #73)
Location: N41717, W29880 12/29-5D
Casing elevation: 481.25
Air rotary (to 176 ft.) & diamond coring, drilled by Carman Water Wells & Wallace Drilling Company & logged by Lamerent of Golder Associates for WESCO, 1980, geologic investigation borehole

Material	Thickness	Depth
Silt & trace sand	15	15
Medium to coarse sand & gravel, trace silt	5	20
Fine to medium sand	10	30
Medium sand & fine to coarse gravel	5	35
Gravelly fine to coarse sand	5	40

Fine to coarse sand & gravel	45	85
Fine to coarse sand & gravel, trace silt	15	100
Gravelly fine to coarse sand	15	115
Fine to coarse sand & gravel	15	130
Fine to coarse sand, some gravel	10	140
Fine to coarse gravel, some sand	5	145
Gravelly fine to coarse sand	10	155
Fine to coarse sand & gravel	21	176
Sandy cobble gravel	8	184
Fine to medium sand	1	185
Sandy conglomerate	1	186
Fine to medium sand	4	189
No record	1	189
Sandy pebble-cobble gravel	5	194
Fine to medium sand	3	197
Sandy gravel	7	204
Gravelly muddy fine to medium sand	2	206
Fine to medium sand	17	223
No recovery	2	225
Fine to medium sand	4	229
Gravelly fine to medium sand	2	231
Slightly gravelly fine to medium sand	1	232
Gravelly mudstone	1	232
Same as interval 231-232 ft.	11	243
No record	1	244
Slightly gravelly fine to medium sand	6	250
Sandy pebbly conglomerate	3	252
Fine to medium sand	4	256
Sandy gravel & gravelly medium sand	3	259
Medium to coarse sand	4	263
Sandy cobble gravel	1	264
Sandy siltstone	6	270
Silty fine sandstone	1	270
Siltstone	4	274
Sandy siltstone	7	287
Silty fine to medium siltstone	8	299
No record	1	300
Muddy gravel	2	302
Sandy siltstone	8	310
Silty sand	12	322
Silty fine sandstone	3	325
Fine to medium sand	2	327
Fine to medium sandstone	2	329
Medium sand	5	334
Muddy fine sand	6	340
Muddy medium to coarse sandstone	2	342
Muddy fine sandstone	14	366
Sandy pebble conglomerate	1	367
Medium to coarse sandstone	1	368
Sandy pebble conglomerate, sand interbeds at 374 ft.	14	382
Sandy pebble-cobble conglomerate	9	391
Sandy pebble gravel	4	395
Sandy pebble-cobble gravel	7	402
Sandy pebble conglomerate	10	412
Sandy pebble-cobble conglomerate	2	414
Sandy pebble-cobble gravel	4	418
Sandy pebble-cobble conglomerate	2	420
Medium to coarse sandstone	2	422
Sandy pebble-cobble conglomerate	4	426
Basalt, vesicular at top	19	445
Basalt, vesicular at top	9	464

699-40-42 (DB-8)
Location: N41894, W42063 12/25-121
Casing Elevation: 602.28
Cable tool to 314 ft. & diamond coring, drilled by Row & Richards for JE Company & Boyles Brothers Drilling Company for RHO, 1977, groundwater monitoring borehole & geologic investigation borehole

Material (1, 16)	Thickness	Depth
Blow sand, top soil	5	5
Sand-layers of gravel	5	10
Sand-gravel	10	20
Sand-caves	20	40
Sand-some silt-caves	30	70
Sand, very little silt	46	116
Coarser sand, some silt	5	120
Coarse sand-small gravel, some silt	10	130
Gravel	17	147
Pure gravel-caves	41	188
3 ft. gravel-2 ft. heavy silt-small gravel, caliche	2	190
Heavy silt w/small chips of basalt & caliche	16	206
2 ft. heavy silt & 2 ft. gravel*	4	210
*formation is a conglomerate of sand, silt & gravel		
Silt & gravel-sand*	8	218
Conglomeration sand-gravel-silt	22	240
2 ft. conglomeration, 3 ft. lava ash? or bluish silt?	5	245
Lava ash?-bluish silt or shale? fine basalt chips & gravel up to 1 in.	5	250
Shale w/basalt & heavy quartzite-small gravel	10	260
Shale w/basalt & heavy quartzite-small gravel-found 2 pieces of wood. This formation has a layer of shale, then a layer of gravel-shale is black wet-gray when dried	5	265
2 ft. above-3 ft. sand-gravel	5	270
2 ft. sand-gravel-3 ft. conglomeration	5	275
Conglomeration	5	280
Black mud-gravel basalt-sand	10	290
Basalt-gravel	5	295
Rotten basalt gravel-looks like cinders-very porous	5	300
4 ft. above-1 ft. basalt	5	305
Basalt	9	314
Basalt	60	374
Tuff, tuffaceous sandstone, sandstone, clay, silt & siltstone	58	432
Basalt	184	616
Clay, sandstone	16	632
No record, lost	6	638
Basalt	97	735
Tuffaceous sandstone	17	752
No record, lost, probably uncemented coarse sand	10	762
Clayey silty sandstone, clayey sandy siltstone, tuff, brown, clay	37	799
No record, lost	5	804
Tuffaceous siltstone	6	810
No record, lost	1	811
Tuffaceous siltstone	19	830
Basalt	145	975
Lapilli tuff & tuffaceous sandstone	4	979

No record, lost	4	980
Siltstone, sandstone, sand	43	1,026
No record	7	1,033
Sand & clay	43	1,076

699-42-38 (RRL-5) 12/25-3E1
Location:
Casing elevation: 544
Cable tool (to ~200 ft.) & mud rotary, drilling by Bultena of Hatch Drilling Company & Conen of McDonald Drilling Company logged by Lillie of & for Rockwell, 1981, geologic investigation borehole

Material (2)	Thickness	Depth
Silty, fine sand	5	5
Gravelly, silty, fine sand	5	10
Silty, fine to medium sand	5	15
Silty, medium, quartz/basalt sand	20	35
Slightly gravelly, silty, medium, quartz/basalt sand	5	40
Silty, medium, quartz/basalt sand	5	45
Silty, sandy, basaltic gravel	15	60
Same, more rotten, basalt cobbles	5	65
Same, more matrix content	5	70
Same, pea gravel	20	90
Gravelly, coarse sand, 50/50 basalt/quartz	5	95
Slightly gravelly, silty, medium sand	10	105
Silty, medium to fine sand	45	150
Slightly gravelly, silty, fine to medium sand	5	155
Silty, sandy cobble to boulder gravel, cemented	20	175
Slightly gravelly, silty, fine sand	10	185
Same, no gravel	15	200
Silty, coarse sand, cobble gravel, lots of exotics	5	225
Gravelly, silty, coarse sand	25	250
Very silty, clayey ?, sandy, coarse gravel	20	280
Silty, gravelly, coarse sand	15	295
Very silty, clayey ?, sandy, coarse gravel	35	330
Silty, sandy gravel to silty, gravelly sand	30	360
Very silty, coarse, sandy, coarse gravel	35	395
Gravelly silt, gray brown	5	400
Silty, sandy, coarse gravel	25	425
Slightly gravelly, carry down ?, plastic, gray brown, clayey silt	10	435
No sample	5	440
Gray to blue-gray clay, sticky	30	470
Green-black clay	15	485
Light green clay	25	510
Clayey gravel	5	515
Coarse to very coarse, sandy, clayey gravel	10	525
Very coarse, gravel cuttings & grey clay balls	5	530
Sandy, clayey grave	10	540
Gravelly, sancy, gray clay	5	545
Clayey, sandy gravel	15	560
Gravelly, sandy gray clay	20	580
Slightly, sandy, gray clay	10	590
Sandy, very coarse, grey clay	34	624
Basalt	1	625

699-43-1 12/28-5D1
Location:
Casing elevation:
Cable tool, drilled by Bultena of Hatch Drilling Company for PNL, 1980, ground-water monitoring borehole

Material	Thickness	Depth
Brown sand	15	15
Large cobbles, gravel	4	19
Large cobbles, boulders, gravel	6	25
Silty, tan clay	39	64
Coarse, rust-colored sand, beginning to show up in clay	1	65

699-43-2 (Golder well # 117)
Location: N43264, +1506 12/22-5K1
Casing elevation: 405.72
Air rotary, drilled by Carman Water Wells & logged by MacLeod of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Fine to medium sand	25	25
Fine to medium sand, trace silt	5	30
Fine to coarse gravel, some fine to coarse sand	10	40
Fine to coarse sand & fine to coarse gravel	10	50
Fine to coarse gravel, some fine to coarse sand	5	55
Fine to coarse sandy, fine to coarse gravel, trace silt	5	60
Fine to coarse sand & fine to coarse gravel, some silt	5	65
Silty, fine sand	5	70
Silty, fine sand, trace fine gravel	15	85
Silty, fine sand, trace clay	2	110
Fine, sandy silt, trace clay	15	125
Fine to medium sand, some silt	5	130
Fine to medium sand, some fine to medium gravel	5	135
Fine to medium sand & fine to coarse gravel	10	145
Silty, fine sand	25	170
Fine sand, some silt	15	185
Silty, fine sand	15	200
Silty, fine sand, trace fine gravel	10	210
Fine to medium sand & fine to medium gravel some silt	5	215
Fine to medium sand & fine to coarse gravel, trace silt	10	225
Fine to medium sand & fine to coarse gravel	5	230
Fine to medium sand, some fine to coarse gravel	5	235
Fine to medium sand	45	280
Fine to medium gravel	5	285
Fine to medium gravel, some fine sand and silt	5	290
Fine to medium, gravelly silt, some fine sand	10	300
Silt, some fine sand, trace clay	40	340
Basalt	50	390

699-43-3
Location:
Casing Elevation: 12/28-8E1
Cable tool, drilled by Bultena of Hatch Drilling Company for PNL, 1979, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine light gray sand	15	15
Sand & gravel	3	18
Sandy cobble gravel	14	32
Cobbles & boulders	3	35
Poorly sorted cobbles & gravel	20	55
Poorly sorted sandy gravel	15	70
Gravelly sand	5	75
Coarse sand, light brown	5	80
Fine sand, brown	6	86
Silty clay	2	88

699-43-8 (Golder well #71)
Location: N42267, W7528 12/28-6F1
Casing Elevation: 472.22
Air rotary (to 140 ft.) & mud rotary, drilled by Carman of Carman Water Wells & Labello of Longyear Drilling Company & logged by Findley, Lubrecht & Wilkening of Golder Associates for NESCO, 1979, geologic investigation borenole

Material (11)	Thickness	Depth
Gravel; fine pebbles to boulders	15	15
Sandy gravel	5	20
Fine pebbly gravel	5	25
Gravel	5	30
Fine pebbly gravel	5	35
Medium sandy gravel	15	50
Gravel	10	60
Sandy gravel	5	65
Gravel	5	70
Medium sandy gravel	10	80
Medium sandy gravel to medium pebbly gravel	5	85
Gravel	15	100
Sandy gravel	5	105
Very fine pebbles - medium gravel	5	110
Sandy clayey silt interbedded w/above gravels	5	115
Silty clay interbed	5	120
Gravelly sandy, clayey silt	10	130
No recovery	10	140
Gravel	35	175
Clayey gravel	5	180
Gravelly clay	35	215
Gravelly clay to clay	48	263
Basalt	20	283

699-43-9 (Golder well #105)
Location: N42625, W8682 12/28-6F1
Casing elevation: 490.74
Air rotary, drilling by Carman Water Wells & logged by MacLeod of Golder Associates for NESCO, 1980, geologic investigation borenole

Material (11)	Thickness	Depth
Fine sand	5	5
Fine to medium sand	5	10
Medium to coarse sand & fine to coarse gravel	85	95
Fine sand, some medium to coarse gravel, trace silt	5	100
Fine to coarse sand	5	105
Fine to coarse sand & fine to medium gravel	15	120
Medium to coarse sand & fine to medium gravel	30	150
Fine to coarse sand & fine to medium gravel	5	155
Fine to coarse sand & fine to coarse gravel	10	165
Basalt	55	220

699-43-18 (Golder well #22)
Location: N42891, W8036 12/27-8F1
Casing Elevation: 517.97
Air rotary (to 140 ft.) & mud rotary, drilled by Carman Water Wells & logged by Burrell & Wilkening of Golder Associates for NESCO, 1980, geologic investigation borenole

Material (11)	Thickness	Depth
Fine sand w/some gravel & silt	5	5
Cobbles w/some gravels & trace sand	9	14
Fine to coarse gravel w/trace sand	16	30
Fine to medium gravel w/some sand	5	35
Fine to medium gravel w/some sand, trace silt	5	40
Fine to coarse gravel w/trace sand & silt	5	45
Sandy fine to coarse gravel	10	55
Fine gravel w/some sand	30	85
Silty medium to fine sand	15	100
Medium gravel w/trace sand	5	105
Sandy medium gravel w/trace silt	15	120
Sandy medium gravel	5	125
Medium sand w/some gravel	7	132
Sandy medium gravel w/trace silt	8	140
Coarse to fine sand & gravel; cemented at 210 to 220 ft. & 225-230 ft.	90	230
Fine sand & silt, some gravel	30	260
Medium to fine sand & coarse to fine gravel w/trace silt & clay	10	270
Medium to fine sand & coarse to fine gravel	5	275
Medium to fine sand & coarse to fine gravel w/trace silt & clay	20	295
Medium to fine sand & coarse to fine gravel	25	320
Fine sand & silt, trace clay & gravel	25	345
Fine sand & silt, trace clay	35	380
Fine sand & silt, trace clay & gravel	10	390
Medium to fine sand, trace silt	15	405
Fine sand & silt, trace clay	55	455
Basalt	35	490

699-43-23 (Golder well #24)
Location: N43245, W22583 12/27-3G1
Casing Elevation: 819.31
Air rotary (to 140 ft.) & mud rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for NESCO, 1980, geologic investigation borenole

Material (11)	Thickness	Depth
Fine sand w/some silt & gravel	5	5
Coarse sand w/some gravel	35	40
Medium gravel w/trace coarse sand	52	92

Fine sand w/some medium gravel	10	102
Medium gravel	4	106
Medium gravel w/some silt	19	125
Medium to coarse gravel w/some sand	115	240
Sand w/some silt & clay	10	250
Medium gravel w/some silt, & trace clay & sand	50	300
Silty clay w/trace fine sand	20	320
Medium gravel w/some coarse sand, & trace of silt & clay	10	330
Silty clay w/trace fine sand	10	340
Fine to medium gravel w/some sand & trace of silt	25	365
Silty clay w/trace fine sand	15	380
Fine to medium gravel w/some sand & trace silt	20	400
Clay	10	410
Fine to medium gravel w/some sand & trace silt	5	415
Clay w/some fine sand & trace silt	5	420
No record	5	425
Clay w/some fine sand & trace silt	5	430
Fine to medium sand	30	460
Clay w/trace fine sand	15	475
Basalt	35	510

699-43-42 (DH-9A)
Location: N43049, W41715 12/26-1H1
Casing Elevation: 564.48
Cable tool (to 154 ft. & diamond coring, drilled by Bigham of Hatch Drilling Company & Hendrickson of Boyles Brothers Drilling Company for ARHCO, 1966, groundwater monitoring & geologic investigation borehole

Material (1, 13)	Thickness	Depth
Sand & cobbles	10	10
Sand & gravel to 4 in.	20	30
Sand	62	92
Cobbles	28	120
Sand, gravel & cobbles	30	150
Sand, gravel & some clay	4	154
Slightly calcareous sandy pebble to cobble gravel	8	162
Fair to well indurated sandy conglomerate	5	167
Slightly calcareous sandy pebble to cobble gravel	7	174
Poorly indurated pebbles & cobbles	6	180
Gray clay	1	181
Fair to poorly indurated calcareous sandy pebble to cobble gravel	4	185
Well indurated blue-gray clay	12	197
Poor to fair, indurated sandy pebble to cobble gravel	5	202
Well indurated slightly gravelly yellow clay	5	207
Weathered basalt w/some clay & $CaCO_3$	6	213
Basalt	10	223

699-43-83
Location: N42700, W38400 12/25-2S1
Casing Elevation:
Cable tool, drilled by Evans & Bigham of Hatch Drilling Company for Rockwell, 1980, geologic investigation & groundwater monitoring borehole

Material (1)	Thickness	Depth
70% very fine sand, 20% fine sand, angular, brown, gray, black, 10% silt brown	25	25
20% medium cobbles, 20% small cobbles, 20% large cobbles, 20% medium pebbles, subrounded, 20% fine sand, brown, black, gray	2	27
Same as 0-25 ft. interval	13	40
30% very fine sand, 30% fine sand, angular, brown, gray, black, 40% silt brown	10	50
70% very fine sand, angular, brown, gray, white, 40% silt brown; silt lense 8 in. thick at 53 ft.	10	60
50% very fine sand, angular, brown, gray, 50% silt brown	12	72
70% silt, brown, 30% very fine sand, angular, brown, gray, black	13	85
80% silt, brown, 20% very fine sand, brown, gray	4	89
80% silt, brown, 20% caliche	2	91
100% caliche	4	95
95% fine sand, angular, 5% caliche	5	100
95% medium sand, angular, brown, gray, 5% silt brown	5	105
80% very fine sand, angular, brown, gray, white, 20% silt brown	18	123
90% silt, reddish brown, 10% very fine sand, angular, brown, gray	2	125
80% silt, brown, 20% very fine sand, angular, brown, black, white	2	127
Boulders, 30% large pebbles, 20% small cobbles, 20% small pebbles, subrounded, black, brown, gray, 25% coarse sand, angular, brown, black, white, yellow, 5% silt brown	3	130
No record	3	133
20% large cobbles, 20% small cobbles, 10% large pebbles, 10% small pebbles, subrounded, brown, black, gray, 10% fine sand, 10% coarse sand, 10% medium sand, angular, black, brown, white, yellow, 10% silt brown; cemented	16	149
20% large cobbles, 20% small cobbles, 10% large pebbles, 10% small pebbles, subrounded, brown, gray, black, 10% fine sand, 20% medium sand, angular, brown, white, black, gray, 10% silt brown; cemented	10	159

20% small cobbles, 20% large pebbles, 20% small pebbles, subrounded, black, brown, gray, white, 20% medium sand, 10% coarse sand, angular, brown, black, white, gray, yellow, 10% silt brown; cemented	5	165
20% small cobbles, 20% large pebbles, 20% small pebbles, subrounded, black, brown, gray, white, 20% coarse sand, 10% fine sand, angular, brown, black, yellow, gray, white, 10% silt, brown; cemented	8	173
10% large cobbles, 20% small cobbles, 10% large pebbles, 20% small pebbles, subrounded, black, brown, white, yellow, 10% coarse sand, 10% medium sand, angular, brown, white, black, yellow, 20% silt brown	8	181
20% small cobbles, 20% large pebbles, 20% small pebbles, subrounded, brown, black, gray, white, yellow, 20% coarse sand, angular, brown, white, black, yellow, gray, 10% silt, brown	9	190
10% silt, 30% sand, 60% gravels to 3 in., cemented	2	192
10% silt, 50% sand, 40% gravel to 3 in., cemented	15	207
10% silt, 40% sand, 50% gravel	48	255

699-43-88
Location: N43174, W88400 12/25-101
Casing Elevation: 643.90
Cable tool, drilled by Chausse of USGS for 3E Company, 1948, groundwater monitoring borehole

Material (4)	Thickness	Depth
Sandy loam	10	10
Silt, sand & clay	15	25
Silt, sand, clay & gravel	3	28
Silt, sand & clay	5	33
Sand, silt & some clay	15	48
Gravel, boulders & silt	4	52
Sand, gravel & silt, dark brown	16	68
Sand, gravel & silt, light brown	2	70
Fine sand, light brown silt & gravel	12	82
Fine sand & silt	4	87
Sand, silt & gravel	13	100
Sand & silt	5	105
Light brown silt, sand & some gravel	5	110
Fine sand & brown silt	30	140
Sand, silt & gravel	2	142
Sand & gravel	1	143
Sand, gravel & silt	4	147
Sand, gravel, boulders & clay	1	148
Sand, gravel & clay	4	152
Sand, clay & gravel	10	162
Sand, gravel, silt & clay	5	167
Sand, gravel & clay	8	175
Sand, clay & gravel	11	186
Fine sand & fine gravel	4	190
Fine sand, gravel & clay	6	196
Sand, gravel, clay & silt	7	203

699-43-89
Location: N42200, W88500 12/25-302
Casing Elevation: 644.15
Cable tool, drilled by Stanbery & Robinson of USGS for 3E Company, 1951, geologic & hydrologic investigation borehole

Material (4)	Thickness	Depth
Recent alluvium	13	13
Silt & fine sand	16	29
Silt, clay & sand	15	44
Sand & gravel	28	72
Sand, gravel & silt	25	97
Sand & silt	15	112
Fine & medium sand	28	140
Sand & silty gravel	105	245
Sand w/gravel & silt	36	281
Sand & gravel	12	293
Gravel, granule to boulder size	3	296
Medium & coarse sand	4	300
Granule to cobble size gravel	7	307

699-43-104
Location: N42979, W104298 12/25-601
Casing Elevation: 756.27
Cable tool, drilled by Hatch of Hatch Drilling Company for 3E Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Silt	4	4
Basalt gravel	116	120
Brown sandy clay w/gravel	30	150
Sandy conglomerate	12	162
Sand & gravel particles	18	180
Sand & gravel cemented	5	185
Sand, gravel cemented very hard	6	191
Cemented sand & gravel-gray	20	211
Coarse sand & gravel	21	232
Clean gravel & sand	13	245
Sand, gravel, silt	22	267
Sand & gravel, clean	3	270
Sand & gravel w/silt	5	275
Sand & gravel, clean	20	295
Clean sand & gravel	9	304
Sandy clay & gravel	11	315
Sand-gravel-silt-loose	5	320
Yellow clay & gravel	10	330
Yellow clay & gravel hard	5	335
Yellow clay-basalt gravel	12	347
Brown sandy clay & basalt gravel	3	350
Green sandy clay & basalt gravel	5	355
Green clay & mixed gravel	15	370
Hard rock-black & some green	8	378
Mixed gravel & clay	2	380
Basalt cuttings-less clay	10	390
Basalt cuttings	6	396
Basalt	28	424
Gray clay & basalt particles	6	430
Gray clay-sand particles	20	450
Runny sand & little clay	5	455
Soapstone float	5	460
Soapstone float, basalt particles	4	464

699-44-2 12/28-5C1
Location:
Casing elevation:
Cable tool, drilled by Bultena of Hatch Drilling Company for PNL, 1980, ground-water monitoring borehole

Material	Thickness	Depth
Sand	2	2
Boulders, large cobbles	13	15
Boulders, cobbles, gravel	5	20
Cobbles, gravel	14	34
Silty, brown sand	1	35
Silty, tan clay	34	69
Coarse, rust-colored sand	1	70

699-44-4 12/28-5D
Location:
Casing elevation:
Cable tool, drilled by Bultena of Hatch Drilling Company for PNL, 1980, ground-water monitoring borehole

Material	Thickness	Depth
Sand	3	3
Boulders, cobbles, gravel	17	20
Large cobbles, gravel	8	28
Cobbles, gravel	2	30
Gravel, sand	7	37
Coarse, black sand, some gravel	3	40
Tan clay	8	48

699-44-7 (Golder well #106)
Location: N44185, W6730 12/28-6Q1
Casing Elevation: 437.78
Air rotary, drilled by Carman Water Wells & logged by Nesbitt of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to coarse sand, some fine to coarse gravel & cobbles	5	5
Fine to medium gravel, some fine to coarse sand	25	30
Fine to coarse sandy fine to medium gravel	5	35
Fine to medium gravel, some fine to coarse gravel	5	40
Fine to coarse sandy fine to medium gravel	10	50
Fine to coarse sand & fine to medium gravel	5	55
Fine to medium gravel, some fine to coarse sand	5	60
Fine to coarse sand & fine to medium gravel	5	65
Fine to medium gravelly fine to coarse sand	5	70
Fine to coarse sand & fine to medium gravel	5	75
Fine to coarse sandy fine to coarse gravel	5	80
Fine to coarse gravel, trace fine to coarse sand	10	90
Silt, some fine sand, trace clay	5	95
Silt & fine to coarse sand, trace clay	5	100
Fine to medium sand, some silt	10	110
Silt, some fine sand, trace clay	10	120
Fine sandy silt, trace clay	20	140
Silt, trace fine sand & clay	45	185
Fine to coarse gravel, some fine to coarse sand	5	190
Fine to coarse sandy fine to medium gravel	5	195
Silty fine to coarse gravel, some fine sand	5	200
Silt, some clay	20	220
Silt, some clay, trace fine sand	5	225
Silt, some clay	10	235
Silt, some clay, trace fine sand	5	240
Fine to medium sand, trace medium gravel	5	245
Fine to medium sand, trace silt	5	250
Fine to coarse gravel, trace fine to coarse sand & silt	5	255
Silt, some fine to medium sand, trace clay	10	265
Silt; trace fine gravel, fine to medium sand & clay	5	270
Silt, some clay; trace fine sand & fine gravel	5	275
Silty fine to coarse gravel, trace fine to coarse sand	5	280
Fine to coarse gravelly fine to coarse sand	10	290
Fine to coarse sand, some fine gravel	5	295
Fine to coarse gravelly fine to coarse sand	5	300
Fine to medium sand; trace fine gravel & silt	10	310
Fine to medium sand; trace fine to coarse gravel & silt	20	330
Fine to medium sand, some fine to medium gravel, trace silt	5	335
Silt; some fine to coarse gravel & some fine to coarse sand; trace clay	10	345
Silt, some fine sand, trace clay	5	350
Silt; trace fine sand & clay	70	420
Silt; trace clay & basalt	5	425
Basalt	50	475

699-44-16 (Golder well #33)
Location: N44275, W6306 12/27-2A1
Casing Elevation: 447.49
Air rotary, drilled by Carman Water Wells & logged by Burrell & Wilkening of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Silty fine sand	7	7
Sandy silty coarse to fine gravel	8	15
Slightly gravelly coarse to medium sand	5	20
Sandy silt	10	30
Fine sand	5	35
Silty fine sand	5	40
Fine sand	5	45
Slightly silty & gravelly fine sand	5	50
Sandy silty coarse to fine gravel	10	60
Sandy coarse to fine gravel	35	95
Fine sand	10	105
Gravelly fine sand	5	110
Sandy coarse to fine gravel	25	135
Sandy gravelly clay	10	145
No record	10	155
Fine sand & silt w/trace clay & gravel	25	180

Fine sand & silt w/trace clay	25	215
Sand & gravel	10	225
Sand & gravel w/trace clay & silt	30	255
Sand & gravel, cemented	30	285
Fine to medium sand	5	290
Fine to medium sand w/trace clay & silt	10	300
Fine sand & silt w/trace clay	55	355
Basalt	29	384

699-44-27 (Golder Well #42)
Location: N40871, 427349 12/27-481
Casing Elevation: 468.92
Air rotary (to 100 ft.) & mud rotary, drilled by Carman Water Wells & logged by Wilkening & Lorecht of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium to coarse sand & grav	100	100
Medium to coarse gravel	20	120
Sand & gravel, trace silt & clay	20	140
Sand & gravel	5	145
Sand & medium to coarse gravel	10	155
Sand & gravel, trace silt & clay	40	195
Sand & gravel, some silt, trace clay	60	255
Fine sand & silt, trace gravel; note this is "blue clay"	108	363
Basalt	60	423

699-44-28 (Golder Well #80)
Location: N40853, 429088 12/27-401
Casing Elevation: 466.63
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium to fine sand, some medium gravel, trace silt	5	5
Fine to coarse sand & fine to medium gravel	10	15
Fine to coarse gravel, trace coarse sand	10	25
Fine to coarse gravel, some coarse sand	5	30
Fine to coarse sand & fine to medium gravel	10	40
Fine to coarse gravel, trace coarse sand	5	45
Fine to coarse gravelly, fine to coarse sand	5	50
Fine to coarse sandy fine to coarse gravel	5	55
Fine to coarse gravel, some fine sand	5	60
Fine to coarse sand, some medium to fine gravel, trace silt	10	70
Fine to medium gravelly fine to coarse sand	5	75
Fine to medium gravelly fine to medium sand, trace silt	5	80
Fine to coarse sand & fine to medium gravel	5	85
Fine to medium gravelly medium to coarse sand, trace silt	5	90
Medium to coarse sand & medium to fine gravel	5	95
Fine to coarse sand & fine to coarse gravel	5	100
Fine to coarse sand & fine to medium gravel	5	105
Fine to coarse gravel, some medium to coarse sand	5	110

699-44-64
Location: N44052, 463751 12/26-541
Casing Elevation: 725.60
Cable tool, drilled by Freeman of Bach Drilling Company for BC Company, 1959, groundwater monitoring borehole

Material (11)	Thickness	Depth
Gravel is compact & dry w/occasional cobbles; large boulders at 9 ft.	32	32
1 large boulder or series of boulders, gravel-boulder	3	35
Grave -boulders	5	40
Gravel	8	48
Pea gravel to 2 in., slightly more clay & dirt in gravel	2	50
Sand & gravel, clay	5	55
Mostly gravel, some sand	5	60
Gravel, sand & clay	10	70
Sand & clay	10	80
Sand	15	95
Sand-few gravels	9	104
Sand-coarse	9	113
Medium sand	9	122
Fine sand	9	131
Sand, dirt	9	140
Fine sand	10	150
Sand & clay	10	160
Coarse sand & gravel	20	180
Sand & clay	10	190
Sand	5	195
Sand-compact	5	200
Sand & clay	10	210
Coarse sand	15	225
Sand, medium to fine	10	235
Medium sand	5	240
Medium to fine sand	5	245
Fine sand	10	255
Medium sand	10	265
Medium to fine sand	10	275
Sand & gravel	5	280
Gravel up to 4 in.; gravel is large & compact	5	285
Gravel, pea to 4 in.; gravel is large & compact	5	290
Gravel, up to 4 in. & large rocks 282 ft.-286 ft.	10	300
Gravel & clay; gravel large & tight, occasional boulder	5	305
Gravel, large & tight, occasional boulder	5	310
Gravel, large & compact	5	315
Gravel & clay; gravel up to 4 in. & tight	15	330
Gravel, large & compact	5	335
Gravel & clay; gravel to 4 in.	15	350
Gravel & sand; most gravel very large up to 5 in.	19	369
Smaller gravel & more sand	1	370
Sand	8	378
Blue clay	2	380
Blue clay & gravel	10	390
Sand, gravel & clay	5	395
Gravel, large & tight	10	405
Gravel & sand	5	410
Coarse gravel	5	415

Gravel & basalt	5	405
Sand, gravel & basalt	5	410
No record	10	420
Medium basalt gravel	5	425
Heavy gravel	5	430
Basalt & gravel; this conglomerate drills just like basalt	5	435
Sand & basalt	7	442
Basalt	10	452

699-44-70 (DC-1)
Location: N42802, 470156 12/26-681
Casing Elevation: 733.21
Rotary, drilled by Century Drilling Company for RHO, 1977, hydrologic investigation borehole

Material (2, 28)	Thickness	Depth
Sandy gravel to gravelly sand & sand	520	520
Basalt	90	610
Interbed	80	690
Basalt	145	835
Interbed	75	910
Basalt	80	990
Interbed	100	1,090
Basalt	150	1,240
Interbed	170	1,410
Basalt	145	1,555
Basalt	65	1,620
Basalt	125	1,745
Basalt	50	1,795
Basalt	160	1,955
Basalt	85	2,040
Basalt	75	2,115
Basalt	55	2,190
Basalt	50	2,240
Basalt	102	2,342
Basalt	130	2,472
Basalt	37	2,515
Interbed, cemented green sandstone	2	2,517
Basalt	38	2,555
Basalt	175	2,850
Basalt	150	3,000
Basalt	115	3,115
Basalt	65	3,180
Basalt	75	3,255
Basalt	65	3,320
Basalt	45	3,365
Basalt	110	3,475
Basalt	160	3,635

699-44-118
Location: 12/24-381
Casing Elevation: 1060
Drilled for Berk, 1967, irrigation water supply well

Material (35)	Thickness	Depth
White sandy soil	5	5
Clay & boulder conglomerate	20	25
Cement gravel-boulders	65	90
Sticky tan clay	20	110
Cement gravel	30	150
Sticky tan clay	10	160
Porous basalt	10	170
Black basalt	40	210
Sandy gray shale	40	250
Brown clay	10	260
Shale & gravel	30	290
Red rock	15	305
Broken basalt	5	310
Gray basalt	100	410
Broken gray basalt	50	460
Gray basalt	50	510
Cracked basalt-gray shale	50	560
Pillowed basalt	30	590
Gray basalt	50	640
Creviced gray basalt	10	650
Gray basalt	110	770
Sand	110	880
Black porous basalt, water	40	920
Hard gray sandstone	20	940
Black basalt	10	950
Gray sand rock	10	960
Sand & water	10	970
Blue gray basalt	5	975
Creviced blue gray basalt	5	980
Red-blue basalt	10	990
Red-blue shale, water	20	1,010
Creviced basalt & brown clay	9	1,019
Creviced blue gray basalt	21	1,040
Blue black basalt	20	1,060
Red black basalt	10	1,070
Gray basalt, water in crevice	10	1,080
Hard gray basalt	30	1,110
Red black basalt	10	1,120
Blue black porous basalt	20	1,140
Blue gray basalt	10	1,150
Iron gray basalt	10	1,160
Porous black basalt, water	20	1,180
Creviced gray black basalt	10	1,190
Gray black basalt	10	1,200
Red & black porous basalt	10	1,210
Gray basalt	5	1,215
Red black basalt	5	1,220
Gray basalt	9	1,229

699-45-4
Location:
Casing Elevation:
Cable tool, drilled by Bultena of Hatch Drilling Company & logged by Eddy of & for PNL, 1979, groundwater monitoring borehole

Material	Thickness	Depth
Sandy topsoil	5	5
Sand & gravel, gravel to 4 in.	1	6
Silt & fine sand, some gravel to 2 in.	2	8
Small gravel, sand & clay	2	10
Gravel, black sand, silt & clay	5	15
Black sand, clayey silt & gravel	10	25
Black sand, silt, small gravel	8	33
Coarse black sand, small gravel & silt	2	35
Medium black sand, some silt	5	40
Sandy gravel	5	45
Gravelly sand, tan	10	55

699-45-6A (Golder Well #9)
Location: N44872, W5566 12/28-6A1
Casing Elevation: 412.05
Air rotary (to 104 ft.) & mud rotary, drilled by Carman of Carman Water Wells & Longyear Drilling Company & logged by Wilkening & Lubrecht of Golder Associates for WESCO, 1979, geologic investigation borehole

Material (11)	Thickness	Depth
No record	10	10
Gravel & cobbles	36	46
Gravel	9	55
Sandy gravel	15	70
Gravelly sand	14	84
Sandy gravel	20	104
Gravelly clay	1	105
Clayey gravel	5	110
Sandy clayey gravel	5	115
No recovery	5	120
Clayey gravel	5	125
Clay	5	130
Silty clay	15	145
No recovery	20	165
Clay	25	190
Gravelly clay	10	200
Clay	40	240
Gravelly clay	10	250
Clay	103	353
Basalt	30	383

699-45-24 (Golder Well #23)
Location: N45047, W24075 12/27-34P1
Casing Elevation: 510.43
Air rotary, drilled by Carman Water Wells & logged by Wilkening of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Silty gravelly coarse to fine sand	10	10
Slightly silty coarse to fine gravel	15	25
Slightly silty cobbly coarse to fine gravel	5	30
Sandy coarse to fine gravel	5	35
Slightly silty & gravelly coarse to fine sand	5	40
Coarse to fine sand	5	45
Slightly silty & gravelly coarse to fine sand	5	50
Slightly silty sandy cobbly coarse to medium gravel	5	55
Coarse to medium gravel	5	60
Slightly sandy coarse to medium gravel	10	70
Slightly gravelly silty clay	5	75
Silty clay	5	80
Gravelly silty clay	5	85
Slightly sandy, clayey, silty, coarse to fine gravel	10	95
Coarse to fine gravel w/trace silt & clay	5	100
Coarse to fine gravel	16	116
Coarse to fine gravel w/ occasional lenses of silty clay	9	125
Cobbly coarse to fine gravel	10	135
Coarse to fine gravel	15	150
Cobbly coarse to fine gravel	5	155
Silty coarse to fine gravel	5	160
Gravelly clayey silt	10	170
Slightly clayey silty coarse to fine gravel w/trace sand	10	175
Coarse to fine gravel w/trace sand	5	180
Coarse to fine gravel w/trace sand & silt	5	185
Coarse to fine gravel w/trace sand	10	195
Slightly silty coarse to fine gravel w/trace sand	5	200
Coarse to fine gravel w/trace sand	5	205
Coarse to fine gravel	10	215
Slightly silty coarse to fine gravel	5	220
Sand w/some gravel & silt	15	235
Gravelly sand	5	240
Coarse to fine gravel w/trace sand	5	245
Slightly silty sand coarse to fine gravel	5	250
Slightly sandy coarse to fine gravel w/trace silt	5	255
Slightly silty coarse to fine gravel	6	261
Silty medium to fine gravel	14	275
Gravelly silt	5	280
Slightly sandy gravelly silt	10	290
Silty clayey medium to fine gravel	10	300
Gravelly silty sand	10	310
Sandy gravelly silty clay	10	320
Slightly sandy, silty, clayey medium to fine gravel	5	325
Slightly silty, sandy medium to fine gravel	15	340
Slightly sandy, clayey, silty medium to fine gravel	10	350
Sandy, silty, clayey medium to fine gravel	5	355
Gravelly clayey sand w/siltstone interbeds	15	370
Slightly gravelly sandy clay	15	385
Sandy clay	5	390
Sandy clay w/trace of fine gravel	5	395
Sandy clay	25	420
Slightly gravelly sandy clay	10	430
Clay w/fine gravel & coarse sand	5	434
Clay	3	437
Basalt	26	473

699-45-25 (Golder well #4)
Location: N45203, W29624 13/27-33R1
Casing Elevation: 513.58
Air rotary to 100 ft. & mud rotary, drilled by Carman Water Wells & logged by Lubrecht & Wilkening of Golder Associates for NEICO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Sand & gravel	5	5
Sand & gravel, trace silt	10	15
Sand, trace gravel	20	35
Sand & gravel	10	45
Sand, some gravel	5	50
Sand & gravel	25	75
Sand & gravel, trace silt	5	80
Fine to coarse sand & silt, trace clay	5	85
Fine sand, trace gravel	10	95
Sand & gravel	10	105
Fine sand, trace gravel	5	110
Sand & gravel	50	160
Sand & gravel, trace silt & clay	10	170
Fine sand & silt, trace clay, trace to some gravel	20	190
Sand & gravel	30	220
Sand & gravel, trace silt & clay	10	230
Fine to coarse sand & silt, trace clay & gravel	10	240
Sand & gravel, trace silt & clay	25	270
Sand & gravel	10	280
Sand & gravel, trace silt & clay	25	305
Fine sand & silt, trace clay & gravel	25	330
Gravel, trace sand, silt & clay	20	350
Fine to medium sand & silt, trace gravel	25	375
Sand & gravel, trace silt & clay	25	400
Fine sand & silt, trace clay & gravel	50	450
Basalt	22	473

699-45-30 (Golder well #7)
Location: N45457, W29592 13/27-33P1
Casing Elevation: 471.90
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NEICO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine sand, some silt	5	5
Fine to coarse sand & fine to coarse gravel	15	20
Fine to coarse gravel	5	25
Fine to coarse gravel, trace medium sand	5	30
Fine to coarse sand & fine to coarse gravel	5	35
Medium sand, some coarse gravel	10	45
Fine to coarse gravel	5	50
Fine to coarse sand & fine to coarse gravel	5	55
Fine to coarse gravel; trace fine sand & silt	10	65
Fine to coarse sand & fine to coarse gravel, trace silt	10	75
Medium sand, some medium to coarse gravel	5	80
Fine to coarse sandy fine to coarse gravel, some silt	5	85
Fine to medium gravelly fine to coarse sand, some silt	5	90
Medium sand, some coarse gravel	5	95
Fine to medium gravelly fine to coarse sand, some silt	5	100
Fine to medium gravelly medium sand	15	115

699-45-42
Location: N45274, W42099 13/26-16R1
Casing Elevation: 577.33
Cable tool, drilled by Baker of USGS for 3E Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & boulders	15	15
Boulders	10	25
Black sand & gravel	9	34
Coarse black sand	1	35
Coarse black sand & gravel-small	15	50
Sand & gravel w/some clay	10	60
Black sand & gravel w/some clay	25	85
Gray sand w/some clay	5	90
Sand & silt	25	115
Sand, gravel & silt	5	120
Sand & gravel	5	125
Boulders	7	132
Gray sand & silt	1	133
Gray sand & boulders	5	140
Coarse gravel & boulders	1	141
Gray sand & gravel	2	143
Gray sand & boulders	2	145
Gray sand & coarse gravel	12	157
Sand, clay & gravel	3	160
Sand & quite a lot of clay	5	165
Sand & a lot of red clay	10	175
Volcanic ash	10	185
Volcanic ash & rock	4	189
Volcanic ash & basalt	1	190
Black basalt	5	195

699-45-69A
Location: N45002, W39429 13/26-31R1
Casing Elevation: 725.46
Cable tool, drilled by Row of USGS for 3E Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Blow sand & gravel at 2 ft.	5	5
Gravel	3	8
Black basalt sand & rocks	8	16
Black sand & gravel	6	22
Sandy clay--lots of clay	18	40
Black basalt gravel & then more clay	8	48
Sandy clay & basalt gravel	2	50
Sandy clay-basalt sand	18	68
Black & white sand	2	70
Black & white sand, basalt & very little clay	5	75
Black & white sand, basalt & more clay as I go down	23	98
Sandy clay & small boulders	2	100
Sandy clay & small gravel	5	105
Sandy clay	20	125
Clay, sand & 20% gravel	10	135
Clay, sand & 60% gravel-basalt	5	140
60% gravel, shale & sand	8	148
75% basalt rock, sand & shale	2	150
Shale, fine sand & basalt	8	158
75% gravel, shale & sand	4	162
Gravel, shale & sand	5	167
Basalt rock (shale or volcanic sand, mud	8	175

Sand & shale (black & white), small gravel	10	185
Hard basalt rocks, sand & gravel	2	187
Basalt rock, gravel, black & white sand & shale	9	196
Black basalt rock--various colors of gravel, black & white sand & shale binder	13	209
Black basalt rock, gravel--all colors, black & white sand w/a fine gray sand, shale as binder	13	222
Black basalt rock, gravel & black & white sand w/shale & clay binder	3	225
Lots of clay, gray sand & about 10% gravel	20	245
Gray sand, clay & 50% gravel	10	255
Lots of clay, 50% gravel--all colors, sand & basalt	12	267
Lots of clay, 50% gravel--all colors, fine gray sand & coarse sand	13	280
Clay, sand & 50% gravel	10	290
Lots of clay, sand & 50% gravel	2	292
Lots of clay, gray sand & 20% gravel	8	300
Clay, gray sand & large gravel; at 302 ft. hit a bed of boulders-pieces the size of basketballs	2	302
Fine gravel, lots of clay & sand	3	305
Lots of clay & gray sand	5	310
Lots of clay, sand-gray & fine gravel	5	315
Clay, sand & 50% coarse sand & gravel	3	318
Lots of clay, sand & very little gravel	17	335
Greenish gray sand & gravel	3	338
Greenish gray sand & medium to fine gravel, layers of clay in this formation from 338 ft.-344 ft.	2	340
Clay, sand & gravel	3	343
Sand, fine gravel & clay binder	12	355
Sand, clay & gravel	13	368

699-45-69B
Location: 12/26-31R2
Casing Elevation:
Air rotary, drilled by Aqua Drilling & logged by McGhan of & for PNL, 1976, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	5	5
Gravel	15	20
Gravelly silt	5	25
Silt	5	30
Gravelly sand, cemented	5	35
Fine to coarse sand	10	45
Fine sand	5	50
Gravelly fine sand	5	55
Medium to coarse sand	10	65
Fine to medium sand	5	70
Fine sand	5	75
Fine to medium sand	10	85
Slightly gravelly fine sand	5	90
Fine to medium sand	10	100
Fine to medium sand, cemented streaks	20	120
Gravelly fine to medium sand	5	125
Gravelly fine to coarse sand	10	135
Gravelly medium to coarse sand	30	165
Fine to medium sand	15	180
Gravelly fine to medium sand	5	185
Gravelly fine to coarse sand	5	190
Coarse sand & gravel	5	195
Gravelly fine to medium sand	10	205
Sandy silt	5	210
Fine to coarse sand	5	215
Gravelly fine to coarse sand	5	220

699-46-3 Golder well #11
Location: N46494, W8498 12/28-32N1
Casing Elevation: 381.83
Air rotary to 225 ft. & mud rotary, drilled by Carman of Carman Water Wells & Hawke of Longyear Drilling Company & logged by Wilkening & Lubrecht of Golder Associates for NRDC, 1974, geologic investigation borehole

Material (1)	Thickness	Depth
No recovery	15	15
Fine to medium sandy gravel	15	30
No recovery	15	45
Gravelly silt	10	55
Sandy silt w/some clay	15	70
No recovery	10	80
Clay	5	85
Siltstone; 95% silt w/traces of clay & sand	20	105
Sandy siltstone; 10% sand	5	110
Sandy siltstone to sandstone	5	115
Medium to fine sand	10	125
Gravelly medium to fine sand	10	135
Gravelly clay; 25% gravel, 75% clay w/traces of sand & silt	10	145
Fine sand w/globs of silty clay	35	180
Sand w/siltstone interbeds	5	185
Sand	10	195
Sand w/siltstone & clay interbeds	10	205
No recovery	10	215
Sand w/siltstone interbeds	5	220
Sand w/traces of siltstone	5	225
No recovery, probable clays &/or sands	77	302
Basalt	21	323

699-46-5A
Location: 12/28-31Q1
Casing Elevation:
Cable tool, drilled by Bultena of Hatch Drilling Company for PNL, 1979, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine sand, light brown	15	15
Sandy gravel	20	35
Coarse gravelly sand	8	47
Medium to fine grained black sand	1	48

699-46-58 (Golder well #114)
Location: N45829, W4656 13/28-31D2
Casing Elevation: 124.20
Air rotary, drilled by Carman Water Wells & logged by MacLeod of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand	15	15
Medium to coarse gravel, trace fine to medium sand	5	20
Medium to coarse gravel, some fine to medium sand	20	40
Silt, some sand, trace clay	5	45
No recovery	5	50
Medium to coarse gravel, trace coarse sand	5	55
Silty medium to coarse gravel, some sand, trace clay	5	60
Fine sandy silt, some medium gravel, trace clay	5	65
Silty fine to coarse sand	15	80
Fine to coarse sand, some silt	30	110
No recovery	5	115
Fine to medium sand, trace silt	20	135
Fine to medium sand, some fine to medium gravel, trace silt	10	145
Silty fine to medium sand, trace fine gravel	5	150
Silt, some fine sand, trace clay	35	185
Fine to medium sand, trace silt	50	235
Silty fine to medium sand	10	245
Fine to medium sand, trace silt	10	255
Silty fine to medium sand	5	260
Fine to medium sand, trace silt	15	275
Silt, some fine sand, trace clay	10	285
Fine to medium sand, trace silt	10	295
Silt, some clay, trace fine sand	35	330
Basalt	50	380

699-46-15 (Golder well #24)
Location: N45668, W14634 13/27-36N1
Casing Elevation: 444.07
Air rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium to fine sand w/some gravel	5	5
Medium gravel w/some sand	5	10
Fine to coarse gravel	5	15
Sandy fine gravel	5	20
Fine to medium gravel w/trace silt	9	29
Basalt	31	60

699-46-21A
Location: 13/27-34Q1
Casing Elevation:
Cable tool, drilled by Chausse of & for SE Company, 1955, abandoned borehole

Material (1)	Thickness	Depth
Boulders	26	26
Gravel	9	35
Sand, gravel	7	42
Gravel	11	53
Sand, gravel	12	65
Sand	17	82
Brown clay	18	100
Clay	10	110
Cemented gravel	26	136
Sand, gravel	4	140

699-46-21B
Location: N46093, W20629 13/27-34Q2
Casing Elevation: 522.02
Cable tool, drilled by Chausse of & for SE Company, 1955, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gravel, boulders	3	3
Boulders	22	25
Sand, gravel, boulders	5	30
Sand, gravel	7	37
No record	8	45
Sand & gravel	12	57
Gravel	22	79
Clay	45	124
Gravel	37	161
Boulders, gravel	20	181
Boulders, gravel, silt	15	196
Sand, silt, gravel	69	265
Clay	60	325
Blue clay	3	328
Green clay & shale, very sticky to drill, has pieces of rock in it	5	333
Sand, gravel & clay	4	337

699-46-21C (Golder well #1)
Location: N46380, W20328 13/27-34Q3
Casing Elevation: 522.30
Air rotary, drilled by O'Connell of Carman Water Wells & logged by Burrell of Golder Associates for NESCO, 1980, foundation test boring

Material (11)	Thickness	Depth
Boulders & cobbles	19	19
Medium gravel	6	25
Coarse sand	13	38
Medium gravel	36	74
Silt w/some sand	6	80
Silt w/some fine sand & clay	22	102
Sand	4	106
Silt w/some fine sand & clay	12	118
Silty medium gravel	47	165
Sandy medium gravel	15	180

699-46-21D (Golder well #2)
Location: N46405, W20997 13/27-34Q4
Casing Elevation: 521.28
Air rotary, drilled by Byrne of Carman Water Wells & logged by Burrell of Golder Associates for NESCO, 1980, foundation test boring

Material (11)	Thickness	Depth
Basalt boulders & cobbles w/some fine sand	10	10
No record	5	15
Coarse sand w/some gravel	20	35
Sandy medium gravel	39	74
Clayey silt	28	102
Fine sand	3	105
Clayey silt	3	108
Medium gravel w/some silt	42	150
Sandy gravel	20	170

599-46-21E (Golder Well #X3)
Location: N46311, W21113 12/27-34J5
Casing Elevation: 522.45
Air rotary, drilled by Carman Water Wells & logged by Golder Associates for WESCO, 1980, foundation test boring

Material (11)	Thickness	Depth
Boulders & cobbles	5	5
Coarse to medium gravel	25	30
Medium gravel w/some coarse sand	35	65
Coarse sand w/some gravel	13	78
Silt w/some sand & clay	24	102
Sand	11	113
Silt w/some sand & lumps of clay	5	118
Medium gravel w/some fine sand	22	140
Gravelly medium sand	40	180

599-46-21F (Golder Well #X4)
Location: N46270, W21160 12/27-34J6
Casing Elevation: 523.36
Air rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for WESCO, 1980, foundation test boring

Material (11)	Thickness	Depth
Boulders & cobbles	10	10
Coarse to medium gravel	10	20
Coarse to medium gravel w/some sand	5	25
Coarse to medium gravel	5	30
Coarse to medium sand	15	45
Medium to fine gravel	25	70
Coarse sand	8	78
Clay w/some silt	27	105
Silty clay	13	118
Gravel w/some silt	62	180

599-46-21G (Golder Well #X5)
Location: N46237, W21219 12/27-34J7
Casing Elevation: 522.75
Air rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for WESCO, 1980, foundation test boring

Material (11)	Thickness	Depth
Boulders & cobbles	20	20
Medium gravel	10	30
Medium gravel, some fine gravel	5	35
Gravels, fine gravel, some sand	5	40
Fine gravel	5	45
Fine gravel, some coarse gravel	5	50
Coarse gravel, some sand	15	65
Fine gravel, some coarse sand	5	70
Fine gravel	10	80
Sandy fine gravel	5	85
Fine sand	10	95
Silty clay	10	105
Fine sand	5	110
Silt w/some siltstone fragments at 112 ft.	5	115
Silt; some clay	5	120
Coarse sand, some gravel	5	125
Coarse to fine gravel	5	130
Medium gravel, some sand	8	138
Coarse sand & medium gravel	19	157
Coarse sand & fine gravel	13	170
Fine sand, some medium gravel & silt	10	180

599-46-79
Location: N45750, W78900 12/25-36N1
Casing Elevation:
Cable tool, drilled by Evans of Hatch Drilling Company for Rockwell, 1980, geological investigation borehole

Material (1)	Thickness	Depth
30% coarse sand, 20% medium sand, 20% fine sand, 20% very fine sand, angular, brown, black, white, gray	5	5
30% small cobbles, 20% medium pebbles, 20% large pebbles, subrounded, black, gray, white, 20% coarse sand, 10% medium sand, angular, brown, white, gray, yellow	5	10
30% medium cobbles, 20% large pebbles, 20% medium pebbles, subrounded, black, brown, gray, 10% coarse sand, 10% medium sand, angular, brown, black, white, yellow, 10% silt brown	5	15
20% large cobbles, 20% small cobbles, 20% large pebbles, 10% small pebbles, subrounded, brown, black, white, yellow, 20% medium sand, angular, brown, black, white, yellow, 10% silt brown	15	30
25% large cobbles, 20% medium cobbles, 20% large pebbles, 5% small pebbles, subrounded, black, brown, white, yellow, 10% sand, angular, black, brown, yellow, white, 10% silt brown; boulders at 32 ft.	40	40

599-46-84
Location: N45750, W84250 12/25-35N1
Casing Elevation:
Cable tool, drilled by Evans of Hatch Drilling Company for Rockwell, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
50% fine sand, 20% very fine sand, angular, brown, gray, yellow, 20% silt brown	5	5
50% very fine sand, 10% fine sand, angular, brown, gray, yellow, white, 20% silt brown	27	32
30% large pebbles, 10% small cobbles, 20% medium pebbles, 10% small pebbles, subrounded, black, white, gray, 20% fine sand, angular, brown, gray, yellow, black, 10% silt brown	8	40

699-47-6
Location: 13/28-21Q1
Casing Elevation:
Cable tool, drilled by Bultena & logged by Eddy of & for PNL, 1979, groundwater monitoring borehole

Material	Thickness	Depth
Sandy topsoil, fine, buff colored	5	5
Sandy gravel	5	10
Boulders & gravel	5	15
Slightly clayey sandy gravel & boulders	5	20
Gravelly medium sand	5	25
Sand	5	30
Sandy gravel	5	35
Silty clay	10	45

699-47-24 (Golder well #25)
Location: N46595, W23921 13/27-34L1
Casing Elevation: 517.22
Air rotary (to 120 ft., & mud rotary, drilled by Carman Water Wells & logged by Wilkening of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Silty fine sand	5	5
Sandy silty cobbly coarse to fine gravel	10	15
Medium to fine sand	10	25
Gravelly medium to fine sand	5	30
Slightly silty sandy coarse to fine gravel	5	35
Sandy coarse to fine gravel	10	45
Sandy silty coarse to fine gravel	15	60
Silty sandy coarse to fine gravel	5	65
Slightly gravelly silty fine sand	5	70
Gravelly silty fine sand	10	80
Slightly gravelly silty fine sand	7	87
Silty fine sand	8	95
Slightly gravelly silty fine sand	5	100
Silty sandy coarse to fine gravel	20	120
Fine sand & medium to fine gravel	10	130
Fine sand & medium to fine gravel, trace silt & clay	5	135
Fine sand & medium to fine gravel	30	165
Fine sand & medium to fine gravel, trace silt & clay	5	170
Fine sand & silt, trace clay, some gravel	5	175
Medium to fine sand & coarse to fine gravel	40	215
Fine sand & silt, trace clay & gravel	20	235
Fine sand & medium to fine gravel, trace silt & clay	35	270
Fine sand & medium to fine gravel	15	285
Fine sand & silt, trace clay, some gravel	5	290
Medium to fine sand & gravel, trace silt & clay	5	295
Fine sand & silt, some gravel, trace clay	20	315
Medium to fine sand & gravel	10	325
Fine sand & silt, trace clay & gravel	85	410
Basalt	30	440

699-47-25 (Golder well #22)
Location: N46749, W25469 13/27-34M1
Casing Elevation: 535.22
Air rotary, drilled by Carman Water Wells & logged by Wilkening of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Sandy coarse to fine gravel	20	20
Coarse to fine gravel	5	25
Sandy coarse to fine gravel	25	50
Slightly sandy coarse to fine gravel	15	65
Coarse to fine gravel	15	80
Silty coarse to fine gravel	5	85
Slightly gravelly silt	10	95
No record	3	98
Gravelly silt	17	115
Coarse to fine gravel	1	116
Silty coarse to fine gravel	9	125
Slightly silty coarse to fine gravel	20	145
Coarse to fine gravel w/trace of silt	5	150
Silty coarse to fine gravel	10	160
Slightly silty coarse to fine gravel	10	170
Coarse to fine gravel w/trace silt	10	180
Coarse to fine gravel	5	185
Coarse to fine gravel w/trace silt	5	190
Coarse to fine gravel	5	195
Coarse to fine gravel w/trace silt	10	205
Coarse to fine gravel	5	210
Slightly silty coarse to fine gravel	10	220
Coarse to fine gravel w/trace silt	5	225
Slightly silty sandy coarse to fine gravel	5	230
No record	5	235
Silty sandy coarse to fine gravel	15	250
Slightly silty sandy coarse to fine gravel	5	255
Silty coarse to fine gravel & sand	5	260
Coarse to fine gravel & sand	5	265
Silty coarse to fine gravel & sand	5	270
Slightly silty coarse to fine gravel & sand	10	280
Silt to sand w/some gravel	5	285
Medium gravel w/some sand	15	300
Sand w/some gravel	10	310
Silty sand w/some clay & gravel	25	335
Sand w/some gravel	20	355
Silty sand w/some clay & gravel	20	385
Sand w/some gravel	25	410
Gravelly sand w/some silt & clay	25	435

699-47-35A
Location: N46875, W34703 12/27-32L1
Casing Elevation: 476.36
Cable tool, drilled by Bentz of & for DE Company, 1955, groundwater monitoring borehole

Material (1)	Thickness	Depth
Boulders & sand	15	15
Boulders & gravel	5	20
Coarse gravel & black sand	5	25
Boulders	2	27
Black sand & boulders	3	30
Boulders & coarse gravel	8	38
Sandstone, silt, some clay; or sand, silt & clay	17	55
Sand & silt	5	60
Coarse gravel, little fine sand	5	65
Coarse gravel, little fine sand & silt	10	75
Boulders, sand, gravel & silt; boulders at 77	7	82
Cement gravel	3	85
Cobbles, gravel & sand	18	103
Basalt	4	107

699-47-35B
Location: N46917, W34694 12/27-32L2
Casing Elevation: 476.65
Air rotary, drilled by Aqua Drilling & logged by Ledgerwood of & for ARHCO, 1975, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand; fine to very fine	5	5
Gravel, sandy; medium pebbles w/medium to coarse sand	5	10
Gravel; pebbles & small cobbles	5	15
Gravel; pebbles & cobbles w/medium sand	5	20
Sand, gravelly; coarse sand w/small to medium pebbles	5	25
Gravel; pebbles & cobbles w/some coarse sand	6	31
Boulder	1	32
Sand; very fine to medium sand w/small pebbles, light tan	3	35
Mud; silt & very fine sand	4	39
Sand, muddy, very fine sand & silt, brown	2	41
Sand; muddy	5	46
Sand, muddy, slightly less muddy than 41 to 46 ft.	9	55
Sand	3	58
Gravel	2	60
Sand, gravelly	5	65
Gravel, sandy; medium to coarse pebbles w/medium sand	5	70
Gravel; pebbles w/medium to coarse sand	25	95
Gravel, sandy; pebbles w/fine to medium sand	5	100
Sand, gravelly; may be 1-2 ft. of clay above basalt	5	105
Basalt	3	108

699-47-46
Location: N47039, W45994 12/26-36M1
Casing Elevation: 480.14
Cable tool, drilled by Blount & Richards of & for DE Company, 1961, groundwater monitoring borehole

Material (1)	Thickness	Depth
Silty sand	1	1
Cobbles	4	5
Gravel & cobbles	15	20
1 in. gravel	5	25
Gravel	5	30
Brown clay & gravel	10	40
Gravel	5	45
3/4 in.-1 in. gravel	3	48
Cobble & gravel 2 in.-3 in.	2	50
No record	5	55
Sand, gravel & cobble 3 in.	15	70
Cobbles 4 in.-6 in., gravel	5	75
Cobble, gravel & sand 3 in.-5 in.	25	100
Cobble, sand & gravel	3	103
1 in. gravel	2	105
Gray gravel	5	110
Gravel	10	120
Sand, gravel to 2 to 3 in.	15	135
Sand & gravel 1 to 2 in.	5	140
Cobble 5 in. to 8 in.	10	150
Sand, gravel 2 to 4 in.	5	155
Gravel 2 to 3 in.	5	160
No record	5	165
Brown sand, gravel	7	172
Rotten basalt	3	175
Red volcanic rock	5	180
Basalt, gray rock; rock started to get harder at 181 ft. & getting harder	5	185
Red volcanic rock, broken	5	190
Basalt & red lava or volcanic rock	5	195
No record	2	197
Basalt	10	207

699-47-50
Location: N47266, W49506 12/26-35K1
Casing Elevation: 583.37
Cable tool, drilled by Bultena of Hatton Drilling Company for Rockwell, 1980, hydrologic investigation borehole

Material (1)	Thickness	Depth
20% fine sand, 20% coarse, 60% gravel, dark gray, some boulders	5	5
10% fine sand, 30% medium sand, 60% gravel & cutting	5	10
10% fine sand, 30% medium sand, 60% gravel	5	15
10% silt, 10% fine sand, 20% medium sand, 60% gravel, dark gray	10	25
20% silt, 10% fine sand, 10% medium sand, 60% gravel, dark gray	5	30
20% silt, 10% fine sand, 20% coarse sand, 50% gravel, light gray	5	35
40% silt, 10% coarse sand, 50% gravel, tan	5	40
30% silt, 10% coarse sand, 60% gravel, tan	5	45

40% silt & clay, 10% coarse sand, 50% gravel, tan	15	60
30% silt, 10% coarse sand, 60% gravel, gray	10	70
20% silt, 10% coarse sand, 70% gravel, dark gray	15	85
30% silt, 10% coarse sand, 60% gravel, dark gray	5	90
40% silt, 10% coarse sand, 50% gravel, light gray	7	90
40% silt, 20% coarse sand, 40% gravel, light gray	5	95
10% silt, 30% coarse sand, 30% gravel, light gray	5	100
40% silt, 40% coarse sand, 20% gravel, tan	15	115
40% silt, 30% coarse sand, 30% gravel, tan, standing back into boulders at 122 ft.	10	125
40% silt, 20% coarse sand, 40% gravel, tan, boulders at 130 ft.	5	130
40% silt, 10% coarse sand, 50% gravel, light gray, some cobbles	10	140
40% silt, 20% coarse sand, 40% gravel, light gray, very hard	10	150
30% silt, 10% coarse sand, 60% gravel, light gray, tight cemented grave	30	180
40% silt, 10% medium sand, 50% gravel, gray, tight cemented gravel	10	190
30% silt, 10% medium sand, 60% gravel, gray, cemented gravel	10	200
20% silt, 10% sand, 70% gravel, gray, not cemented	5	205
25% silt, 20% sand, 55% gravel, gray	5	210
Dark black cuttings	5	215
Basalt, looks like black sand	5	220
Basalt chips & cuttings, black	40	260
No record (sediments)	29	295
Basalt	[illegible]	295

699-47-61
Location: N47481, [illegible] 12/26-35F1
Casing Elevation: [illegible]
Cable tool, drilled [illegible] by Drilling Company for SE Company, 1955, groundwater monitoring borehole

Material (1)	Thickness	Depth
Cobbles	10	10
Boulders & gravel	5	15
Heavy gravel	10	25
Gravel	15	40
Gravel; going into just a little finer gravel	10	50
Heavy gravel, hitting some big rocks in this gravel	15	65
Boulders	20	85
Boulders, heavy gravel & scattered boulders	5	90
Gravel	5	95
Gravel, big boulders	5	100
Boulders	10	110
Coarse gravel	5	115
Gravel	5	120
Gravel & boulders	5	125
Gravel	5	130
Gravel & boulders	5	135
Cobbles & coarse gravel	5	140
Gravel & cobbles	5	145
Boulders	5	150
No record	7	157
Record unclear, probably basalt	3	160
Hard basalt	5	165
No record	2	167

699-47-60
Location: N47137, W60286 12/26-33G1
Casing Elevation: 849.64
Cable tool, drilled by Row of JSGS for SE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil & black sand	5	5
Gravel, sand & basalt mud	12	17
Black basalt rock & sand	5	22
Black sand	17	39
Black sand, basalt & gravel; used topsoil as binder	10	49
Basalt rock, gravel & sand; topsoil out in hole	14	63
Basalt rock, gravel & sand	4	67
Fine to medium coarse black & white sand	1	68
Fine to medium coarse black & white sand & some gravel	5	73
Fine, black basalt sand or powder	5	78
Black & white sand & some clay	5	83
Black & white sand, gravel & little clay	2	85
Sandy clay & gravel (silt) (colors)	4	89
Black & white sand, clay & small gravel	2	91
Sandy clay, basalt & gravels	5	96
Coarse gravel	1	97
Gravel, basalt & some clay	1	98
Coarse basalt gravel, sand & clay	3	101
Gravel	1	102
Fine to coarse basalt gravel-- mud binder	17	119
Fine to medium basalt gravel & fine to coarse black & white sand w/very little mud binder	22	141
Basalt gravel, black & white sand & very little mud binder	21	162
Basalt gravel, black & white sand & more mud	9	171
Basalt gravel, black & white sand & less mud	3	174
Basalt gravel, black & white sand & mud binder	4	178
Fine black sand, very little binder	5	183
Some clay w/black & white sand & fine basalt gravel	3	186
Fine black sand & very little clay	3	189
Basalt gravel, black & white sand & very little mud	17	206
Basalt gravel, black & white sand & more mud	5	211
Medium basalt gravel, black & white sand & lots of mud	8	219
Fine black sand	3	222
Some coarse gravel, black & white sand & very little mud	4	226

Fine gray sand & very little mud	5	215
Gravel, sand & very little mud	3	218
Black & gray sand & no mud	7	225
Medium gravel, sand & very little mud; black & white sand, basalt gravel & other gravel--all colors; a little clay at 235 ft.	15	240
Gravel & clay	4	244
Sand & less clay	1	245
Sand, gravel & some clay	7	252
Lots of gravel, all colors & sand w/medium amount of clay	13	265
Fine gravel, clay & coarse to fine sand	5	270
Gray sand, gravel & clay	5	275
Basalt gravel, small gravel--all colors, gray sand & clay	5	280
Slight trace of clay & pure fine sand	2	282
Basalt rock (solid)	5	287

699-48-22 (Golder well #25)
Location: N47929, W22019 T3/27-34G1
Casing Elevation: 517.28
Air rotary to 140 ft. & mud rotary, drilled by Carman Water Wells & logged by Burrell & Lubrecht of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (ft)	Thickness	Depth
Fine to coarse sand w/trace gravel	5	5
Fine to coarse gravel & sand	25	30
Gravelly coarse to medium sand	30	60
Fine sand w/some silt	20	80
Fine sand, trace silt	5	85
Sand, no description	5	90
Fine to medium sand	10	100
Fine sand w/silt	15	115
Fine sand w/some coarse gravel, trace silt	5	120
Coarse gravel w/some sand, trace silt	25	145
Medium to fine gravel w/some coarse to fine sand, trace silt	70	215
Medium to fine gravel w/some fine sand & trace silt	30	245
Fine sand w/some silt & fine gravel	5	250
Medium to fine gravel w/some fine sand & trace silt	10	260
Silt & sand w/trace gravel & clay	5	265
Fine gravel & coarse sand w/ some fine sand, trace silt	25	290
Sand & gravel, trace silt, trace clay	15	305
Fine sand & silt, trace clay, trace gravel	30	335
Fine sand & silt, trace clay, trace gravel, "blue clay of lower Ringold"	35	370
Fine sand & silt, trace clay, trace to some gravel	10	380
Basalt	25	405

699-48-27 (Golder well #27)
Location: 48445, W25792 T3/27-33H1
Casing Elevation: 525.26
Air rotary, drilled by Carman Water Wells & logged by Wilkening, Burrell & Lubrecht of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (ft)	Thickness	Depth
Silty sand	5	5
Cobbly sandy coarse to fine gravel	5	10
Slightly sandy coarse to fine gravel	5	15
Sandy coarse to fine gravel	16	31
Gravelly coarse to medium sand	4	35
Slightly gravelly coarse to medium sand	9	44
Sandy gravel	16	60
Silt w/trace fine sand	10	70
Silt w/trace clay	5	75
Clayey silt	5	80
Silt	5	85
Slightly gravelly & sandy silt	15	100
Gravelly sandy silt	5	105
Sandy silt	10	115
Slightly gravelly, silty sand	5	120
Gravelly silty sand	5	125
Slightly silty gravelly coarse to fine sand	5	130
Sandy gravel	5	135
Slightly sandy gravel	5	140
Slightly sandy & silty grave	5	145
Slightly sandy coarse to fine gravel	30	175
Slightly sandy silty coarse to fine gravel	10	185
Slightly cobbly, sandy, silty gravel	5	190
Slightly sandy silty gravel; cemented sand matrix on some clasts at 205 ft.	30	220
Gravel w/trace sand & silt	15	235
Sandy gravelly silt	20	255
Silty sandy gravel	15	270
No record	5	275
Silty sandy gravel	25	300
Clayey gravel	10	310
Fine gravel w/some silt & trace clay	10	320
Fine gravel w/some silt	20	340
Clay	20	360
Slightly gravelly clay	15	375
Gravelly clay	15	390
Sandy gravelly clay	5	395
Sand & gravel, trace silt & clay	7	402
Basalt	45	447

699-48-35 (Golder well #96)
Location: N48489, W24765 T3/27-32F1
Casing Elevation: 487.55
Air rotary, drilled by Carman Water Wells & logged by Hanson & Andrilenas of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (ft)	Thickness	Depth
Gravelly fine to coarse sand, trace silt	5	5
Fine to coarse sand & fine to coarse gravel, trace silt	20	25

Fine to coarse gravel, trace coarse sand	5	30
Fine to coarse gravel, trace coarse sand & silt	20	50
Silt, some coarse sand, trace clay	66	116
Silt, some coarse sand	5	120
Silt, some clay	5	125
Medium to coarse sand	25	150
Medium to coarse sand, trace gravel	5	155
Medium to coarse sand & coarse gravel	10	165
Basalt	80	245
Medium to coarse sand, trace basalt	5	250
Medium to coarse sand & basalt	5	255
Basalt	45	300
Coarse sand & basalt	5	305
Rounded basalt gravel & sandy silt, trace clay	5	310
Medium to coarse sand	10	320
Fine to coarse sand	5	325
Medium to coarse sand	30	355
Basalt	100	455

599-48-42 D8-1S)
Location: 13/27-31M1
Casing Elevation: 1480
Cable tool to 68 ft.) & diamond coring, drilled by Hatch Drilling Company & Hendrickson of Boyles Brothers Drilling Company for RHO, 1980, geologic investigation borehole

Material (2)	Thickness	Depth
Sediments	68	68
Basalt	98	166
Silty clay grading to sandy silt	5	171
Silty medium sand	15	186
Silt	4	190
Clay	14	204
Sandy clay	5	209
Lenses of clay & medium to coarse sand	4	213
Clay	3	216
Basalt	184	400
Rubbly yellow to orange basalt	2	402
Black clay w/yellow blebs to sandy clay	10	412
Tan medium to fine sand	5	417
Dark gray clay	4	421
Basalt	83	518
Light brown, very fine to fine sand grading to medium sand	13	531
Basalt pebble conglomerate	6	537
Yellow clay grading to medium to fine sand	13	550
Basalt cobble conglomerate	42	592
Medium sand	4	596
Same as interval 550 to 592 ft.	16	612
Basalt	53	665
Basalt	80	745
Light brown fine to medium sand grading to coarse sand	44	789
Fine & very coarse sand	7	796
Fine sand w/increasing clay content	22	818
Medium to coarse sand	2	820
Silty clay & stringers of ash throughout; basalt fragments near base	19	839
Basalt	79	918
Basalt	142	1,060
Basalt	196	1,257
Light gray-green clay to a dark vuggy clay w/blue-green clay-filled vugs	4	1,261
Basalt	84	1,345
Basalt	68	1,413
Basalt	45	1,460
Basalt	34	1,494
Basalt	388	1,882
Basalt	76	1,958
Baked green-gray clay w/minor sand	4	1,962
Basalt	9	1,971

599-48-48 DC-2)
Location: N47947, W48263 13/25-35D1
Casing Elevation: 527.5
Cable tool to 208 ft.) & diamond coring, drilled by Hatch Drilling Company, Continental Drilling Company & Boyles Brothers Drilling Company for RHO, 1977, bedrock geology & hydrology investigation borehole

Material (2, 30)	Thickness	Depth
Glaciofluvial sand & gravels	205	205
Basalt	3	208
Basalt	36	244
Tuff altered to blue & brown clay	1	245
No recovery	6	251
Lapilli tuff altered to buff claystone	14	265
Siltstone	5	270
Gray tuffaceous siltstone	5	275
Brown lapilli tuff	12	287
Fine tuffaceous sandstone grading to sandy siltstone	5	292
Basalt	192	484
Black tuffaceous clay	14	498
Green tuffaceous sandstone	6	504
Basalt	98	602
Pale green to gray tuffaceous sandstone	11	613
Basalt cobble conglomerate	24	637
Green fine sandstone	5	642
Basalt cobble conglomerate	36	678
Lithic wacke; tuffaceous material	4	682
Gray claystone, varved	13	695
Basalt	140	835
Dark gray vitric tuff	5	840
Light brown to yellow siltstone w/carbonaceous material	9	849
Pale yellow mudstone	2	851
Coarse sandstone	11	862
Pale green siltstone & claystone	12	874
Green clay	5	880
Green fine sandstone	10	890
Silty coarse sandstone	12	902
No record	4	906
Fine sandstone	10	916
White, fine, tuffaceous sandstone	6	922
Tuff breccia	11	933
Basalt	162	1,095
Basalt	50	1,145
Baked green clay	1	1,146
Basalt	201	1,347
Black tuffaceous clay	1	1,348
No recovery	3	1,351
Basalt	104	1,455
Basalt	197	1,652

Basalt	313	1,969
Basalt	77	2,046
Green clayey sandstone	4	2,050
Basalt	60	2,110
Basalt	55	2,165
Basalt	147	2,312
Basalt	37	2,349
Basalt	92	2,441
Basalt	186	2,627
Basalt	121	2,748
Basalt	50	2,798
Basalt	18	2,816
Basalt	46	2,862
Basalt	96	2,958
Basalt	220	3,178
Basalt	68	3,246
Basalt	54	3,300

699-48-77
Location: N47838, W70660 13/26-31G1
Casing Elevation: 688.15
Cable tool, drilled by Chausse & Roberts of & for GE Company, 1956, groundwater monitoring borenole

Material (1)	Thickness	Depth
Topsoil, gravel	5	5
Boulders, gravel	22	27
Sand, silt, some gravel	1	28
Sand, silt; patches of silt & then pure sand	12	40
Sand; black & white sand at 42 ft.	27	67
Sand, gravel, cobbles	1	68
Cobbles, sand, gravel	10	78
Sand, gravel, cobbles	12	90
Cemented gravel, silt	2	92
Sand, silt & gravel	24	116
Sand, silt, gravel; boulders	22	138
Sand; silt, gravel; boulders, silt runs in layers	14	152
Sand, gravel, boulders-no silt	18	170
Sand, silt, gravel; picked up some silt w/gravel at 170 ft., could be cemented gravel	110	280
Sand, gravel; sand comes in	15	295
Sand, silt, gravel	8	303
Sand & silt	2	305

699-49-21 (Golder well #17)
Location: N49382, W20515 13/27-35D1
Casing Elevation: 494.72
Air rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for NEECO, 1980, geologic investigation borenole

Material (11)	Thickness	Depth
Fine sand w/some gravel & silt	5	5
Coarse gravel & sand	30	35
Coarse to fine gravel & sand w/trace silt	10	45
Gravelly coarse sand	5	50
Coarse to fine sand & gravel	10	60
Coarse sand	10	70
Fine to coarse sand w/some gravel & trace silt	5	75
Fine to medium sand w/trace of silt & occasional pieces of tuff & gravel	30	105
Weathered lithic tuff	25	130
Basalt	20	150

699-49-28 (GM-6
Location: N49288, W28100 13/27-32B1
Casing Elevation: 505.40
Cable tool, drilled by Evans of Hatch Drilling Company for ARHCO, 1971, hydrologic investigation borenole

Material (1)	Thickness	Depth
Sand	1	1
Cobbles, gravel & sand	4	5
Sand, gravel & cobbles	5	10
Sand & some gravel	9	19
Sand	1	20
Sand w/some gravel	5	25
Black sand & 3/4 in. gravel	15	40
Sand & gravel	6	46
Sand, gravel & cobbles	19	65
Sand & silt	20	85
Sand, fine brown	5	90
Brown, fine sand	20	110
Sand & traces of clay	1	111
Fine brown sand	19	130
Fine brown sand	15	145
Sand & silt	5	150
Brown sand, silt & 2½ in. gravel	4	154
No record	1	155
Sand & gravel	5	160
Sand	2	162
Clay w/sand & some gravel	3	165
Clay & fine sand	12	177

699-49-31 (Golder well #9)
Location: N48624, W30670 13/27-32A1
Casing Elevation: 535.12
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NEECO, 1980, geologic investigation borenole

Material	Thickness	Depth
Fine sand & silt	5	5
Fine to coarse gravel, some coarse sand, trace silt	40	45
Fine sand & fine to medium gravel, some silt	10	55
Fine to medium gravelly fine sand, trace silt	5	60
Fine to medium sand, some medium to coarse gravel, trace silt	5	65
Fine sand; trace coarse gravel & silt	5	70
Fine sand	10	80
Fine sand, some medium to coarse gravel	10	90
Fine to medium gravel, trace fine sand	20	110
Coarse sand & fine to medium gravel, trace silt	5	115
Fine to medium sand & fine to medium gravel, trace silt	5	120
Fine to medium sand & fine to medium gravel	5	125
Fine to medium sand & fine to coarse gravel	10	135
Fine to medium sand & medium to coarse gravel	5	140
Fine to medium sand, trace fine to medium gravel	5	145
Fine to medium sand & medium to coarse gravel	10	155
Medium to coarse gravel	15	170

Fine to coarse gravel, trace fine to medium sand	5	175
Medium to coarse gravel, trace fine to medium sand	5	180
Fine to medium sand & medium to coarse gravel	5	185
Fine to medium sand & fine to coarse gravel	15	200
Fine to medium sand & medium to coarse gravel	5	205
Fine to medium sand, some medium to coarse gravel	5	210
Fine to medium sand	10	220
Fine to medium sand, some medium gravel	5	225
Fine to medium sand, some medium to coarse gravel	10	235
Fine to medium sand & medium to coarse gravel	10	245
Medium to coarse gravelly fine to medium sand	5	250
Fine to medium sand, some medium to coarse gravel	10	260
Coarse gravel	5	265
Fine to medium sand & coarse gravel	5	270
Fine to medium sand & medium to coarse gravel, trace organics (wood)	10	280
Fine to medium sand & coarse gravel	5	285
Fine to medium sand & medium to coarse gravel, trace organics (wood)	10	295
Fine to medium sand & silt, trace fine to medium gravel	5	300
Coarse sand & fine to coarse gravel, trace silt	5	305
Fine to coarse sand & silt, some medium to coarse gravel	5	310
Medium to coarse sand	5	315
Fine to coarse sand & fine to coarse gravel, trace silt	15	330
Fine to coarse sand & silt, trace clay	5	335
Fine to coarse sand, trace silt	5	340
Fine to coarse sand; trace silt & organics (wood)	5	345
Fine to medium sand & silt, some clay	5	350
Fine sand & silt, trace clay	15	365
Fine sand & silt, some clay	5	370
Fine to medium sand & silt, some clay	5	375
Fine to coarse sand & silt, some clay	5	380
Fine to medium gravelly fine to coarse sand & silt	5	385
Fine to coarse sand & silt, trace fine gravel	5	390
Basalt	146	536
Fine to medium sand w/cementing (silica)	4	540
Fine to medium sand, trace medium gravel	5	545
Fine to medium sand	15	560
Fine to medium sand w/cementing (silica)	5	565
Fine to medium sand w/silica cementing; & siltstone	5	570
Fine to medium sand w/cementing; & siltstone; & basalt	5	575
Basalt	100	675

699-49-32A (Golder well #91)
Location: N48557, W22070 12/27-32d2
Casing Elevation: 512.04
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Medium to fine sand	5	5
Fine to coarse gravel, some medium sand, trace silt	40	45
Medium to fine sand, some medium gravel, trace silt	5	50
Medium to fine sand; trace medium gravel & silt	10	60
Medium to fine sand & fine to medium gravel, trace silt	20	80
Fine to coarse gravel, some fine sand & silt	5	85
Fine sand & silt, trace medium gravel	5	90
Fine sand & silt	5	95
Medium to fine sand & fine to medium gravel	5	100

699-49-32B (Golder well #97)
Location: N48570, W21866
Casing Elevation: 515.55
Air rotary, drilled by Carman Water Wells & logged by Ingram of Golder Associates for NESCO, 1980, geologic investigation borehole

Material	Thickness	Depth
Silt, some fine to coarse sand, trace medium to coarse gravel	5	5
Fine gravel, trace subrounded coarse sand	5	10
Subrounded medium gravel & medium to coarse sand	5	15
Subrounded medium gravel, some subangular coarse sand	5	20
Subrounded fine to medium gravel, trace subangular coarse sand	5	25
Subrounded fine to medium gravel & coarse subrounded sand	5	30
Subangular fine to medium gravel, trace subrounded coarse sand	5	35
Subangular medium to coarse gravel, trace subrounded coarse sand	5	40
Subangular medium gravel, trace subangular coarse sand	5	45
Subangular fine to coarse gravel, some medium to coarse sand	5	50
Subangular medium to coarse sand, trace fine gravel	5	55
Subangular medium to coarse gravel, trace coarse sand	5	60
Subangular fine to medium gravel & coarse sand	15	75
Sandy silt, trace medium to coarse gravel, trace clay	5	80
Silt, trace clay	5	85
Silt	10	95
Silt; trace clay	5	100
Silt	10	110
Silt, trace clay	10	120

Silt	5	125
Silt, some clay	5	130
Medium sand, some silt, trace clay	5	135
Clayey silt	10	145
Silt, trace clay	10	155
Medium sand, trace basalt	10	165
Medium sand, some basalt	5	170
Medium sand & basalt	5	175
Basalt	90	265
Medium to coarse sand, trace basalt	10	295
Medium sand	10	305
Silt, trace clay	25	325
Basalt	15	340

699-49-33 (Golder well #92)
Location: N48533, W33174 13/27-32G1
Casing Elevation: 502.77
Air rotary, drilled by Carman Water Wells & logged by Arnold & Wilkening of Golder Associates for NESCO, 1980, geologic investigation borenole

Material (11)	Thickness	Depth
Fine sand & silt	5	5
Fine to coarse gravel	30	35
Fine to coarse gravel, some fine to coarse sand	5	40
Fine to coarse gravel	15	55
Fine to coarse gravel, trace fine to coarse sand	5	60
Fine to medium gravelly fine to medium sand, trace silt	5	65
Fine to medium sand, trace silt	5	70
Fine to medium sand & fine to medium gravel	5	75
Basalt	125	200
Clayey fine to medium sand & silt	5	205
Fine to medium sand	40	245
Fine to medium sand, trace medium gravel	5	250
Fine to medium sand	5	255
Fine sand & silt & basalt	5	260
Basalt	96	356

699-49-34 (Golder well #89)
Location: N48525, W33571 13/27-32G2
Surface Elevation: 495.70
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for NESCO, 1980, geologic investigation borenole

Material (11)	Thickness	Depth
Fine to coarse sands, some coarse gravel	5	5
Medium to coarse gravel, some medium to fine sand, trace silt	5	10
Coarse sand & fine to coarse gravel, trace silt	15	25
Medium gravelly medium to fine sand, trace silt	5	30
Fine to coarse gravel, trace medium to fine sand	10	40
Fine to coarse gravel, some medium to fine sand	5	45
Fine sand & silt, trace clay	20	65
Fine sand & silt, trace clay & medium gravel	5	70
Medium to fine sand, some silt	5	75
Medium to fine sand, trace medium gravel	5	80
Basalt	5	85

699-49-48 (DDH-1)
Location: N49367, W48347 13/26-35A1
Casing Elevation: 551.92
Cable tool to 772 ft. & borenole, drilled by Bentz of & for SE Company & ARHCO, 1969, geologic investigation borenole

Material (1, 2)	Thickness	Depth
Sand, silt & boulders	10	10
Sand, gravel & boulders	10	20
Coarse gravel & sand	20	40
Coarse gravel	5	45
Coarse gravel & cobbles	5	50
Coarse gravel	5	55
Cobbles, coarse gravel	10	65
Small & coarse gravel	10	75
Coarse sand & gravel	5	80
Cobbles & gravel	5	90
Cobbles; coarse gravel	15	105
Coarse gravel	5	110
Cobbles & gravel	12	122
Basalt	51	173
Basalt	27	200
Tuffaceous sandstone	50	250
Basalt	192	442
Tuffaceous sandstone	18	460
Basalt	284	744
Sediments	120	864
Basalt	241	1,105

699-49-55
Location: N48805, W49326 13/26-34B1
Casing Elevation: 530.14
Cable tool, drilled by Miller of & for SE Company, 1961, groundwater monitoring borenole

Material (1)	Thickness	Depth
Silt, sand & cobbles 6 in.	5	5
Gray silt, sand, gravel & boulders	5	10
Boulders	2	12
Gray silt & sand	9	21
Some gravel, gray silt & sand	3	24
Gray silt & sand	26	50
Gray clay	1	51
Gray coarse sand & silt	5	56
Gray coarse sand, silt & gravel 2 in.	4	60
Gray coarse sand & silt	5	65
Gray silt & sand	5	70
Gray sand	10	80
Gray silt w/some sand	10	90
Gray coarse sand	10	100
Gray silt, sand & some gravel 1 in.	10	110
Gray silt, sand, gravel & cobbles 6 in.	8	118
Grayish brown clay	5	123
Gray coarse sand & gravel 2 in.	7	130
Coarse sand & gravel 3 in.	5	135
Gravel	1	136
Bit shows definitely very hard rock	1	137
Hard rock; can't drive past 136 ft.	1	138
Basalt	6	144
Gray basalt	5	149

699-49-57
Location: N48360, W59?? 12/25-24Q?
Casing Elevation: 852.8?
Cable tool, drilled by Row, Richards & Chausse of & for SE Company, 1956, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil, silt, sand, gravel	4	4
Gravel	1	5
Gravel, boulders & sand	8	13
Gravel & boulders	12	25
Gravel, boulders & silt	10	35
Gravel & sand	30	65
Sand & gravel	5	70
Sand-pure-caves	10	80
Sand, some gravel	10	90
Sand, some silt	10	100
Fine sand & silt	10	110
Fine sand & silt, gravel	5	115
Gravel, sand	10	125
Pure gravel	12	137
Gravel	13	150
Pure gravel	10	160
Gravel, sand	2	162
Basalt	6	168

699-49-79
Location: N48650, W59095 12/25-36Q?
Casing Elevation: 888.89
Cable tool, 1948

Material	Thickness	Depth
Rocks	19	19
Gray sand	2	21
Black sand	3	24
Gravel	3	27
Fine black sand	3	30
Black sand	2	32
Black & white sand	3	35
Clay, sand & gravel	9	44
Coarse black & white sand & little gravel	1	45
Fine black & white sand, little gravel & clay	2	47
Sand & clay w/little gravel	33	80
Sand & clay w/very little gravel	10	90
Sand & clay	25	115
Sand, clay & rocks	3	118
Sand & gravel w/little clay	2	120
Sand & coarse gravel	3	123
Sand & gravel	2	125
Sand & little gravel	3	128
Gray sand	3	131
Sand, gravel & rock	4	135
Sand & gravel	3	138
Gravel & little sand	10	148
Sand & gravel	5	153
Sand	2	155
Sand, gravel & rocks	4	159
Fine sand-gray	2	161
Sand & gravel	2	163
Sand, gravel & rocks	2	165
Sand & gravel	1	166
Sand & gravel	4	170
Sand, gravel & rock	9	179
Sand & little gravel & rocks	20	199
Sand, gravel & rocks w/some clay	10	209
Sand, rocks & some clay	12	221
Sand, clay & rocks	32	253
Sand, clay & few rocks	2	255
Sand, clay & rocks	9	264
Sand & silty gravel	3	267
Sand, gravel & little clay	8	275
Sand & gravel	1	276
Sand, gravel & rocks	2	278
Silty sandy gravel	4	282
Silty sand & gravel	4	286
Sand & gravel	3	290

699-49-358 (DC-4)
Location:
Casing Elevation:
Cable tool (to 617 ft.) & diamond coring, drilled by Nelson Drilling Company & Bayles Brothers Drilling Company, 1978, bedrock geologic & hydrologic investigation borehole

Material (2, 3)	Thickness	Depth
Sediments	617	617
Basalt	7	624
Basalt	60	684
Tuff to tuffaceous sandstone	8	692
No recovery	2	694
Medium sandstone	4	698
No recovery	26	724
Tuffaceous sandstone, gray w/varves of black clay or organic material	3	727
No recovery	7	734
Cobble conglomerate	63	797
Basalt	132	929
Tuff	5	934
No recovery	10	944
Gray, medium, tuffaceous sandstone	4	948
No recovery	14	962
Gray, medium sandstone	11	973
No recovery	11	982
Conglomerate	1	984
Basalt	117	1,101
Light gray tuffstone	*	1,109
Silty sandstone	2	1,111
Cobble conglomerate	33	1,144
Light green to gray tuffaceous siltstone & clayey tuffaceous siltstone	18	1,162
Medium to coarse sandstone	8	1,170
Green clayey siltstone	2	1,172
Basalt	212	1,384
Gray lapilli tuffstone grading to tuffaceous siltstone w/layers of black clay	16	1,400
Green, fine sandstone (tuffaceous?)	22	1,422
Green clayey mudstone	2	1,424
Green coarse sandstone	12	1,436
Fine to medium sandstone	13	1,449
Clayey & silty sandstone	35	1,484
Silty, clayey fine sandstone w/2 ft. very coarse sandstone at 1,493 ft	20	1,504
Gray, vitric clay w/some diatomite	3	1,507
Light green, fine mudstone	5	1,512
Gray, vitric tuff clay w/some diatomite	3	1,515
Basalt	163	1,678
Basalt	69	1,747
Basalt	169	1,916
Basalt	184	2,100
Basalt	100	2,200
Basalt	45	2,245
Basalt	41	2,286
Basalt	65	2,351

Basalt	118	2,469
Basalt	127	2,596
Basalt	67	2,663
Clay	1	2,664
Green fine sandstone w/clay lenses	12	2,676
Basalt	65	2,741
Basalt	55	2,796
Basalt	172	2,968
Basalt	266	3,234
Basalt	116	3,350
Basalt	40	3,390
Basalt	68	3,458
Basalt	142	3,600
Basalt	205	3,805
Basalt	74	3,879
Basalt	117	3,996

699-49-95
Location: N49400, W95100 10/25-3301
Casing Elevation: +810
Cable tool, 1943

Material (1)	Thickness	Depth
Soil	5	5
Sand, some gravel	3	8
Sand & coarse gravel	4	12
Boulders w/sand & gravel	8	20
Gravel, cemented	50	70
Gravel, clay & sand	16	86
Sand, clay & sandstone	9	95
Sandstone	30	125
Sand, loose caving	20	145
Sandstone, caving 194-200'	105	250
Sand, gravel, some clay	38	288
Gravel, cemented	54	342
Gravel, pea-sized, carrying sand & a little clay	7	349
Sand & pea gravel, loose	16	365
Sandstone	26	391
Record unclear; "sand & pea gravel" or "sandstone"	12	403
Sand & gravel	25	428
Sandstone & pea gravel	1	429
Sand & gravel	23	452
Sandstone (washed cuttings are of quartz, feldspar, basalt & mica; drills into greenish-brown sludge)	18	471
Sandstone, hard	9	480
Sandstone & pea gravel	12	492
Clay, sandy, brown	20	512
Sand & gravel	5	517
Sand & pea gravel	23	540

699-49-100A (DH-9, 28-11)
Location: N49426, W100349 10/25-3201
Casing Elevation: 792.58
Cable tool (to 340 ft.) & diamond coring, drilled by Rodda or Bach Drilling Company & Boyles Brothers Drilling Company for ARHCO, 1977, bedrock geology investigation corehole

Material (1,2,12,36)	Thickness	Depth
Silt	5	5
Silt, 5% caliche	7	12
Very fine sand & small gravel	1	13
Silt, 5% caliche	2	15
Sand & gravel to 2 in.	5	20
Basalt cobbles 30%, gravel 30%, medium sand 30%	6	26
70% gravel to small cobbles, 30% medium sand; gray	14	40
50% gravel to small cobbles, 50% sand; gray	10	50
60% coarse sand, 20% gravel, 20% clay or fine sand	5	55
60% very coarse sand, 20% gravel, 20% clay	10	65
80% coarse sand, 20% pea gravel	5	70
Dark brown silt	4	74
Cemented gravel 50%, coarse sand 50%	1	75
Lightly cemented gravel 50%, sand & clay 50%	5	80
Lightly cemented gravel to 2 in. 50% & sand & clay	5	85
Lightly cemented 50% gravel, 20% very coarse sand, 30% medium sand; dark gray	10	95
70% gravel, 20% very coarse sand, 10% medium sand; not cemented	5	100
60% gravel, 20% coarse sand, 20% medium sand	5	105
70% gravel (cemented), 30% sand; dark gray	5	110
65% gravel, 35% medium sand; dark gray	5	115
70% gravel, 30% sand; dark gray		
60% medium sand, 40% cemented gravel	10	125
50% clay, 30% very coarse sand, 20% fine sand; tan	15	140
40% clay, 40% pea gravel to 1 in., 20% medium-fine sand; tan	5	145
60% gravel, 20% clay, 20% medium sand; tan	5	150
60% gravel, 20% very coarse sand, 20% medium-fine sand; gray	10	160
Tan silt	10	170
Silt 80% very fine sand; tan	10	180
90% very fine sand, 10% clay; gray	5	185
60% coarse sand, 40% medium sand	5	190
70% very coarse sand, 30% silt	5	195
70% gravel, 30% medium sand	5	200
50% coarse sand, 50% clay	10	210
100% clay	5	215
Clay, tan	5	220
50% large cobbles & gravel, 30% clay, 20% medium sand; tan	5	225
Cobble, coarse gravel & very coarse sand, 10% medium sand	5	230
50% gravel & cobbles, 50% coarse sand; gray	10	240
50% gravel, 30% very coarse sand, 20% medium sand	5	245
Boulders	5	250
Cobbles, very coarse sand	5	255
Sand & gravel	5	260
50% gravel to 3 in., 30% very coarse sand, 20% medium sand; tan	5	265
Boulders, gravel	5	270
Boulders	5	275
70% cobbles & gravel cemented w/brown clay-like material	10	285
70% cobbles & gravel, 30% dark brown clay-like material	5	290
70% gravel, 20% medium-fine sand, 10% clay	5	295
60% cobbles & gravel, 20% medium sand, 20% hard brown clay; cemented	10	305

50% cobbles & gravel; 30% very fine white sand, 20% brown clay	5	310
60% gravel, 40% hard clay-like w/white sand	10	320
40% gravel, 60% hard clay-like w/white sand	5	325
90% brown clay-like material w/sand, 10% gravel	5	330
50% very coarse sand, 50% brown clay-like material & white sand	5	335
60% gravel, 20% medium sand, 20% very fine sand & clay-like material	5	340
No recovery	2	342
Slightly silty sandy gravel to sandy gravel	68	410
Basalt w/some clay	10	420
Basalt	9	429
Basalt	95	524
Basalt	88	612
Tuffstone	5	617
No recovery	4	621
Tuffaceous siltstone, streaks of brown clay & white diatomite?	10	631
Light brown to yellow sandy siltstone	2	633
No recovery	7	640
No record	1	641
No recovery	3	644
Coarse, red sandstone	3	647
No recovery	5	652
Pebbly siltstone	2	654
Basalt	219	873
No recovery	8	881
Medium to coarse, brown, tuffaceous sandstone	16	897
Gray tuffstone	5	902
Light yellow, tuffaceous siltstone	9	911
Fine sandstone	11	922
No recovery	3	925
Medium to coarse sandstone	1	926
No recovery	1	927
Very coarse sandstone	15	942
Fine sandstone	6	948
Medium to coarse sandstone	5	953
Green claystone	1	954
Fine sandstone	6	960
Green sandy siltstone	6	966
Clay	2	968
Gray tuffaceous siltstone; light brown w/lapilli & clayey at 984 ft.	16	984
No recovery	5	989
Tuffaceous siltstone	15	1,004
Basalt	32	1,036

699-49-100B

Location: N494'0, W100'65 12/28-2002

Casing Elevation: 791.05

Air rotary, drilled by Aqua Drilling & logged by Ledgerwood of & for ARHCO, 1976, hydrologic investigation borehole

Material (ft)	Thickness	Depth
Fine to very fine sand	14	14
Sandy gravel	6	20
Pebbles & cobbles w/fine to very fine sand	8	28
Very fine sand	5	33
Slightly sandy gravel	7	40
Sandy gravel, pebbles & cobbles w/very fine to medium sand	24	64
Cemented silty, sandy gravel	44	108
Gravelly medium to coarse sand	6	114
Sandy gravel	4	118
Muddy gravel, pebbles w/fine sand & silt	6	124
Muddy sandy gravel	10	134
Muddy gravelly sand	2	136
Coarse black sand w/silt	6	142
Fine to medium sand, clean	4	146
Gravelly sand	6	152
Very fine to coarse sand	12	164
Very fine sand	4	168
Fine to medium sand, clean	2	170

699-49-100C

Location: N494'9, W100'04 12/28-2003

Casing Elevation: 790.43

Cable tool, drilled by Mings & Evans of Hatch Drilling Company for ARHCO, 1976, hydrologic investigation borehole

Material (ft)	Thickness	Depth
90% brown silt, 10% medium sand	17	17
20% cobbles, 50% pebbles, 30% sand	8	25
10% cobbles, 30% pebbles, 30% sand, 10% silt	10	35
30% cobbles, 50% pebbles, 10% sand, 10% silt	15	50
30% cobbles, 40% pebbles, 20% sand, 10% silt	25	75
20% cobbles, 30% pebbles, 30% sand, 20% silt	10	85
2% boulders, 40% cobbles, 40% pebbles, 10% sand, 8% silt	10	95
20% cobbles, 30% pebbles, 30% coarse sand, 20% silt	25	120

20% cobbles, 20% pebbles, 30% sand, 30% silt	15	135
20% cobbles, 20% pebbles, 40% sand, 20% silt	5	140
80% sand, 20% silt, brown	5	145
5% cobbles, 10% pebbles, 55% coarse sand, 20% silt	10	155
10% cobbles, 10% pebbles, 70% sand, 10% silt	20	175
80% fine sand, 20% silt, brown	15	190
10% cobbles, 10% pebbles, 40% sand, 20% silt	10	200
70% silt, 40% clay, brown	25	225
20% cobbles, 20% pebbles, 40% sand, 20% silt, brown	10	235
10% cobbles, 20% pebbles, 50% sand, 20% silt	10	245
10% cobbles, 30% pebbles, 40% sand, 20% silt, brown	5	250
20% cobbles, 20% pebbles, 40% sand, 20% silt, brown	6	256
30% cobbles, 40% pebbles, 20% sand, 10% silt, brown	14	270
20% cobbles, 40% pebbles, 20% sand, 20% silt, brown	10	280
30% cobbles, 30% pebbles, 20% sand, 20% silt, brown	5	285
40% cobbles, 20% pebbles, 20% sand, 20% silt, brown	5	300
20% cobbles, 40% pebbles, 20% sand, 20% silt, brown	5	305
40% cobbles, 20% pebbles, 20% sand, 20% silt, brown	20	325
No record	13	338
40% cobbles, 20% pebbles, 20% sand, 10% [illegible], brown	10	348
[illegible]% pebbles, 90% sand, 5% clay, brown	3	351
30% pebbles, 60% sand, 10% clay	3	354
40% cobbles, 20% pebbles, 20% sand, 10% clay	12	366
No record	15	381
40% cobbles, 40% pebbles, 20% sand & clay	5	386
40% cobbles, 40% pebbles, 20% sand	7	393
Gray sticky clay	7	400
Broken basalt	8	408

699-50-28B SM-8
Location: N50282, W27510 13/27-33B2
Casing Elevation: 837.30
Cable tool, drilled by Allison of Bacm Drilling Company for ARMCO, 1971, hydrologic investigation borenole

Material	Thickness	Depth
Brown sand	5	5
Sand & gravel, gray, size 2 in.	25	30
Clay & gravel, size 2 in., yellow	5	35
Clay & silt, brown, soft	40	75
Clay & silt, brown	5	80
Clay & silt, yellow	15	95
Sand & silt, light yellow	20	115
Sands & silt & clay, yellow	20	135
Sand & silt, yellow, soft	25	160
Sand & silt, soft	5	165
No record	2	167

699-50-30
Location: N50299, W29833 13/27-29P1
Casing Elevation: 823.84
Cable tool, drilled by Rumley of JGSS for GE Company, 1948, groundwater monitoring borenole

Material	Thickness	Depth
Rocks & boulders	20	20
Little clay, rocks & boulders	5	25
Clay	40	65
Rocks, boulders, little sand & little clay	5	70
Rocks & boulders	15	85
Rocks, boulders & little sand	4	89
Clay & gravel	11	100
Clay	5	105
Clay & fine sand	5	110
Fine sand	27	137
Sandy clay	18	155
Fine, sandy clay	5	160
Sand & rocks	6	166
Rocks	4	170
Rocks & gravel	5	175
Water sand	2	177
Fine water sand	1	178
Boulders & rocks	13	191
Coarse sand & rocks	5	197
Sand & boulders	10	207
Fine black & white sand	13	220
Little clay & fine sand	10	230
Fine white sand	15	245
Sand & rocks	20	265
Fine sand	8	273
White sand & rocks	2	275
White sand, little clay & rocks	5	280
Clay	15	295
Gray sand	5	300
Fine white sand	10	310
Little clay, fine sand & rocks	5	315
Clay, soapstone & rocks	15	330
Blue clay & rocks	20	350
Blue clay	15	365
Basalt sand	5	370
Basalt	10	380

699-50-42
Location: N50206, W41909 13/27-20N1
Casing Elevation: 466.84
Cable tool, drilled by Chausse of & for GE Company, 1955, groundwater monitoring borenole

Material	Thickness	Depth
Boulders, sand & gravel	5	5
Gravel, boulders	10	15
Gravel	23	38
Clay	18	56
Cemented gravel	9	65
Basalt	12	77
Gray basalt, brown & red rock	3	80
Brown & red rock, porous	10	90
No record	14	104
Black & brown rock	11	115
Black rock	10	125

699-50-45
Location: N50195, W44992 13/26-25P1
Casing Elevation: 451.41
Cable tool to 41 ft. & air rotary, drilled by Bigham of Hatch Drilling Company & Osborn of Osborn Drilling Company for Rockwell, 1980, hydrologic investigation borenole

Material	Thickness	Depth
Brown sand	2	2
Cemented sand, gravel, cobbles	3	5
25% sand, 50% gravel, 25% cobbles	10	15
25% sand, 50% gravel, 0% cobbles	5	20
20% silt, 20% sand, 40% gravel, 20% cobbles, very hard	15	35
Sand, silt, gravel, cobbles	2	37
Basalt, hard, black	4	41
Basalt, gray, hard	79	120
Basalt, black, broken, soft	10	130
Clay, tan, soft	3	133
No record	45	178

699-50-48
Location: N49980, W47858 13/27-35A2
Casing Elevation: 850.39
Cable tool, drilled by Bultema of Hatch Drilling Company for Rockwell, 1980, hydrologic investigation borenole

Material	Thickness	Depth
Large cobbles & boulders	17	17
Boulders, large cobbles	17	34
Boulders, cobbles, some gravel	11	45
Compacted gravel, cobbles	66	111
Boulders or basalt?	2	113
Basalt?	1	114
Basalt	5	119
Basalt, gray, hard	91	210
Gray basalt, very little clay in sample	5	215
Basalt gravel	4	219
No record (sediments)	31	250
Basalt	1	250

699-50-83
Location: N49840, W83067 10/26-34A1
Casing Elevation: 586.10
Cable tool, drilled by Gentz of & for UE Company, 1964, groundwater monitoring borehole

Material (1)	Thickness	Depth
Silt, gravel & cobbles	5	5
Gravel & cobbles	10	15
Coarse gravel up to 3 in.	15	30
Boulders & gravel	7	37
Cobbles & gravel	10	47
Gravel & cobbles	3	50
Cobbles & gravel	15	65
Small & coarse gravel	7	72
Coarse gravel	3	75
75% coarse gravel, 25% coarse sand	12	87
50% gravel, 50% sand	3	90
Fine & coarse sand	15	105
80% sand, 20% small gravel	5	110
Fine & coarse sand	20	130
Fine & coarse sand & silt	13	143
Coarse gravel & sand	4	147
Sand, gravel & basalt	10	157
Basalt	28	185

699-50-85
Location: N49873, W84505 10/25-26N1
Casing Elevation: 739.35
Cable tool, drilled by Row & Roberts of & for UE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil	1	1
Gravel	14	15
Boulders, gravel, sand	20	35
Sand, gravel & a little bit of silt	10	45
60% sand, 25% gravel, 15% silt	5	50
60% gravel, 35% sand, 5% silt	5	55
60% gravel, 30% sand, 10% silt	5	60
Gravel, sand, no silt	5	65
Granules, small gravel, sand, caliche, no silt	5	70
Sand, gravel, some silt, caliche	5	75
Sand, some silt, caliche	25	100
Caliche, sand, fine gravel	20	120
Very heavy silt or clay	15	135
Heavy silt	50	185
Sandy silt, heavy	5	190
Pure sand, very little silt	5	195
Sandy silt	10	205
Sand, some gravel, very little silt	5	210
Some boulders, sand, some gravel, very little silt	5	215
90% gravel, sand, very little silt	15	230
50% gravel, 30% sand, 10% silt	15	245
Conglomerate, gravel, silt, sand	15	260
Gravel, sand & silt	15	275
Sand, gravel, little silt	17	292
Conglomeration	23	315
Sand, gravel, some silt	8	323
Sandy muck w/gravel	4	327
Sand, some silt	4	331
Sand, gravel, silt	10	341
Sand, gravel, silt-just muck	14	355
Gravel, sand & muck	10	365
Muck-came in faster than I could bail it out	2	367
Muck-this formation acts like it is pinching in	8	375
Muck-hole takes lots of it: muck, sand, gravel, silt	11	386
Muck, less gravel & coarse sand, more silt & fine sand	16	402
Sand, silt & gravel	3	405
Cobbles, gravel & sand: boulder field	5	410
Cobbles, gravel, silt & sand	5	415
Gravel, boulders, sand, silt or muck	8	423
Muck	2	425
Muck, boulders	5	430
Less muck, more boulders	5	435
Boulders	2	437
Gravel, sand & muck	4	441
Conglomeration-gravel 35%, sand 25%, silt 40%	19	460
40% silt, 35% gravel, 25% silt, making muck	5	465
50% gravel, 20% sand, 30% silt	5	470
60% gravel, 25% sand, 15% silt, 1 ft. whitish clay	5	475
Whitish clay or ash	4	479
Very dark gray clay	1	480
Dark gray, looks like clay or rotten shale	10	490
Bluish-green rotten shale, muds up badly	7	497
Bluish-green shale	3	500
Yellow shale	5	505
Bluish green shale & silt: between 505 ft. and 510 ft. picked up a strata of very fine sand, cannot be over 6 in. to 10 in. thick	13	518
Fine to coarse sand, small gravel	2	520
Slate color mud w/50% gravel, 20% sand, 30% silt; the mud in this formation could be lava mud	12	532
50% gravels & boulders, 20% sand, 20% silt	13	545
50% gravel & boulders, 25% silt of some kind; this silt when wet is greenish-blue, when dry is yellow-tan, very hard dry	13	558
50% gravel & boulders, 25% sand, 25% silt or mud	2	560
40% gravel & boulders, 35% sand, 25% silt, some wood	5	565
40% gravel & boulders, 35% sand, 25% silt, no wood	7	572
Gravel, sand, silt	1	573
Heavy shale or clay	3	576
Gravel, sand, silt	4	580
40% gravel, 25% sand, 35% silt	5	585
Gravel, sand & black mud	0.5	585.5
Basalt	10.5	596
Hard basalt	2	598
Basalt, drilled about 1 ft. per hour	2	600

699-50-35
Location: 13/29-33D1
Casing Elevation:
Cable tool, drilled by Rodda of USGS for SE Company, 1948, groundwater monitoring borehole

Material	Thickness	Depth
No record	327	327
Sand, gravel & silt	12	339

Depth of hole unknown

699-50-111
Location: N50295, W111396
Casing Elevation: 810.86
Drilled by Jannsen Drilling Company for Enyeart, 1922, irrigation water supply borehole

Material	Thickness	Depth
Soil & hardpan	10	10
Gravel	50	60
Sand & clay	68	128
Gravel	23	151
Basalt, black	165	316
Yellow clay, sticky	59	375
Blue clay	10	385
Black basalt	14	399
Sand	3	402
Sand & gravel	15	417
Blue basalt	69	486
Soft material	7	493
Fine sand	6	498
White coarse sand	1	499
Sand	1	500
Fine sand	4	504
Gray basalt	19	523
Soft conglomerate	24	547
Gray basalt, fractured, bad crevice at 557 ft.	35	582
Black basalt, hard	103	685
Gray basalt	29	714
Black sand formation	3	717
Gray basalt	9	726
Blue basalt	19	745
Gray basalt	83	828
Gray rock similar to sand rock	5	833
White sand	9	842
Sand	8	850
Sand & clay	5	855
Gray water sand	13	868
Blue clay	4	872
Sand & clay	10	882
Clay	8	890
Sand & clay	7	897
Sand	3	900
Clay	14	914
Sand	9	923
Clay	3	926
Sand & clay	10	936
Clay, blue, sticky	6	942
Brown clay & petrified wood	12	954
Green shale	7	961
Sand	2	963
Black basalt, hard, fractured; small seam in rock at 972 ft.	93	1,056
Soft seam or crevice	1	1,057
Hard streak	1	1,058
Soft streak	1	1,059
Hard streak	2	1,060
Basalt, hard, crevices	22	1,082
Basalt, honeycombed	2	1,084
Hard ground	1	1,085
Basalt w/some petrified wood	3	1,088
Basalt, wood & a little green shale	4	1,092

699-51-19 Golder well #381
Location: N50775, W18814 13/27-26P1
Casing Elevation: 425.04
Air rotary, drilled by Carman Water Wells & logged by Burrell & Lubrecht of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (111)	Thickness	Depth
Gravelly sand w/trace silt	5	5
Sandy medium to coarse gravel w/trace silt	10	15
Fine to medium gravel w/trace sand & silt	15	30
Fine to coarse sand & fine to medium gravel	15	45
Silt to sandy silt	5	50
Fine to coarse sand & fine to medium gravel w/trace silt	15	65
Clay w/some sand & gravel	15	80
Silty sand & basalt gravel	5	85
Basalt	67	152

699-51-26A (DH-7, DB-10)
Location: N51235, W15886 13/27-35M1
Casing Elevation: 517.11
Cable tool to 60 ft., & diamond coring, drilled by Evans of Hatch Drilling Company & Boyles Brothers Drilling Company for IRECO, 1977, hydrologic investigation borehole

Material (1, 261)	Thickness	Depth
Black sand	5	5
Black sand & gravel & cobbles	11	16
Sand w/some gravel	3	20
Sand & gravel & boulders & cobbles	10	30
Sand & gravel & cobbles & boulders	9	39
Red broken rock	11	50
Rock basalt	7	57
Basalt	6	63
Basalt	49	112
Tuffaceous sandstone & sandy siltstone	45	157
Basalt	14	171
No record	6	177
Basalt	9	186
Breccia, shear zone	7	193
Basalt	80	242
Tuffaceous claystone & clay	16	258
Basalt	35	293
Tectonic breccia	6	299
Basalt	22	322
Tuffaceous clay & siltstone	17	339
Basalt	77	416
No record	8	424
Tectonic breccia	8	432
No record	4	436
Basalt	8	444
Clay & sandstone	18	462
Basalt	15	477
Fault plane	3	480
Basalt	51	641
Lapilli tuff & sandstone	6	647
Basalt	106	753
Clay, tuffaceous siltstone, siltstone & tuffstone	17	770
Basalt	79	849
Clay, sandstone	44	893

699-51-368 (Golder well #72)
Location: N51096, W35973 13/27-29M2
Casing Elevation: 515.54
Air rotary (to 150 ft.) & mud rotary, drilled by Carman Water Wells & logged by Wilkening & Burrell of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to medium sand, trace gravel & silt	5	5
Fine to coarse gravel, trace sand	5	10
Fine to coarse sand & gravel, trace silt	10	20
Fine to coarse gravel, trace sand	5	25
Fine to medium sand & fine to coarse gravel	5	30
Fine to coarse sand, some gravel	5	35
Basalt	85	120
Fine sand, some silt, trace clay	5	125
Fine sand, some silt	15	140
Fine sand, trace silt	10	150
Fine sand & silt, some clay, trace gravel	10	160
Gravelly fine sand & silt, some clay	5	165
Fine to medium gravel, trace sand & silt	5	170
Basalt	184	354
Gravelly fine sand & silt, some clay	6	360
Fine sand & silt, some clay, trace gravel	14	374
Basalt	66	440
Fine sand & silt, some gravel, trace clay	5	445
Basalt	79	524
Medium to coarse sand & fine gravel	6	530
Fine to medium sand, trace silt	10	540
Basalt	20	560
Fine to coarse sand, some silt	5	565
Basalt	8	573

699-51-360 (Golder well #90)
Location: N51148, W35747
Casing Elevation: 517.65
Air rotary, drilled by Carman Water Wells & logged by Burrell of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to coarse sand, trace silt	5	5
Coarse sand & fine to medium gravel	5	10
Fine to coarse gravel, trace fine to coarse sand	8	18
Fine to coarse sand, trace fine to medium gravel	7	25
Fine to medium gravelly fine to coarse sand, trace silt	5	30
Fine to coarse gravel, trace fine to coarse sand	5	35
Fine to coarse gravel, trace coarse sand	8	47
Basalt	71	118
Fine to coarse sand & trace fine gravel	17	135
Fine to coarse sand; & siltstone w/trace fine gravel	5	140
Fine to coarse sand, trace fine gravel	18	158
Basalt	207	365
Fine sand & silt, & siltstone	5	370
Basalt	25	395
Fine to coarse gravel	5	400
Siltstone & fine gravel	5	405
Siltstone, trace fine to coarse gravel	5	410
Fine sand & silt trace fine gravel	5	415
Siltstone, trace fine gravel	5	420
Basalt	60	480
Siltstone & medium gravel	10	490
Basalt	11	501

699-51-45
Location: N509'5, W46414 13/26-25N1
Casing Elevation: 444.63
Cable tool to 17 ft. & below 119 ft.; & air rotary, drilled by Bultena of Hatch Drilling Company & Osborn of Osborn Drilling Company for Rockwell, 1980, hydrologic investigation borehole

Material (11)	Thickness	Depth
Sand & gravel	3	3
Gravel, cobbles	6	9
Boulders, cobbles	3	12
Basalt	5	17
Basalt, gray, hard	15	32
Basalt, gray, very hard	61	93
Basalt, gray, hard	17	110
Basalt, black, soft	5	115
Clay, tan, hard	4	119
Silt & clay, dark gray	11	130
Silt & sand, brown	8	138
Silt & sand, tan	12	145
Sand, some clay, brown	20	165
Basalt	3	168

699-51-63
Location: N51449, W40060 13/26-29M1
Casing Elevation: 577.84
Cable tool, drilled by Pow, Wall & Roberts of & for GE Company, 1956, groundwater monitoring borehole

Material (11)	Thickness	Depth
Topsoil	0.5	0.5
Gravel, silt, boulders	4.5	5
Boulders, gravel, caves; hit a large boulder at 5 ft.	12	17
Gravel, boulders, silt	5	22
Gravel, fine sand	4	26
Gravel, sand; caves	9	35
Boulders, gravel, sand; caves	5	40
Boulders, sand, gravel; caves	10	50
Boulders, gravel, black sand; caves	5	55
Black sand, caves	5	60
Black sand, gravel; caves	5	65
Gravel, black sand; caves	10	75
Gravel; caves	5	80
Pure gravel; caves	11	91
Gravel; caves	51	142
Pure gravel; caves	9	151
Gravel, sand; caves	16	167
Gravel; caves	3	170
Gravel, sand; caves	12	182
Hung up, looked like I lost the shoe, pulled pipe, hole filled back up to 17 ft.		
No record	8	33
Big boulder	3	25

Boulders, gravel	20	45
Boulders, gravel, some silt	5	50
Old hole; pit old hole at 50 ft., old hole caved in at 55 ft.	5	55
Gravel, boulders	5	70
Gravel, cavings; caves	10	80
Gravel	7	87
Gravel, boulders	33	120
Gravel, boulders; caves	22	142
Gravel, boulders; very bad cave	2	144
Boulders, gravel; caves	13	157
Gravel, boulders; caves	16	173
Boulders, gravel, some silt; caves	8	181
Boulders; swells slow & hard	2	183
Either large boulder bed or basalt; from formation & color of tailings, I think it is basalt	2	185

699-51-75
Location: N50667, 475161 13/25-25Q1
Casing Elevation: 641.51
Cable tool, drilled by Gentz of & for SE Company, 1957, groundwater monitoring borehole

Material (ft)	Thickness	Depth
Boulders, gravel & sand	10	10
Boulders, gravel	32	42
Cobbles, boulders	8	50
Boulders, gravel	10	60
Cobbles, gravel, boulders	10	70
Cobbles, gravel	25	95
Sand, gravel & cobbles	15	110
Cobbles, gravel	15	125
Gravel, sand, silt	20	145
Cobbles, gravel, sand, silt	10	165
Gravel, sand silt; 212 ft. sandstone, hard formation	55	220
Cobbles, gravel, sand	5	225
Gravel, sand	5	230
Coarse sand, little gravel	5	235
Gravel, sand	5	240
Sand, gravel	10	250
Sand, gravel, cobbles	5	255
Gravel, sand	11	266
Sand, little silt, sand & silt at 266 ft.	4	270
Sand, gravel, silt	5	275
Sand, gravel	5	280
Sand, cobbles, gravel	12	292
Coarse gravel, fine sand	8	300
Small & coarse gravel, fine sand	15	315
Coarse gravel & sand	17	332
Sand, silt, gravel	3	335
Sand, gravel	5	340
Sand, gravel, cobbles	7	347
Sand, gravel, basalt, cobbles	8	355
Sand & gravel	7	362
Sand, silt, gravel	3	365
Sand, gravel, basalt	7	372
Sand, gravel, basalt, cobbles	3	375
Basalt; pipe stopped at 376 ft. 8 in.	7	382

699-52-17 (Golder well #39)
Location: N52167, 47[illegible] 13/27-25K1
Casing Elevation: 599.53
Air rotary to 100 ft. & mud rotary, drilled by Carman Water Wells & logged by Arnold & Burrell of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (ft)	Thickness	Depth
Sand w/trace silt & gravel	5	5
Gravel w/some sand w/trace silt	5	10
Gravel w/trace sand	10	20
Sand & gravel	20	40
Sand & gravel w/trace silt	45	85
Silty coarse to fine sand, trace gravel & clay	5	90
Sand & silt, w/some gravel & trace clay	5	95
Silt, some clay, trace gravel & sand	5	100
Coarse to fine sand & silt, trace gravel & clay	15	115
Gravel & sand, trace silt & clay	30	145
Sand, some gravel & silt, trace clay	5	150
Medium to fine sand, some silt, trace clay	5	155
Silty sand, trace clay	5	160
Sand & silt, trace clay	10	170
Medium to fine sand & silt, trace clay	5	175
Medium to fine sand, trace silt	30	205
Sandy silt, trace gravel & clay	10	215
Sandy silt, trace clay	5	220
Silt, some sand, trace clay	5	225
Silt & sand, trace clay	5	230
Medium to fine sand & silt, trace clay	5	235
Sandy silt, trace clay	5	240
Medium to fine sand & silt, trace clay	10	250
Sandy silt, trace clay	5	255
Medium to fine sand & silt, trace clay	[illegible]	300
Fine to coarse sand & silt, trace clay & gravel siltstone fragments	15	315
Coarse to fine sand & silt, trace clay & gravel siltstone fragments	40	355
Basalt	25	380

699-52-30 (Golder well #88)
Location: N51727, 429739
Casing Elevation: 644.68
Air rotary, drilled by Carman Water Wells & logged by Arnold of Golder Associates for WESCO, 1980, geologic investigation borehole

Material (ft)	Thickness	Depth
Fine to medium sand & medium to coarse gravel, trace silt	5	5
Fine to coarse sand & fine to coarse gravel, trace silt	5	10
Fine to coarse sand, some medium to fine gravel	5	15
Fine to coarse gravel, some medium to fine sand, trace silt	5	20
Fine to coarse sand & medium to coarse gravel, trace silt	5	25
Fine sand & silt	25	50
Fine to medium sand & trace silt	15	65

Fine sand & silt	10	75
Fine sand & silt, trace medium gravel	5	80
Fine sand & silt, some medium to coarse gravel	5	85
Medium to fine sand & fine to coarse gravel	5	90
Medium to fine sand, trace fine to medium gravel	5	95
Medium to fine sand	10	105
Medium to fine sand, trace fine to medium gravel	5	110
Fine sand & silt, some fine to medium gravel	5	115
Fine sand & silt, some medium to coarse gravel	5	120
Fine sand & silt, trace fine to medium gravel	5	125
Fine to coarse sand, trace medium gravel	10	135
Fine to coarse sand	5	140
Fine sand & silt	20	160
Medium to fine sand	20	180

699-52-46A
Location: N52196, w45706 13/26-25L1
Casing Elevation: 455.61
Cable tool (to 51 ft. & below 170 ft.) & air rotary, drilled by Bultena of Hatch Drilling Company & Osborn of Osborn Drilling Company for Rockwell, 1980, hydrologic investigation borehole

Material (1)	Thickness	Depth
No record	5	5
Gravel & cobbles, brown	5	10
10% coarse sand, 30% silt, 60% gravel & cobbles, gray	5	15
10% coarse sand, 20% silt, 70% gravel & cobbles, gray	5	20
10% coarse sand, 20% silt, 70% gravel, gray	5	25
10% coarse sand, 20% silt, 70% gravel & cobbles, gray	10	35
Sticky clay & silt, 10% coarse sand, tan	10	45
65% silt & clay, 35% gravel & sand, gray	6	51
Basalt		
Basalt, brown & black, soft	9	60
Basalt, black & brown, medium hard	5	65
Basalt, black, hard	10	75
Basalt, gray, very hard	79	154
Basalt, gray, hard	11	165
Clay, yellow, hard	5	170
Clay & some cement, gray	5	175
Fine sand	5	180
Very fine sand & some silty clay, tan	10	190
Fine sand & silt, pink	10	200
Silt & clay, fine sand, tan	15	215
Black sand	5	220
Black sand & silt	5	225
Basalt	1	225

699-52-46B
Location: 13/26-25L2
Casing Elevation: 455
Cable tool, drilled by Bultena of Hatch Drilling Company for RHO, 1980, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand & gravel	20	20
No record	24	44
Basalt	1	44

699-52-48
Location: N51566, w48076 13/26-26J1
Casing Elevation: 466.06
Cable tool (to 33 ft. & below 149 ft.) & air rotary, drilled by Bultena of Hatch Drilling Company & Osborn of Osborn Drilling Company for Rockwell, 1980, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand	5	5
Gravel, some cobbles, sand	4	9
Gravel, cobbles, sand	10	19
Boulders	9	28
Basalt, black	40	68
Basalt, gray, very hard	77	145
Clay, hard, yellow	4	149
Brown sand	5	155
Silt & sand	10	165
Silt & clay, small rock chips	5	170
Blue clay w/small gravel chips	5	175
Blue clay w/sand & small gravel	5	180
Blue clay w/black sand	5	185
Blue clay w/black sand, some chips	5	190
Blue clay; black sand, some basalt chips	5	195
Basalt chips & other cuttings	2	197

699-52-52 (DOE-5)
Location: N51889, w52077 13/26-4H1
Casing Elevation: 557.93
Air rotary (to 152 ft.) diamond coring, drilled by Soil Sampling Service & Boyles Brothers Drilling Company, 1974, geologic & hydrologic investigation borehole

Material (1, 2, 21)	Thickness	Depth
Coarse gravel w/silt	10	10
Coarse sand, black	10	20
Coarse gravel w/silty sand	60	80
Gravel, sand, silty	65	145
Basalt	7	152
Basalt	70	222
Interbed; tuffaceous sandstone, tuff & sandstone	56	278
Basalt	184	462
Interbed; tuff, tuffaceous sandstone & sandstone	22	484
Basalt	100	584
Interbed; tuff, sandstone, cobble conglomerate & sandy clay	30	614
Basalt	218	832
Interbed, tapilli tuff, siltstone, sandstone & sand	75	908

699-53-47
Location: N52518, W47461 13/25-25D2
Casing Elevation: 418.28
Cable tool, drilled by Bignam of Hatch Drilling Company, 1966, groundwater monitoring borehole

Material (ft)	Thickness	Depth
Cobbles in dirt	3	3
Gravel, cobbles	10	13
Boulder, sand & gravel	7	20
Sand, gravel, boulders	10	30
Boulders; very hard rock could be boulders or fractured basalt, some clay	4	34
Boulders	7	41

699-53-50
Location: N53219, W50196 13/25-25F1
Casing Elevation: 444.21
Cable tool to 36 ft. & below 146 ft. & air rotary, drilled by Bultema of Hatch Drilling Company & Osborn of Osborn Drilling Company for Rockwell, 1980, hydrologic investigation borehole

Material (ft)	Thickness	Depth
70% gravel & 30% coarse sand, gray	5	5
Some gravel & coarse sand	5	10
70% gravel & cobbles, 10% silt, 20% medium sand	5	15

699-53-35 (GW-4)
Location: N53199, W24763 13/27-29F1
Casing Elevation: 530.99
Cable tool, drilled by Evans of Hatch Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (ft)	Thickness	Depth
Fine, silty sand	4	4
Fine black & brown sand	7	8
Brown sand, fine	13	18
Sand & gravel	7	25
Coarse sand & some gravel	15	40
Silt	3	43
Fine brown sandy silt	2	45
Sandy silt	5	50
Silt	2	53
Fine sand	7	60
Sand & some 1 in.-gravel	10	70
Sand & 1/4 in.-to 4 in.-gravel	6	76
Fine sand & gravel & cobbles	11	87
Brown sand & gravel, coarse gravel	8	95
Brown sand & 2 in. gravel & some silt	10	105
Brown sand & coarse gravel; at 109 ft. there is a layer of cobbles	7	112
Sand & gravel	11	123
Brown clay w/some sand	15	138
Gray clay w/some sand	10	148

70% gravel & cobbles, 20% silt, 10% coarse sand, gray	5	20
70% gravel & cobbles, 10% silt, 20% coarse sand	5	25
70% gravel & cobbles, 10% coarse sand, 20% silt & clay	5	30
Tight gravel & cobble	5	35
Basalt	1	36
Basalt, black, medium hard	4	40
Basalt, gray, hard	35	75
Basalt, gray, medium	10	85
Basalt, gray, hard	55	140
Sandy clay	6	146
Silt & clay w/some gravel chips, tan	9	155
Silt & sand, light gray	5	160
Silt & some black sand, gray	5	165
Silt & fine light colored sand, tan	5	170
Silty clay & fine sand, tan	5	175
Fine sand & silt, tan & gray	5	180
Fine sand & silt, gray	5	185
Fine sand & clay, tan	7	192
Basalt	2	194

699-53-55A
Location: N53006, W55014 10/25-27Gl
Casing Elevation: 675.50
Cable tool, drilled by Miller of & for GE Company, 1961, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gravel & sand & cobble	5	5
Gray sand, gravel & cobbles; mit boulders at 5 ft.	10	15
Gravel, sand & cobbles	5	20
Gravel & sand	5	25
Sand & gravel to 3 in.	5	30
Sand, gravel & cobble	5	35
Gray silt, sand & cobbles 3 in.	5	40
Gray silt, sand & cobbles 5 in.	5	45
Gravel & cobble up to 5 in.	5	50
Sand, gravel, large cobble	9	59
Fine silty sand	1	60
Gray sand w/little silt; heaves	7	67
Gray sand & gravel	8	75
Clean gravel & cobble-boulders	5	80
Gravel, cobble, boulders	5	85
Gray, gravel, sand & cobbles	15	100
Gravel & sand	5	105
Gravel, cobble, sand	5	110
Sand & gravel	5	115
Gray silt & sand	15	130
Sand	5	135
Gravel up to 3 in. in sand	5	140
Sand	10	150
Gravel & sand	5	155
Sand	5	160
Gray silt, sand & gravel	5	165
Gray mostly gravel w/little sand & silt	5	170
Gray gravel w/some sand & silt	5	175
Small gravel & sand	5	180
Coarse sand & gravel	5	185
Coarse sand & gravel, clean	2	187
Sand, silt, gravel	3	190
Sand, silt & mostly gravel	5	195
Silt, sand & mostly gravel	5	200
Silt, sand & gravel, too many colors to list	5	205
Coarse sand & gravel	5	210
Heaving fine silt	2	212
Large gravel, cobble up to 5 in.	7	220
Gray sand	5	225
Gravel	10	235
Sand & gravel	5	240
Gray sand	5	245
Some sand, gravel	5	250
Gravel, cobble	8	258
White silt 1; got into the white stuff at 258 ft.	7	265
Gray pebbly clay w/silt	10	275
Brown pebbly clay & silt	5	280
Brown pebbly clay	5	285
Clay	5	290
Clay w/broken rock	5	295
Some form of rock, not basalt; very hard, may be cemented gravel, doesn't drill like cemented gravel	1	296
Rock	4	300
Gray basalt (none/comb)	5	305
Broken wormy rock	10	315
Gray basalt	20	335
Hard, gray basalt	5	340
Very hard, gray basalt	5	345
Gray basalt	10	355
Basalt; last 3 in. very hard	5	360
Gray basalt	5	365
Basalt	5	370
Dark gray basalt	5	375
Basalt	5	380
Dark gray basalt	5	385
Basalt	15	400
Very hard rock	5	405
Basalt	35	440
Very hard basalt, no interbeds as yet	5	445
No record, probably very hard basalt	10	455

699-53-55B
Location: N52979, W55030 10/26-27G2
Casing Elevation: 664.90
Air rotary, drilled by Aqua Drilling & logged by Ledgerwood of ARHCO for ARHCO, 1975, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand, fine	5	5
Gravel, cobbles & boulders w/fine to medium sand	15	20
Sand, slightly gravelly; coarse black sand w/pebbles & cobbles	5	25
Gravel, sandy	10	35
Gravel	5	40
Gravel, slightly muddy, slightly sandy	5	45
Gravel, sandy; cobbles, boulders	10	55
Sand, gravelly	5	60
Gravel, slightly sandy; fine sand & silt blowing off	5	65
Gravel, sandy; no sample 80-85 ft., fines lost at 65-85 ft.	25	90
Sand, gravelly	5	95
Gravel, slightly sandy	10	105
Sand, gravelly; very coarse sand	5	110
Sand; coarse to medium	35	145
Sand; fine to medium	5	150

Sand; medium to coarse	10	160
Gravel, sandy;small pebbles w/coarse sand	5	165
Gravel, slightly sand; small well sorted pebbles	5	170
Gravel, sandy; small pebbles w/fine to coarse sand; sand at 172 ft.	5	175
Sand, gravelly; coarse sand w/small pebbles	10	185
Sand, pebbly; very coarse sand w/medium to fine pebbles	5	190
Gravel, sandy; medium to fine pebbles w/very coarse sand	5	195
Sand, gravelly; coarse to very coarse sand w/medium to fine pebbles	5	200
Gravel; medium to fine pebbles w/some very coarse sand	5	205
Gravel, sandy; pebbles w/medium to coarse sand	10	215
Gravel, sandy; pebbles w/fine to coarse sand	25	240
Gravel, sandy; coarse pebbles & small cobbles w/fine to medium sand	11	251
Mud; gray very fine sand & silt, slightly pebbly	2	253

699-53-103
Location: N52729, W103420 13/25-30Q1
Casing Elevation: 837.25
Drilled by Lawson for C. L. McKee, 1927, irrigation water supply borehole

Material (ft)	Thickness	Depth
"Surface"	22	22
Clay & boulders	216	238
Clay, blue, green & yellow	240	478
Basalt, black, w/soft seams	34	512
Clay, blue, hard & sandy	10	522
Clay, sticky, blue & variegated	22	544
Clay, sticky, blue	26	570
Shale, soft, w/"soapstone float"	10	580
Rock, water bearing	25	705
Basalt, black	115	820
Basalt, broken	4	824
Clay, soft, w/"broken rock"	26	850
"Lake bed w/wood", layers of green clay	10	860
Basalt, black & broken	65	925
Basalt, hard, black	25	950
Basalt, black & "broken"	25	975
Basalt, broken	23	998
Sand, fine	1	999
Porous rock	101	1,100
Sand, fine	10	1,110

699-53-111
Location: N52992, W111403 13/24-25E1
Casing Elevation: 924.68
Drilled by George Scott for J. Ford, 1925, irrigation water supply borehole

Material (ft)	Thickness	Depth
Soil (clay)	16	16
Gravel, dirty, some boulders	157	173
Basalt, black & gray, hard	322	495
Shale, blue, sticky & blue sandy shale, 40 ft. of coarse granite sand, some brownish shale on top of rock	130	625
Basalt, hard	23	648
Basalt	129	777

699-53-114
Location: 13/24-26M1
Casing Elevation: 1025
Drilled by Jannsen Drilling Company for A. Brown, 1918, water supply borehole

Material (ft)	Thickness	Depth
Soil	8	8
Gravel & boulders	172	180
Basalt, hard	247	427
Cavity	1	427
No record	51	478
Sandstone	14	492
Shale, blue	75	567
Sand	6	573
Shale, blue	10	583
Shale, brown	9	592
Shale, green	6	598
Basalt, honeycombed	70	668

699-54-15 "Golden Well #40"
Location: N52561, W115409 13/27-25E1
Casing Elevation: 908.54
Air rotary to 140 ft. & mud rotary, drilled by Carman Water Wells & logged by Wilkening of Golder Associates for NESCO, 1980, geologic investigation borehole

Material (ft)	Thickness	Depth
Medium to fine sand & silt, trace gravel	10	10
Coarse to fine gravel, some sand, trace silt	20	30
Medium to fine sand, trace gravel	15	45
Medium to fine sand, trace silt	90	135
Medium to fine sand, some silt	5	140
Coarse to fine gravel, trace silt	15	155
Coarse to fine sand & silt, trace gravel & clay	10	165
Coarse to fine sand & silt, trace clay	15	180
Coarse to fine sand & gravel, some silt, trace clay	15	195
Medium to fine sand & silt, trace clay	55	250
Coarse to fine gravel, some sand & silt	5	255
Fine sand & silt, trace clay	30	285
Medium to fine sand & silt, trace clay	60	345
Medium to fine sand & silt, trace clay & gravel	3	348
Basalt	24	372

699-54-173

Location: N53886, W17330 13/27-25G2
Casing Elevation: 403.40
Air rotary, drilled by Aqua Drilling & logged by Fecht of & for ARHCO, 1975, hydrologic investigation borenole

Material (1)	Thickness	Depth
Pebbles, coarse to medium; sandy, very coarse to medium	20	20

699-54-170 (DH-9B, DC-6)

Location: 53872, W17345 13/27-25G3
Casing Elevation: 404.37
Air rotary to 102 ft. & Diamond coring; drilled by Aqua Drilling & logged by Ledgerwood of ARHCO & drilled by Earl Hendrickson of Boyles Brothers Drilling Company for ARHCO, 1978, geologic investigation borenole

Material (1,2,13,22)	Thickness	Depth
Gravel, sandy; pebbles & cobbles w/fine to medium sand	12	12
Sand, slightly pebbly; medium to coarse sand w/small pebbles	5	17
Gravel, sandy; pebbles w/fine to medium sand	13	30
Gravel, slightly sandy; small, large, medium pebbles to cobbles very fine to fine sand	7	37
Sand, gravelly; black sand w/small to medium pebbles	3	40
Gravel, sandy; pebbles w/coarse sand	15	55
Gravel, slightly sandy; small to medium pebbles	5	60
Gravel, sandy, coarse sand	10	70
Gravel, sand; pebbles w/coarse sand	5	75
Mud; very fine sand & silt, brown	5	80
Mud, very fine sand & silt	15	95
Gravel, muddy	8	103
Silty conglomerate, slight $CaCO_3$	5	108
Clay, $CaCO_3$	5	113
Fine to very fine silty sand, $CaCO_3$	5	118
Muddy silt, slight $CaCO_3$	5	123
Clay	5	128
Sandy silt	5	133
Medium to coarse sand	5	138
Medium to fine sand, $CaCO_3$	5	143
Sandy silt, $CaCO_3$	10	153
Fine to medium sand	40	193
Sandy gravel	7	200
Silty clay, no to slight $CaCO_3$	48	248
Silty clay to fine sand, slight $CaCO_3$	10	258
Gray silt	10	268
Fine to medium sand, no $CaCO_3$, poor to good incuration	26	294
No record	12	306
Blue green sandy clay, no $CaCO_3$	5	311
Gray silty clay, no $CaCO_3$	18	329
Gray clay, no $CaCO_3$	7	336
No record	3	339
Gray clay, $CaCO_3$	4	343
Gray conglomerate, $CaCO_3$	2	345
Blue gray conglomerate	5	350
Basalt	5	355
Basalt	21	376
Basalt	111	487
Brown tuffaceous sandstone	10	497
Claystone	3	500
Gray, sandy siltstone w/clay	14	514
Basalt	176	690
Rubbly tuff breccia of mudstone & claystone	10	700
Black claystone	4	704
Basalt	74	778
Basalt	55	833
Basalt	46	879
Green clay	1	880
Basalt	113	993
Green tuffaceous sandstone; silty & fine-grained	73	1,066
Green clay	6	1,072
Basalt	88	1,160
Basalt	122	1,282
Basalt	172	1,454
Green & black clay	2	1,456
Basalt	38	1,494
Basalt	86	1,580
Basalt	77	1,657
Basalt	48	1,705
Basalt	21	1,726
Basalt	40	1,766
Basalt	67	1,833
Basalt	109	1,942
Basalt	111	2,053
Basalt	102	2,155
Black clay, probably altered glass	1	2,156
Basalt	107	2,263
Basalt	142	2,405
Basalt	57	2,462
Basalt	133	2,595
Basalt	19	2,614
Basalt	13	2,627
Basalt	83	2,710
Basalt	93	2,803
Basalt	133	2,936
Basalt	122	3,058
Basalt	71	3,129
Basalt	205	3,334
Basalt	36	3,370
Basalt	30	3,400
Basalt	10	3,410
Basalt	77	3,487
Basalt	497	3,984
Basalt	152	4,136

699-54-24 (DM-3)

Location: N54135, W14075 13/27-29C1
Casing Elevation: 390.24
Cable tool, drilled by Evans of Hatch Drilling Company for ARHCO, 1971, hydrologic investigation borenole

Material (1)	Thickness	Depth
Fine silty sand	15	15
Fine sand & silt	1	16
Sand & gravel & cobbles	2	18
Coarse sand & gravel	12	30
Silty sand & coarse gravel	10	40
Silty sand & gravel & traces of yellow clay	5	45
Sand & gravel	10	55
Sandy silt w/some gravel	35	90
Fine brown sand	20	95
Sand & coarse gravel	18	113
Sand & gravel & traces of clay	2	115
Sand & gravel & cobbles	2	117
Fine brown sand	18	135

Sand & cobbles w/trace of clay	2	137
Grey clay w/some sand	8	145
Ringold	5	150
Basalt	6	156

699-54-37B
Location: N54140, W36806 13/27-30A2
Casing Elevation: 533.75
Cable tool, drilled by Jannsen Drilling Company & logged by Warren of USGS for Haynes & Culver, 1923, stock water supply borehole

Material (1)	Thickness	Depth
Sand & gravel, cemented	135	135
Basalt, black	172	307
Basalt, "honeycomb"	13	320
Basalt, black & gray	57	377
Basalt, fractured	10	387
Basalt, blue & black	94	481
Sandstone	6	487
Shale, brown	7	494
Shale, blue	20	514
Sand, gray & black, hard	3	517
Rock, gray, hard (basalt?)	27	544
Basalt, blue, hard	55	599
Basalt, soft	173	772
Basalt, mixed w/green rock	18	790
Basalt, black	15	805
Shale & broken rock	19	824
Basalt, black	84	908
Sand	5	913
Shale	29	942
Sand & shale	2	944
Sand	16	970
Basalt	?	?

699-54-42
Location: N54390, W42431 13/25-25A1
Casing Elevation: 511.49
Cable tool, drilled by Rumley of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine black sand	14	14
Fine black sand & rocks	3	17
Rocks & boulders	36	53
Coarse sand & rocks	7	60
Coarse sand & rocks & boulders	14	74
Coarse sand, rocks & little clay	18	92
Clay, sand, rocks & boulders	8	100
Clay & sand	25	125
Fine sand & clay	15	140
Clay, gravel & soapstone	30	170
Clay & soapstone	5	175
Clay & fine sand	15	190
Clay, volcanic ash	9	199
Basalt & volcanic ash	9	208
Basalt	2	210

699-54-45 (GM-3)
Location: N54203, W44506 13/25-25B1
Casing Elevation: 494.25
Cable tool, drilled by Bigham of Hatch Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
No record	5	5
Gravel, cobbles, boulders	5	10
Sand, gravel, cobbles	34	44
Boulder	4	48
Gravel, cobbles	2	50
Gravel, cobbles, boulders	5	55
Sand, gravel, cobbles	5	60
Sand, gravel, cobbles, small boulders	15	75
Brown clay w/small gravel, streaks of black sand	30	105

699-54-57
Location: N54011, W56629 13/26-27D1
Casing Elevation: 577.78
Cable tool, drilled by Chausse of & for GE Company, 1955, groundwater monitoring borehole

Material (1)	Thickness	Depth
No record	10	10
Boulders	15	25
Gravel	10	35
Boulders, gravel	10	45
Gravel	10	55
No record	5	60
Coarse sand	5	65
Gravel; bentonite in hole at 110 ft.	89	154
Sand, silt, gravel	6	160
No record	2	162
Sand, silt, gravel	7	169
Sand, gravel, boulders; large boulder at 178 ft.	3	172
Boulders	2	180
Boulders, gravel; bed gravel; shoe breaking up	1	181
Basalt	18	199

699-55-40 (GM-1)
Location: N58331, W40415 13/27-19P1
Casing Elevation: 543.13
Cable tool, drilled by Evans of Hatch Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
Brown & black sand w/traces of silt	25	25
Brown & black w/some gravel & traces of silt	5	30
Sand w/some gravel	10	50
Sand & gravel	15	65
Sand & gravel & cobbles	21	86
Sand & gravel w/cobbles	5	91
Sand & gravel & cobbles	4	95
Grave & silt size 3 in. yellow	15	110
Sand & gravel size 2 in. yellow	10	120
Clay w/sand yellow	7	127
Gravel w/clay size 2 in. yellow	10	140
Gravel & sand fine yellow	5	145

699-55-44 (GM-2)
Location: N55462, W43677 13/26-24D1
Casing Elevation: 519.67
Cable tool, drilled by Bigham of Hatch Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand	5	5
Sand & gravel	5	10
Sand, gravel, cobbles; 15 ft. to 19 ft. was a boulder or large cobble	10	20
Sand, gravel	5	25
Sand, gravel, cobbles	15	40
Sand & gravel, some silt	35	75
Sand, gravel, cobbles, some silt	15	90
Sand, gravel, cobbles	5	95
Sand, gravel, cobbles w/some brown clay	5	100
Brown sandy clay	40	140
Gray to brown clay w/gravel	20	160

699-55-50A
Location: N55006, W49999 12/26-25C1
Casing Elevation: 442.31
Cable tool, drilled by Baker of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil & black sand	5	5
Black sand & boulders	15	20
Black volcanic rock	5	25
Black lava rock	8	33
Boulders	4	37
Gray sand & gravel	6	43
Gray sand & boulders	2	45
Boulders & black sand	5	50
Black sand	10	70
Water gravel	10	80
Gray sand & gravel	15	95
Red volcanic ash	5	100
Basalt	5	105
No record	3	108
Porous basalt, not very hard	2	110

699-55-50B
Location: W443 13/26-25C2
Casing Elevation: W443
Cable tool, drilled by Bentz of & for GE Company, 1956, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine sand	1	1
Gravel	10	10
Gravel, cobbles & black sand; cobbles at 14 ft.	6	16
Cobbles, gravel & black sand	10	26
Cobbles, gravel, sand, little silt; some silt at 28 ft.	6	32
Run out of silt at 32 ft. Coarse gravel up to 2 1/2 in. & black sand	1	33
Coarse gravel up to 3 in. & black sand	3	36
Gravel up to 2 in., black sand, little silt	8	44
Pea gravel, some gravel up to 2 in., fine & coarse black sand	1	45
Small and coarse gravel up to 3 in. & sand; very little pea gravel at 50 ft.	12	57
50% small & coarse gravel up to 2 in., 50% black sand, very little silt	3	60
Black sand, small & coarse gravel up to 4 in., formation drills like basalt	2	62
50% pea gravel & coarse gravel up to 4 in., 50% black sand, little silt	6	68
50% small & coarse gravel up to 2 in., 50% black fine & coarse sand, some silt	2	70
50% fine & coarse sand, 50% small & coarse gravel run up to 4 in.	5	75
Gray sand, gravel, little silt, small & coarse gravel up to 11 in.	7	82
75% small & coarse gravel up to 3 in., 25% fine & coarse gray sand, little silt	5	87
50% gravel, small up to 3 in., 50% fine & coarse gray sand	2	89
Light gray clay & fine sand	5	94
Basalt	1	95

699-55-50C
Location: 12/26-25C3
Casing Elevation: 440
Cable tool, drilled by Rowe & Richards of & for GE Company, 1956, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil, blow sand	5	5
Gravel, boulders, sand	14	19
Blue gravel	1	20
2 ft. pure gravel, 3 ft. gravel, silt, sand	5	25
Gravel, sand, silt	15	40
Pure gravel	5	45
Pure gravel, small to 2 in. diameter	3	48
Pure gravel	2	50
1 ft. gravel, 4 ft. black medium sand, some gravel	5	55
Black sand, some gravel	3	58
Coarse black sand, some gravel	2	60

699-55-50D
Location: N55017, W49950 12/26-25C4
Casing Elevation: 440.04
Cable tool, drilled by Rowe & Richards of & for GE Company, 1956, groundwater monitoring borehole

Material (1)	Thickness	Depth
Blow sand, some silt	5	5
Boulders, gravel, silt	10	15
Boulders, gravel, sand silt	17	32
Black sand, some gravel	13	45
Black sand, more small gravel	5	50
Black sand, small gravel	10	60
Record unclear	4	64
Record unclear	3	67
Record unclear	5	72
Record unclear	3	75
Fine sand to coarse granules, gravel up to 4 1/2 ft.	5	80
Fine sand, coarse sand, granules, some gravel	6	86
Record unclear	2	88
Record unclear	1	89
Gravel & sand	2	91
Basalt, porous & rotten	5	96
Basalt gets harder the deeper I go	4	100

699-55-57
Location: N54608, W57208 13/26-2702
Casing Elevation: 555.26
Air rotary, drilled by Aqua Drilling & logged by Ledgerwood of & for ARHCO, 1975, hydrologic investigation borenole

Material (1)	Thickness	Depth
Sand	1	1
Gravel (10-12 in. boulders at 2 ft.)	5	6
Sandy gravel	10	16
Gravel	5	20
Sandy gravel	10	30
Gravel (boulder at 34 ft.)	5	35
Sandy gravel	10	45
Gravelly medium to coarse sand	5	50
Sandy gravel	20	70
Gravelly sand	5	75
Sandy gravel	50	125
Gravelly sand, very coarse sand w/pebbles	15	140
Slightly pebbly sand	5	145
Gravelly sand	10	155
Very coarse sand	15	170
Basalt	10	180

699-55-60A
Location: N55100, W60100 13/26-2101
Casing Elevation: 572.89
Cable tool, drilled by Durand & Son Drilling Company for duPont, 1943, groundwater monitoring borenole

Material (1)	Thickness	Depth
Topsoil	4	4
Heavy gravel & boulders	128	132
Pea gravel	6	138
Gravel & boulders	52	190
Wash gravel	2	192
Coarse gravel	6	198
Heavy gravel	4	202
Gravel-boulders	31	233

699-55-60B
Location: N55425, W60140 13/26-2102
Casing Elevation: 572.38
Cable tool, drilled by Durand & Son Drilling Company for duPont, 1944, groundwater monitoring borenole

Material (1)	Thickness	Depth
Boulders & gravel	5	5
Gravel	18	23
Boulders	4	27
Gravel & boulders	12	39
Gravel	7	46
Gravel & boulders	11	57
Gravel & sand	4	61
Gravel	12	73
Gravel & boulders	6	79
Gravel	22	101
Gravel & sand	15	116
Gravel	3	119
Gravel & sand	7	126
Gravel	7	133
Fine gravel & sand	8	141
Coarse gravel	22	163
Medium gravel	10	173
Fine gravel & coarse sand	10	183
Fine sand	10	193
Fine gravel	10	203
Coarse sand	10	213
Fine gravel & coarse sand	10	223
Fine gravel & fine sand	5	228
Medium gravel	2	230
Fine gravel	10	240
Coarse gravel	10	250
Fine gravel	10	260
Fine gravel & fine sand	10	270
Coarse sand	10	280

699-55-63
Location: N55100, W62740 13/26-2801
Casing Elevation: 572.00
Cable tool, drilled by Durand & Son Drilling Company for duPont, 1944

Material	Thickness	Depth
Boulders	16	16
Rock & boulders	4	20
Coarse gravel & boulders	2	22
Black gravel	5	27
Sand & gravel	12	39
Gravel	10	49
Coarse gravel	5	54
Gravel	8	62
Gravel & boulders	6	68
Gravel	8	76
Gravel & boulders	7	83
Gravel	9	92
Gravel & sand	7	99
Gravel	16	115
Fine gravel	7	122
Gravel	10	132
Fine gravel & sand	9	141
Fine gravel	10	151
Gravel & sand	12	163
Fine gravel	10	173
Basalt	19	192

699-55-65A
Location: N55100, W65280 13/26-2981
Casing Elevation: 580.00
Cable tool, drilled by Durand & Son Drilling Company for duPont, 1944

Material	Thickness	Depth
Topsoil	2	2
Coarse gravel	25	27
Gravel & boulders	63	90
Sand & gravel	13	103
Gravel	16	119
Sand & gravel	17	136

699-55-65B
Location: N55300, W65280 13/26-2002
Casing Elevation: 580.00
Cable tool, drilled by Durand & Son Drilling Company for duPont, 1944, groundwater monitoring borenole

Material (1)	Thickness	Depth
Topsoil	2	2
Gravel	2	4
Gravel & boulders	30	34
Coarse gravel	7	41
Gravel & boulders	9	50
Coarse gravel & boulders	2	52
Boulders	3	55
Gravel & boulders	18	73
Gravel	11	84
Sand & gravel	8	92

Gravel	14	106
Gravel & sand	16	122
Gravel	3	125
Gravel & clay	5	130
Fine gravel	5	135
Gravel & clay	5	140
Basalt	6	146

699-55-65C
Location: N55100, W68300 13/26-20D
Casing Elevation: 580.30
Cable tool, drilled by Durand & Son Drilling Company for duPont, 1944, groundwater monitoring borehole

Material (1)	Thickness	Depth
Terrace deposits	135	135
Ringold	5	140
Basalt	6	146

699-55-70
Location: N55325, W69955 13/26-19R1
Casing Elevation: 569.04
Cable tool, drilled by Chausse of USGS for GE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil & boulders	5	5
Sand & boulders	20	25
Boulders	10	35
Gravel & boulders	9	44
Sand, boulders & clay	17	61
Boulders, gravel & clay	11	72
Gravel, boulders & clay	8	80
Gravel & boulders	2	82
Gravel & clay	3	85
Sand, gravel & clay	36	121
Brown clay, sand & gravel	19	140
Brown clay & sand	15	155
Sand & clay	10	165
Clay	15	180
Gravel	1	181
Sand, clay & gravel	9	190
Brown clay, sand & gravel	6	196
Clay, sand & boulders	4	200
Basalt	5	205

699-55-76
Location: N55001, W75897 13/25-25B1
Casing Elevation: 583.24
Cable tool, drilled by Donaldson of Bach Drilling Company for GE Company, 1953, groundwater monitoring borehole

Material (1)	Thickness	Depth
Rock, sand, & gravel	3	3
Boulders	2	5
No record	2	7
Boulders	3	10
Sand & gravel	5	15
Gravel	10	25
No record	5	30
Sand & gravel	15	45
Gravel & boulders	20	65
Sand & gravel	25	90
Gravel & boulders	10	100
Sand & gravel, some boulders	5	105
Sand & gravel	10	115
No record	5	120
Gravel & boulders	5	125
Muddy gravel, few boulders	4	129
Muddy gravel & sand	18	147
Gravel, hard pan	5	152
Sand & gravel, little brown clay	15	167
Brown clay, sand & gravel	13	180
Sand, gravel heavy to sand, little brown clay	5	185
Sand, gravel, little brown clay; formation heavy to fine sand from 195 ft. to 219 ft.	35	220
No record	3	223
Basalt, hit basalt at 223 ft.	5	228

699-55-89
Location: N54969, W88592 13/25-27D1
Casing Elevation: 617.43
Cable tool, drilled by Greenfield & Podda of USGS for GE Company, 1948, groundwater monitoring borehole

Material	Thickness	Depth
No record	6	6
Sand, gravel, & boulders	6	12
Sand & gravel	5	17
Gray sand	3	20
Boulders, & medium gravel; some basalt at 22 ft., 22 ft. to 24 ft. gravel is about 1/2 basalt	6	26
Coarse & medium gravel; lot of basalt gravel	5	31
Coarse to medium gravel, a little over 1/2 basalt & boulders	4	35
Coarse to medium gravel & little sand; a lot of the gravel is basalt	2	37
Coarse to medium gravel & sand	3	40
Coarse to medium gravel w/ granite & quartzite	5	45
Coarse to medium gravel & sand	3	48
Gravel & sand	6	54
Coarse to medium gravel & sand	1	55
Medium gravel & little sand	1	56
Silt & gravel	6	62
Sand, gravel, boulders & silt	6	68
Gravel & boulders 50%, sand 30%, silt 20%	3	81
About 50% gravel, 25% basalt & 25% other, sand 30%, silt 20%	4	85
About 50% gravel & boulders (25% basalt & 35% others), 25% sand, 15% silt	5	90
A boulder at least 1 ft. thick	1	91
50% gravel, ground gravel & boulders, 30% sand & 20% silt	3	94
Mostly small boulders, 50% gravel & rock, 15% silt & 25% sand	1	95
60% gravel & boulders (20% basalt & 40% other rock), 20% silt & 20% sand	5	100
Gravel 60% (20% basalt, 40% other), sand 15%, light color & fine, & silt & rotten basalt balls 25%	5	105
Gravel & boulders 60%, sand 15%, & silt & rotten basalt 25%	5	110
60% gravel & boulders, sand 20% & silt 20%	5	115
40% gravel, 40% sand, & 20% silt	3	118

40% gravel, 40% fine light colored sand & 20% rotten basalt or silt that is dark brown	2	120
50% gravel, 30% sand, 20% silt, brown clay-like material, also white lumps	5	125
Large boulder or boulders	3	128
60% gravel, 30% sand, 10% silt; gravel about 20% basalt & 80% other, sand, fine & light colored, silt light brown, & clay-like lump real deep red	4	132
60% gravel, & boulders, 30% sand, 10% brown silt	3	135
60% gravel & boulders, 20% sand & 20% light brown silt	9	144
40% gravel, 40% sand & 20% silt	1	145
50% gravel & boulders, 30% sand & 20% silt	5	150
40% gravel & boulders, hit boulders at 154 ft., sand 20%, silt 30% which showed brown rotten basalt, or clay-like lumps that were soft	5	155
35% gravel, 40% sand & 25% silt	5	160
50% gravel & boulders, 25% sand & 25% silt; boulder bed 162 ft. to 164 ft., 168 ft. to 170 ft. there is sand cemented to the gravel, & a few white very soft clay like lumps	12	172
60% gravel & boulders, 25% sand, 15% silt; weathered basalt rocks have fine sand cemented to them	7	179
40% gravel & boulders, 35% sand & 25% silt	9	188
40% gravel & boulders, 20% sand & 40% silt; 20% of gravel & boulders is basalt & 80% other rocks	7	195
40% gravel & boulders, 25% sand, 35% silt; have weathered basalt rocks & brown rotten basalt lumps of clay-like material	5	200
40% gravel & boulders, 40% sand, 20% silt; sand cemented to weathered basalt & any other rough rocks	10	210
40% gravel, 40% sand, 20% silt; rocks have sand cemented to them	16	216
40% gravel & boulders, 35% sand & 25% silt	7	223
50% gravel & rock, 20% sand & 10% silt; the gravel & sand all appear to be cemeted together; rocks have sand coating & sand like chunks came out that were almost rock;. some brown, light brown & almost white clay-like lumps are mixed w/coarse sand	4	227
50% gravel & boulders, 25% sand & 25% silt; rock & gravel about 20% basalt, 80% others w/mostly yellow rock; sand came up to them, sand is light & dry	3	230
50% gravel & boulders, 25% sand & 25% silt & clay-like material; found rock w/hard ash-like coating which was olive green, sand w/white clay-like material was outside of this rock, mostly yellow	5	235

699-55-35

Location: N58000, +84960 13/25-21N1
Casing Elevation: 777.25
Cable tool, drilled by Close of Bach Drilling Company, 1955, groundwater monitoring borehole

Material	Thickness	Depth
Boulders & gravel	20	20
Gravel	45	65
Gravel & boulders	10	75
Gravel	25	100
Fine sand & gravel	10	110
Silty sand	25	135
Sand & gravel	15	150
Sand	10	160
Gravel	15	175
Gravel & sand	25	200
Sand & gravel, a little clay	15	215
Sand & gravel, some clay	10	225
Sand, gravel & clay	5	230
Small gravel, sand & clay	15	245
Gravel, sand, clay	20	265
Boulders, gravel & clay	20	285
Gravel, sand & clay	30	315
Boulders, gravel & clay	15	330
Gravel, sand & clay	45	375
Sand & clay	10	385
Clay	10	395
Gravel & clay	10	405
Clay	40	445
Clay & fine sand	15	460
Sand & clay	10	470
Sand, gravel & clay	10	480
Sand & clay	10	490
Sand, clay & gravel	10	500
Gravel & clay	10	505
Sand, clay, gravel	7	512
Basalt, rock	3	515
Basalt rock	15	530

699-56-26 (GW-1D)

Location: N55801, +25726 13/27-02N1
Casing Elevation: 409.04
Cable tool, drilled by Evan of Hatch Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand	3	3
Broken red rock	1	4
Red rock	15	19
Basalt	6	25

699-36-40A (Golder well #G-6)
Location: N56696, W40425 13/27-19P2
Casing Elevation: 867.28
Air rotary to 61 ft., & diamond coring, drilled by Carman Water Wells & Diamond Drilling Company & logged by McRae, Nesbit & Burke of Golder Associates for WESCO, 1981, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to coarse sand	5	5
Fine to medium sand	45	50
Medium to coarse sand & fine to coarse gravel	11	61
Flowtop breccia	22	83
Fractured vesicular basalt	4	87
Fracture basalt	62	149
Silty sandstone	17	166
No recovery	4	170
Siltstone	5	175
Sandstone	26	200
Fracture basalt	25	225

699-36-40B (Golder well #G-10)
Location: N56638, W40485 13/27-19P3
Casing Elevation: 843.70
Air rotary to 65 ft., & diamond coring, drilled by Carman Water Wells & Diamond Drilling Company & logged by McLeod, Souther, Hefner & Griswold of Golder Associates for WESCO, 1981, geologic investigation borehole

Material (11)	Thickness	Depth
Fine to coarse sand, some fine to coarse gravel	20	20
Fine to coarse sand	5	25
Fine to medium sand, some coarse gravel	35	60
Fine to medium sand & fine to medium gravel	5	65
Fractured basalt	10	75
Vesicular basalt	2	77
Basalt breccia	42	119
Dark gray basalt	58	177
Claystone	5	182
Silty slightly clayey sand	14	196
Fine to medium sandstone	14	210
Medium sand, trace silt	15	225
Dark gray vesicular to dense basalt	172	397

699-36-43 (GW-1)
Location: N56251, W42048 13/25-24R1
Casing Elevation: 840.42
Cable tool, drilled by Bigham of Hatch Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
Brown sand	5	5
Brown sand & silt	5	10
Silt & brown sand	5	15
Black sand	38	53
Broken rock	7	60
Weathered basalt, brown clay	87	147
Weathered basalt, brown clay; fairly solid basalt, vesicular	3	150
Vesicular basalt, brown clay	5	155

699-37-25A (GW-14)
Location: N56756, W39477 13/27-22M1
Casing Elevation: 814.37
Cable tool, drilled by Evans of Hatch Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
Black sand	28	28
Black sand & gravel	19	47
Black sand w/some gravel	8	55
Black sand, fine to medium coarse	5	60

699-37-25B
Location: 13/27-22M2
Casing Elevation:
Air rotary, drilled by Aqua Drilling & logged by Fecht & for ARHCO, 1975, hydrologic investigation borehole

Material (1)	Thickness	Depth
No record	?	?
Medium sand, 35-50% basalt	17	24
Pebbles, medium to fine	1	25
Pebbles, sandy; medium to fine pebbles, medium to fine sand	5	30
Sand, pebbly; very coarse to coarse sand, medium to fine pebbles	10	40
Pebbles, coarse to fine	5	45
Pebbles, medium to fine	20	65
Sand, pebbly, very coarse to coarse sand, medium to fine pebbles	5	70
Pebbly, sandy; medium to fine pebbles, very coarse to coarse sand	5	75
Silt, sandy; fine to very fine sand	6	81

699-37-29B
Location: 13/27-22L2
Casing Elevation:
Air rotary, drilled by Aqua Drilling & logged by Fecht & Ledgerwood of & for ARHCO, 1975, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand; medium-fine	5	5
Sand; medium, 50% basalt	15	20
Gravel, sandy; pebbles w/medium to fine sand	5	25
Large boulder	2	29
Gravel, sandy	2	30
Gravel, sandy; small to medium pebbles w/fine to coarse sand	15	45
Sand, gravelly; coarse sand w/ small pebbles	5	50
Gravel, sandy; small pebbles w/coarse sand	5	55
Gravel; small to medium pebbles, little sand	5	60
Gravel; small to medium pebbles, w/coarse sand	5	65
Gravel, small to medium pebbles, little sand	15	80
Some signs of clay at 81 ft.	1	81

699-57-22
Location: N57020, W82990 12/25-22L1
Casing Elevation: 577.36
Cable tool, drilled by St. George & Smith of Haden Drilling Company for SE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Solid cobble bed, cobble 12 in. minus	5	5
12 in. minus cobble & silty sand	10	15
Cobbles & silty sand; hit large boulder 18 ft.; hit boulder at 34 ft.	21	36
Cemented gravel, sand	14	40
Silty gravel & sand; very silty gravel & sand 44 ft.; hit boulder at 49 ft.	15	55
Silty gravel & sand, a few large cobble 6 in.-8 in. minus; hit boulder at 59 ft.	5	60
Silty gravel & sand; hit boulder 136 ft.	135	205
Conglomerate	5	210
Sand & silt	15	225
Brown silty sand	10	235
Yellow sand & silt	5	240
No record	5	245
Sand & silt	20	265
Sand & gravel	50	315
Sand	10	325
Sand & gravel	18	343
Rock	12	355

*Note written on driller's log says "Basalt from 343 ft.-353 ft. not recorded in logs".

699-58-24 (GM-15)
Location: N58012, W24141 12/27-22F1
Casing Elevation: 418.80
Cable tool, drilled by Evans of Hatch Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand w/some gravel	3	3
Sand & gravel	2	5
Sand & gravel & cobbles	5	10
Sand & gravel 1 1/2-	14	24
Black sand	3	27
Black sand & gravel	3	30
No record	5	35
Black sand & gravel	20	55
Black sand	5	60

699-58-40 (Golder well #G-5)
Location: N57764, W40484 12/27-19L1
Casing Elevation: 743.13
Rotary (to 1 ft.) & diamond coring, drilled by Diamond Drilling Company & logged by Krause, Rice, Burke, McLeod, Nesbit & Moser of Golder Associates for WEICO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Silt (loess)	1	1
Weathered basalt	9	10
Weathered fractured basalt	21	31
Fractured basalt	12	43
Weathered flow bottom	1	44
Silty sandstone	18	62
Vesicular basalt	3	65
Slightly vesicular basalt	15	80
Fractured dense basalt	61	141
Weathered basalt	1	142
Weathered fractured basalt	4	146
Fractured dense basalt	100	246
Clayey silt to silt	15	261
Scoriaceous flowtop breccia	5	266
Fractured dense basalt w/clay seam at 271 ft.	62	328
Basalt breccia	58	386
Fractured dense basalt	9	395
Clay	21	416
Scoriaceous flowtop breccia	15	431
Vesicular basalt	19	450

699-58-41A (Golder well #G-1)
Location: N57953, W40520
Casing Elevation: 701.46
Air rotary (to 20 ft.) & diamond coring, drilled by Carman Water Wells & Diamond Drilling Company & logged by Moser of Golder Associates for WEICO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
Sandy silt (loess)	20	20
Fractured vesicular basalt	8	28
Fractured basalt	47	75
Basalt breccia	1	76
Fractured basalt	2	77
Basalt breccia	1	78
Fractured basalt	32	110
Basalt breccia	76	186
Fractured basalt w/zones of basalt breccia	59	245
Fractured basalt	29	274

699-58-41B (Golder well #G-2)
Location: N57988, W40575
Casing Elevation: 701.18
Air rotary (to 84 ft.) & diamond coring, drilled by Carman Water Wells & Diamond Drilling Company & logged by Krause of Golder Associates for WEICO, 1980, geologic investigation borehole

Material (1)	Thickness	Depth
No record	84	84
Fractured basalt	4	88
Brecciated basalt	19	107
Fracture basalt	42	149
Broken basalt w/clay gouge at 152 ft.	5	155
Brecciated basalt	12	167
Fractured basalt w/clay gouge at 174 ft. & 194 ft.	29	196
Fracture basalt w/zones of brecciation	9	207
Fracture basalt, highly brecciated at 222 ft.	18	225

699-58-41D (Golder well #G-4)
Location: N58077, e40703
Casing Elevation: 629.43
Air rotary to 23 ft & diamond coring, drilled by Carman Water Wells & Diamond Drilling Company & logged by Krause of Golder Associates for WESCO, 1980, geologic investigation borenole

Material (1)	Thickness	Depth
No record	23	23
Fracture basalt	24	47
Flow breccia	2	49
Gray siltstone to sandy siltstone	22	71
Vesicular basalt	8	79

699-59-12 (DH-10)
Location: N59424, e32378 12/27-20A1
Casing Elevation: 424.29
Cable tool, drilled by Allison of Bach Drilling Company for ARHCO, 1971, hydrologic investigation borenole

Material (1)	Thickness	Depth
Surf sand, brown	2	2
Sand & gravel, size 1 1/2 in., black	43	45
Gravel, dark, size 2 in.	15	60
Sand	13	73
Sand & gravel, size 1/2 in.	5	78
No record	6	84

699-59-44 (Golder well #107)
Location: N59221, e43514
Casing Elevation: 587.76
Air rotary, drilled by Carman Water Wells & logged by Lubrecht of Golder Associates for WESCO, 1980, geologic investigation borenole

Material (1)	Thickness	Depth
Basalt gravel	15	15
Basalt	55	70

699-59-55 (DH-10)
Location: 12/26-22B1
Casing Elevation: 5405
Air rotary, drilled by Aqua Drilling & Development Company & logged by Hodge of ARHCO for ARHCO, 1975, borenole abandoned

Material (1)	Thickness	Depth
Medium sand w/medium gravel	15	15
Medium to fine sand w/coarse gravel	5	20
Medium to fine sand w/medium gravel	15	35
Medium to fine sand & gravel w/medium cobbles	10	45
Medium to fine sand w/small amount fine grave	10	55
Medium to fine sand w/some medium cobbles	35	90
Medium to fine sand, small amount gravel	5	95
Medium to fine sand w/medium cobbles	5	100
Medium to fine sand w/small & medium cobbles	15	115
Medium to fine sand & gravel	5	120
Medium to fine gravel w/small amount sand	10	130
Medium to fine gravel w/small cobbles	15	145

699-59-58 (GBM-8)
Location: N58859, e57753 12/26-22B1
Casing Elevation: 497.77
Cable tool, drilled by Baker of Bach Drilling Company for ARHCO, 1972, hydrologic investigation borenole

Material (1)	Thickness	Depth
Sand, gravel, cobbles	13	13
No record	22	35
Silt, gravel, cobbles	5	40
Sand, gravel, cobbles, boulder	2	42
Boulder	1	43
Sand, gravel, cobbles, boulder	3	46
Sand, gravel, cobbles	21	66
Sand & gravel	9	75
Sand, gravel, cobbles	14	89
Sand & gravel	1	90
Sand	12	102
Medium sand	10	112
No record	2	114

699-59-8CA
Location: N59445, e79548 12/25-21A1
Casing Elevation: 581.20
Cable tool, drilled by Greenfield of USGS for BE Company, 1948, borenole abandoned

Material	Thickness	Depth
Rocks & sand	5	5
Rocks, sand, & little clay	5	10
Rocks & sand	1	11
Basalt gravel & little sand	5	16
Basalt chips	4	20
Coarse basalt chips	4	24
Basalt sand	1	25
Coarse basalt gravel	3	28
Basalt sand	4	32
Fine basalt sand	3	35
Basalt sand & mostly basalt gravel	3	38
Basalt sand	2	40
Sand & gravel (basalt sand & gravel is mostly basalt)	4	44
Fine basalt sand	7	51
Sand & gravel & mostly basalt	3	54
Basalt sand	1	55
Basalt sand & gravel	6	61
Fine gravel--mostly basalt	3	64
Sand & gravel--mostly basalt	3	67
Gray sand	3	70
Sand & gravel	9	79
Sand, gravel & rocks	1	80
Sand, gravel, & rocks & lots of basalt	3	83

699-39-80B
Location: N59453, W79548 13/25-23A2
Casing Elevation: 583.25
Cable tool, drilled by Greenfield of USGS for AE Company, 1948, groundwater monitoring borehole

Material	Thickness	Depth
Rocks & sand	6	6
Basalt rocks, little sand & blue binder	4	9
Basalt rocks & little dark gray sand	1	10
Basalt rocks w/gray sand	1	11
Basalt boulder	3	14
Basalt boulder & very fine sand	1	15
Basalt boulder & fine to medium sand	1	16
Very fine to medium basalt sand	1	17
Coarse basalt rock & little sand	1	18
Fine basalt rock & little sand	1	19
Fine & medium basalt sand	1	20
Sharp basalt gravel & little fine & medium basalt sand	1	21
Coarse basalt gravel & little fine & medium basalt sand	1	22
Fine & medium basalt sand	1	23
Basalt, gravel, & sand	5	28
Medium basalt sand	1	29
Very fine to medium basalt sand	2	31
3/4 basalt gravel & 1/4 other gravel w/blue binder	2	33
Fine to medium basalt sand	2	35
Fine to medium basalt sand & basalt gravel	4	39
Fine to medium basalt sand	2	41
Fine basalt sand	2	43
Fine & medium basalt sand	3	46
Fine to medium basalt sand	3	49
Fine to medium basalt sand & little gravel	2	51
Fine to medium basalt sand	1	52
Medium basalt sand	2	54
Fine to medium sand & 2/3 basalt	7	61
Basalt sand & gravel	7	68
Sand, mostly basalt	4	71
Sand & gravel, mostly basalt	2	73
Little sand & gravel--1/2 basalt & 1/2 other	2	75
Fine to medium gray sand	2	77
Silt, sand & gravel	8	85
Silt, sand & fine gravel	3	88
Gray sand & gravel	4	92
Gray sand, gravel & little silt	3	95
Fine to medium gray sand & gravel	4	99
Fine to medium gray sand & fine gravel	1	100
Fine to medium gray sand & coarse gravel	3	104
Fine to medium gray sand & fine gravel	1	105
Fine to medium gray sand & coarse gravel	4	109
Fine to medium gray sand & medium coarse gravel	1	110
Fine to medium gray sand & coarse gravel	5	115
Silt & medium gravel	2	117
Silt & coarse gravel	3	120
Silt & medium to coarse gravel	5	125
Silt & coarse gravel	3	128
Silt & medium gravel	7	135
Silt & medium to coarse gravel	4	139
Silt & medium gravel	1	140
Silt & medium to coarse gravel	3	143
Silt & medium to coarse gravel & little basalt	2	146
Silt & medium to coarse gravel	2	147
Coarse gravel & silt	5	152
Coarse gravel, silt & lump of clay	2	154
Coarse gravel, silt & little clay	4	158
Medium & coarse gravel, silt & little clay	7	165
Medium gravel, clay & little silt	4	169
Clay w/little fine gravel	4	173
Clay w/very little fine gravel	2	175
Clay & little gravel	2	177
Basalt gravel & little clay	3	180
Basalt sand & silt	4	184
Basalt sand & little clay from above	1	185
Basalt sand & gravel	2	187
Sharp pieces of basalt	3	190
Pieces of basalt gravel	2	192
Basalt sand	6	198

699-39-101
Location: N56919, W100659 13/25-19A1
Casing Elevation: 580.30
Air rotary, drilled by & logged by McGhan of PNL for PNL, 1976

Material (1)	Thickness	Depth
100% basalt pebbles	15	15
100% basalt pebbles, no fines	5	20
Slightly silty to fine sandy pebbles, basaltic pebbles, no fine fraction	10	30
Fine to coarse sandy pebble	5	35
Slightly silty to fine sand-pebbles	5	40
50% fine to medium sand-50% pebbles	5	45
70% fine to medium sand-30% pebbles	5	50
20% fine sand-80% fine gravel	5	55
Fine to medium sand	5	60
1 1/2 ft. boulder	2	62
Fine sand & boulders	3	65
Silt-fine sand-coarse gravel	5	70
Silt-fine to coarse sand-some small gravel	5	75
Fine sand & gravel	5	80
70% fine sand-30% small gravel	5	85
Fine sand	5	90
Silt & fine sand	10	100
Silt-gravel to 1 in.	5	105
Fine to coarse sand	5	110
Medium to coarse sand-small gravel	5	115
No record	2	117
Basalt	5	122

699-60-32 (GM-1)
Location: W60390, +32032 13/27-17R1
Casing Elevation: 425.20
Cable tool, drilled by Allison of Bach Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
Surf sand, brown	2	2
Sand & gravel, black 2 in.	30	32
Sand & gravel, black	33	65
Clay w/gravel, yellow	5	70
Clay & gravel, size 2 in., yellow	9	79
Clay & broken rock	6	85

699-60-53A (CH-1)
Location: 13/26-22A1
Casing Elevation: ~820
Diamond coring, drilled by Boyles Brothers Drilling Company & logged by McLean of & for RHO, 1980, geologic investigation borehole for Shallow Borehole Plugging Test Site

Material (2)	Thickness	Depth
No record, probably basalt	9	9
Basalt	69	78
Fine-grained sandstone	8	86
Tuff	17	103
Basalt	47	150

699-60-53B (CH-2)
Location: 13/26-22A2
Casing Elevation: ~820
Diamond coring, drilled by Boyles Brothers Drilling Company and logged by McLean of & for RHO, 1980, geologic investigation borehole for Shallow Borehole Plugging Test Site

Material (2)	Thickness	Depth
No record, probably basalt	4	4
Basalt	74	78
Sandstone	7	85
Airfall unit	17	102
Basalt	58	160

699-60-53C (CH-3)
Location: 13/26-22A3
Casing Elevation: ~820
Diamond coring, drilled by Boyles Brothers Drilling Company & logged by McLean of & for RHO, 1980, geologic investigation borehole for Shallow Borehole Plugging Test Site

Material (2)	Thickness	Depth
No record, probably basalt	4	4
Basalt	73	77
Sandstone	6	83
Tuff/airfall unit	19	102
Basalt	48	150

699-60-53D (CH-4)
Location: 13/26-22A4
Casing Elevation: ~820
Diamond coring, drilled by Boyles Brothers Drilling Company & logged by McLean of & for RHO, 1980, geologic investigation borehole for Shallow Borehole Plugging Test Site

Material (2)	Thickness	Depth
No record, probably basalt	8	8
Basalt	72	80
Tuff & sandstone	4	84
Tuff	19	103
Basalt	57	160

699-60-53E (CH-5)
Location: 13/26-22A5
Casing Elevation: ~820
Diamond coring, drilled by Boyles Brothers Drilling Company & logged by McLean of & for RHO, 1980, geologic investigation borehole for Shallow Borehole Plugging Test Site

Material (2)	Thickness	Depth
Basalt	75	75
Tuffaceous sandstone	5	80
Tuff	20	100
Basalt	50	150

699-60-53F (CH-6)
Location: W60324, +62750 13/26-22A6
Casing Elevation: ~820
Diamond coring, drilled by Hendrikson of Boyles Brothers Drilling Company & logged by McLean of & for RHO, 1980, geologic investigation borehole

Material (2)	Thickness	Depth
No record, probably basalt	4	4
Basalt	72	76
Tuffaceous sandstone	10	86
Airfall	4	90
Tuff	6	96
Clay rich bed	1	97
Airfall	3	100
Basalt	186	286
Sandstone	4	290

699-60-67 (GM-7)
Location: W60350, +56612 13/26-22D1
Casing Elevation: 469.44
Cable tool, drilled by Smith & Rodda of Bach Drilling Company for ARHCO, 1972, hydrologic investigation borehole

Material (1)	Thickness	Depth
Boulders, cobbles, coarse sand, f/gravel	6	6
Cobbles, f/gravel, c/sand	4	10
Cobbles, f/m gravel, c/sand	1	11
Boulders, cobbles, f/m gravel, c/sand; hit boulders at 12 ft.	1	12
Cobbles, f/m gravel, c/sand	8	20
Cobbles, v/c/f sand, f/m/s sand	5	25
Cobbles, m/sand, f/ms gravel	5	30
Cobbles, c/m sand, f/m/s gravel	4	34
v/c m sand, f/m/s gravel	3	37
Cobbles, v/c m sand, f/m/s gravel	1	38
vc/m sand, f/m/s gravel	2	40
vc/m /f sand, f/m/s gravel	5	45
vc/m sand, m/s gravel	5	50
f/c sand, m/s gravel	8	58

f/c sand, silt, m/s gravel	4	82
f sand, silt, m/s gravel	2	84
f sand, m/s gravel	2	86
m/f sand, m/s gravel	2	88
f sand, m/s gravel	4	92
f/m sand, m/s gravel	2	94
vf/m sand, m/s gravel	5	99
f/m sand, m/s gravel	3	102
vc/f sand, silt, m/s gravel	2	104
f sand, silt, f/m/s gravel	2	106
f sand, f/m gravel	2	108
m/c sand, f/m gravel	2	110
f/m sand, s/ gravel	2	112
vf/f sand, s gravel	2	114
vf/f sand, silt	2	116
vf/f sand	40	156
vf sand	2	158
c sand, m/s gravel	4	162
c sand, f/m/s gravel	4	166
c/f sand, f/m/s gravel	2	168
c/f sand, s gravel	5	173
Black sand	8	181
Blue sand & pea gravel	2	183
Blue sand	6	189
Blue black sand, sand is fine & heavy	3	192
Blue black sand, basalt @ 145 ft.	1	193
Rotten basalt	2	195
Basalt; basalt is very rotten to 148 ft.	7	202
Basalt; the basalt is rotten & is light in weight	1	203

699-60-60
Location: N60030, W61467 13/26-21B1
Casing Elevation: 512.03
Cable tool (to 129 ft., & diamond coring, drilled by Chausse for AE Company & Hendricks of Boyles Brothers Drilling Company for APCO, 1976, groundwater monitoring borehole

Material (1, 13)	Thickness	Depth
Topsoil & boulders	5	5
Sand & boulders	11	16
Fine black sand	4	20
Boulders	6	26
Fine gray sand & boulders	7	33
Fine black sand	2	35
Coarse black sand	5	40
Sand, gravel & boulders	10	50
Sand & gravel	6	56
Black sand	4	60
Coarse black sand	5	65
Sand, gravel & boulders	3	68
Black & white sand	2	70
Black & white sand & gravel	7	77
Black & white sand	4	81
Black & white sand & gravel	6	87
Black & white sand	3	90
Black & white sand & gravel	5	95
Record unclear	3	98
Brown clay & 1/3 gravel	10	108
Fine black & white sand & clay	2	110
Clay & gravel	13	123
Coarse black & white sand & boulders	3	126
Basalt	2	128
Basalt	5	133

699-61-16A
Location: N61467, W15673 13/27-11B1
Casing Elevation: 412.52
Cable tool, drilled by Row of USGS for AE Company, 1950, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sandy clay & caliche	40	40
Clay caliche & sand; heavy clay, yellow & tan color, lot of caliche & some hard rock-like formation, could be shale	17	57
Blue-green shale or clay & hard sandstone	6	63
Blue shale, gray shale; at 67 ft.	5	68
Blue shale	8	76
Blue shale w/showing of yellow clay	2	80
Brown sandy clay or shale	10	90
Yellow clay	5	95
Brown clay	5	100
Reddish brown shale or clay	5	105
Reddish brown clay, shale & caliche	20	125
Tan, brown, sandy silt	15	140
Fine white sand & silt	6	146
Light clay & sand, some basalt gravel	4	150
Fine white sand, clay & tan silt	15	165
Tan silt, clay mud & fine white sand, showing of sandstone & blue shale; sandstone is fine & rotten	20	185
Fine white sand, tan silt & clay, very little sandstone & blue shale	9	194
Fine white sand, tan silt & clay, very little gravel	1	195
Very fine white sand, mud binder, darker color	10	205
White shale, small amount of fine gravel	10	215
White shale, small amount of fine gravel & some sandstone	5	220
White shale, small amount of fine gravel, layers of reddish-brown sand & clay	7	227
Reddish-brown sand, very little binder	3	230
Reddish-brown sand	3	233
White tight shale	2	235
Layers of red-brown sand & white shale, some blue shale, very little fine gravel	5	240
White shale; hole is making lots of muck	2	242
Blue shale, sand, & white clay	8	250
White sticky shale, brown sand & blue shale strainer; a little gravel showed up at 260 ft.	10	260
White clay & sand	5	265
White clay or shale, some sand & sandstone	5	270
White clay & fine sand	8	278
Pink soapy clay, no sand in it	1	279
White clay & sand	9	288
White sandy clay	9	298

White clay, sand & a showing of blue shale	5	300
Blue shale & some basalt chips	3	303
Loose green silt, gray sand & basalt chips	5	308
Green sandy silt & basalt chips	1	309
Black sandy basalt; looks like we have struck basalt, hole bridged in above w/white quicksand; had to spud out for over 100 ft.; casing stopped at 303 ft.	1	310
Basalt rock	8	318
Layer of sticky black shale & lots of basalt	2	320
Basalt w/layers of black shale	3	323
Basalt	4	327
Basalt gravel & lava mud	2	329
At 330 ft. fine basalt gravel (rotten basalt) & black basalt mud	1	330
Layers of blue shale w/basalt gravel & black mud	5	335
Basalt gravel, lava mud, some shale	5	340
Basalt chips, lava mud	8	348
Basalt	4	352
No record	10	362
Solid basalt	5	367
Fine gray sand	1	368
Basalt	2	370
Solid basalt	5	375
Small break in basalt, some sand & gravel in this break	1	376
Solid basalt	14	390
Solid basalt	25	415
Solid basalt, very hard	4	419
Solid basalt	4	423
Solid basalt, small break; 428 ft.-430 ft. very hard	7	430
Solid basalt, very hard	5	435
Basalt, showing of Ringold	1	436
Drilled through basalt at 426 ft. & into a rotten sandstone, sand & small gravel, caliche & various other formations	3	439
Solid basalt	7	446
Solid basalt	6	452
Dark shale, pink mud, basalt chips, & sand, this shale is dark bluish gray when wet & when dried out it is a light whitish gray	6	458
Gray sandstone, ash, sand, basalt chips	11	469
Basalt	3	472
Layer of shale	1	473
Layers of basalt & shale	2	475
Lava mud, basalt chips, blue shale, iron, sand & about everything	15	490
Porous basalt w/blue shale & ash-like substance impregnated all through the pores	15	505
Black basalt, some ash; at 505 ft. into a more solid basalt, this basalt is rotten, 510 ft. to 512 ft. more solid	7	512
Basalt, black ash mud, various other soft muds; at 517 ft. broke through solid basalt	5	517
Loose basalt & sand	3	520
Solid hard basalt	8	528
Hard solid basalt; 552 ft. to 555 ft. hardest basalt we have hit	33	565
Basalt--small break	3	568
Solid basalt w/some volcanic ash & mud	5	573
Basalt w/layers of ash	4	577
Basalt & ash	5	582
No record	1	583
Solid basalt	1	584
Rotten basalt	16	600
Hard basalt	7	607

699-61-26A
Location: N61060, +26260 13/27-16R1
Casing Elevation: 410
Cable tool, 1942, drilled for DuPont

Material	Thickness	Depth
Soil	2	2
Sand, loose & some gravel	18	20
Gravel, cemented ("hard pan")	24	44
Sand & pea gravel, water-bearing	30	74
Clay, sticky	46	120
Sand, coarse grading to fine, light-red, water-bearing	11	131
Sand, fine (some clay)	24	155
Clay	25	180
Sand, fine	12	192
Gravel; basaltic rocks & fragments	3	195
Clay	21	216
Clay, soft, silt & sand; gravel at bottom	24	240
Clay, sticky, bluish-gray; has streaks of light-yellow fine sand	117	357
Gravel, pea-size, & sand	6	363

699-61-37 (DM-18)
Location: N60618, +27041 13/27-13R1
Casing Elevation: 442.94
Cable tool, drilled by Allison of Bach Drilling Company, 1971, hydrologic investigation borehole

Material	Thickness	Depth
Surf sand, brown	3	3
Sand & gravel, size 1 1/2 in., black	22	25
Sand & gravel, size 1 1/2 in., dark	25	50
Sand & gravel, size 2 in. dark	10	60
Sand & gravel, size 1 1/2 in., dark	10	70
Sand, black, medium fine	6	76

699-61-41 (DM-16)
Location: N61256, +41118 13/27-18N1
Casing Elevation: 428.92
Cable tool, drilled by Allison of Bach Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material	Thickness	Depth
Surf sand, brown, medium fine	5	5
Sand, gray, medium fine	5	10
Sand, brown, medium fine	5	15
Sand & silt, yellow, fine, soft	15	30

Sand & silt & gravel, size 1 in.	5	35
Sand & gravel, size 2 in., dark	5	40
Clay & silt, cream color, soft	5	45
Blue soft clay	7	52

699-61-55A (DH-8)
Location: 13/26-15Q1
Casing Elevation:
Diamond coring, drilled by Boyles Brothers Drilling Company & logged by ARHCO for ARHCO, 1976, geologic investigation borehole

Material (13)	Thickness	Depth
Basalt	69	69
Clay	2	71
Basalt	152	223
Lapilli tuff & sandstone	26	249

699-61-53 (DC-11)
Location: N60693, W63026 13/26-15R1
Casing Elevation: 754
Diamond coring, drilled by Boyles Brothers Drilling Company & logged by Leugerwood et al for Rockwell, 1978, WSTF geologic investigation borehole

Material (2, 25)	Thickness	Depth
Basalt	75	75
Tuffaceous siltstone	21	96
Basalt	142	238
Vesicular basalt w/sedimentary clay	3	241
Basalt	37	278
Claystone, clay, sandy w/lenses of arkosic sands, palagonite	26	304
Basalt	58	362
Basalt	23	385

699-61-62 (GBH-1)
Location: N60522, W62217 13/26-16N1
Casing Elevation: 497.51
Cable tool, drilled by Smith of Bach Drilling Company for ARHCO, 1972, hydrologic investigation borehole

Material (1)	Thickness	Depth
Fine sand; hand dug	2	2
Large gravel, cobbles, fine sand, hand dug	2	4
Large gravel, small gravel, cobbles, fine sand	1	5
Large-small gravel, very fine sand	4	-
Large gravel, very fine sand	1	-
L/s/ gravel, v/f/ sand	6	-
Cobbles, v/f/ sand/l/ gravel	1	16
Cobbles, l/ gravel, v/f/ sand	2	18
No record, probably cobbles, l/ gravel, v/f/ sand	1	19
Cobbles, boulders, l/ gravel, v/f/ sand	2	21
Boulder, l/ gravel, v/f/ sand	1	22
Boulders, s/ gravel, v/f/ sand; encountered 5 or 6 large boulders 21 ft.-25 ft.	3	25
Boulders, cobbles, l/ gravel	3	28
Cobbles, l/s gravel	2	30
Boulders, cobbles, l/ gravel, v/f/ sand	2	32
Boulders, cobbles, s/ gravel, v/f/ sand	1	33
Cobbles, s/ gravel, v/f/ sand	1	34
Cobbles, l/ gravel, c//f/ sand	1	35
L/s gravel, f/ sand	2	37
Cobbles, l/ gravel, c//f/ sand	3	40
L/ gravel, c//f/ sand	3	43
Cobbles, l/s gravel, c/f/ sand	2	45
Cobbles, gravel, c/ sand	2	47
Cobbles, gravel, c/ sand	5	52
Cobbles, gravel, c/ sand	1	53
Boulders, c/ gravel, cobbles, c/ sand	1	54
Cobbles, c/ gravel, c/ sand	1	55
Boulder, c/ gravel, c/ sand; a layer of coarse sand 6 in. to 8 in., separating boulders at approx. 57 ft.	4	59
Boulder, cobbles, c/ sand	1	60
Boulders, cobbles, c/ sand, gravel	1	61
Cobbles, gravel, c/ sand	2	63
Cobbles, l/ gravel, c/ sand	2	65
L/ gravel, c/ sand	1	66
Cobbles, l/s gravel, c/ sand;	3	69
L/s gravel, c/ sand, cobbles	1	70
Cobbles, c/ sand, f/m/s gravel	2	72
Boulders, f/m/s gravel; hit rather large boulder at 73 ft.	1	74
Boulder, f/ sand, f/m/s gravel	1	75
Boulders, cobbles, f/s gravel, c/f/ sand	4	79
Cobbles, c/ sand, f/m/s gravel	1	80
Cobbles, c/ sand, m/s gravel	6	86
L/m/s gravel, c/ sand, silt	2	88
L/m/s gravel, c/ sand	2	90
L/m/s gravel, c/f sand	2	92
Cobbles, c/ sand/ f/m/s gravel	2	94
Cobbles, c//f/ sand, f/m/s gravel	2	96
C/f sand, f/m/s gravel	2	98
Cobbles, c/ sand, f/m/s gravel	2	100
No record	1	101
Cobbles, c//f/ sand, f/m/s gravel	2	103
Cobbles, c/ sand, f/m/s gravel	2	105
C/ sand, f/m/s gravel	4	109
C/f sand, m/s gravel	2	111
V/c/ sand, m/s gravel	2	113
V/c sand	2	115
V/c/ sand, f/m/s gravel	2	117
V/c/ sand, f/m gravel	2	119
V/c/ sand, f/m/s gravel	5	124
C/ sand, f/m/s gravel	2	126
C/m sand, f/m/s gravel	2	128
V/c sand, m/s gravel	2	130
V/c sand, f/m/s gravel	4	134
Cobbles, v/c/ sand, f/m/s gravel	2	136
Cobbles, v/c/ sand, m/s gravel	2	138
Vc/m sand, f/m/s gravel	2	140
V/cm sand, f/m gravel	2	142
Boulder, v/c/ sand, f/m gravel; hit boulder at approx 146 ft.	4	146
V/c/ sand, f/m/s gravel	1	147
V/c//c/ sand, f/m/s gravel	3	150
V/c/ sand, f/m/s gravel	1	151
Boulder, cobbles, v/c/ sand, f/m/s gravel	2	153
V/c/ sand, f/m/s gravel	4	157
V/c/ sand, m/s gravel	4	161
V/c/ sand, s/ gravel	2	163
V/c/ sand, cobbles, /m gravel	2	165
V/c/ sand, cobbles, f/m/s gravel	2	167

V/c/ sand, f/m/s gravel	2	169
V/c//c/ sand, f/m/s gravel	1	170
Cobbles, v/c/ sand, f/m/s gravel	3	173
Cobbles, v/c//c/ sand, f/m/s gravel	2	175
V/c/ sand, m/s gravel	1	176
V/c/ sand, f/m/s gravel	1	177
Cemented m/s gravel	1	178
Black basalt, M; black basalt at 177 1/2 ft. recovered piece of honeycombed basalt	3	181
Black basalt (H)	2	183
Black basalt	3	186
No record	1	187
Black basalt (H)	1	188

699-61-66
Location: N61062, +65626 13/25-1701
Casing Elevation: 822.18
Cable tool, drilled by Bentz for GE Company, 1955, groundwater monitoring borehole

Material	Thickness	Depth
Boulders, gravel & sand	5	5
No record	5	10
Cobbles, & gravel	10	20
Small & coarse gravel	15	35
Cobbles & gravel, little sand	5	40
Cobbles & gravel	10	50
Coarse gravel & black sand	5	55
Coarse gravel, little sand	5	60
Cobbles & gravel, sand & silt	5	65
Small & coarse sand, gravel & silt	5	70
Coarse gravel	5	75
Cobbles & coarse gravel	10	85
Fine sand, coarse sand & gravel	15	90
Coarse sand & gravel	20	110
Cobbles & gravel	15	125
Coarse gravel, little silt	15	140
No record	5	145
Coarse gravel, fine sand	15	160
Coarse sand & gravel-clay	5	165
Fine & coarse sand	5	170
Fine & coarse sand & coarse gravel	5	175
Coarse gravel & sand	5	180
Fine & coarse sand	5	185
Fine & coarse sand & gravel	10	195
Fine & coarse sand, coarse gravel	10	205
Cobbles, coarse gravel, fine & coarse sand	10	215
Basalt	10	225

699-61-84
Location: 13/25-14N1
Casing Elevation:
Cable tool, drilled in 1943 (for duPont)

Material	Thickness	Depth
Top soil	4	4
Coarse gravel & boulders	35	39
Coarse & fine gravel	12	51
Loose gravel & boulders	8	59
Gravel	45	104
Clay & gravel	7	111

699-62-11 (GW-12
Location: N62104, +01412 13/27-1701
Casing Elevation: 434.12
Cable tool, drilled by Division of Bacon Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
Surf sand brown	2	2
Sand & boulders + 8 in.	12	14
Sand & boulders + 2 in. dark	18	32
Sand & gravel + 2 1/4 in. dark	35	65
Sand & gravel + 2 in. dark	5	70
Sand & gravel + 1 1/4 in. brown	5	75
Sand & silt fine brown	9	84

699-62-32
Location: N62250, +01875 13/27-1702
Casing Elevation: 431.32
Dug, stock well

Material	Thickness	Depth
Gravel & sand	75	75

699-62-42A
Location: N61937, +40880 13/26-1301
Casing Elevation: 402.00
Cable tool, drilled by Durand Drilling Company for duPont, 1944, hydrologic investigation borehole

Material (1, 12)	Thickness	Depth
Sand & coarse gravel	5	5
Medium gravel	10	15
Basalt boulders	5	20
Coarse gravel & sand	8	28
Coarse gravel	8	36
Sand & gravel	10	46
Coarse gravel & sand	8	54
Sand & gravel	12	66
Yellow clay	6	72

699-62-43B
Location: N62338, +40880 13/26-1302
Casing Elevation: 400.21
Cable tool, drilled by Row & Jack & logged by Hart & Frank of USGS for GE Company, 1954, hydrologic investigation borehole

Material (1, 12)	Thickness	Depth
Sand, wind blown, fine, medium & coarse grained	5	5
Gravel, granular & pebble gravel w/some coarse sand & cobble gravel	8	13
Gravel & sand, largely granular gravel & coarse sand w/some pebbles & cobbles to 6 in. in diameter, well rounded, clean	26	39
Sand w/some gravel, coarse & very coarse grained well sorted, clean sand w/little pebble gravel & medium sand	2	39
Sand w/gravel, very coarse & coarse-grained sand w/pebble & cobble gravel	12	51

Sand, coarse grained, clean, well sorted w/some pebble gravel & a little medium sand	2	54
Gravel & sand, cobble & pebble gravel w/much very coarse sand	2	56
Sand, coarse & very coarse-grained clean sand w/much pebble gravel	5	61
Gravel & sand, mixed pebble & cobble gravel & some coarse & very coarse sand	3	64
Clay & silt, strong, semiplastic, firm clay & silt	4	68

699-62-42C
Location: N62238, W42680 12/26-1303
Casing Elevation: 429.66
Cable tool, drilled by Gentz for GE Company, 1954, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand	12	12
Coarse gravel up to 3 in.	13	25
Gravel up to 1 1/2, little black sand	5	30
Coarse gravel up to 4 in.	5	35
Small & coarse gravel, little sand	5	40
Small & coarse gravel up to 4 in.	5	45
Pea gravel & coarse gravel up to 3 in.	5	50
Small & coarse grave, 50% black coarse sand	5	55
75% fine black sand, 25% coarse gravel	6	61
Fine black sand, no gravel	6	67
White clay	3	70
Brown clay & silt	20	90
Clay, silt & sand	10	100

699-62-42D
Location: N62238, W42630 12/26-1304
Casing Elevation: 429.30
Cable tool, drilled by Jack & Row for GE Company, 1954, hydrologic investigation borehole

Material (1)	Thickness	Depth
Blow sand, top soil	10	10
Gravel & sand	40	50
Pure sand	17	67
Light tan silt	6	73

699-62-42E
Location: N62256, W42651 12/26-1305
Casing Elevation: 421.32
Cable tool, drilled by Bach of Bach Drilling Company for GE Company, 1959, hydrologic investigaton borehole

Material (1)	Thickness	Depth
Boulders & heavy gravel	18	18
Boulders	12	30
Gravel	10	40
Coarse gravel	14	54
Gravel, up to 2 in. size	2	56
Fine gravel, coarse sand	2	58
Fine sand	8	66
Fine black sand; added clay	2	68
Clay (blue)	5	73
Clay	2	75
Clay, (blue)	3	78
No record	5	83

699-62-42F
Location: N62324, W42718 12/26-1306
Casing Elevation: 421.34
Cable tool, drilled by Bach of Bach Drilling Company, 1959, hydrologic investigation borehole

Material (1)	Thickness	Depth
No record	10	10
Coarse gravel	15	25
Boulders	10	35
Heavy gravel	10	45
Fine sand	3	48
No record	11	59
Fine gravel; using some clay	5	64
No record	2	66
Clay	4	70
Clay & gravel	8	78
Clay	5	83
No record	1	84

699-62-42G
Location: N62368, W42748 12/26-1307
Casing Elevation: 419.96
Cable tool, drilled by Bach of Bach Drilling Company for GE Company, 1959, hydrologic investigation borehole

Material (1)	Thickness	Depth
Heavy gravel & cobbles w/sand	5	5
Cobbles, boulders	5	10
Heavy gravel	10	20
Fine gravel	15	35
Coarse sand	7	42
Fine sand	16	58
Fine gravel; added clay	8	66
Clay	2	68
No record	13	81

699-62-42H
Location: N62379, W42755 12/26-1308
Casing Elevation: 427.41
Cable tool, drilled by Bach of Bach Drilling Company for GE Company, 1959, hydrologic investigation borehole

Material (1)	Thickness	Depth
Medium sand	10	10
Sand & gravel	20	30
Gravel	20	50
Clay & gravel; layer of yellow clay mixed w/gravel	20	.
Clay & sand	20	90

699-62-43I
Location: N62337, W42752 13/26-13J9
Casing Elevation: 421.90
Cable tool, drilled by Bach of Bach Drilling Company for SE Company, 1959, hydrologic investigation borehole

Material (1)	Thickness	Depth
Cobbles	10	10
Heavy gravel	10	20
Cobbles, gravel	10	30
Fine gravel	10	40
Fine sand; added clay	22	62
Sand	2	64
Sand & clay	2	66
Sandy clay	2	68
Clay	11	79

699-62-43J
Location: N62340, W42787 13/26-13J10
Casing Elevation: 422.35
Cable tool, drilled by Bach of Bach Drilling Company for SE Company, 1959, hydrologic investigation borehole

Material (1)	Thickness	Depth
Heavy gravel	25	25
Coarse sand	5	30
Fine gravel	32	62
Coarse sand	2	64
Sandy clay	2	66
Clay	14	80

699-62-43K
Location: N62289, W42722 13/26-13J11
Casing Elevation: 428.44
Cable tool, drilled by Bach of Bach Drilling Company for SE Company, 1959, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand & gravel	60	60
Sand; using clay	8	68
Clay	2	70
No record	11	81

699-62-43L
Location: N62337, W42809 13/26-13J12
Casing Elevation: 420.53
Cable tool, drilled by Bach of Bach Drilling Company for SE Company, 1959, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand & gravel	5	5
Cobbles or heavy gravel (?)	5	10
Heavy gravel	10	20
Medium gravel	10	30
Fine gravel	38	68
Fine sand	8	66
Clay	11	79

699-62-43M
Location: N62305, W42769 13/26-13J13
Casing Elevation: 424.49
Cable tool, drilled by Bach of Bach Drilling Company for SE Company, 1959, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand	25	25
Gravelly sand	5	40
No record	10	50
Sand	20	70
Sandy clay	8	78

699-62-43N
Location: 13/26-13J14
Casing Elevation:
Cable tool, drilled by Bach of Bach Drilling Company for SE Company, 1959, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand	5	5
Cobblestones	5	10
No record	5	15
Sand	50	65
Clay	4	69

699-62-53 (DC-10)
Location: N62468, W43244 13/26-15J1
Casing Elevation: 438
Diamond coring, drilled by Boyles Brothers Drilling Company & logged by Ledgerwood of & for Rockwell, 1977, WSTF geologic investigation borehole

Material (2, 26)	Thickness	Depth
Glaciofluvial sediments: sand & gravel, about 70% basalt	24	24
Basalt	32	56
Clay, claystone, siltstone, vitric tuff, tuffaceous sandy siltstone, silty sandy claystone, sandy siltstone	69	125
Basalt	145	270
Tuff	2	272
Basalt	26	298
Tuffaceous sandstone, tuffaceous siltstone, mudstone, breccia	48	346
Basalt	24	430
Basalt	26	456

Note: Drilled at 25.6 E for vertical

699-62-57 (DB-9)
Location: 13/26-15L1
Casing Elevation:
Corehole, drilled by Boyles Brothers Drilling Company & logged by Ledgerwood for ARHCO, 1977, hydrologic investigation borehole

Material (2, 26)	Thickness	Depth
Basalt	121	121
Tuffaceous siltstone, sandstone, clay, sand, tuff	29	150
Basalt	178	328
Clay	10	338
Basalt	165	503
Tuff, green clay, sand	86	589

699-63-25A
Location: N63312, W24806 13/27-18E1
Casing Elevation: 395.15
Cable tool, drilled by Pow for GE Company, 1949, groundwater monitoring borehole

Material (1)	Thickness	Depth
Topsoil	1	1
Large boulders, sand & topsoil	4	5
Large boulders, sand & silt	3	8
Boulders, sand & silt; at 10 ft, hit a boulder	4	12
Boulders, gravel, sand & silt	3	15
Gravel, basalt boulders, sand & very little silt	13	28
Gravel, black sand & basalt	2	30
Gravel & sand	6	36
Gravel	4	40
Gravel & sand; good pea gravel to 1 1/2 in. in diameter, coarse black sand	9	49
Black sand & gravel	6	55
Gravel	1	56
Black sand & gravel	6	62
Sandy silt	3	65
Sandy clay-heavy clay	14	79
Sandstone, sand, gravel, reddish shale & clay; shale looks rotten & full of seams	24	103
Fine reddish sand w/sandstone, basalt chips & fine gravel	7	110

699-63-25B
Location: 13/27-18E2
Casing Elevation:
Cable tool, drilled by Bigham of Hatch Drilling Company for BNWL, 1967, hydrologic investigation borehole

Material (1)	Thickness	Depth
Hard packed silt w/gravel to 1 in.	2	2
Boulder	1	3
No record	3	6
Coarse sand & gravel	4	10
Large gravel	2	12
Cobbles, sand & silt	3	15
Boulders, cobbles & silt	5	20
Cobbles, sand & silt	6	26
Cobbles & silt	10	36
Fine sand & silt	5	40
1 in. gravel & sand	10	50

699-63-51 (GM-17)
Location: N62857, W50622 13/26-14L1
Casing Elevation: 424.54
Cable tool, drilled by Allison of Bach Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
Surf sand, brown	2	2
Sand & gravel, size 1 1/2 in.	5	7
Sand, coarse, & gravel, size 1 in., black	8	15
Sand, coarse black, & fine gravel 1/2 in.	5	20
Sand & silt & gravel, brown 1/2 in.	6	26
Clay, gray, soft	10	36

699-63-55 (GM-6)
Location: N62516, W55061 13/26-15K1
Casing Elevation: 426.54
Cable tool, drilled by Smith of Bach Drilling Company for ARHCO, 1972, hydrologic investigation borehole

Material (1)	Thickness	Depth
Coarse sand brown	1	1
Coarse sand, gray, medium gravel	5	6
Coarse sand, medium to small gravel	3	9
Cobbles, very coarse sand; large, medium & small gravel	2	11
Very coarse sand; large, medium & small gravel	5	16
Very fine to medium sand, silt, medium & small gravel	5	21
Cobbles, very coarse sand; large, medium & small gravel	2	23
Very coarse to medium sand; large, medium & small gravel	4	27
Very coarse sand, medium to small gravel	4	31
Very coarse to fine sand; large, medium & small gravel	2	33
Very coarse sand, medium & small gravel	5	38
Very coarse sand, small gravel	2	40
Very coarse sand, medium to small gravel	2	42
Very coarse sand, small gravel	23	65
Very coarse sand, silt, medium to small gravel	1	66
Very coarse sand, silt, small gravel	2	68
Very coarse to fine sand, silt, small gravel	2	70
Very coarse to coarse sand, silt	8	78
Very coarse, coarse & fine sand, silt	2	80
Fine to coarse sand, silt	2	82
Fine sand, yellow clay	2	84
Fine to coarse sand, yellow clay	2	86
Very coarse sand, yellow clay	2	88
Gray sandrock	12	100
Coarse sand, small gravel	2	102
Very coarse sand, small gravel	2	104
Very coarse to fine sand	2	106
Very coarse to coarse sand, small gravel	2	108
Very coarse to coarse sand	2	110
Very fine to fine sand	2	112
Black basalt	10	122

699-63-58 (GM-5)
Location: N62691, W57789 13/26-15N1
Casing Elevation: 491.90
Cable tool, drilled by Rodda of Bach Drilling Company, 1972, hydrologic investigation borehole

Material (1)	Thickness	Depth
Gravel & silt	2	2
Sand & gravel	11	13
Cement gravel	2	15
Boulders	1	16
Boulders & gravel	4	20

Cobbles & gravel	4	24
Sand & gravel	4	28
Sand, gravel & cobbles	20	48
Sand & gravel	12	60
Sand, gravel & cobbles	10	70
Sand & gravel	26	96
Sand, gravel & cobbles	6	102
Boulder, sand & gravel	2	104
Sand & gravel, fine	4	108
Sand & gravel, dea	4	112
Sand & gravel	8	120
Cemented gravel	2	122
Boulder, 20-24 in.	2	124
Sand & gravel	6	130
Basalt	10	140

699-61-89 UGB-1

Location: N62751, W88504 13/25-18M1
Casing Elevation: 512.40
Air rotary, drilled by Soil Sampling Service & logged by Ledgerwood of B & R for ARHCO, 1972, hydrologic investigation borehole

Material (1)	Thickness	Depth
Boulder	1	1
Broken basalt	2	3
Boulder	6	9
Sandy cobble gravel (basalt) turned to coarse sand	2	10
Sandy coarse gravel w/cobbles & boulders	8	18
Sandy coarse gravel w/fine sand, cobbles & boulders	4	22
Silty coarse gravel	10	32
Silty fine to medium sand	4	36
Medium to coarse gravel	4	40
Silty fine to medium gravel	2	42
Medium to coarse gravel w/fine sand	4	46
Coarse gravel w/coarse sand	2	48
Coarse gravel w/coarse black sand	6	52
Boulders & cobbles	2	54
Coarse gravel w/fine to medium sand	6	60
Coarse gravel w/fine silty sand	4	64
Coarse gravel w/fine sand	4	68
Medium to coarse gravel w/fine sand	2	70
Coarse gravel w/fine sand	2	72
Coarse gravel w/medium to fine sand	4	76
Medium to coarse grave w/fine sand	2	78
Coarse gravel w/fine sand	2	80
Fine to coarse gravel w/fine to coarse sand	2	82
Medium to coarse gravel w/medium to coarse sand	4	86
Coarse gravel w/medium to coarse sand	4	90
Sandy medium to coarse gravel	2	92
Medium to coarse gravel w/medium to coarse sand	8	100
Medium to coarse gravel w/fine sand & silt	4	104
Medium to coarse gravel w/coarse sand	2	106
Medium gravel w/medium to coarse sand	2	108
Medium to coarse gravel w/coarse sand	2	110
Coarse gravel w/fine sand & silt	4	114
Coarse gravel w/coarse sand	16	130
Medium to coarse sand w/medium gravel	2	132
Medium to coarse gravel w/silty medium sand	2	134
Fine to medium sand	2	136
Fine to coarse gravel w/silty sand	6	142
Medium to coarse gravel w/silty coarse sand	6	148
Coarse gravel w/coarse sand & silt	2	150
Medium to coarse gravel w/less silty sand	4	154
Coarse sand w/medium to coarse gravel	2	156
Silty sand w/medium to coarse gravel	2	158
Silty coarse to medium gravel w/coarse sand	2	160
Medium to coarse gravel w/sand & silt & hard clay fragments	2	162
Coarse gravel w/silt, brown silt lense at 161 ft.	2	164
Coarse gravel w/medium to coarse sand	8	172
Medium gravel w/silty coarse sand	4	176
Coarse to medium gravel w/fine to coarse sand	2	178
Basalt, vesicular, fresh	2	180
Basalt, palagonitic	2	182
Basalt, palagonitic w/clay	2	184
Basalt	34	218

699-61-90

Location: N62892, W90254 13/25-16M1
Casing Elevation: 509.72
Cable tool, drilled by Baker of USGS for BE Company, 1948, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & boulders	5	5
Basalt boulders on top of one another	14	19
Basalt boulders & gravel	1	20
Coarse basalt gravel	5	25
Fine black sand & some gravel	7	32
Fine black sand & gravel	3	35
Black sand & lots of gravel; ran out of sand at 38 ft.	3	38
Basalt gravel	4	42
Coarse gravel	3	45
Boulders & coarse gravel; at 45 1/2 ft. hit a boulder about 1 ft. thick	9	54
Coarse gravel	5	59
Boulders	1	60
Coarse black sand & gravel	57	117
Fine black sand w/some clay & silt	3	120
Fine black sand, clay & silt	4	124
Sand & coarse gravel	5	129
Coarse gravel & sand	1	130
Coarse gravel, sand, & clay	5	135
Clay, sand, & gravel; lots of coarse gravel	9	144
Clay, sand & some coarse gravel	6	150

Clay, sand & coarse gravel	13	183
Lots of basalt gravel w/other gravel mixed in; fine & coarse sand silt & clay binder	7	170
Gravel, sand, clay & silt binder; lot of gravel & coarse sand	5	175
Lots of gray sand & gravel, silt & clay binder	7	182
Lots of basalt gravel, fine to coarse sand, silt & clay binder, rock as big as baseballs	10	192
3 in. gravel, lots of sand, silt w/little clay binder	10	202
Fine gravel, fine to coarse sand, lots of silt & clay	5	207
3 in. gravel, sand, silt, & clay binder	4	211
Fine gravel, fine sand, silt & clay binder; this formation lies in layers of coarse gravel, then a layer of fine gravel w/lots of silt & clay	3	214
Sand, gravel & silt	1	215
Medium small gravel, black & white sand & lots of silt	15	230
Medium gravel 25%, coarse sand 25%, fine sand 25%, & 25% silt & clay	6	236
Black basalt, sand & silt, very little gravel	2	238
Basalt	3	241
Solid black basalt	4	247
Solid black basalt w/some white volcanic ash	6	253

699-63-31
Location: 13/25-16H2
Casing Elevation:
Air rotary, drilled by Aqua Drilling & Development Company & logged by Ledgerwood of & for ARHCO, 1975, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand	5	5
Gravelly sand	5	10
Large cobbles & boulders	5	15
Gravelly medium sand	5	20
Sandy gravel	20	40
Gravelly medium sand	5	45
Sandy gravel	5	50
Boulders	1	50

699-63-32 (UGB-3)
Location: N63467, W92042 13/25-16G1
Casing Elevation: 497.20
Air rotary, drilled by Soil Sampling Service logged by Ledgerwood of & for ARHCO, 1973, hydrologic investigation borehole

Material (1)	Thickness	Depth
Basalt boulders & cobbles	10	10
Coarse gravel w/fine sand & silt	2	12
Coarse gravel w/fine to coarse sand	14	26
Medium to coarse sand w/coarse gravel	2	28
Coarse gravel w/fine to coarse sand	12	40
Boulder	1	41
Medium to coarse gravel w/coarse sand	3	44
Coarse gravel w/medium to fine sand	2	46
Coarse gravel w/silty sand	4	50
Coarse gravel w/fine sand	6	56
Coarse gravel w/silty sand	12	68
Coarse gravel w/fine sand, boulder 69 ft.	4	72
Coarse gravel w/silty sand	48	120
Silty fine to coarse gravel	10	130
Medium to coarse gravel w/coarse sand	8	138
Coarse silty gravel w/fine to medium sand	10	148
Coarse gravel, mostly basaltic	2	150
Basalt	16	166
Medium to coarse sand	6	172
Fine to medium gravel	2	174
Basalt	12	186

699-63-95 (UGB-2, DB-12)
Location: N63009, W95000 13/25-15-E1
Casing Elevation: 486.66
Air rotary to 205 ft. & diamond core, drilled by Soil Sampling Service & logged by Ledgerwood for ARHCO, 1980, hydrologic & geologic investigation borehole

Material (1, 2)	Thickness	Depth
Silt w/basalt coarse gravel	2	2
Coarse gravel w/coarse sand, boulder at 7 ft.	8	10
Coarse gravel w/fine sand & silt	8	18
Coarse gravel w/silty sand	10	28
Silty sand w/coarse gravel	4	32
Coarse gravel w/fine to coarse sand	14	46
Medium to coarse gravel w/silty fine sand, boulder at 41 ft.	10	56
Medium to coarse gravel w/fine to coarse sand	6	62
Coarse gravel w/fine to coarse sand	6	68
Coarse gravel w/silty fine sand	4	72
Medium to coarse gravel w/silty sand	2	74
Coarse gravel w/silty sand	8	82
Medium to coarse gravel w/silty sand	4	86
Fine sand & silt w/medium to coarse gravel	2	88
Basalt; aphanitic, nonvesicular, some alteration	2	90
Basalt; mostly unaltered	2	92
Basalt	8	100
Basalt; plagioclase microlites & olivine microphenocrysts	2	102
Basalt	79	181
Clay, reddish brown	4	185
Clay & fine silt, red-brown	5	190
Clay & fine silt, green-gray	4	194
Fine to medium basalt gravel w/clay	3	197
Fine silt	2	199
Basalt	10	209
Basalt	170	379
Tuffstone, tuffaceous siltstone, tuffaceous sandstone, sandstone, sand, clay mudstone, diatomaceous tuffstone, claystone	128	507
Basalt	194	701

699-64-27
Location: 13/27-16A1
Casing Elevation: 414.29
Cable tool, drilled for Corps of Engineers, , domestic water supply well

Material (1)	Thickness	Depth
Sand & fine gravel	20	20
Sand, gravel & small boulders	5	25
Sand w/some fine gravel	48	73
Gray clay	10	83

699-64-62A (18M-2)
Location: N63786, W61746 13/26-16F1
Casing Elevation: 500.10
Cable tool, drilled by Baker of Bach Drilling Company for ARHCO, 1972, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand, gravel, cobbles, boulders	5	5
Cobbles, boulders, sand, gravel	8	13
Sand, gravel, cobbles	5	18
* Sand 7-18 ft. not typical, but powdery like unmixed cement		
Silt, gravel, cobbles; stuck together by clay-like substance	7	25
Sand, bea gravel, cobbles	5	30
Silt, sand, gravel cobbles	5	35
Cobbles, boulders, sand, gravel	5	40
Sand, gravel, cobbles	20	60
Gravel, cobbles, fine sand & silt	13	73
Cobbles, sand, gravel	2	75
Cobbles, boulder, sand, gravel	8	83

699-64-62B (18M-2 Redrill)
Location: N63786, W61746 13/26-16F2
Casing Elevation: 500.25
Cable tool, drilled by Baker of Bach Drilling Company for ARHCO, 1972, hydrologic investigation borehole

Material (1)	Thickness	Depth
No record (see 64-62B)	85	85
Cobbles, boulders, sand & gravel	5	90
Cobbles, sand, gravel	15	105
Gravel, coarse sand	1	106
Cobbles, sand, gravel	10	116

699-65-50
Location: N64699, W50146 12/26-14C1
Casing Elevation: 467.86
Cable tool, drilled by Gentz of & for SE Company, 1955, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine sand	40	40
Fine sand & coarse gravel	5	45
Coarse black sand & gravel	5	50
Fine black sand & coarse gravel	5	55
Cobble, gravel, & sand	10	65
Coarse gravel	15	80
Coarse gravel, little sand	10	90
Sand, silt & gravel	5	95
Fine sand, coarse gravel	5	100
Sand, silt, & clay	4	104
Brown clay	20	124
Blue clay	36	160
Brown clay	5	165
Gray clay	5	170
Blue clay	10	180
Blue clay & gravel	5	185
Sand, gravel & clay	5	190
Gray, sandy clay	20	210
Brown clay	5	215
Sand, silt, gravel, & clay	5	220
Brown coarse sand & caliche	5	225
Sand, silt & gravel	15	240
Sand & silt, little clay	5	245
Clay, little sand & silt	10	255
Sand, silt, little clay, gravel	5	260
Brown clay	5	265
Sand, silt, gravel, little clay	15	280
Yellow clay	20	300
Yellow clay, little gravel	15	315
Sand, silt & clay	10	325
Clay, some silt, sand, & gravel	25	350
Sand, silt & clay	20	370
Fine sand	5	375
Sand & silt	5	380
Fine gravel	5	385
Fine sand	15	400
Sand, silt, little clay	5	405
Sand, silt, clay	10	415
Fine sand, little silt	5	420
Fine sand, little silt & clay	15	435
Sand, silt, little clay	15	450
Sand, silt, & clay w/small gravel mixed in	13	463
Blue clay	2	465
Gray clay	5	470
Gray clay w/little gravel	10	480
Gray clay	30	510
Blue clay	10	520
Blue & gray clay w/small gravel	10	530
Blue clay	10	540
Green clay	5	545
Blue & black clay, & sandstone in small pieces	15	560
Blue & black shale & sandstone	5	565
Basalt, sand & clay	5	570

699-65-59A
Location: N65050, W58931 12/26-16A1
Casing Elevation: 506.86
Cable tool, drilled by Donaldson of Bach Drilling Company for SE Company, 1958, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	2	2
Gravel & rocks	13	15
Gravel & sand	8	23
Gravel & rock	9	32
Sand & gravel	67	99
Sand & fine gravel	13	112
Sand & gravel	15	127
Sand	23	150
Sand & gravel	16	166
Sand	27	193
Sandy clay	7	200

699-65-59B
Location: 13/25-16A2
Casing Elevation: 507
Air rotary, drilled by Aqua Drilling Company & logged by Hodge of & for ARHCO, 1976, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sandy gravel; pebbles & cobbles w/sand & silt	50	50
Gravelly sand; fine to coarse sand w/basalt pebbles	5	55
Sandy gravel	15	70
Gravelly sand	10	80
Sandy gravel	30	110
Slightly gravelly sand; medium to fine sand w/pebbles	5	115
Sandy gravel; pebbles w/fine to coarse sand	5	120
Slightly muddy gravel; pebbles & cobbles w/fine sand & silt	20	140
Slightly sandy gravel; pebbles & cobbles w/fine sand & silt	20	160
Muddy gravel; pebbles & cobbles w/fine sand & silt	15	175
Slightly sandy gravel; pebbles w/fine sand & silt	1	175

699-65-59C
Location: 13/25-16A2
Casing Elevation: 507
Air rotary, drilled by Aqua Drilling Company & logged by Ledgerwood of & for ARHCO, 1976, hydrologic investigation borehole

Material (1)	Thickness	Depth
Silty sandy gravel	25	25
Slightly sandy gravel; basalt pebbles & cobbles	5	30
Sandy gravel; basalt pebbles & cobbles w/fine to coarse sand	17	47
Gravelly sand; fine to coarse w/basalt pebbles	8	55
Sandy gravel; pebbles & cobbles w/fine to coarse sand	5	60
Slightly sandy gravel; pebbles & small cobbles w/fine to coarse sand	10	70
Sandy gravel; pebbles & cobbles w/fine to medium sand	20	90
Slightly sandy gravel; pebbles & cobbles w/fine sand	5	95
Sandy gravel; pebbles & cobbles w/fine sand	10	105
Sand; fine to coarse sand w/ small pebbles	5	110
Sandy gravel; pebbles w/fine to coarse sand	10	120
Gravel, pebbles & cobbles, clean	5	125
Gravel; pebbles & cobbles, slightly silty	10	135
Sandy gravel; pebbles & small cobbles w/coarse sand	5	140
Gravelly sand; coarse sand w/ pebbles	1	140

699-65-83
Location: N64944, W8296; 13/25-14C1
Casing Elevation: 485.62
Cable tool, drilled by Rodda of Bach Drilling Company, 1967, groundwater monitoring borehole

Material (1)	Thickness	Depth
Tight sand, gravel, & cobbles	5	5
Fine loose sand & gravel	15	20
Tightly cemented sand & gravel	5	25
Loose sand & gravel	30	55
Open gravel	25	80
Sand & gravel	5	85
Sand, gravel, & clay, mostly very fine sand	5	90
Fine sand, some gravel	5	95
Fine sand, very little gravel	5	100
Sand & gravel	15	115
Sand	5	120

699-65-95 (DOE-5)
Location: N64738, W9934; 12/25-17A1
Casing Elevation: 452.26
Air rotary, drilled by Soil Sampling Service & logged by Ledgerwood of & for ARHCO, 1977 hydrologic investigation borehole

Material (1)	Thickness	Depth
Coarse gravel w/sand & silt	2	2
Fine to coarse gravel w/coarse sand	6	8
Coarse gravel	4	12
Coarse gravel w/medium to coarse sand	4	16
Fine sand w/coarse gravel	2	18
Coarse gravel w/fine sand	1	19
Brown silt	1	20
Coarse gravel	2	22
Coarse gravel w/sand & silt	4	26
Medium to coarse gravel w/fine sand & silt	2	28
Fine to coarse gravel w/medium to coarse gravel	2	30
Medium to coarse gravel w/fine to medium sand	14	44
Coarse gravel w/silt	2	46
Coarse gravel w/sand	4	50
Coarse gravel w/sand & silt	5	55
Silt	1	56
Basalt	50	106

699-66-12
Location: N65994, W2097; 13/27-10Q1
Casing Elevation: 389.01
Cable tool, drilled by Miller & Owens for DE Company, 1961, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gray gravel & silt	5	5
Cobbles & gravel	10	15
Cobbles, & sand to gravel	5	20
Gray sand, gravel & 6 in. cobbles	5	25
Gray silt, sand, gravel & 6 in. cobbles	5	30
Sand, gravel & cobbles	5	35
Gray clay & rock	5	40
Gray clay	5	45
Gray clay & some rock	5	50
Gray clay	5	55
Sandy, soft clay	5	60
Brown, sandy clay	5	65
Yellow, sandy clay	35	100

699-66-18
Location: N66000, W38000 13/27-7R1
Casing Elevation: 436.20
Cable tool, drilled by Stratton of Hagen Drilling Company for BE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & 1 in. gravel	5	5
Cemented sand & 1/2 in. gravel, cement color	10	15
Cemented sand & 1 1/2 in. gravel, cement color	5	20
Cemented sand & 1 in. gravel, cement color	7	27
Fine sand, trace of silt, cement color	5	32
Fine sand, clay, trace of silt, cement color	13	45
Gray clay w/some 1/4 in. gravel	5	50
Gray clay w/trace of black & green clay w/1/4 in. gravel & rotten wood	5	55
Gray clay w/traces of black clay w/1/4 in. gravel & rotten wood	5	60
Green clay w/traces of black clay	5	65
Green clay w/traces of brown clay	15	80
Green clay w/traces of brown clay & 1/4 in. gravel	5	85
Gray clay w/some shale & sand & gravel	5	90
Gray clay w/some 1/4 in. gravel	10	100
Gray clay	5	105
Gray clay w/traces of blue clay	5	110
Gray clay w/traces of green clay & 1/4 in. gravel	5	115
Gray clay, 1/4 in. gravel & traces of green clay	15	130
Gray clay, fine gravel & trace of green clay	5	135
Gray clay w/trace of brown clay w/some shale	10	145
Gray clay w/shale	5	150

699-66-19 (GM-19)
Location: N66099, W39459 13/27-7R1
Casing Elevation: 453.70
Cable tool, drilled by Allison of Bach Drilling Company for ARHCO, 1971, hydrologic investigation borehole

Material (1)	Thickness	Depth
No record	25	25
Coarse sand & gravel size 2 in.	5	30
Sand & gravel, size 3 in.	12	42
Clay, gray, soft	8	50
Clay, gray w/few gravels size 4 in.	10	60
Clay, gray, soft	15	75
Gray clay lighter color, soft	15	90

699-66-58 (GM-4)
Location: N68807, W37758 13/26-10R1
Casing Elevation: 502.00
Cable tool, drilled by Baker of Bach Drilling Company for ARHCO, 1972, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand & gravel	18	18
Sand & few gravel	2	20
Sand, coarse & medium	5	25
Few gravels, coarse & medium sand	10	35
Coarse & medium sand	20	55
Coarse, medium & fine sand	10	65
Sand & gravel	31	96
Sand, cobbles, gravel	6	102
Sand & gravel	10	112

699-66-64 (GM-2)
Location: N66483, W34249 13/25-8R1
Casing Elevation: 505.92
Cable tool, drilled by Baker of Bach Drilling Company for ARHCO, 1972, hydrologic investigation borehole

Material	Thickness	Depth
Cobbles, sand, gravel	10	10
Sand, cobbles, gravel	14	28
Sand, cobbles, gravel	16	44
Packed sand & gravel	11	55
Cobbles, sand, gravel	5	60
Sand, cobbles, gravel	20	80
Sand & gravel	5	85
Sand, cobbles & gravel	5	90
Sand, gravel	2	92
Sand, cobbles, gravel	2	94
Sand, gravel	6	100
Sand, cobbles, gravel	12	112
No record	6	118

699-66-91 (UGB-4)
Location: N65708, W30879 13/25-3R1
Casing Elevation: 467.75
Air rotary, drilled by Soil Sampling Service & logged by Ledgerwood of & for ARHCO, 1972, hydrologic investigation borehole

Material (1)	Thickness	Depth
Coarse gravel w/fine sand & silt	2	2
Cobbles & coarse gravel w/fine sand	2	4
Medium gravel w/fine sand & silt	6	10
Medium to coarse gravel w/fine sand	12	22
Fine to coarse gravel	4	26
Coarse sand w/fine to coarse gravel	2	28
Coarse gravel w/silt	2	30
Coarse gravel	8	38
Coarse gravel w/fine sand & silt	2	40
Medium gravel w/silt	4	44
Fine coarse gravel w/silt	12	56
Brown silt	1	57
Fine gravel w/fine silty sand	1	58
Medium to coarse gravel w/silty sand	5	64

Fine sand & silt w/medium to coarse gravel	2	66
Coarse to medium gravel w/fine sand	12	78
Sand & silt w/coarse gravel	4	82
Medium to coarse sandy gravel	16	98
Basalt	65	163
Clay	1	164
Green sand, clay & basalt gravel	6	170
Fine sand & clay, poorly cemented, greenish yellow	5	175
Fine sand; silt & clay, yellow	2	177
Fine to coarse gravel	5	182
Brown silt	1	183
Fine to coarse gravel & green sand	7	190

699-66-103
Location: N65980, W102780 13/25-7Q1
Casing Elevation: 463.30
Cable tool, drilled by Durand & Son Drilling Company for duPont Company, 1944, industrial water supply well

Material (1)	Thickness	Depth
Boulders & gravel	18	18
Gravel	2	20
Boulders & gravel	30	50
Sand & gravel	10	60
Gravel	14	74
Sand & gravel	6	80
Gravel	35	115
Sand & gravel	1	116
Gravel	13	129

699-67-51
Location: N67100, W81490 13/26-11N1
Casing Elevation: 524.60
Cable tool, drilled by Hatch of Hatch Drilling Company for GE Company, 1961, groundwater monitoring borehole

Material (1)	Thickness	Depth
Black lava sand & gravel, loose	15	15
Black & white sand-loose	40	55
Sand & silt, brown	20	75
Sand & silt, gray	15	90
Gray sand & silt & small gravel 1 in.	6	96
Clean gravel to 1 in.	9	105
Gravel to 2 in. sand & silt	10	115
No record	5	120
Gravel to 4 in. sand & silt	10	130
Gravel to 3 in. sand & silt	10	140
Ringold	5	145
Small gravel & sand, clean	5	150
Small gravel, sand & silt, brown	5	155
Brown clay & gravel streaks	15	170
Gray brown clay, gravel streaks	20	190
Blue clay, gravel	10	200
Blue clay, sand & gravel	5	205
Pure blue clay	5	210
Blue clay w/sand & gravel	20	230
Gray clay w/sand & gravel	10	240
Gray clay & decomposed rock	5	245
Brown sandy clay	5	250

699-67-86
Location: N66996, W85997 13/25-12K1
Casing Elevation: 472.39
Cable tool, drilled by Jacobson & Stratton of Hagen Drilling Company for GE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Coarse sand & gravel w/silt binder 1 1/2 in. gravel w/some cobbles	5	5
Coarse sand & 1 1/2 in. gravel w/silt binder & cobbles, light gray in color	5	10
Coarse sand & 1 1/2 in. gravel w/silt binder, light gray in color	5	15
Basalt gravel	10	25
1/2 in. gravel & coarse and w/silt binder, light gray in color	5	30
1 in. gravel & coarse sand w/silt binder, light gray in color	5	35
Coarse sand & gravel w/silt binder, light gray	5	40
1 1/2 in. gravel & coarse sand w/silt binder, light gray	5	45
Coarse sand & gravel w/silt binder, light gray	25	70
1 1/2 in. gravel & coarse sand w/silt binder, light gray	5	75
Coarse & fine black sand; about 98% fine sand	5	80
Coarse & fine black sand	5	85
1 1/4 in. gravel down to fine sand, blackish in color	5	90
Coarse & fine sand, about 50% fine black sand	5	95
2 in. gravel down to fine black sand	5	100
Coarse & fine black sand	15	115
Light brown gravel & coarse sand	5	120
Coarse & 75% fine sand, light brown	5	125
Fine gray, sand w/1 1/2 in. gravel; broken basalt	5	130
2 1/2 in. gravel down to fine sand; 80% fine sand, light brown; 4 in. broken basalt	5	135
2 1/2 in. gravel down to fine sand w/a silt binder; light brown	5	140
1/4 in. gravel down to fine sand w/silt binder; light brown.	5	145
3 in. gravel down to fine sand; about 99% fine brown sand	5	150
1/4 in. gravel down to fine sand; about 90% fine, brown sand	5	155
3/4 in. gravel down to fine sand; about 99% fine, brown sand	5	160
2 in. gravel down to fine sand; about 90% fine sand w/silt binder, w/broken basalt very tightly packed	5	165
Basalt gravel w/2 in. minus gravel w/coarse sand & some silt tightly packed	5	170

1 in. gravel down to fine sand w/silt binder; 95% fine brown sand	5	175
1/2 in. gravel down to fine sand w/silt binder about 80% fine brown sand	5	180
1 in. minus gravel, coarse brown sand, silt binder tightly packed	5	185
4 in. minus gravel down to fine sand w/silt binder	5	190
2 in. minus gravel down to fine brown sand w/silt binder	5	195
2 in. gravel w/90% coarse brown sand, silt binder	5	200
2 in. gravel w/coarse sand silt binder tightly packed	5	205
4 in. gravel down to fine brown sand w/silt binder & traces of black clay & broken basalt, very tightly packed	5	210
2 in. minus gravel down to fine brown sand w/silt binder & traces of clay & broken basalt, very tightly packed	5	215
2 in. minus gravel, basalt gravel, coarse brown sand, silt binder, tightly packed	5	220
2 in. minus gravel, basalt chips, coarse brown sand, silt binder, tightly packed	5	225
1/2 in. minus gravel down to fine brown sand w/silt binder tightly packed	5	230
2 in. minus gravel to fine brown sand w/silt binder very tightly packed	5	235
2 in. minus gravel, basalt chips, coarse brown sand, silt binder, tightly packed	10	245
Silt w/some sand	2	247
3 in. broken basalt & silt & caliche light brown in color	3	250
Silt & caliche	10	260
1/2 in. gravel down to fine brown sand w/silt binder	5	265
1 in. minus gravel, fine brown sand, silt binder	5	270
1/2 in. gravel, fine brown sand, silt binder	5	275
1/2 in. gravel down to fine brown sand & silt binder	5	280
1/4 in. gravel down to fine brown sand & silt binder	5	285
2 in. minus gravel, coarse brown & fine sand	5	290
2 in. minus gravel, coarse & fine sand, basalt chips, traces of silt tightly packed; light brown	5	295
3 in. gravel down to fine brown sand & basalt chips	5	300
1 1/2 in. gravel down to fine brown sand	6	306
2 in. minus gravel & fine brown sand	4	310
3 in. minus gravel down to fine brown sand w/silt binder & basalt chips	5	315
1 in. gravel down to fine brown sand w/silt binder & basalt chips	5	320
1 in. minus gravel, basalt chips, fine sand, silt binder	5	325
1/2 in. gravel down to fine brown sand w/silt binder	5	330
2 in. gravel down to fine brown sand w/silt binder	5	335
1 in. gravel down to fine brown sand w/silt binder	5	340
2 in. gravel down to fine brown sand w/silt binder	5	345
2 in. minus gravel, fine sand, silt binder	5	350
2 in. minus gravel down to fine brown sand w/traces of caliche & silt binder	5	355
1/4 in. minus gravel down to fine brown sand w/silt binder	5	360
1/2 in. minus grave , brown sand w/silt binder	5	365
1/2 in. minus gravel, brown sand w/traces of silt	5	370
2 in. gravel down to fine brown sand w/basalt chips & silt binder, very tightly packed	5	375
1 in. gravel, fine sand, basalt chips, silt binder, tightly packed	5	380
1 in. gravel, brown sand w/basalt chips, silt binded, tightly packed	5	385
1/2 in. gravel down to fine brown sand w/silt binder very tightly packed	5	390
Fine sand w/basalt chips	5	395
2 in. gravel down to fine sand w/silt binder	5	400
1/4 in. gravel down to fine sand w/silt binder tightly packed	5	405
1 in. minus gravel, fine brown sand, silt binder	5	410
1/2 in. gravel, fine brown sand, silt binder	5	415
1 in. gravel down to fine brown sand w/silt binder, tightly packed	5	420
1/2 in. gravel down to fine brown sand w/silt binder tightly packed	5	425
1/2 in. gravel, fine sand, basalt chips, silt binder tightly packed	5	430
3 in. gravel down to fine brown sand w/silt binder, tightly packed	5	435
2 in. gravel down to fine brown sand w/silt binder, seems to be more tightly packed sand	5	440
1 in. gravel down to fine brown sand w/silt binder, broken basalt chips tightly packed	5	445
1 in. gravel, fine brown sand, clay, trace of silt, tightly packed	5	450
1/2 in. gravel, fine brown sand, trace of silt, clay tightly packed	5	455
Light brown silty clay with 3 in. gravel & down	5	460
Gray or light brown silty clay	5	465

699-67-98
Location: N66801, W98000 13/25-8P1
Casing Elevation: 455.47
Cable tool, drilled by St. George of Haden Drilling Company for SE Company, 1960, groundwater monitoring borehole

Material (1)	Thickness	Depth
Cobbles & silty sand	25	25
Gravel & silty sand	5	30
Gravel & silty sand; hit boulder at 33 ft., very silty sand 34 ft., few gravels	5	35
Silty sand, few gravels	5	40
Silty sand, gravel	5	45
Gravel & sand	5	50
Gravel & silty sand, hit boulder at 51 ft.	5	55
Gravel & sand	14	69
Black silty sand	46	115
Black sand, silty, & gravel	6	121
Silty sand & gravel	8	129
Yellow clay; pipes broken basalt	1	130
Yellow clay	15	145
Layer broken basalt	1	146
Hit caliche 146 ft., small pieces broken basalt in caliche	4	150
Caliche, broken basalt	20	170
Basalt decomposed; some layers of very hard basalt	10	180
Blue basalt	5	185

699-68-105
Location: N68129, W105214 13/25-7M1
Casing Elevation: 461.85
Cable tool, drilled by Corps of Engineers for AEC, 1952, domestic water supply

Material (5)	Thickness	Depth
Loose sand & gravel	11	11
Loose gravel & boulders	16	27
Loose gravel	29	56
Loose sand & gravel	14	90
Loose sand & gravel, some boulders	13	93
Boulders	1	94

699-69-45
Location: N69129, W44995 13/26-12F1
Casing Elevation: 486.34
Cable tool, drilled by McDonald of Hatch Drilling Company for SE Company, 1961, groundwater monitoring borehole

Material (1)	Thickness	Depth
Fine brown sand & silt	2	2
Loose black sand-some silt	13	15
Sand is brown now-more silt	15	30
Brown & black sand-silt	10	40
Black loose sand	7	47
Black loose sand, occasional gravel from 1 in. to 6 in.	3	50
Black loose sand, more gravels	5	55
Black loose sand very gravelly	5	60
Sand, silt, gravels to 4 in.	5	65
Sand, silt, gravels smaller	15	70
Sand, silt, gravels to 2 in.	16	86
Sand, silt, gravels to 1 in., clay lenses now	5	91
Hard sandy brown clay	13	104
Hard brown clay-small gravels	11	115
Brown clay & small gravel lenses	5	120
Blue clay & small gravel lenses	5	125
Blue clay, fewer gravels	8	133
Blue clay, no gravel, harder	6	139
Hard blue clay	1	140
Blue clay	7	147
Brown clay some gravels	3	150
Brown clay no gravels	22	172
Green or blue clay	13	185
Green or blue clay, turning to brown	5	190
Brown clay	10	200
Brown clay, sandy	5	205
Brown clay very hard	10	215
Brown clay very sandy	6	221
Clean black & white sand, very fine	14	235
Clean black & white sand, very fine, some silt	10	245
Soft sandy brown clay	5	240
Very sandy soft brown clay	10	250
Very sandy soft brown clay, more clay less sand	5	255
Soft sandy brown clay	36	291
Hard brown clay, gravel lenses	9	300

699-70-17 (DH-9)
Location: 13/27-11B1
Casing Elevation: ~880
Rotary (to 20 ft.) & diamond coring, drilled by Hendrickson of Bayles Brothers Drilling & logged by Lillie of & for RHO, 1980, geologic investigation borehole

Material (2)	Thickness	Depth
No recovery	20	20
Silty clayey fine sand, very poor induration, brownish yellow	4	24
Slightly clayey sandy silt, fine to very fine sand, fine laminations, poor to fair indurations, brownish yellow	3	27
Slightly silty medium sand, cross-bedded, poor to fair induration well sorted, rounded to sub-angular, micaceous, brownish yellow	5	32
Slightly clayey silt, fine laminations, poor to fair induration, iron staining & mica on laminae planes, brownish yellow	5	37
No recovery	5	42
Slightly sandy clayey silt & siltstone, very fine to fine laminations, fair to good induration, iron staining and mica on laminae planes, yellowish brown to gray	4	46
Alternating beds of clayey silt & silty fine sand, laminae to inch thick beds, fair induration, white to brownish yellow	2	48
Fine to very fine sand, horizontal bedding, poor induration, brown	2	50
Alternating beds of sandy silt & caliche, laminae to inch thick beds, brownish yellow	1	51
Fine to very fine sand, no apparent bedding, poor induration, grayish brown	1	52
Alternating beds of siltstone & silty fine sand, poor to good induration, laminae to inch thick beds, brownish yellow to light brownish gray	5	57
Slightly sandy silt & siltstone, laminae to inch thick beds, poor to good induration, minor caliche layers, light brownish gray	4	61
Clayey silt, very fine laminae to several inch thick beds, fair to good induration, convolutead bedding, color range: white, light brownish gray, dark gray, yellowish brown, dark yellowish brown	10	71
Alternating beds of clayey silt & silty clay, fine laminae to inch thick beds, clayey silt is faintly cross-bedded, silty clay is massive, some minor very fine sand beds, minor caliche beds, dark gray to dark yellowish brown	13	84
Slightly clayey silty fine sand, no apparent bedding, poor to fair induration, minor caliche stringers, grayish brown to yellowish brown	8	92
Slightly sandy siltstone, no apparent bedding, good induration, $CaCO_3$ cementation (variable), light brownish gray	5	97
Slightly clayey silty fine sand, no apparent bedding, fair induration, very micaceous, dark yellowish brown	6	103
Slightly sandy silt & siltstone, no apparent bedding, poor to fair induration, crumply, some FeO concretions, light brownish gray	9	112
Very slightly sandy clayey silt to silty clay, no apparent bedding, fair to good induration, minor caliche stringers, FeO concentrations, light brownish gray	5	117
Clayey siltstone, faint laminae, good induration FeO concentrations, light brownish gray	3	120
Slightly silty fine sand, cross & convoluted bedding, poor induration, mica, quartz, light gray w/brownish yellow staining	2	122
Alternating beds of silty fine sand & fine sand, beds are 0.5" thick, cross & convoluted bedding, poor to fair induration, minor caliche stringers, very micaceous, quartz, feldspar, brownish yellow w/light gray & black banding on cross-beds	15	137
Fine to very fine sand, cross-bedded, poor induration, angular, micaceous, pale brown w/brownish yellow to dark yellowish brown staining	5	142
Fine to medim sand, horizontally bedded to massive, very poor induration, angular, very micaceous, wood fragments, pale brown to light yellowish brown	10	152
Alternating beds of silty fine sand & fine sand, beds are 0.5" thick, cross & convoluted bedding, poor to fair induration, minor caliche stringers, very micaceous, quartz, feldspar, brownish yellow w/light gray & black banding on cross-beds	15	137
Fine to very fine sand, cross-bedded, poor induration, angular, micaceous, pale brown w/brownish yellow to dark yellowish brown staining	5	142

Fine to medium sand, horizontally bedded to massive, very poor induration, angular, very micaceous, wood fragments, pale brown to light yellowish brown	10	152
Fine to very fine sand, cross-bedded to massive, poor to fair induration, angular, very micaceous, yellowish brown	5	157
Slightly silty fine to medium sand, horizontal to cross-bedded, fair to good induration, minor stringers of $CaCO_3$ cementation, angular, quartz, mica, gray to white w/yellowish brown to dark yellowing brown staining	10	167
Fine to very fine sand, cross-bedded, very poor induration, well sorted, angular quartz, minor $CaCO_3$ cementation, one cobble at 170.5', gray to white w/yellowish brown to dark yellowish brown staining	5	172
Slightly silty fine sand, cross & convoluted bedding very poor to fair induration, dispersed & variable $CaCO_3$ cementation, minor silt beds, gray to pale brown w/dark yellowish brown stain	9	181
Alternating beds of silty fine sand & sandy silt, fine laminae, fair induration, yellowish brown	2	183
Slightly sandy siltstone, cross-bedded, good induration, gray w/yellowish brown staining	4	187
Siltstone, horizontal & cross-bedded, good induration, dark yellowish brown	1	188
Very fine to fine sand, ripple & cross-bedded, fair induration, light brownish gray	2	190
Siltstone, fine laminae, well to good induration, light gray to gray w/yellowish brown, brownish yellow & yellow staining	7	197
No recovery	5	202
Siltstone, horizontal laminae, well indurated, light brownish gray w/yellow staining	4	206
Clay & claystone, plastic to massive, brecciated, poor to very well indurated, light gray to pale brown w/black & yellow horizontal banding	11	217
No recovery	4	221
Fine to medium sand, no apparent bedding, very loose to poor induration, quartz, mica, brown w/dark yellowish brown stain	5	226
No recovery	5	231
Medium to fine sand, no apparent bedding, very loose to poor induration quartz, mica, brown	4	235
Siltstone, horizontal & cross-bedded laminae, good to well indurated, some minor very thin beds of sand & clay, light brownish gray w/brownish yellow staining	6	241
Slightly silty fine sand, no apparent bedding, poor induration, yellowish brown	4	245
Slightly sandy siltstone, cross-bedded, well indurated, light brownish gray	2	247
Clay & claystone, cross-bedded laminae to massive, plastic to well indurated, light gray to pale brown w/brownish yellow to dark yellowish brown stain	8	255
Silty fine to very fine sand, rippled & cross-bedded, very loose to fair induration, dispersed & variable $CaCO_3$ cementation, light gray to pale brown w/dark yellowish brown to black staining	18	273
Claystone, laminae to massive, good induration, light brownish gray	1	274
Slightly silty sandstone, ripple & cross-bedded laminae, good induration, gray w/dark yellowish brown stain	3	277
Sandy siltstone, horizontal laminae, good induration, gray	5	282
Silty fine to very fine sand, no apparent bedding, good induration, dark gray	1	283
Slightly silty claystone, laminar to massive, good induration, dark gray, w/some white banding	4	287
Slightly silty clayey very fine to fine sand, ripple & cross-bedded laminae, dark gray w/some white cross-beds	5	292
Slightly silty claystone, laminar to massive, well indurated, organic matter, gaseous odor, dark gray	5	297
No recovery	5	303
Clay, massive, plastic gray	1	304
Claystone, massive, crumbly, very well indurated, very dark gray	4	308
No recovery	5	313
Claystone, massive, fractured, very well indurated, grayish blue-green to dark gray	17	330
Slightly sandy slightly clayey siltstone, cross-bedded to massive, good in induration, some minor sand cross-beds, dark gry w/yellow banding	3	333
Fine sand, cross-bedded, good induration, some minor clay layers, dark gray w/yellow banding	2	335
Slightly silty claystone, massive, fractured, good induration, dark olive gray	15	350

Slightly sandy siltstone, faintly cross-bedded to massive, well to very well indurated, disseminated organic matter, 361.75 to 362 ft very hard $CaCO_3$ cementation, 362 to 372 ft micaceous, dark gray	22	372
Slightly sandy to sandy siltstone, cross-bedded, very well indurated, disseminated organic matter, very dark gray	5	377
Clay, massive, fair induration, dark gray	2	379
No recovery	7	386
Siltstone, massive, fractured, well indurated, dark olive gray	6	392
Silty claystone, massive, slightly fractured, well indurated, dark olive gray	10	402
Clayey siltstone, massive, well indurated, slight organic matter, dark olive gray	6	408
Slightly clayey sandy siltstone, faint horizontal bedding, very well indurated, organic matter, clay balls, FeO concretions, very dark gray	11	419
Slightly silty claystone, massive, slightly fractured, very well indurated, filled worm burrows(?), black	5	424
Slightly silty fine sand, no apparent bedding, good to well indurated, very micaceous, abundant large wood fragments, gaseous odor, black	16	440
Slightly silty very fine to fine sand, cross-bedded, well indurated, micaceous, wood fragments, black	5	445
Silty claystone, massive, well indurated, black	5	450
No recovery	6	456
Silty fine sand, horizontal bedding, well indurated, clay balls, very dark gray	3	459
Medium sand, no apparent bedding, very loose, angular, quartz, mica, very dark gray	3	462
Coarse sand, cross-bedded, very loose, well sorted, angular, quartz, mica, heavies, dark gray	2	464
Medium sand, massive, loose, FeO concentrations, angular, quartz, mica, very dark gray	2	466
Coarse sand, cross-bedded, loose, well sorted, angular, quartz, heavies, mica, very dark gray	8	474
Claystone, massive, fractured, well indurated, dark olive gray	8	482
Slightly sandy clayey siltstone, faint horizontal bedding to massive, fractured, abundant wood fragments, shell at 482.4', white clay pebbles at 487.5 to 488.5, micaceous, dark olive gray to black	15	497
Silty claystone, massive, very well indurated, abundant large wood fragments, olive gray	6	503
Clayey siltstone, massive, well indurated, olive gray	1	504
Sandy siltstone, massive, fractured, well indurated, olive gray	4	508
Slightly silty claystone, massive, extensive fracturing, disseminated caliche from 511 to 517, olive gray	9	517
Claystone, brecciated w/ slickensided surfaced on breccia fragments, olive gray	5	552
Clayey siltstone, massive, good induration, caliche horizons at 524 and 527, olive gray	4	526
Clayey siltstone, massive, poor to good induration, caliche horizon at 528, grayish brown to brown	7	533
Clayey siltstone, massive, good induration, disseminated caliche, reminiscent of a relic soil horizon, dark brown	3	536
Clayey siltstone, massive, poor induration, reminiscent of a relic soil horizon, light brownish gray	2	538
Siltstone, massive, good induration. $CaCO_3$ cementation from 542 to 544, disseminated caliche stringers throughout, reminiscent of a relic soil horizon, color range pale brown to dark brown	12	550
Siltstone breccia, $CaCO_3$ cementation, brown	2	552
Clayey siltstone, massive, good induration, caliche horizons at 524 and 526, olive gray	4	526
Clayey siltstone, massive, poor to good induration, caliche horizon at 528, grayish brown to brown	7	533
Clayey siltstone, massive, good induration, disseminated caliche, reminiscent of a relic soil horizon, dark brown	3	536
Clayey siltstone, massive, poor induration, reminiscent of a relic soil horizon, light brownish gray	2	538
Siltstone, massive, good induration. $CaCO_3$ cementation from 542 to 544, disseminated caliche stringers throughout, reminiscent of a relic soil horizon, color range pale brown to dark brown	12	550
Siltstone breccia, $CaCO_3$ cementation, brown	2	552
Sandstone, fine to medium sand, $CaCO_3$ cemented, very very well indurated, basaltic sand, grayish brown	11	563

Siltstone, $CaCO_3$ cemented, very very well indurated, solutin cavities, reminiscent of a relic soil horizon, yellowish brown	5	568
Sandstone, $CaCO_3$ cementation, coarse sand, very very well indurated, 50% basalt sand, yellowish brown	4	572
Siltstone, $CaCO_3$ cementation, brecciated, caliche stringers every inch, decrease in cementation 577 to 578, grayish brown	7	579
Sandstone, convoluted bedding, poor to good induration, very fine to fine sand, FeO concretions, brown to dark brown	4	583
Medium to coarse sand, cross-bedded, loose, moderately well sorted, sub-angular, quartz, heavies, mica, brown to dark brown	9	592
Medium to fine sand, cross-bedded, loose, moderately well sorted, sub-angular, quartz, heavies, mica, brown to dark brown	5	597
Medium sand, cross-bedded, loose, well sorted, sub-rounded, quartz, heavies, mica, brown	11	608
Sandy gravel, cobbles, rounded, medium sand matrix, brown	1	609
Sandy siltstone, massive, well indurated, disseminated organic matter, brown to dark brown	5	614
Medium to fine sand, cross-bedded, poor to good induration, moderately well sorted, sub-angular, quartz, mica, heavies, dark yellowish brown	5	619
Sandy siltstone, massive, wael indurated, disseminated organic matter, clay pebbles, dark yellowish brown	8	627
Medium sand, cross-bedded, loose well sorted, sub-angular, quartz, mica, heavies, light brownish gray	6	633
No recovery	5	638
Medium to fine sand, cross-bedded, very loose, moderately well sorted, sub-rounded, light brownish gray	5	643
Medium sand, cross-bedded, loose, moderately well sorted, sub-angular to sub-rounded, quartz, heavies, mica, light brownish gray	4	647
Sandy gravel, pebbles to cobbles, granitics, basalt, medium sand matrix, dark yellowish brown	2	649
Silty fine sand to sandy silt, massive, good induration, micaceous, dark yellowish brown	2	651
Clay, massive, plastic, very soft, $CaCO_3$ cementation at 650.5, light gray	2	653
Silty claystone massive, good to well indurated, disseminated caliche, brecciated from 655 to 663, light gray	7	660
Slightly sandy siltstone, massive, fractured, disseminated caliche, grayish brown	6	666
Silty fine sand, no apparent bedding, loose, moderately well sorted, sub-angular, quartz, feldspar, mica, heavies, yellowish brown	2	670
Slightly silty medium sand, no apparetn bedding, loose to good induration, well sorted, sub-rounded, quartz, mica, yellowish brown to salt & pepper	5	675
No recovery	5	680
Medium sand, cross-bedded, loose, well sorted, sub-rounded to rounded, quartz, mica, heavies, 3" of pebble gravel at 685.75', light brownish gray	16	696
Sandy gravel, pebbles to cobbles, rounded medium sand matrix	1	697
Sandstone, medium sand, $CaCO_3$ cementation, light brownish gray	1	698
Claystone, horizontal laminae, vertical fractures, good induration gray w/olive & black horizontal banding	8	706
Silty claystone, horizontal laminae, vertical fractures, good induration, FeO concretions, gray w/yellowish brown staining	9	715
Silty very fine to fine sand, cross-bedding, fair induration, FeO concretions, gray	1	716
Silty claystone, convoluted & cross-bedding, vertical fractures, good indurattion light brownish gray w/ yellowish brown & black horizontal banding	18	734
Claystone, massive, good induration, possible ash at 734 ft, olive yelow to dark gray w/light red horizontal banding	5	739
Claystone, horizontal laminae to massive, well indurated, apple greenish gray w/yellow & black horizontal banding	5	744
Claystone, massive, fractured, well to very well indurated, very dark gray	10	754
Claystone, massive, fractured, very well indurated, 761 to 762.5 ft., very solid caliche, 762.5 to 770 ft., may be a saprolite, dark blue to black	9	770
Basalt flow top, green clay filling fractures	6	776

699-70-68
Location: N70123, W68357 13/26-6D1
Casing Elevation: 526.21
Cable tool, drilled by Gentz of & for GE Company, 1954, groundwater monitoring borehole

Material	Thickness	Depth
Boulders, sand & silt	10	10
Boulders & gravel	8	18
Cobbles & gravel	2	20
Coarse gravel	5	25
Fine & coarse black sand	5	30
Black sand & gravel	5	35
Black sand	5	40
Fine black sand	5	45
Sand, small & coarse gravel	5	50
Gravel small to coarse, sand	8	58
Sand & gravel	7	65
Sand	3	68
Gravel	6	74
Sand	3	77
Gravel & sand	18	95
Sand	5	100
Gravel & sand	20	120
Sand & gravel	19	149

699-71-30
Location: N71300, W30400 13/27-4N1
Casing Elevation: 400.68
Cable tool, drilled by Swain of Hatch Drilling Company for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Small gravel	20	20
Loose gravel	5	25
Cemented gravel	5	30
Clay	2	32
Small gravel	3	35
Clay	15	50
Clay & gravel mixed	10	60
Sandy clay & gravel	10	70
Sandy clay	10	80
Sandy clay-soft	5	85
Sandy clay-harder, small gravel	5	90
Sandy clay-softer	5	95
Sandy clay-soft	20	115
Sandy clay-quantities of small gravel increasing	5	120
Sandy clay, quantities of small gravel	5	125
Sandy-gravel-hard	10	135
Sandy clay	5	140
Sand & small gravel	5	145
Sand & small gravel, some clay	5	150

699-71-52
Location: N71310, W52268 13/26-2N1
Casing Elevation: 523.00
Cable tool, drilled by Gentz, Row & Jannke of & for GE Company, 1954, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand & silt	3	3
Small & coarse gravel	7	10
Sand & gravel, silt	5	15
Sand, very little gravel	5	20
Black sand, very little gravel	35	55
Black sand, some silt & gravel	35	90
3 ft. sand, 2 ft. gravel	5	95
Gravel, some sand	5	100
Coarse gravel up to 4 in. & black sand	10	110
Coarse gravel, sand, some silt	5	115
Gravel, silt sand; (white sh gray silt at 155)	40	155
Sand silt, sand & gravel	10	165
White clay or shale or silt	10	175
Light green silt	5	180
Medium green silt	30	210

699-71-77
Location: N70995, W75997 12/25-1P1
Casing Elevation: 472.29
Cable tool, drilled by Wilcox of Haden Drilling Company for GE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Cobbles or gravel	5	5
Gravel w/some sand, trace of silt	5	10
Basalt gravel w/some sand & trace of silt	5	15
Basalt gravel sand & some silt	5	20
Basalt gravel, 2 in. gravel, sand, & some silt	5	25
Basalt gravel, sand & some silt	10	35
5 in. minus basalt gravel w/some coarse sand & a little silt	5	40
6 in. minus basalt gravel & coarse sand w/traces of silt	5	45
2 in. minus basalt gravel w/ coarse & fine sand, trace of silt	10	55
3 in. minus gravel w/fine & coarse sand, trace of silt	5	60
2 in. minus basalt gravel, fine & coarse sand, some silt	10	70
2 in. minus gravel, coarse & fine sand	5	75
3 in. minus gravel & sand w/some coarse sand	5	80
2 1/2 in. minus gravel & sand w/some coarse sand & trace of silt	5	85
2 in. minus gravel & sand w/silt very tightly packed	5	90
2 in. minus gravel w/fine & coarse sand tightly packed	5	95
2 in. minus gravel w/sand tightly packed	5	100
Small gravel w/fine & coarse sand 2 in. minus gravel w/sand	5	105
2 in. minus gravel w/sand & a little silt; very tightly packed	10	115
4 in. minus gravel w/fine & coarse sand & trace of silt	5	120
2 in. minus gravel w/fine & coarse sand, trace of silt	5	125
2 in. minus gravel, sand tightly packed	5	130
Cemented sand & gravel tightly packed	5	135
3 in. minus gravel w/brown sand & some silt w/small bits of blue clay	5	140
3 in. minus gravel w/sand & some silt	5	145

2 in. minus gravel w/sand & some silt	5	150
2 in. minus gravel packed, sand & some silt	5	155
1 in. minus gravel w/fine sand & some coarse, trace of silt	5	160
2 in. minus gravel & sand w/some coarse & trace of silt, sample color brown	5	165
2 in. minus gravel w/fine sand & some coarse snd; trace of silt, water color brown	5	170
2 in. minus gravel w/fine & coarse sand, brown	5	175
Silt w/sand, brown color; hit silt at 177 ft.	15	190
Sand & silt, light brown in color	10	200
Silt & clay-light brown	5	205
Silt & clay w/1 in. minus gravel, brown	5	210
Silt & sand, brown	10	220
Silt & sand, brown, trace of gravel	5	225
Sand & silt, brown	15	240
Small gravel w/sand & silt, brown w/different color rock	5	245
Sand & silt w/1 in. minus gravel	5	250
Silt, fine & medium sand w/light brown color	25	275
Sand & silt, brown & gray	15	290
2 in. minus gravel w/sand & silt, brown & gray	5	295
Sand & 2 in. minus gravel, trace of silt	5	300

699-72-73
Location: N72038, W73225 13/25-6N1
Casing Elevation: 482.87
Cable tool, drilled by Owens & Miller for 3E Company, 1961, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gray cobbles	5	5
Gray gravel, cobbles	20	25
Gray boulders & gravel	5	30
Gray cobbles, gravel	20	50
Sand, cobbles, gravel-gray	25	75
Gray gravel, cobbles	10	85
Gray cemented gravel, cobbles	25	110
Gray, gravel, sand	5	115
Gray, cemented gravel & cobbles	35	150
Gray gravel & cobbles	10	160
Gray cemented gravel & cobbles	5	165
Gray & brown clay	5	170
Gray, hard clay	5	175
Brown clay	25	200

699-72-86
Location: 13/25-3R1
Casing Elevation:
Cable tool, drilled by Ranney Water Collector Corporation for DuPont Company, 1943, abandoned borehole

Material (1)	Thickness	Depth
Yellow sand & sandy yellow clay	13	13
Coarse gravel & boulders	14	27

699-72-92
Location: N71290, W91963 13/25-4Q1
Casing Elevation: 482.22
Cable tool, drilled by Owens & Miller for 3E Company, 1961, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gray gravel, sand, cobble-2 in.	15	15
Sand, gravel & cobbles-6 in.	5	20
Sand, gravel & cobbles	5	25
Gray boulders	15	40
Gravel & boulders	5	45
Gray gravel & cobbles	5	50
Dark gray gravel	5	55
Gray sand & gravel	5	60
Gray gravel & cobbles	10	70
Gravel, boulders to sand & silt	5	75
Gravel & cobbles	5	80
Gray cobbles	10	90
Gray, heaving sand & gravel	5	95
Gray, heaving sand	5	100
Gray heaving sand & gravel	5	105
Gray sand & gravel	10	115
Gray silt, sand & boulders	5	120
Gray sand & gravel	10	130
Gray silt, sand & cobbles or boulders	5	135
Gray silt & gravel	5	140
Gray sand & gravel	10	150
Gray cemented gravel & cobbles	15	165
Gray cobbles, sand	10	175
Gray cemented gravel	20	195
Gray gravel & cobbles	5	200

699-72-61
Location: N70195, W80527 13/25-4K1
Casing Elevation: 501.53
Cable tool, drilled by Wilcox & Richards of Haden Drilling Company for 3E Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Silt & sand, gravel w/cobbles	1	1
Gravel & cobbles	4	5
Gravel, sand & cobbles	15	20
2 in. minus basalt gravel w/sand & grades of silt material dark gray in color	5	25
2 in. minus basalt gravel	5	30
2 in. minus basalt gravel w/ coarse black sand, some fine sand w/little silt color material	5	35
Coarse black sand & 1 in. minus gravel w/fine sand & silt	10	45
Black sand w/1 in. minus fine gray sand	10	55
Black basalt, gravel w/fine & coarse sand	5	60
Black basalt gravel w/coarse sand & some silt	15	75
Basalt gravel w/coarse sand & silt, gray	5	80
Black basalt gravel, sand, & some gray silt	5	85
2 in. minus gravel w/coarse sand, some fine sand, trace of silt, dark gray	10	95

1 in. minus gravel w/coarse sand & a little fine sand & silt possibly cemented	5	100
3/4 in. minus gravel w/coarse sand & a little fine sand & silt	5	105
2 in. minus gravel w/coarse & fine sand, traces of silt, dark gray	5	110
Gravel	2	112
Gray gravel	3	115
Gray sand	5	120
Tan sand & gravel	13	133
2 in. minus gravel & fine sand w/trace of coarse sand & silt material, brown	7	140
15 in. minus gravel w/fine sand & trace of silt-brown	10	150

699-74-23
Location: N74490, W23330 13/27-3L1
Casing Elevation: 376.48
Cable tool, drilled by Ranney Water Collector Corporation for duPont, 1943, hydrologic investigation borehole

Material (1)	Thickness	Depth
Small cobbles, coarse gravel & sand	15	15
Fine sand	5	20
Boulders & sand	3	23
Coarse gravel & cobbles w/some sand	12	35
Sand & yellow silt	2	37
Gray silt	13	50

699-74-44
Location: N74200, W44200 13/27-1G1
Casing Elevation: 445.18
Cable tool, drilled by Hatch of Hatch Drilling Company for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
3 ft. sand, 2 ft. cobbles	5	5
Gravel	30	35
Cobbles, gravel	5	40
Gravel	5	45
Sand	5	50
Sand & clay	20	70
Clay	25	95
Clay-small gravel streaks	10	105
Clay	5	110
Clay-gravel	5	115
Clay-blue	20	135
Clay-yellow & small gravel	5	140
Green sandy clay	5	145
Sandy clay	5	150

699-74-48
Location: N74000, W48000 13/27-2H1
Casing Elevation: 487.18
Cable tool, drilled by Richards, Wilcox, & Smith of Haden Drilling Company for GE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gray sand & gravel	12	12
Coarse black sand & 2 in. minus gravel w/trace of fine sand & silt, dark gray in color	3	15
Coarse black sand & 1 1/2 in. minus gravel w/trace of fine sand & silt, dark gray	5	20
3 in. minus gravel w/coarse sand, trace of fine sand & silt, dark gray	10	30
3 in. minus gravel w/coarse black sand, trace of fine sand	5	35
Coarse black sand w/trace of silt minus gravel	30	65
Coarse black sand w/trace of silt & gravel	2	67
3 in. minus gravel w/little sand & trace of silt, dark gray	3	70
3 in. minus gravel w/little coarse sand & fine sand, trace of silt, tanish gray in color	5	75
Coarse sand w/gravel & some fine sand & silt tanish gray	10	85
Coarse & fine sand w/little 1 in. minus gravel, trace of silt, light brown	5	90
1 in. minus gravel & coarse black sand w/trace of fine sand & silt, dark brown	5	95
1 in. minus gravel w/trace of fine sand & silt, brown	5	100
1 in. minus gravel & fine sand & silt, brown	5	105
Minus gravel w/trace of sand & silt, brown	5	110
Minus gravel w/trace of sand & silt	5	115
Tightly packed gravel & sand w/trace of silt light brown in color	9	124
Clay, silt w/trace of sand	1	125
Silt, clay brown in color	10	135
Silty clay, blue in color	5	140
Silty clay & trace of gravel w/fine sand	5	145
Blue silty clay w/trace of gravel	5	150

699-75-22A
Location: N74690, W22350 13/27-3Q1
Casing Elevation: 379.07
Cable tool, drilled by Ranney Water Collector Corporation for duPont, 1943, hydrologic investigation borehole

Material (1)	Thickness	Depth
Cobbles, coarse gravel & sand filling the spaces	10	10
Fine to medium-grained sand	17	27
Coarse gravel & sand w/scattered cobbles	3	30
Fine grained sand	5	35

699-75-22B
Location: N74690, W22370 13/27-3Q2
Casing Elevation: 380.30
Cable tool, drilled by Ranney Water Collector Corporation for duPont, 1943, hydrologic investigation borehole

Material (1)	Thickness	Depth
Coarse gravel & cobbles	10	10
Coarse gravel & sand	5	15
Boulders & sand	5	20
Sand & scattered boulders	5	25
Boulders	3	28
Fine sand	8	36

699-77-36
Location: N76700, W36150 14/27-32N1
Casing Elevation: 412.28
Cable tool, drilled by Hatch of Hatch Drilling Company for SE Company, 1957, groundwater investigation borehole

Material (1)	Thickness	Depth
Top sand	2	2
Cemented gravel	1	3
Sand, cemented gravel	2	5
Gravel	10	15
Hard, cemented gravel	5	20
Loose gravel	5	25
Loose gravel, small	5	30
Loose gravel	10	40
Loose gravel, sandy green clay	5	45
Green, sandy clay-streaks of yellow	10	55
Green, sandy clay	5	60
Gray clay	10	70
Firm brown clay	5	75
Firm gray clay	15	90
Green, sandy clay	20	110
Brown, sandy clay	10	120
Brown sandy clay, coarse sand	15	135
Brown sandy clay, fine gravel	15	150

699-77-54
Location: N76700, W64100 14/25-34R1
Casing Elevation: 480.39
Cable tool, drilled by Hatch of Hatch Drilling Company for SE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Cobbles & boulders	10	10
Cobbles & grave	10	20
Loose gravel	10	30
Gravel	5	35
Gravel-silt streaks	5	40
Cobbles	1	41
Gravel & cobbles	1	42
Gravel	1	43
Gravel & cobbles	1	44
Gravel	12	56
Loose gravel	14	70
Loose gravel & sand	5	75
Loose fine gravel	10	85
Gravel-sand	5	90
Cemented gravel	10	100
Cemented gravel & sand	10	110
Hard packed sand & gravel	5	115
Sand heaving-large gravel mixed w/sand	3	118
Heaving sand & gravel	2	120
Sand & small gravel	10	130
Sand & small gravel-clay	10	140
Gravel & sand	5	145
Clean gravel	5	150

699-78-62
Location: N77750, W62000 14/25-32N1
Casing Elevation: 469.38
Cable tool, drilled by Swain of Hatch Drilling Company for SE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Top sandy	1	1
Large loose gravel	1	2
Small cemented gravel-hard	8	10
Small boulders & large loose gravel	5	15
Small gravel-cemented-hard	5	20
Large loose gravel	5	25
Loose gravel	5	30
Loose gravel	10	40
Loose gravel	4	44
Small cemented gravel-hard	6	50
Cemented gravel-hard	10	60
Sandy clay, soft	1	61
Cemented gravel-hard	4	65
Layers of gravel & clay 6-12 in. of gravel & 1 1/2 to 2 ft. of clay	5	70
Large loose gravel-slow	5	75
Gravel	15	90
Green sand	1	91
Gravel	2	93
Green sand & gravel	2	95
Green sand	5	100
Sand-gravel	20	120
Sand & gravel, softer w/some signs of clay	5	125
Sandy clay	5	130
Clay & small gravel	2	132
Sandy clay & gravel	8	140
Sandy clay	10	150

699-79-104
Location: 14/25-31M1
Casing Elevation:
Rotary, drilled by Strasser Drilling Company for Corps of Engineers, 1983, domestic water supply well

Material (10)	Thickness	Depth
Topsoil, silty sand	4	4
Loose black sand	46	50
Brown sand w/gravel	10	60
Coarse gravel & boulders	150	210
Sand w/clay binder	85	295
Sand, gravel w/basalt talus, cemented	25	320
Sand, gravel & basalt talus, cemented w/clay	20	340
Gravel, silt, sand & clay	90	430
Sand, gravel & clay	259	689

699-80-11
Location: 14/28-31E1
Casing Elevation: 726.80
Cable tool, drilled for JSBR, hydrologic investigation borehole

Material (19)	Thickness	Depth
Loose sand	10	10
Sandy soil	91	101
Ringold clay	5	106

699-80-19B
Location: N79801, e38544 14/27-31D1
Casing Elevation: 404.84
Cable tool, drilled by Durand & Son Drilling Company for duPont, 1944, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand & gravel	4	4
Gravel	19	23
Coarse gravel	15	38
Fine sand	2	40
Gravel & clay	3	43
Clay	10	53

699-80-43P
Location: N79638, e43176 14/26-36H1
Casing Elevation: 413.58
Rotary, drilled by Hood of Pitcher Drilling Company for BNWL, 1965, groundwater monitoring borehole

Material (1)	Thickness	Depth
Sand	1	1
Gravel	39	40
Clay & gravel	5	45
Sandy-clay	15	60
Sandy-clay-brown	15	75
Clay	30	105
Sand & clay w/gravels	7	112
Sandy clay w/gravels	14	126
Sandy clay	9	135
Sand & clay w/gravel	75	210
Sandy clay	15	225
Clay & sand	30	255
Clay & sand w/gravel	15	270
Sandy clay	75	345
Sandy clay w/gravels	30	375
Sandy clay-green	5	380
Sandy clay-blue green	10	390
Clay-blue-gray, sticky	15	405
Clay-blue-gray w/gravels	16	421
Clay w/gravels	14	435

699-80-43Q
Location: N79588, e43178 14/26-36H2
Casing Elevation: 412.59
Rotary, drilled by Hood & Lovdahl of Pitcher Drilling Company for BNWL, 1965, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gravel & sand	15	15
Gravel	15	30
Sand & clay w/gravel	15	45
Brown clay	30	75
Clay, brownish gray	15	90
Sand & clay & gravel	45	135
Sand & clay & very coarse gravel	15	150
Sand & gravel	15	165
Sand & clay	15	180

699-80-43R
Location: N79638, e43180 14/26-32A3
Casing Elevation: 412.77
Rotary, drilled by Hood & Lovdahl of Pitcher Drilling Company for BNWL, 1965, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gravel	30	30
Sandy clay w/gravels	15	45
Clay w/gravels	15	60
Firm clay	30	90
Sandy clay	50	140

699-80-43S
Location: N79685, e43182 14/26-32A4
Casing Elevation: 412.82
Rotary, drilled by Hood & Lovdahl of Pitcher Drilling Company, for BNWL, 1965, groundwater monitoring borehole

Material (1)	Thickness	Depth
Gravel	40	40
Sandy clay w/gravels	10	50

699-81-5
Location: 14/28-33D1
Casing Elevation: 740.17
Cable tool, drilled for JSBR, hydrologic investigation borehole

Material (19)	Thickness	Depth
Fine sand	29	29
Fine sand & little soil mixed	20	49
Ringold clay	5	53

699-81-58
Location: N81004, e57993 14/25-34D1
Casing Elevation: 439.55
Cable tool, drilled by Wilcox & Richards of Hagen Drilling Company for DE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
Large gravel w/sand & trace of silt	5	5
3 in. minus gravel	5	10
Boulders	4	14
Boulders & gravel	1	15
Large gravel & cobble w/some sand & trace of silt	5	20
3 in. minus gravel w/some trace of silt, coarse sand & fine sand stray cobbles	5	25
Sand & gravel	15	40
3 in. minus gravel w/fine sand & coarse sand & a little silt, brownish gray	5	45
3 in. minus gravel w/some fine & coarse sand, traces of silt, brownish gray	5	50
1 1/8 in. minus gravel w/fine sand & silt, brownish gray light gray sand & gravel	5	55

Sand	5	60
Gray sand	5	65
1 in. minus gravel w/fine sand & some silt, light brown	3	70
1 in. minus gravel w/coarse & fine sand, trace of silt, light brown	5	75
1 in. minus gravel coarse & fine sand w/trace of silt, light brown	5	80
Sand & gravel	5	85
Sand & gravel, silt, light brown	5	90
Tan silt	7	97
Silt w/a little sand & 1/4 in. minus gravel, light brown	8	105
Silt w/some sand, lumps of silt & a few pea gravel, brown	10	115
Silt w/some sand lumps of silt & some pea gravel, brown	5	120
Tan silt	15	135
Light gray-green silt w/flakes of gravel	10	145
Sand & gravel	5	150

699-81-64A
Location: 14/26-32A1
Casing Elevation:
Cable tool, drilled by Ranney Water Collector Corporation for duPont, 1943, abandoned borehole

Material (1)	Thickness	Depth
Yellow sand & sandy yellow clay	12	12
Coarse gravel & boulders	10	22

699-81-64B
Location: 14/26-32A2
Casing Elevation:
Cable tool, drilled by Ranney Water Collector Corporation for duPont, 1943, hydrologic investigation borehole

Material (1)	Thickness	Depth
Coarse gravel, cobbles & boulders w/very little sand	38	38

699-81-64C
Location: 14/26-32A3
Casing Elevation:
Cable tool, drilled by Ranney Water Collector Corporation for duPont, 1943, abandoned borehole

Material (1)	Thickness	Depth
Coarse gravel, boulders & cobbles w/very little sand	34	34
Medium & coarse sand & gravel	4	38

699-83-11
Location: 14/28-10N1
Casing Elevation: 736.85
Cable tool, drilled for USBR, hydrologic investigation borehole

Material (19)	Thickness	Depth
Sand & very little silt mixed	22	22
Sandy soil, very hard, packed	7	29
Sand & little soil	11	40
Sand, very hard, packed	9	49
Fine sandy soil	22	71
Fine sand	18	94
Ringold clay	5	99

699-83-16
Location: 14/27-26R1
Casing Elevation: 731.92
Cable tool, drilled for USBR, hydrologic investigation borehole

Material (19)	Thickness	Depth
Fine sand	107	107
Ringold clay	5	112

699-83-47
Location: N82950, W47100 14/27-29N1
Casing Elevation: 435.27
Cable tool, drilled by Hatch of Hatch Drilling Company for GE Company, 1957, groundwater monitoring borehole

Material (1)	Thickness	Depth
Brown sand	10	10
Gray sand	15	25
No record	5	30
Boulders & cemented gravel; hit boulders at 32 ft. w/sand	5	35
Small gravel-cemented	15	50
Coarse sand	5	55
Gravel	25	80
Gray clay & gravel	10	90
Brown sandy clay	15	105
Gray sandy clay	10	115
Brown sandy clay	5	120
Brown sandy clay w/gravel	5	125
Brown sandy clay	5	130
Brown sandy clay-loose	10	140
Brown sandy clay w/two streaks of gravel at 144 ft.	5	145
Brown sandy clay	5	150

699-84-16
Location: 14/27-26J1
Casing Elevation: 721.36
Cable tool, drilled for USBR, hydrologic investigation borehole

Material (19)	Thickness	Depth
Fine sand	111	111
Ringold clay	5	116

699-84-20
Location: 14/27-26M1
Casing Elevation: 676.21
Cable tool, drilled for USBR, hydrologic investigation borehole

Material (19)	Thickness	Depth
Fine sand	87	87
Ringold formation	9	96

699-84-35A
Location: N82999, W34996 14/27-29L1
Casing Elevation: 400.25
Cable tool, drilled by Wilcox & Richards of Haden Drilling Company for GE Company, 1962, hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand & gravel	25	25
Gray silt & small gravel	5	40
Tan silt	8	48
Clay, silt w/trace of coarse sand grayish brown in color	2	50
Clay, silt w/a little fine gravel & coarse sand, grayish brown in color	5	55
Silty sand w/very light trace of gravel brown in color	10	65
Silt & fine sand w/trace of coarse sand, tightly packed	5	70
Silty fine sand w/tightly packed 1 in. minus gravel	5	75
Brown silt & sand	25	100
Light brown sand, silt, & gravel	30	130
Brown silty sand w/traces of fine gravel	10	140
Brown silty sand w/a few hard lumps	10	150
Silt w/little clay & some gravel, golden brown in color	45	195
Silty sand w/light trace of gravel, brown in color	5	200
Silty sand w/some 3/4 in. minus gravel, brown in color	10	210
Tan silt & gravel	5	215
Light gray clay & caliche	5	220
Silty clay w/some pea gravel & coarse sand, tan in color	5	225
Silty clay w/trace of gravel & coarse sand, tan in color	5	230
Silty clay w/trace of gravel & sand, tinted blue	10	240
Silt w/trace of sand & 1 in. minus gravel, brownish color	5	245
Sand & silty gravel	10	255
Sand & silty pea gravel	5	260
Light brown sand & silty pea gravel w/rusty colored streaks	10	270
Light brown sand & silty pea gravel	11	281
Silt w/cemented 3/4 in. minus gravel, light brown in color	9	290
Light blue silt w/little "schall"	5	295
Light blue silt w/a little blue "schall" & gravel	5	300
No record	3	303
Black clay w/"schall"	2	305
Grayish black clay & silt	20	325
Grayish black clay & pea gravel	10	335
Silty black clay w/some "schall" clay	5	340
Silty black clay w/black "schall" clay	5	345
Blue & black "schall" clay	5	350
Light blue "schall" clay w/ 1/4 in. minus basalt gravel	5	355
No record	4	359
Basalt bedrock	1	360
Coarse & fine basalt chips	5	365
Bedrock w/a lot of fine sand & silt in sample	5	370

699-84-36D
Location: 14/27-29M4
Casing Elevation:
Cable tool, drilled by Rodda of Bach Drilling Company for ARHCO, 1974, in situ testing borehole

Material (1)	Thickness	Depth
60% gravel, 40% gray sand	25	25
60% gravel, 50% sand	10	35

699-84-36E
Location: 14/27-29M5
Casing Elevation:
Cable tool, drilled by Baker of Bach Drilling Company for ARHCO, 1974, in situ testing borehole

Material (1)	Thickness	Depth
60% gravel, 40% sand	35	35

699-84-36F
Location: 14/27-29M6
Casing Elevation:
Cable tool, drilled by Baker of Bach Drilling Company for ARHCO, 1974, in situ testing borehole

Material (1)	Thickness	Depth
80% sand, 10% brown gravel	2	2
60% sand, 40% gray gravel	10	12
60% sand, 40% gray gravel	13	25
60% gravel, 30% sand, 10% cobbles	10	35

699-85-11
Location: 14/28-30M1
Casing Elevation: 733.75
Cable tool, drilled for USGR, hydrologic investigation borehole

Material (19)	Thickness	Depth
Coarse sand	12	12
Hard sand	17	29
Sand	9	38
Fine sand	47	85
Ringold clay	6	91

699-85-21
Location: 14/27-26E1
Casing Elevation: 681.06
Cable tool, drilled for USGR, hydrologic investigation borehole

Material (19)	Thickness	Depth
Sandy silt	10	10
Fine sandy silt	32	42
Fine sand	30	72
Yellow clay	9	81

699-36-11
Location: 14/28-30D1
Casing Elevation: 728.37
Cable tool, drilled for USBR, hydrologic investigation borehole

Material (19)	Thickness	Depth
Fine sand	55	55
Ringold clay	5	60

699-36-60
Location: N85723, W59826 14/28-28B1
Casing Elevation: 453.63
Cable tool drilled by Saunt & Trantham of Jansen Drilling Company for GE Company, 1961, geologic & hydrologic investigation borehole

Material (1)	Thickness	Depth
Sand & gravel w/some cobble	6	6
Sand gravel & cobbles to 8 & 9 in.	4	10
Cobbles & boulders	5	15
Sand	1	16
Cobbles, gravel, & sand	4	20
Sand, silt & gravel	5	25
Sand, silt & gravel to 1 in.	5	30
Silt, sand & 4 in. gravel	5	35
Sand, gravel & cobbles	5	40
Sand & gravel	5	45
Gravel & cobbles	5	50
Cemented sand & gravel	5	55
Silt, sand & gravel to 5 in.	5	60
Sand & gravel	2	62
Sand & gravel to 5 in.	3	65
Cobble	5	70
Sand, gravel & cobble	5	75
Clean gravel & cobble to 6 & 8 in.	5	80
Sand & gravel	5	85
Very little sand, 2/3 gravel	5	90
Mostly gravel	5	95
Light gray clay	1	96
Light gray clay w/some gravel	4	100
Light gray clay	30	130
Silty clay	35	165
Brownish red clay	5	160
Brownish clay w/some small gravel	5	165
Brown silt & sandy clay	5	170
Brown silt & sandy clay, some pea gravel	5	175
Sandy clay; small bits of sandstone at 180 ft.	20	195
Silty sand	5	200
Sandy clay & gravel	20	220
Silty sand	10	230
Brown silty sand w/decayed pea gravel	10	240
Brown silty sticky clay	5	245
Brown silty sandy clay	10	255
Brown sandy sticky clay	20	275
Light brown, sandy sticky clay	5	280
Dark brown clay, drills slowly	5	285
Weathered rock & gravel	5	290
Brown silt, sand, & weathered gravel; hardpan at 291 ft.	5	295
Brown silty clay, w/pea gravel	10	305
Sticky, silty clay w/pea gravel	5	310
Brown & gray, sticky, silty clay & pea gravel	5	315
Sandy clay	20	335
Sandy, sticky clay	10	345
Sandy clay	5	350
Sticky clay	5	355
Sticky, brown clay	5	360
Sticky, brown, silty clay	10	370
Blue silty clay w/some gravel	10	380
Tough, sticky blue clay	5	385
Tough, sticky blue clay w/pea gravel	5	400
Sticky, dark, gray clay	5	405
Very sticky, dark gray clay	5	410
Sticky blue & black silty clay	5	415
Brown & gray silty clay	20	435
Brownish gray sticky clay	5	440
Grayish black clay	5	445
*Softer from 446 to 453 is a multicolored material that is fairly hard. Has a lot of gravel in it. Drills like some kind of cemented material.	10	455
Small gravel & clay with areas of cemented material	5	460
Clay, light gray gravel up to 3 in. w/areas of cemented material	5	465
Caliche & gravel	5	470
Light clay & pea gravel	5	475
Sticky brown silty clay, pea gravel & some to 1 in.	5	480
Hard, brown sand & gravel	10	490
Cemented gravel	20	510
Cemented gravel, 70% quartz	5	515
Basalt	15	530

699-87-23
Location: 14/27-27A1
Casing Elevation:
Cable tool, drilled for USBR, hydrologic investigation borehole

Material (19)	Thickness	Depth
Sand & silt	35	35
Fine sand & silt	13	48
Sandy clay	22	70

699-89-35
Location: N88767, W35221 14/27-20L1
Casing Elevation: 397.16
Cable tool, drilled by Owens & Miller for GE Company, 1961, groundwater monitoring borehole

Material	Thickness	Depth
Silt & 12 in. cobbles, brown	5	5
Silt & 10 in. cobbles, brown	5	10
Cobbles & boulders	15	25
Gravel & cobbles	5	30
No record	10	40
Sand & gravel; 47 ft. to 54 ft., fine sand	10	50
Brown clay	25	75

699-92-14
Location: N92000, W14000 14/27-24Q1
Casing Elevation: +862
Rotary, drilled by Strasser Drilling Company for Corps of Engineers, 1953, domestic water supply well

Material (10)	Thickness	Depth
Topsoil	3	3
Caliche	6	9
Light brown clay, sandy	201	210
Sticky blue clay, shale streaks; sand 270-274	68	278
Green & black clay	13	291
Blue clay	12	303
Gray clay	26	329
Hard gray clay & green shale	36	365
Blue clay & streaks of shale	32	397
Brown sandy clay	18	415
Blue & brown clay layers	23	438
Brown silt & clay, limey streaks, pea gravel in clay	42	580
Sandstone & gravel	8	588
Hard gray basalt	13	60
Soft red basalt	24	625
Black basalt	23	648
Gray basalt	49	697
Green shale & talus, Ellensburg?	4	701
Gray hard pan	29	730
Black basalt	40	770
Hard, gray basalt	34	804
Broken black basalt	6	810
Hard, gray basalt	26	836
Broken, gray basalt	3	839
Hard gray basalt	2	841
Black basalt	1	842
Hard, gray, basalt	12	854
Broken, gray basalt w/hard streaks	6	860
Hard gray basalt	14	874
Red porous rock & clay	9	883
Porous black basalt	263	1,146
Hard gray basalt	19	1,165
Blue gumbo clay	30	1,195
Gray basalt	51	1,246
Probably conglomerate; sample shows sand, gravel & black basalt layers	30	1,276
Blue clay	7	1,283
Similar to 1246 to 1276 interval	8	1,291
Black basalt	3	1,294
Gray basalt	19	1,313
Black basalt	35	1,348
Gray basalt, hard	23	1,371
Porous black basalt, clay & gravel layers; black basalt at 1396 ft	29	1,400

699-93-93
Location: 14/24-21B
Casing Elevation: +837
Rotary, drilled by Strasser Drilling Company for Corps of Engineers, 1953, domestic water supply well

Material (10)	Thickness	Depth
Coarse gray sand	22	22
Fine gray sand	55	77
Sandy clay	120	197
Sandy clay & gravel	17	214
Cement gravel	13	227
Sand, clay & gravel	26	253
Cement gravel	5	258
Gray clay, sand & gravel	6	274
Brown & gray sand w/clay	14	288
Gray clay	2	290
Yellow clay	10	300
Gray clay	10	310
Clay, sand & gravel	15	325
Light brown clay	16	341
Sand & gravel, clayey	35	376
Cement gravel	31	407
Yellow clay	22	429
Yellow clay w/gravel	22	451
Yellow & blue clay	2	453
Blue shale	27	480
Yellow sandy clay	6	486
Soft sand & clay	2	488
Hard sand & clay	18	506
Sand, gravel & clay	7	513
Cement gravel	7	520

699-96-49
Location: N96388, W49232 14/25-14G1
Casing Elevation: 419.29
Cable tool, drilled by Wilcox & Smith of Haden Drilling Company for SE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
3 in. gravel	5	5
3 in. minus gravel w/some coarse & fine sand, trace of silt, gray in color	5	10
2 in. minus gravel w/some fine & coarse sand, trace of silt, gray in color	10	20
3 in. minus gray gravel & fine sand & silt	30	50
Fine sand w/some coarse sand & fine gravel, gray in color	5	55
Gray, fine & coarse sand	5	60
Brown sand & silt w/little fine gravel	5	65
Brown sandy silt w/bit of hard lumps of silt & fine gravel	5	70
Brown sand & silt w/bit of hard lumps of silt	5	75
Brown sand & silt w/shell, silt and caliche	10	85
Brown sandy silt w/fine caliche	15	100

699-97-43
Location: N97143, W43241 14/25-13A1
Casing Elevation: 421.91
Cable tool, drilled by Smith & Wilcox of Haden Drilling Company for SE Company, 1962, groundwater monitoring borehole

Material (1)	Thickness	Depth
3 in. minus gravel w/coarse & fine sand, little silt, gray in color	5	5
3 in. minus gray gravel w/coarse & fine sand	20	25
3 in. minus, gray gravel, fine silt & sand	5	30
Fine sand w/trace of coarse sand & 2 in. minus gravel & silt, light gray in color	5	35
3 in. minus gravel w/coarse & fine sand, trace of silt, gray	10	45
clay & silt w/gravel, reddish brown in color	5	50
Reddish brown clay & silt w/bits of fine gravel	10	60
Reddish brown clay & silt w/bits of coarse sand & hard silt	5	65
Brown sand & hard silt	15	80
Brown sand & caliche	20	100

699-101-48A
Location: N101465, W47984 14/26-12E1
Casing Elevation: 389.29
Cable tool, drilled by Ranney Water Collector Corporation for duPont, 1943, hydraulic investigation borehole

Material (1)	Thickness	Depth
Boulders, cobbles, coarse gravel w/some sand & sandy clay in the openings	35	35
Fine sand	5	40
Medium sand w/very little gravel & a few cobbles	8	48
Firm yellow sandstone, calcareous cement	2	50

699-101-48B
Location: N101454, W47787 14/26-12E2
Casing Elevation: 390.15
Cable tool, drilled by Ranney Water Collector Corporation for duPont, 1943, hydrologic investigation borehole

Material (1)	Thickness	Depth
Boulders, cobbles, w/some sand & sandy clay in the openings	35	35
Fine sand & cobbles w/scattered boulders	11	46
Sand w/medium & coarse gravel	2	48

699-101-48C
Location: N101476, W47985 14/26-12E3
Casing Elevation: 388.59
Cable tool, drilled by Ranney Water Collector Corporation for duPont, 1943, hydrologic investigation borehole

Material (1)	Thickness	Depth
Boulders & cobbles w/some sand & sandy clay in the openings	21	21
Sand & cobbles	3	24
Coarse gravel & cobbles w/some sand	19	43
Medium & coarse gravel w/very little sand	2	45
Sand & fine gravel	2	47
Clay bound medium & coarse gravel	2	49
Fine yellow sandstone-calcareous cement	29	77

699-102-48
Location: N101550, W47790 14/26-11H1
Casing Elevation: 390
Cable tool, drilled by Ranney Water Collector Corporation for duPont, 1943, hydrologic investigation borehole

Material (1)	Thickness	Depth
Boulders, cobbles, w/some sand & sandy clay in the openings	38	38
Fine & medium sand	3	41
Yellow sandstone-calcareous cement, streak of pebbles on top	15	56

699-102-2S
Location: 14/27-1P1
Casing Elevation: 575.34
Rotary, drilled for Bureau of Reclamation, 1980, hydrologic investigation borehole

Material (19)	Thickness	Depth
Sandy silt	85	85
Clay, some silt layers	85	170
Claystone, gray	10	180
Silt, brown, some clay	70	250
Silt, brown	70	320
Silt, light brown, some clay	30	350
Clay, light brown, some silt	14	364
Basalt, gray, some gray clay	6	370
Basalt, black bedrock	8	378

699-107-79
Location: N107000, W78890 14/25-1E1
Casing Elevation: 559.32
Rotary, drilled by Strasser Drilling Company for Corps of Engineers, 1952, domestic water supply well

Material (10)	Thickness	Depth
Soil	10	10
Caliche (hard 26-28) cemented gravel, very hard at 40 ft.	39	49
Gravel	2	51
Clay	9	60
Shale & clay	20	80
Clay	4	84
Hard shale	9	93
Shale & clay	17	110
Red, sandy shale	71	181
Sand carrying water; hard sand streak at 185 ft.	10	191
Consolidated material, drills like rock	2	193
Sand & clay	31	224
Sand	2	226
Consolidated material	8	234
Sandy clay	12	246
Caliche	5	251
Sand & clay	27	278
Brown sand, hole caves	12	290
White, sticky clay	26	316
Brown, sticky clay	12	328
Fine sand	7	335
Shale	19	354
Black basalt	9	363
Alternate shale & basalt streaks	5	368
Black basalt	90	458
Conglomerate of broken basalt & shale	30	485
Dense, gray basalt	145	630
Plastic, brown clay	5	635
Basalt, fractures filled w/brown clay	10	645
Gray clay	13	658
Basalt w/thin clay seams	140	798
Blue clay	15	813
Yellow sand & clay	9	822
Gray sandstone or granitic sand	37	859
Yellow clay	2	861
Basalt	2	863
Yellow clay	7	870
Yellow sand & clay	10	880
Blue shale	15	895
Sand	5	900
Shale w/basalt streaks	5	905
Basalt	29	934
White porous rocks	1	935

699-111-26
Location: 15/27-34L
Casing Elevation: 699.14
Rotary, drilled by Strasser Drilling Company for Corps of Engineers, 1952, domestic water supply well

Material (10)	Thickness	Depth
Topsoil & white, compact clay	109	109
Reddish-brown shale	39	148
Red sand	3	151
Reddish-brown shale	47	204
Blue clay	4	208
Brown & gray basalt	11	219
Alternate layers of hard & soft rock	7	226
Hard gray basalt	12	238
Medium hard gray basalt, green clay in seams, water in pores, bailed hole	16	254
Porous black basalt	15	269
Very hard black basalt	25	294
Brittle, hard basalt	3	297
Porous black basalt, sand in interbedding	42	339
Hard, black basalt, sand in interbeds	15	354
Fractured basalt, hard	13	367
Hard basalt	23	390
Hard, rough, black basalt	43	433
Hard gray basalt, crevasse at 468 ft. Rock showed smooth side	43	476
Brown & gray basalt, softer	14	490
Gray basalt	19	509
Gray basalt w/seams of blue clay	26	535
Broken basalt	25	560
Gray basalt	8	568
Gray & black basalt	22	590
Hard broken basalt	8	598
Gray basalt	6	604
Basalt & soapstone streaks	4	608
Broken formation	1	609
Gray basalt	7	616
Porous rock w/soapstone coating & blue clay	4	620
Gray basalt	8	628

699-113-28
Location: 15/27-12D
Casing Elevation: 702.31
Rotary, drilled by Strasser Drilling Company for Corps of Engineers, 1953, domestic water supply well

Material (10)	Thickness	Depth
Topsoil	6	6
Caliche	17	23
White clay & gravel	55	78
Brown clay scattered gravel	29	107
Hard caliche	38	145
Brown sandy clay	13	158
Brown clay, sand & gravel	5	163
Fine brown sand	9	172
Brown clay, basalt talus, hard	103	275
Coarse sand & gravel	2	277
Porous black basalt	23	300
Gray basalt	24	324
Porous black basalt w/green material in pores	34	358
Hard gray basalt	19	377
Porous gray basalt & clay	29	406
Medium hard, gray basalt	53	459
Soft, dark gray basalt	52	511
Hard gray basalt	50	561
Black basalt	6	567
Gray clay	15	582
Gray basalt	18	598
Black basalt	45	643
Gray basalt	19	662
Black basalt	40	702
Gray basalt	4	706
Black basalt	9	715
Gray basalt	6	721
Soft gray basalt w/streaks of white ash	44	765
Blue clay	32	797
Blue clay & sand	19	816
Sticky yellow clay	30	846
Black clay w/decomposed rock	26	872
Black basalt	4	876
Broken black basalt & black sand	3	879
Black sandstone	42	921
Gray basalt	34	955
Black basalt	27	982
Porous brown basalt, broken	16	998
Black basalt	34	1,032
Hard gray basalt	2	1,034
Red & brown cinders	4	1,038
Black basalt	29	1,067
Broken black & brown basalt	10	1,077
Broken black basalt	23	1,100
Hard black basalt	24	1,124
Light brown basalt	8	1,132
Hard gray basalt	8	1,140

699-114-11 (DH-1)
Location: 15/27-16A
Surface Elevation: 836
Corehole, drilled by & for Bureau of Reclamation, 1966, hydrologic investigation borehole

Material (13)	Thickness	Depth
Silty sand, brown, compact, dry	12	12
Boulders & cobbles, reddish-brown, basaltic, strongly weathered, caliche coated w/some gravels & sand	9	21
Basalt	60	81
Sandstone, light gray, white to yellow & tan, fine to coarse grained, weakly cemented to indurated & fractured, stratified w/embedded strongly weathered basaltic gravels	8	89
Sand, soft	10	99

699-114-60
Location: 15/28-29D1
Casing Elevation: 787.60
Rotary, drilled by Strasser Drilling Company for Corps of Engineers, 1952, domestic water supply well

Material (10)	Thickness	Depth
Topsoil	13	13
Clay & gravel	3	16
Brown sand	4	20
Brown & gray clay	78	101
Soft brown clay w/pebbles	92	193
Light gray sandy clay	83	276
Broken basalt	12	288
Hard gray basalt (crevices)	53	341
Porous black rock w/clay	19	360

Yellow clay	6	366
Porous black rock & clay	7	373
Brown & black porous rock	26	399
Medium hard, gray basalt	123	522
Gray clay, sand & gravel	5	527
Brown clay & gravel	9	536
Brown sand & clay	10	546
Brown & red clays in streaks	3	549
Broken rock	21	570
Gray basalt, crevices at 625 ft.	70	640
Broken gray basalt	20	660
Yellow sticky clay	50	710
Brown sand	34	744
Yellow clay	10	754
Yellow, brown, & green clay & talus rock	16	770
Red clay w/some rock	4	774
Gray clay-brown rock	10	784
Gray basalt	77	861
Red, yellow, & gray broken rock	7	868
Gray, broken basalt	22	890

699-114-127 (DH-5)
Location:
Casing Elevation:
Rotary to 210 ft) & diamond coring

Material	Thickness	Depth
Glaciofluvial sand, silt, gravel; cemented conglomerate boulders; cobbles	201	201
Basalt	9	210
Basalt	91	301
Sandstone	24	325
Basalt	134	459
Tuffaceous sandstone w/clay layers & quartz sand w/ micaflakes	63	522
Basalt	54	576
Basalt	33	609
Clay, micaceous quartz sand & tuffaceous sandstone	75	684
Basalt	42	726
Basalt	38	764
Basalt	55	819
Basalt	90	909
Baked clay	2	911
Basalt	62	973
Basalt	75	1,048
Baked clay	5	1,053
Basalt	200	1,253
Basalt	119	1,372
Basalt	44	1,416
Sandstone	70	1,486
Basalt	28	1,714
Basalt	95	1,809
Basalt	41	1,850
Basalt	40	1,890
Basalt	76	1,966
Basalt	45	2,011
Basalt	79	2,090
Basalt	10	2,100
Basalt	146	2,246
Basalt	74	2,320
Basalt	34	2,354
Basalt	77	2,431
Basalt	182	2,613
Basalt	212	2,825
Basalt	58	2,883
Basalt	269	3,152
Basalt	141	3,293
Basalt	290	3,583
Basalt	17	3,600
Basalt	137	3,737
Basalt	19	3,756
Basalt	62	3,818
Basalt	22	3,840
Basalt	36	3,876
Basalt	20	3,896
Basalt	50	3,946
Basalt	62	4,008
Basalt	34	4,042
Basalt	53	4,095
Basalt	65	4,160
Basalt	16	4,176
Basalt	41	4,217
Basalt	19	4,236
Basalt	73	4,309
Basalt	30	4,339
Basalt	204	4,543
Basalt	30	4,573
Basalt	118	4,691
Basalt	209	4,900
Basalt	27	4,927
Basalt	15	4,942
Basalt	44	4,986
Basalt	10	4,996
Basalt	6	5,002

699-117-10 (DH-4)
Location: 15/28-20W1
Casing Elevation: 880
Rotary to 21 ft.) & diamond coring

Material	Thickness	Depth
No record, probably basalt	21	21
Basalt	8	29
Basalt	15	44
Tuffaceous sandstone	1	45
Basalt	47	92
Basalt	75	167
Basalt	177	344
Soil	1	345
Basalt	57	402
Tuffaceous sandstone, rubble & clay	22	424
Basalt	72	496
Basalt	11	507
Tuffaceous clay w/wood fragments	1	508
Basalt	31	539
Basalt	17	556
Basalt	67	623
Basalt	141	764
Basalt	50	814
Basalt	74	888
Basalt	98	986
Basalt	344	1,330
Basalt	149	1,479
Baked clay & sandstone w/clay varves	10	1,489
Basalt	21	1,510
Basalt	80	1,590
Basalt	52	1,642
Basalt	88	1,670
Basalt	182	1,852
Basalt	76	1,928
Basalt	162	2,090
Basalt	10	2,100
Basalt	6	2,106
Basalt	11	2,117
Basalt	101	2,218
Basalt	32	2,250
Basalt	55	2,305
Basalt	128	2,433
Basalt	35	2,468
Basalt	450	2,918
Basalt	49	2,967

Basalt	75	3,042
Basalt	68	3,110
Basalt	90	3,200
Basalt	75	3,275
Basalt	106	3,381
Basalt	31	3,412
Basalt	2	3,414
Basalt	51	3,465
Basalt	37	3,502
Basalt	1	3,503
Basalt	132	3,635
Basalt	23	3,658
Basalt	42	3,700
Basalt	36	3,736
Basalt	55	3,791
Basalt	1	3,792
Basalt	26	3,818
Basalt	50	3,868
Basalt	28	3,896
Basalt	59	3,955
Basalt	55	4,110
Basalt	32	4,142
Basalt	50	4,192
Basalt	2	4,194
Basalt	28	4,222
Basalt	2	4,224
Basalt	24	4,248
Basalt	2	4,250
Basalt	46	4,296
Basalt	1	4,297
Basalt	26	4,323
Basalt	14	4,337
Basalt	200	4,537
Basalt	35	4,572
Basalt	103	4,675
Basalt	7	4,682
Basalt	30	4,712
Basalt	44	4,756

699-117-11 (DH-2)
Location: 15/27-25J
Ground Elevation: 910
Corehole, drilled by & for Bureau of Reclamation, 1966, hydrologic investigation borehole

Material (19)	Thickness	Depth
Silty sand, brown, compact, dry	10	10
Sand & gravel, brown, basaltic, strongly weathered, abundant caliche fragments	5	15
Gravel, reddish-brown, basaltic, moderately weathered, some caliche coating	3	18
Basalt	38	56

699-119-11 (DH-3)
Location: 15/27-25A
Surface Elevation: 1004
Corehole, drilled by & for Bureau of Reclamation, 1966, hydrologic investigation borehole

Material (19)	Thickness	Depth
Silty sand, brown, compact, dry	16	16
Cobbles & gravels, reddish-brown, basaltic, strongly weathered, some sand, silt & clay	5	21
Boulders, dark gray, basaltic, slightly vesicular, predominantly dense, slightly weathered, some secondary mineralization filling vesicles in boulders	2	23
Basalt	40	63

699-122-11 (DH-4)
Location: 15/27-24J
Surface Elevation: 1010
Corehole, drilled by & for Bureau of Reclamation, 1966, hydrologic investigation borehole

Material (19)	Thickness	Depth
Silty sand, brown, compact, dry	3	3
Cobbles & gravels, reddish-brown, basaltic, moderately weathered, some large boulders & sand	4	7
Boulders, reddish-brown to dark gray, basaltic, weathered, some cobbles, gravels & sand	5	12
Sand, brown, silty, compact, some small gravels	7	19
Basalt	40	59

699-HAN-1
Location:
Casing Elevation: 393.77
Cable tool, drilled by Durand Drilling Company for duPont Company, 1943

Material	Thickness	Depth
Overburden	3	3
Coarse gravel	3	6
Boulders, coarse gravel & sand	7	13
Sand, gravel & boulders	7	20
Sand, gravel	5	25
Sand & pea gravel	9	34
Sandy brown clay	36	70
Red, brown clay w/sand & pea gravel	30	100

699-HAN-2
Location:
Casing Elevation: 394.97
Cable tool, drilled by Durand Drilling Company for duPont Company, 1943

Material	Thickness	Depth
Topsoil	1	1
Coarse gravel	25	26
Sandy brown clay & gravel	9	35
Sand & silt	65	100

699-HAN-3
Location:
Casing elevation: 395.0
Cable tool, drilled by Durand Drilling Company for duPont Company, 1943

Material	Thickness	Depth
Coarse sand, gravel & boulders	31	31
Pea gravel	30	61
Yellow clay	5	66

699-HAN-4
Location:
Casing elevation: 391.76
Cable tool, drilled by Durand Drilling Company for duPont Company, 1943

Material	Thickness	Depth
Sand, gravel & boulders	50	50
Brown clay	15	65

699-HAN-6
Location:
Casing Elevation: 384.78
Cable tool, drilled by Durand Drilling Company for duPont Company, 1943

Material	Thickness	Depth
Topsoil	15	15
Coarse sand & gray clay	10	25
Sand & gravel	10	35
Coarse sand & gravel	15	50
Clay & fine sand	4	54

699-HAN-7
Location:
Casing Elevation: 384.12
Cable tool, drilled by Durand Drilling Company for duPont Company, 1943

Material	Thickness	Depth
Topsoil-sandy brown clay	20	20
Coarse sand & gravel	9	29
Coarse gravel & cobble rock	9	38
Brown clay	3	41

699-HAN-8
Location: N53262, W18965
Casing Elevation: 383.60
Cable tool, drilled by Durand Drilling Company for duPont Company, 1943

Material	Thickness	Depth
Top soil	2	2
Gravel	7	9
Gravel & boulders	10	19
Gravel	7	25
Pea gravel	2	27
Sand & gravel	22	50
Sand, some gravel	10	60

699-HAN-9
Location: N54065, W18031
Casing Elevation: 394.46
Cable tool, drilled by Durand Drilling Company for duPont Company, 1943

Material	Thickness	Depth
Sand, gravel, boulders	10	10
Gravel, boulders	6	16
Boulders	2	18
Sand, gravel	30	48
Sand	2	50
Sand, gravel-coarse	29	79
Yellow clay	11	90

699-HAN-10
Location: N49152, W7767
Casing Elevation: 380.27
Cable tool, drilled by Durand Drilling Company, 1943, abandoned borehole

Material	Thickness	Depth
Sand & silt	15	15
Gravel	6	21
Pea gravel	11	32
Gravel	8	40
Clay	8	48

699-HAN-11
Location: N48687, W7210
Casing Elevation: 384.11
Cable tool, drilled by International Water Supply, 1943

Material	Thickness	Depth
Sand	8	8
Coarse sand-gravel	28	36
Siltstone	1	37
Coarse clean sand-medium gravel	9	46
Yellow silt	9	55

699-HAN-12
Location: N50807, W12508
Casing Elevation: 400.37
Cable tool, drilled by Durand Drilling Company for duPont Company, 1943

Material	Thickness	Depth
Topsoil	3	3
Boulders	5	8
Gravel & boulders	12	20
Gravel	15	35
Sand & gravel-very fine	5	40
Fine sand, dirty, heaving	17	57
Fine sand, dirty	15	72
Clay	8	80

699-HAN-13
Location:
Casing Elevation: 386.55
Cable tool, drilled by International Water Supply for duPont Company, 1943

Material	Thickness	Depth
Sand	6	6
Sand & boulders	12	18
Sand, coarse gravel	21	39
Yellow silt	12	45

699-HAN-14
Location: N52029, W13441
Casing Elevation: 410.25
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944

Material	Thickness	Depth
Boulders	5	5
Boulders & gravel	3	8
Gravel	21	29
Boulders & gravel	3	32
Coarse gravel	2	34
Gravel, sand boulders	3	37
Gravel & boulders	3	40
Gravel	39	79
Small gravel	6	85
Gravel	3	88
Clay	2	90

699-HAN-16
Location: N48868, W9596
Casing Elevation: 396.15
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944, abandoned borehole

Material	Thickness	Depth
Gravel	4	4
Boulders	5	9
Boulders & gravel	25	35
Muddy gravel	4	39
Brown clay	6	45

699-HAN-17
Location: N48879, W12540
Casing Elevation: 412.37
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944

Material	Thickness	Depth
Topsoil	3	3
Gravel & boulders	5	8
Boulders	1	9
Gravel & boulders	4	13
Gravel	6	19
Fine & coarse gravel	15	34
Gravel	14	48
Water, gravel & boulders	5	53
Gravel	27	80
Sand & gravel	6	86
Gravel	2	87
Sand & gravel	2	89
Brown clay	4	93

699-HAN-18
Location: N48869, W12548
Casing Elevation: 409.99
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944

Material	Thickness	Depth
Topsoil	2	2
Gravel	4	6
Boulders	5	11
Boulders & gravel	9	20
Coarse gravel	14	34
Gravel & fine sand	5	39
Gravel	20	59
Large gravel	9	68
Gravel	12	80
Sand & gravel	8	88
Shale	9	97

699-HAN-19
Location: N48805, W12614
Casing Elevation: 412.72
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944

Material	Thickness	Depth
Boulders	4	4
Gravel & boulders	11	15
Sand & gravel	4	19
Gravel	10	29
Sand	6	35
Gravel	30	65
Sand & gravel	6	71
Gravel	5	76
Clay	8	84

699-HAN-20
Location: N48791, W12611
Casing Elevation: 412.21
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944

Material	Thickness	Depth
Sand, boulders	4	4
Gravel, boulders	12	16
Fine sand	4	20
Fine sand, gravel	2	22
Gravel	12	34
Sand	12	46
Fine sand	3	49
Medium gravel	14	63
Gravel	13	76
Clay	10	86

699-HAN-21
Location: N48713, W12573
Casing Elevation: 413.87
Cable tool, drilled by Durand Drilling Company, for duPont Company, 1944

Material	Thickness	Depth
Boulders	5	5
Boulders & gravel	13	18
Coarse sand & gravel	2	20
Gravel	15	35
Coarse gravel	14	49
Small gravel	10	59
Sand & gravel	4	63
Clay	8	71

699-HAN-22
Location: N48947, W12486
Casing Elevation: 411.21
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944

Material	Thickness	Depth
Boulders	4	4
Sand & boulders	21	25
Sand & gravel	25	50
Gravel	13	63
Sand & fine gravel	25	88
Brown clay	9	97

699-HAN-23
Location: N48830, W47903
Casing Elevation: 411.27
Cable tool, drilled by Durand Drilling Company, for duPont Company, 1944

Material	Thickness	Depth
Topsoil	1	1
Boulders	13	14
Boulders & gravel	5	19
Gravel	33	52
Fine gravel	8	60
Gravel	20	80
Large gravel	8	88
Sand & gravel	4	92
Brown clay	10	102

699-HAN-24
Location: N47903, W17870
Casing Elevation: 424.98
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944

Material	Thickness	Depth
Topsoil	2	2
Boulders & gravel	18	20
Sand & gravel	7	27
Boulders	4	31
Gravel	23	54
Sand, gravel	10	64
Gravel	1	65
Sand & gravel	11	75
Clay	10	86

699-HAN-25
Location: N48478, W15516
Casing Elevation: 409.80
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944

Material	Thickness	Depth
Sand & boulders	3	3
Coarse gravel	7	10
Sand & gravel	10	20
Coarse gravel	15	35
Gravel	25	60
Mostly sand	6	66
Sand showing clay	9	75
Clay	8	83

699-HAN-26
Location: N51308, W18412
Casing Elevation: 410
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944

Material	Thickness	Depth
Boulders	12	12
Boulders & gravel	6	18
Coarse gravel	11	29
Gravel & boulders	8	37
Gravel	10	47
Gravel & coarse sand	8	55
Gravel	12	67
Fine heavy gravel	7	74
Fine gravel	3	77
Fine loose gravel	4	81
Fine gravel	4	85
Yellow clay	10	95
Gravel	1	96
Hard shell	1	97
Boulders & gravel	3	100
Yellow clay	7	107

699-HAN-27
Location: N49857, W18552
Casing Elevation: 409.90
Cable tool, drilled by Durand Drilling Company for duPont Company, 1944

Material	Thickness	Depth
Gravel	4	4
Large boulders	5	9
Boulders	6	15
Gravel & boulders	2	17
Coarse gravel	3	20
Gravel & boulders	1	21
Coarse gravel	3	24
Gravel & boulders	2	26
Gravel	4	30
Gravel & boulders	12	42
Gravel	10	52
Gravel & sand	3	55
Gravel	20	75
Coarse gravel	4	79
Gravel & sand	3	82
Coarse gravel	3	85
Gravel	6	91
Fine gravel & sand	3	94
Clay & gravel	15	109
Fine gravel	1	110
Blue clay	7	117
Fine gravel	1	118
Blue clay & gravel	3	121
Clay	19	140

699-44N-31

Location:
Casing Elevation: 410
Cable tool, drilled by International Water Supply for duPont Company, 1943

Material	Thickness	Depth
Sand	6	6
Boulders & sandrock	12	18
Coarse gravel & sand	16	34
Blue sandy clay	3	37

APPENDIX A

CROSS-REFERENCES OF 600 AREA BOREHOLE DESIGNATIONS

NORTHWEST ENERGY SYSTEMS COMPANY/GOLDER ASSOCIATES

Borehole No.		Borehole No.		Borehole No.	
a	b	a	b	a	b
1	40-13[c]	35	47-24	84	36-21
2	39-12	36	48-22	85	34-19
3	40-12A	37	49-21	86	32-18
4	38-15	38	51-19	87	30-16
4A	38-14	39	52-17	88	52-30
5	41-10	40	54-15	89	49-34
6	36-17	41	45-26	90	51-36C
7	43-8	42	44-27	91	49-32
8	35-19A	43	42-29	92	49-33
8A	35-19B	44	41-31	93	49-31
9	45-6A	45	40-32	94	37-E1
9A	45-6B	46	38-34B	95	51-36D
10	33-21A	46A	38-34D	96	48-35
10A	3-21B	47	37-36	97	49-32
11	46-3	48	32-26	98	40-2
12	31-23	49	28-23	99	39-1
13	30-25A	50	31-11	100	36-C3
13A	30-25B	51	31-8	101	37-4
14	28-27	52	33-6	102	38-3
15	26-29A	53	35-3	103	39-2
15A	26-29B	54	36-1	104	41-11
		55	38-CO	105	43-9
17	34-20			106	44-7
18	37-16	68	39-E2	107	60-44
19	40-12B	69	39-23	108	39-7
20	48-27	70	36-27	109	40-6
21	47-27	71	32-32	110	41-5
22	47-25	71A	32-31	111	36-2
23	45-24	72	51-36B	112	42-10
24	43-23	73	42-30	113	38-9
25	42-21	74	35-28	114	46-5
26	40-20	75	33-30	115	36-10
27	38-19	76	37-25	116	42-3
		77	40-21	117	43-2
29	35-16	78	30-25	118	35-6
30	33-14	79	45-30	119	34-8
31	41-20	80	44-28	120	40-0
32	43-18	81	42-27	121	35-3
33	44-16	82	41-25		
34	46-15	83	37-22		

[a]Northwest Energy Systems Company/Golder Associates.

[b]Hanford.

[c]Boreholes prefixed by 699-.

ROCKWELL/ATLANTIC RICHFIELD HANFORD COMPANY

Shallow Boreholes					
Borehole No.		Borehole No.		Borehole No.	
a	b	a	b	a	b
UGB-1	63-89[c]	GM-9	55-40	GBM-3	66-64
UGB-2	63-95	GM-10	59-32	GBM-4	63-58
UGB-3	63-92	GM-11	60-32	GBM-5	63-58
UGB-4	66-91	GM-12	62-31	GBM-6	63-55
UGB-5	65-95	GM-13	56-26	GBM-7	60-57
		GM-14	57-25	GBM-8	59-58
GM-1	56-43	GM-15	58-24		
GM-2	55-44	GM-16	61-41	CH-1	60-53A
GM-3	54-34	GM-17	63-31	CH-2	60-53B
GM-4	53-35	GM-18	61-37	CH-3	60-53C
GM-5	50-29B	GM-19	66-39	CH-4	60-53D
GM-6	49-28			CH-5	60-53E
GM-7	51-36A	GBM-1	61-62	CH-6	60-53F
GM-8	54-45	GBM-2	64-62A		

Intermediate and Deep Boreholes					
DB-1	2-E14	DC-1	48-49	DDH-1	49-48
DB-2	15-E13	DC-2	40-48	DH-2	50-112B
DB-3	2-E19	DC-3	44-70	DDH-3	S30-E15C
DB-4	35-27	DC-4	49-86B	DH-4	117-10
DB-5	52-52	DC-5	49-86A	DH-5	114-127
		DC-6	54-17C	DH-6	W11-26
DB-7	S16-24	DC-7	15-15F	DH-7	W19-10
DB-8	42-42	DC-8	15-15G	DH-8	61-55A
DB-9	62-57			DH-8A	61-35B
DB-10	51-36A	DC-10	62-53	DH-9	49-100A
DB-11	49-100A	DC-11	61-53	DH-9A	43-42
DB-12	63-95	DC-12	10-54B	DH-9B	54-17C
DB-13	17-47			DH-10	59-55
DB-14	25-80	DC-14	84-34	DH-18	26-15C
DB-15	47-42	DC-15	S15-E14	DH-19	70-17

[a] Rockwell/Atlantic Richfield Hanford Company.

[b] Hanford.

[c] Boreholes prefixed by 699-.

WESTINGHOUSE/WESTINGHOUSE ATOMIC DEVELOPMENT COMPANY

Test Boreholes	
Borehole No.	
a	b
DH-1	S1-7A[c]
DH-2	S1-7B
DH-3	S1-7C
DH-4	S1-7D
DH-5	S1-7E
DH-6	S1-7F
DH-7	S2-8
DH-8	S1-8A
DH-9	S1-8B
DH-10	S1-8C
DH-11	S1-8D
DH-12	S1-8E
DH-13	S1-8F
DH-14	S1-8G
DDH-1	S17-30A
DDH-2	S17-30B
DDH-3	S17-30C
DDH-4	S17-28
DDH-5	S17-25
DDH-6	S17-24
Water Supply Boreholes	
Well 1	SO-7
Well 2	SO-8
Well 3	S1-8H

[a]Westinghouse/ Westinghouse Atomic Development Company.

[b]Hanford.

[c]Boreholes prefixed by 699-.

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
INTERMEDIATE AND DEEP BOREHOLES

Hanford Generating Plant Boreholes	
a	*b*
BH-16	83-60[c]
BH-17	31-63
BH-18	86-64
Nuclear Projects 1, 2 & 4 Boreholes	
B-12	12-1A
B-35	13-2B
B-36	10-3A
BH-137	6-2A
BH-138	9-E5A
BH-139A	16-E4A
BH-140	11-E4E
BH-141	20-E2
BH-142	14-E3E
BH-143	11-E8B
BH-144	15-E3A
BH-145	16-E3A

[a]Washington Public Power Supply System.

[b]Hanford.

[c]Boreholes prefixed by 699-.

APPENDIX B

DRILLING CONTRACTORS ON THE HANFORD SITE

Aqua Drilling & Development Company
Pasco, Washington

B & H Drilling Company
Kennewick, Washington

Bach Drilling Company
Yakima, Washington

Barnett Pump and Irrigation
Othello, Washington

Boyles Brothers Drilling Company
Spokane, Washington

Budinger Geotechnical Consultants
Spokane, Washington

Calvert Western Drilling Company
Grand Junction, Colorado

Carmen Water Wells
Chelan, Washington

Century Drilling Company
Shelby, Montana

Coeur d'Alene Drilling Company
Coeur d'Alene, Idaho

Conners Drilling Company
Spokane, Washington

Continental Drilling Company
Seattle, Washington

Diamond Drilling Contractors
Spokane, Washington

Durrand & Son Drilling Company
Walla Walla, Washington

Findlay Drilling Company
Coeur d'Alene, Idaho

Four Star Drilling Company
Moses Lake, Washington

General Electric Company
Richland, Washington

Geophysical Services Incorporated
Tulsa, Oklahoma

Haden Drilling Company
Pasco, Washington

Hatch Drilling Company
Pasco, Washington

International Water Supply*

Jannsen Drilling Company*

Jungman Drilling Company
Walla Walla, Washington

Layne Western
Moses Lake, Washington

Longyear Drilling Company
Spokane, Washington

McDonald Drilling Company
Reno, Nevada

Miracle & Wooster Drilling Company
Vernal, Utah

Nelson Drilling Company
Pasco, Washington

Osborn Drilling Company
Pasco, Washington

Pitcher Drilling Company*

Ranney Water Collector Corporation
New York, New York

Schaefer Well Service, Inc
Victoria, Texas

Scott Drilling Company*

Smith & Son Drilling Company*

Soil Sampling Service
Puyallup, Washington

Storey Drilling Company*

Strasser Drilling Company
Portland, Oregon

Taylor Drilling Company
Chehalis, Washington

U. S. Geological Survey
Richland, Washington

Wallace Diamond Drill Company
Osburn, Idaho

Wyland Drilling Company
Lake Oswego, Washington

*Address not known.

APPENDIX C

LIST OF ABBREVIATIONS, ACRONYMS, AND SYMBOLS

~	approximately
w/	with
%	percent
*	note to follow

AEC	U.S. Atomic Energy Commission
ARCHO	Atlantic Richfield Hanford Company
Bechtel	Bechtel Corporation
Blume	J. A. Blume & Associates, Engineers
BNWL	Battelle Northwest Laboratories
du Pont	E. I. de Pont De Nemours & Company
FFTF	Fast Flux Test Facility
Fugro	Fugro Inc.
GE	General Electric
GSI	Geophysical Services, Inc.
HEDL	Hanford Engineering Development Laboratory
NESCO	Northwest Energy Systems Company
PNL	Pacific Northwest Laboratory
Rockwell	Rockwell Hanford Operations
USBR	U.S. Bureau of Reclamation
USGS	U.S. Geological Survey
USWPS	U.S. Water and Power Service
WADCO	Westinghouse Atomic Development Company
WNP	Washington Public Power Supply System Nuclear Project
WPPSS	Washington Public Power Supply System

c	coarse
f	fine
ft	foot or feet
in.	inch or inches
l	large
m	medium
s	small
vc	very coarse
vf	very fine

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TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

May 19, 1982

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Ms. Adensam:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority) 50-391

In L. M. Mills' letter to you dated April 15, 1982, TVA provided proposed revisions to chapter 8 of the Watts Bar Nuclear Plant Final Safety Analysis Report (FSAR). At the request of the NRC Power Systems Branch, enclosed ar oversized copies of figures 8.1.2A, 8.2-1A, 8.2-1B, and 8.2-1C. Also encl are additional revisions to section 8.3. Please note that the informatic provided by thi letter and the letter dated April 15, 1982 is in addit power systems information provided in Amendment 46.

If you have any questions concerning this matter, please get in tou D. P. Ormsby at FTS 858-2682.

Very truly yours,

TENNESSEE VALLEY AUTHC

R. H. Shell

R. H. Shell
Nuclear Engineer

Sworn to and subscribed before me
this 19th day of May 1982

Paulette H. White
Notary Public
My Commission Expires 9-5-84

Enclosures

transfer. The charger is a solid-state type which converts a 3-phase 480-volt ac input to a nominal 125-volt dc output having a rated capacity of 20 amperes. Over this output current range the dc output voltage will vary no more than +1.0 percent for a supply voltage amplitude variation of +10 percent and frequency variation of +2.0 percent. Some operational features of the chargers are: (1) an output voltage adjustable over the range of 125 to 133 volts, (2) equalize and float modes of operation (the charger normally operates in the float mode at 128 volts, but can be switched to the equalize mode with an output of 133 volts, (3) a current-limit feature which limits continuous overload operation to 125 percent of rated output, (4) protective devices which prevent a failed charger from external overloads, (5) metering and alarm circuits to monitor the charger output.

The diesel-generator 125-volt dc control and field flash circuits are supplied power from their respective dc distribution panels located in the diesel building on El. 742 (see Figure 8.3-1). A typical panel and its associated loads is shown on Figure 8.3-55. Each circuit (including the battery charger input to the panel) is protected by a thermal-magnetic circuit breaker. The battery input circuit to the panel is protected by a thermal-magnetic circuit breaker and a coordinated fuse. Local metering on the distribution panel and battery charger includes ~~battery and~~ charger current, battery and charger voltage, and battery system ground detection. ~~Low battery charger output voltage and loss of 480 volt ac supply to the charger is alarmed in the main control room.~~

Prior to placing the 125-volt dc diesel generator battery system into service, the system components will be tested to ensure their proper operation. The diesel-generator batteries will be preoperationally tested for the following conditions:

1. To verify that the diesel generator battery capacity will meet the manufacturer's guaranteed performance.

2. To verify that the diesel generator battery system has the ability to supply power before, during, and after loss of the 480V ac power supply to the diesel generator battery charger in the worst case condition.

3. To verify that the battery charger will recharge the diesel generator battery to the nominally fully charged condition while supplying power to the normal control loads.

4. To verify that the diesel generator is able to start, come to speed, flash the generator field, and build up voltages when the diesel generator battery is on equalize charge.

There are two alarms in the MCR for each DGU. One is labeled "Diesel Generator Control Power Failure." This alarm not only alerts the operator to a loss of control power, it indicates a complete loss of the diesel generator dc power supply. The other alarm is labeled "Diesel Generator Battery Trouble." This alarm indicates (1) loss of the battery charger ac supply, (2) loss of battery charger output, and (3) diesel generator battery system overvoltage.

battery charge-discharge current

46