STATE OF SOUTH DAKOTA Richard Kneip, Governor

DEPARTMENT OF NATURAL RESOURCE DEVELOPMENT Vern W. Butler, Secretary

GEOLOGICAL SURVEY
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GROUND-WATER STUDY FOR THE BROOKINGS-DEUEL RURAL WATER SYSTEM

bу

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GROUND-WATER STUDY FOR THE BROOKINGS-DEUEL RURAL WATER SYSTEM

At the request of the Brookings-Deuel Rural Water System, the South Dakota Geological Survey conducted a ground-water study in three areas: White-Deer Creek, north of Bruce, and Clear Lake. The purpose of the study was to locate sources of water for the Rural Water System. Two weeks of drilling were done in 1974 and three weeks in 1975. In addition, the Survey supervised two aquifer tests in 1975 and 1976 and analyzed the data.

The project was financed by East Dakota Conservancy Sub-District, Brookings County, Deuel County, Brookings-Deuel Rural Water System, and the South Dakota Geological Survey. The following are the results of the study and conclusions for each area.

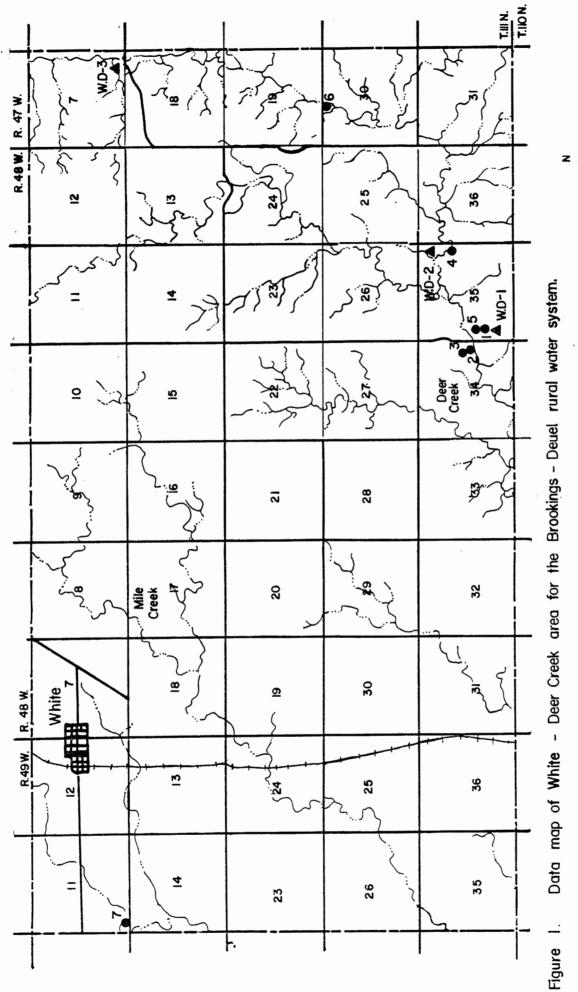
WHITE-DEER CREEK AREA

Seven test holes were drilled in the White-Deer Creek area in 1974. The logs of these test holes are in appendix A and the locations are shown in figure 1. Three water samples were collected from the area and analyzed. The chemical analysis results from these water samples are in table 1 and the locations of the samples are shown in figure 1.

The results of the test hole drilling and water sample analyses were presented to the Board of Directors of the Brookings-Deuel Water System. The long distance from the major water users to this area eliminated it from further consideration.

NORTH OF BRUCE

In the area north of Bruce three auger and two rotary holes were drilled in 1974. The analyses of three water samples



Test hole location number, refers to test hole in appendix A. **6**

▲ W.D-1 Water sample location, number refers to water sample in table 1.

miles

Chemical Analyses of Water Samples Collected from the White - Deer Creek Area Table 1.

		,		·		
	ЭшбИ			J. Finley	E. Sherman	R. Thompson
	ni zzenbrah znisra			33.5	32.9	.09
	Hardness CaCO ₃			570	560	1020
	fatoT sbifo2		10001	420	520?	1420
	albrilN nagorliM		10.0	<0.5	1.0	18.
u	Мапдапеѕе		0.05	0.1	<0.05	<0.05
Parts Per Million	Iron		0.3	0.4	<0.02	1.1
Parts P	9157[u2	1107in	500^{1}	210	50	140
	Chlorides		250	10	15	110
	muisəngsM			40	70	100
	ınu i bo2			10	2	20
	aniolsƏ			160	115	240
	To diged (iset) (feet)			333	50	20
	9 Fqm52		А	WD-1	UD-2	ND-3

Drinking water standards, U.S. Public Health Service (1962).

All samples were analyzed by the South Dakota Geological Survey.

Modified for South Dakota by the Department of Health (written communication, Mater Sanitation Section, September 24, 1963).

2. To convert to grains, divide parts per million by 17.

collected from this area are designated by WB-1 through WB-3 in table 2. The Board of Directors of the Brookings-Deuel Rural Water System was informed that there is enough ground water for development for the Rural Water System in this area. It was also recommended that additional test holes be drilled and a pump test conducted after agreement was reached with land owners.

In 1975 the South Dakota Geological Survey drilled 14 test holes and constructed 5 observation wells. Empire Drilling Company was hired and they constructed 6 observation wells. The locations of all the holes drilled in 1974 and 1975 are in figure 2 and the logs are in appendix B.

In October, 1975, on the recommendation of the South Dakota Geological Survey, an aquifer test was conducted in the Big Sioux Aquifer north of Bruce, Brookings County, South Dakota. The test site was located in NE% NE% NE% NE% Sec. 25, T. 112 N., R. 51 W., which corresponds to the location of the main well site for the Brookings Deuel Rural Water System (fig. 2). Supervision and analysis of the aquifer test were provided by the South Dakota Geological Survey.

Well and Aquifer Test Description

The test well was 44 feet deep, 12 inches in diameter, with 15 feet of 40 slot screen set at the bottom. The driller's log of the test well was as follows:

0- 2 Topsoil
2-11 Gravel, dirty
11-15 Gravel, coarse
15-27 Sand, coarse
27-37 Sand, fine
37-44 Sand, coarse
44- Blue clay (till)

Chemical Analyses of Water Samples Collected North of Bruce Table 2.

	esenbraH eniaาป ni		22.3	13.8	24.7	18.8
	Hardness CaCO ₃		380	320	420	320
	Total Solids	10001	390	280	390	450
	Aterati nagortiN	10.0	2.	<0.5	3.0	1.0
lion	esəuagana⊬i	0.05	0.1	90.0	0.05	<0.1
Parts Per Million	noml	0.3	0.03	<0.02	<0.02	0.1
Part	Sulfate	500^{1}	30	< 20	20	105
	səbinofdƏ	250	20	10	10	10
	เลมisəngsMi		40	40	09	35
	muibo2		5	10	9	55
	muto[sO		06	09	65	7.0
	To high (jeet) [fek		12	603	15?	
	9 [daeS	V	WB-1	WB-2	WB-3	VB-4

Drinking water standards, U.S. Public Health Service (1962). A. Drinking water standards, U.S. Public Health Service (1962) All samples were analyzed by the South Dakota Geological Survey.

Modified for South Dakota by the Department of Health (written communication, Water Sanitation Section, September 24, 1968). To convert to grains, divide parts per million by 17.

Location of Water Samples

Sec. 31 T112N R50M, 0. Rust

WB-2 WB-3 WE-4

INVAINUA Sec. 30 T112N R50W, M. Apland (House Well) HMANUA Sec. 30 T112N R50W, M. Apland (Sand Point Well) HEANEANEW Sec. 25 T112N R51W, Brookings-Deuel Rural Water System

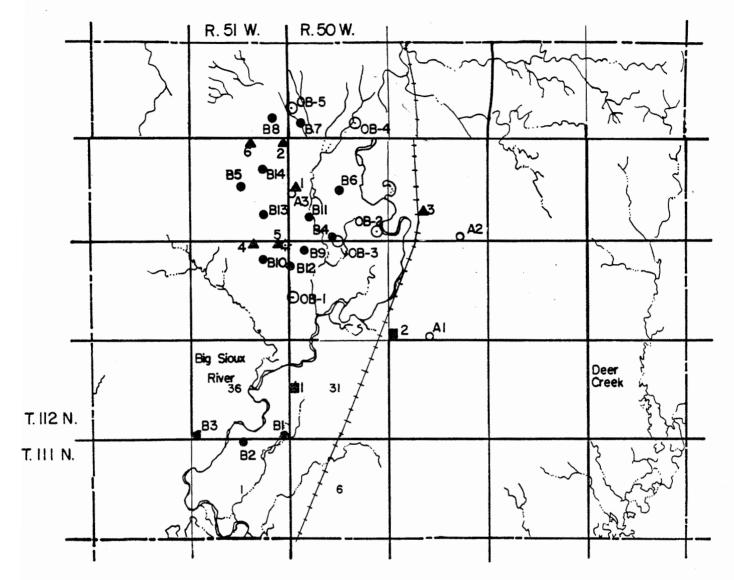


Figure 2. Map showing location of test holes drilled north of Bruce area for the Brookings-Deuel rural water system.

EXPLANATION

- Test holes and observation holes (1975) B1-B14 ○OB-1 - OB-5
- ▲ Test holes by Empire Drilling Co. I-6
- o Auger holes (1974)

AI-A3

Rotary holes (1974)

land2

[‡]Pump test well

The well was pumped at an average rate of 470 gpm (gallons per minute) for 116 hours. The saturated thickness of the aquifer was 34 feet. The discharged water was piped to the Big Sioux River about 6,200 feet south of the test well. The four observation wells monitored for the test were located 50 to 100 feet north and south of the test well (fig. 3). These observation wells were partially penetrating (25 feet deep) with sand points at the bottom. Water levels in OB5 (fig. 3) were checked periodically throughout the test, but were not used for determining aquifer characteristics.

Aquifer Test Results

The following table (table 3) shows static water levels, total drawdown, and recovery in the wells used for the aquifer test.

TABLE 3. Summary of water level measurements for the pump test north of Bruce

	Elevation (Ground Surface) (feet - MSL)	Static Water Level (feet - MSL)	Total Drawdown (116 hours)	Recovery (72 hours after shutoff)
Test Well	1632.21	1623.23	9.41 feet	9.05 feet
OB1	1630.11	1620.78	1.83 feet	1.55 feet
OB2	1629.65	1620.75	2.61 feet	2.11 feet
OB3	1629.43	1620.66	2.39 feet	2.24 feet
OB4	1629.61	1620.63	1.88 feet	1.47 feet

The drawdown data from the test were analyzed using the Theis non-equilibrium formulas. The data were corrected for dewatering

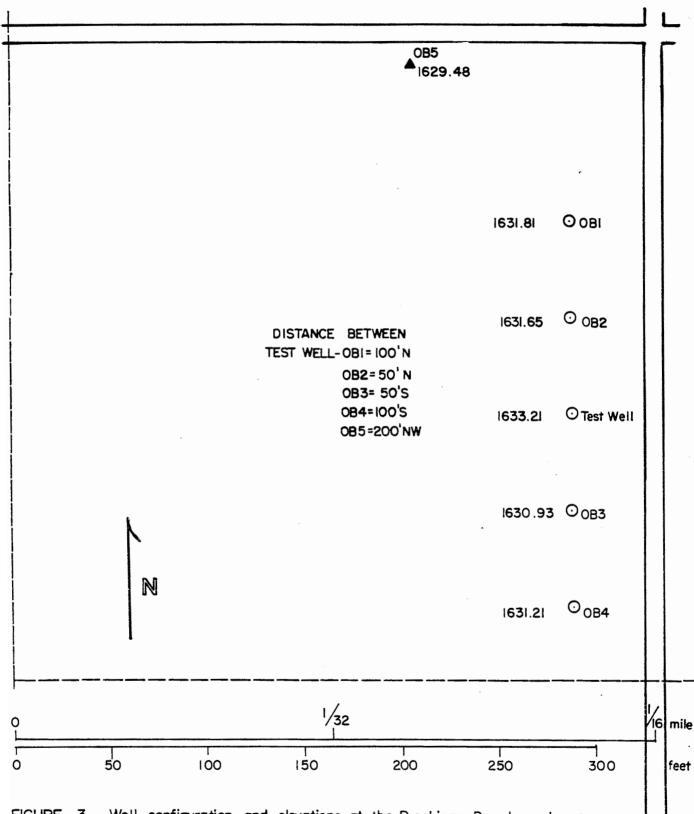


FIGURE 3 -- Well configuration and elevations at the Brookings-Deuel rural water system test site, NE/4, NE/4, NE/4, NE/4, SEC. 25, T. 112N; R.51 W; Brockings county, South Dakota.

and matched to the non-leaky, artesian, constant discharge type curve. The Jacob time-drawdown method was used for drawdowns measured during the later part of the test. Analysis showed the transmissivity of the aquifer to be approximately 155,000 gpd/ft (gallons per day per foot) and storage coefficient to be 0.11. With a saturated thickness of 34 feet, the permeability was found to be 4560 gpd/ft. The specific capacity of the test well was 50 gpm/ft (gallons per minute per foot).

Using the aquifer characteristics determined above and the distribution of drawdowns during test pumping, it is estimated that the aquifer can safely yield at least 500 gpm (gallons per minute) without causing interference in existing wells. It is suggested that any new wells be at least 800 feet away from the well at the test site.

For specific details about the aquifer test and analysis, the reader may contact the South Dakota Geological Survey. The results of chemical analysis of a water sample collected during the test are designated by WB-4 in table 2.

CLEAR LAKE AREA

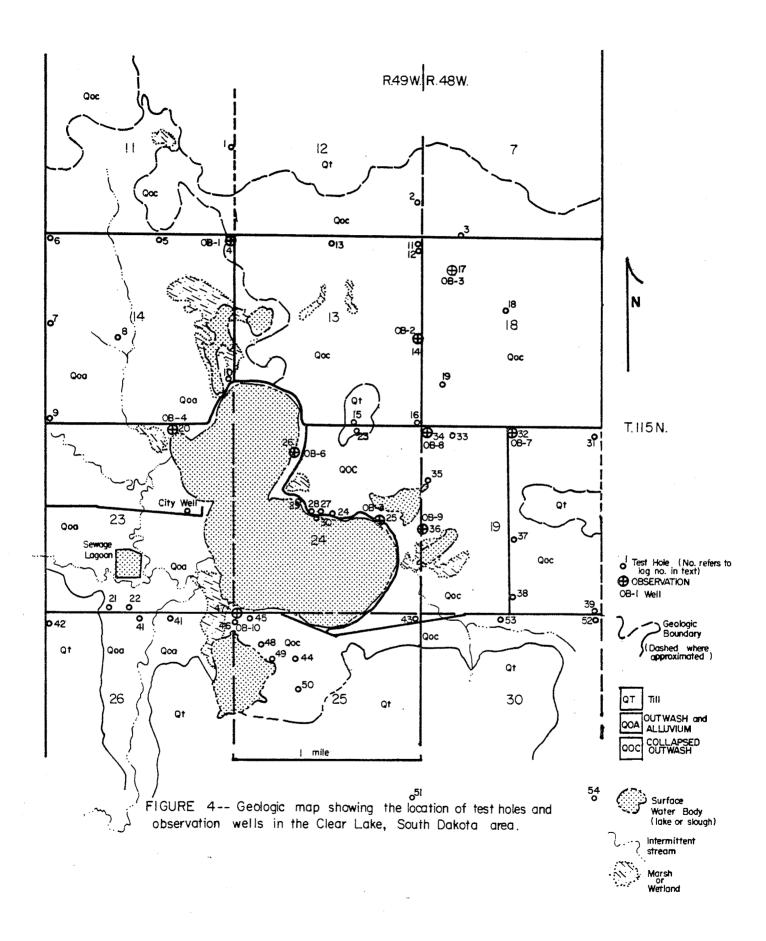
In 1974, the Brookings-Deuel Rural Water System requested the assistance of the South Dakota Geological Survey (SDGS) in finding a ground-water supply in Deuel County for the northern part of the water system. The South Dakota Geological Survey was conducting a geology and water resource study of Deuel County at that time and was therefore able to provide general test hole and water quality information. Based on this, two areas in the County were considered for further investigation: (1) a buried aquifer

near Cobb Creek northeast of Brandt, South Dakota; and (2) the surface aquifer in the Clear Lake, South Dakota, vicinity. The area northeast of Brandt was dropped from consideration after further chemical analysis showed the water in the aquifer to contain about 1000 ppm (parts per million) hardness. Field work was then concentrated in the Clear Lake area. Several test holes were drilled near Clear Lake in 1974 specificially for the Rural Water System study. Scheduling of other projects delayed further field work until July, 1975, when more test holes were drilled, observation wells installed, and ground-water samples taken. The geology and saturated thickness maps included in this report are based on all test hole information including that acquired during the Deuel County geology and water resources study. See appendix C for the listing of well logs.

Geology

The Clear Lake study area lies in a broad valley between two major Late Wisconsin age glacial moraines, the Bemis to the south and west and the Altamont (Coteau Hills) to the north and east (fig. 4). The moraines are primarily composed of glacial till (yellow clay, blue clay, boulder clay) which is a mixture of boulders, pebbles, gravel, sand, and silt in a matrix of clay. The till may transmit some ground water, but it is relatively impermeable and acts as a boundary for the surface aquifer and as a confining layer for deeper aquifers.

The surface deposits in the broad valley mentioned above consist primarily of glacial outwash sand and gravel. In figure 4 the outwash is divided into two categories: (1) outwash and



alluvium (Qoa); and (2) collapsed outwash (Qoc). The outwash and alluvium are contained in a relatively flat plain which extends from Clear Lake northwest toward East Coteau Lake. This mapping unit includes glacially derived silts, sands, and gravels and recently deposited silts and sands found along present drainages. The collapsed outwash consists of sand, gravel, silt, and minor amounts of clay associated with the Altamont moraine. The collapsed outwash area is characterized by low rolling hills with some sloughs. The collapsed area slopes upward toward the Altamont moraine and the sand and gravel grades into the till of the moraine.

Clear Lake Aquifer

The collapsed outwash and outwash-alluvium combined constitute the surface or water table aquifer in the Clear Lake area. The Clear Lake Aquifer is composed of the saturated part of the glacial deposits from the surface to a depth of approximately 60 feet. There are deeper aquifers in the area but they were not included in this study. Figure 5 shows thickness of saturated sand and gravel and depth to water in the fall of 1975 for the Clear Lake Aquifer. The thickest point found in the aquifer was in SEk SWk SEk NWk sec. 24, T. 115 N., R. 49 W., just east of Ulven Park, where 61 feet of saturated gravels were encountered. However, the gravel was relatively "dirty" (clayey) in the bottom 38 feet. The thickest portion of the aquifer, with 30 or more feet of saturation, falls within an area about one-quarter of a mile wide and along a line from the southwest side of Clear Lake to the northeast quarter of sec. 18, T. 115 N., R. 48 W. It was this portion of the aquifer where further test drilling was

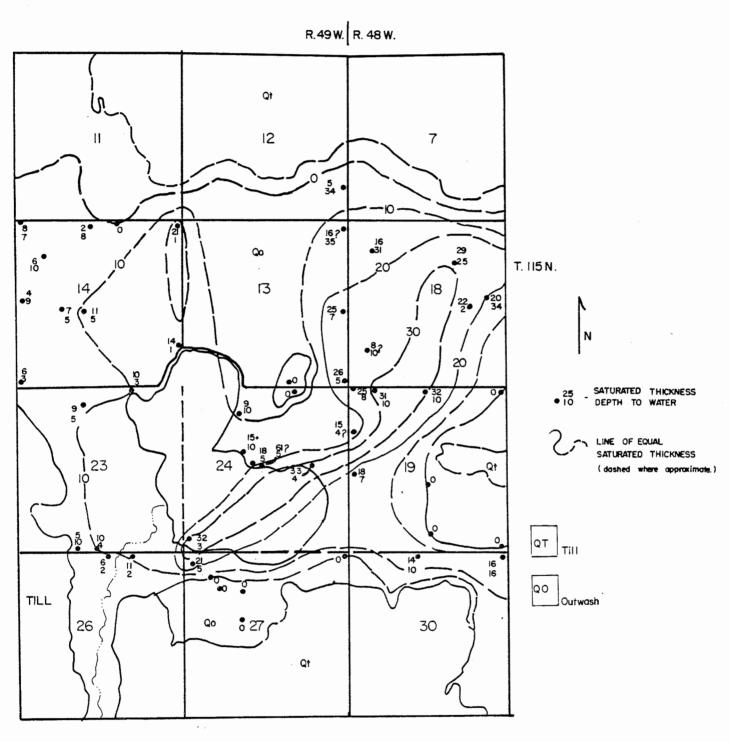


FIGURE 5-- Map showing the thickness of saturated sand and depth to water in the Clear Lake, South Dakota area.

recommended. After consideration of the water quality (see next section), the engineer for the Rural Water System chose the NE% sec. 18, T. 115 N., R. 48 W., for the location of a test well. Since there was an irrigation well near this location and permits were granted for other wells in the aquifer, the South Dakota Geological Survey recommended that an aquifer test be conducted. The test was conducted in August, 1976. The description and results of the test are in a following section of this report.

Water Quality

The results of chemical analyses of water samples obtained for the Clear Lake study may be found in table 4. Figure 6 shows the location of sampling sites.

Water samples W-1 to W-5 are from the aquifer northeast of Brandt, South Dakota. The water is very hard and would have caused treatment problems for the water system; therefore, this location was not considered further.

Samples W-11, W-14 to W-16 were taken from wells very near Clear Lake and the marshy areas just east of the Lake. These samples had a total dissolved solids concentration of approximately 1000 ppm.

Samples W-6 and W-12 were taken from the surface aquifer in sec. 18, T. 115 N., R. 48 W., about 1½ miles northwest of the Lake. The water had less than 600 ppm total dissolved solids. Sample W-12 was taken from a farm well--thus the 18 ppm nitrate was considered to be from a local source and not an indication of the nitrates in the aquifer. Sample W-6 was taken from an irrigation test in the NE% of section 18. The water from this sample was

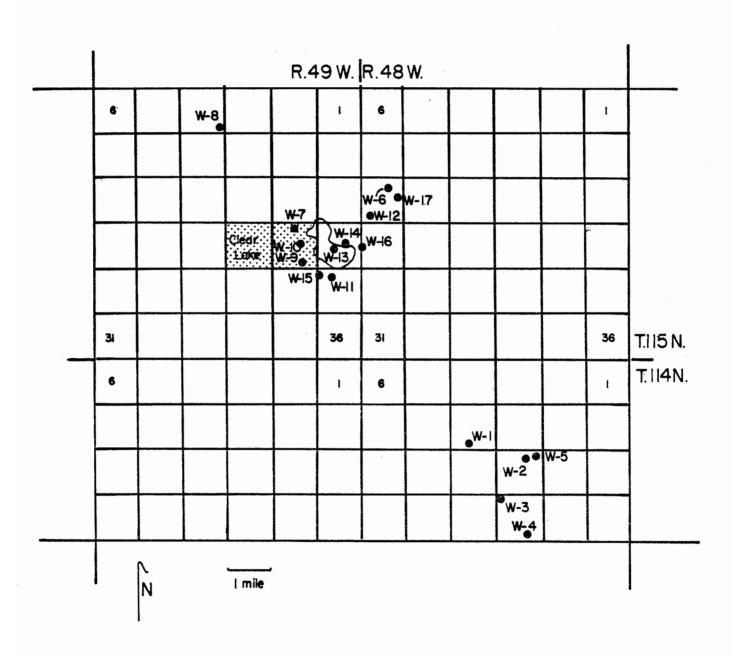


FIGURE 6 -- Location of water samples from the Clear Lake and Brandt area, South Dakota.

	• .																				
	Hq		7.30	7.25	7.30	7.35	7.58	I I I	8.1	7.6	7.3	7.4	1 1	;	-	1		-		1	1
	SpiloS	10003	066	920	1980	624	7903	523?	350	418	633	693	872	596	999	990	1090	920	340	243	300
	4 [stoT szenbraH	;	1240	1160	2000	890	692	360	280	340	510	540	540	340	999	770	790	760	215	215	215
	Alk.	1	375	385	480	410	364	:	189	240	329	265	312	228	130	440	350	410	216	216	220
	Nitrate nagoriN	10.0	10.	3.	4.	2.	0.09	1.7	7.9	2.4	1.2	3.4	33	13	1.5	0.5	0.5	0.5	1.5	1.1	1.5
Million	Manganes e	0.05	<0.05	9.0	4.	0.5	0.10	90.0		1	! ! !	: :	0.2	0.1	0.5	0.5	0.7	9.0	<0.05	<0.05	<0.05
Per	Iron	0.3	<0.1	<0.1	<0.1	0.9	0.36	90.0		1	0.05	0.08	0.2	0.2	1.0	4.3	1.0	4.?	<0.1	<0.1	<0.1
Parts	Sulfate	5003	470	485	920	235	302	-	55	97	200	140	200	30	320	<50	2003	<50	50	50	50
	SbirofdD	250	25	15	150	< 10	6	-	2.8	3.3	7.3	130	71	24	16	10	10	10	< 5	< 5	< 5
	muizəngaM	-	09	70	140	35	53	;	24	29	45	46	53	35	100	35	45	40	25	25	25
	muibo2	:	15	15	40	15	30	:	5.8	4.2	14.	30	10	7	11	130	90	130	<20	:	<20
	muisla3	-	400	350	575	300	190	-	7.3	33	130	140	120	30	09	250	275	225	45	45	45
	Source		S G	S S	5 % 6	SåG	S & G	5 & 6	5 & G	5 % G	S & G	ShG	S & G	SaG	Surface Well	S & G	SaG	5 & G	S & G	S 2 G	S & G
	Depth of Well (feet)		90	65	23	35	120	503	17	32			56	3.4		90	99	09	99	99	99
	Depth to Water (feet)		40	:	20	11	09	25	3.3	3.						4.4	5.5	9.0	35.3	35.3	35.3
	Well or Test Hole Mumber										City of Clear Lake-East Well	City of Clear Lake-Mest Well	Angle Farm	Atyeo Farm	Clear Lake- Surface	06-3	0B−5	06-7	Test Well	Test Well	Test Well
	Location		114 46 9 cddb	114 48 15 abca	114 43 22 bbbd	114 45 22 deda	114 45 15 a	115 48 18 a	USGS 115 49 23 abaa	USGS 115 49 4 dddd	USGS 115 49 23 dede	USGS 115 49 23 accd	115 49 25 babc	115 45 15 ccda	115 49 24 bddd	115 49 24 adec	115 49 25 bbbb	115 to 19 cbbb	115 45 15 adda	115 45 15 adda	115 43 15 adda
	Data Collection Point Wumber	А	W-1*	7-11	14-3	11-4	W-51	M-61	4-12	20-7	11-92	:i-10 ²	4-11	71-15	d-13	W-14	u-15	\-10	4-17A 24 Sin.	4-176 24 nr.	,1-170 72 lin.

All analyses by the South Dakota Geological Survey unless otherwise noted.

Analysis by the Water Quality Laboratory, Bater Resources Research Institute, Brookings, South Dakota.

Analysis by the United States Geological Survey, Salt Lake City, Utah.

Hodified for South Dakota by the Department of Health (written communication, Water Sanitation Section, September 24, 1968).

To convert to grains per gallon, divide parts per million by 17.

Drinking Water Standards, U. S. Public Health Service (1962). * 1.4.8.4.4

of good quality so the test well for the Rural Water System was drilled about 1,500 feet east of the irrigation well.

In August, 1976, samples W-17a, b, c, were taken from the Rural Water System test well (NE% SE% SE% NE% sec. 18, T. 115 N., R. 48 W.) at various times throughout the aquifer test. The water is relatively soft by South Dakota standards (table 4) and should not cause any treatment problems.

Clear Lake Aquifer Test

An aquifer test was conducted in August, 1976, in NE% SE% SE% NE% sec. 18, T. 115 N., R. 48 W., in the collapsed area of the Clear Lake Aquifer. The test well was 56 feet deep with 10 feet of 60 mesh stainless steel screen set at the bottom. The observation wells monitored for the test were all 55 feet deep. The wells were located 25 feet N30°W (OB1), 85 feet N30°W (OB2), 75 feet N70°E (OB3), and 46 feet S30°E (OB4) of the test well. The test well was pumped at 235 gallons per minute for 75 hours. Static water levels and total drawdowns in the wells were as follows:

Well	Static Water Level	Total Drawdown
Test Well	34.5 feet (from ground surface)	7 feet
OB1	34.2 feet (from ground surface)	3.49 feet
OB2	34.3 feet (from ground surface)	2.0 feet
OB3	36.5 feet (from ground surface)	1.82 feet
OB4	34.0 feet (from ground surface)	2.71 feet

Saturated thickness of the aquifer in the test area was 20 feet. The water produced during the test was piped to a low pasture area approximately 800 feet south of the test well. An irrigation well 1500 feet northwest of the test well was pumping approximately 700 gallons per minute during the test. However, water level measurements made in the observation wells before and during the aquifer test indicate that the irrigation well had no effect on the test.

The aquifer parameters calculated from the aquifer test were:

Transmissivity (T) = 85000 gpd/ft
Storage Coefficient (S) = 0.10
Permeability (K) = 4250 gpd/ft²

From the aquifer test analysis, it is recommended that the production well be pumped at a rate of 235 gallons per minute or less. If other wells are planned for the area, they should be at least 600 feet apart and pumped no more than 235 gallons per minute. These recommendations are made assuming the saturated thickness of the aquifer to be 20 feet and that well loss will be minimized by proper construction. It is also recommended that some of the observation wells be maintained for future monitoring of water levels.

This report was prepared by Dennis Beissel and Assad Barari in September, 1976.

APPENDIX A

TEST HOLES DRILLED IN WHITE-DEER CREEK AREA FOR THE

BROOKINGS-DEUEL RURAL WATER SYSTEM

Location	NEWNWSWS	Section: <u>35</u> T.	<u>111</u> N. sX	R. <u>48</u> XX w.
Well:	Test Hole:	1	Land Owner:	
County:	Brookings	Date: <u>8-74</u>	Elevation:	(A, I, T)
E-Log:		Samples:	Drilling Company:	SDGS
Source of Data:				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	15	Sand and gravel	2-17
	5	Clay, blue	17-22
	3	Sand and gravel	22-25
	12	Clay, blue	25-37
	5	Sand and gravel	37-42
		·	
	·		

Location NE ¹ ₄ NE ¹ ₄ SE ¹ ₄	Section:34 T.	<u>111</u> N. ½X	r. <u>48</u> XX w.
Well: Test I	Hole:2	Land Owner:	
County: Brookings	Date:8-74	Elevation:	(A, I, T)
E-Log:	Samples:	Drilling Company:	SDGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil	0-2
	5	Silt and sand	2-7
	6	Clay and sand layers	7-13
	15	Sand and gravel, boulders, cobbles	13-28
		Test hole was abandoned at 28' due to large cobbles	
		,	

Location	NE4NE4SE4	Section: <u>34</u>	T	N.	XSX	R. <u>43</u>	-XEK	W.
Well:	Test Hole:	3 30' N. of Test Hole	2)	Land Owner:				
County:	Brookings	Date:		Elevation:	****	(A, I	, T)	
E-Log:		Samples:		Drilling Comp	pany:S	ngs		
Source of Data: -								

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	6	Sand and silt, brown	2-8
	6	Sand and gravel	8-14
	16	Sand, very coarse, some gravel	14-30
	3	Gravel, (abandoned the hole due to caving)	30-33

Location	SE4SE4NE4	Section:35 T	111 N. XSX	R. <u>48</u> £X w.
Weil:	Test Hole:	4	Land Owner:	
County:	Brookings	Date:	Elevation:	(A, I, T)
E-Log:		Samples:	Drilling Company:	SDGS
Source of Data:				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	3	Sand and silt	2-5
	3	Sand, fine, brown	5-8
	9	Clay, blue, pebbly	8-17
	16	Sand, very coarse, some gravel	17-33
	7	Gravel	33-40
	3	Sand, very coarse, gravel, cobbles	40-48
		Could not penetrate	
		·	
31. 27. 20. 20. 20. 20. 20. 20. 20. 20. 20. 20			

Location	NE-INW-ISW-I	_ Section: <u>35</u>	Τ.	111 N. XXX	R. <u>48</u> XX	W.
Well:	Test Hole:	5		Land Owner:		
County:	Brookings	Date:		. Elevation:	(A, I, T)	
E-Log:		Samples:		Drilling Company: _	SDGS	
Source of Data:						

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	5	Sand and silt	2-7
	7	Gravel, some clay	7-14
	12	Clay, sandy, pebbly	14-26
	5	Gravel	26-31
	12	Clay, blue, sandy	31-43
	14	Gravel	43-57
	40	Gravel ?, silty	53-98

Location NEWNEY	Section:	<u> 30</u> т. <u>111</u>	N. XSX	R. <u>47</u>	ЖK w.
Well:	Test Hole:6	Land	Owner:	Millioniae Carrieria, Antonio - Antonio	
County:Brook	ings Date:	Elevat	tion:	(A, I,	T)
E-Log:	Samples:	Drillir	ng Company: —	SDGS	
Source of Data:					

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	18	Clay, blue	2-20
	20	Gravel	20-40
	8	Sand, very coarse, gravel	40-48
	7	Clay, sandy	48-55
	3	Gravel	55-58
	4	Clay? very sandy	58-62
	36	Clay, gray	62-98

Location	SWISWISWI	Section:11	Т	111 N. XXX	R. <u>49</u> XX	W.
Well:	Test Hole:	7		Land Owner:		
County:	Brookings	Date:		Elevation:	(A, I, T)	
E-Log:		Samples:		Drilling Company:	SDGS	
Source of Data	:					

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	6	Clay and gravel	2-8
	5	Gravel	8-13
	20	Clay, grayish-blue, pebbly	13-33
	5	Sand, coarse	33-38
	40	Alternating thin beds of clay and gravel	38-78
	42	Clay, pebbly	78-120

APPENDIX B

TEST HOLES DRILLED IN THE BRUCE AREA

FOR THE

BROOKINGS - DEUEL RURAL WATER SYSTEM

Location	SWISEISEISWI	Section: <u>29</u>	Т	<u>112</u> N.	X6X	R. <u>50</u> E	₹ w.
Well:	Test Hole:	Auger 1		Land Owner:		BDRWS	
County:	Brookings	Date:8-9-74		Elevation:	1635	(XXXX)	Т)
E-Log:		Samples: <u>yes</u>		Drilling Com	pany:		DGS
Source of Data:							

Geologic Unit	Thickness	Lithologic Description	From - to Feet		
	1	Topsoil, black, sandy			
	3	Clay, light brown, oxidized; some gravel; dry-hard	1-4		
	3	Clay, very sandy, oxidized; some fine gravel	4-7		
	5	Clay, very sandy, oxidized; medium to coarse			
		gravel; dry-hard	7-12		
	4	Clay, very sandy; some medium to coarse gravel; moist	12-16		
	6	Sand; gravel, medium to coarse; saturated	16-22		
	10	Sand; gravel, medium to coarse; slightly clayey	22-32		
	14	Sand; gravel, clean	32-46		
	3	Clay, unoxidized; some sand and gravel	46-49		
·					
			,		

Location	SE4SE4SW4SE4	_ Section: _	20	T	112_ N.	χ 8 χ	R. <u>50</u>	—' <i>X</i> ₹	W.
Well:	Test Hole:	Auge	er 2		Land Owner:				
County:	Brookings	Date:	8-9-74		Elevation: _	1645	(XX)	(Ķ Τ))
E-Log:		Samples:	yes		Drilling Com	pany: <u>SDGS</u>	<u> </u>		
Source of Data: .									

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil, black, sandy	0-2
	4	Clay, some sand, oxidized, moist	2-6
	1	Sand, medium; slightly clayey	6-7
	5	Sand & clay, some medium gravel, oxidized; dry & hard	7-12
	8	Sand, fine to medium gravel; some clay; saturated	12-20
•	11	Sand, coarse; some gravel, medium, saturated	20-31
	8	Clay & sand, unoxidized	31-39

Location	NMPNMPNMPSMP	Section: 19	T	112 N. XXX	R. <u>50</u> X	₿X W.
Well:	Test Hole: _	Auger 3		Land Owner:		
County:	Brookings	Date: -8-9-74		Elevation:1630	(X AX X X	Т)
E-Log:	····	Samples:		Drilling Company:	s	DGS-
Source of Data:						

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil, black, sandy	0-1
	6	Clay, oxidized; moist, sandy	1-7
	5	Sand, medium, some clay; saturated	7-12
	5	Sand, medium to coarse; some gravel	12-17
	24	Sand Coarse; gravel, fine	17-41
	8	Clay, gray-black, compact	41-49

Location	SWYSWYSWYNWY	Section: 31	т	112 N.	2 %	R. <u>50</u> XEX W.
Well:	Test Hole:	Rotary 1	L	_and Owner:		
County:	Brookings	Date: 8-74	E	Elevation: <u>6</u>	124	(Х ХХХ, т)
E-Log:		Samples:		Orilling Comp	any:	SDGS
Source of Data: -						

Geologic Unit	Thickness	kness Lithologic Description		
		Topsoil		
	22	Sand & gravel	0-22	
	12	Sand, very coarse; fast drilling; 25% gravel size	22-34	
	26	Clay, pebbly, very sandy	34-60	
		•		
#				

Location	SMF SMF SMF SMF	Section: 29	T	N.	XSX	R50	XEX	W.
Well:	Test Hole:	Rotary 2		Land Owner:				-
County:	Brookings	Date:8-74		Elevation:	1627	(X X X)	Χi, τ)	
E-Log:		Samples:		Drilling Comp	any:		SDGS	
Source of Data:								

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	35	Sand & gravel; topsoil	0-35
	10	Clay, very sandy, pebbly	35-45
	25	Clay, gray	45-70

Location	SE4SE4SE4SE4	Section:36	т	<u>112</u> N.	χ ⁸ χ	R. <u>51</u> XE.	W.
Well:	Test Hole:	B 1		Land Owner:	-		
County:	Brookings	Date: 8-12-75		Elevation:	1621	(X X ,XX) , т)
E-Log:		Samples:		Drilling Comp	oany:	SDO	GS
Source of Data:							

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil	0-1
	2	Clay, gray-brown, some sand	1-3
	27	Sand and gravel	3-30
	19	Clay, brown, some sand	30-49
		Depth to water - 4'	
		·	

Location	NWI:NWI:NWI:NEI:	Section:1	Т	111 N XXX	R	51 X x	w
		ole:_B 2 (Auger)				-	
County:	Brookings	Date:8-12-75		Elevation: 1622	>	. (Ж.Х.Х.К, т)
E-Log:		Samples:		Drilling Company:	SDGS		
Source of Data	:						
Geologic Unit	Thickness	Lithologic Desc	ription			From - to	\neg

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil	0-1
	34	Sand, and gravel, silty	1-35
***	14	Clay, gray, some pebbles	35-49
		Depth to water - 6.3'	

LocationSWISSWISSWIS	Section: <u>36</u> T	112 N. X\$X	R. <u>51</u> XX W
Well: Test Hole:	B 3 A&B (Auger)	Land Owner:	and the second s
County:Brookings	Date:8-12-75	Elevation: 1626	(XXXX, T)
E-Log:	Samples:	Drilling Company:	SDGS
Source of Data:			

Geologic Unit	Thickness Lithologic Description		From - to Feet
	1	Soil	0-1
	3	Clay, brown, sandy	1-4
	2	Sand, silty, tan	4-6
	3	Gravel, clayey, tan	6-9
		Unable to drill farther	
		Depth to water not measured	
·			

Location	SWISEISEISEI	Section: T	<u>112</u> N. XX	R. <u>50</u> XeX	W.
Well:	Test Hole:	B4	Land Owner:		
County:	Brookings	Date: 8-13-75	Elevation:1630	(XXXX T))
E-Log:		Samples:	Drilling Company:SDG	\$	
Source of Data:					

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil	0-1
	32	Sand & gravel	1-33
	11	Clay, green to brown	33-44
		Depth to water - 5.2'	
0			

		SWIANEI Section: 24 T. 112 N. XX R Test Hole:	
County:	Brookir	1gs Date: 9-2-7 5 Elevation: 1632 Samples: Drilling Company:	(ХХХХХ), т)
Source of Data:			
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	26	Sand, fine to medium	2-28
	23	Gravel	28-51
	19	Till, oxidized, hard	51-70
		Depth to water - 15.9'	
		·	
	1		

Location	SW4SW4SW4NE4	Section: 19	т	112 N.	λ 3 .΄	R.	50 X	XX /	W.
Well:	Test Hole:	В6		Land Owner:	*****				<u>,</u>
County:	Brookings	Date: 9-2-75		Elevation:		1631	<u> — (</u> ХХХХ	Τ)	
E-Log:		Samples:		Drilling Comp	oany: _		SDGs		
Source of Data:		,							

Geologic Unit Thickness		Lithologic Description	From - to Feet
	2	Soil	0-2
	25	Sand, medium to coarse	2-27
	13	Till, gray, sand, unoxidized	27-40
	20	Gravel	40-60
	17	Till, unoxidized, gravelly	60-77
	13	Silt, hard, unoxidized	77-90
			·
		Depth to water - 7'	
		·	
		·	
		,	

Location	NW4SW4NE4NW4	Section:	Т	115 N. XSX	R. <u>49 Xe</u> X w
Well:	Test Hole:	26 (Ob - 6)		Land Owner:	
County:	Deuel	Date:7-15-75		Elevation: 1790	(ХХХХ, т)
E-Log:		Samples:yes		Drilling Company:	SDGS
C					

Source of Data: __

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	2	Clay, silty, dark brown	2-4
	14	Gravel, fine to coarse; coarse cobbles	4-18
		approx. ½" - also very coarse sand intermixed,	
		subrounded	
	1	Clay, silty, shite to tan	18-19
	5	Gravel, fine to coarse	19-24
	30	Clay, silty, light brown to tan; interlayered gravels	24-54
	6	Clay, gray; 6" gravel beds interlayered	54-60
		T.D. 60'	
		Observation well 20' 1½" plastic	
		5' plastic screen	

Location	SEISWISEINWI	Section: <u>24</u> T	115 N. XXX	R. <u>49</u> XEX W.
Well:	Test Hole:	27	Land Owner:	
County:	Deuel	Date:	Elevation: 1780	(ХХХХ Т)
E-Log:	no	Samples: _no	Drilling Company:	SDGS
Source of Data:				

Geologic Unit Thickness		Lithologic Description	From - to Feet
	7	Topsoil, black, silty, pebbly	0-7
	15	Gravel, sand, coarse; some clay, (Marl)	7-22
	8	Gravel, fine, pebbly; trace of clay	22-30
	27	Gravel; clayey	30-57
	11	Gravel; clay, gray	57-68
	2	Clay, gray, pebbly (till)	68-70

		SW14SW2 Section: 18 T. 112N. YSX. R.	
County:	Brookir	ngs Date: 9-2-75 Elevation: 1631	(Χ <mark>Ҳ</mark> ҲΧ ^ζ ΑΧ _λ
		Samples: Drilling Company:	
Source of Data: -	***************************************		
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil Soil	0-2
	10	Sand, medium to coarse	2-12
	18	Gravel	12-30
	6	Till, unoxidized, soft	30-36
	5	Gravel	36-41
	11	Till, unoxidized	41-52
	8	Silt, green	52-60
		Depth to water - 7'	

Location SEINWISEISEI	Section: T.	112 N. XSX	R. <u>51</u> XX W.
Well: Test Hole	B8	Land Owner:	
County:Brookings	Date:9-2-75	Elevation:1637	(XXXX T)
E-Log:	Samples:	Drilling Company:	SDGS
Source of Data:			

Geologic Unit	Thickness	s Lithologic Description	
	1	Soil	0-1
	11	Sand, fine to medium	1-12
	6	Gravel	12-18
	43	Gravel and sand interlayered, fine to medium	18-61
	9	Till, unoxidized, gravelly	61-70
	10	Silt, green, hard	70-80
		Depth to water - 12.3'	
		h	
		7	
		·	

LocationSk	Paneanwanwa	Section:30	T	112 N.	XeX	R. <u>50</u>	XEX	W.
Well:	Test Hole:	В9		Land Owner:				-
County:Br	rookings D	ate: 9-3	-75	Elevation:	1627	(X XXX	Т)	
E-Log:	S	amples:		Drilling Comp	any:		SDGS	
Source of Data:								

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	2	Sand, medium to coarse	2-4
	24	Gravel	4-28
	15	Sand, coarse	28-43
	15	Gravel Gravel	43-58
	12	Till, gray, unoxidized	58-70
		Depth to water - 9'	
·			

Location	NEWSEWNWWNEW	_ Section:	25	T	<u>112</u> N.	X 8 X	R. <u>51</u>	—_X € X	W.
Well:	Test Hole:	B10			Land Owner	·	(1)		
County:	Brookings	Date:	9-3-7	75	Elevation: _	1630	(X X X)	(i), Τ))
E-Log:		Samples:			Drilling Com	pany:	SDO	35	
Source of Data:									····

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	3	Sand, medium to coarse	2-5
	36	Gravel	5-41
	8	Sand, coarse	41-49
	11	Till, yellow-brown, unoxidized	49-60
		Depth to water - 7.8'	
			4.44.44.44.44.4
<u></u>			

Location	NEYNEYSWYSWY	Section:19	T	112 N.	XSX	R. <u>50</u> X	EXX w.
Well:	Test Hole:	<u> </u>		Land Owner:			
County:	Brookings	Date: 9-3-75		Elevation:	1625	(XXXX	Т).
E-Log:		Samples:		Drilling Com	pany:	SDGS	
Source of Data:		,					

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil	0-1
	4	Silt, black, clayey	1-5
	32	Gravel	5-37
	10	Till, light brown, oxidized, coal present	37-47
	13	Till, unoxidized, light brown	47-60
	·		
		Depth to water 3.4'	
<u> </u>			

Location	SW4SW4NW4NW4	Section: 30	т	112 N.	λ <mark>8</mark>	R. <u>50</u>	X E X	W.
Well:	Test Hole:	B12		Land Owner:				
County:	Brookings	Date: 9-3-75		Elevation: _	1626	(Ă;	(X i , T)	
E-Log:		Samples:		Drilling Com	pany:S	DGS		
Source of Data: -								

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	49	Gravel	. 2-51
	19	Till, gray, unoxidized	51-70
		Depth to water 5.7'	
			
·			
,			

Location	SEISEINWISEI	Section: 24	T.	112N. XX ₆ X	R. <u>51</u> XX	w.
Well:	Test Hole:	B13		Land Owner:		
County:	Brookings	Date: 9-4-7	75	Elevation:	1630 (XXXX T)
E-Log:		Samples:		Drilling Company: .	SDGS	
Source of Data:	***					

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	5	Sand	2-7
	48	Gravel .	7-55
	15	Till, gray, unoxidized	55-70
		Depth to water - 7.7'	
1			
			· · · · · · · · · · · · · · · · · · ·

Location	NWINWISEINEI	_ Section: _	24	т	112 N. XX	R. <u>51</u> Xe. W.
Well:	Test Hole:	B14			Land Owner:	***************************************
County:	Brookings	Date:	9-8-75		Elevation: 1635	(Х ^{XX} Х, т)
E-Log:		Samples:			Drilling Company:	SDGS
Source of Data:						

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	3	Silt, black	2-5
	13	Sand, very coarse	5-18
	13	Gravel	18-31
	10	Sand, fine to medium	31-41
	4	Gravel	41-45
	6	Till, sandy	45-51
	9	Clay, dark gray	51-60
		Depth to water - 11.3'	
			·
		,	

Location	SW4SW4SW4NW4	Section: 30	T	112 N. s ^X	R . <u>50</u> XeX	w.
Well:	Test Hole:	OB B 1		Land Owner:		
County:	Brookings	Date: 9-4-7	5_	Elevation: 1624.67	(X , I, X))
E-Log:		Samples:		Drilling Company:	SDGS	
Source of Data:						

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil	0-1
	2	Clay, dark brown, sandy	1-3
	20	Gravel	3-23
	.5	Coal layer	23-23.5
	5.5	Gravel	23.5-29
	7	Till, unoxidized	29-36
	31	Gravel	36-67
	3	Till, unoxidized	67-70
		Observation Well	

LocationNW\(\frac{1}{2}\)SE\(\frac{1}{2}\)SE\(\frac{1}{2}\)	Section:19 T	<u>112</u> N. XS	R. <u>50</u> XeX w.
Well: Test Hole:	OB B 2	Land Owner:	
County:Brookings	Date: 9-4-75	Elevation: 1626	(X X XXXX T)
E-Log:	Samples:	Drilling Company:	SDGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil	0-2
	10	Clay, black, some gravel	2-12
	10	Gravel	12-22
	8	Clay, sandy	22-30
MT.	10	Till, slightly oxidized	30-40
	·		
		Depth to water - 7.1'	
		,	

LocationSE ¹ ₄ S	E¼SE¼SW½	Section: 19	Т	112 N.	X6X	R. <u>50</u>	XEX	W.
Well:	Test Hole:	OR R 3		Land Owner:				
County:Broo	kings [Date:9-4-75		Elevation: _	1627.51	(XX,	1,X¥)	}
E-Log:	S	Samples:		Drilling Com	pany:	SD	GS	
Source of Data:								
Castania	· · · · · · · · · · · · · · · · · · ·							

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil	0-1
	2	Silt, sandy	1-3
	29	Gravel	3-32
	9	Sand, fine to medium	32-41
	9	Till, green, oxidized	41-50
		Depth to water - 5.6'	
		,	

Location SWIASEIASWIASEIA	Section: <u>18</u> T.	112_ N. XX	R. <u>50</u> XeX w.
Well: Test Hole:	OB B 4	Land Owner:	
County:Brookings	Date: 9-4-75	Elevation:1631.86	(X X , 1,X X)
E-Log:	Samples:	Drilling Company:	SDGS
Source of Data:		•	

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil	0-1
	2	Silt	1-3
	17	Gravel	3-20
	10	Sand, fine to coarse	20-30
	6	Clay	30-36
	17	Gravel	36-53
	5	Sand, medium to very coarse	53-58
	12	Till, unoxidized	58-70
•			
		Depth to water - 7.5'	
	-		

Location	SWISWINWISWI	Section: 18	_ T.	112 N.	XSX	R. <u>50</u>	XEX	W.
Well:	Test Hole:	OB B 5		Land Owner:				
County:	Brookings [Date:9_8_7	<u></u>	Elevation:	1631.	02 (X X ,	(XXX,I	
E-Log:	S	Samples:n		Drilling Com	pany:	SDGS		
Source of Date:								

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil	0-1
	2	Clay, dark brown to black, silty, organic rich	1-3
	18	Sand, fine to medium; gravel, fine to medium,	
		subround	3-21
	8	Gravel, medium to coarse	21-29
	7	Till, gray, slightly oxidized, soft	29-36
	3	Gravel, fine to medium; sandy	36-39
	16	Till, sandy, rocky	39-45
	15	Clay, dark gray, hard (till)	45-60
		T.D. 60'	
		W.L. 5.2'	

Location	SWISWISWINWI	Section: <u>19</u>	T	112 N.	sX X	R. <u>50</u>	XEX	W.
Well:	Test Hole:	Empire 1		Land Owner:	BDRWS	L		
County:	Brookings	Date: 4-30-75		Elevation:1	631.31.	(X X,	1, XX)	
E-Log:		Samples:		Drilling Comp	any:	Emp	oire	
Source of Data:							· · · · · · · · · · · · · · · · · · ·	
Geologic		1:1. 1 · B				Fro	om - to	

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	39	Sand and gravel	2-41
	4	Clay	41-45
		40' observation well - 2" pipe	
		depth to water - 6.5' 4-30-75	
		7.8' 9-9-75	

		NE1/4NE1/4 Section: 24 T. 112 N. XeX R. 5. Test Hole: Empire 2 Land Owner: BDRWS	
County:	Brookir	ngs Date: 4-30-75 Elevation: 1632.86	(XX, 1, XX)
E-Log:		Samples: Drilling Company:	Empire
Source of Data: .			
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	23	Gravel	2-25
	16	Sand & gravel	25-41
	4	Till, gray	41-45
		40' observation well - 2" pipe	
		depth to water - 7.7' 4-30-75	
		9.6' 9-9-75	

Location	SE¼SW¾N	NE\SW\s	Section: <u>20</u>	Т.	N.	X S X	R	50 XeX	W.
			Empire 3						
County:	Brookin	ngs	Date:	4-30-75	Elevation:	1630		. (X X ,XX) , т)
E-Log:			Samples:		Drilling Co	mpany: .		Empire	
Source of Data:									
Geologic Unit	Thickness		Lithol	ogic Descriptio	n			From - to Feet	
	2	Topsoil						0.2	

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	18	Gravel	2-20
	13	Sand & gravel	20-33
	2	Till, gray	33-35
		30' observation well - 2" pipe	
		depth to water - 6.4' 4-30-75 .	
<u></u>			

Location	NWINEINWINEI	Section: 25	T	112 N.	ē XX	R	51	£X. w
Well:	Test Hole:	Empire 4		Land Owner:	BDRW	IS		
County:	Brookings	Date: 4-30-75		Elevation:	1630	-	(XXXX	Т)
E-Log:		Samples:		Drilling Comp	any:		Emp i	re·
Source of Data:								

Geologic Unit Thickness		Lithologic Description	
	2	Topsoil	0-2
	3	Clay, sandy	2-5
	20	Sand & gravel	5-25
	15	Sand, some gravel	25-40
	7	Grave1	40-47
	3	Gravel, coarse	47-50
	5	Till, gray	50-55
		50' observation well - 2" pipe	
		depth to water 9.1' 4-30-75	
		10.8' 9-9-75	

Location	NE4NE4N	NEINEI Section: 25 T. 112 N. SXX R.	<u>51 XX.</u> w.
Well:		Test Hole: Empire 5 Land Owner: BDRWS	
County:	Brookir	ngs Date: 5-1-75 Elevation: 1629.48	(X ¼ , 1, ¼ X ¾
E-Log:		Samples: Drilling Company:Emp	ire
Source of Data: -			
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	23	Sand & gravel	2-25
	10	Sand	25-35
	2	Gravel	35-37
	3	Till, gray	37-40
		35' observation well - 2" pipe	
		depth to water 5.6' 5-1-75	
		8.8' 9-9-75	
, and			

Location NEWNEWNEWNEW	Section: <u>13</u> T	115N. XSX	R. <u>49</u> XX W.
Well: Test Hole:	12	Land Owner:	
County:Deuel	Date:6-13-73	Elevation: 1813	(ХХХХ Т)
E-Log:no	Samples:no	Drilling Company:	SDGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil, black	0-1
	9	Silt; damp	1-10
	5	Clay; oxidized, moist (till)	10-15
	25	Sand, medium to coarse; moist, dirty	15-40
	10	Sand, coarse; moist	40-50
	10	Clay; unoxidized, very hard (till)	50-60
		·	
,			

Location	NWI:NWI:N	WINE'S	. Section: <u>13</u>	т.,	115N.	XsX	R. 49	X X	w.
			13						
			Date:6-13-73						
,			Samples:no						
Source of Data:									
Geologic	T L:-1		l ishalaria Das				Fre	om - to	\neg

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil, brown	0-1
	6	Sand, medium to coarse; dry, clean	1-7
	10	Sand, medium; damp, very clean	7-17
	13	Clay; oxidized, hard (till)	17-30
		·	

Location NEINEINEISE	1/4 Section: 13 T.	115 N. XSX	R. <u>49</u> XX w.
Well: Test	Hole: 14 (0b - 2)	Land Owner:	
County:Deuel	Date:7-15-75	Elevation: 1790	(XX,XI, т)
E-Log:	Samples: <u>Yes</u>	Drilling Company: _	SDGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
2		Topsoil	0-2
	2	Clay, silty, black; unoxidized	2-4
	11	Gravel, fine, subrounded; very coarse sand; some	4-15
		medium gravel; few cobbles	
	5	Gravel, fine to medium, angular; unsorted	15-20
	3	Clay, silty, yellow to dark tan	20-23
	3	Gravel, medium	23-26
	2	Clay, silty, yellow to dark tan	26-28
	4	Gravel, medium	28-32
	18	Clay, yellow, silty; interbedded gravel, medium	32-50
		6" to 2' thick	
		T.D. 50'	
		Observation Well 20' plastic pipe 1指"	
		4' Johnson Screen	
·····			

Location	SW4SE4SW4SE4	Section:	т	115 N.	8 <u>X</u> X	R. <u>49</u> XX	w.
Well:	Test Hole:	15		Land Owner:			
County:	Deuel	Date:		Elevation:	1798	(X ҲӼХ <i>і</i> , т)	
E-Log:	no	Samples:n_0		Drilling Comp	any:	SDGS	
Source of Data:							

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Topsoil, black	0-3
	48	Clay, oxidized, pebbly - water at 16 feet	3-51
	4	Gravel, pea-size, could be drilling in till	51-55
the state of the s			

Location	SE4SE4SE4SE4	Section:13	r. <u>115</u> N. XX	R. <u>49</u> XeX w.
Weil:	Test Hole:	16	Land Owner:	
County:	Deuel	Date:8-2-71	Elevation: 1782	(XXXXX, T)
E-Log:		Samples:	Drilling Company:	USGS
Source of Data				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil, black, silty	0-1
	4	Silt, buff and rusty brown	1-5
	1	Sand, buff, silty, few pebbles, (wet)	5-6
	2	Clay, buff, sandy, few pebbles (till)	6-8
	4	Sand, brown, clayey	8-12
	5	Sand, brown	12-17
	17	Sand and gravel	17-34
	3	Clay, gray, pebbly (till)	34-37

Location NW\(\frac{1}{2}SE\(\frac{1}{2}NW\(\frac{1}	Section:18 T.	
Well: Test Hole:	17 (0b - 3)	Land Owner:
County:Deuel	Date:7-21-7_5	Elevation: 1795 (XXXXX) T)
E-Log:	Samples:	Drilling Company:SDGS
Source of Data:		

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	1	Clay, brown, very sandy	2-3
	20	Sand, very coarse; gravel, fine, subrounded	3-23
	24	Gravel, medium to coarse; unsorted, rounded	23-47
	3	Clay	47-50
		T.D. 50'	
		Observation well 45' 1¼" pipe	
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Location	SE4NE4SE4NW4	Section: 18	T	115 N.	XeX.	R. <u>48</u>	_X 5 X	W.
Well:	Test Hole:	18		Land Owner:				
County:	Deuel	Date:7-21-75		Elevation:	1770	(XXX)	ζт)	
E-Log:		Samples: <u>Ves</u>		Drilling Comp	pany: _SDG	S		·
Source of Data	:							

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Topsoil	0-3
	10	Silt, dark brown to black, clayey, organic rich	3-13
	12	Gravel, medium to coarse, unsorted	13-25
	10	Gravel, very coarse, hard drilling, couldn't penetrate	25-35
	·	T.D. 35'	
		,	

Location NEINWISWISSWI	Section:18 T.	115 N. XX	R. <u>48 XeX</u> w.
Well: Test Ho	le: 19	Land Owner:	
County:Deuel	Date:7-22-75	Elevation: 1785	(XXXI, T)
E-Log:	Samples:	Drilling Company:	SDGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	4	Clay, dark brown, sandy	2-6
	12	Gravel, fine to medium, unsorted, rounded	6-18
		to subrounded	
	14	Clay, gray, sandy (till); interbedded gravels,	
		medium to coarse; 4' clay - 3 to 4' gravel	18-32
	7	Gravel, medium to very coarse, unsorted, angular	32-39
	1	Clay, gray, silty, pebbly (till)	39-40
		T.D. 40'	

Location NEWNEWNWWNEW	Section: 23 T	115 N. X	R. <u>49</u> XeX w.
Well: Test Hole:	20 (0b - 4)	Land Owner:	
County:Deuel	Date: _8-3-71	Elevation:1781	(ХХХХ Т)
E-Log:	Samples:	Drilling Company:	USGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil, sandy, reddish brown	0-1
	1	Sand and gravel (dry)	1-2
	11	Sand and gravel (wet)	2-13
	4	Clay, gravel (till)	13-17
		Obs. well	
		10½' casing (glv. pipe)	
		3' sand point	
		MP = +3.32 ft.	
		W/L = 6.74' below MP (Aug 3)	
		W/L = 7.08' (Aug 18)	

Location	SE4SW4SE4SW4	Section:23	т. <u>115</u> м. XX	R. <u>49</u> XX W.
Well:	Test Hole:	21	Land Owner:	
County:	Deuel	Date:	Elevation:1785	(ЖХХХ, т)
E-Log:	no	Samples: 10	Drilling Company:	SDGS
Source of Data:				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	5	Topsoil, black, humic	0-5
	9	Gravel, coarse; sand, coarse	5-14
	1	Cobbles; tough drilling	14-15
	40	Clay, gray, pebbly, (till); shale boulder at 47 feet	
		to 50 feet; rock at 55 feet	15-55
		·	

Location	SE4SE4SE4SW4	Section: <u>23</u>	Т.	115 N. XXX	R. <u>49</u> XX	W.
Well:	Test Hole:	22		Land Owner:		
County:	Deuel	Date:8=2=71		Elevation: 1770	(XXXXX, T)	١
E-Log:		Samples:		Drilling Company:	USGS	
Source of Data:						

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, black, clayey	0-2
	2	Clay, light brown, very gravelly	2-4
	8	Gravel, clayey, sandy (wet)	4-12
	6	Gravel, medium to coarse, sandy	12-18
	9	Clay, gray, pebbly (till)	13-27
		·	
	·		
		·	

Location NWINEINWINEI	Section:24 T	115 N. XSX	R. <u>49</u> XEX W.
Well: Test Hole:	23	Land Owner:	
County:Deuel	Date:7-15-75	Elevation: 1795	(AXXX T)
E-Log:	Samples: no	Drilling Company:	SDGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	14	Clay, silty, brown; intermittent layers of gravel	2-16
		(till, oxidized)	
	7	Clay, black, silty; interlayered gravel - 6", gravel	
		medium; angular - fine angular	16-23
	6	Clay, oxidized; intermittent hard layers; siltstone,	
		black (boulder).	23-29
		Hit rock 29'	
		T.D. 29'	
		·	
*			

Location	SW4SW4SW4NE4	Section:24		т	115 N.	/8 ;	R. <u>49</u>		W.
Well:	Test Hole:	24			Land Owner:				
County:	Deuel	Date:7	'-15 - 75		Elevation:	1783	(X X	ХХĶ т)	١
E-Log:		Samples:	no	_	Drilling Com	pany:S	SDGS		
Source of Data:									

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Topsoil, black	0-3
	12	Gravel, medium to coarse, subangular to subrounded	3-15
	6	Cobbles, 5-6" diameter; impenetrable	15-21
		T.D. 21'	
	·		
-			

Location	SW4SW4SE4NE4	Section: 24	T	115 N.	βΧ̈́Χ	R. <u>49</u> XX	W.
Weil:	Test Hole:	25 (0b - 5)		Land Owner:			
County:	Deuel	Date: <u>7-18-75</u>		Elevation:	1775	(ХХХХ Т)
E-Log:		Samples: <u>Yes</u>		Drilling Comp	oany:	SDGS	
Source of Data:							

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	2	Clay, brown, sandy	2-4
	11	Gravel, medium, angular, (unsorted?)	4-15
	1	Silt, soft, black (lake deposit)	15-16
	20	Gravel, medium to coarse, unsorted	16-36
	1	Sand, fine to medium, subrounded	36-37
	21	Clay, silty, very soft	37-58
	1	Gravel, medium, rounded to subrounded	58-59
	21	Clay, gray, silty, sandy (till) unoxidized; thin	
		layers of medium gravel	59-30
		T.D. 80'	
		Observation well 21' of 1½" plastic pipe	
		5' plastic sandpoint	

Location	SW4SE4SE4NW4	Section: <u>24</u> T.	115 N. XSX	R. <u>49</u> XeX w.
Well:	Test Hole 2	28	Land Owner:	
County:	Deuel	Date:7-15-75	Elevation: 1780	(ÄХХХ Т)
E-Log:		Samples:no	Drilling Company:	SDGS
Source of Data:				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Topsoil, black	0-3
	6	Gravel, medium, subrounded	3-9
	14	Cobbles; difficult drilling; water loss	9-23
		cobbles & pebbles 1-3" diameter	
	•	larger rocks below.	
		Granite boulder at 23'	
		T.D. 23'	

Location	NE4SW4SE4NW4	Section:24	т. <u>115</u> N. X _S X	R. <u>49</u> XX w.
Well:	Test Hole:	29	Land Owner:	
County:	Deuel	Date: - 7-15-75	Elevation:1785	(XX,XX, т)
E-Log:		Samples:no	Drilling Company:	SDGS
Source of Data	:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil, black	0-2
	4	Gravel, coarse	3-7
	18	Cobbles & pebbles, 6~7" diameter	7-25
		Impossible drilling past 25'	
		T.D. 25'	

LocationSE	LISEUSEUNWU	Section: 24	т	<u>115</u> N.	sX	R. <u>49</u> XX	W.
Well:	Test Hole 30			Land Owner:			
County:De	euel D	ate: 7-15-7 5		Elevation:	1780	(X X ,XXX) T)
E-Log:	Sa	amples:no		Drilling Comp	any:SD	GS	
Source of Data:							

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Topsoil, black	0-3
	8	Gravel, medium to coarse, subangular	3-11
	12	Cobbles, assorted sizes, 6-7" diameter	11-23
		Impenetrable layer of cobbles	
		T.D. 23'	

Location	NE4NE4NE4NE4	Section:19 T	115 N. XSX	R. <u>48</u> e ^X w.
Well:	Test Hole:	31	Land Owner:	
County:	Deuel	Date: 6-12-73	Elevation: 1785	(XXXXX, т)
E-Log:	no	Samples:no	Drilling Company:	SDGS
Source of Data:				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil, black	0-1
	5	Sand, medium; dry, clean	1-6
	3	Gravel, medium; moist	6-9
	16	Clay; oxidized, saturated (till)	9-25
		·	
		-	

Location NW4NW4NW4NE4	Section: T.	112N. X8X	R. <u>51 XXX</u> W.
Well: Test Hole:	Empire 6	Land Owner:BDRWS	
County: Brookings	Date:5-1-75	Elevation: 1638.55	(XX, 1, XX)
E-Log:	Samples:	Drilling Company:	Empire
Source of Data:			-

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	3	Clay, sandy	2-5
	20	Sand & gravel	5-25
	10	Sand	25-35
	12	Sand & gravel	35-47
	3	Clay	47-50
		45' observation well - 2" pipe	
		depth to water - 16.6' 9-9-75	
		15.1' 4-30-75	
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	w.				
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APPENDIX C

TEST HOLE LOGS FROM THE CLEAR LAKE AREA SOUTH DAKOTA

Location	NEINEINEISEI	Section: T	115 N. XX R	4 <u>9</u> XX w.
Well:	Test Hole:	1	Land Owner:	
County:	Deuel	Date: 6-13-73	Elevation: 1810	(ХХХХХ, т)
E-Log:	no	Samples:	Drilling Company: SD	GS
Source of Data: -	G Wallace			
Geologic Unit	Thickness	Lithologic Description	1	From - to Feet

Geologic Unit	Thickness	From - to Feet	
	1	Topsoil, brown	0-1
	19	Clay; oxidized, moist (till)	1-20
	10	Gravel, very clayey; saturated, dirty, cohesive	20-30
	5	Clay; unoxidized (till)	30-35
		·	

Location	NEWNEWSEWSEW	Section:12	T	<u>115</u> N.	XSX	R. <u>49</u> X	₿X W.
Well:	Test Hole:	2		Land Owner:	-		
County:	Deuel	Date: 6-29-73		Elevation:	1800	(X X ,X,X,X	т)
E-Log:	no	Samples:no		Drilling Com	pany:	SDGS	
Source of Data:		,					

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil, brown	0-1
	21	Gravel, coarse; dry, clean	1-22
	13	Sand, medium; dry, clean	22-35
	5	Sand, coarse; saturated, clean	35-40
	5	Clay; unoxidized, hard (till)	40-45
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		,				115N. XSX		
Well:		Test Hole:	3			Land Owner:		
County:	Deuel_		Date:6-	29-73		Elevation: 1821		(XXXX T)
E-Log:	no	···-	Samples:	no		Drilling Company:	SDGS	S
Source of Data: .								
Geologic Unit	Thickness		Li	ithologic Desc	ription			From - to Feet
	4	Sand, fi	ine; dry, g	ot stuck,	unat	ole to drill		0-4
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Location NEWNEWNEWNEW	Section: T	<u>115</u> N. XX	R. <u>49</u> XX W
Well: Test Hole:	4 (0b-1)	Land Owner:	
County:Deuel	Date: 8-3-71	Elevation: 1782	(ЖХХХ [*] , т)
E-Log:	Samples:	Drilling Company:	USGS
Source of Date:			

Geologic Unit	Thickness	Thickness Lithologic Description			
	1	Soil, black, gravelly	0-1		
	8	Sand and gravel, medium-grained, dirty, (wet, till)	1-9		
	5	Clay, gray, pebbly, (till)	9-14		
	3	Sand, gray, fine to medium	14-17		
	5	Sand, gray, gravelly, medium to coarse	17-22		
-	10	Clay, gray, pebbly, (till)	22-32		
		Observation well			
		16 ft. plastic pipe			
		3 Ft. sd. pt. (rubber coupling)			
		MP= +3.07'			
		W/L = 6.46' (Aug 3)			
		W/L = 7.00' (Aug 18)			
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Location	NE4NW4NW4NE4	Section: <u>14</u>	T	115 N. XXX	R. 49 XeX	W.
Well:	Test Hole:	5	-	Land Owner:		
County:	Deu el	Date:9-4-73		Elevation: <u>1790</u>	(ХХХХ Т))
E-Log:		Samples:		Drilling Company:	USGS	
Source of Data:	•					

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	15	Silt, yellow brown, wet at 5 ft	0-15
	6	Silt, gray, very slightly clayey	15-21
	6	Clay, silty, pebbly, gray (till)	21-27
	·		
			-
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Location NWINWINWINWI	Section:14 T	<u>115</u> n. XeX	R. <u>49</u> XX W.
Well: Test Hole:	6	Land Owner:	
County:Deuel	Date:8-3-71	Elevation: 1799	(X ХХХ т)
E-Log:	Samples:	Drilling Company:	USGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, black, clay	0-2
	4	Sand, brownish-gray, clayey, pebbly, damp (till)	2-6
	1	Sand, reddish brown, clayey, pebbly (till)	6-7
	8	Sand and gravel, medium (wet)	7-15
	7	Clay, gray, pebbly (till)	15-22

Location	SW4SW4SW4NW4	Section:14	т	115 N.	8 X X	R. <u>49</u> XX	W.
Well:	Test Hole:	7		Land Owner:		• .	
County:	Deuel	Date: 9-4-73		Elevation: _	1796	(XXXX, т)
E-Log:		Samples:		Drilling Com	pany:	USGS	
Source of Data:							

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Silt, clayey, yellowish brown, dry	0-3
	4	Gravel, sandy, fine to medium, brown	3-7
	4	Gravel, medium, brown, wet at 9 ft, some coarse	4-11
	2	Gravel, medium to coarse, silty, brown	11-13
	14	Clay, silty, pebbly, brown (till)	13-27

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Location	NW날NE날NE날SW날	Section:14	T	115 N. XSX	R. <u>49</u> E w.
Well:	Test Hole:	8		Land Owner:	
County:	Deuel	Date:7-22-75		Elevation:1780	(XĂXX, т)
E-Log:		Samples: MO		Drilling Company:	SDGS
Source of Data:					

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil, black	0-2
	12	Silt, light to dark brown, oxidation layer	2-14
	8	Gravel, fine to medium, subangular to subrounded;	
		interbedded clay, light to medium brown, sandy	14-22
	3	Cobbles, 2-3" est. diameter	22-25
	7	Clay, brown, silty, pebbly (till); intermittent	
		thin gravel lenses	25-32
	6	Clay, light brown (till) oxidized	32-38
	12	Clay, gray (till) unoxidized	38-50
		T.D. 50'	

Location	SWISSWISSWIS	Section: 14	Т	115 N. XXX	R. <u>49</u> XX	W.
Well:	Test Hole:	9		Land Owner:		
County:	Deuel	Date: <u>8-3-71</u>		Elevation:	1790 (X ,XXX T))
E-Log:		Samples:		Drilling Company:	USGS	
Source of Data:						

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil, brown	0-1
	2	Sand, brown, silty and sandy (till)	1-3
	6	Sand and gravel, clayey (wet, till)	3-9
	13	Clay, gray, pebbly (till)	9-22

Location	NE4SE4SE4	Section:14	T	115 N. XXX	R. <u>49</u> XX w.
Well:	Test Hole:	10		Land Owner:	
County:	Deuel	Date: 8-3-71		Elevation:	<u>1776</u> (ХХХХ т)
E-Log:		Samples:		Drilling Company:	USGS
Source of Data: _					

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil, black, sandy, gravelly	0-1
	14	Sand and gravel, medium to coarse (wet), dirty	1-15
	12	Clay, gray, pebbly (till)	15-27
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Location	NEINEINEINEI	Section:13 T	115 N. XX	R. <u>49</u> XX w.
Well:	Test Hole:	11	Land Owner:	
County:	Deuel	Date:	Elevation: 1810	(XХXXX, т)
E-Log:	2	Samples:no	Drilling Company:	SDGS
Source of Data:				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil, black	0-2
	11	Clay, light brown, silty to very fine sandy texture,	
		oxidized	2-13
	9	Sand, fine, clayey, oxidized	13-22
	2	Gravel, fine to medium	22-24
	27	Gravel, coarse, some cobbles, clayey	24-51
	9	Silt, gray, clayey	51-60
		T.D. 60'	
_			

Location	NW4NW4NW4NE4	Section: 19	т	115 N.	% <u>X</u>	R. <u>48</u> XX	X w.
Well:	Test Hole:	32 (Ob - 7)		Land Owner:			
County:	Deuel	Date:7-16-75		Elevation:	L790	(ХХХХ т)
E-Log:		Samples: <u>Yes</u>		Drilling Comp	oany:	SDGS	<u>_</u>
Source of Data:							

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil, black	0-2
	4	Clay, light brown, sandy, medium	2-6
	8	Gravel, medium to coarse, subangular to	
		subrounded, clean	6-14
	28	Cobbles, unknown diameter, approx. 4-6"?	14-42
	18	Clay & silt, gray, gravelly, fine	42-60
		T.D. 60'	
		Observation well 22' $1\frac{1}{4}$ " plastic	
		5' plastic sand point	

Location NWaNEaNWaNWa	Section: T	115 N. XEX	R. <u>48</u> XEX W.
Well: Test Hole:	33	Land Owner:	
County:Deuel	Date:7-22-75	Elevation:1785	(X X XXX т)
E-Log:	Samples: <u>yes</u>	Drilling Company:SDC	25
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	1	Clay, gray, sandy -	2-3
	6	Sand, medium to coarse, unsorted	3-9
	32	Gravel, medium to coarse, unsorted, rounded	9-41
	6	Clay, brown, sandy (till); gravel, two interbedded	
		layers, medium-coarse	41-47
	6	Clay, gray, silty (till); interbedded gravel	47-53
		T.D. 53'	
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Location NWENWENWENWE	Section:19 T.	115_ N. XeX	R. <u>48</u> XEX w.
Well: Test Hole:	34	Land Owner:	
County:Deuel	Date:7_15_75	Elevation:1780	(X X ,XX,X т)
E-Log:	Samples:no	- Drilling Company:	SDGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil	0-2
	10	Clay, silty; oxidized	2-12
	16	Sand, fine to medium; subrounded	12-28
	1	Clay, silty, black; unoxidized	28-29
	8	Gravel, fine; sand, very coarse	29-37
		Hit rock at 37'	
		T.D. 37'	
·			
		Observation well 20' plastic 1¼"	
		5' plastic sandpoint	
		set at 23';above clay layer	

Location NW4NW4SW4NW4	Section: T	. <u>115</u> N. XX	R. <u>48</u> XeX w.
Well: Test Hole:-	35	_ Land Owner:	
County:Deuel	Date:7-18-75	Elevation:1777	(XXXX T)
E-Log:	Samples:	_ Drilling Company:	SDGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil, black	0-2
	5	Silt, light brown to gray	2-7
	2	Sand, medium to coarse, subrounded	7-9
	7	Gravel, medium to very coarse, subrounded to subangular	9-16
	6	Cobbles, est. 3-4" diameter	16-22
-	11	Clay, gray, silty, gravelly (till) unoxidized	22-33
	1	Cobbles, 2-3" diameter or rocky till	33-34
	16	Clay, gray, pebbly (till) unoxidized	34-50
		T.D. 50'	
7-4			

Location	NW4NW4NW4SW4	Section:19	т	<u>115</u> N.	ą;	R. <u>48</u>	ξ	W.
Weil:	Test Hole:	36 (Ob - 9)	-	Land Owner:				
County:	Deuel	Date: 7-18-75		Elevation:	1782	(¾XXX,	Т)	
E-Log:		Samples: n 0		Drilling Comp	any:	SDGS		
Source of Data:								

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Topsoil, black	0-3
	6	Sand, fine to coarse, clean	3-9
	11	Silt, dark gray, some oxidation	9-20
	18	Gravel, medium to coarse, subrounded, clean	20-38
	22	Clay, gray, silty, sandy (till); gravel stringer at 42	38-60
		T.D. 60'	
		Observation Well 34' 1½" plastic	
		bottom 5' slotted	

LocationSWINWINWISEI	Section: T	. <u>115</u> N. XXX	R. <u>49</u> £ W.
Well: Test Hole:	37	Land Owner:	
County:Deuel	Date: 9-5-73	Elevation:1800	(X X , X X, Т)
E-Log:	Samples:	_ Drilling Company:	USGS
Source of Data:			70 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		·	

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	8	Gravel and sand, silty, fine to coarse, brown, dry	0-3
	14	Clay, silty, pebbly, brown, damp (till)	8-22
		·	

Location	NW4SW4SW4SE4	Section:	19	т	115 N.	X <mark>8</mark> X	R. <u>48</u>	_χ ξ <u>ζ</u>	w.
Well:	Test Hole:	38			Land Owner:				
County:	Deuel	Date:	6-29-73	3_	Elevation:	1792	(Ă,X	ά, τ)	
E-Log:	no	Samples:no			Drilling Comp	any:	SDGS		
Source of Data:	***************************************								

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil, black	0-1
	11	Gravel, coarse; dry, clean	1-12
	13	Clay; oxidized, dry (till)	12-25

Location	SEISEISEISEIS	Section:19	т. <u>1</u>	<u>15</u> N.	%€X	R. <u>48</u> XX	w.
Well:	Test Hole:	39	La	and Owner:			
County:	Deuel	Date:	Ele	evation:	1811	(XX , XX)	Γ)
E-Log:		Samples:no	Dr	rilling Comp	pany:SD	GS	
Source of Data:							

Geologic Unit	Thickness	Thickness Lithologic Description			
	11	Gravel, sand; some pebbles	0-11		
	18	Sand and gravel; clay, yellow, pebbly	11-29		
	56	Clay, gray, pebbly, (till)	29-85		
	37	Clay, gray, pebbly, (till);some sand	35-122		
	28	Sand and gravel; clay, gray, pebbly, (till)	122-150		

LocationNFINELNWINE	Section: <u>26</u> T.	115 N. XSX	R. <u>49</u> XEX W.
Well: Test	Hole: 40	Land Owner:	
County:Deuel	Date:8-2-71	Elevation: 1779	(T XXXXX)
E-Log:	Samples:	Drilling Company:	USGS
Source of Data:			

Geologic Unit	Thickness	Thickness Lithologic Description				
	2	Soil, black	0-2			
	2	Clay, light brown, sandy, wet	2-4			
	11	Gravel and sand, wet	4-15			
	2	Clay, brown, pebbly, sandy, (till)	15-17			
-	5	Clay, gray, pebbly, (till)	17-22			
			·			
		,				

Location	NWINWINWINEI	Section:26 T.	<u>115</u> N. 16%	R. <u>49</u> È W.
Well:	Test Hole:	41	Land Owner:	
County:	Deuel	Date:7-17-75	Elevation: 1775	(X A ,XX), T)
E-Log:		Samples:	Drilling Company: —	SDGS
Source of Data:				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
2		Topsoil, black	0-2
	4	Clay, light brown; silts, black	2-6
	7	Gravel, coarse, white, subrounded	6-13
	18	Clay, dark gray to black, gravelly (till)	13-31
	4	Cobbles, 2-3" diameter & larger	31-35
	4	Clay, dark gray, pebbly; some gravel (till)	35-39
		Cobbles, 2-3" diameter	
			·
			·

Location	NULNWLN	NW-100-100 T. 115 N. XX R. 49	XXXX w.
Well:		Test Hole: 42 Land Owner: 42	
County:	Deuel	Date: 8-2-71 Elevation: 1833	(T XXXX T)
E-Log:		Samples: Drilling Company:	USGS
Source of Data: .			
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	22	Clay, buff, pebbly and sandy (till) damp	
		(7 feet), wet (12 feet)	0-22

Location	NE4NE4NE4NE4	_ Section:	25	T	115 N.	ΧŠ	R. <u>49</u>	_X 5 X	W.
Well:	Test Hole:	43			Land Owner:	****			
County:	Deuel	Date:	8-2-71		Elevation:	1785	(X X XX)	ζт)	!
E-Log:		Samples:			Drilling Comp	any:	USGS	5	
Source of Data: -									

Geologic Unit	Thickness	From - to Feet	
	2	Soil, black	0-2
	1	Silt, buff, few stones	2-3
	2	Clay, brown, gravelly, sandy	3-5
	7	Clay, brown, pebbly, damp, (till)	5-12
	10	Clay, dark brown, pebbly, wet (till)	12-22
			1

6-40

SOUTH DAKOTA GEOLOGICAL SURVEY

Location	SE½SW½N	<u>F⅓N₩</u> Section: <u>25</u> T. <u>115</u> N. S R.	_49XX w.
Well:		Test Hole: 44 Land Owner:	
County:	Deuel	Date:7-17-75	(XXXX T)
E-Log:		Samples: Drilling Company:	SDGS
Source of Data:		•	
Geologic Unit	Thickness	- Lithologic Description	From - to Feet
	1	Topsoil	0-1
	5	Gravel, fine to medium, subrounded	1-6

Clay, black, silty, sandy (till); interbedded

gravel, medium to coarse, thin

T.D. 40'

34

Location	NELNWLNWL	Section: <u>25</u>	T	115 N.	XSX	, R	49 XEX	W.
Well:	Test Hole:_	45		Land Owner:			- 10	
County:	-Deuel	Date: 7-16-75		Elevation:	1780		(ϪΧΧΚ, Τ)
E-Log:		Samples: <u>no</u>		Drilling Com	pany:	SDGS		
Source of Data: _							######################################	

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil ,	0-2
	13	Sand, very coarse; gravel, fine; subrounded to	
		subangular; sand, medium, subrounded intermixed	2-15
	11	Sand, very coarse; gravel, fine	15-26
		T.D. 26'	

Location	NWIANWIANWIANWIA	Section: 25	T	<u>115</u> N.	X 8 X	R. <u>49</u>	– Ķ	W.
Well:	Test Hole:	46 (0b - 10)		Land Owner:				
County:	Deuel	Date: _7-17-76		Elevation:		1776 (X X XX	ХĶТ)
E-Log:		Samples:		Drilling Comp	any:	SDGS		
Source of Data:								

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil, black	0-2
	22	Gravel, medium to coarse; subrounded to subangular	2-24
	4	Cobbles, unknown diameter, 3-4" est.	24-28
	7	Gravel, medium to coarse, subrounded	28-35
	15	Clay, sandy, medium gray	35-50
		T.D. 50'	
		Observation Well-20' 1녈" plastic	
		5' plastic sandpoint	
		·	

Location	NฟรุNฟรุก	<u> ՍՍԿ-ՈՍԿ-</u> Section: <u>25</u> T. <u>115</u> N. XX R. <u>4</u>	<u>19</u> XEX W.
Well:		Test Hole: 47 Land Owner:	
County:	Deuel	Date: 8-2-71 Elevation: 1780	(Χ Ϫ ,ΧΙ, Τ)
E-Log:		Samples: Drilling Company:	USGS
Source of Data: -			
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	4	Clay, brown, gravelly, sandy, dry	0-4
	25	Gravel, reddish brown, clayey, very sandy, (wet)	4-29
	3	Clay, gray, pebbly (till)	29-32
			·
- 1			

Location NWISEINWINWI	Section:25 T	115 N. XX R. 49	XEX w.
Well: Test Hole:	. 48	Land Owner:	
County:Deuel	Date:7-17-75	Elevation: 1780 (XX	,ХХ <mark>К</mark> , т)
E-Log:	Samples:no	Drilling Company: _SDGS	
Source of Data:			

Geologic Unit	Thickness Lithologic Description			
	1	Topsoil	0-1	
	8	Clay, light tan, soft	1-9	
	2	Sand & gravel, intermixed, clean	9-11	
	27	Clay, gray, silty (till) unoxidized; interbedded thin		
		gravel layers	11-38	
	5	Sand, medium to very coarse, angular	38-43	
	17	Clay, gray, silty, sandy (till) unoxidized	43-60	
		T.D. 60'		

Location	SELSELNWLNWL	Section: _	25	T	<u>115</u> N.	X6X	R. <u>49</u>	X	W.
Well:	Test Hole	49	Western Co	····-	Land Owner:				
County:	<u>Deuel</u>	Date:	7-17-7	5	Elevation: _	1780	(XX)	XXX T)	
E-Log:		Samples:	no		Drilling Com	pany:		SDGS	<u> </u>
Source of Data	:					<u> </u>			<u> </u>

Geologic Unit	Thickness Lithologic Description		
	1	Topsoil	0-1
	12	Clay, light yellow to tan, soft (oxidized) to clay,	
		dark black (unoxidized) - slough deposit	1-13
	1	Gravel, coarse	13-14
	11	Clay, dark black, soft (unoxidized)	14-25
	25	Clay, dark black, pebbly, sandy (till); interbedded	
		gravel, medium to coarse, thin	25-50
		T.D. 50'	
			·

Location NEWSWASEWNWW	Section:25	T. <u>115</u> N. XXX	R. <u>49</u> XX W.
Well: Test Hole:	50	Land Owner:	
County:Deuel	Date:7-17-75	Elevation:	1805 (XXXX) T)
E-Log:	Samples:no	Drilling Company:	SDGS
Source of Data:			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil	0-1
	2	Gravel, medium, rounded	1-3
	23	Clay, light tan, silty, oxidized with interbedded	
		gravel, medium, rounded; clay layers average 5-6'	
		thick - gravel 6"-1' thick	3-26
	21	Clay, dark black, unoxidized (lake deposit)	26-47
	7	Clay, dark black, pebbly, unoxidized (till)	47-54
	6	Gravel, medium to coarse, unsorted, rounded	54-60
	10	Clay, silty, pebbly, gray; gravel, medium-coarse	60-70
	30	Clay, gray, silty, pebbly (till) unoxidized	70-100
		T.D. 100'	
	,		

Location SE¼SE¼SE¼SE½	Section: 25 T	115 N. XXX	R. <u>49</u> XX w.
Well: Test Hole:	51	Land Owner:	
County:Deuel	Date: 9-18-72	Elevation:	<u>1834</u> (ХХХХ Т)
E-Log:yes	Samples:yes	Drilling Company:	SDGS
0 (0)			

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil, black	0-1
	17	Clay, yellowish-brown, silty	1-18
	15	Clay, grayish-brown	18-33
	34	Clay, gray, sandy, silty	33-67
	31	Sand, gray	67-98
	4	Gravel	98-102
	. 79	Clay, gray, gravelly lots of boulders (gravel	
		stringer from 124-126) (till)	102-181
	67	Clay, gray, pebbly (till)	181-248
	9	Gravel	248-257
	61	Clay, gray, pebbly (till) (gravelly) in spots	257-318
	8	Gravel, medium to coarse	318-326
	30	Clay, gray, silty, sandy, pebbly, (till) gravelly	
		in spots	326-356
	31	Clay, yellow-brown (oxidized), wood around 385',	
		gravelly in spots	356-387
	29	Clay, gray, gravelly (till)	387-416
	13	Gravel	416-429
	135	Clay, gray, gravelly (till)	429-564
	23	Gravel	564-587
	23	Clay, gray, gravelly (till)	587-610

Location NEWNEWNEWNEW	Section:30 T	115 N. SeX	R. <u>48</u> £ W.
Well: Test Hole:	52	Land Owner:	
County:Deuel	Date: 8-2-71	Elevation: 1809	(X X XX % т)
E-Log:	Samples:	Drilling Company:	USGS
Source of Data:		•	

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, black	0-2
	3	Clay, reddish brown, silty, (till)	2-5
	7	Gravel and sand, reddish brown (dry)	5-12
	4	Sand and gravel, brown, dirty	12-16
	11	Sand, and gravel, brown (wet)	16-27
	10	Sand, brown (wet)	• 27-37
	5	Clay, gray, pebbly (till)	37-42
	5	Clay, as above, gravel stringers	42-47

Location	NWINEINEINWI	Section: 30	т	115 N. XX	R. <u>48</u> X <u>e</u> X w.
Well:	Test Hole:	53		Land Owner:	****
County:	Deuel	Date:		Elevation: 1785	(ÄХ̈ХХ̈, т)
E-Log:		Samples:no		Drilling Company:	SDGS

Source of Data:

Geologic Unit	Thickness Lithologic Description		From - to Feet	
	2	Topsoil, black		
	2	Gravel, fine, very clayey, subangular	2-4	
	4	Cobbles, est. 3-4" diameter	4-8	
	16	Gravel, medium, clayey, subangular to subrounded,		
		dirty; interbedded clay	8-24	
	3	Clay, brown, silty, sandy (till); gravelly	24-27	
	78	Clay, gray, silty, pebbly (till); a few gravel		
		layers; 1"-1½" pebbles; very sparse	27-105	
	6	Gravel, fine to medium, subangular, very clayey, dark		
		gray	105-111	
	3	Gravel, pebbles 1-2" diameter	111-114	
	26	Clay, gray, silty, pebbly (till) unoxidized	114-140	
		T.D. 140'		

Location	SE4SE4SE4SE4	Section:30	т	115_N.	s %	R. <u>48</u> XX V	٧.
Well:	Test Hole:	54		Land Owner:	-		-
County:	Deuel	Date:6-12-73		Elevation:	1313	(T XXXX T)	
E-Log:	no	Samples:		Drilling Comp	any:	SDGS	
Source of Data: _							

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil, brown	0-1
	19	Clay; oxidized, dry (till)	1-20
	5	Clay; oxidized, moist (till)	20-25
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		·	
	·	,	