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DEPARTMENT OF WATER AND NATURAL RESOURCES  
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Open-File Report 46-UR

GROUND-WATER STUDY IN THE ELKTON AREA FOR THE  
BROOKINGS-DEUEL RURAL WATER SYSTEM

by

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**CONTENTS**

	Page
<b>INTRODUCTION</b> .....	1
<b>RESULTS OF INVESTIGATION</b> .....	1
Deer Creek area .....	1
Medary Creek area .....	1
<b>ACTIONS SUBSEQUENT TO THE INVESTIGATION</b> .....	7
<b>REFERENCES</b> .....	7

**FIGURES**

1. Locations of study areas .....	3
2. Data map .....	4
3. Saturated thickness map .....	5
4. Selected water chemistry data .....	6

**TABLE**

1. Water quality .....	2
------------------------	---

**APPENDIX**

A. Logs of test holes and observation wells drilled for this investigation .....	8
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## INTRODUCTION

This report contains the results of a ground-water investigation conducted by the South Dakota Geological Survey for the Brookings-Deuel Rural Water System. Field work was conducted from August 24 to August 31, 1983. The investigation included the drilling of 12 rotary test holes, 8 of which were completed as observation wells, the collection and analysis of 9 water samples (table 1), and the supervision of an aquifer test. This investigation was financed by the South Dakota Geological Survey, the East Dakota Water Development District, and the Brookings-Deuel Rural Water System.

The Brookings-Deuel Rural Water System was in the process of expanding their system to accommodate water users in an area northeast of the City of Elkton. The South Dakota Geological Survey was asked to locate a source of good quality ground water in the vicinity of the proposed system. The main objective of the study was to find a source of water which, in addition to being generally suitable for drinking, contained low concentrations (less than the Environmental Protection Agency (EPA) standards) of iron (Fe), manganese (Mn), and nitrate-nitrogen ( $\text{NO}_3\text{-N}$ ) (table 1).

Test drilling was conducted in two areas containing surficial outwash aquifers: the Deer Creek area and the Medary Creek area (fig. 1).

## RESULTS OF INVESTIGATION

### Deer Creek Area

Two observation wells were installed in test holes at map locations (ML) 11 and 12 penetrating the surficial outwash aquifer (fig. 2). Water samples were collected from each well and analyzed (table 1). Water-quality data show that the concentrations of iron (Fe) and manganese (Mn) exceed the EPA recommended limits. Water from the Deer Creek area is not recommended for rural water system use and will not be discussed further.

### Medary Creek Area

In the Medary Creek area, test drilling occurred in secs. 26, 27, 28, 33, 34, 35 and 36, T. 110 N., R. 48 W. (fig. 2). An area was defined in these sections with a saturated thickness of 20 to 39 feet (fig. 3). Six observation wells were installed in this area at ML 3, 4, 6, 7, 9 and 10 (fig. 2) and water samples from each were collected and analyzed (table 1). Figure 4 lists the concentrations of  $\text{NO}_3\text{-N}$ , Fe, and Mn for each of the wells sampled. The data were then presented to an engineering firm hired by the Brookings-Deuel Rural Water System. The engineering firm analyzed the data and chose a site to conduct an aquifer test.

TABLE 1. Water Quality

Well ID (2)	Location (3)	SDGS Lab ID (4)	Date Sampled	Depth Well (ft) (5)	Conductivity (mmhos) (6)	TDS	Hardness as CaCO <sub>3</sub>	Fe	Mn	SO <sub>4</sub>	NO <sub>3</sub> -N	Na	Ca	Mg	K	Cl	F	HCO <sub>3</sub>	(1) Chemical Constituents -- Parts per million	
<b>DEER CREEK AREA</b>																				
ML11	111N-47W-31C8BB	EBD-84-008	06/01/84	45	934	614	454	0.51	0.55	260	0.2	15	128	33	2.9	8	0.41	---		
ML12	111N-48W-35C8BB	EBD-84-009	06/01/84	45	907	620	457	3.15	0.96	249	0.4	16	121	38	10.1	7	0.72	---		
<b>MEDARY CREEK AREA</b>																				
ML3	110N-48W-27C8CB	EBD-83-003	08/31/83	45	984	704	476	0.07	0.37	264	0.04	45	107	51	2.8	10	0.59	323		
ML4	110N-48W-28C8CC	EBD-83-004	08/31/83	45	727	524	387	0.05	0.1	139	0.45	11	91	39	1.8	9	0.24	280		
ML6	110N-48W-34A8BB	EBD-83-006	09/01/83	45	879	622	433	0.05	0.05	204	5.8	27	98	46	2.0	15	0.43	286		
ML7	110N-48W-35B8CB	EBD-83-005	09/01/83	43	898	628	464	0.76	0.4	220	0.04	24	107	48	2.0	12	0.27	378		
ML9	110N-48W-35D8CC	EBD-83-001	08/31/83	31	603	392	309	0.63	0.4	64	0.59	12	73	31	1.2	6	0.3	299		
ML10	110N-48W-36C8CC	EBD-83-002	08/31/83	27	768	520	394	0.05	0.07	120	4.5	16	94	39	3.0	22	0.23	305		
Aquifer test																				
	110N-48W-35D8DD	EBD-83-007	11/18/83	28	759	488	362	0.08	0.05	94	7.4	12	91	33	2.5	22	0.23	310		
<b>EPA LIMITS</b>																				
						500		0.3		250	10					250	2.4			
						(7)		(7)		(7)	(8)					(7)	(8)			

(1): TDS - total dissolved solids; Fe - iron; Mn - manganese; SO<sub>4</sub> - sulfate; NO<sub>3</sub>-N - nitrate-nitrogen; Na - sodium; Ca - calcium; Mg - magnesium; K - potassium; Cl - chloride; F - fluoride; HCO<sub>3</sub> - bicarbonate.

(2): Map location (ML) number - corresponds to number on figure 1 and in appendix A.

(3): See appendix A for explanation of location format.

(4): South Dakota Geological Survey Chemistry Laboratory identification number.

(5): Well depth is presented in feet below land surface.

(6): mmhos - micromhos.

(7): EPA recommended limits (U.S. Environmental Protection Agency, 1985b).

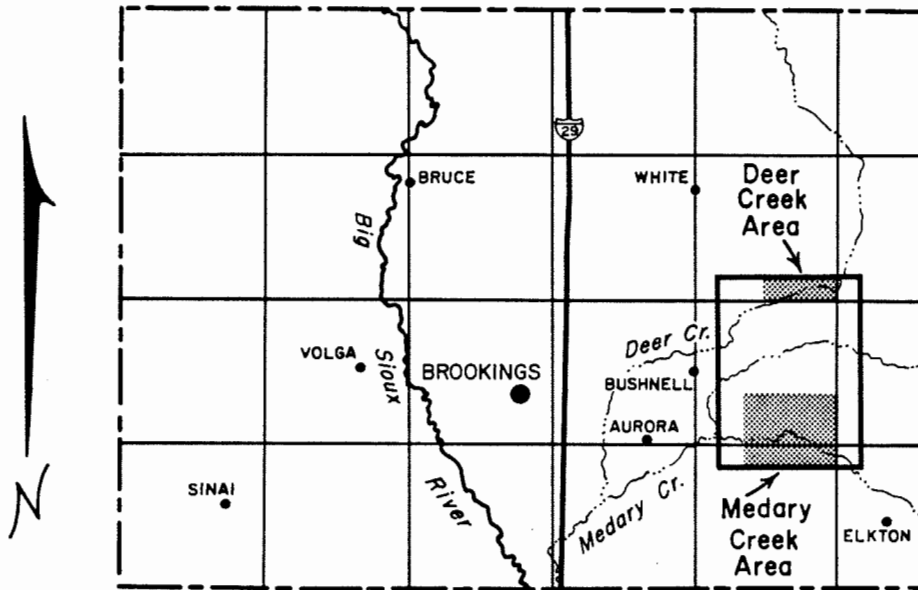
(8): EPA recommended limits (U.S. Environmental Protection Agency, 1985a).

-- Observation wells were first blown clean with air lift then sampled by pitcher pump.

-- Aquifer test well was sampled by turbine pump.

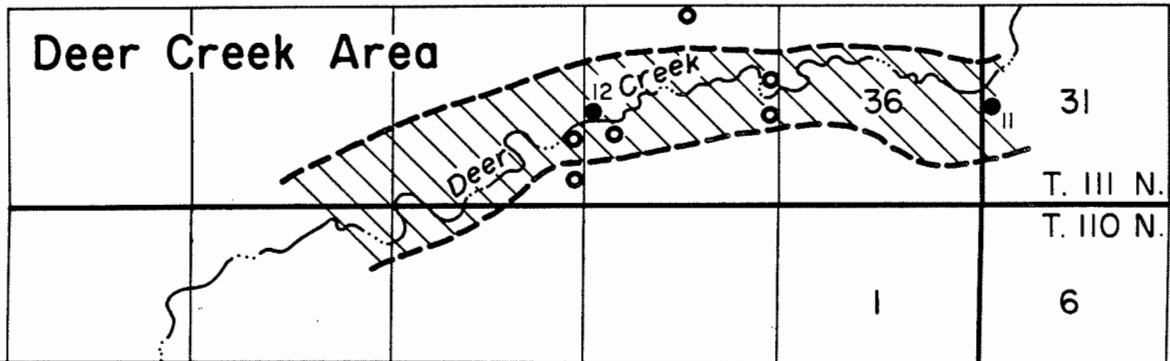


Index map of South Dakota showing location of Brookings County.



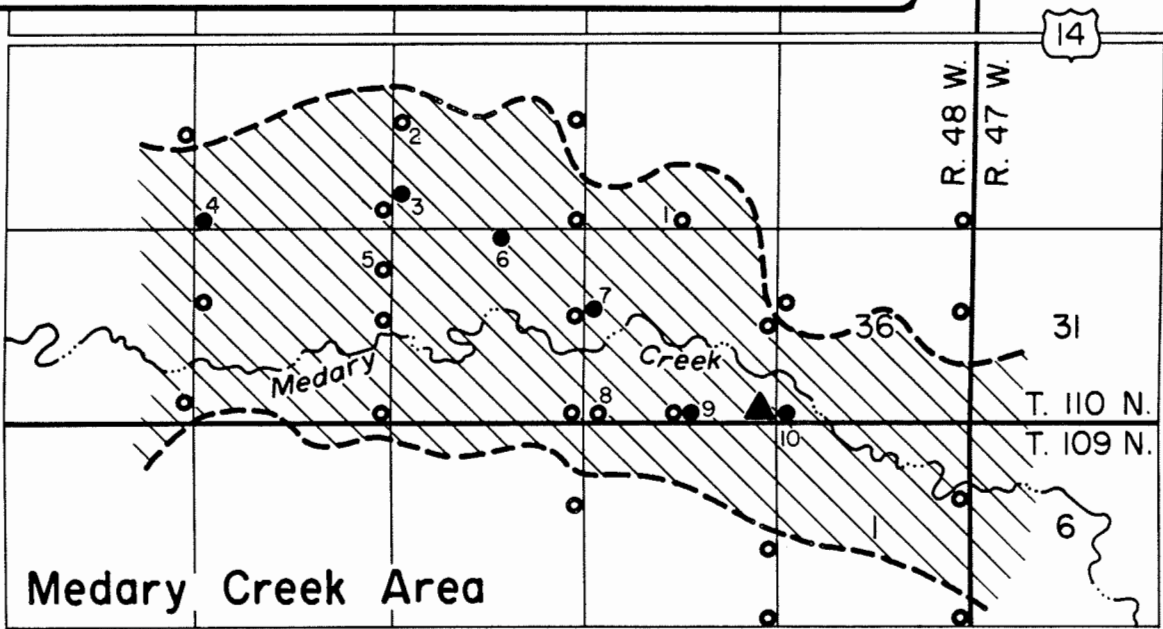
Map of Brookings County showing study area locations.

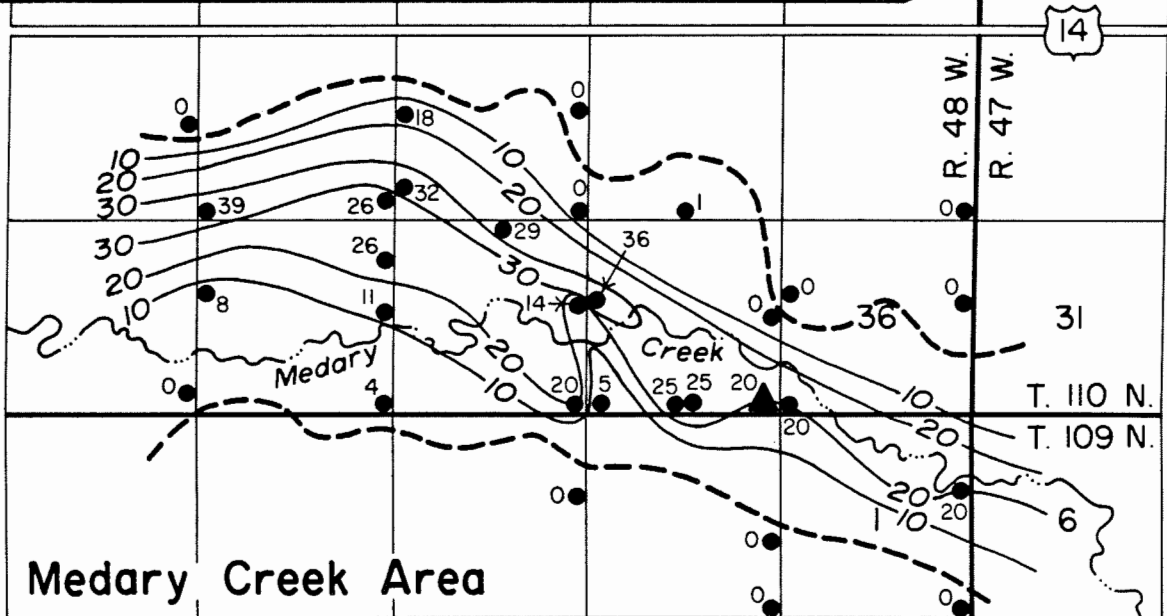
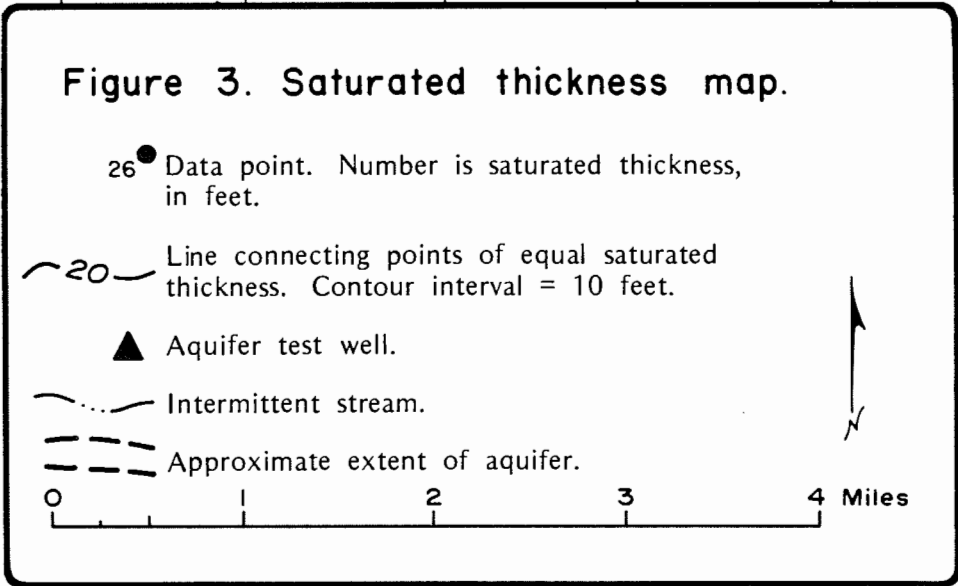
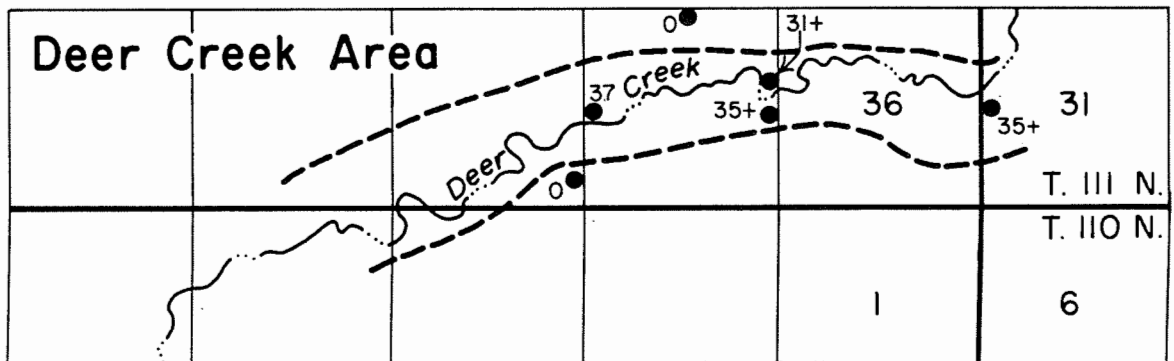
Figure 1. Locations of study areas.

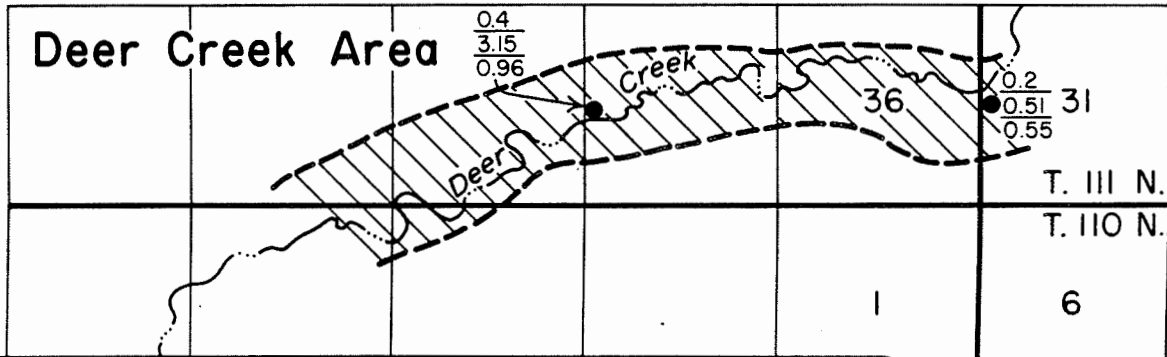


**Figure 2. Data map.**

- 5 ● Test hole.
  - 4 ● Observation well.
  - ▲ Aquifer test well.
  - Intermittent stream
  - ▨ Approximate extent of aquifer.
- Number refers to listing in Appendix A. Logs of the rest are on file at the S.D. Geological Survey.
- 0 1 2 3 4 Miles







**Figure 4. Selected water chemistry data.**

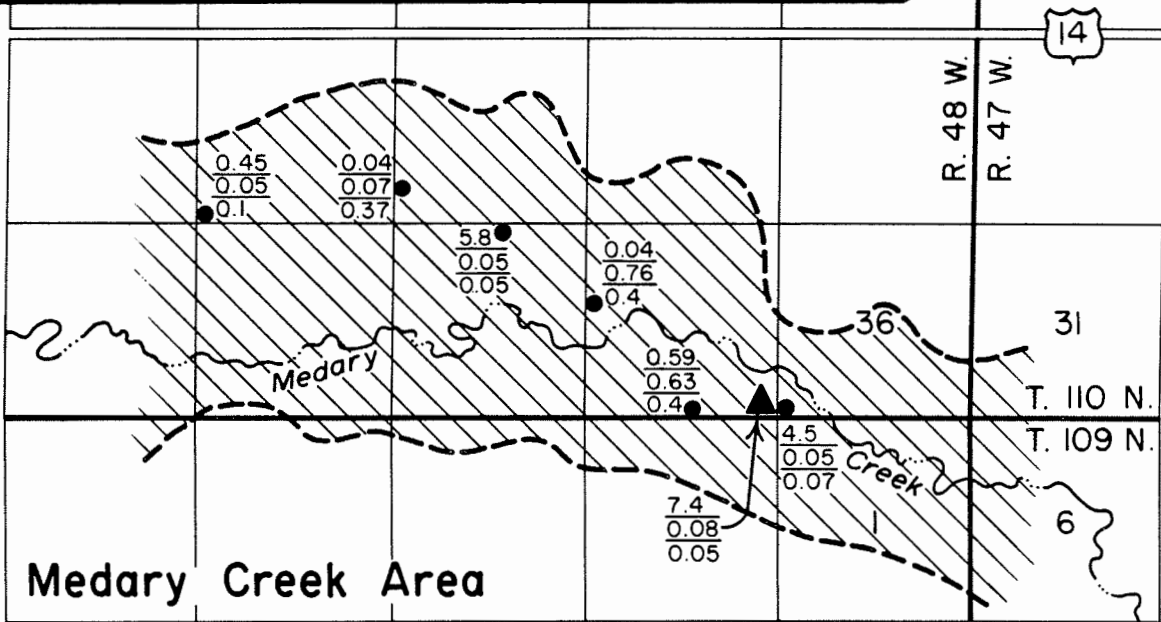
5.8 ● Well. Numbers are concentrations in parts per million.  
 $\frac{0.05}{0.05}$  Upper number is nitrate-nitrogen; middle number is iron; lower number is manganese.

▲ Aquifer test well.

— Intermittent stream.

▨ Approximate extent of aquifer.

0 1 2 3 4 Miles





## ACTIONS SUBSEQUENT TO THE INVESTIGATION

After obtaining an agreement from the landowner and at the instruction of the engineering firm, a private drilling company was hired to drill a production well in the southeast corner of sec. 35, T. 110 N., R. 48 W. The Brookings-Deuel Rural Water System obtained water rights from the Division of Water Rights, Department of Water and Natural Resources in Pierre, South Dakota. An aquifer test was conducted for 24 hours from November 18 to November 19, 1983. A production well with 12-inch diameter steel casing and a 7-foot long, 80 slot Johnson screen, installed to a depth of 38 feet, was pumped at a rate of 200 gallons per minute (gpm) during the test. Three observation wells at various distances from the production well were monitored during the test. Water pumped from the production well was piped northeast to the road ditch. The South Dakota Geological Survey supervised the aquifer test and collected a water sample which was sent to the Office of Drinking Water, Department of Water and Natural Resources in Pierre, South Dakota, for analysis.

The aquifer yield and water-quality data collected during the aquifer test showed that the yield of the production well was satisfactory for rural water system use. This well was added to the Brookings-Deuel Rural Water System.

## REFERENCES

- Barari, Assad, and Beissel, Dennis, 1976, Ground-water study for the Brookings-Deuel Rural Water System: South Dakota Geological Survey Open-File Report 7-UR, 113 p.
- Tomhave, Dennis W., 1987, Sand and gravel resources in Brookings County, South Dakota: South Dakota Geological Survey, Information Pamphlet 38.
- U.S. Environmental Protection Agency, 1985a, National interim primary drinking water standards - maximum contaminant levels for inorganic chemicals: Code of Federal Regulations, Title 40, Part 141, Section 141.11, p. 523-524.
- \_\_\_\_\_ 1985b, National secondary drinking water regulations - secondary maximum contaminant levels: Code of Federal Regulations, Title 40, Part 143, Section 143.3, p. 584.

## APPENDIX A

### Logs of test holes and observation wells drilled for this investigation

#### 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 2.

#### 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 NW NW NE sec. 34, T. 110 N., R. 48 W. is the same as a **LOCATION** of 110N-48W-34ABBB.

#### LATITUDE and LONGITUDE

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

#### DRILLING COMPANY

SDGS is an abbreviation for South Dakota Geological Survey.

#### TOTAL DRILL HOLE DEPTH and SCREEN LENGTH

The numbers are presented in feet.

#### SCREEN TYPE and CASING TYPE

PVC - polyvinyl chloride

#### CASING TOP ELEVATION and GROUND SURFACE ELEVATION

The numbers are presented in feet above mean sea level. The elevations were estimated using topographic maps.

#### CASING DIAMETER

The numbers are presented in inches.



MAP LOCATION: 3  
 LEGAL LOCATION: SW NW SW SW SEC. 27, T. 110 N., R. 48 W.  
 LATITUDE: 44.1757 LONGITUDE: 96.3513  
 LAND OWNER:  
 PROJECT: ELKTON/BROOKINGS-DEUEL  
 DRILLING COMPANY: SDGS  
 DRILLER: M. THOMPSON DRILLER'S LOG:  
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X  
 DATE DRILLED: 08-24-1983 DRILLING METHOD: ROTARY  
 GROUND SURFACE ELEVATION: 1661.00 T  
 TOTAL DRILL HOLE DEPTH: 50.0 TEST HOLE NUMBER: R2-83-113  
 WATER RIGHTS WELL: SDGS WELL NAME: R2-83-113  
 OTHER WELL NAME:  
 BASIN: BIG SIOUX AQUIFER: BIG SIOUX  
 MANAGEMENT UNIT: AURORA  
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 5.0  
 CASING TYPE: PVC CASING DIAMETER: 2.0  
 CASING TOP ELEVATION: 1663.20 T  
 CASING STICK-UP: 2.20 TOTAL CASING AND SCREEN: 44.5  
 WELL MAINTENANCE DATE: 08-31-1983  
 USGS HYDROLOGICAL UNIT CODE: 10170202  
 ELECTRIC LOG INFORMATION:  
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:  
 NATURAL GAMMA: EXTRA:  
 SAMPLES:

0	-	2.0	CLAY, BLACK (TOPSOIL)
2.0	-	43.0	SAND AND GRAVEL, BROWN; GRADES FROM A MEDIUM SAND TO A COARSE GRAVEL
43.0	-	50.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)

\* \* \* \*

COUNTY: BROOKINGS LOCATION: 110N-48W-28CCCC  
 MAP LOCATION: 4  
 LEGAL LOCATION: SW SW SW SW SEC. 28, T. 110 N., R. 48 W.  
 LATITUDE: 44.1748 LONGITUDE: 96.3626  
 LAND OWNER:  
 PROJECT: ELKTON/BROOKINGS-DEUEL  
 DRILLING COMPANY: SDGS  
 DRILLER: C. SCHMIG DRILLER'S LOG:  
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X  
 DATE DRILLED: 08-25-1983 DRILLING METHOD: ROTARY  
 GROUND SURFACE ELEVATION: 1643.00 T  
 TOTAL DRILL HOLE DEPTH: 50.0 TEST HOLE NUMBER: R2-83-115  
 WATER RIGHTS WELL: SDGS WELL NAME: R2-83-115  
 OTHER WELL NAME:  
 BASIN: BIG SIOUX AQUIFER: BIG SIOUX  
 MANAGEMENT UNIT: AURORA  
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 5.0  
 CASING TYPE: PVC CASING DIAMETER: 2.0  
 CASING TOP ELEVATION: 1645.00 T  
 CASING STICK-UP: 2.00 TOTAL CASING AND SCREEN: 44.8

WELL MAINTENANCE DATE: 08-31-1983  
USGS HYDROLOGICAL UNIT CODE: 10170202  
ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:  
NATURAL GAMMA: EXTRA:  
SAMPLES:

0	-	1.0	CLAY, BLACK (TOPSOIL)
1.0	-	44.0	SAND AND GRAVEL, BROWN; GRADES FROM A MEDIUM SAND TO A COARSE GRAVEL
44.0	-	50.0	CLAY, TANNISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)

\* \* \* \*

COUNTY: BROOKINGS LOCATION: 110N-48W-33AADD  
MAP LOCATION: 5  
LEGAL LOCATION: SE SE NE NE SEC. 33, T. 110 N., R. 48 W.  
LATITUDE: 44.1736 LONGITUDE: 96.3514  
LAND OWNER:

PROJECT: ELKTON/BROOKINGS-DEUEL  
DRILLING COMPANY: SDGS  
DRILLER: M. JARRETT DRILLER'S LOG:  
GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X  
DATE DRILLED: 08-29-1983 DRILLING METHOD: ROTARY  
GROUND SURFACE ELEVATION: 1651.00 T  
TOTAL DRILL HOLE DEPTH: 50.0 TEST HOLE NUMBER: R2-83-117  
USGS HYDROLOGICAL UNIT CODE: 10170202  
ELECTRIC LOG INFORMATION:  
SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:  
NATURAL GAMMA: EXTRA:  
SAMPLES:

0	-	1.0	CLAY, BLACK (TOPSOIL)
1.0	-	32.0	SAND AND GRAVEL, BROWN; GRADES FROM A MEDIUM SAND TO A COARSE GRAVEL
32.0	-	33.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
33.0	-	35.0	SAND, GRAY, FINE TO COARSE; UNOXIDIZED
35.0	-	43.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
43.0	-	47.0	SAND, GRAY, MEDIUM TO COARSE; UNOXIDIZED
47.0	-	50.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)

\* \* \* \*

COUNTY: BROOKINGS LOCATION: 110N-48W-34ABBB  
MAP LOCATION: 6  
LEGAL LOCATION: NW NW NW NE SEC. 34, T. 110 N., R. 48 W.  
LATITUDE: 44.1747 LONGITUDE: 96.3436  
LAND OWNER:  
PROJECT: ELKTON/BROOKINGS-DEUEL  
DRILLING COMPANY: SDGS

DRILLER: M. JARRETT  
 GEOLOGIST: D. TOMHAVE  
 DATE DRILLED: 08-31-1983  
 GROUND SURFACE ELEVATION: 1664.00 T  
 TOTAL DRILL HOLE DEPTH: 50.0  
 WATER RIGHTS WELL:  
 OTHER WELL NAME:  
 BASIN: BIG SIOUX  
 MANAGEMENT UNIT: AURORA  
 SCREEN TYPE: PVC, MFG.  
 CASING TYPE: PVC  
 CASING TOP ELEVATION: 1665.60 T  
 CASING STICK-UP: 1.60  
 WELL MAINTENANCE DATE: 09-01-1983  
 USGS HYDROLOGICAL UNIT CODE: 10170202  
 ELECTRIC LOG INFORMATION:  
 SPONTANEOUS POTENTIAL:  
 NATURAL GAMMA:  
 SAMPLES:

DRILLER'S LOG:  
 GEOLOGIST'S LOG: X  
 DRILLING METHOD: ROTARY  
 TEST HOLE NUMBER: R2-83-124  
 SDGS WELL NAME: R2-83-124

AQUIFER: BIG SIOUX  
 SCREEN LENGTH: 5.0  
 CASING DIAMETER: 2.0  
 TOTAL CASING AND SCREEN: 44.6

0	-	3.0	CLAY, BLACK (TOPSOIL)
3.0	-	45.0	SAND AND GRAVEL, BROWN; GRADES FROM A MEDIUM SAND TO A COARSE GRAVEL
45.0	-	50.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)

\* \* \* \*

COUNTY: BROOKINGS  
 MAP LOCATION: 7  
 LEGAL LOCATION: NW SW SW NW SEC. 35, T. 110 N., R. 48 W.  
 LATITUDE: 44.1726  
 LAND OWNER:  
 PROJECT: ELKTON/BROOKINGS-DEUEL  
 DRILLING COMPANY: SDGS  
 DRILLER: M. THOMPSON  
 GEOLOGIST: D. TOMHAVE  
 DATE DRILLED: 08-25-1983  
 GROUND SURFACE ELEVATION: 1662.00 T  
 TOTAL DRILL HOLE DEPTH: 50.0  
 WATER RIGHTS WELL:  
 OTHER WELL NAME:  
 BASIN: BIG SIOUX  
 MANAGEMENT UNIT: AURORA  
 SCREEN TYPE: PVC, MFG.  
 CASING TYPE: PVC  
 CASING TOP ELEVATION: 1663.50 T  
 CASING STICK-UP: 1.50  
 WELL MAINTENANCE DATE: 09-01-1983  
 USGS HYDROLOGICAL UNIT CODE: 10170202  
 ELECTRIC LOG INFORMATION:  
 SPONTANEOUS POTENTIAL:  
 NATURAL GAMMA:  
 SAMPLES:

LOCATION: 110N-48W-35BCCB  
 LONGITUDE: 96.3401  
 DRILLER'S LOG:  
 GEOLOGIST'S LOG: X  
 DRILLING METHOD: ROTARY  
 TEST HOLE NUMBER: R2-83-116  
 SDGS WELL NAME: R2-83-116

AQUIFER: BIG SIOUX  
 SCREEN LENGTH: 5.0  
 CASING DIAMETER: 2.0  
 TOTAL CASING AND SCREEN: 42.7

0 - 1.0 CLAY, BLACK (TOPSOIL)  
 1.0 - 42.0 SAND AND GRAVEL, BROWN; GRADES FROM A  
 MEDIUM SAND TO A COARSE GRAVEL  
 42.0 - 50.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
 UNOXIDIZED (TILL)

\* \* \* \*

COUNTY: BROOKINGS LOCATION: 110N-48W-35CCCC  
 MAP LOCATION: 8  
 LEGAL LOCATION: SW SW SW SW SEC. 35, T. 110 N., R. 48 W.  
 LATITUDE: 44.1657 LONGITUDE: 96.3357  
 LAND OWNER:  
 PROJECT: ELKTON/BROOKINGS-DEUEL  
 DRILLING COMPANY: SDGS  
 DRILLER: M. THOMPSON DRILLER'S LOG:  
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X  
 DATE DRILLED: 08-24-1983 DRILLING METHOD: ROTARY  
 GROUND SURFACE ELEVATION: 1662.00 T  
 TOTAL DRILL HOLE DEPTH: 50.0 TEST HOLE NUMBER: R2-83-110  
 USGS HYDROLOGICAL UNIT CODE: 10170202  
 ELECTRIC LOG INFORMATION:  
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:  
 NATURAL GAMMA: EXTRA:  
 SAMPLES:

0 - 9.0 SAND AND GRAVEL, BROWN; MEDIUM SAND TO A  
 COARSE GRAVEL  
 9.0 - 50.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
 UNOXIDIZED (TILL)

\* \* \* \*

COUNTY: BROOKINGS LOCATION: 110N-48W-35DCCC 2  
 MAP LOCATION: 9  
 LEGAL LOCATION: SW SW SW SE SEC. 35, T. 110 N., R. 48 W.  
 LATITUDE: 44.1657 LONGITUDE: 96.3321  
 LAND OWNER:  
 PROJECT: ELKTON/BROOKINGS-DEUEL  
 DRILLING COMPANY: SDGS  
 DRILLER: M. JARRETT DRILLER'S LOG:  
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X  
 DATE DRILLED: 08-24-1983 DRILLING METHOD: ROTARY  
 GROUND SURFACE ELEVATION: 1666.00 T  
 TOTAL DRILL HOLE DEPTH: 35.0 TEST HOLE NUMBER: R2-83-111  
 WATER RIGHTS WELL: SDGS WELL NAME: R2-83-111  
 OTHER WELL NAME:  
 BASIN: BIG SIOUX AQUIFER: BIG SIOUX  
 MANAGEMENT UNIT: AURORA  
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 5.0  
 CASING TYPE: PVC CASING DIAMETER: 2.0  
 CASING TOP ELEVATION: 1667.80 T  
 CASING STICK-UP: 1.80 TOTAL CASING AND SCREEN: 30.6  
 WELL MAINTENANCE DATE: 08-31-1983

USGS HYDROLOGICAL UNIT CODE: 10170202

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:  
NATURAL GAMMA: EXTRA:  
SAMPLES:

0 - 29.0 SAND AND GRAVEL, BROWN; GRADES FROM A  
MEDIUM SAND TO A COARSE GRAVEL  
29.0 - 35.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
UNOXIDIZED (TILL)

\* \* \* \*

COUNTY: BROOKINGS

LOCATION: 110N-48W-36CCCC

MAP LOCATION: 10

LEGAL LOCATION: SW SW SW SW SEC. 36, T. 110 N., R. 48 W.

LATITUDE: 44.1657

LONGITUDE: 96.3247

LAND OWNER:

PROJECT: ELKTON/BROOKINGS-DEUEL

DRILLING COMPANY: SDGS

DRILLER: C. SCHMIG

DRILLER'S LOG:

GEOLOGIST: D. TOMHAVE

GEOLOGIST'S LOG: X

DATE DRILLED: 08-24-1983

DRILLING METHOD: ROTARY

GROUND SURFACE ELEVATION: 1674.00 T

TOTAL DRILL HOLE DEPTH: 35.0

TEST HOLE NUMBER: R2-83-112

WATER RIGHTS WELL:

SDGS WELL NAME: R2-83-112

OTHER WELL NAME:

BASIN: BIG SIOUX

AQUIFER: BIG SIOUX

MANAGEMENT UNIT: AURORA

SCREEN TYPE: PVC, MFG.

SCREEN LENGTH: 5.0

CASING TYPE: PVC

CASING DIAMETER: 2.0

CASING TOP ELEVATION: 1675.20 T

CASING STICK-UP: 1.20

TOTAL CASING AND SCREEN: 26.5

WELL MAINTENANCE DATE: 08-31-1983

USGS HYDROLOGICAL UNIT CODE: 10170202

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:  
NATURAL GAMMA: EXTRA:  
SAMPLES:

0 - 1.0 CLAY, BLACK (TOPSOIL)  
1.0 - 30.0 SAND AND GRAVEL, BROWN; GRADES FROM A  
MEDIUM SAND TO A COARSE GRAVEL  
30.0 - 35.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;  
UNOXIDIZED (TILL)

\* \* \* \*

COUNTY: BROOKINGS

LOCATION: 111N-47W-31BBBB

MAP LOCATION: 11

LEGAL LOCATION: NW NW NW SW SEC. 31, T. 111 N., R. 47 W.

LATITUDE: 44.2236

LONGITUDE: 96.3134

LAND OWNER:

PROJECT: ELKTON/BROOKINGS-DEUEL



DRILLING COMPANY: SDGS  
 DRILLER: M. THOMPSON  
 GEOLOGIST: D. TOMHAVE  
 DATE DRILLED: 08-30-1983  
 GROUND SURFACE ELEVATION: 1715.00 T  
 TOTAL DRILL HOLE DEPTH: 63.0  
 WATER RIGHTS WELL:  
 OTHER WELL NAME:  
 BASIN: BIG SIOUX  
 MANAGEMENT UNIT: AURORA  
 SCREEN TYPE: PVC, MFG.  
 CASING TYPE: PVC  
 CASING TOP ELEVATION: 1717.00 T  
 CASING STICK-UP: 2.00  
 WELL MAINTENANCE DATE:  
 USGS HYDROLOGICAL UNIT CODE: 10170202  
 ELECTRIC LOG INFORMATION:  
 SPONTANEOUS POTENTIAL:  
 NATURAL GAMMA:  
 SAMPLES:

DRILLER'S LOG:  
 GEOLOGIST'S LOG: X  
 DRILLING METHOD: ROTARY  
 TEST HOLE NUMBER: R2-83-123  
 SDGS WELL NAME: R2-83-123  
 AQUIFER: BIG SIOUX  
 SCREEN LENGTH: 5.0  
 CASING DIAMETER: 2.0  
 TOTAL CASING AND SCREEN: 45.0

0	-	2.0	CLAY, BLACK (TOPSOIL)
2.0	-	9.0	GRAVEL, BROWN, MEDIUM; OXIDIZED
9.0	-	28.0	CLAY, GRAY, VERY SILTY, VERY GRAVELLY; UNOXIDIZED (ALLUVIUM)
28.0	-	63.0	GRAVEL, BROWN, COARSE TO VERY COARSE; OXIDIZED, ABANDONED HOLE

\* \* \* \*

COUNTY: BROOKINGS  
 MAP LOCATION: 12  
 LEGAL LOCATION: SW NW NW SW SEC. 35, T. 111 N., R. 48 W.  
 LATITUDE: 44.2232  
 LAND OWNER:  
 PROJECT: ELKTON/BROOKINGS-DEUEL  
 DRILLING COMPANY: SDGS  
 DRILLER: M. THOMPSON  
 GEOLOGIST: D. TOMHAVE  
 DATE DRILLED: 08-30-1983  
 GROUND SURFACE ELEVATION: 1690.00 T  
 TOTAL DRILL HOLE DEPTH: 65.0  
 WATER RIGHTS WELL:  
 OTHER WELL NAME:  
 BASIN: BIG SIOUX  
 MANAGEMENT UNIT: AURORA  
 SCREEN TYPE: PVC, MFG.  
 CASING TYPE: PVC  
 CASING TOP ELEVATION: 1692.00 T  
 CASING STICK-UP: 2.00  
 WELL MAINTENANCE DATE:  
 USGS HYDROLOGICAL UNIT CODE: 10170202  
 ELECTRIC LOG INFORMATION:  
 SPONTANEOUS POTENTIAL:

LOCATION: 111N-48W-35CBBC  
 LONGITUDE: 96.3358  
 DRILLER'S LOG:  
 GEOLOGIST'S LOG: X  
 DRILLING METHOD: ROTARY  
 TEST HOLE NUMBER: R2-83-122  
 SDGS WELL NAME: R2-83-122  
 AQUIFER: BIG SIOUX  
 SCREEN LENGTH: 5.0  
 CASING DIAMETER: 2.0  
 TOTAL CASING AND SCREEN: 45.0  
 SINGLE POINT RESISTIVITY:

NATURAL GAMMA:  
SAMPLES:

EXTRA:

0	-	3.0	CLAY, BROWN (ALLUVIUM)
3.0	-	12.0	CLAY, GRAY, VERY SILTY, SANDY, PEBBLY (ALLUVIUM)
12.0	-	49.0	GRAVEL, BROWN, MEDIUM TO VERY COARSE; OXIDIZED
49.0	-	65.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)

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