

**STATE OF SOUTH DAKOTA**  
George S. Mickelson, Governor

**DEPARTMENT OF WATER AND NATURAL RESOURCES**  
Floyd Matthew, Secretary

**DIVISION OF GEOLOGICAL SURVEY**  
Merlin J. Tipton, State Geologist

**Open-File Report 58-UR**

**INVESTIGATION OF THE SIOUX FALLS SANITARY LANDFILL**

by

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## INTRODUCTION

### Purpose

This project was undertaken in 1984 by the South Dakota Geological Survey, South Dakota Department of Water and Natural Resources, to assess the geologic and hydrologic suitability of the Sioux Falls sanitary landfill site (SW¼ sec. 35, T. 101 N., R. 51 W.) for continued use (fig. 1). The results of this investigation were compiled in 1984 in a preliminary report and were made available for general use. This investigation by the South Dakota Geological Survey did not include an examination of ground-water quality. Water samples were, however, collected by the Office of Air Quality and Solid Waste (now called the Division of Air Quality and Solid Waste), South Dakota Department of Water and Natural Resources, for analysis. Records of these analyses are on file with the Division of Air Quality and Solid Waste.

### Previous Studies

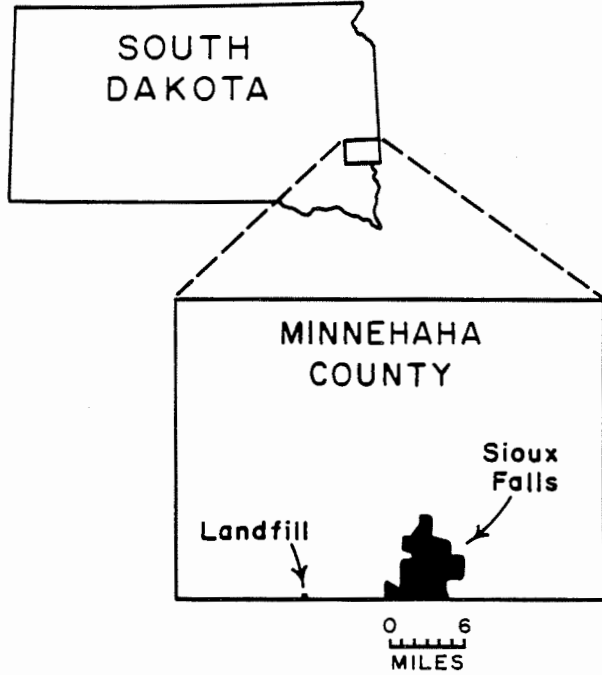
Initial test holes required for permitting of the landfill site were drilled in 1978 by Great Plains Engineering Laboratory, Sioux Falls, South Dakota (test holes B-1 through B-5; fig. 2). These five holes encountered silty or sandy clay to a depth of 50 feet, with the exceptions of sand from 4 to 6 feet in hole B-2 and clayey sand from 1.5 to 4.5 feet in hole B-3.

In November, 1983, more test holes were drilled at the site because methylene chloride, a solvent which has been related to cancer, was detected in some water samples collected in the vicinity of the landfill. Records of sampling and chemical analyses are on file with the Division of Air Quality and Solid Waste. Concern arose as to whether or not the landfill might be polluting water in the area. Because of the concern, the Sioux Falls Health Department hired Enviologic Systems, Inc., Denver, Colorado, to direct the drilling of six more test holes which ranged from 30 to 50 feet deep (L-1, L-2, L-7, E-1, E-2, and B-5 Duplicate; fig. 2). Three of the six holes (L-2, E-1, and E-2) encountered significant sandy zones (up to 26 feet thick) near the northeast corner of the landfill property along the east litter-fence line.

A month later, in December of 1983, more test holes were drilled at the site because of concern over the reports of sand lenses and/or layers within the landfill's confines. Sixteen additional test holes ranging from 10 to 70 feet deep were drilled by the state of South Dakota along the east and south litter-fence lines (holes T-1 through T-15; fig. 2). Nine of the 16 test holes encountered sand lenses or layers ranging from 1 foot to perhaps greater than 60 feet in thickness (T-1, T-2, T-3, T-5, T-7.5, T-8, T-11, T-12, and T-15). Logs of these holes and other previously drilled holes are on file with the Division of Air Quality and Solid Waste.

The results of drilling done by the state of South Dakota raised new questions relative to the site's suitability for use as a landfill. The South Dakota Geological Survey was asked by the South Dakota Department of Water and Natural Resources and the city of Sioux Falls to conduct a more extensive hydrogeologic investigation of the landfill site. The results of that effort are described in this report.

Figure 1. Site-location map.



*Topographic map portion taken from 7.5 minute series maps (Hartford, South and Lennox, NW Quadrangles).*

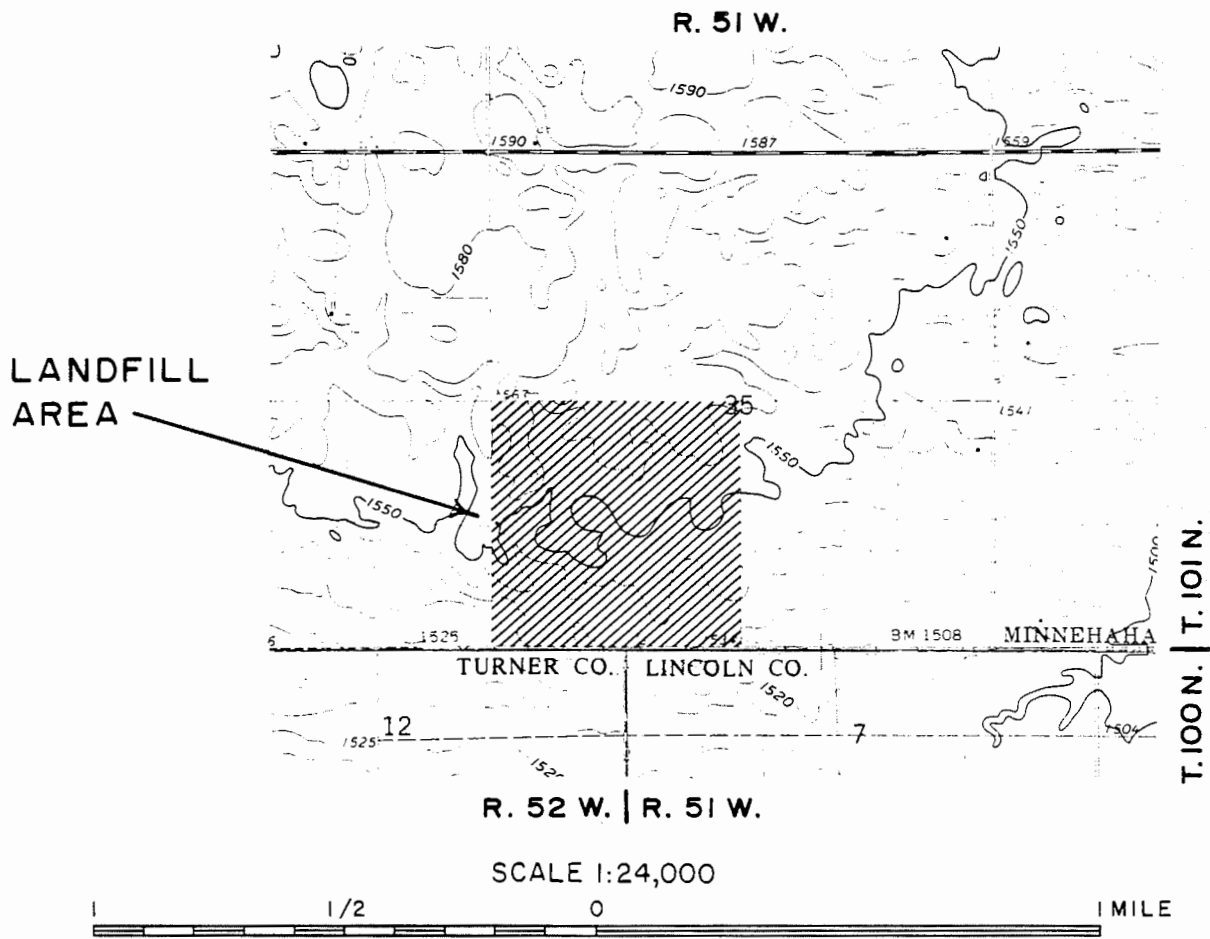
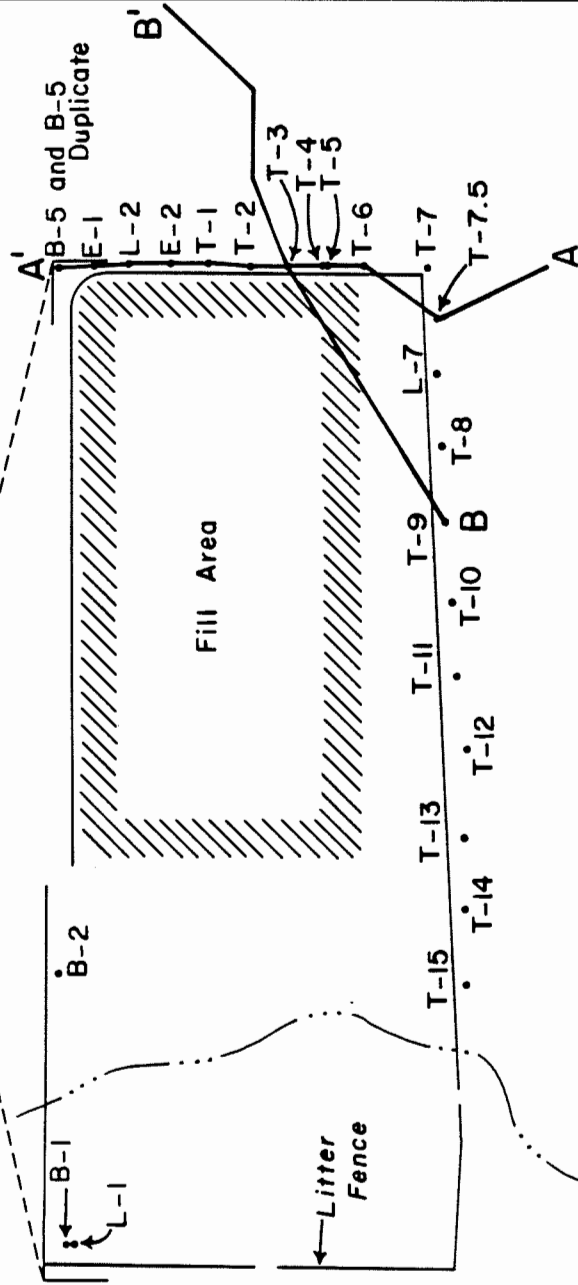
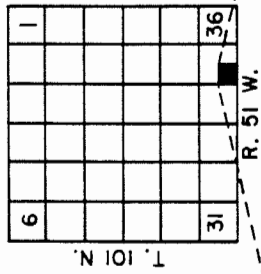


Figure 2. Locations of preexisting data points.



**EXPLANATION**

Holes B-1 through B-5 were drilled in 1978 by Great Plains Engineering Laboratory for permitting purposes.

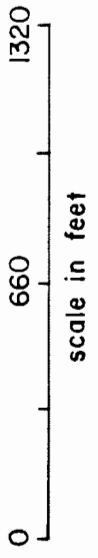
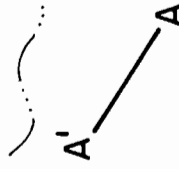
Holes L-1, L-2, L-7, B-5 Duplicate, E-1 and E-2 were drilled in November, 1983. Drilling was supervised by Envirollogic Systems, Inc.

Holes T-1 through T-15 were drilled in December, 1983. Drilling was supervised by the South Dakota Department of Water and Natural Resources, Division of Environmental Quality.

Logs of all holes are on file at the South Dakota Department of Water and Natural Resources, Division of Environmental Quality.

..... Intermittent drainage.

Location of cross section.



• B-3

B-4

## Present Investigation

Drilling activities commenced on July 10, 1984, and concluded on July 26, 1984. During this interval, 80 test holes were drilled, 36 of which were completed as observation wells (fig. 3, app. A). Test holes were used to check the geologic suitability of the site and the observation wells allowed for definition of the ground-water gradient through the site and provided a monitoring network for ground-water sampling. Some holes were drilled outside of landfill property boundaries (ML 67 through ML 80, fig. 3) to determine the lateral extent of some sand lenses and/or layers encountered along the east edge of the landfill property.

The casing-top elevations of the observation wells were determined so that direct comparisons of water levels within the monitoring network could be made (apps. A and B). Methods and procedures for drilling, plugging of test holes, observation well construction, and removal of water from observation wells are presented in appendix C.

## PROJECT RESULTS

### Geology

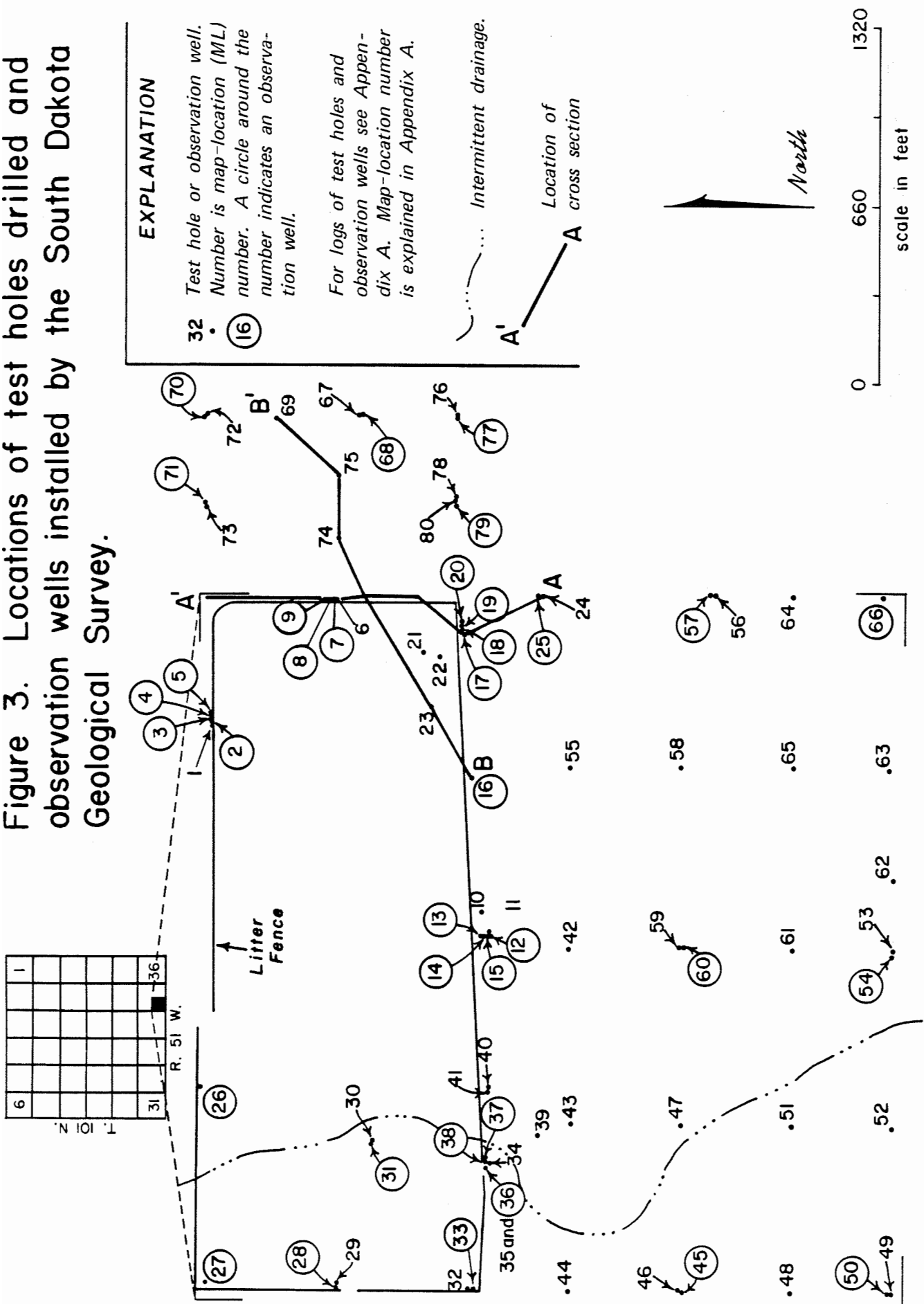
The landfill is constructed in and is underlain by Wisconsin age glacial till (Steece, 1959). Till is an unsorted mixture of silt, sand, gravel, and boulders that is deposited directly by glacial ice and has had little or no reworking by water. Discontinuous bodies of sand and gravel are occasionally found within till, but they usually have a limited extent. In the study area, Steece (1959) describes the till as being a boulder clay consisting of 60 to 70 percent olive-gray to olive-brown calcareous clay and silt, with some rock fragments. Test holes drilled for this investigation (fig. 3, app. A) show that the landfill area is underlain by primarily clayey materials, as described by Steece.

Sand lenses and/or layers were encountered in some of the test holes. Figure 4 shows all locations where this sand and/or gravel was encountered by drilling prior to and during this investigation. Figure 4 is designed for a quick reference to the presence or absence of sand and gravel and is not intended to show the depth, thickness, or degree of lateral continuity of the sand and gravel.

Figures 5 and 6 illustrate the generalized sediment profile in and near the northeast corner of the landfill property. Although the sand lenses and layers shown in the cross sections may appear to be extensive, a comparison of these cross sections, figure 4, and the test hole logs indicates otherwise. Sand lenses or layers encountered during drilling in 1978, 1983, and 1984, are believed to be discontinuous or have a limited lateral extent.

The thickest sequence of sand was encountered along the east edge of the landfill property in the test hole at map location (ML) 6 (figs. 3 and 5). A minimum of 44 feet of sand exists in this hole. The sand was not found to have significant lateral extent; in fact, the only test hole outside of landfill property boundaries to encounter this particular sand was at ML 74 (figs. 3, 4, and 6).

Figure 3. Locations of test holes drilled and observation wells installed by the South Dakota Geological Survey.



**EXPLANATION**

32 . Test hole or observation well.  
 Number is map-location (ML) number. A circle around the number indicates an observation well.

For logs of test holes and observation wells see Appendix A. Map-location number is explained in Appendix A.

..... Intermittent drainage.

A'—A Location of cross section

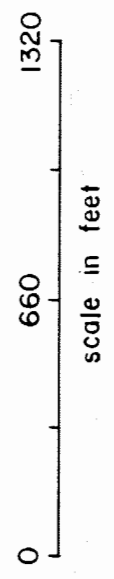




Figure 4. Occurrence of sand and gravel.

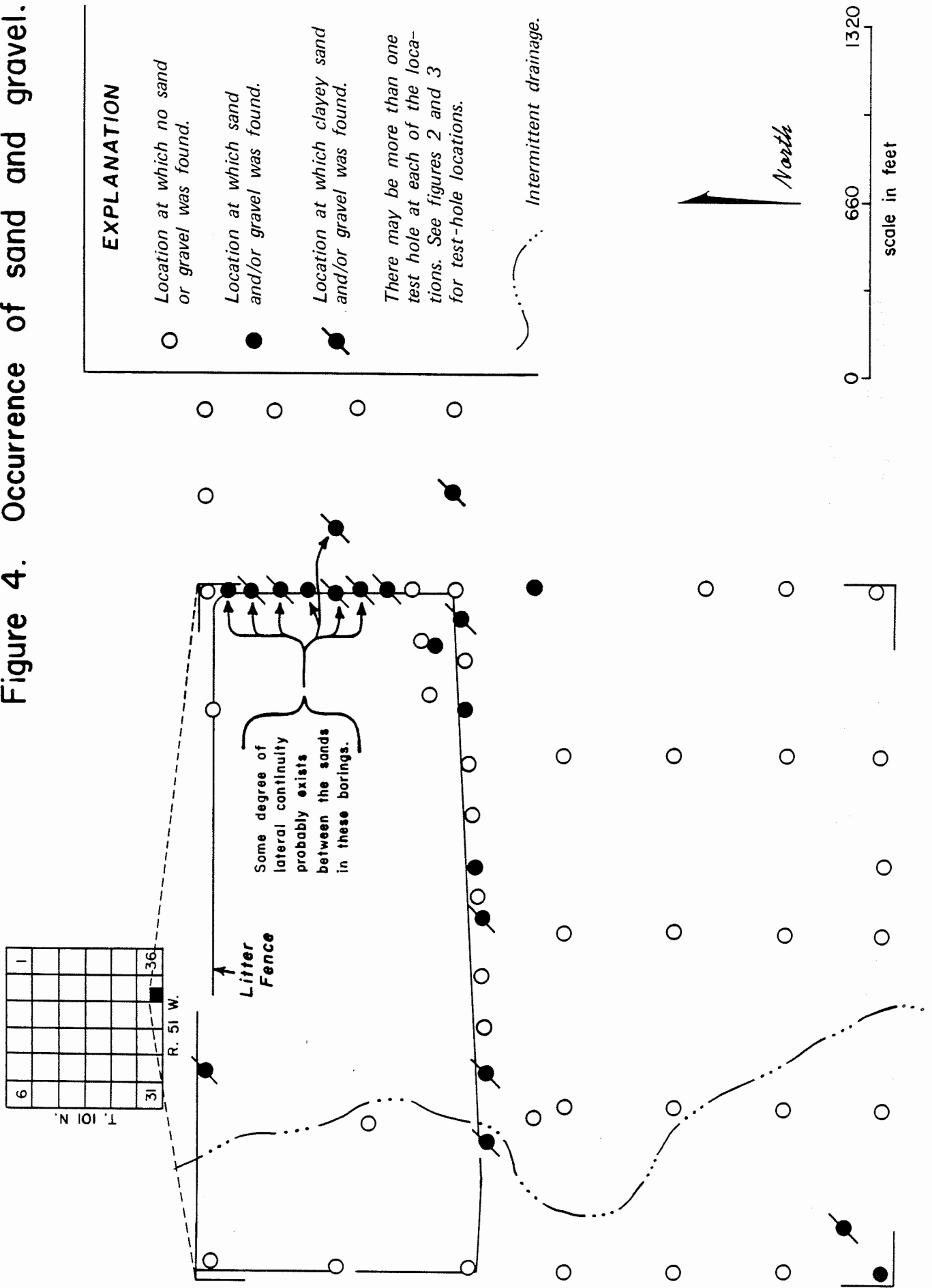


Figure 5. Cross section A - A'.

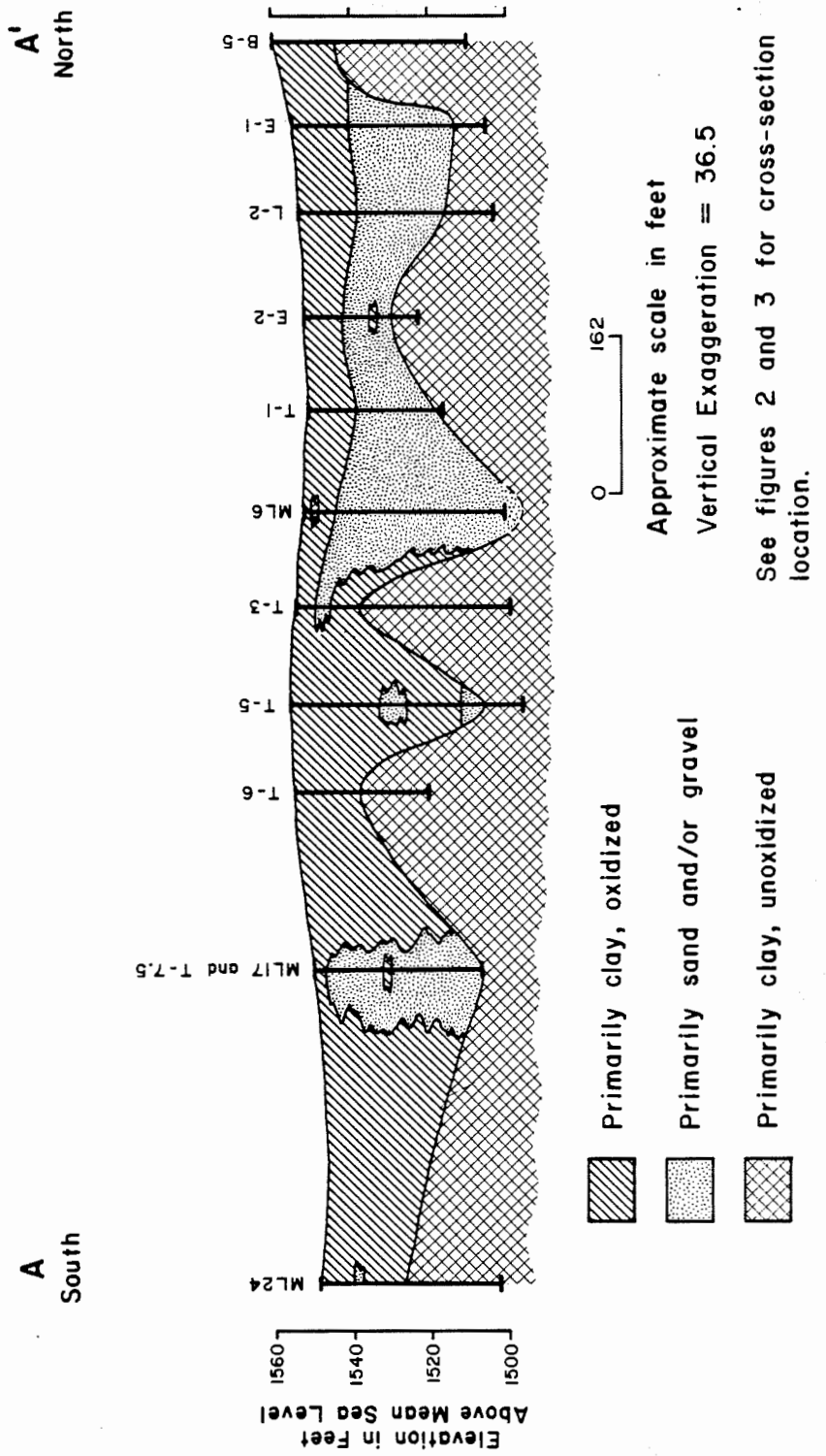
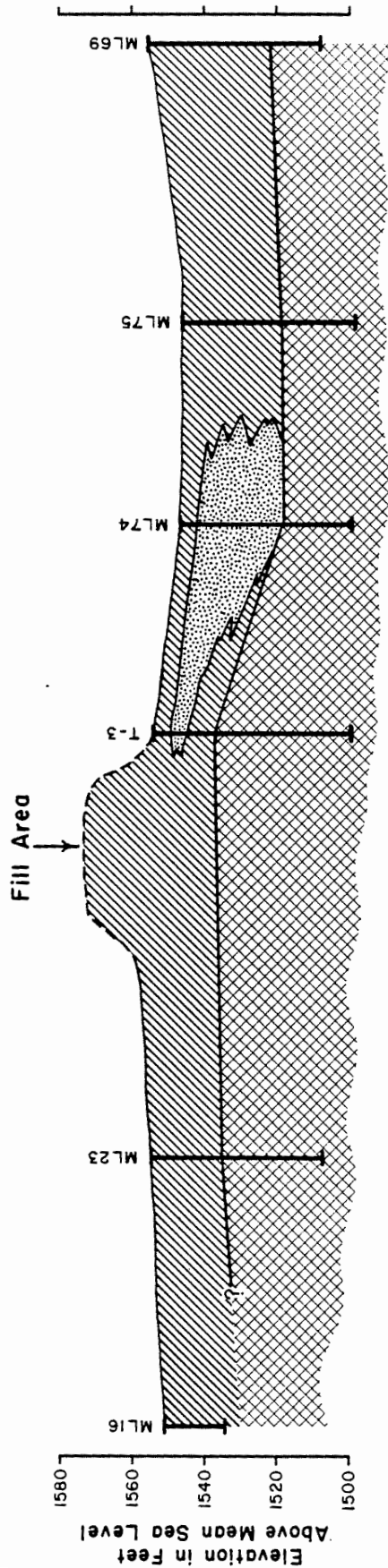





Figure 6. Cross section B-B'.

B' Northeast

B Southwest



-  Primarily clay, oxidized
-  Primarily sand and/or gravel
-  Primarily clay, unoxidized



Approximate scale in feet

Vertical Exaggeration = 36.5

See figures 2 and 3 for cross-section location.

## Ground Water

### Ground-Water Gradient

The potential for lateral movement of shallow ground-water in the till is to the south (fig. 7). The general slope of the water-table surface essentially mimics the land's surface topography (fig. 1). The lowest ground-water elevation corresponds to the lowest land surface elevation.

Little or no potential for vertical movement of ground water is shown by comparison of water levels in wells at the nested-well sites (apps. B and D; see app. C for description of nested wells). If any does exist, it is for downward movement but the differences in altitude of water levels at any given nest are small. These differences may be real or it may be that water levels in some wells had not reached equilibrium conditions. Long-term monitoring is required to determine actual vertical flow potential.

### Ground-Water Levels

The average depth to water below land surface was 4.5 feet (using data from those observation wells which had water in them on August 1, 1984). However, ground-water levels listed in appendix B may not represent equilibrium conditions in all cases. This is because a relatively short time elapsed between the time that wells were installed and the times that water-level measurements were made. Likewise, removal of water from the observation wells on two occasions (app. C) for well development and sampling purposes may have contributed to nonequilibrium conditions.

No water was observed in the well at ML 16 (fig. 3). This depth of dry sediment is anomalous when compared to other nearby shallow water levels. There are not enough data available to explain the lack of water in this well. Thus, this data point was not used in constructing figure 7.

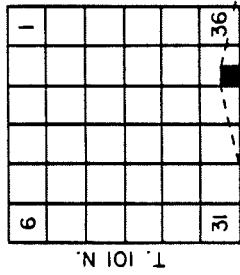
An examination of water levels shows a general trend of a declining water table through the period of monitoring. The effects of removing water from observation wells for well development and sampling purposes were considered in making this interpretation and do not appear to have had a long-term influence on most of the wells. Six of the wells, however, showed a rising water level through part or all of the monitoring period. These six wells are interpreted to be completed in sediments possessing low-hydraulic conductivity and few fractures and do not represent the actual trend of declining water through the period of monitoring (i.e., the water levels in the wells had not yet fully risen to the level of the surrounding ground water).

## DISCUSSION

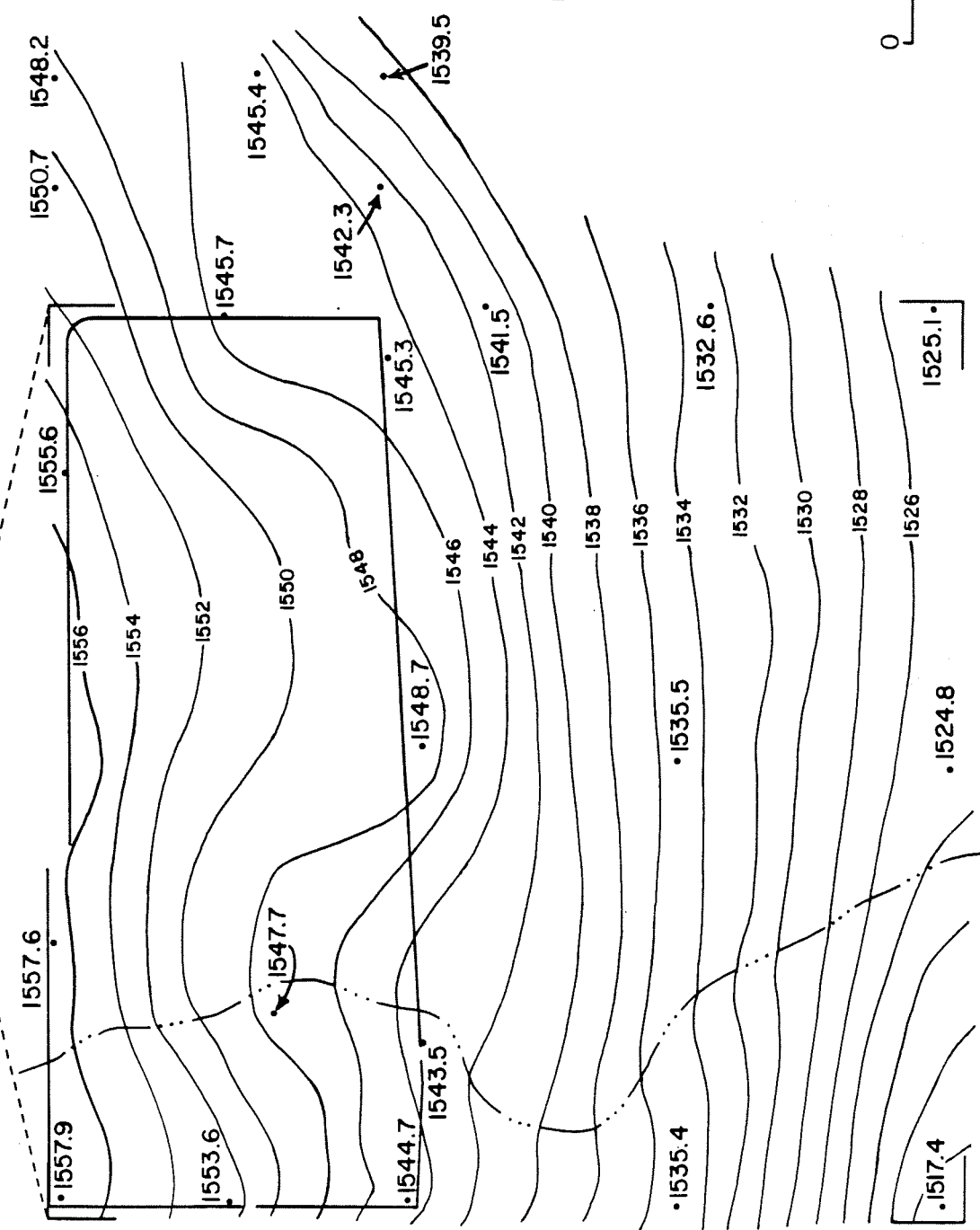
### Geologic Suitability of the Landfill Site

The site at SW $\frac{1}{4}$  sec. 35, T. 101 N., R. 51 W. appears to be suitable for continued use as a landfill, from a strictly geologic standpoint. This is because materials underlying the site are comprised primarily of clay. Sand lenses and layers exist within the clay sediments on or near the site; however, the sands are believed to be discontinuous or of limited lateral extent.

Figure 7. Water-table elevations on September 5, 1984.



R. 51 W.

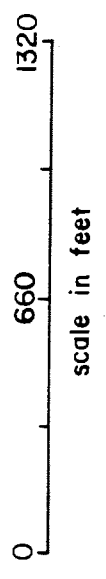


**EXPLANATION**

1555.6 Observation well. Number is altitude of water in well, in feet above mean sea level. Where a nested well set exists, the deepest of the wells was used for this map.

1538 Line connecting points of equal elevation, in feet above mean sea level. Contour interval = 2 feet.

..... Intermittent drainage.



There is no known direct contact or connection between the sands encountered during drilling and any aquifer material presently tapped by water wells. This is because the near surface sands at the site are not extensive and because the major aquifer in this locality is buried by more than 100 feet of till (Iles, in preparation).

#### Hydrologic Suitability of the Landfill Site

Any leachate that may be migrating from the landfill site through sand lenses or layers is not likely to contaminate nearby water wells. This is because of the discontinuous nature of the shallow sands and the more than 100 feet of till between land surface and the confined aquifer in that locality.

There are, however, some questions that arise as to the suitability of the site as a landfill, from a hydrologic standpoint:

1. An intermittent drainage passes through the western portion of the site (fig. 2). Some surface water runoff from the landfill site and potentially some leachate is carried away through this drainageway during periods of high precipitation and snowmelt. As the area of active filling of refuse moves westward from its present location and nearer to the drainage, it seems likely that the potential for contaminants entering the drainage will increase.
2. A potential exists for shallow, lateral movement of leachate through fractures in the till. Fractures are assumed to be present because of the rapidity with which most of the water levels recovered after pumping of the observation wells on August 1, 1984 (see water levels for August 1, 1984 and August 2, 1984, app. B). The potential for and magnitude of such movement cannot be quantitatively assessed with the data available.
3. There is a question as to the practical limitation of the depth of burial of future waste materials. In the 31 observation wells which had water in them on August 1, 1984, the average depth to water below land surface was approximately 4.5 feet. Shallower water levels would undoubtedly occur in the spring in at least some of the wells and water levels deeper than the observed average may occur later in the year.

#### General Comments

The interpretations in this report were made without considering water-quality data which were gathered by the Office of Air Quality and Solid Waste, South Dakota Department of Water and Natural Resources. The suitability of this site for continued use as a landfill, as described in this report, may have to be reassessed if water-quality data indicate ground-water contamination that poses an unacceptable hazard to human health or the environment.

## REFERENCES

Iles, Derric L., in preparation, *Ground-water study for the Sioux Falls-Brandon area*: South Dakota Geological Survey, Open-File Report 34-UR.

Steece, Fred V., 1959, *Geology of the Hartford quadrangle*: South Dakota Geological Survey Geologic Quadrangle Map, text.

## APPENDIX A

### Logs of test holes and observation wells

#### MAP LOCATION (ML)

A number which is assigned to the log according to the order in which it is listed (see **LEGAL LOCATION and LOCATION**). This number corresponds to the numbers shown on figure 3.

#### LEGAL LOCATION and LOCATION

The logs are listed by smallest township number, then the smallest range number, the smallest section number, and then by quarter section: NE = A; NW = B; SW = C; SE = D. A comparison of **LEGAL LOCATION and LOCATION** is as follows. A **LEGAL LOCATION** of NW SE NE SW sec. 30, T. 99 N., R. 64 W. is the same as a **LOCATION** of 099N-64W-30CADB.

#### LATITUDE and LONGITUDE

The format is DD.MMSS where D is degrees, M is minutes, and S is second.

#### DRILLING COMPANY

SDGS is an abbreviation for South Dakota Geological Survey.

#### TOTAL DRILL HOLE DEPTH, SCREEN LENGTH, TOTAL CASING AND SCREEN, and CASING STICK-UP SCREEN, and CASING STICK-UP

The numbers are presented in feet.

#### SCREEN TYPE and CASING TYPE

PVC - polyvinylchloride; MFG - manufactured; 18 SLOT - number 18 slot size; SCH. 40 - schedule 40

#### CASING TOP ELEVATION and GROUND SURFACE ELEVATION

The numbers are presented in feet above mean sea level. T - the elevation was estimated from a 7½ minute series topographic map. I - the elevation was determined using a surveying instrument.

#### CASING DIAMETER

The numbers are presented in inches.



County: MINNEHAHA  
Map Location: 1  
Legal Location: NW NE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3026  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-10-1984  
Ground Surface Elevation: 1560.00 I  
Total Drill Hole Depth: 47.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

0 - 5.0 CLAY, DARK-BROWN, SILTY, PEBBLY (TILL)  
5.0 - 20.0 CLAY, YELLOW-BROWN, SILTY; SATURATED  
(TILL)  
20.0 - 47.0 CLAY, GRAY, SILTY, PEBBLY (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 2  
Legal Location: NW NE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3026  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-11-1984  
Ground Surface Elevation: 1560.00 I  
Total Drill Hole Depth: 20.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1561.64 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

BOTTOM OF WELL IS AT 20 FEET. AUGER DIAMETER  
WAS 10 INCHES. 15 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50

Location: 101N-51W-35CAAB 1  
Longitude: 96.5518

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-152

Single Point Resistivity:  
Extra:

Location: 101N-51W-35CAAB 2  
Longitude: 96.5518

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-153  
SDGS Well Name: R20-84-153

Aquifer: TILL

Screen Length: 2.1  
Casing Diameter: 2.0

Total Casing and Screen: 22.0

Single Point Resistivity:  
Extra:

POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

- 0 - 2.0 CLAY, BROWN, SILTY, PEBBLY (TILL)
- 2.0 - 12.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY; SATURATED (TILL)
- 12.0 - 20.0 CLAY, GRAY, SILTY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA	Location: 101N-51W-35CAAB 3
Map Location: 3	
Legal Location: NW NE NE SW SEC. 35, T. 101 N., R. 51 W.	
Latitude: 43.3026	Longitude: 96.5518
Land Owner: SIOUX FALLS	
Project: SIOUX FALLS LANDFILL	
Drilling Company: SDGS	
Driller: A. MACDONALD	Driller's Log: X
Geologist: D. ILES	Geologist's Log:
Date Drilled: 07-24-1984	Drilling Method: AUGER
Ground Surface Elevation: 1560.00 I	
Total Drill Hole Depth: 19.0	Test Hole Number: A1-84-222
Water Rights Well:	SDGS Well Name: A1-84-222
Other Well Name:	
Basin: BIG SIOUX	Aquifer: TILL
Management Unit:	
Screen Type: PVC, MFG., 18 SLOT	Screen Length: 4.6
Casing Type: PVC, SCH. 40	Casing Diameter: 2.0
Casing Top Elevation: 1561.70 I	
Casing Stick-up: 2.00	Total Casing and Screen: 20.0
Well Maintenance Date:	
USGS Hydrological Unit Code: 10170203	
Electric Log Information:	
Spontaneous Potential:	Single Point Resistivity:
Natural Gamma:	Extra:
Samples:	

BOTTOM OF WELL IS AT 18 FEET. AUGER DIAMETER WAS 6 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 18.5 FEET. 13 GALLONS OF GRAVEL PACK AND 2.5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

- 0 - 2.0 CLAY, DARK-BROWN, VERY SILTY; MOIST (TOPSOIL)
- 2.0 - 6.0 CLAY, BROWN, SILTY, SANDY; MOIST (TILL)
- 6.0 - 11.0 CLAY, LIGHT-BROWN, SILTY, SANDY, PEBBLY; SATURATED (TILL)
- 11.0 - 16.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY; SATURATED (TILL)
- 16.0 - 19.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 4  
Legal Location: NW NE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3026  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. THOMAS  
Geologist: D. ILES  
Date Drilled: 07-24-1984  
Ground Surface Elevation: 1560.00 I  
Total Drill Hole Depth: 14.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1561.53 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CAAB 4

Longitude: 96.5518

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-223  
SDGS Well Name: A1-84-223

Aquifer: TILL

Screen Length: 4.6  
Casing Diameter: 2.0

Total Casing and Screen: 15.5

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 13.5 FEET. AUGER DIAMETER WAS 6 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 13.5 FEET. 8 GALLONS OF GRAVEL PACK AND 2.5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 2.0 CLAY, BLACK, SILTY; MOIST (TOPSOIL)  
2.0 - 7.0 CLAY, BROWN TO REDDISH-BROWN, SILTY,  
SANDY, PEBBLY; MOIST (TILL)  
7.0 - 11.0 CLAY, LIGHT-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
11.0 - 14.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 5  
Legal Location: NW NE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3026  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-24-1984

Location: 101N-51W-35CAAB 5

Longitude: 96.5518

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Ground Surface Elevation: 1559.00 I  
Total Drill Hole Depth: 9.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1561.66 I  
Casing Stick-up: 2.50  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Test Hole Number: A1-84-224  
SDGS Well Name: A1-84-224  
Aquifer: TILL  
Screen Length: 4.6  
Casing Diameter: 2.0  
Total Casing and Screen: 11.0  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 8.5 FEET. AUGER DIAMETER WAS 6 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 8.5 FEET. 6 GALLONS OF GRAVEL PACK AND 2.5 GALLONS BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS IMMEDIATELY ON TOP OF THE PELLETS AND FILLED THE ANNULUS TO THE LAND SURFACE.

0 - 2.0 CLAY, DARK-BROWN TO BLACK, SILTY  
(TOPSOIL)  
2.0 - 6.0 CLAY, BROWN, SILTY, SANDY; MOIST (TILL)  
6.0 - 9.0 CLAY, LIGHT-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 6  
Legal Location: SE NE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3021  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-10-1984  
Ground Surface Elevation: 1552.00 I  
Total Drill Hole Depth: 52.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CAAD 1  
Longitude: 96.5512  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: R20-84-150  
Single Point Resistivity:  
Extra:

0 - 2.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)  
2.0 - 4.0 CLAY, GRAY (TILL)  
4.0 - 8.0 SILT, YELLOW; WITH CLAY  
8.0 - 20.0 SAND, YELLOW, FINE TO COARSE, SILTY;

20.0 - 52.0 SATURATED  
SAND, GRAY, FINE TO COARSE, SILTY; ALSO  
SOME FINE GRAVEL, SATURATED

\* \* \* \* \*

County: MINNEHAHA	Location: 101N-51W-35CAAD 2
Map Location: 7	
Legal Location: SE NE NE SW SEC. 35, T. 101 N., R. 51 W.	
Latitude: 43.3021	Longitude: 96.5512
Land Owner: SIOUX FALLS	
Project: SIOUX FALLS LANDFILL	
Drilling Company: SDGS	
Driller: L. HELSETH	Driller's Log: X
Geologist: D. ILES	Geologist's Log:
Date Drilled: 07-10-1984	Drilling Method: AUGER
Ground Surface Elevation: 1552.00 I	
Total Drill Hole Depth: 22.0	Test Hole Number: R20-84-151
Water Rights Well:	SDGS Well Name: R20-84-151
Other Well Name:	
Basin: BIG SIOUX	Aquifer: PLEISTOCENE SERIES
Management Unit:	
Screen Type: PVC, MFG., 18 SLOT	Screen Length: 2.1
Casing Type: PVC, SCH. 40	Casing Diameter: 2.0
Casing Top Elevation: 1555.37 I	
Casing Stick-up: 3.00	Total Casing and Screen: 20.0
Well Maintenance Date:	
USGS Hydrological Unit Code: 10170203	
Electric Log Information:	
Spontaneous Potential:	Single Point Resistivity:
Natural Gamma:	Extra:
Samples:	

THE AUGER DIAMETER WAS 10 INCHES. THE HOLE  
COLLAPSED AROUND THE CASING AND NO GRAVEL PACK  
WAS EMPLACED. TEN GALLONS OF BENTONITE PELLETS  
WERE PLACED IN ANNULUS AND CAME TO WITHIN 8  
INCHES OF LAND SURFACE. BOTTOM OF WELL IS AT  
17 FEET.

0 - 2.0	CLAY, YELLOW (TILL)
2.0 - 4.0	CLAY, GRAY (TILL)
4.0 - 8.0	SILT, YELLOW, SANDY; SATURATED
8.0 - 20.0	SAND, GRAY, FINE TO COARSE
20.0 - 22.0	CLAY, GRAY

\* \* \* \* \*

County: MINNEHAHA	Location: 101N-51W-35CAAD 3
Map Location: 8	
Legal Location: SE NE NE SW SEC. 35, T. 101 N., R. 51 W.	
Latitude: 43.3021	Longitude: 96.5512
Land Owner: SIOUX FALLS	
Project: SIOUX FALLS LANDFILL	
Drilling Company: SDGS	

Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1553.00 I  
Total Drill Hole Depth: 10.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1554.62 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: R20-84-173  
SDGS Well Name: R20-84-173  
Aquifer: TILL  
Screen Length: 4.6  
Casing Diameter: 2.0  
Total Casing and Screen: 11.5  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 9.5 FEET. AUGER DIAMETER  
WAS 10 INCHES. 15 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED. THE  
PELLETS CAME TO WITHIN ONE FOOT OF LAND SURFACE.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 5.0 CLAY, YELLOW-BROWN (TILL)  
5.0 - 10.0 CLAY, YELLOW-BROWN; SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 9  
Legal Location: SE NE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3021  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1552.00 I  
Total Drill Hole Depth: 15.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1554.23 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:

Location: 101N-51W-35CAAD 4  
Longitude: 96.5512  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: R20-84-174  
SDGS Well Name: R20-84-174  
Aquifer: TILL  
Screen Length: 4.6  
Casing Diameter: 2.0  
Total Casing and Screen: 16.5  
Single Point Resistivity:

Natural Gamma:  
Samples:

Extra:

BOTTOM OF WELL IS AT 14.5 FEET. AUGER DIAMETER WAS 10 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 14.5 FEET. HOLLOW-STEM AUGER WAS FILLED WITH WATER AND CASING WAS INSTALLED THROUGH AUGER. 20 GALLONS OF GRAVEL PACK AND 5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. PELLETS CAME TO WITHIN 2.5 FEET OF LAND SURFACE.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 15.0 CLAY, YELLOW-BROWN, SANDY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 10  
Legal Location: SW SW NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-12-1984  
Ground Surface Elevation: 1554.90 I  
Total Drill Hole Depth: 27.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CACC 1

Longitude: 96.5528

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-159

Single Point Resistivity:  
Extra:

0 - 10.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)  
10.0 - 27.0 CLAY, YELLOWISH-BROWN, SILTY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 11  
Legal Location: SW SW NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-12-1984  
Ground Surface Elevation: 1554.00 I  
Total Drill Hole Depth: 32.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:

Location: 101N-51W-35CACC 2

Longitude: 96.5529

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-160

Single Point Resistivity:

Natural Gamma:  
Samples:

Extra:

0 - 2.0 CLAY, YELLOWISH-BROWN, SILTY, PEBBLY  
(TILL)  
2.0 - 15.0 SAND; WITH CLAY  
15.0 - 28.0 SAND, GRAY; WITH MORE CLAY THAN FROM 2 TO  
15 FEET  
28.0 - 32.0 CLAY, GRAY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 12  
Legal Location: SW SW NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-17-1984  
Ground Surface Elevation: 1554.00 I  
Total Drill Hole Depth: 18.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1555.79 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CACC 3

Longitude: 96.5529

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-166  
SDGS Well Name: R20-84-166

Aquifer: TILL

Screen Length: 2.0  
Casing Diameter: 2.0

Total Casing and Screen: 19.5

Single Point Resistivity:  
Extra:

BOTTOM OF WELL AT 17.5 FEET. AUGER DIAMETER WAS  
10 INCHES. THE HOLLOW-STEM AUGER WAS FILLED WITH  
WATER PRIOR TO REMOVAL OF BIT AND INSTALLATION  
OF CASING INSIDE THE AUGER. NO GRAVEL PACK OR  
BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG  
OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS  
NEAR LAND SURFACE.

0 - 3.0 CLAY, YELLOWISH-BROWN, SILTY (TILL)  
3.0 - 15.0 SAND, YELLOW, SILTY, VERY CLAYEY  
15.0 - 18.0 CLAY, GRAY, SILTY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 13

Location: 101N-51W-35CACC 4



Legal Location: SW SW NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1555.00 I  
Total Drill Hole Depth: 8.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1556.60 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Longitude: 96.5529

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-178  
SDGS Well Name: R20-84-178

Aquifer: TILL

Screen Length: 4.6  
Casing Diameter: 2.0

Total Casing and Screen: 9.5

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 7.5 FEET. AUGER DIAMETER WAS  
10 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 7.5  
FEET. 22 GALLONS OF GRAVEL PACK WAS EMPLACED AND  
CAME TO WITHIN 2 FEET OF LAND SURFACE. A 50  
POUND BAG OF GRANULAR BENTONITE WAS POURED ON  
TOP OF THE GRAVEL PACK.

0 - 1.0 TOPSOIL, BLACK  
1.0 - 4.0 SAND AND GRAVEL  
4.0 - 8.0 CLAY, YELLOW-BROWN (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 14  
Legal Location: SW SW NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1554.00 I  
Total Drill Hole Depth: 12.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT

Location: 101N-51W-35CACC 5

Longitude: 96.5529

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-179  
SDGS Well Name: R20-84-179

Aquifer: TILL

Screen Length: 4.6

Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1555.98 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Casing Diameter: 2.0  
Total Casing and Screen: 13.5  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 11.5 FEET. AUGER DIAMETER WAS 10 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 11.5 FEET. 5 GALLONS OF GRAVEL PACK AND 5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. THE GRAVEL PACK CAME TO WITHIN 5 FEET OF LAND SURFACE. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 1.0 TOPSOIL, BLACK  
1.0 - 5.0 CLAY, YELLOW, SLIGHTLY SANDY (TILL)  
5.0 - 12.0 CLAY, YELLOW, SILTY, SANDY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 15  
Legal Location: SW SW NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1554.00 I  
Total Drill Hole Depth: 16.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1555.56 I  
Casing Stick-up: 1.50  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CACC 6  
Longitude: 96.5529  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: R20-84-180  
SDGS Well Name: R20-84-180  
Aquifer: TILL  
Screen Length: 4.6  
Casing Diameter: 2.0  
Total Casing and Screen: 17.0  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 15.5 FEET. AUGER DIAMETER WAS 10 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 15.5 FEET. NO GRAVEL PACK WAS EMPLACED AS THE HOLE COLLAPSED UP TO 4 FEET. 5 GALLONS OF BENTONITE

PELLETS WERE PUT IN THE ANNULUS AT THE 4-FOOT DEPTH.

0 - 4.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)  
4.0 - 12.0 CLAY, YELLOW-BROWN, SILTY, VERY SANDY (TILL)  
12.0 - 16.0 CLAY (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 16  
Legal Location: SE SW NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-17-1984  
Ground Surface Elevation: 1551.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1552.65 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CACD

Longitude: 96.5521

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-167  
SDGS Well Name: R20-84-167

Aquifer: TILL

Screen Length: 2.0  
Casing Diameter: 2.0

Total Casing and Screen: 18.0

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 16 FEET. AUGER DIAMETER WAS 10 INCHES. 13 GALLONS OF GRAVEL PACK AND 5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 17.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 17  
Legal Location: NE SE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3016  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH

Location: 101N-51W-35CADA 1

Longitude: 96.5513

Driller's Log: X

Geologist: D. ILES  
Date Drilled: 07-11-1984  
Ground Surface Elevation: 1550.00 I  
Total Drill Hole Depth: 22.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1551.52 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: R20-84-154  
SDGS Well Name: R20-84-154  
Aquifer: PLEISTOCENE SERIES  
Screen Length: 2.1  
Casing Diameter: 2.0  
Total Casing and Screen: 19.5  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 17.5 FEET. AUGER DIAMETER WAS  
10 INCHES. THE HOLE COLLAPSED AROUND THE CASING  
AND NO GRAVEL PACK OR BENTONITE PELLETS WERE  
EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE  
WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 3.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)  
3.0 - 18.0 SAND, YELLOW, FINE TO MEDIUM  
18.0 - 20.0 CLAY  
20.0 - 22.0 SAND, YELLOW, FINE TO MEDIUM

\* \* \* \*

County: MINNEHAHA  
Map Location: 18  
Legal Location: NE SE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3016  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1549.00 I  
Total Drill Hole Depth: 6.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1550.90 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:

Location: 101N-51W-35CADA 2  
Longitude: 96.5513  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: R20-84-175  
SDGS Well Name: R20-84-175  
Aquifer: PLEISTOCENE SERIES  
Screen Length: 4.6  
Casing Diameter: 2.0  
Total Casing and Screen: 8.0

Spontaneous Potential:  
Natural Gamma:  
Samples:

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 6 FEET. AUGER DIAMETER WAS  
10 INCHES. 10 GALLONS OF GRAVEL PACK WERE  
EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE  
WAS POURED ON TOP OF THE GRAVEL PACK.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 6.0 SAND AND GRAVEL, RUST-COLORED

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 19  
Legal Location: NE SE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3016  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1548.00 I  
Total Drill Hole Depth: 15.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1550.28 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CADA 3

Longitude: 96.5513

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-176  
SDGS Well Name: R20-84-176

Aquifer: TILL

Screen Length: 4.6  
Casing Diameter: 2.0

Total Casing and Screen: 17.0

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 15 FEET. AUGER DIAMETER WAS  
10 INCHES. 28 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED. THE  
GRAVEL PACK CAME TO WITHIN 10 FEET AND PELLETS  
CAME TO WITHIN 8 FEET OF LAND SURFACE. A 50  
POUND BAG OF GRANULAR BENTONITE WAS POURED IN  
THE ANNULUS NEAR LAND SURFACE.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 5.0 CLAY, GRAY, SILTY, PEBBLY (TILL)  
5.0 - 8.0 SAND AND GRAVEL, GRAY  
8.0 - 15.0 CLAY, GRAY, SILTY (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 20  
Legal Location: NE SE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3016  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1548.00 I  
Total Drill Hole Depth: 11.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1549.87 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CADA 4

Longitude: 96.5513

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-177  
SDGS Well Name: R20-84-177

Aquifer: TILL

Screen Length: 4.6  
Casing Diameter: 2.0

Total Casing and Screen: 12.5

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 10.5 FEET. AUGER DIAMETER WAS  
10 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 10.5  
FEET. 20 GALLONS OF GRAVEL PACK AND 5 GALLONS  
OF BENTONITE PELLETS WERE EMPLACED. THE GRAVEL  
PACK CAME TO WITHIN 4 FEET OF LAND SURFACE.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 5.0 CLAY, LIGHT-GRAY, SILTY, SANDY (TILL)  
5.0 - 11.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 21  
Legal Location: NE SE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3018  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. THOMAS  
Geologist: D. ILES  
Date Drilled: 07-24-1984  
Ground Surface Elevation: 1555.00 T  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:

Location: 101N-51W-35CADA 5

Longitude: 96.5515

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-225

Single Point Resistivity:

Natural Gamma:  
Samples:

Extra:

0 - 5.0 CLAY, BLACK, VERY SILTY, SANDY, PEBBLY;  
MOIST (TOPSOIL)  
5.0 - 10.0 CLAY, GREENISH-BLUE, SILTY, SANDY,  
PEBBLY; MOIST; ROTTEN ODOR (TILL)  
10.0 - 20.0 CLAY, DARK-GREEN, SANDY, SILTY; SOME  
MEDIUM SAND; SATURATED; ROTTEN ODOR  
(TILL)  
20.0 - 26.0 CLAY, DARK-GREEN, SILTY, VERY SANDY;  
SATURATED; ROTTEN ODOR (TILL)  
26.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 22  
Legal Location: NE SE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3017  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. THOMAS  
Geologist: D. ILES  
Date Drilled: 07-24-1984  
Ground Surface Elevation: 1553.00 T  
Total Drill Hole Depth: 23.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CADA 6

Longitude: 96.5515

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-227

Single Point Resistivity:  
Extra:

0 - 6.0 SAND, REDDISH-BROWN, MEDIUM TO COARSE;  
SOME FINE GRAVEL, POORLY SORTED;  
SATURATED BELOW 5 FEET  
6.0 - 11.0 SAND AND GRAVEL, REDDISH-BROWN; MEDIUM  
SAND TO COARSE GRAVEL; SATURATED  
11.0 - 23.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 23  
Legal Location: NW SE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3018  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-24-1984

Location: 101N-51W-35CADB

Longitude: 96.5518

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Ground Surface Elevation: 1555.00 T  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Test Hole Number: A1-84-226

Single Point Resistivity:  
Extra:

- 0 - 3.0 CLAY, DARK-BROWN TO BLACK, SILTY (TOPSOIL)
- 3.0 - 20.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY; MOIST; SATURATED BELOW 10 FEET (TILL)
- 20.0 - 48.0 CLAY, GRAY, SILTY, VERY SANDY, PEBBLY; SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 24  
Legal Location: SE SE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3013  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-11-1984  
Ground Surface Elevation: 1549.00 I  
Total Drill Hole Depth: 47.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CADD 1

Longitude: 96.5512

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-155

Single Point Resistivity:  
Extra:

- 0 - 9.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)
- 9.0 - 11.0 SAND, YELLOW, FINE TO MEDIUM; SATURATED
- 11.0 - 22.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)
- 22.0 - 47.0 CLAY, GRAY, SLIGHTLY SANDY (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 25  
Legal Location: SE SE NE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3013  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-11-1984  
Ground Surface Elevation: 1549.00 I  
Total Drill Hole Depth: 20.0  
Water Rights Well:

Location: 101N-51W-35CADD 2

Longitude: 96.5512

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-156  
SDGS Well Name: R20-84-156



Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1551.19 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Aquifer: TILL  
Screen Length: 2.1  
Casing Diameter: 2.0  
Total Casing and Screen: 22.0  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 20 FEET. AUGER DIAMETER WAS  
10 INCHES. 12 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED. A  
50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN  
THE ANNULUS NEAR LAND SURFACE.

0 - 20.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 26  
Legal Location: NW NE NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3026  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1566.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1567.76 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CBAB  
Longitude: 96.5537  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: R20-84-184  
SDGS Well Name: R20-84-184  
Aquifer: TILL  
Screen Length: 2.0  
Casing Diameter: 2.0  
Total Casing and Screen: 19.0  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 17 FEET. AUGER DIAMETER WAS  
10 INCHES. 15 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED.  
A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED

IN THE ANNULUS NEAR LAND SURFACE.

- 0 - 3.0 TOPSOIL, BLACK
- 3.0 - 5.0 CLAY, YELLOW-BROWN (TILL)
- 5.0 - 12.0 SAND AND GRAVEL, CLAYEY
- 12.0 - 17.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
 Map Location: 27  
 Legal Location: NW NW NW SW SEC. 35, T. 101 N., R. 51 W.  
 Latitude: 43.3026  
 Land Owner: SIOUX FALLS  
 Project: SIOUX FALLS LANDFILL  
 Drilling Company: SDGS  
 Driller: L. HELSETH  
 Geologist: D. ILES  
 Date Drilled: 07-19-1984  
 Ground Surface Elevation: 1565.00 I  
 Total Drill Hole Depth: 17.0  
 Water Rights Well:  
 Other Well Name:  
 Basin: BIG SIOUX  
 Management Unit:  
 Screen Type: PVC, MFG., 18 SLOT  
 Casing Type: PVC, SCH. 40  
 Casing Top Elevation: 1567.49 I  
 Casing Stick-up: 2.00  
 Well Maintenance Date:  
 USGS Hydrological Unit Code: 10170203  
 Electric Log Information:  
 Spontaneous Potential:  
 Natural Gamma:  
 Samples:

Location: 101N-51W-35CBBB

Longitude: 96.5547

Driller's Log: X  
 Geologist's Log:  
 Drilling Method: AUGER

Test Hole Number: R20-84-185  
 SDGS Well Name: R20-84-185

Aquifer: TILL

Screen Length: 2.0  
 Casing Diameter: 2.0

Total Casing and Screen: 18.0

Single Point Resistivity:  
 Extra:

BOTTOM OF WELL IS AT 16 FEET. AUGER DIAMETER WAS  
 10 INCHES. 20 GALLONS OF GRAVEL PACK AND 5  
 GALLONS OF BENTONITE PELLETS WERE EMPLACED.  
 A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED  
 IN THE ANNULUS NEAR LAND SURFACE.

- 0 - 3.0 CLAY, BROWN-GRAY (TILL)
- 3.0 - 10.0 CLAY, YELLOW-BROWN (TILL)
- 10.0 - 17.0 CLAY, GRAY-BROWN (TILL)

\* \* \* \*

County: MINNEHAHA  
 Map Location: 28  
 Legal Location: SW NW NW SW SEC. 35, T. 101 N., R. 51 W.  
 Latitude: 43.3021  
 Land Owner: SIOUX FALLS  
 Project: SIOUX FALLS LANDFILL  
 Drilling Company: SDGS

Location: 101N-51W-35CBBC 1

Longitude: 96.5547

Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1560.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1562.46 I  
Casing Stick-up: 2.50  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: R20-84-187  
SDGS Well Name: R20-84-187  
Aquifer: TILL  
Screen Length: 2.0  
Casing Diameter: 2.0  
Total Casing and Screen: 19.0  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 16.5 FEET. AUGER DIAMETER WAS 10 INCHES. 15 GALLONS OF GRAVEL PACK AND 5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 4.0 CLAY, GRAY, PEBBLY (TILL)  
4.0 - 13.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)  
13.0 - 17.0 CLAY, GRAY-BROWN, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 29  
Legal Location: SW NW NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3021  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. THOMAS  
Geologist: D. ILES  
Date Drilled: 07-23-1984  
Ground Surface Elevation: 1560.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CBBC 2  
Longitude: 96.5547  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: A1-84-219  
Single Point Resistivity:  
Extra:

0 - 12.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)  
12.0 - 19.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)  
19.0 - 28.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; MOIST;

28.0 - 38.0 SATURATED BELOW 23 FEET (TILL)  
CLAY, BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
38.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 30  
Legal Location: SE NW NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3020  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-23-1984  
Ground Surface Elevation: 1552.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CBBD 1

Longitude: 96.5539

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-220

Single Point Resistivity:  
Extra:

0 - 4.0 CLAY, DARK-BROWN, VERY SILTY; MOIST  
(TILL)  
4.0 - 10.0 CLAY, GRAY-BROWN, VERY SILTY; MOIST  
(TILL)  
10.0 - 21.0 CLAY, LIGHT-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
21.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 31  
Legal Location: SE NW NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3020  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. THOMAS  
Geologist: D. ILES  
Date Drilled: 07-23-1984  
Ground Surface Elevation: 1552.00 I  
Total Drill Hole Depth: 18.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40

Location: 101N-51W-35CBBD 2

Longitude: 96.5539

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-221  
SDGS Well Name: A1-84-221

Aquifer: TILL

Screen Length: 1.9  
Casing Diameter: 2.0

Casing Top Elevation: 1553.89 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Total Casing and Screen: 20.0

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 18 FEET. AUGER DIAMETER WAS  
6 INCHES. 5 GALLONS OF GRAVEL PACK AND 2.5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED.  
A 50 POUND BAG OF GRANULAR BENTONITE WAS  
POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 4.0 CLAY, DARK-BROWN, SILTY (TOPSOIL)  
4.0 - 15.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST;  
SATURATED BELOW 9 FEET (TILL)  
15.0 - 18.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 32  
Legal Location: SW SW NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3016  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1559.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CBCC 1

Longitude: 96.5547

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-218

Single Point Resistivity:  
Extra:

0 - 9.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST  
(TILL)  
9.0 - 29.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)  
29.0 - 38.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)  
38.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; MOIST  
(TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 33  
Legal Location: SW SW NW SW SEC. 35, T. 101 N., R. 51 W.

Location: 101N-51W-35CBCC 2

Latitude: 43.3016  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1559.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1561.72 I  
Casing Stick-up: 2.50  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Longitude: 96.5547  
  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
  
Test Hole Number: R20-84-186  
SDGS Well Name: R20-84-186  
  
Aquifer: TILL  
  
Screen Length: 2.1  
Casing Diameter: 2.0  
  
Total Casing and Screen: 19.0  
  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 16.5 FEET. AUGER DIAMETER WAS  
10 INCHES. 15 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED.  
A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED  
IN THE ANNULUS NEAR LAND SURFACE.

0 - 4.0 CLAY, GRAY-BROWN (TILL)  
4.0 - 17.0 CLAY, GRAY-BROWN, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 34  
Legal Location: SE SW NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-12-1984  
Ground Surface Elevation: 1540.70 I  
Total Drill Hole Depth: 47.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CBCD 1  
  
Longitude: 96.5540  
  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
  
Test Hole Number: R20-84-162  
  
Single Point Resistivity:  
Extra:

0 - 2.0 TOPSOIL, BLACK  
2.0 - 7.0 CLAY, YELLOW, SILTY, SANDY; SATURATED

(TILL)  
7.0 - 22.0 CLAY, YELLOWISH-BROWN (TILL)  
22.0 - 37.0 SAND, GRAY, SILTY; SOME CLAY (TILL?)  
37.0 - 47.0 CLAY, GRAY, SILTY, PEBBLY (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 35  
Legal Location: SE SW NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-12-1984  
Ground Surface Elevation: 1550.00 I  
Total Drill Hole Depth: 27.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CBCD 2

Longitude: 96.5540

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-163

Single Point Resistivity:  
Extra:

0 - 2.0 TOPSOIL, BLACK  
2.0 - 7.0 CLAY, YELLOW, SILTY, SANDY; SATURATED  
(TILL)  
7.0 - 27.0 CLAY, YELLOWISH-BROWN (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 36  
Legal Location: SE SW NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-16-1984  
Ground Surface Elevation: 1550.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1551.77 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:

Location: 101N-51W-35CBCD 3

Longitude: 96.5540

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-164  
SDGS Well Name: R20-84-164

Aquifer: TILL

Screen Length: 2.0  
Casing Diameter: 2.0

Total Casing and Screen: 19.0

Spontaneous Potential:  
Natural Gamma:  
Samples:

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 17 FEET. AUGER DIAMETER WAS 10 INCHES. 12 GALLONS OF GRAVEL PACK AND 5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 10.0 CLAY, YELLOWISH-BROWN, SILTY, SANDY (TILL)  
10.0 - 17.0 CLAY, GRAY, SANDY, SILTY (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 37  
Legal Location: SE SW NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1549.00 I  
Total Drill Hole Depth: 12.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1551.33 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CBCD 4

Longitude: 96.5540

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-181  
SDGS Well Name: R20-84-181

Aquifer: TILL

Screen Length: 4.6  
Casing Diameter: 2.0

Total Casing and Screen: 13.5

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 11.5 FEET. AUGER DIAMETER WAS 10 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 11.5 FEET. 20 GALLONS OF GRAVEL PACK AND 5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. CASING WAS FILLED WITH WATER TO KEEP IT FROM FLOATING. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 6.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)  
6.0 - 9.0 SAND AND GRAVEL, REDDISH-BROWN, CLAYEY



9.0 - 12.0 CLAY, YELLOW-BROWN (TILL)

\* \* \* \*

County: MINNEHAHA	Location: 101N-51W-35CBCD 5
Map Location: 38	
Legal Location: SE SW NW SW SEC. 35, T. 101 N., R. 51 W.	
Latitude: 43.3015	Longitude: 96.5540
Land Owner: SIOUX FALLS	
Project: SIOUX FALLS LANDFILL	
Drilling Company: SDGS	
Driller: L. HELSETH	Driller's Log: X
Geologist: D. ILES	Geologist's Log:
Date Drilled: 07-19-1984	Drilling Method: AUGER
Ground Surface Elevation: 1549.00 I	
Total Drill Hole Depth: 16.0	Test Hole Number: R20-84-182
Water Rights Well:	SDGS Well Name: R20-84-182
Other Well Name:	
Basin: BIG SIOUX	Aquifer: TILL
Management Unit:	
Screen Type: PVC, MFG., 18 SLOT	Screen Length: 4.6
Casing Type: PVC, SCH. 40	Casing Diameter: 2.0
Casing Top Elevation: 1551.45 I	
Casing Stick-up: 2.00	Total Casing and Screen: 17.5
Well Maintenance Date:	
USGS Hydrological Unit Code: 10170203	
Electric Log Information:	
Spontaneous Potential:	Single Point Resistivity:
Natural Gamma:	Extra:
Samples:	

BOTTOM OF WELL IS AT 15.5 FEET. AUGER DIAMETER WAS 10 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 15.5 FEET. 5 GALLONS OF GRAVEL PACK AND 5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. THE HOLE WAS SOLID AT 5 FEET PRIOR TO ADDITION OF PELLETS. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 4.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)  
4.0 - 6.0 SAND AND GRAVEL, BROWN; WITH SOME CLAY  
6.0 - 16.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA	Location: 101N-51W-35CBCD 6
Map Location: 39	
Legal Location: SE SW NW SW SEC. 35, T. 101 N., R. 51 W.	
Latitude: 43.3013	Longitude: 96.5538
Land Owner: SIOUX FALLS	
Project: SIOUX FALLS LANDFILL	
Drilling Company: SDGS	
Driller: A. MACDONALD	Driller's Log: X
Geologist: D. ILES	Geologist's Log:

Date Drilled: 07-24-1984  
Ground Surface Elevation: 1550.00 T  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

0 - 5.0 CLAY, BLACK, SILTY; MOIST (TOPSOIL)  
5.0 - 9.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
9.0 - 24.0 CLAY, BROWN TO RED, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
24.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 40  
Legal Location: SW SE NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-12-1984  
Ground Surface Elevation: 1551.20 I  
Total Drill Hole Depth: 47.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

0 - 3.0 CLAY, YELLOW (TILL)  
3.0 - 7.0 SAND, BROWN; WITH CLAY  
7.0 - 32.0 CLAY, YELLOW, SILTY, SANDY; SATURATED  
(TILL)  
32.0 - 47.0 CLAY, GRAY, SILTY, PEBBLY (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 41  
Legal Location: SW SE NW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3015  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-16-1984

Drilling Method: AUGER  
Test Hole Number: A1-84-228

Single Point Resistivity:  
Extra:

Location: 101N-51W-35CBDC 1

Longitude: 96.5537

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-161

Single Point Resistivity:  
Extra:

Location: 101N-51W-35CBDC 2

Longitude: 96.5537

Driller's Log:  
Geologist's Log: X  
Drilling Method: HOLLOWSTEM

Ground Surface Elevation: 1551.20 I  
Total Drill Hole Depth: 38.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples: X

Test Hole Number: R20-84-165

Single Point Resistivity:  
Extra:

- 0 - 2.0 TOPSOIL, BLACK
- 2.0 - 7.0 CLAY, YELLOWISH-BROWN, SILTY, SANDY,  
PEBBLY (TILL)
- 7.0 - 9.0 CLAY, YELLOWISH-BROWN, VERY SILTY, VERY  
SANDY, VERY PEBBLY; THIS INTERVAL WAS  
SAMPLED WITH A SPLIT SPOON (TILL)
- 9.0 - 37.0 NOT DESCRIBED; SEE HOLE R20-84-161
- 37.0 - 38.0 SAND, GRAY, MEDIUM, VERY CLAYEY; THIS  
INTERVAL DESCRIBED FROM MATERIAL LODGED  
IN THE BIT HOLE OF THE AUGER; SEE NOTES

A SPLIT-SPOON SAMPLE WAS TAKEN FROM 7 TO 9 FEET.  
ADDITIONAL SAMPLING WAS ATTEMPTED FROM 32  
TO 38 FEET BUT THE BIT HOLE WAS PLUGGED WITH  
SEDIMENT.

\* \* \* \*

County: MINNEHAHA  
Map Location: 42  
Legal Location: NE NE SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3012  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1550.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CCAA

Longitude: 96.5529

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-217

Single Point Resistivity:  
Extra:

- 0 - 1.0 SILT, BLACK, PEBBLY; SATURATED (TOPSOIL)
- 1.0 - 9.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST;  
SATURATED BELOW 5 FEET (TILL)
- 9.0 - 14.0 CLAY, BROWN, SILTY, VERY SANDY; SATURATED  
(TILL)
- 14.0 - 48.0 CLAY, GRAY, SILTY, VERY SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA

Location: 101N-51W-35CCAB

Map Location: 43  
Legal Location: NW NE SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3012  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: M. JARRETT  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1550.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203

Longitude: 96.5538

Electric Log Information:

Spontaneous Potential:

Natural Gamma:

Samples:

Driller's Log: X

Geologist's Log:

Drilling Method: AUGER

Test Hole Number: A2-84-164

Single Point Resistivity:

Extra:

0 - 2.0 SILT, BLACK, SANDY, PEBBLY; MOIST  
(TOPSOIL)  
2.0 - 5.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST  
(TILL)  
5.0 - 8.0 CLAY, LIGHT-BROWN, VERY SILTY, SANDY,  
PEBBLY; SATURATED (TILL)  
8.0 - 27.0 CLAY, BROWN, SILTY, VERY SANDY, PEBBLY;  
SATURATED (TILL)  
27.0 - 36.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
36.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 44  
Legal Location: NW NW SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3012  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1550.00 T  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203

Location: 101N-51W-35CCBB

Longitude: 96.5547

Electric Log Information:

Spontaneous Potential:

Natural Gamma:

Samples:

Driller's Log: X

Geologist's Log:

Drilling Method: AUGER

Test Hole Number: A1-84-216

Single Point Resistivity:

Extra:

0 - 1.0 SILT, BLACK, PEBBLY; MOIST (TOPSOIL)  
1.0 - 24.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST;  
SATURATED BELOW 7 FEET (TILL)  
24.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 45  
Legal Location: SW NW SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3008  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1544.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1545.97 I  
Casing Stick-up: 1.50  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CCBC 1

Longitude: 96.5547

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-172  
SDGS Well Name: R20-84-172

Aquifer: TILL

Screen Length: 2.0  
Casing Diameter: 2.0

Total Casing and Screen: 18.5

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 17 FEET. AUGER DIAMETER WAS  
10 INCHES. 13 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50  
POUND BAG OF GRANULAR BENTONITE WAS POURED IN  
THE ANNULUS NEAR LAND SURFACE.

0 - 17.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY; THE  
LOWER 7 FEET SEEMED SLIGHTLY SATURATED  
(TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 46  
Legal Location: SW NW SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3008  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1544.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203

Location: 101N-51W-35CCBC 2

Longitude: 96.5547

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-215

Electric Log Information:

Spontaneous Potential:  
Natural Gamma:  
Samples:

Single Point Resistivity:  
Extra:

- 0 - 3.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)
- 3.0 - 9.0 CLAY, REDDISH-BROWN, SILTY, VERY SANDY; SATURATED (TILL)
- 9.0 - 26.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; SATURATED (TILL)
- 26.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 47  
Legal Location: SE NW SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3008  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: B. EPLING  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1537.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203

Location: 101N-51W-35CCBD

Longitude: 96.5538

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A2-84-163

Electric Log Information:

Spontaneous Potential:  
Natural Gamma:  
Samples:

Single Point Resistivity:  
Extra:

- 0 - 2.0 CLAY, BLACK, SILTY, SANDY; MOIST (TOPSOIL)
- 2.0 - 10.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST; SATURATED BELOW 6 FEET (TILL)
- 10.0 - 15.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY; SATURATED (TILL)
- 15.0 - 19.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY; SATURATED (TILL)
- 19.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 48  
Legal Location: NW SW SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3004  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD

Location: 101N-51W-35CCCB

Longitude: 96.5547

Driller's Log: X

Geologist: D. ILES  
Date Drilled: 07-17-1984  
Ground Surface Elevation: 1526.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: A1-84-209  
Single Point Resistivity:  
Extra:

- 0 - 5.0 CLAY, BLACK, SILTY, SANDY, PEBBLY; MOIST (TILL)
- 5.0 - 11.0 CLAY, LIGHT-BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)
- 11.0 - 15.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST; SATURATED BELOW 12 FEET (TILL)
- 15.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 49  
Legal Location: SW SW SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3001  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: B. EPLING  
Geologist: D. ILES  
Date Drilled: 07-17-1984  
Ground Surface Elevation: 1523.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CCCC 1  
Longitude: 96.5547  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: A1-84-208

Single Point Resistivity:  
Extra:

- 0 - 2.0 SILT, BLACK, SANDY, PEBBLY; MOIST (TOPSOIL)
- 2.0 - 4.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)
- 4.0 - 6.0 SAND, BROWN, MEDIUM TO COARSE; SOME FINE GRAVEL; SATURATED
- 6.0 - 20.0 CLAY, DARK-BROWN, SILTY, SANDY, VERY SANDY BELOW 9 FEET, PEBBLY; SATURATED (TILL)
- 20.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 50

Location: 101N-51W-35CCCC 2

Legal Location: SW SW SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3001  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1523.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1524.78 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Longitude: 96.5547

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-171  
SDGS Well Name: R20-84-171

Aquifer: TILL

Screen Length: 2.0  
Casing Diameter: 2.0

Total Casing and Screen: 19.0

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 17 FEET. AUGER DIAMETER WAS  
10 INCHES. 13 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50  
POUND BAG OF GRANULAR BENTONITE WAS POURED IN  
THE ANNULUS NEAR LAND SURFACE.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 5.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)  
5.0 - 10.0 CLAY, YELLOW-BROWN, SILTY, SANDY;  
SATURATED (TILL)  
10.0 - 17.0 CLAY, GRAY, SILTY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 51  
Legal Location: NW SE SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3004  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: B. EPLING  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1538.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:

Location: 101N-51W-35CCDB

Longitude: 96.5538

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-210

Single Point Resistivity:  
Extra:



Samples:

0 - 1.0 SILT, BLACK, SANDY, PEBBLY; MOIST  
(TOPSOIL)  
1.0 - 19.0 CLAY, BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)  
19.0 - 28.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)  
28.0 - 35.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)  
35.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; MOIST  
(TILL)

\* \* \* \* \*

County: MINNEHAHA

Map Location: 52

Legal Location: SW SE SW SW SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3001

Land Owner: SIOUX FALLS

Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS

Driller: A. MACDONALD

Geologist: D. ILES

Date Drilled: 07-17-1984

Ground Surface Elevation: 1529.00 I

Total Drill Hole Depth: 48.0

USGS Hydrological Unit Code: 10170203

Electric Log Information:

Spontaneous Potential:

Natural Gamma:

Samples:

0 - 3.0 CLAY, BLACK, SILTY, SANDY (TOPSOIL)  
3.0 - 10.0 CLAY, BLACK, SILTY, SANDY, PEBBLY; MOIST  
10.0 - 17.0 CLAY, LIGHT-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)  
17.0 - 20.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST;  
SATURATED BELOW 18 FEET (TILL)  
20.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA

Map Location: 53

Legal Location: SE SE SW SW SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3001

Land Owner: SIOUX FALLS

Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS

Driller: B. EPLING

Geologist: D. ILES

Date Drilled: 07-17-1984

Ground Surface Elevation: 1530.00 I

Location: 101N-51W-35CCDC

Longitude: 96.5538

Driller's Log: X

Geologist's Log:

Drilling Method: AUGER

Test Hole Number: A1-84-207

Single Point Resistivity:

Extra:

Location: 101N-51W-35CCDD 1

Longitude: 96.5529

Driller's Log: X

Geologist's Log:

Drilling Method: AUGER

Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Test Hole Number: A1-84-206

Single Point Resistivity:  
Extra:

0 - 2.0 SILT, BLACK, SANDY, PEBBLY; MOIST  
(TOPSOIL)  
2.0 - 9.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST;  
SATURATED BELOW 7 FEET (TILL)  
9.0 - 14.0 CLAY, BROWN, SILTY; LITTLE SAND;  
SATURATED (TILL)  
14.0 - 19.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
19.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 54  
Legal Location: SE SE SW SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3001  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-17-1984  
Ground Surface Elevation: 1530.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1531.91 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CCDD 2

Longitude: 96.5529

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-170  
SDGS Well Name: R20-84-170

Aquifer: TILL

Screen Length: 2.0  
Casing Diameter: 2.0

Total Casing and Screen: 19.0

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 17 FEET. AUGER DIAMETER WAS  
10 INCHES. 13 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50  
POUND BAG OF GRANULAR BENTONITE WAS POURED IN  
THE ANNULUS NEAR LAND SURFACE.

0 - 1.0 TOPSOIL, BLACK  
1.0 - 17.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 55  
Legal Location: NW NE SE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3012  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: B. EPLING  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1545.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CDAB  
Longitude: 96.5520  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: A2-84-165  
Single Point Resistivity:  
Extra:

- 0 - 1.0 TOPSOIL, BLACK
- 1.0 - 6.0 CLAY, BLACK-GRAY, SLIGHTLY SILTY
- 6.0 - 16.0 CLAY, YELLOW-BROWN, SILTY, SLIGHTLY SANDY  
AND PEBBLY; SATURATED (TILL)
- 16.0 - 18.0 CLAY, GRAYISH-BROWN TO GRAY, SILTY,  
SLIGHTLY SANDY AND PEBBLY (TILL)
- 18.0 - 48.0 CLAY, GRAY, SANDY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 56  
Legal Location: SE NE SE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3007  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-11-1984  
Ground Surface Elevation: 1541.00 I  
Total Drill Hole Depth: 47.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CDAD 1  
Longitude: 96.5512  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: R20-84-157  
Single Point Resistivity:  
Extra:

- 0 - 1.0 TOPSOIL, BLACK
- 1.0 - 10.0 CLAY, YELLOW, SILTY, PEBBLY (TILL)
- 10.0 - 47.0 CLAY, YELLOWISH-BROWN, SILTY, PEBBLY  
(TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 57  
Legal Location: SE NE SE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3007  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-17-1984  
Ground Surface Elevation: 1541.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1543.31 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CDAD 2

Longitude: 96.5512

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-168  
SDGS Well Name: R20-84-168

Aquifer: TILL

Screen Length: 2.0  
Casing Diameter: 2.0

Total Casing and Screen: 19.0

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 17 FEET. AUGER DIAMETER WAS  
10 INCHES. 13 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50  
POUND BAG OF GRANULAR BENTONITE WAS POURED IN  
THE ANNULUS NEAR LAND SURFACE.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 17.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 58  
Legal Location: SE NE SE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3008  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: D. TOMHAVE  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1541.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:

Location: 101N-51W-35CDAD 3

Longitude: 96.5520

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A2-84-162

Single Point Resistivity:  
Extra:

Samples:

0 - 2.0 TOPSOIL, BLACK  
2.0 - 10.0 CLAY, BROWN, SILTY, PEBBLY; MOIST;  
SATURATED BELOW 8 FEET (TILL)  
10.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 59  
Legal Location: SW NW SE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3008  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: B. EPLING  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1544.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

0 - 1.0 SILT, BLACK, PEBBLY, SANDY; MOIST  
(TOPSOIL)  
1.0 - 33.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST;  
SATURATED BELOW 15 FEET (TILL)  
33.0 - 39.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
39.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 60  
Legal Location: SW NW SE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3008  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-19-1984  
Ground Surface Elevation: 1544.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:

Location: 101N-51W-35CDBC 1

Longitude: 96.5529

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-214

Single Point Resistivity:  
Extra:

Location: 101N-51W-35CDBC 2

Longitude: 96.5529

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-183  
SDGS Well Name: R20-84-183

Aquifer: TILL

Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1546.34 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Screen Length: 2.0  
Casing Diameter: 2.0  
Total Casing and Screen: 18.0  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 16 FEET. AUGER DIAMETER WAS  
10 INCHES. 15 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED.  
A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED  
IN THE ANNULUS NEAR LAND SURFACE.

0 - 1.0 TOPSOIL, BLACK  
1.0 - 17.0 CLAY, YELLOW-BROWN (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 61  
Legal Location: NW SW SE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3004  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1537.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CDCB  
Longitude: 96.5529  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: A1-84-211  
Single Point Resistivity:  
Extra:

0 - 2.0 SILT, BLACK, SANDY, PEBBLY; MOIST  
(TOPSOIL)  
2.0 - 17.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST  
(TILL)  
17.0 - 22.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)  
22.0 - 27.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)  
27.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; MOIST  
(TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 62

Location: 101N-51W-35CDCC

Legal Location: SW SW SE SW SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3001

Land Owner: SIOUX FALLS

Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS

Driller: L. HELSETH

Geologist: D. ILES

Date Drilled: 07-11-1984

Ground Surface Elevation: 1531.60 I

Total Drill Hole Depth: 47.0

USGS Hydrological Unit Code: 10170203

Electric Log Information:

Spontaneous Potential:

Natural Gamma:

Samples:

- 0 - 3.0 TOPSOIL, BLACK
- 3.0 - 5.0 CLAY, YELLOWISH-BROWN; SATURATED (TILL)
- 5.0 - 7.0 CLAY, GRAY (TILL)
- 7.0 - 29.0 CLAY, YELLOWISH-BROWN, SILTY, PEBBLY (TILL)
- 29.0 - 47.0 CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA

Map Location: 63

Legal Location: SE SW SE SW SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3001

Land Owner: SIOUX FALLS

Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS

Driller: A. MACDONALD

Geologist: D. ILES

Date Drilled: 07-17-1984

Ground Surface Elevation: 1532.00 I

Total Drill Hole Depth: 48.0

USGS Hydrological Unit Code: 10170203

Electric Log Information:

Spontaneous Potential:

Natural Gamma:

Samples:

- 0 - 4.0 CLAY, BLACK, SILTY; MOIST (TOPSOIL)
- 4.0 - 10.0 CLAY, LIGHT-BROWN, SILTY, SANDY, PEBBLY; MOIST, SATURATED BELOW 7 FEET (TILL)
- 10.0 - 18.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; SATURATED (TILL)
- 18.0 - 25.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY; SATURATED; MOIST ONLY BELOW 23 FEET (TILL)
- 25.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; MOIST (TILL)

\* \* \* \*

Longitude: 96.5526

Driller's Log: X

Geologist's Log:

Drilling Method: AUGER

Test Hole Number: R20-84-158

Single Point Resistivity:

Extra:

Location: 101N-51W-35CDCD

Longitude: 96.5520

Driller's Log: X

Geologist's Log:

Drilling Method: AUGER

Test Hole Number: A1-84-205

Single Point Resistivity:

Extra:

County: MINNEHAHA  
Map Location: 64  
Legal Location: NE SE SE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3004  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1535.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CDDA

Longitude: 96.5512

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-213

Single Point Resistivity:  
Extra:

0 - 1.0 SILT, BLACK, SANDY, PEBBLY; MOIST  
(TOPSOIL)  
1.0 - 6.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST  
(TILL)  
6.0 - 16.0 CLAY, BROWN, SILTY, VERY SANDY, PEBBLY;  
SATURATED (TILL)  
16.0 - 48.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
VERY FIRM; SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 65  
Legal Location: NW SE SE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3004  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: B. EPLING  
Geologist: D. ILES  
Date Drilled: 07-18-1984  
Ground Surface Elevation: 1539.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CDDB

Longitude: 96.5520

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-212

Single Point Resistivity:  
Extra:

0 - 2.0 SILT, BLACK, SANDY, PEBBLY; MOIST  
(TOPSOIL)  
2.0 - 18.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST;  
SATURATED BELOW 6 FEET (TILL)  
18.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)



\* \* \* \*

County: MINNEHAHA  
Map Location: 66  
Legal Location: SE SE SE SW SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3001  
Land Owner: SIOUX FALLS  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. HELSETH  
Geologist: D. ILES  
Date Drilled: 07-17-1984  
Ground Surface Elevation: 1533.00 I  
Total Drill Hole Depth: 17.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1534.82 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35CDDD

Longitude: 96.5512

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: R20-84-169  
SDGS Well Name: R20-84-169

Aquifer: TILL

Screen Length: 2.0  
Casing Diameter: 2.0

Total Casing and Screen: 19.0

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 17 FEET. AUGER DIAMETER WAS  
10 INCHES. 13 GALLONS OF GRAVEL PACK AND 5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50  
POUND BAG OF GRANULAR BENTONITE WAS POURED IN  
THE ANNULUS NEAR LAND SURFACE.

0 - 2.0 TOPSOIL, BLACK  
2.0 - 17.0 CLAY, YELLOW-BROWN, SILTY, PEBBLY (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 67  
Legal Location: SW NE NW SE SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3020  
Land Owner: N. MILLER  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: J. SHAFFER  
Geologist: D. ILES  
Date Drilled: 07-25-1984  
Ground Surface Elevation: 1552.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:

Location: 101N-51W-35DBAC 1

Longitude: 96.5502

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A2-84-167

Single Point Resistivity:

Natural Gamma:  
Samples:

Extra:

0 - 2.0 SILT, BLACK, SANDY, PEBBLY; DRY (TOPSOIL)  
2.0 - 4.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST  
(TILL)  
4.0 - 5.0 GRAVEL, BROWN, MEDIUM TO COARSE, SANDY;  
SATURATED  
5.0 - 8.0 CLAY, BROWN, SILTY, VERY SANDY, PEBBLY;  
SATURATED (TILL)  
8.0 - 15.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
15.0 - 25.0 CLAY, GRAY-BROWN, SILTY, SANDY, VERY  
PEBBLY; SATURATED (TILL)  
25.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 68  
Legal Location: SW NE NW SE SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3020  
Land Owner: N. MILLER  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-25-1984  
Ground Surface Elevation: 1552.00 I  
Total Drill Hole Depth: 18.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1554.07 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35DBAC 2

Longitude: 96.5502

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-235  
SDGS Well Name: A1-84-235

Aquifer: TILL

Screen Length: 2.1  
Casing Diameter: 2.0

Total Casing and Screen: 20.0

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 18 FEET. AUGER DIAMETER WAS  
6 INCHES. 5 GALLONS OF GRAVEL PACK AND 2.5  
GALLONS OF BENTONITE PELLETS WERE EMPLACED.  
A 50 POUND BAG OF GRANULAR BENTONITE WAS  
POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 5.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST  
(TILL)  
5.0 - 9.0 CLAY, BROWN, SILTY, VERY SANDY, VERY

9.0 - 18.0 PEBBLY; MOIST (TILL)  
CLAY, BROWN, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA	Location: 101N-51W-35DBBA 1
Map Location: 69	
Legal Location: NE NW NW SE SEC. 35, T. 101 N., R. 51 W.	
Latitude: 43.3023	Longitude: 96.5502
Land Owner: N. MILLER	
Project: SIOUX FALLS LANDFILL	
Drilling Company: SDGS	
Driller: B. EPLING	Driller's Log: X
Geologist: D. ILES	Geologist's Log:
Date Drilled: 07-25-1984	Drilling Method: AUGER
Ground Surface Elevation: 1556.00 I	
Total Drill Hole Depth: 48.0	Test Hole Number: A2-84-168
USGS Hydrological Unit Code: 10170203	
Electric Log Information:	
Spontaneous Potential:	Single Point Resistivity:
Natural Gamma:	Extra:
Samples:	

0 - 1.0	SILT, BLACK, SANDY, PEBBLY; DRY (TOPSOIL)
1.0 - 15.0	CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)
15.0 - 21.0	CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)
21.0 - 34.0	CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)
34.0 - 48.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; MOIST (TILL)

\* \* \* \* \*

County: MINNEHAHA	Location: 101N-51W-35DBBA 2
Map Location: 70	
Legal Location: NE NW NW SE SEC. 35, T. 101 N., R. 51 W.	
Latitude: 43.3026	Longitude: 96.5502
Land Owner: N. MILLER	
Project: SIOUX FALLS LANDFILL	
Drilling Company: SDGS	
Driller: A. MACDONALD	Driller's Log: X
Geologist: D. ILES	Geologist's Log:
Date Drilled: 07-25-1984	Drilling Method: AUGER
Ground Surface Elevation: 1551.00 I	
Total Drill Hole Depth: 19.0	Test Hole Number: A1-84-233
Water Rights Well:	SDGS Well Name: A1-84-233
Other Well Name:	
Basin: BIG SIOUX	Aquifer: TILL
Management Unit:	
Screen Type: PVC, MFG., 18 SLOT	Screen Length: 2.0
Casing Type: PVC, SCH. 40	Casing Diameter: 2.0
Casing Top Elevation: 1553.26 I	

Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Total Casing and Screen: 20.5

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 18.5 FEET. AUGER DIAMETER WAS 6 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 18.5 FEET. 7.5 GALLONS OF GRAVEL PACK AND 2.5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

- 0 - 4.0 CLAY, GRAYISH-BLACK, SILTY, PEBBLY; MOIST (TOPSOIL)
- 4.0 - 13.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)
- 13.0 - 19.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 71  
Legal Location: NE NW NW SE SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3026  
Land Owner: N. MILLER  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. THOMAS  
Geologist: D. ILES  
Date Drilled: 07-25-1984  
Ground Surface Elevation: 1559.00 I  
Total Drill Hole Depth: 19.0  
Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1560.52 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35DBBA 3

Longitude: 96.5507

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER

Test Hole Number: A1-84-234  
SDGS Well Name: A1-84-234

Aquifer: TILL

Screen Length: 2.1  
Casing Diameter: 2.0

Total Casing and Screen: 20.0

Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 18 FEET. AUGER DIAMETER WAS 6 INCHES AND ACTUAL HOLE DEPTH WAS ONLY 18.5 FEET. 5 GALLONS OF GRAVEL PACK AND 2.5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND

BAG OF GRANULAR BENTONITE WAS POURED IN THE  
ANNULUS NEAR LAND SURFACE.

0 - 19.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST  
(TILL)

\* \* \* \*

County: MINNEHAHA	Location: 101N-51W-35DBBA 4
Map Location: 72	
Legal Location: NE NW NW SE SEC. 35, T. 101 N., R. 51 W.	
Latitude: 43.3026	Longitude: 96.5502
Land Owner: N. MILLER	
Project: SIOUX FALLS LANDFILL	
Drilling Company: SDGS	
Driller: B. EPLING	Driller's Log: X
Geologist: D. ILES	Geologist's Log:
Date Drilled: 07-26-1984	Drilling Method: AUGER
Ground Surface Elevation: 1551.00 I	
Total Drill Hole Depth: 48.0	Test Hole Number: A2-84-169
USGS Hydrological Unit Code: 10170203	
Electric Log Information:	
Spontaneous Potential:	Single Point Resistivity:
Natural Gamma:	Extra:
Samples:	

0 - 1.0 SILT, BLACK, SANDY, PEBBLY; MOIST  
(TOPSOIL)  
1.0 - 5.0 CLAY, BLACK, VERY SILTY, SLIGHTLY SANDY;  
MOIST  
5.0 - 14.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST;  
SATURATED BELOW 6 FEET (TILL)  
14.0 - 16.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
SATURATED  
16.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA	Location: 101N-51W-35DBBA 5
Map Location: 73	
Legal Location: NE NW NW SE SEC. 35, T. 101 N., R. 51 W.	
Latitude: 43.3026	Longitude: 96.5507
Land Owner: N. MILLER	
Project: SIOUX FALLS LANDFILL	
Drilling Company: SDGS	
Driller: L. THOMAS	Driller's Log: X
Geologist: D. ILES	Geologist's Log:
Date Drilled: 07-26-1984	Drilling Method: AUGER
Ground Surface Elevation: 1559.00 I	
Total Drill Hole Depth: 48.0	Test Hole Number: A1-84-236
USGS Hydrological Unit Code: 10170203	
Electric Log Information:	
Spontaneous Potential:	Single Point Resistivity:
Natural Gamma:	Extra:

Samples:

- 0 - 1.0 SILT, BLACK, CLAYEY, PEBBLY; MOIST (TOPSOIL)
- 1.0 - 28.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)
- 28.0 - 34.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY; SATURATED (TILL)
- 34.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; SATURATED (TILL)

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 74  
Legal Location: SW NW NW SE SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3021  
Land Owner: N. MILLER  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: A. MACDONALD  
Geologist: D. ILES  
Date Drilled: 07-26-1984  
Ground Surface Elevation: 1547.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35DBBC  
Longitude: 96.5509

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: A1-84-237

Single Point Resistivity:  
Extra:

- 0 - 5.0 CLAY, GRAY, VERY SILTY; SATURATED
- 5.0 - 24.0 SAND, BROWN, MEDIUM TO COARSE, SLIGHTLY CLAYEY; SATURATED
- 24.0 - 29.0 SAND AND GRAVEL(?), CLAYEY; SAND IS COARSER THAN INTERVAL FROM 5 TO 24 FEET; SATURATED
- 29.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; SATURATED

\* \* \* \* \*

County: MINNEHAHA  
Map Location: 75  
Legal Location: SE NW NW SE SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3021  
Land Owner: N. MILLER  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. THOMAS  
Geologist: D. ILES  
Date Drilled: 07-26-1984  
Ground Surface Elevation: 1546.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203

Location: 101N-51W-35DBBD  
Longitude: 96.5505

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: A1-84-238

Electric Log Information:

Spontaneous Potential:  
Natural Gamma:  
Samples:

Single Point Resistivity:  
Extra:

0 - 4.0 CLAY, BLACK, VERY SILTY, PEBBLY;  
SATURATED (TOPSOIL)  
4.0 - 27.0 CLAY, BROWN, VERY SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
27.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA

Location: 101N-51W-35DBCA 1

Map Location: 76

Legal Location: NE SW NW SE SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3017

Longitude: 96.5502

Land Owner: N. MILLER

Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS

Driller: L. THOMAS

Driller's Log: X

Geologist: D. ILES

Geologist's Log:

Date Drilled: 07-25-1984

Drilling Method: AUGER

Ground Surface Elevation: 1543.00 I

Total Drill Hole Depth: 48.0

Test Hole Number: A1-84-229

USGS Hydrological Unit Code: 10170203

Electric Log Information:

Spontaneous Potential:  
Natural Gamma:  
Samples:

Single Point Resistivity:  
Extra:

0 - 3.0 SILT, BLACK, CLAYEY, PEBBLY; MOIST  
(TOPSOIL)  
3.0 - 5.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)  
5.0 - 23.0 CLAY, BROWN, VERY SILTY, SANDY, PEBBLY;  
SATURATED (TILL)  
23.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
SATURATED (TILL)

\* \* \* \*

County: MINNEHAHA

Location: 101N-51W-35DBCA 2

Map Location: 77

Legal Location: NE SW NW SE SEC. 35, T. 101 N., R. 51 W.

Latitude: 43.3017

Longitude: 96.5502

Land Owner: N. MILLER

Project: SIOUX FALLS LANDFILL

Drilling Company: SDGS

Driller: A. MACDONALD

Driller's Log: X

Geologist: D. ILES

Geologist's Log:

Date Drilled: 07-25-1984

Drilling Method: AUGER

Ground Surface Elevation: 1543.00 I

Total Drill Hole Depth: 18.0

Test Hole Number: A1-84-230

Water Rights Well:  
Other Well Name:  
Basin: BIG SIOUX  
Management Unit:  
Screen Type: PVC, MFG., 18 SLOT  
Casing Type: PVC, SCH. 40  
Casing Top Elevation: 1545.49 I  
Casing Stick-up: 2.00  
Well Maintenance Date:  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

SDGS Well Name: A1-84-230  
Aquifer: TILL  
Screen Length: 2.1  
Casing Diameter: 2.0  
Total Casing and Screen: 14.5  
Single Point Resistivity:  
Extra:

BOTTOM OF WELL IS AT 12.5 FEET. AUGER DIAMETER WAS 6 INCHES. THE HOLE CAVED IN UP TO 12.5 FEET PRIOR TO INSTALLATION OF CASING. 9 GALLONS OF GRAVEL PACK AND 2.5 GALLONS OF BENTONITE PELLETS WERE EMPLACED. A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED IN THE ANNULUS NEAR LAND SURFACE.

0 - 5.0 CLAY, BLACK, SILTY; MOIST (TOPSOIL)  
5.0 - 18.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST (TILL)

\* \* \* \*

County: MINNEHAHA  
Map Location: 78  
Legal Location: NE SW NW SE SEC. 35, T. 101 N., R. 51 W.  
Latitude: 43.3017  
Land Owner: N. MILLER  
Project: SIOUX FALLS LANDFILL  
Drilling Company: SDGS  
Driller: L. THOMAS  
Geologist: D. ILES  
Date Drilled: 07-25-1984  
Ground Surface Elevation: 1550.00 I  
Total Drill Hole Depth: 14.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Location: 101N-51W-35DBCA 3  
Longitude: 96.5507  
Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: A1-84-231  
Single Point Resistivity:  
Extra:

0 - 2.0 SILT, BLACK, SANDY, PEBBLY (TOPSOIL)  
2.0 - 4.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; DRY (TILL)  
4.0 - 6.0 SAND AND GRAVEL, BROWN, MEDIUM SAND TO COARSE GRAVEL, CLAYEY; SATURATED  
6.0 - 14.0 CLAY, REDDISH-BROWN, SILTY, VERY SANDY; SOME COARSE GRAVEL; SATURATED;  
ABANDONED HOLE AT 14 FEET DUE TO ROCKS



(TILL)

\* \* \* \*

County: MINNEHAHA  
 Map Location: 79  
 Legal Location: NE SW NW SE SEC. 35, T. 101 N., R. 51 W.  
 Latitude: 43.3017  
 Land Owner: N. MILLER  
 Project: SIOUX FALLS LANDFILL  
 Drilling Company: SDGS  
 Driller: L. THOMAS  
 Geologist: D. ILES  
 Date Drilled: 07-25-1984  
 Ground Surface Elevation: 1550.00 I  
 Total Drill Hole Depth: 18.0  
 Water Rights Well:  
 Other Well Name:  
 Basin: BIG SIOUX  
 Management Unit:  
 Screen Type: PVC, MFG., 18 SLOT  
 Casing Type: PVC, SCH. 40  
 Casing Top Elevation: 1552.21 I  
 Casing Stick-up: 2.00  
 Well Maintenance Date:  
 USGS Hydrological Unit Code: 10170203  
 Electric Log Information:  
   Spontaneous Potential:  
   Natural Gamma:  
   Samples:

Location: 101N-51W-35DBCA 4

Longitude: 96.5507

Driller's Log: X  
 Geologist's Log:  
 Drilling Method: AUGER

Test Hole Number: A1-84-232  
 SDGS Well Name: A1-84-232

Aquifer: TILL

Screen Length: 2.0  
 Casing Diameter: 2.0

Total Casing and Screen: 20.0

Single Point Resistivity:  
 Extra:

BOTTOM OF WELL IS AT 18 FEET. AUGER DIAMETER WAS  
 6 INCHES. 9 GALLONS OF GRAVEL PACK AND 2.5  
 GALLONS OF BENTONITE PELLETS WERE EMPLACED.  
 A 50 POUND BAG OF GRANULAR BENTONITE WAS POURED  
 IN THE ANNULUS NEAR LAND SURFACE.

- 0 - 2.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST  
(TILL)
- 2.0 - 5.0 GRAVEL, COARSE, ANGULAR, POORLY SORTED;  
DRY
- 5.0 - 17.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST  
(TILL)
- 17.0 - 18.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)

\* \* \* \*

County: MINNEHAHA  
 Map Location: 80  
 Legal Location: NE SW NW SE SEC. 35, T. 101 N., R. 51 W.  
 Latitude: 43.3017  
 Land Owner: N. MILLER  
 Project: SIOUX FALLS LANDFILL  
 Drilling Company: SDGS

Location: 101N-51W-35DBCA 5

Longitude: 96.5507

Driller: B. EPLING  
Geologist: D. ILES  
Date Drilled: 07-25-1984  
Ground Surface Elevation: 1550.00 I  
Total Drill Hole Depth: 48.0  
USGS Hydrological Unit Code: 10170203  
Electric Log Information:  
Spontaneous Potential:  
Natural Gamma:  
Samples:

Driller's Log: X  
Geologist's Log:  
Drilling Method: AUGER  
Test Hole Number: A2-84-166

Single Point Resistivity:  
Extra:

- 0 - 3.0 SILT, BLACK, SANDY, PEBBLY; DRY (TOPSOIL)
- 3.0 - 6.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
DRY (TILL)
- 6.0 - 14.0 CLAY, BROWN, SILTY, SANDY, PEBBLY; MOIST  
(TILL)
- 14.0 - 16.0 CLAY, DARK-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)
- 16.0 - 24.0 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY;  
MOIST (TILL)
- 24.0 - 48.0 CLAY, GRAY, SILTY, SANDY, PEBBLY; MOIST  
(TILL)

\* \* \* \*

APPENDIX B

Water-level measurements and elevations of the observation wells

Map Loca- tion Num- ber	SDGS Well Name	Casing Top Eleva- tion (ft)	Depth to water from casing top (ft)				
			7-26-84	8-1-84	8-2-84	8-21-84	9-5-84
2	R20-84-153	1561.64	4.82	----	4.07	5.37	6.08
3	A1-84-222	1561.70	4.64	----	4.72	5.56	6.26
4	A1-84-223	1561.53	4.98	----	4.16	5.43	6.13
5	A1-84-224	1561.66	4.81	----	4.28	5.60	6.33
7	R20-84-151	1555.37	8.72	8.26	12.28	8.98 <sup>1</sup>	9.67
8	R20-84-173	1554.62	7.41	7.45	7.48	8.11	8.90
9	R20-84-174 <sup>2</sup>	1554.23	6.98	7.02	7.08	7.67	8.52
12	R20-84-166 <sup>2</sup>	1555.79	6.10	5.79	8.35	----	7.08
13	R20-84-178	1556.60	6.58	6.28	6.35	----	7.75?
14	R20-84-179	1555.98	5.96	5.66	5.77	----	7.15
15	R20-84-180	1555.86	5.66	5.29	7.08	----	6.73
16	R20-84-167	1552.65	Dry	Dry	Dry	----	Dry
17	R20-84-154	1551.52	4.87	4.44	4.54	5.56	6.25
18	R20-84-175	1550.90	3.89	4.03	4.04	5.07	5.86
19	R20-84-176	1550.28	3.46	3.25	3.34	4.37	5.07
20	R20-84-177	1549.87	2.70	2.91	3.03	4.06	4.86
25	R20-84-156	1551.19	7.90	7.86	7.95	9.10	9.73
26	R20-84-184	1567.76	8.33	8.56	8.68	9.51	10.12
27	R20-84-185	1567.49	7.72	7.54	8.27	7.78	9.61
28	R20-84-187	1562.46	7.13	6.86	6.94	----	8.85
31	A1-84-221	1553.89	5.43	4.64	12.05	5.38	6.18
33	R20-84-186	1561.72	13.05	13.65	13.82	----	17.01
36	R20-84-164	1551.77	7.07	5.96	10.71	----	8.28
37	R20-84-181 <sup>3</sup>	1551.33	5.62	5.15	5.33	----	7.90
38	R20-84-182	1551.45	6.07	5.42	6.07	----	7.97
45	R20-84-172	1545.97	8.30	8.45	8.68	9.77	10.60
50	R20-84-171	1524.78	9.64	7.89	13.72	----	7.41
54	R20-84-170	1531.91	5.23	5.38	5.50	----	7.15
57	R20-84-168	1543.31	7.68	8.04	8.41	----	10.73

APPENDIX B -- continued.

Map Loca- tion Num- ber	SDGS Well Name	Casing Top Eleva- tion (ft)	Depth to water from casing top (ft)				
			7-26-84	8-1-84	8-2-84	8-21-84	9-5-84
60	R20-84-183	1546.34	8.03	8.26	8.40	9.48	10.88
66	R20-84-169	1534.82	7.91	7.69	10.62	----	9.73
68	A1-84-235	1554.07	11.87	7.88	11.95	7.96	8.66
70	A1-84-233	1553.26	12.53	6.29	13.99	4.33	5.07
71	A1-84-234	1560.52	7.98	7.70	7.68	8.73	9.81
77	A1-84-230	1545.49	4.91	3.20	8.91	5.25	6.04
79	A1-84-232	1552.21	8.36	8.30	8.34	9.23	9.88

<sup>1</sup> Measurement actually made on August 22, 1984.

<sup>2</sup> Water was added to inside of hollow-stem auger before bit was removed to enable installation of casing through auger.

<sup>3</sup> Casing was filled with water to keep it from floating during installation of observation well.

Casing top elevations are relative to mean sea level.

## APPENDIX C

### Methods and Procedures

#### DRILLING

All test holes were advanced using the flight auger method. Drilling rigs used were either a Parmanco F-86-B (4-inch O.D. diameter auger; rig A1 or A2, app. A) or a Mobile B-61XD (10.75-inch O.D. diameter hollow-stem auger; rig R20, app. A).

#### PLUGGING OF TEST HOLES

All test holes in which an observation well was not installed were plugged with a bentonite slurry. The slurry was pumped into the hole from the bottom to the land surface.

#### OBSERVATION WELL CONSTRUCTION

Casing material consisted of 2-inch diameter, schedule 40 PVC. Screens consisted of 2-inch diameter, no. 18 slot, schedule 80 PVC. Casing, screens, and slip caps were joined by PVC cement (see accompanying figure in this appendix).

Where possible, the annular space between the PVC screen and test-hole wall was partially filled with a predominantly quartz sand filter pack. The filter pack extended from the bottom of the open annular space to at least the top of the well screen. The filter pack was isolated from the remainder of the annular space by placing bentonite pellets on top of the filter pack. Auger cuttings from the hole were then used to fill the annulus to within 1 to 3 feet of land surface. A 50-pound bag of granular bentonite was then poured into the annulus to provide a seal around the observation well at the land surface. Any remaining annular space was filled with more cuttings up to land surface. Depending on the test-hole depth, the test-hole's ability to remain open after the auger was removed, and other conditions, variations of these procedures were sometimes necessary. See appendix A for details concerning each particular well.

#### NESTED-WELL SETS

Five nested sets of observation wells (more than one well at the same location but completed at different depths) were constructed at the landfill site. These nests account for 18, or one-half, of the observation wells constructed for this investigation (app. D). In each of the nested sets, the deepest well was installed first to determine the water level at a particular location. Then the other wells of the nest were installed to provide discrete, screened intervals from the top of the deepest wells' screens up to the water-table level. Consequently, a nested-well set is superior to a single well which is screened from top to bottom because it allows water sampling at discrete horizons within the hydrologic system and it allows measurements needed to determine vertical ground-water flow components.

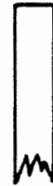
#### REMOVAL OF WATER FROM OBSERVATION WELLS

Water in all wells (except those at ML 2, 3, 4, and 5, fig. 3) was pumped using the air-lift method on

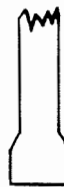
# Observation - well materials

## CASING

20-foot lengths were cut, when necessary, to proper length for each well.



← 2" i.d., schedule 40, PVC



← belled end

## SCREENS

Slotted length was 1.9, 2.0, or 2.1 feet. This type of screen was glued to the non-belled end of the casing.



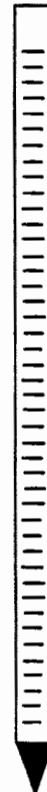
← slip coupler

← 2" i.d., 18-slot, PVC

← slip cap

2" i.d., 18-slot, PVC  
Slotted length = 4.6 feet.

This type of screen was glued to the casing using either a slip coupler or the belled end on the casing.



August 1, 1984. Depths to water prior to this pumping are listed in appendix B as are recovery water levels measured the following day. Wells at ML 2, 3, 4, and 5 were pumped using the air-lift method on August 2, 1984.

Removal of water from some wells occurred a second time on either August 21 or 22, 1984. This time a bailer was used instead of the air-lift method to remove the water. The depths to water were measured prior to bailing and are listed in appendix B. No recovery measurements were made at this time. Wells were either bailed until dry or until the amount of water removed equalled or exceeded the pre-bailing volume of water in the well.

**APPENDIX D**

**List of observation wells and approximate depth  
of well bottom below land surface**

SINGLE WELLS			:	NESTED WELLS		
Map Location Number <sup>1</sup>	SDGS Well Name <sup>2</sup>	Well Depth (ft)	:	Map Location Number <sup>1</sup>	SDGS Well Name <sup>2</sup>	Well Depth (ft)
16	R20-84-167	16	:	2	R20-84-153	20
25	R20-84-156	20	:	3	A1-84-222	18
26	R20-84-184	17	:	4	A1-84-223	13.5
27	R20-84-185	16	:	5	A1-84-224	8.5
28	R20-84-187	16.5	:			
31	A1-84-221	18	:	7	R20-84-151	17
33	R20-84-186	16.5	:	8	R20-84-173	9.5
45	R20-84-172	17	:	9	R20-84-174	14.5
50	R20-84-171	17	:			
54	R20-84-170	17	:	12	R20-84-166	17.5
57	R20-84-168	17	:	13	R20-84-178	7.5
60	R20-84-183	16	:	14	R20-84-179	11.5
66	R20-84-169	17	:	15	R20-84-180	15.5
68	A1-84-235	18	:			
70	A1-84-233	18.5	:	17	R20-84-154	17.5
71	A1-84-234	18	:	18	R20-84-175	6
77	A1-84-230	12.5	:	19	R20-84-176	15
79	A1-84-232	18	:	20	R20-84-177	10.5
			:	36	R20-84-164	17
			:	37	R20-84-181	11.5
			:	38	R20-84-182	15.5

<sup>1</sup> Applies to figure 3 and appendix A.

<sup>2</sup> Applies to appendix A.