

STATE OF SOUTH DAKOTA
George S. Mickelson, Governor

DEPARTMENT OF WATER AND NATURAL RESOURCES
John J. Smith, Secretary

GEOLOGICAL SURVEY
Merlin J. Tipton, State Geologist

Open-File Report No. 48-UR

GROUND-WATER STUDY FOR THE CITY OF
ARLINGTON, SOUTH DAKOTA

by

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CONTENTS

	Page
INTRODUCTION	1
BACKGROUND INFORMATION	1
RESULTS OF INVESTIGATION	1
ACTIONS SUBSEQUENT TO INVESTIGATION	1
REFERENCES	8

FIGURES

1. Data map	2
2. Saturated thickness of the Altamont aquifer, with bedrock-surface contours	6
3. Saturated thickness of the Ramona aquifer	7

TABLES

1. Water quality	3
2. Well inventory	4

APPENDIX

A. Logs of test holes and observation wells	9
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INTRODUCTION

This report contains the results of a ground-water investigation conducted by the South Dakota Geological Survey for the City of Arlington, South Dakota. Field work was conducted from June 13 to June 22, 1983. The investigation included: drilling and logging of 10 rotary test holes (fig. 1), construction of 3 observation wells (fig. 1), collection and analysis of 7 water samples (table 1), and compilation of a private well inventory (table 2).

The investigation was financed by the South Dakota Geological Survey, the East Dakota Water Development District, and the City of Arlington.

BACKGROUND INFORMATION

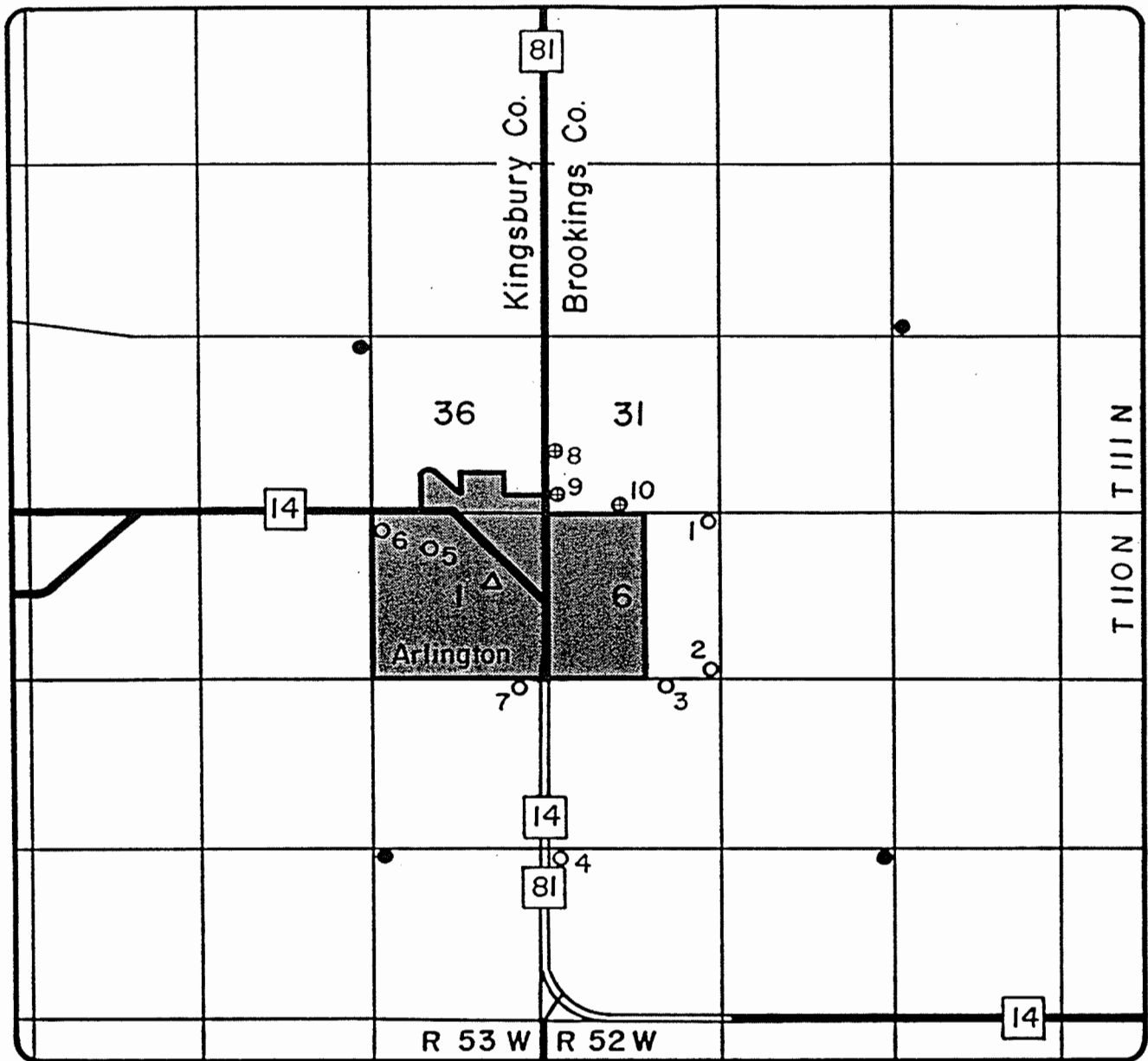
Arlington previously obtained its water from a 618-foot deep well tapping a basal glacial aquifer, the Altamont aquifer (Hamilton, in prep.) (fig. 2). The City decided to investigate the potential of all aquifers in this area before drilling a new city well and asked the South Dakota Geological Survey to conduct a ground-water study.

RESULTS OF INVESTIGATION

During the investigation, a shallower aquifer, the Ramona aquifer (Hamilton, in prep.), was located in the vicinity of Arlington (fig. 3) and three observation wells were installed in it (fig. 1). General water quality proved not to be any better than the water already being used by the City. The observation well at map location (ML) 9 (fig. 1, table 1) seemed to deliver the best quality water with lower total solids and much lower sodium concentration but it was twice as hard as the present City water (table 1). The concentration of total-dissolved solids in the present City water supply is high and exceeds 2,000 parts per million (table 1). No aquifer with significantly better water was located near the City.

ACTIONS SUBSEQUENT TO THE INVESTIGATION

From this information, the City of Arlington decided to apply for water rights through the Division of Water Rights, Department of Water and Natural Resources, in Pierre, South Dakota, to drill a new well in the vicinity of the old well to the same basal aquifer. A private drilling company was hired to drill a production well and conduct an aquifer test. The South Dakota Geological Survey logged the test hole for the production well and the U.S. Geological Survey supervised the aquifer test. Results of the aquifer test are on file at the U.S. Geological Survey in Huron, South Dakota.



△ City Well

● Test hole drilled for a another investigation. (Lehr, J.D., and Johnson, Gary D., in prep.)

○₃ Test hole drilled for this investigation.

⊕₈ Observation well installed for this investigation.

0 1 Mile



Number is map location (ML) number. See appendix A for explanation and for logs of test holes and wells.

FIGURE 1. Data Map.

TABLE 1. Water Quality

(1) Chemical Constituents -- Parts per million

Well ID (2)	Location (3)	SDGS Lab ID (4)	Date Sampled	Depth Well (ft) (5)	Conductivity (mmhos) (6)	TDS	Hardness as CaCO ₃	Fe	Mn	SO ₄	NO ₃ -N	Na	Ca	Mg	K	Cl	F	HCO ₃
RAMONA AQUIFER																		
ML8	111N-52W-31C8CB	ARC-83-001	06/22/83	245	2250	1980	1210	0.14	1.07	1240	<0.08	68	296	115	-----	3	0.70	-----
ML8	111N-52W-31C8CB	ARC-84-006	06/20/84	245	2180	1960	1294	-0.05	1.32	1225	<0.2	66	330	115	9.5	3	1.13	-----
ML9	111N-52W-31C8CB	ARC-83-002	06/22/83	275	1540	1240	790	0.12	0.06	716	<0.08	50	190	77	-----	5	0.57	-----
ML9	111N-52W-31C8CB	ARC-84-005	06/20/84	275	1543	1245	777	-0.05	-0.05	700	2.6	50	180	80	5.3	6	0.6	-----
ML10	111N-52W-31C8CB	ARC-84-004	06/20/84	280	1991	1750	1201	-0.05	2.37	1098	<0.2	73	296	113	9.2	4	1.6	-----
ALTMONT AQUIFER																		
City Well	110N-53W-01AC	ARC-83-004	06/22/83	618	-----	2077	363	3.0	0.17	910	<0.1	560	86	33	16.0	190	0.4	487
City Well	110N-53W-01AC	ARC-84-007	06/20/84	618	2732	2045	365	0.25	0.15	810	<0.2	490	92	33	12.7	183	2.3	-----
EPA LIMITS						500		0.3	0.05	250	10					250	2.4	
						(7)		(7)	(7)	(7)	(8)					(7)	(8)	

(1): TDS - total dissolved solids; Fe - iron; Mn - manganese; SO₄ - sulfate; NO₃-N - nitrate nitrogen; Na - sodium; Ca - calcium; Mg - magnesium; K - potassium; Cl - chloride; F - fluoride; HCO₃ - 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 enforceable limits (U.S. Environmental Protection Agency, 1985a).

Samples collected from observation wells were air lifted. Samples collected from the city well were by submersible pump.

TABLE 2. Well Inventory

EXPLANATION:

Casing: S - Steel; P - Plastic; C - Concrete
 Pump: S - Submersible; C - Cylinder
 Use: S - Stock; D - Domestic; N - None
 Geologic Source: G - Glacial Outwash; D - Dakota Formation
 Location: Given as quarter section, Section, Township, and Range

Well Owner's Name	Location	Depth of well (ft)	Casing	Pump	Use	Geologic Source
R. Nelson	SW SW SW SW sec. 4, T. 110 N., R. 52 W.	203	S	C	S	G
O. Piehl	NE SW NW NE sec. 5, T. 110 N., R. 52 W.	300	S	C	N	G
J. Olsen	SW SW SW SW sec. 5, T. 110 N., R. 52 W.	437	S	C	S	G
L. Peterson	SE SE SE SE sec. 7, T. 110 N., R. 52 W.	?	S	C	S	G
R. Quam	NW NW SW NW sec. 8, T. 110 N., R. 52 W.	120	S	C	S	G
R. Selken	SW SE SW SE sec. 9, T. 110 N., R. 52 W.	220	P	S	S&D	G
M. Selken	SE SW NW NW sec. 16, T. 110 N., R. 52 W.	160	S	C	S&D	G
H. Selken	SW SW SW SW sec. 17, T. 110 N., R. 52 W.	385	S	C	S&D	G
D. Jensen	SW SW NW NW sec. 19, T. 110 N., R. 52 W.	535	S	C	S&D	G
P. Cleveland	NE SE NE SE sec. 2, T. 110 N., R. 53 W.	275	S	C	S	G
D. Lee	SE SE SE NE sec. 3, T. 110 N., R. 53 W.	180	S	C	S	G
L. Gisselbeck	NE NE NE SE sec. 10, T. 110 N., R. 53 W.	1240	S	S	S&D	D
M. Peterson	NE NE NE SW sec. 11, T. 110 N., R. 53 W.	385	S	S	S&D	G

Well Owner's Name	Location	Depth of well (ft)	Casing	Pump	Use	Geologic Source
R. Cheney	SE NE NE SW sec. 12, T. 110 N., R. 53 W.	585+	S	C	---	G
R. Lee	NW NE NW NE sec. 13, T. 110 N., R. 53 W.	300+	S	C	S	G
A. Groom	SE NW NE NE sec. 14, T. 110 N., R. 53 W.	400+	S	C	S	G
T. Thorsvold	NW NW SW NW sec. 14, T. 110 N., R. 53 W.	451	S	C	S&D	G
L. Rapp	NW NW NW SW sec. 14, T. 110 N., R. 53 W.	450+	S	C	S	G
H. Larsen	NE SE NE SE sec. 15, T. 110 N., R. 53 W.	430	S	C	S	G
O. Piehl	NE SE SE SW sec. 19, T. 111 N., R. 52 W.	280+	S	C	S&D	G
G. L. Eggebraaten	SW NW SW SW sec. 20, T. 111 N., R. 52 W.	110	C	S	S&D	G
D. Karlstad	SW SW SW NW sec. 29, T. 111 N., R. 52 W.	180	S	C	S	G
K. Liebach	NW NW SW SW sec. 29, T. 111 N., R. 52 W.	180	S	S	N	G
H. Bennett	SE NW SE SE sec. 30, T. 111 N., R. 52 W.	285	P	S	S	G
W. Kuehn	NE NE SE SE sec. 27, T. 111 N., R. 53 W.	386	S	C	S	G
E. Hoyer	SE SE SE SE sec. 35, T. 111 N., R. 53 W.	180+	S	C	S	G
J. Loyd	SE SE SE NE sec. 36, T. 111 N., R. 53 W.	50	C	?	N	G

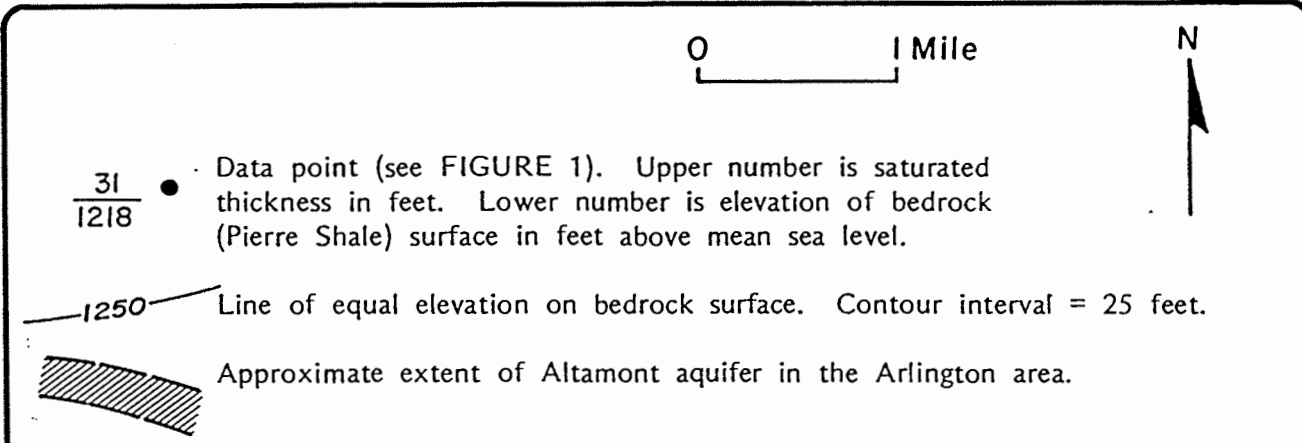
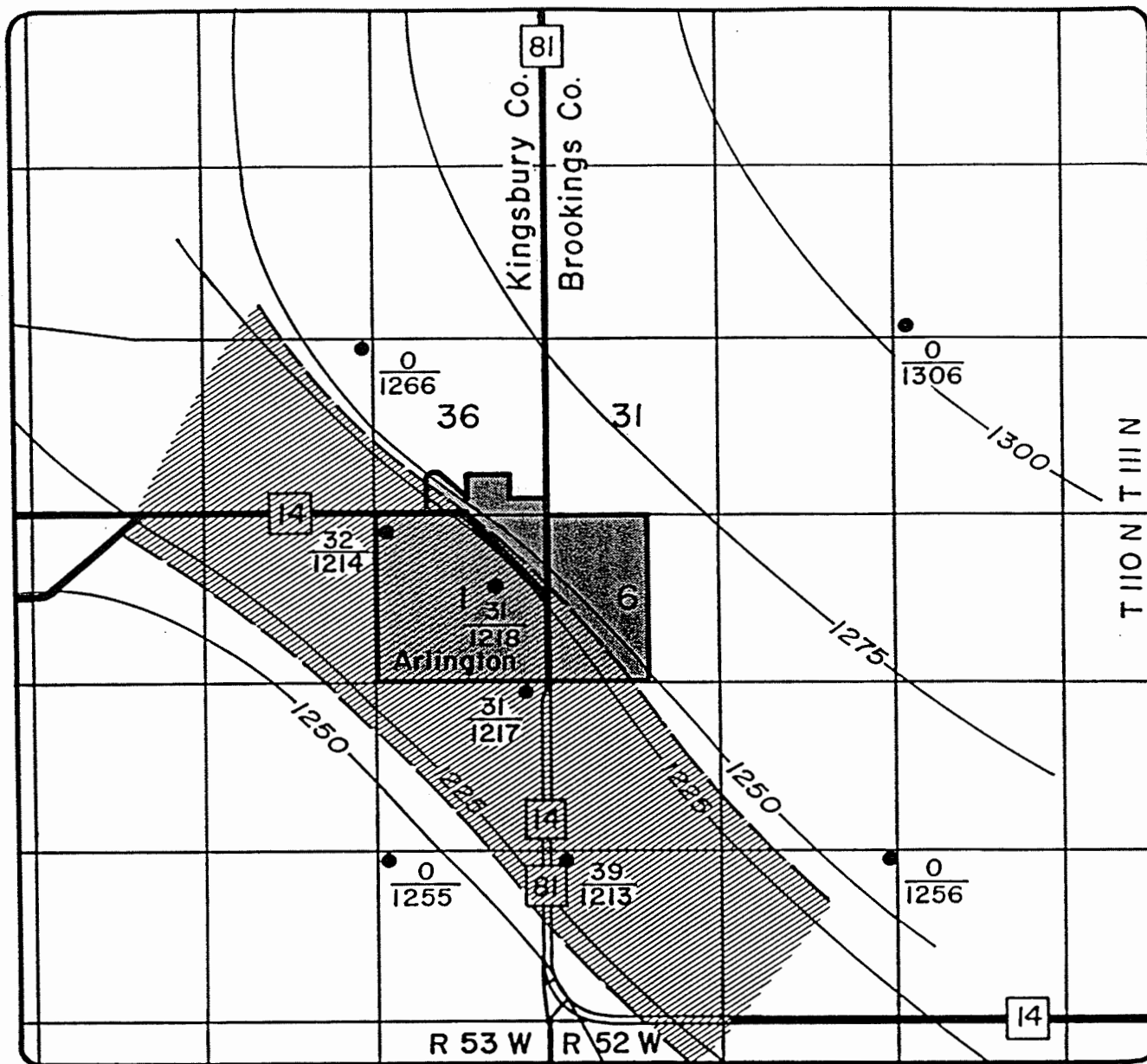
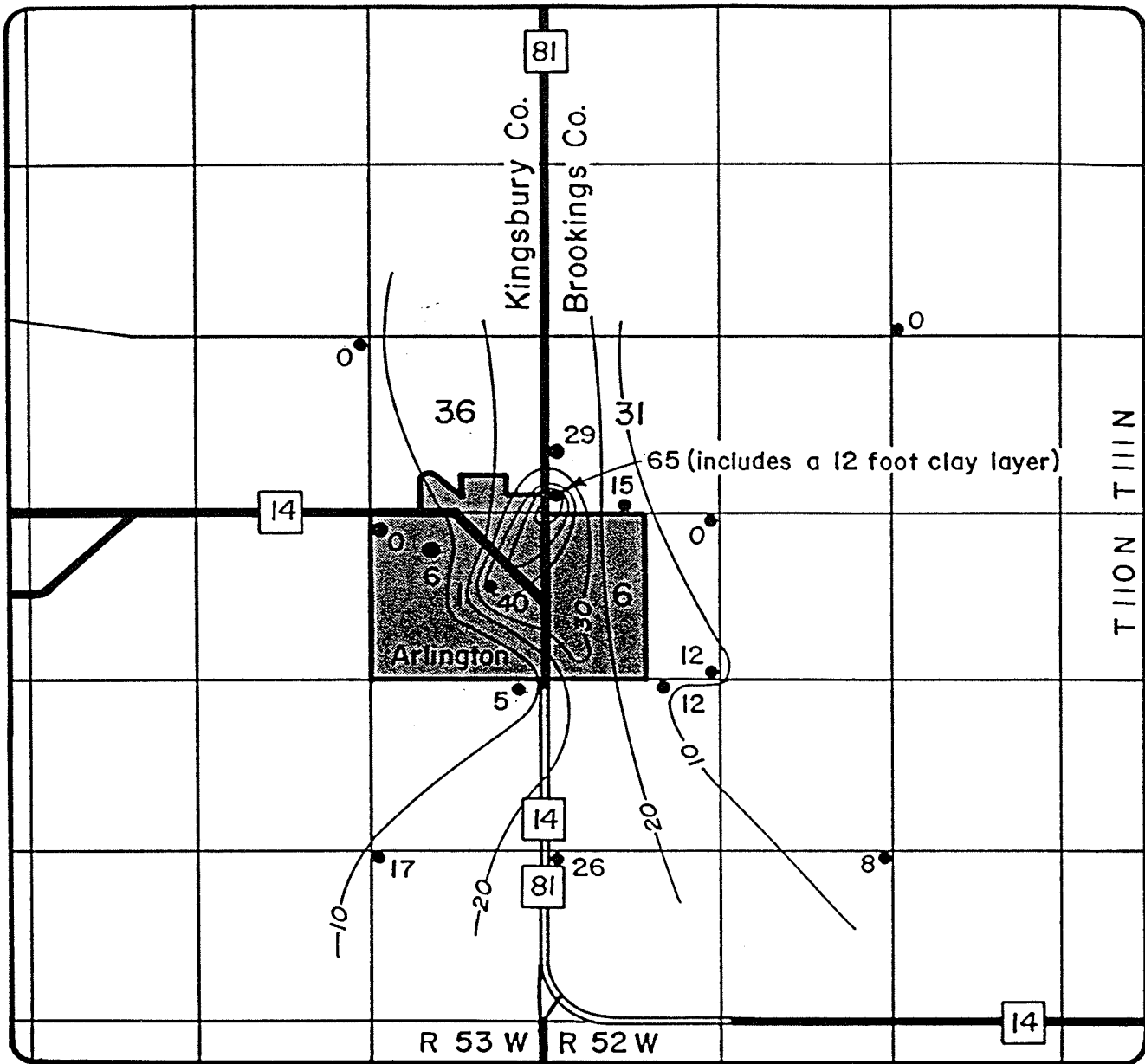


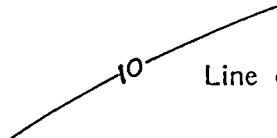
FIGURE 2. Saturated thickness of the Altamont aquifer, with bedrock surface contours.



0 1 Mile



6 • Data point (see FIGURE 1). Number is saturated thickness, in feet.



Line of equal saturated thickness. Contour interval = 10 feet.

FIGURE 3. Saturated thickness of the Ramona aquifer.

REFERENCES

- Hamilton, Louis J., in preparation, Water resources of Brookings and Kingsbury Counties, South Dakota: U.S. Geological Survey Water-Resources Investigations Report.
- Lehr, J. D., and Johnson, Gary D., in preparation, Geology of Brookings and Kingsbury Counties, South Dakota: South Dakota Geological Survey Bulletin.
- 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

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 1.

LEGAL LOCATION and LONGITUDE

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 SW SW SW sec. 31, T. 111 N., R. 52 W. is the same as a LOCATION of 111N-52W-31CCCB,

LATITUDE and LOCATION

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.

COUNTY: BROOKINGS LOCATION: 110N-52W-06AAAA
MAP LOCATION: 1
LEGAL LOCATION: NE NE NE NE SEC. 06, T. 110 N., R. 52 W.
LATITUDE: 44.2208 LONGITUDE: 97.0629

LAND OWNER:
PROJECT: ARLINGTON CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: M. THOMPSON/M. JARRETT DRILLER'S LOG:
GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
DATE DRILLED: 06-17-1983 DRILLING METHOD: ROTARY
GROUND SURFACE ELEVATION: 1820.00 T
TOTAL DRILL HOLE DEPTH: 350.0 TEST HOLE NUMBER: R2-83-51
USGS HYDROLOGICAL UNIT CODE: 10170202
ELECTRIC LOG INFORMATION:
SPONTANEOUS POTENTIAL: X SINGLE POINT RESISTIVITY: X
NATURAL GAMMA: X EXTRA:
SAMPLES:

0	-	2.0	CLAY, BLACK, SILTY (TOPSOIL)
2.0	-	14.0	SILT, YELLOWISH-BROWN, CLAYEY; OXIDIZED
14.0	-	18.0	CLAY, YELLOWISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
18.0	-	26.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
26.0	-	37.0	CLAY, BROWNISH-GRAY, SILTY, SANDY, PEBBLY; SLIGHTLY OXIDIZED (TILL)
37.0	-	116.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
116.0	-	218.0	CLAY, GRAY, SILTY, VERY SANDY, VERY PEBBLY; UNOXIDIZED, MANY SMALL GRAVEL LENSES (TILL)
218.0	-	262.0	CLAY, YELLOWISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
262.0	-	290.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
290.0	-	316.0	CLAY, YELLOWISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
316.0	-	350.0	SILT, YELLOWISH-BROWN, CLAYEY, SANDY; OXIDIZED (TILL)

* * * *

COUNTY: BROOKINGS LOCATION: 110N-52W-06DDDD
MAP LOCATION: 2
LEGAL LOCATION: SE SE SE SE SEC. 06, T. 110 N., R. 52 W.
LATITUDE: 44.2120 LONGITUDE: 97.0632

LAND OWNER:
PROJECT: ARLINGTON CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: M. JARRETT/M. THOMPSON DRILLER'S LOG:
GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
DATE DRILLED: 06-21-1983 DRILLING METHOD: ROTARY
GROUND SURFACE ELEVATION: 1805.00 T
TOTAL DRILL HOLE DEPTH: 290.0 TEST HOLE NUMBER: R2-83-52

USGS HYDROLOGICAL UNIT CODE: 10170201

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL: X

SINGLE POINT RESISTIVITY: X

NATURAL GAMMA: X

EXTRA:

SAMPLES:

0	-	1.0	CLAY, BLACK, SILTY (TOPSOIL)
1.0	-	2.0	GRAVEL, BROWN, MEDIUM; OXIDIZED
2.0	-	10.0	CLAY, LIGHT-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
10.0	-	88.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
88.0	-	142.0	CLAY, GRAY, SILTY, VERY SANDY, PEBBLY; UNOXIDIZED, SOME SMALL GRAVEL LENSES (TILL)
142.0	-	156.0	GRAVEL, GRAY, FINE TO MEDIUM, CLAYEY, SILTY; UNOXIDIZED
156.0	-	190.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
190.0	-	216.0	CLAY, YELLOWISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
216.0	-	228.0	GRAVEL, BROWN, FINE TO MEDIUM; OXIDIZED, SOME CLAY FROM 220 TO 224 FEET
228.0	-	252.0	CLAY, YELLOWISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED, GRAVEL STRINGER FROM 250 TO 252 FEET (TILL)
252.0	-	290.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)

* * * *

COUNTY: BROOKINGS

LOCATION: 110N-52W-07ABAB

MAP LOCATION: 3

LEGAL LOCATION: NW NE NW NE SEC. 07, T. 110 N., R. 52 W.

LATITUDE: 44.2117

LONGITUDE: 97.0657

LAND OWNER:

PROJECT: ARLINGTON CITY STUDY

DRILLING COMPANY: SDGS

DRILLER: M. THOMPSON

DRILLER'S LOG:

GEOLOGIST: D. TOMHAVE

GEOLOGIST'S LOG: X

DATE DRILLED: 06-22-1983

DRILLING METHOD: ROTARY

GROUND SURFACE ELEVATION: 1825.00 T

TOTAL DRILL HOLE DEPTH: 305.0

TEST HOLE NUMBER: R2-83-55

USGS HYDROLOGICAL UNIT CODE: 10170201

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL: X

SINGLE POINT RESISTIVITY: X

NATURAL GAMMA: X

EXTRA:

SAMPLES:

0	-	1.0	CLAY, BLACK, SILTY (TOPSOIL)
1.0	-	8.0	CLAY, YELLOWISH-BROWN, VERY SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
8.0	-	12.0	CLAY, BROWNISH-GRAY, SILTY, SANDY, PEBBLY; SLIGHTLY OXIDIZED (TILL)

12.0 - 214.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;
 UNOXIDIZED (TILL)
 214.0 - 216.0 GRAVEL, BROWN, FINE TO MEDIUM; OXIDIZED
 216.0 - 229.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;
 UNOXIDIZED (TILL)
 229.0 - 235.0 GRAVEL, BROWN, FINE TO MEDIUM, SANDY;
 OXIDIZED
 235.0 - 246.0 CLAY, GRAY, SILTY, SANDY, VERY PEBBLY;
 UNOXIDIZED (TILL)
 246.0 - 258.0 GRAVEL, BROWN, MEDIUM, SANDY; OXIDIZED,
 CLAY LAYER FROM 252 TO 254 FEET
 258.0 - 274.0 CLAY, YELLOWISH-BROWN, SILTY, SANDY,
 PEBBLY; OXIDIZED (TILL)
 274.0 - 276.0 GRAVEL, BROWN, FINE; OXIDIZED
 276.0 - 305.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;
 UNOXIDIZED (TILL)

* * * *

COUNTY: BROOKINGS LOCATION: 110N-52W-18BBBA
 MAP LOCATION: 4
 LEGAL LOCATION: NE NW NW NW SEC. 18, T. 110 N., R. 52 W.
 LATITUDE: 44.2025 LONGITUDE: 97.0735
 LAND OWNER:
 PROJECT: ARLINGTON CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: M. THOMPSON/C. SCHMIG DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 06-13-1983 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1770.00 T
 TOTAL DRILL HOLE DEPTH: 635.0 TEST HOLE NUMBER: R2-83-46
 USGS HYDROLOGICAL UNIT CODE: 10170201
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: X SINGLE POINT RESISTIVITY: X
 NATURAL GAMMA: X EXTRA:
 SAMPLES:

0 - 1.0 CLAY, BLACK, SILTY; MOIST (TOPSOIL)
 1.0 - 24.0 CLAY, YELLOWISH-BROWN, SILTY, SANDY,
 PEBBLY; OXIDIZED (TILL)
 24.0 - 42.0 CLAY, BROWNISH-GRAY, SILTY, SANDY,
 PEBBLY; SLIGHTLY OXIDIZED (TILL)
 42.0 - 165.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;
 UNOXIDIZED, GRAVEL FROM 79 TO 82 FEET
 (TILL)
 165.0 - 206.0 CLAY, YELLOWISH-BROWN, SILTY, SANDY,
 PEBBLY; OXIDIZED (TILL)
 206.0 - 232.0 GRAVEL, BROWN, FINE TO COARSE; OXIDIZED
 232.0 - 258.0 CLAY, YELLOWISH-BROWN, SILTY, SANDY,
 PEBBLY; OXIDIZED (TILL)
 258.0 - 440.0 CLAY, GRAYISH-BROWN, SILTY, SANDY,
 PEBBLY; SLIGHTLY OXIDIZED (TILL)
 440.0 - 518.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;
 UNOXIDIZED, GRAVEL FROM 486 TO 490

		FEET (TILL)
518.0 -	557.0	GRAVEL, GRAY, FINE TO MEDIUM; UNOXIDIZED
557.0 -	572.0	SHALE, DARK-GRAY, CLAYEY, SILTY; UNOXIDIZED (PIERRE SHALE)
572.0 -	635.0	CHALK, WHITISH-BROWN, CLAYEY, SILTY; OXIDIZED, VERY CALCAREOUS (NIOBRARA FORMATION)

* * * *

COUNTY: KINGSBURY	LOCATION: 110N-53W-01BACD
MAP LOCATION: 5	
LEGAL LOCATION: SE SW NE NW SEC. 01, T. 110 N., R. 53 W.	
LATITUDE: 44.2200	LONGITUDE: 97.0826
LAND OWNER:	
PROJECT: ARLINGTON CITY STUDY	
DRILLING COMPANY: SDGS	
DRILLER: C. SCHMIG/M. THOMPSON	DRILLER'S LOG:
GEOLOGIST: D. TOMHAVE	GEOLOGIST'S LOG: X
DATE DRILLED: 06-16-1983	DRILLING METHOD: ROTARY
GROUND SURFACE ELEVATION: 1818.00 T	
TOTAL DRILL HOLE DEPTH: 335.0	TEST HOLE NUMBER: R2-83-50
USGS HYDROLOGICAL UNIT CODE: 10170201	
ELECTRIC LOG INFORMATION:	
SPONTANEOUS POTENTIAL: X	SINGLE POINT RESISTIVITY: X
NATURAL GAMMA: X	EXTRA:
SAMPLES:	

0 -	3.0	CLAY, BLACK, SILTY; MOIST (TOPSOIL)
3.0 -	6.0	CLAY, YELLOWISH-BROWN, VERY SILTY, SANDY, PEBBLY; OXIDIZED
6.0 -	8.0	SAND, BROWN, FINE, SILTY; OXIDIZED
8.0 -	18.0	CLAY, BROWNISH-GRAY, SILTY, SANDY, PEBBLY; SLIGHTLY OXIDIZED (TILL)
18.0 -	84.0	CLAY, GRAY, VERY SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
84.0 -	131.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
131.0 -	218.0	CLAY, GRAY, VERY SILTY, VERY SANDY, PEBBLY; UNOXIDIZED (TILL)
218.0 -	239.0	CLAY, YELLOWISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
239.0 -	245.0	GRAVEL, BROWN, FINE TO MEDIUM; OXIDIZED
245.0 -	291.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
291.0 -	295.0	GRAVEL, BROWN, VERY COARSE; OXIDIZED
295.0 -	335.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)

* * * *

COUNTY: KINGSBURY	LOCATION: 110N-53W-01BBBC
MAP LOCATION: 6	
LEGAL LOCATION: SW NW NW NW SEC. 01, T. 110 N., R. 53 W.	

LATITUDE: 44.2206 LONGITUDE: 97.0854
 LAND OWNER:
 PROJECT: ARLINGTON CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: C. SCHMIG/M. THOMPSON DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 06-15-1983 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1831.00 T
 TOTAL DRILL HOLE DEPTH: 665.0 TEST HOLE NUMBER: R2-83-48
 USGS HYDROLOGICAL UNIT CODE: 10170201
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: SINGLE POINT RESISTIVITY:
 NATURAL GAMMA: EXTRA:
 SAMPLES:

0	-	1.0	CLAY, BLACK, SILTY, VERY SANDY; MOIST (TOPSOIL)
1.0	-	23.0	CLAY, TANNISH-BROWN, VERY SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
23.0	-	208.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED, SOME SMALL GRAVEL LENSES (TILL)
208.0	-	268.0	CLAY, YELLOWISH-BROWN, SILTY, VERY SANDY, PEBBLY; OXIDIZED (TILL)
268.0	-	548.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED, SOME SMALL GRAVEL LENSES (TILL)
548.0	-	561.0	GRAVEL, BROWN, FINE TO MEDIUM; OXIDIZED
561.0	-	585.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
585.0	-	617.0	GRAVEL, GRAYISH-BROWN, FINE TO MEDIUM
617.0	-	646.0	SHALE, DARK-GRAY, CLAYEY, SILTY; UNOXIDIZED, GREASY (PIERRE SHALE)
646.0	-	665.0	CHALK, GRAYISH-BROWN, CLAYEY, SILTY; OXIDIZED, CALCAREOUS (NIOBRARA FORMATION)

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COUNTY: KINGSBURY LOCATION: 110N-53W-12AAAB
 MAP LOCATION: 7
 LEGAL LOCATION: NW NE NE NE SEC. 12, T. 110 N., R. 53 W.
 LATITUDE: 44.2117 LONGITUDE: 97.0735
 LAND OWNER:
 PROJECT: ARLINGTON CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: C. SCHMIG/M. THOMPSON DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 06-14-1983 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1834.00 T
 TOTAL DRILL HOLE DEPTH: 680.0 TEST HOLE NUMBER: R2-83-47
 USGS HYDROLOGICAL UNIT CODE: 10170201
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: X SINGLE POINT RESISTIVITY: X

NATURAL GAMMA: X
SAMPLES:

EXTRA:

0	-	1.0	CLAY, BLACK, SILTY; MOIST (TOPSOIL)
1.0	-	29.0	CLAY, TANNISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
29.0	-	228.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED, SOME SMALL GRAVEL LENSES (TILL)
228.0	-	271.0	CLAY, BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
271.0	-	276.0	GRAVEL, BROWN, MEDIUM TO COARSE; OXIDIZED
276.0	-	414.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
414.0	-	430.0	GRAVEL, BROWN, FINE TO MEDIUM; OXIDIZED
430.0	-	478.0	CLAY, BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
478.0	-	586.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
586.0	-	617.0	GRAVEL, GRAY, FINE TO MEDIUM; UNOXIDIZED
617.0	-	653.0	SHALE, DARK-GRAY, CLAYEY, SILTY; UNOXIDIZED (PIERRE SHALE)
653.0	-	680.0	CHALK, LIGHT-GRAY, CLAYEY, SILTY; UNOXIDIZED, VERY CALCAREOUS (NIOBRARA FORMATION)

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COUNTY: BROOKINGS

LOCATION: 111N-52W-31CBCB

MAP LOCATION:

8

LEGAL LOCATION: NW SW NW SW SEC. 31, T. 111 N., R. 52 W.

LATITUDE: 44.2228

LONGITUDE: 97.0741

LAND OWNER:

PROJECT: ARLINGTON CITY STUDY

DRILLING COMPANY: SDGS

DRILLER: M. THOMPSON

DRILLER'S LOG:

GEOLOGIST: D. TOMHAVE

GEOLOGIST'S LOG: X

DATE DRILLED: 06-21-1983

DRILLING METHOD: ROTARY

GROUND SURFACE ELEVATION: 1800.00 T

TOTAL DRILL HOLE DEPTH: 275.0

TEST HOLE NUMBER: R2-83-53

WATER RIGHTS WELL:

SDGS WELL NAME: R2-83-53

OTHER WELL NAME:

BASIN: BIG SIOUX

AQUIFER:

MANAGEMENT UNIT:

SCREEN TYPE: PVC, MFG.

SCREEN LENGTH: 5.0

CASING TYPE: PVC

CASING DIAMETER: 2.0

CASING TOP ELEVATION: 1802.00 T

CASING STICK-UP: 2.00

TOTAL CASING AND SCREEN: 245.0

WELL MAINTENANCE DATE:

USGS HYDROLOGICAL UNIT CODE: 10170201

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL:

SINGLE POINT RESISTIVITY:

NATURAL GAMMA:

EXTRA:

SAMPLES:

0	-	2.0	CLAY, BLACK, SILTY (TOPSOIL)
2.0	-	33.0	CLAY, GRAYISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
33.0	-	65.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)
65.0	-	164.0	CLAY, GRAY, SILTY, VERY SANDY, PEBBLY; UNOXIDIZED, SOME SMALL GRAVEL LENSES (TILL)
164.0	-	221.0	CLAY, YELLOWISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
221.0	-	250.0	GRAVEL, BROWN, MEDIUM; OXIDIZED, SEVERAL SMALL CLAY LAYERS
250.0	-	275.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED (TILL)

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COUNTY: BROOKINGS

LOCATION: 111N-52W-31CCCB

MAP LOCATION: 9

LEGAL LOCATION: NW SW SW SW SEC. 31, T. 111 N., R. 52 W.

LATITUDE: 44.2215

LONGITUDE: 97.0741

LAND OWNER:

PROJECT: ARLINGTON CITY STUDY

DRILLING COMPANY: SDGS

DRILLER: M. THOMPSON/C. SCHMIG

DRILLER'S LOG:

GEOLOGIST: D. TOMHAVE

GEOLOGIST'S LOG: X

DATE DRILLED: 06-16-1983

DRILLING METHOD: ROTARY

GROUND SURFACE ELEVATION: 1820.00 T

TOTAL DRILL HOLE DEPTH: 305.0

TEST HOLE NUMBER: R2-83-49

WATER RIGHTS WELL:

SDGS WELL NAME: R2-83-49

OTHER WELL NAME:

BASIN: BIG SIOUX

AQUIFER:

MANAGEMENT UNIT:

SCREEN TYPE: PVC, MFG.

SCREEN LENGTH: 5.0

CASING TYPE: PVC

CASING DIAMETER: 2.0

CASING TOP ELEVATION: 1822.00 T

CASING STICK-UP: 2.00

TOTAL CASING AND SCREEN: 275.0

WELL MAINTENANCE DATE:

USGS HYDROLOGICAL UNIT CODE: 10170201

ELECTRIC LOG INFORMATION:

SPONTANEOUS POTENTIAL:

SINGLE POINT RESISTIVITY:

NATURAL GAMMA: X

EXTRA:

SAMPLES:

0	-	46.0	CLAY, YELLOWISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
46.0	-	176.0	CLAY, GRAY, SILTY, SANDY, PEBBLY; UNOXIDIZED, SOME SMALL GRAVEL LENSES (TILL)
176.0	-	208.0	CLAY, ORANGISH-BROWN, SILTY, SANDY, PEBBLY; OXIDIZED (TILL)
208.0	-	232.0	SAND AND GRAVEL, BROWN; OXIDIZED, GRADES FROM A MEDIUM SAND TO A COARSE GRAVEL
232.0	-	244.0	CLAY, BROWN, SILTY, SANDY, PEBBLY;

244.0 - 273.0 OXIDIZED (TILL?)
 SAND AND GRAVEL, BROWN; OXIDIZED, GRADES
 FROM A MEDIUM SAND TO A MEDIUM GRAVEL
 273.0 - 305.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;
 UNOXIDIZED (TILL)

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COUNTY: BROOKINGS LOCATION: 111N-52W-31CDDC
 MAP LOCATION: 10
 LEGAL LOCATION: SW SE SE SW SEC. 31, T. 111 N., R. 52 W.
 LATITUDE: 44.2211 LONGITUDE: 97.0713
 LAND OWNER:
 PROJECT: ARLINGTON CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: M. JARRETT DRILLER'S LOG:
 GEOLOGIST: D. TOMHAVE GEOLOGIST'S LOG: X
 DATE DRILLED: 06-22-1983 DRILLING METHOD: ROTARY
 GROUND SURFACE ELEVATION: 1805.00 T
 TOTAL DRILL HOLE DEPTH: 305.0 TEST HOLE NUMBER: R2-83-54
 WATER RIGHTS WELL: SDGS WELL NAME: R2-83-54
 OTHER WELL NAME:
 BASIN: BIG SIOUX AQUIFER:
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 5.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION: 1807.00 T
 CASING STICK-UP: 2.00 TOTAL CASING AND SCREEN: 280.0
 WELL MAINTENANCE DATE:
 USGS HYDROLOGICAL UNIT CODE: 10170201
 ELECTRIC LOG INFORMATION:
 SPONTANEOUS POTENTIAL: X SINGLE POINT RESISTIVITY: X
 NATURAL GAMMA: X EXTRA:
 SAMPLES:

0 - 9.0 CLAY, YELLOWISH-BROWN, SILTY, SANDY,
 PEBBLY; OXIDIZED (TILL)
 9.0 - 26.0 CLAY, BROWNISH-GRAY, SILTY, SANDY,
 PEBBLY; SLIGHTLY OXIDIZED (TILL)
 26.0 - 80.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;
 UNOXIDIZED (TILL)
 80.0 - 186.0 CLAY, GRAY, VERY SILTY, SANDY,
 PEBBLY; UNOXIDIZED, SMALL GRAVEL
 LENSES (TILL)
 186.0 - 266.0 CLAY, YELLOWISH-BROWN, SILTY, SANDY,
 PEBBLY; OXIDIZED (TILL)
 266.0 - 281.0 SAND AND GRAVEL, BROWN; OXIDIZED, GRADES
 FROM A COARSE SAND TO A MEDIUM GRAVEL
 281.0 - 305.0 CLAY, GRAY, SILTY, SANDY, PEBBLY;
 UNOXIDIZED (TILL)

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