# STATE OF SOUTH DAKOTA Richard Kneip, Governor

DEPARTMENT OF NATURAL RESOURCE DEVELOPMENT Vern W. Butler, Secretary

GEOLOGICAL SURVEY
Duncan J. McGregor, State Geologist

Open-File Report No. 11-UR

GROUND-WATER STUDY FOR THE CITY OF FREDERICK

bу

Betsy Slugg

and

Assad Barari

Science Center University of South Dakota Vermillion, South Dakota 1976

### CONTENTS .

Pa	ge
GROUND-WATER STUDY FOR THE CITY OF FREDERICK	1
FIGURES	
<ol> <li>Map showing locations of test holes and water samples in the Frederick area</li> </ol>	5
2. Map showing saturated thickness in feet of sand and gravel in the Frederick area	6
TABLE	
1. Chemical analyses of water sample collected from the Frederick city well	4
APPENDIX	
A. Logs of test holes drilled in the Frederick area	7

#### GROUND-WATER STUDY FOR THE CITY OF FREDERICK

This report contains the results of a ground-water study conducted by the South Dakota Geological Survey for the City of Frederick, Brown County, South Dakota. The field work was conducted between June 18 and July 2, 1976. The purpose of the study was to locate a water source to augment the present water supply. The city presently receives its water from a well located within the town. This well is 21 feet deep and yields water from gravel outwash. Included in the study were: (1) interpretation of the geology, (2) drilling of 20 rotary holes and 10 auger holes, (3) chemical analysis of a water sample from the city well. Locations of the test holes are plotted on the map in figure 1 along with the location of the water sample.

Test drilling was conducted near the present well to determine whether the well penetrated the total thickness of gravel in that particular area, and to locate other sources of gravel in the vicinity of the town. Figure 2 shows the thickness of saturated sand and gravel at each hole.

The attached table shows the results of a water sample collected from the city well, and also the recommended limits set by the Department of Health. The water sample was analyzed by the South Dakota Geological Survey, and the results are presented in parts per million. Only iron and manganese exceed the recommended limits in this water.

Within the city limits the saturated thickness of sand varies from 1 foot to a maximum of 17 feet, with the most con-

sistent thickness in the vicinity of the present well. Of the holes drilled outside of town, three holes (8, 9, 10) had from 22 to 29 feet of saturated sand and gravel. These three holes are located from 1½ to 2½ miles east of town (see figs. 1, 2, and app. A).

The water level at the city well is approximately 17 feet below the land surface. Although there are 14 feet of saturated gravel at this location, the city well penetrates only 4 feet into it. This well was pumped approximately 90 gallons per minute with a drawdown of one foot, and the water level stabilized at this level. Therefore, the conclusion of the survey is that deepening the well at this location or drilling a well north of the city well, and penetrating the total thickness of the aquifer, will increase the pumping capacity enough for the foreseeable future.

Another potential area for a well field is in the vicinity of test holes 8 and 9 (see fig. 1 and app. A) approximately 1½ miles east of town. The saturated sand and gravel is more than 20 feet thick in this location. If the city should decide to test this area, it is recommended that a few test holes be drilled in this area and if the results are satisfactory a well should be drilled and a pump test should be conducted for at least 72 hours. Water samples should be collected and analyzed. The results of the pump test and water sample analyses will help to decide if the quantity and quality of water is satisfactory.

Before a new well is drilled, the city should contact the Division of Water Rights, Department of Natural Resource Develop-

ment, to obtain water rights and a permit to drill a municipal well, and the South Dakota Environmental Protection Agency to determine the biological and chemical suitability of the water.

The project was financed by the South Dakota Geological Survey, the Oahe Conservancy Sub-District, and the City of Frederick.

This report was prepared by:

Betsy Slugg Assad Barari September, 1976.

### CHEMICAL ANALYSES OF WATER SAMPLE COLLECTED FROM FREDERICK CITY WELL

	City well Frederick, S.D.	Drinking Water Standards U.S. Public Health Service
	Parts Pe	er Million <sup>1</sup>
Calcium	55	
Sodium	180	
Magnesium	50	
Chlorides	110	250
Sulfate	210	500 <sup>2</sup>
Iron	0.60	0.3
Manganese	0.40	0.05
Nitrate Nitrogen	4.6	10.0
Hardness CaCO3	3421	
Total Solids	940	10002

<sup>1</sup> To convert to grains, divide ppm by 17

<sup>&</sup>lt;sup>2</sup>Modified for South Dakota by the Department of Health (written communication, Water Sanitation Section, September 24, 1968)

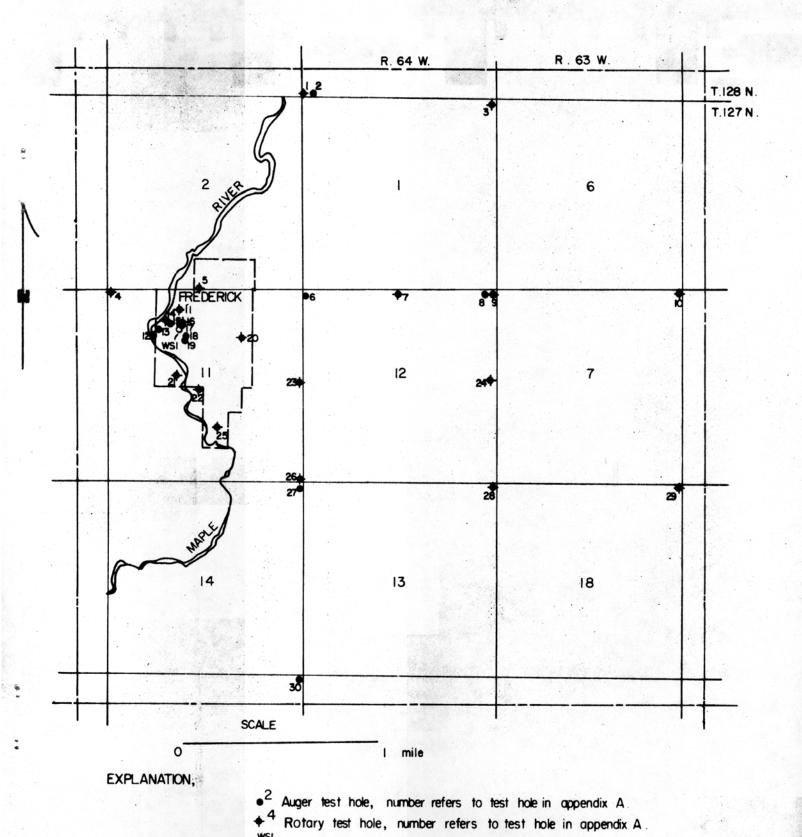


FIGURE 1 -- Map showing locations of test hole and water sample in Frederick area.

sample.

Water

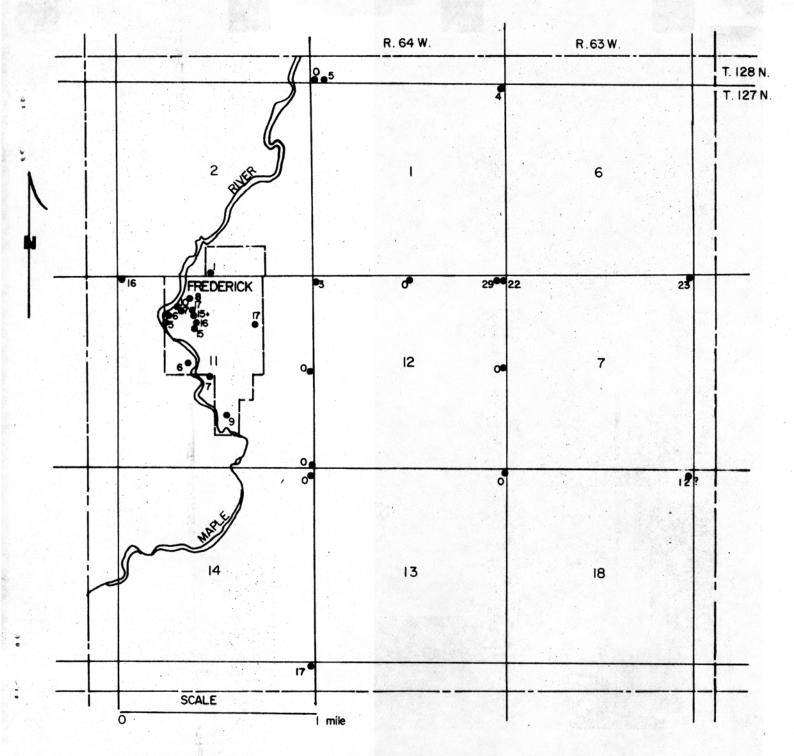


Figure 2 -- Map showing saturated thickness in feet of sand and gravel in the Frederick area.

#### APPENDIX A

LOGS OF TEST HOLES DRILLED IN THE

FREDERICK AREA

			128 N. XX		
			Elevation:136		
E-Log:		Samples:	Drilling Company:	SDGS	
Source of D	ata:				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	6	Sand, brown, clayey	0-6
	9	Gravel, brown, coarse	6-15
	40	Clay; sand and gravel stringers	15-55
	15	Shale	55-70
		T.D. 70'	
		W.T. 15'	
	100		-
-			
	+++		

Location	SW14SW14SW14SW14	Section:	36 т	128 N. XX	R. <u>64</u> K. W.
Well:	Auger Test Hole:	_ 2		Land Owner:	
County:	Brown	Date:	6-21-76	Elevation: 1370	(A, I, T)
E-Log:		Samples:		Drilling Company:	SDGS
Source of Data:					

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, light brown, silty, pebbly	0-2
-	4	Gravel, light brown, silty	2-6
	10	Gravel, brown, coarse to medium, sandy	6-16
	5	Gravel, brown, silty	16-21
	2	Till	21-23
		T.D. 23'	
		W.T. 16'	
7			

Source of Data						
E-Log:		Samples:		Drilling Company:	SDGS	
County:	Brown	Date:6-24-76		Elevation: 1399	( A, I,	т)
Well:	Rotary Test Hole:	3		Land Owner:		
Location	NEWNEWNEWNEW	_ Section:1	т.	127 N. XX	R64	iX. w.

Geologic Unit	Thickness	Lithologic Description		From - to Feet
	4	Soil, black, sandy		0-4
	11	Clay, brown, pebbly		4-15
	4	Gravel, coarse, clayey		15-19
	10	Clay, blue gray, gravelly		19-29
	31	Clay, blue gray, sandy, silty		29-60
		Rock		60
		T.D. 60'		
		W.T. 15'		
	+			
	+		- 30	

Source of Date:				
E-Log:		Samples:	- Drilling Company: SDGS	
County:	Brown	Date: _6-25-76	Elevation:1397 ( A, I,	T )
Well:	Rotary Test Hole:	4	Land Owner:	
Location	NW4NW4NW4NW4	Section: T	127_ N. XX R64i	<u>¥</u> . w.

ieologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, black	0-2
	11	Clay, brown, sandy, silty	2-13
	4	Sand, brown, medium, gravelly	13-17
-	6	Clay, gray, sandy, silty	17-23
	12	Sand, gray, medium to coarse	23-35
	29	Clay, gray, sandy, silty, rocky	35-64
	36	Shale, blue gray, bentonite	64-100
		T.D.100'	
		W.T.5.4'	

Source of Dat	a:				
E-Log:		Samples:		Drilling Company:	SDGS
County:	Brown	Date: 6-24-76		Elevation: 1375	(A, I, T)
Well:	Rotary Test Hole:	5		Land Owner:	
Location	SE4SE4SE4SW4	Section:2	т	127 N. S.	R. 64 E. XX

Geologic Unit	Thickness	Lithologic Description	From · to Feet
	1	Soil, brown, silty, sandy	0-1
	6	Gravel, sand, rocks	1-7
	20	Clay, sandy, silty, pebbly	7-27
	2	Clay, blue gray	27-29
	18	Clay, silty; sand stringers	29-47
	13	Shale, blue gray, bentonite	47-60
		T.D. 60'	- Lander Control of the Control of t
	to tear	W.T. 6.7'	

Source of Data:			
E-Log:		Samples:	Drilling Company:SDGS
County:	Brown	Date: _6-21-76	Elevation:1385 (A, I, T)
Well:	Auger Test Hole:	6	Land Owner:
Location	NWINWINWINWI	Section: 12	T. <u>127</u> N. XX R. <u>64</u> XX. W.

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Soil, sandy, gravelly	0-3
	15	Sand, brown, silty	3-18
	5	Till	18-23
		T.D. 23'	
		W.T. 15'	

Source of Data: .					
E-Log:		Samples:	Drilling Company: -	SDGS	_
County:	Brown	Date: 7-1-76	Elevation 1390	(A, I, T)	
Well:	Rotary Test Hole:	7	Land Owner:	***************************************	
Location	NEANEANEANWA	Section: T	127 N. XX	R. <u>64</u> XX	w.

eologic Unit	Thickness	Lithologic Description	From to Feet
	5	Soil, black to brown, sandy	0-5
	70	Clay, brown, silty	5-75
	5	Shale, blue gray	75-80
		T.D. 80'	
		W.T. not measured	
* 1			
<del></del>			

Location	NEWNEWNEWNEW	_ Section: 12	T. 127 N. S.	R. 64 XX W.
Well:	Auger Test Hole:	8	Land Owner:	
County:	Brown	Date: 6-22-76	Elevation: 1406	(A, I, T)
E-Log:		Samples:	Drilling Company:	SDGS
Source of Date				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil, brown	0-1
	3	Sand, brown, fine, silty	1-4
	4	Sand, brown, medium, silty, pebbly	4-8
	7	Clay, sandy, gravelly	8-25
	7	Sand, gray, medium, silty	25-32
	5	Sand, gray, coarse, silty	32-37
	17	Sand, coarse, fine gravel	37-54
	5	Clay	54-59
		T.D. 59'	
		W.T. 22'	

Location	NEINEINEINEI	Section:	T. 127 N. XX	R. <u>64</u> X. W.
Well:	Rotary Test Hole	:9	Land Owner:	
County:	Brown	Date:6-29-76	Elevation:140	6(A, I, T)
E-Log:		Samples:	Drilling Company: _	SDGS
Source of Data				

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Soil, brown, sandy, silty	0-3
	15	Clay, brown, sandy, silty	3-18
	6	Gravel, brown, medium, sandy	18-24
	16	Sand, gray, medium to coarse	24-40
	30	Clay	40-70
	1.0	Rock	70
		T.D. 70'	
		W.T. 15'	
	2		
	94		

ocation:	NE <sup>1</sup> / <sub>4</sub> N	NEINEINEI Section: 7 T. 127 S., R. 63	Æ. ₩.
Vell:	Rotary Tes	st Hole: Land Owner:	
County:	Brown	Date: <u>6-30-76</u> Elevation:	(A, I, T)
-Log:		Samples: Drilling Company:SDGS	
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, black, sandy	0-2
nee	12	Sand, brown, medium, subrounded	2-14
	18	Clay, brown, sandy, silty	14-32
	23	Gravel, brown, medium, sandy, clayey	32-55
	37	Clay	55-92
	8	Shale, blue gray	92-100
		T.D. 100'	
		W.T. 23'	
*			
*			

ocation:	SEIANWIANEIANV	Section: 11 T.127 8X, R. 64	Æ. W.
		st Hole: 11 Land Owner:	
		Date:6-23-76	
-Log:		Samples: Drilling Company:SDGS	
ource of Da	ta:		1
Geologic Unit	Thickness	Lithologic Description	From - to Feet
1	11	Sand, brown, fine to medium, clayey	0-11
	7	Gravel, sand	11-18
	37	Clay	18-55
	5	Shale	55-60
		ı	
		T.D. 60'	
<i>J</i>		W.T. 9.6'	

Location:	SEISEINWIN	Section: 11 T. 127 XX, R. 64	XEX W.
Well:	Auger Tes	st Hole: Land Owner:	
County:	Brown	Date: 6-76 Elevation: 1368	(A, I, T)
E-Ľog:		Samples: Drilling Company: SDGS	
	ta:		
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, black	0-2
	4	Clay, black, silty	2-6
	3	Silt, black, clayey	6-9
	5	Sand, black, medium, silty	9-14
	6	Till	14-20
		T.D. 20'	
	,	W.T. 6'	
· · · · · · · · · · · · · · · · · · ·			
~			
-			
*			
- 4h			

tion:	SW4SW4NE4NW	Section: 11 T. 127 XX, R. 64	
	Auger Tes	t Hole: Land Owner:  Date: 6-76	_ (A, I, T)
		Samples: Drilling Company: SDGS	
	ta:		From - to
ologic Unit	Thickness	Lithologic Description	Feet
	4	Soil, brown, silty	0-4
	8	Silt, brown	4-12
	3	Sand, brown, coarse, silty	12-15
	3	Sand, gray, coarse, silty	15-18
	5	Till	18-23
		T.D. 23'	
		W.T. 11'	
,			

Location:	NWISWISNEISNV	Section: 11 T. 127 XX, 'R. 64	XEX W.
Well:	Rotary Tes	st Hole: Land Owner:	
County:	Brown	Date: 6-22-76 Elevation: 1367	(A, I, T)
E-Log:	_	Samples: Drilling Company: SD	GS
Source of Da	ta:		
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, black, sandy, silty	0-2
	8	Silt, brown, clayey	2-10
	8	Sand, medium to coarse, gravelly, clayey	10-18
	6	Gravel, medium to coarse, sandy	18-24
	6	Till	24-30
<u> </u>		T.D. 30'	
		W.T. 13.8'	
* 6			

Location:	NE4SW4NE4NW	Section: 11 T. 127 N. R. 64	XEX.
		st Hole: Land Owner:	
County:	Brown	Date: 6-76 Elevation: 1365	(A, I, T)
Log:		Samples: Drilling Company:SDGS	
	ıta:		
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, dark brown, silty	0-2
ı	1	Soil, light brown, silty	2-3
	6	Silt, black, clayey, sandy	3-9
	4	Silt, brown, clayey	9-13
	1	Gravel	13-14
	10	Silt, sandy	14-24
_	61	Gravel, gray, silty	24-30
	3	Till	30-33
		T.D. 33'	
		W.T. 14'	

ocation:	NE4SW4NE4NV	Section: 11 T. 127 N. R. 64	<b>Æ</b> . W.
Vell:	Rotary Tes	st Hole: 16 Land Owner:	
County:	Brown	Date: 6-22-76 Elevation: 1368	_ (A, I, T)
		Samples: Drilling Company:SD	
ource of Da	ta:		
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, black, sandy	0-2
	8	Clay, brown, sandy, silty	2-10
	10	Gravel, coarse; sand, medium to coarse	10-20
	11	Gravel, coarse, sandy, cobbly	20-31
	5	Clay, gray, sandy, silty	31-36
_		T.D. 40'	
		W.T. 14.1'	
	/		
4			
•			

SW4SE4NE4NW	Section: 11 T. 127 XX, R. 64	^₩. _ W.
	Samples: Drilling Company:SDGS	
ta:		
Thickness	Lithologic Description	From - to Feet
2	Soil, black, sandy, silty	0-2
10	Sand, gravel, brown	<b>2-</b> 12
18	Gravel, medium to coarse, clean	12-30
		į.
	T.D. 30' (caving in)	
	W.T. 15'	
	Rotary Test	2 Soil, black, sandy, silty 10 Sand, gravel, brown 18 Gravel, medium to coarse, clean  T.D. 30' (caving in)

Location:	SWISEINEIN	Section: 11 T. 127 XX, R. 64	XEX W.
Well:	Auger Tes	st Hole:18 Land Owner:	4
County:	Brown	Date:6-18-76 Elevation:1368	(A, I, T)
E-Ļog:		Samples: Drilling Company:SDG	ş
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Soil	0-1
	15	Gravel, coarse, sandy, silty	1-16
	3	Gravel, medium, sandy, silty	16-19
	13	Sand, coarse; gravel, clean	19-32
	6	Till	32-38
		T.D. 33'	
		W.T. 16'	
4			
•			

ocation: _	NE4NW4SE4NW	Section: 11 T. 127 XX, R. 64	4Z. · _ W.
		st Hole: 19 Land Owner:	
County:	Brown	Date: <u>6-76</u> Elevation: <u>1367</u>	(A, I, T)
-Log:		Samples: Drilling Company:SDGS	
ource of Da	ta:		
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	4	Soil, dark brown, silty	0-4
	4	Sand, brown, fine, silty	4-8
	9	Gravel, fine to medium, clayey	8-17
	12	Gravel, medium, silty	17-29
	3	Silt, gravelly	29-32
***************************************	3	Till	32-35
		T.D. 25'	
		W.T. 14'	
•			

_ocation:	SELSELNWLNE	Section: 11 T. 127 XX, R. 64	_ XEX _ W.
		st Hole: Land Owner:	
County:	Brown	Date: 6-76 Elevation: 1370	_ (A, I, T)
E-Log:		Samples: Drilling Company: SDGS	
Source of Da	ta:		
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Soil, black, silty	0-3
	6	Clay, gray, silty	3-9
	6	Clay, brown, sandy, silty, pebbly	9-15
	13	Sand, brown, clayey	15-28
	4	Gravel	28-32
	18	Clay, sandy, pebbly, rocky	32-50
$\overline{}$	10	Shale, blue gray	50-60
		T.D. 60'	
		W.T. 5.1'	
•			
			\$

Location:	SEISWISEINN	Section: 11 T. 127 XX, R. 64	XEX W.
Well:	Rotary Tes	et Hole: Land Owner:	
		Date:6-76	(A, I, T)
		Samples: Drilling Company: SDGS	
Geologic	ta		From - to
Unit	Thickness	Lithologic Description	Feet
	2	Soil, black, sandy	0-2
	17	Clay, gray-brown	2-19
	12	Clay, sandy, silty, pebbly	19-31
	6	Sand, blue gray	31-37
	3	Shale, blue gray	37-40
	, ,	T.D. 40'	
		W.T. 14.6'	
•			
-			
•			
1 200			

Location:	NEZNEZNEZSI	Section: 11 T. 127 XX, R. 64	- 程. W.
Well:	Te	st Hole: Land Owner:	
		Date: 6-28-76 Elevation: 1363	
E-kog:		Samples: Drilling Company: Sl	
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Soil, black, sandy, silty	0-3
	9	Clay, gray, sandy, silty	3-12
	2	Sand, brown, medium	12-14
	7	Gravel; medium coarse sand; clay	14-21
	7	Clay, gray, silty, rocky, sandy	21-38
	12	Shale, blue gray	38-50
	A	T.D. 50'	
		W.T. 13.7'	
	-		
1			
<u> </u>			
5			
	- 1		

E-Log: Source of Data:	Thickness	Date: 6-22-76 Elevation: 1389  Samples: Drilling Company: SD  Lithologic Description  Soil, brown, sandy, silty  Clay, brown, sandy, silty, pebbly  Clay, gray, sandy, silty, pebbly  Shale  T.D. 90'  W.T. 16'	
Geologic Unit  3 19 42	Thickness	Lithologic Description  Soil, brown, sandy, silty Clay, brown, sandy, silty, pebbly Clay, gray, sandy, silty, pebbly Shale  T.D. 90'	From - to Feet 0-3 3-22 22-64
Geologic Unit  3  19  42	Thickness	Lithologic Description  Soil, brown, sandy, silty Clay, brown, sandy, silty, pebbly Clay, gray, sandy, silty, pebbly Shale  T.D. 90'	Feet 0-3 3-22 22-64
19		Clay, brown, sandy, silty, pebbly Clay, gray, sandy, silty, pebbly Shale T.D. 90'	3-22 22-64
42	1	Clay, brown, sandy, silty, pebbly Clay, gray, sandy, silty, pebbly Shale T.D. 90'	22-64
	7 3.0	T.D. 90'	
26		T.D. 90'	64-90
		W.T. 16'	
* 1 27		The second secon	
1			
	,		
			*

Location: _	SEISEISEIN	E <sup>1</sup> <sub>4</sub> Section: 12 T. 127 XX, R. 64	XEX W
		st Hole: 24 Land Owner:	
		Date: 7-1-76 Elevation: 1394	
		_ Samples: Drilling Company:SDGS	
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	5	Soil, black-brown, sandy	0-5
	70	Clay, sandy, silty, pebbly	5-75
	15	Shale, blue gray	75-90
		T.D. 90'	•
		W.T. not measured	
			,
·			
1			
6			
* 1			

Location:	SWISWINWISE	Section: 11 T.127 XX, R. 64	XEX W.
		st Hole: Land Owner:	
		Date: 6-25-76 Elevation: 1397	
		Samples: Drilling Company:SDGS	
	ta:		
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	7	Soil, black, silty	0-7
	12	Gravel, coarse; sand, medium to coarse	7-19
	26	Clay, silty, sandy, pebbly	19-45
	15	Shale drill	45-60
		T.D. 60'	
		W.T. 10'	
			was a second of the second of
1			
0			

Location:	SEISEISEISE	Section: 11 T. 127	N. XX, R64	XEX W.
Well:	Rotary Tes	st Hole:26 Land Owner:		
County:	Brown	Date: 6-29-76 Elev	ration:1393	(A, I, T)
E-Log:		Samples: Drilling Compan	y:sds	
Geologic Unit	Thickness	Lithologic Description		From - to Feet
	2	Soil, brown, sandy, silty		0-2
	65	Clay, sandy, silty, pebbly		2-67
	3	Shale, blue gray		67-70
		T.D. 70'		
		W.T. 31'		
٠				
				•
1				
ø				
•				

		Section: 14 T. 127 XX, R. 64	
		Date:6-22-76	
		Samples: Drilling Company:SDGS	
Geologic	ta:		From - to
Unit	Thickness	Lithologic Description	Feet
	1.5	Soil, silty, gravelly	0-1.5
	2.5	Soil, silty, sandy	1.5-3
	18	Till, silty	3-21
	27	Till	21-48
		T.D. 43'	
		W.T. 32'	
4			
•			
1004			

Rotary Tes	t Hole: Land Owner:	
	Samples: Drilling Company:SDGS	
ta:		
Thickness	Lithologic Description	From - to Feet
1.5	Soil, brown, sandy	0-1.5
77.5	Clay, brown, sandy, silty, pebbly	1.5-79
11	Shale	79-90
	T.D. 90'	
	W.T. not measured	
	Rotary Tes Brown ta: Thickness 1.5 77.5	1.5 Soil, brown, sandy 77.5 Clay, brown, sandy, silty, pebbly 11 Shale T.D. 90'

	NEINEINEINE	E½ Section: 18 T. 127 XX, R. 63	XEX W.
		st Hole: Land Owner:	
County:	Brown	Date: 6-30-76 Elevation: 1393	(A, I, T)
E-Log:		_ Samples: Drilling Company:SDO	S
Source of Da			
Seologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Soil, black	0-2
	22	Clay, sandy, silty, pebbly	2-24
	12	Sand, gray, coarse, gravelly, clayey	24-36
	42	Clay, gray, sandy, pebbly	36-78
	15	Till	78-93
	7	Shale	93-100
<u> </u>			
		T.D. 100'	
		W.T. not measured	
3			
) * . - *			
P			

### SOUTH DAKOTA GEOLOGICAL SURVEY DERICK

ocation: _	NEINEINEINE	Section: 23 T. 127 XX, R. 64	_ W.
Vell:	Auger Tes	st Hole:30 Land Owner:	
ounty:	Brown	Date: 6-22-76 Elevation: 1400	(A, I, T)
-Ķog:	<del>onduc</del>	Samples: Drilling Company: SDG	<del>s</del>
purce of Da	ta:	The state of the present was	er
Geologic Unit	Thickness	Lithologic Description	From - to Feet
	4	Soil, light brown, silty, sandy, clayey	0-4
	14	Till, brown	4-18
	16	Clay, sandy	18-34
	11 11	Sand, medium to fine, silty	34-45
	6	Sand, medium to coarse, silty	45-51
	6	Till	51-57
		rilling was desiduated hear the present well to de	er-
	ibe America	T.D. 57'	
	a thi	W.T. 20'	
		roru is the town isquie 7 phous the <b>thickness of</b>	
		and the grayer at each hole.	
		Tached table sesses and repers to water bampse	
		rom the city	
en.		Department	
		1. Dakota-Geologicos mente en elle legació alegació	
2		sets per militaria allo sello se antabelo excesso	2334
		in this	
		city limits has alterated tolowheas of seend	
		ost to a case of 17 feet, with the most co	