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GROUND WATER STUDY FOR THE  
SOUTHERN SPINK-NORTHERN BEADLE  
MUNICIPAL WATER COUNCIL

by

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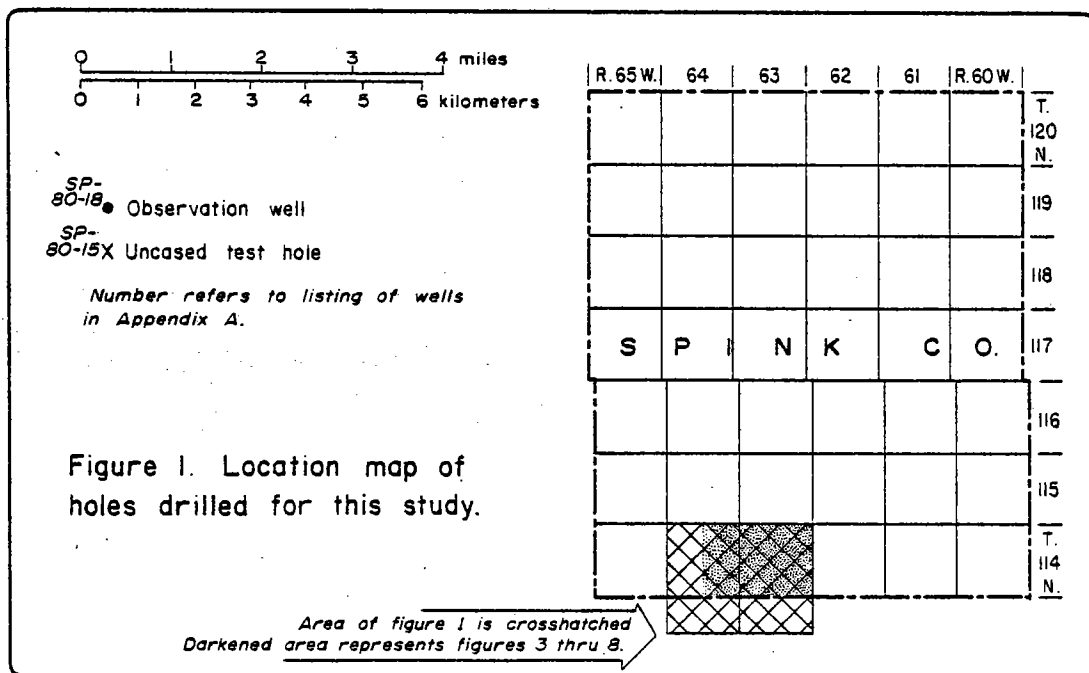
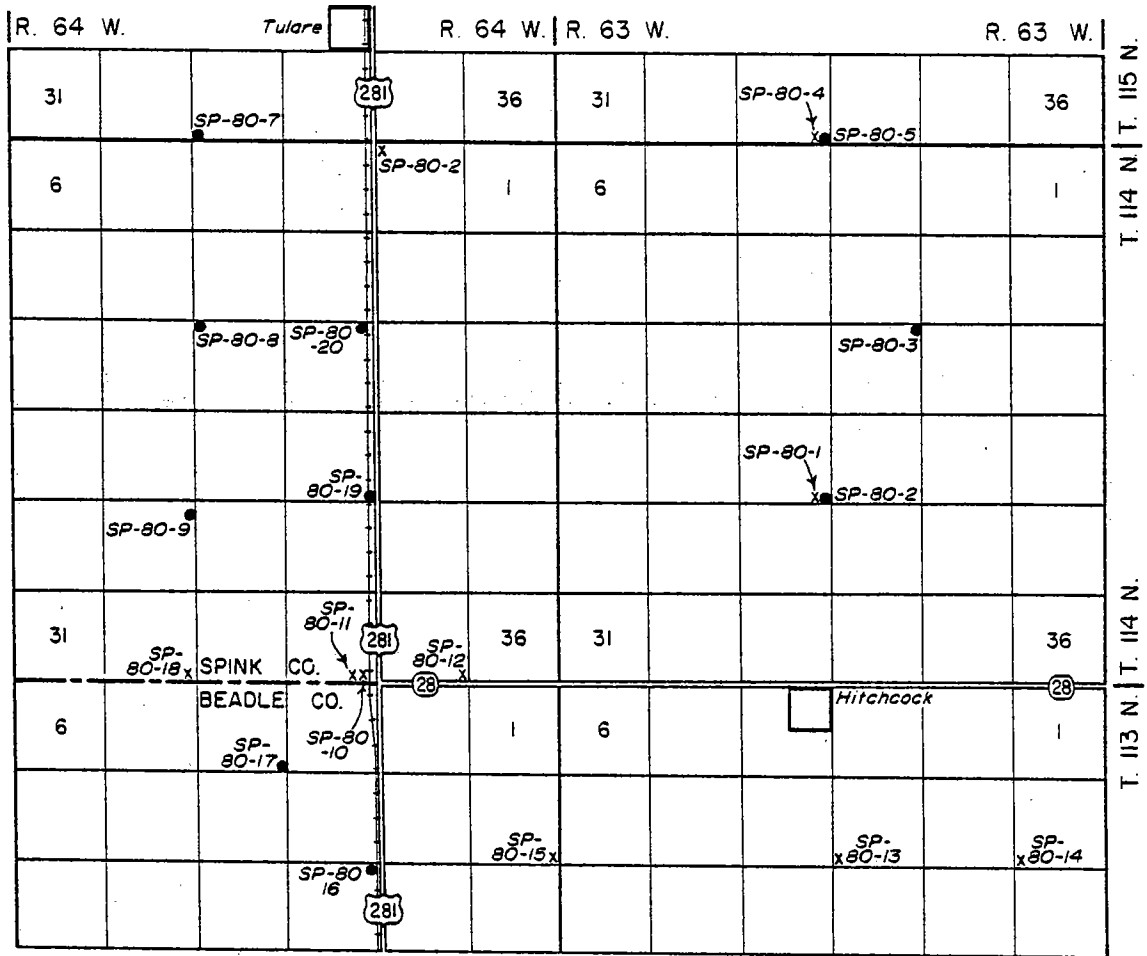
## GENERAL INFORMATION

At the request of the Southern Spink-Northern Beadle Municipal Water Council, the South Dakota Geological Survey conducted a ground-water investigation in southwest Spink and northwest Beadle Counties. The purpose of the study was to assist the Water Council in locating a dependable source of comparably high quality ground water. The project was financed by the South Dakota Geological Survey, the Southern Spink-Northern Beadle Municipal Water Council, the Old West Regional Commission, and the Oahe Conservancy Sub-District.

A previous report (Old West Rural Water Office, 1979) prepared for the Water Council had proposed that a well field be located within 5 miles of Hitchcock, South Dakota. Observation well data from the South Dakota Office of Water Rights suggested that an extensive glacial aquifer was present northwest, north, northeast, and east of Hitchcock.

To evaluate this ground water resource, a study was conducted over a 120 square mile area (fig. 1). Twenty test holes were drilled with a rotary drill rig to determine the thickness and extent of the aquifer. Ten of these test holes were cased with 2-inch diameter plastic pipe and plastic sandpoints (slot size = .018 inch) for use as observation wells. Descriptive logs of these test holes are shown in appendix A.

Water samples were taken from nine of these observation wells and from five nearby observation wells (monitored by



the Office of Water Rights). Additionally, the depths to water in all of the observation wells were measured and subtracted from the casing-top elevations so that a water level map could be made.

## RESULTS

Test drilling indicated that the original study area could be narrowed to include only Belmont Township and the eastern two-thirds of Garfield Township (i.e., T. 114 N., R. 63 W., and the eastern two-thirds of T. 114 N., R. 64 W.). The drilling also confirmed earlier interpretations that the aquifer was thin between Tulare and Hitchcock. On the generalized east-west cross-section across southwestern Spink County this shows as a "bottleneck" separating two thicker segments of the aquifer (fig. 2). Figure 3 also illustrates how the saturated thickness of the aquifer thins from about 45 feet west of U.S. Highway 281 to about 10 feet northwest of Hitchcock and then thickens to about 30 feet north and east of Hitchcock.

Ground-water movement is toward the James River. In the western part of the study area, the aquifer is confined and has from 35 to 40 feet of artesian head. However, some of this head is lost where the aquifer thins, resulting in the aquifer often being unconfined in the eastern portion of the study area. Figure 4 indicates the water levels (elevations above sea level) and the general direction of movement. It

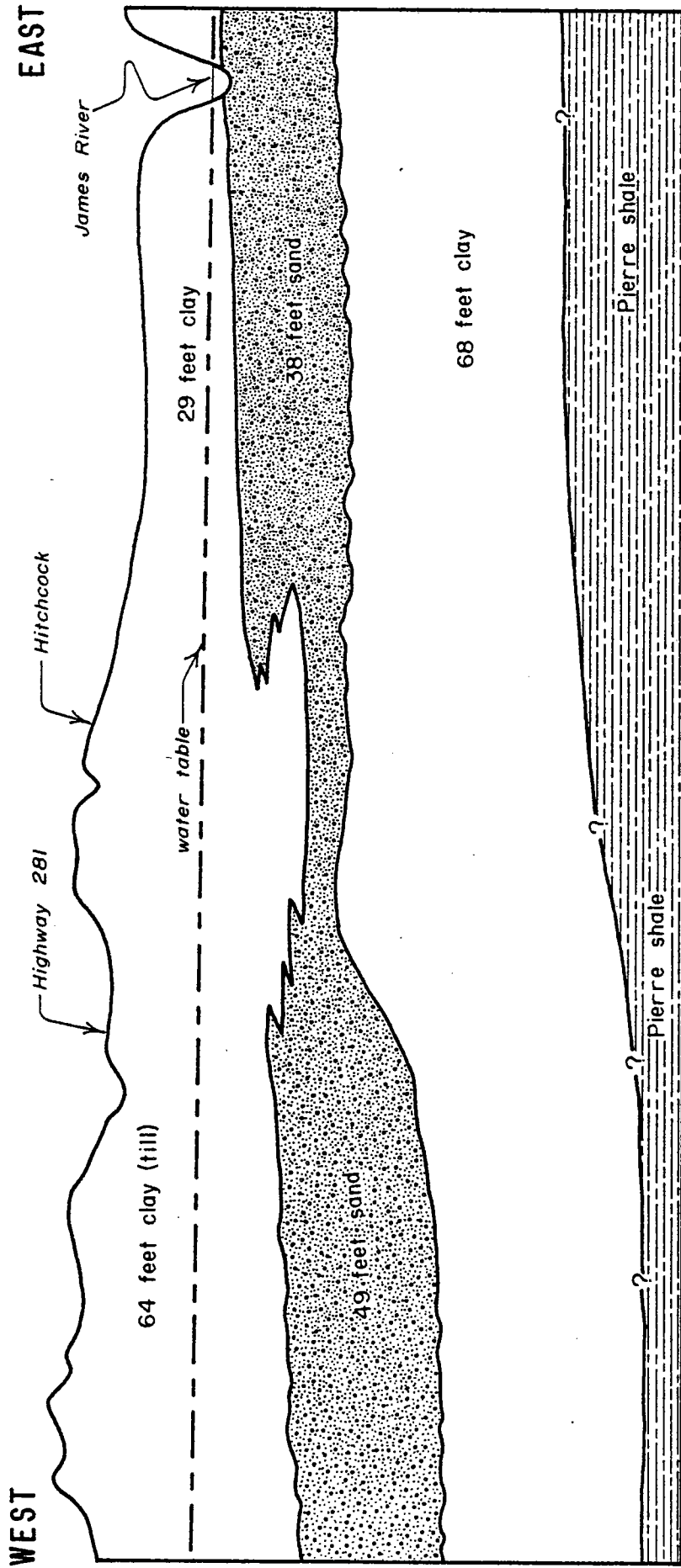


Figure 2. Generalized east-west cross-section across southwestern Spink County.

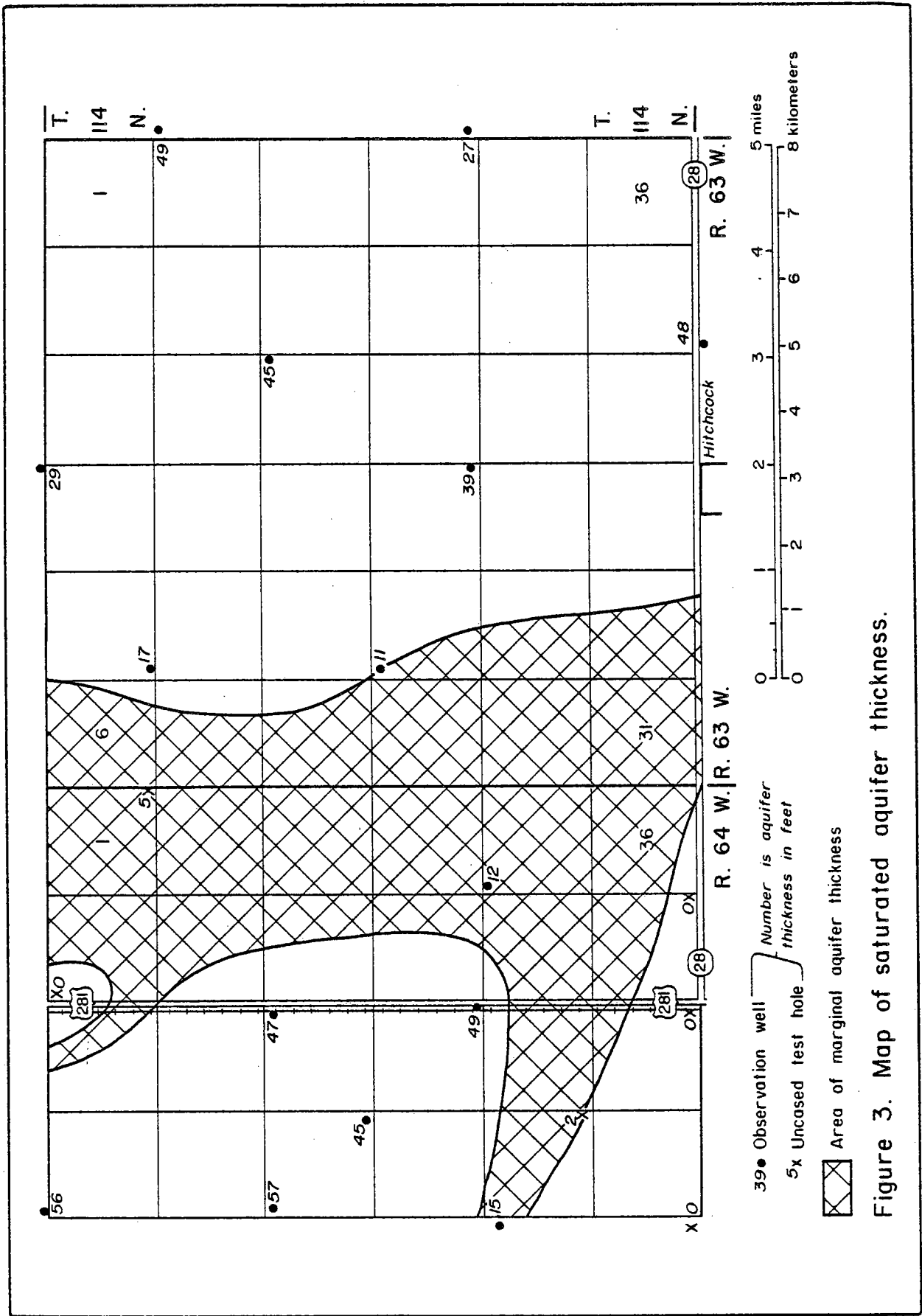


Figure 3. Map of saturated aquifer thickness.

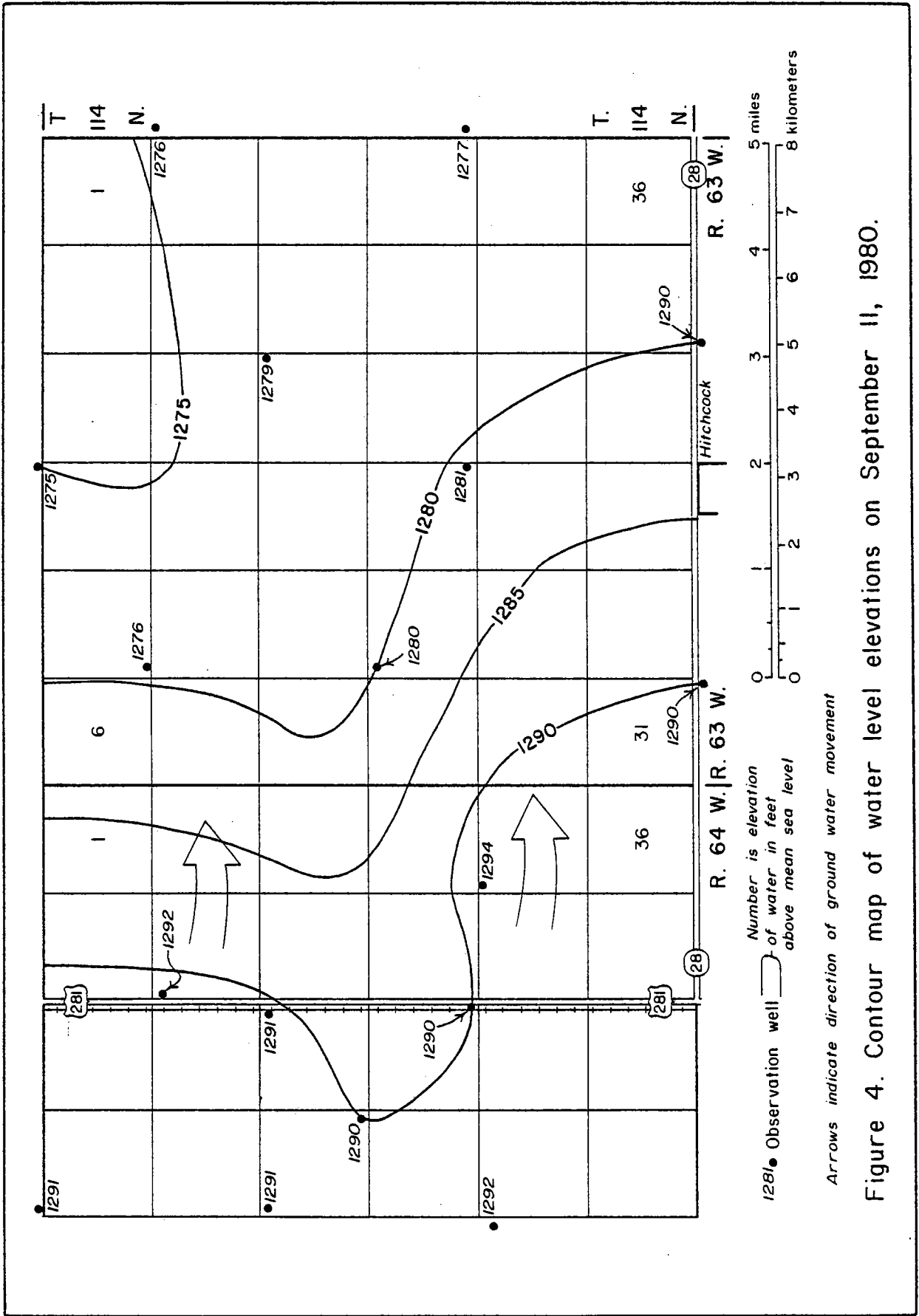


Figure 4. Contour map of water level elevations on September 11, 1980.

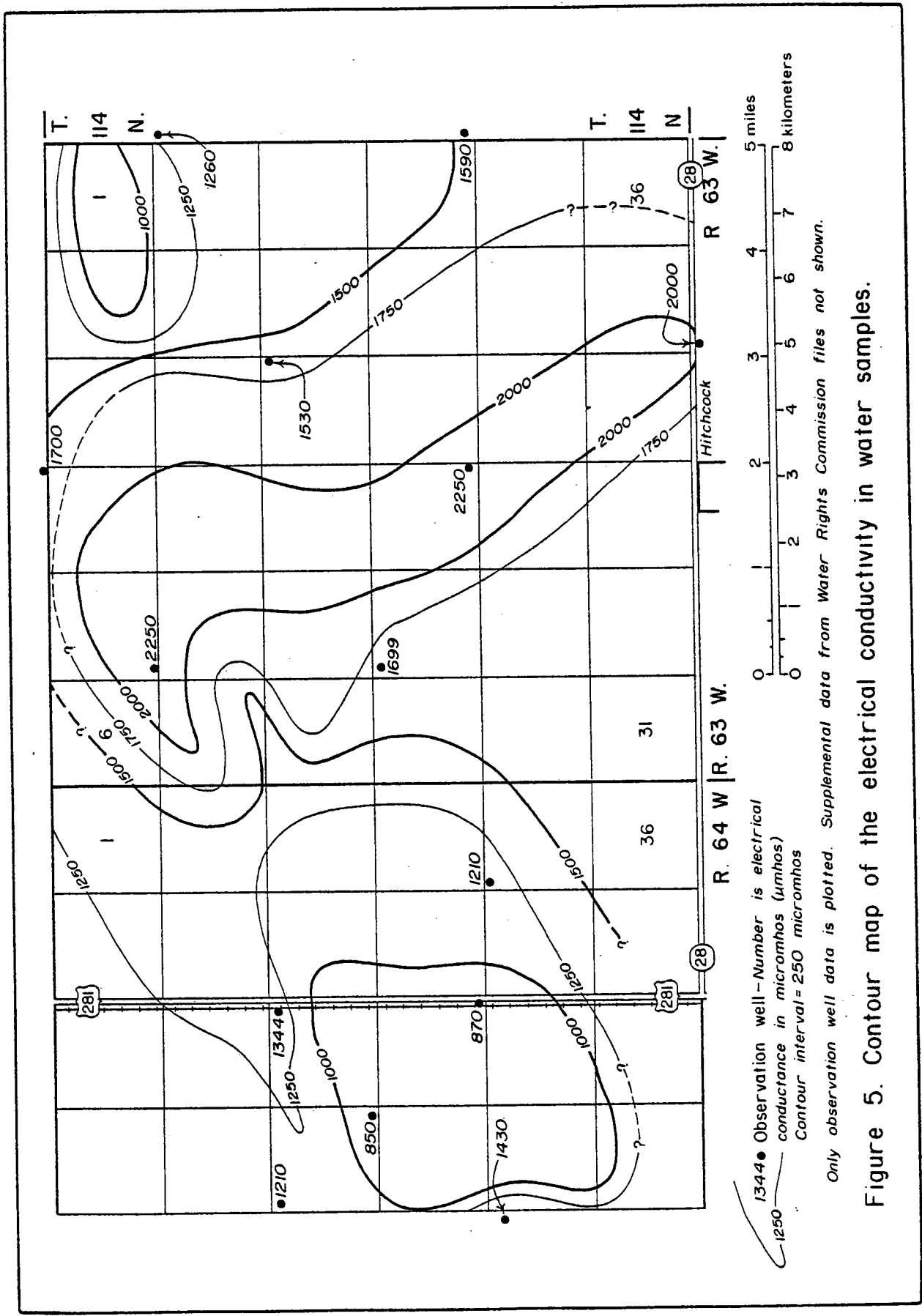


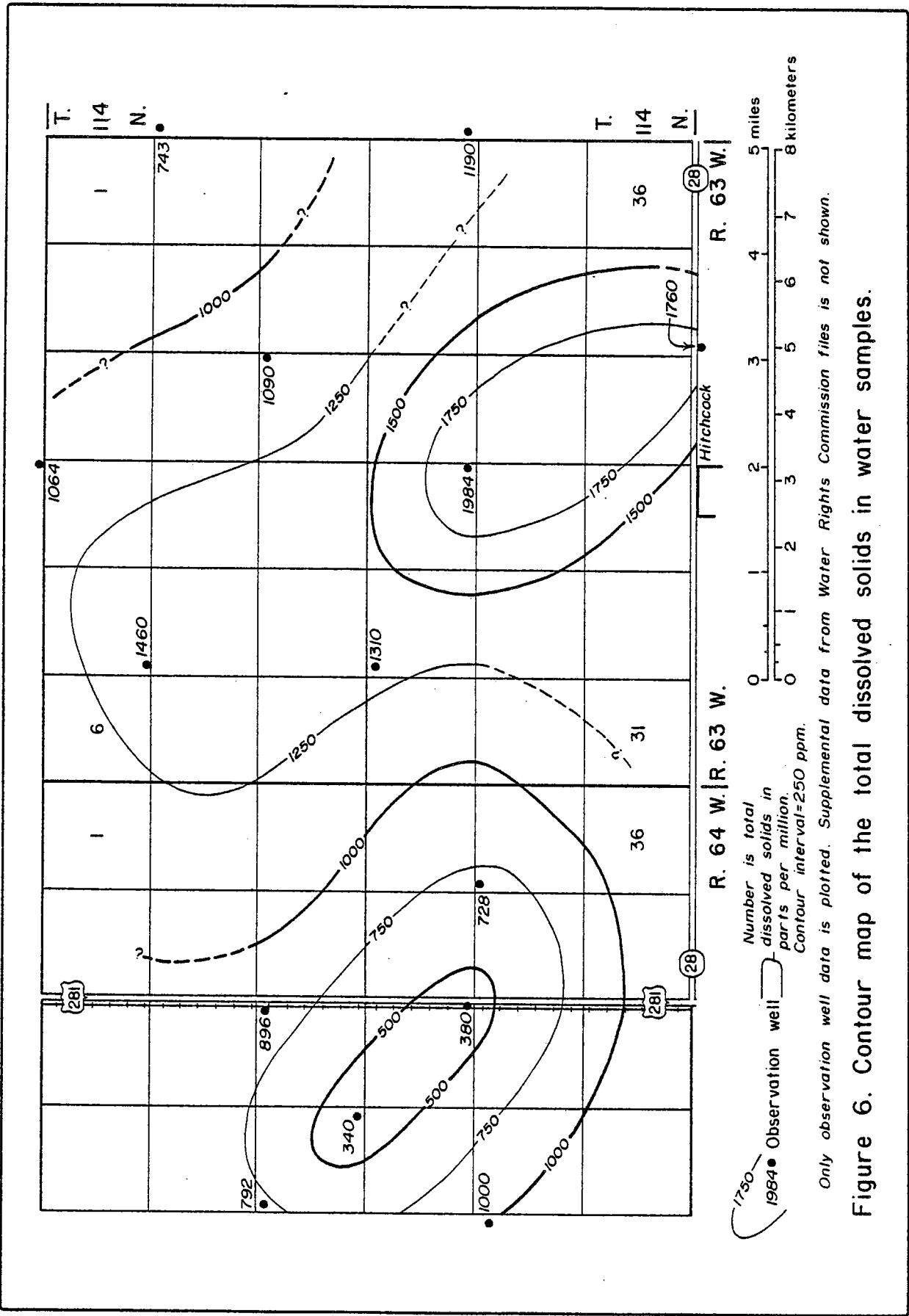
also illustrates the steepening of the hydraulic gradient where the aquifer thins.

Water samples taken from the glacial aquifer showed that water quality varies considerably in the study area. These chemical changes may be attributed partially to variations in the natural materials through which the ground water moves. This is especially obvious where an area of poorer quality appears east of and parallel to the thinning of the aquifer. Other chemical variations may be caused by abandoned flowing Dakota Formation wells which are contaminating the glacial aquifer. However, no conclusions were drawn in this study to explain why electrical conductivity, total dissolved solids, and hardness increase across the area.

Figures 5, 6, and 7 illustrate the locations of both the least and the most desirable water qualities. They also suggest that further study outside (east) the study area might reveal a return to better quality water. For this report, however, the area of best quality can be visualized on figure 6 by identifying the 500-contour on the total dissolved solids map, which is one of the USEPA's (United States Environmental Protection Agency) recommended limit for the National Secondary Drinking Water Regulations.

The distribution of iron in the aquifer is shown by figure 8. Values of iron ranged from 0.04 parts per million (ppm) to 8.90 ppm in the samples taken for this study. A more typical value, in the recommended area (i.e., where





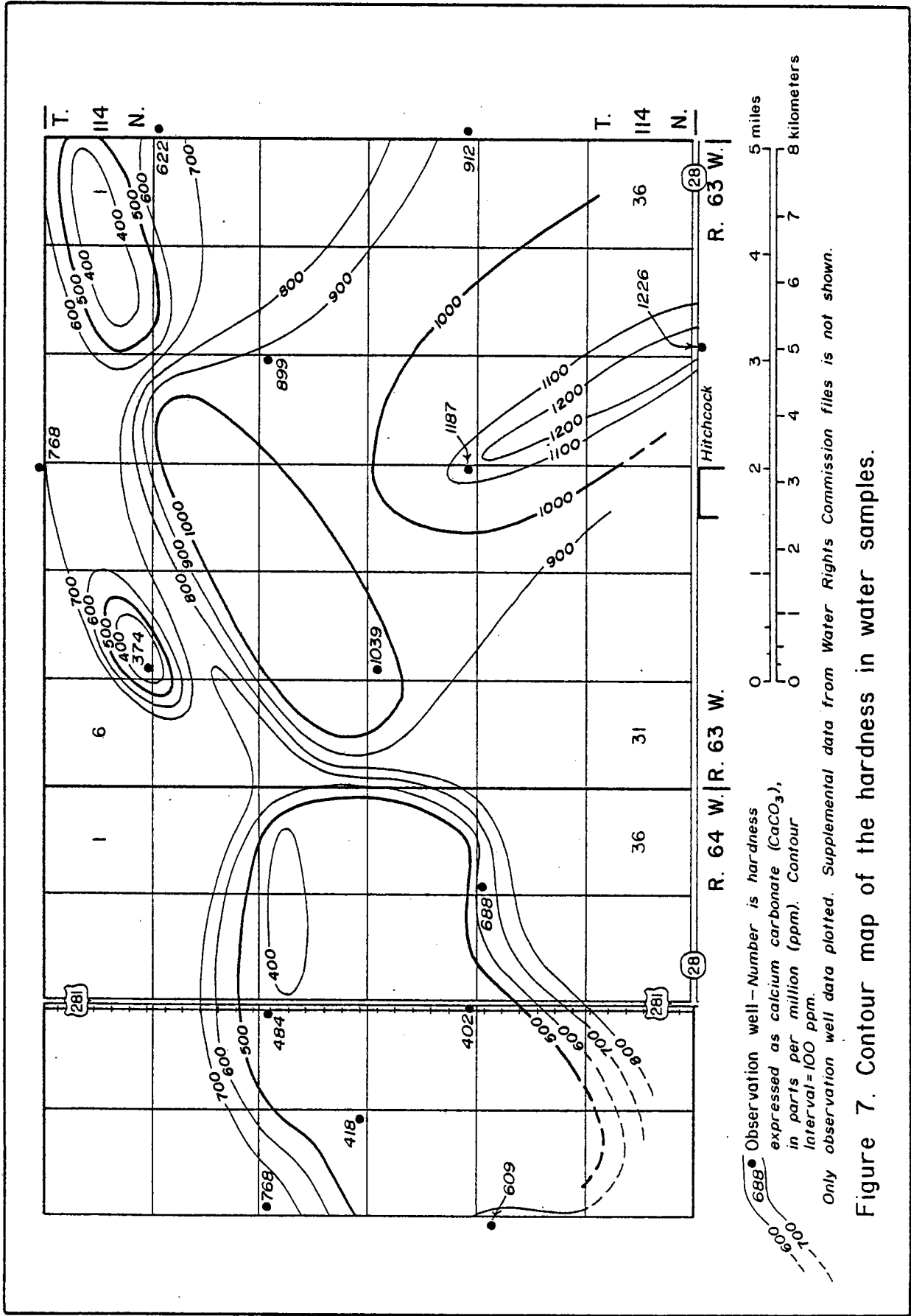


Figure 7. Contour map of the hardness in water samples.

hardness and total dissolved solids are minimal), is about 2.2 ppm which exceeds the USEPA's recommended limit.

Associated with the iron is manganese. It was observed to range from 0.35 ppm to 1.56 ppm but tends to be about 1 ppm in the area of greatest interest and also exceeds the USEPA's recommended limit.

The complete results of water quality analyses are shown as table 1 of this report.

#### RECOMMENDATIONS

Test drilling and analyses of the water samples suggest that the best quality of ground water in the study area is west of U.S. Highway 281 and 2 to 4 miles north of the Spink-Beadle County line. The best water quality in the area (SP-80-19) is contrasted in table 2 with the reported (S.D. Department of Environmental Protection, 1979) water qualities of various communities near the study area.

The Water Council should seek out area landowners and obtain easements so that additional testing can be done at specific sites. The Water Council should also bear in mind that holders of other water rights are also in the area and that proper well spacing should be determined for wise use of the aquifer. It is recommended, therefore, that the Water Council contact the South Dakota Office of Water Rights so that correct legal procedures can be followed.

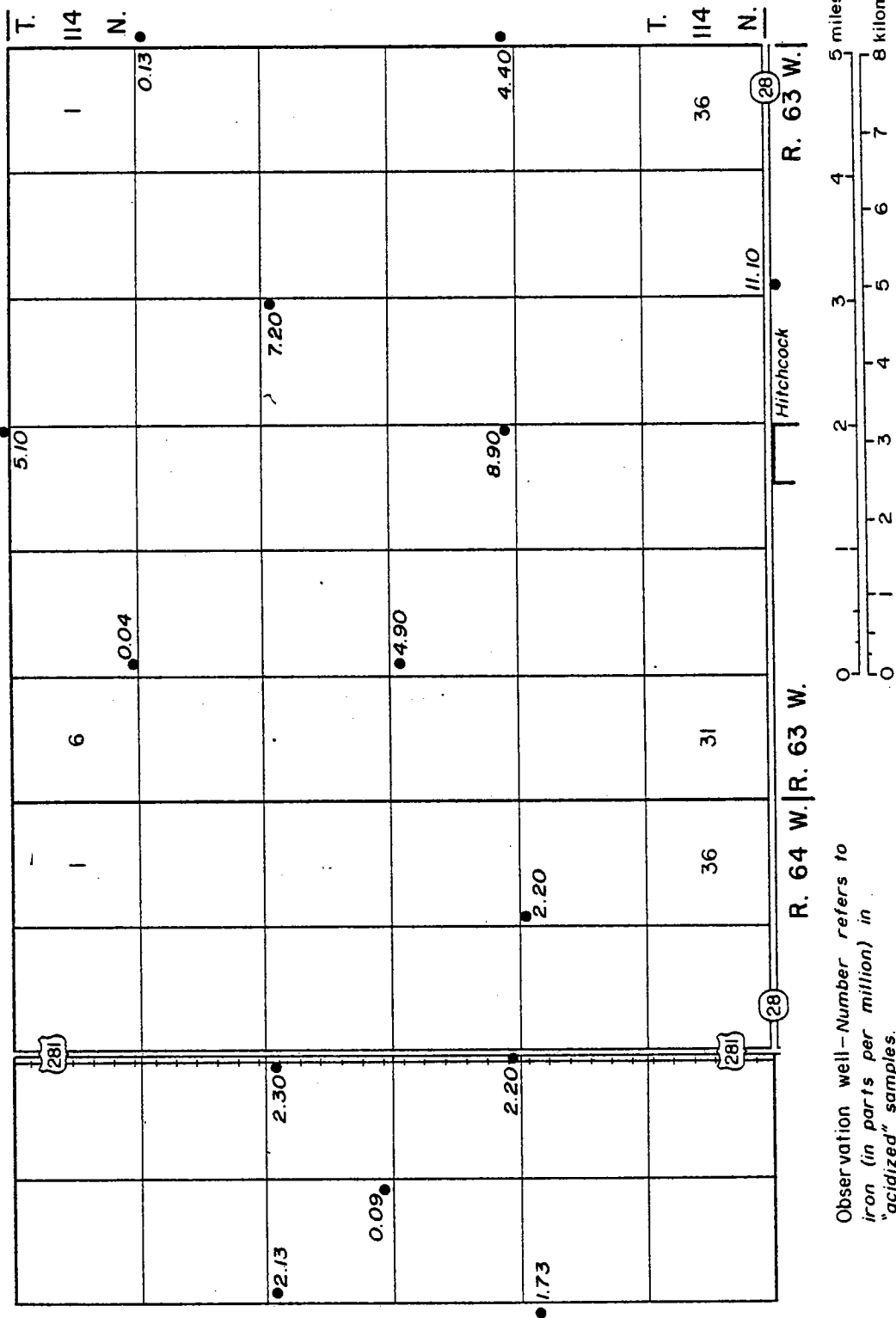


Figure 8. Distribution of iron concentrations in water samples.

Table 1. Summary of water quality analyses

Reference appendix B for locations

Well Name	PARTS PER MILLION										Conductivity Micro mhos
	Calcium	Sodium	Magnesium	Iron	Manganese	Chloride	Fluoride	Nitrate Nitrogen	Sulfate	Total Dissolved Solids	
A				0.3 <sup>2</sup>	0.05 <sup>2</sup>	250 <sup>2</sup>	2.4 <sup>1</sup>	10.0 <sup>1</sup>	250 <sup>2</sup>	500 <sup>2</sup>	
SP-80B	203	117	64	5.10	0.35	90	0.24	0.10*	375	1064	1700
SP-80C	128	87	39	2.13	1.02	25	0.26	0.10*	238	792	1210
SP-80D	234	52	77	7.20	0.38	10	0.21	0.10*	550	1090	1530
SP-80E	174	104	43	1.73	1.05	38	0.19	0.10*	450	1000	1430
SP-80F	307	149	103	8.90	0.78	10	0.17	0.10*	950	1984	2250
SP-80G	132	127	38	2.30	1.07	30	0.22	0.35	275	896	1344
SP-80H	112	41	29	2.20	1.17	10	0.14	0.10*	50	380	870
BD-80A	30	506	7	0.08	0.48	160	0.32	0.10*	425	1516	2875
BD-80B	50	207	12	0.17	0.47	38	0.32	0.10*	125	628	1155
BD-77A	344	89	90	11.10	1.56	30	0.18	0.10*	1010	1760	2000
SP-77G	117	47	31	0.09	0.91	10	0.18	0.10*	130	340	850
SP-77H	166	66	51	0.13	0.72	35	0.26	0.10*	250	740	1260
SP-77I	246	63	73	4.40	0.72	25	0.28	0.10*	588	1190	1590
SP-77X	269	58	90	4.90	1.07	8	0.18	0.10*	625	1310	1699
SP-78C	106	394	27	0.04	1.34	150	0.42	0.10*	763	1460	2250
SP-78D	194	34	50	2.20	0.82	50	0.22	0.10*	300	728	1210

\* - Less Than

Sample A

<sup>1</sup>United States Environmental Protection Agency "National Interim Drinking Water Regulations", December 24, 1975 (enforceable limits)

<sup>2</sup>United States Environmental Protection Agency "National Secondary Drinking Water Regulations", July 19, 1979 (recommended limits)

Table 2. Comparison of various communities water qualities with that found in this study

Chemical Constituent (ppm)	Redfield	Tulare	Hitchcock	Messington**	Wolsey	SP-80-19 (SP-80H) (this study)**
Calcium	35	97	324	175	315	112
Sodium	680	530	171	217	200	41
Magnesium	11	29	83	65	77	29
Potassium	11	18	23	9	21	--
Iron	0.3	0.8	4.7	0.1*	1.8	2.2
Manganese	0.05	0.07	0.11	1.64	0.13	1.17
Chloride	196	137	101	71	131	10
Fluoride	2.4	1.9	2.2	0.5	2.3	0.14
Nitrate Nitrogen	1*	1*	0.1*	0.8	0.1*	0.1*
Sulfate	1030	1160	1280	730	1260	50
Total Dissolved Solids	2179	2128	2275	1644	2269	380
Hardness (as CaCO <sub>3</sub> )	132	361	1151	706	1105	402

\* - Less than

\*\* - Withdrawals from shallow glacial aquifers



Depending upon which of the two options described in the preliminary engineering and feasibility report (Old West Rural Water Office, 1979) is selected, either one well pumping 300 gallons per minute (gpm) for 5 hours a day, or two wells pumping 400 gpm for 9 hours a day could meet the anticipated demand. In either case, the daily withdrawal would be less than that of a typical irrigation well.

It is suggested that after selecting a specific site a well performance test or, better yet, a pump test be conducted for at least 72 hours. This type of information would be useful in establishing the optimum pumping rate, well spacing if more than one well is needed, and the aquifer's hydrologic properties.

Finally, before drilling any permanent production wells, the Water Council should secure approval of a permit to appropriate water from the Board of Water Management. Likewise, the biological and chemical suitability of the ground water should be approved by the South Dakota Office of Water Quality.

#### REFERENCES CITED

- Old West Rural Water Office, 1979, Preliminary engineering and feasibility report for the Southern Spink-Northern Beadle Municipal Water Council for South Dakota: Old West Rural Water Office, 1533 N. 12th Street, Bismarck, ND 58501.
- S.D. Department of Environmental Protection, 1979, South Dakota Public Water Supply Chemical Data.

APPENDIX A

Logs of holes drilled for this study  
(for map location, see fig. 1)

Format of information

Test Hole County-Year-Number (Observation Well Name)

Location: (Assume section location given in quarters)

Date Drilled:

Elevation: 1300 (Type of Measurement)

(I) = Elevation of casing top made by a  
surveying instrument

(T) = Elevation of ground level estimated  
from 7 1/2 minute topographic map

Test Hole SP-80-1

Location: SE SE SE SE sec. 21, T. 114 N., R. 63 W.

Date Drilled: July 21, 1980

Elevation: 1300 (T)

0- 1	Topsoil, brown
1- 3	Sand, brown, very fine to medium
3- 15	Clay, yellow-brown, pebbly, sandy (till)
15- 29	Clay, medium gray, pebbly, sandy; soft (till)
29- 67	Sand, gray, medium to coarse, rounded; with flat, gray shale fragments and black coal
67-135	Clay, medium gray matrix, pebbly, sandy (till)
135-157	Shale, dark gray, brittle; drills harder and slightly calcareous

\* \* \* \*

Test Hole SP-80-2 (SP-80F)

Location: SE SE SE SE sec. 21, T. 114 N., R. 63 W.

Date Drilled: July 22, 1980

Elevation: 1301.94 (I)

0- 1	Topsoil, brown
1- 3	Sand, brown, very fine to medium
3- 15	Clay, yellow-brown, pebbly, sandy (till)
15- 28	Clay, medium dark gray, pebbly, sandy (till)
28- 67	Sand, gray, medium to coarse with lots of coal fragments

Installed 60 feet of 2-inch PVC casing and a 5-foot  
sandpoint. Slotted lower 10 feet of casing.

\* \* \* \*

Test Hole SP-80-3 (SP-80D)

Location: NE NE NE NE sec. 15, T. 114 N., R. 63 W.

Date Drilled: July 22, 1980

Elevation: 1301.12 (I)

0- 9	Silt, yellow-brown with minor amounts of very fine sand
9- 25	Sand, brown, medium to coarse, slightly silty with coal fragments
25- 70	Sand, gray, medium to coarse; with coal and grains of shale
70- 77	Clay, medium dark gray, sandy; soft (till)

Installed 60 feet of 2-inch PVC casing and a 6-foot sandpoint. Slotted lower 15 feet of casing.

\* \* \* \*

Test Hole SP-80-4

Location: SE SE SE SE sec. 33, T. 115 N., R. 63 W.

Date Drilled: July 22, 1980

Elevation: 1293 (T)

0- 3	Topsoil, brown, silty, sandy
3- 5	Clay, yellow-brown, silty, sandy, pebbly (till)
5- 14	Sand, brown, medium, well-sorted
14- 51	Sand, gray, medium to very coarse quartz grains with 40-50% shale grains; also coal fragments
51-118	Clay, medium dark gray, sandy, pebbly; gravelly from 108 to 118 feet (till)
118	Rock

\* \* \* \*

Test Hole SP-80-5 (SP-80B)

Location: SE SE SE SE sec. 33, T. 115 N., R. 63 W.

Date Drilled: July 22, 1980

Elevation: 1295.35 (I)

0- 3	Topsoil, brown, silty, sandy
3- 5	Clay, yellow-brown, silty, sandy, pebbly (till)
5- 14	Sand, brown, medium, well-sorted
14- 49	Sand, gray, medium to very coarse quartz grains with 40-50% shale grains; also trace of coal fragments
49- 50	Clay, gray (till)

Installed 46 feet of 2-inch PVC casing and a 6-foot sandpoint. Slotted lower 10 feet of casing.

\* \* \* \*

Test Hole SP-80-6

Location: NW NW NW NW sec. 2, T. 114 N., R. 64 W.

Date Drilled: July 23, 1980

Elevation: 1318 (T)

0- 15 Sand, brown, fine to medium, well-sorted  
15- 24 Sand, gray, medium to coarse, trace of very  
fine gravel between 20 and 24 feet  
24- 40 Clay, medium dark gray matrix, sandy, pebbly (till)  
40-106 Clay, medium dark gray matrix; gravelly, very  
coarse sand (till)  
106-134 Clay, medium dark gray matrix; sandy, pebbly (till)  
134 Rock

\* \* \* \*

Test Hole SP-80-7 (SP-80A)

Location: SW SW SW SW sec. 33, T. 115 N., R. 64 W.

Date Drilled: July 23, 1980

Elevation: 1317.12 (I)

0- 11 Sand, brown, medium; minor amount of very fine sand  
11- 47 Clay, medium dark gray matrix, sandy; gravelly  
between 24 and 33 feet (till)  
47-103 Sand, gray, medium to coarse; occasionally very  
coarse. Typical assortment of quartz, shale  
and coal grains  
103-110 Clay, medium dark gray matrix

Installed 100 feet of 2-inch PVC casing and a 5-foot  
sandpoint. Slotted lower 20 feet of casing.

\* \* \* \*

Test Hole SP-80-8 (SP-80C)

Location: NW NW NW NW sec. 16, T. 114 N., R. 64 W.

Date Drilled: July 24, 1980

Elevation: 1327.28 (I)

0- 4 Sand, brown, very fine, silty  
4- 8 Sand, brown, coarse to fine  
8- 21 Clay, yellow-brown, silty, sandy (till)  
21- 36 Clay, medium dark gray matrix, silty, sandy (till)  
36- 49 Clay, medium dark gray matrix, gravelly, sandy (till)  
49-106 Sand, gray, medium to coarse; occasional trace of  
very coarse sand, especially between 60 and 70 feet  
106-110 Clay, medium dark gray matrix; with a rock from  
106 to 107 feet (till)

Installed 80 feet of 2-inch PVC casing and a 5-foot  
sandpoint. Slotted lower 20 foot of casing.

Test Hole SP-80-9 (SP-80E)

Location: SE NE NE NE sec. 29, T. 114 N., R. 64 W.

Date Drilled: July 24, 1980

Elevation: 1335.35 (I)

0- 1	Topsoil, brown
1- 17	Clay, yellow-brown, silty, sandy (till)
17- 38	Clay, medium dark gray, silty, sandy (till)
38- 39	Rocks (stone line?)
39- 83	Clay, medium dark gray matrix, very silty, sandy, pebbly; drills hard with sand lenses from 47 to 48 feet and from 61 to 63 feet (till)
83- 98	Sand, gray, medium to coarse; with coal fragments
98-109	Clay, medium dark gray matrix, silty, sandy, pebbly; drills hard (till)
109-123	Sand, gray; with coal, poor sample return
123-137	Clay, medium dark gray matrix, silty, sandy (till)

Installed 92 feet of 2-inch PVC casing and a 5-foot sandpoint. Slotted lower 10 feet of casing.

\* \* \* \*

Test Hole SP-80-10

Location: SE SE SE SE sec. 34, T. 114 N., R. 64 W.

Date Drilled: July 24, 1980

Elevation: 1331 (T)

0- 10	Sand, brown, coarse to very coarse with a trace of very fine gravel
10- 12	Clay, yellow-brown, silty, sandy, pebbly (till)
12- 21	Clay, medium dark gray, silty, sandy, pebbly (till)
21- 27	Sand, fine to coarse
27- 37	Clay, medium dark gray matrix, very sandy (till)
37- 38	Rocks (stone line?)
38- 66	Clay, medium dark gray matrix, very gravelly, lots of rocks; has characteristic cream to pale orange colored rock fragments and 1/4-inch shale pebbles; drills hard (till)
66	Rock, abandoned hole and re-drilled as SP-80-11

\* \* \* \*

Test Hole SP-80-11

Location: SW SE SE SE sec. 34, T. 114 N., R. 64 W.

Date Drilled: July 25, 1980

Elevation: 1331 (T)

0- 8 Sand, brown, coarse to very coarse; trace of gravel  
8- 14 Clay, yellow-brown, silty, sandy, pebbly (till)  
14- 21 Clay, medium dark gray, silty, sandy, pebbly (till)  
21- 27 Sand, fine to coarse  
27- 36 Clay, medium dark gray, very sandy (till)  
36- 37 Rocks (stone line?)  
37-147 Clay, medium dark gray matrix, very gravelly, many  
rocks to 70 feet; has characteristic cream to pale  
orange colored rock fragments and 1/8-inch shale  
pebbles, drills hard (till)

\* \* \* \*

Test Hole SP-80-12

Location: SE SE SE SE sec. 35, T. 114 N., R. 64 W.

Date Drilled: July 25, 1980

Elevation: 1323 (T)

0- 5 Sand, brown, fine; silty  
5- 13 Clay, yellow-brown matrix, silty, sandy (till)  
13- 33 Clay, medium dark gray matrix, silty, sandy (till)  
33- 37 Rocks, sand and gravel probably with clay  
37- 77 Clay, medium dark gray matrix, very gravelly and sandy;  
drills hard (till)  
77-135 Clay, medium dark gray matrix, very gravelly with  
sand lenses (?) from 99 to 105 feet and from  
111 to 114 feet (till)  
135 Rock

\* \* \* \*

Test Hole SP-80-13

Location: SW SW SW SW sec. 10, T. 113 N., R. 63 W.

Date Drilled: July 25, 1980

Elevation: 1331 (T)

0- 4 Sand, brown, fine to medium, slightly silty  
4- 16 Clay, yellow-brown matrix, silty, sandy, pebbly (till)  
16- 21 Sand, brown, fine to very fine  
21- 44 Clay, medium dark gray matrix, very sandy (till)  
44- 55 Gravel, gray, very fine; with trace of coarse sand;  
composed of quartz, shale, and cream to pale  
orange colored rock fragments  
55-107 Clay, medium dark gray; extremely gravelly interval  
causes much of the clay fraction to be destroyed.  
No loss of drilling fluid. Clasts in this interval  
resemble the overlying unit (till)

\* \* \* \*

Test Hole SP-80-14.

Location: SW SW SW SW sec. 12, T. 113 N., R. 63 W.

Date Drilled: July 28, 1980

Elevation: 1306 (T)

0- 3 Sand, yellow, fine  
3- 11 Sand, with fine gravel; rusty  
11- 16 Clay, gray, silty, sandy, pebbly (till)  
16- 18 Sand, fine to coarse  
18- 21 Clay, gray (till?)  
21- 22 Rocks (stone line?)  
22-147 Clay, medium dark gray matrix, silty, sandy  
pebbly (till)

\* \* \* \*

Test Hole SP-80-15

Location: SE SE SE SE sec. 12, T. 113 N., R. 64 W.

Date Drilled: July 29, 1980

Elevation: 1327 (T)

0- 4 Sand, yellow, fine, silty  
4- 15 Clay, yellow-brown, silty, sandy, pebbly (till)  
15- 41 Clay, medium dark gray, silty, sandy, pebbly (till)  
41-147 Clay, medium dark gray, gravelly; drills hard and  
has typical cream to pale orange colored rock  
fragments (till)

\* \* \* \*

Test Hole SP-80-16 (BD-80B)

Location: NE NE NE NE sec. 15, T. 113 N., R. 64 W.

Date Drilled: July 29, 1980

Elevation: 1331.16 (I)

0- 8 Sand, brown, fine to medium  
8- 12 Clay, yellow-brown matrix, silty, sandy (till)  
12- 14 Clay, medium dark gray matrix, silty, sandy (till)  
14- 22 Sand, fine to medium; with a clay lense from 16 feet  
to 17 feet  
22- 60 Clay, medium dark gray, silty, ranging from very sandy  
to gravelly (till)  
60- 95 Sand, fine to fine gravel; clayey in places, with  
coal fragments  
95-100 Clay, gray, silty, sandy, pebbly (till)

Installed 80 feet of 2-inch PVC casing and a 6-foot  
sandpoint. Slotted lower 20 feet of casing.

\* \* \* \*

Test Hole SP-80-17 (BD-80A)

Location: SE SE SE SE sec. 4, T. 113 N., R. 64 W.

Date Drilled: July 29, 1980

Elevation: 1328.18 (I)

0- 8	Sand, fine with silt
8- 15	Clay, yellow-brown, sandy, pebbly (till)
15- 41	Clay, medium dark gray, silty, sandy, pebbly (till)
41- 61	Clay, medium dark gray, gravelly, sandy; drills harder (till)
61- 73	Sand, gray, fine to coarse
73- 83	Sand, gray, coarse to very coarse with some gravel
83- 86	Clay, medium dark gray, silty, sandy, pebbly (till)

Installed 77 feet of 2-inch PVC casing and a 6-foot sandpoint. Slotted lower 20 feet of casing.

\* \* \* \*

Test Hole SP-80-18

Location: SE SE SE SE sec. 32, T. 114 N., R. 64 W.

Date Drilled: July 30, 1980

Elevation: 1328 (T)

0- 2	Silt, brown with fine sand
2- 11	Sand, yellow-brown, fine to medium
11- 13	Clay, yellow-brown, silty, sandy, pebbly (till)
13- 33	Clay, gray, silty, sandy, pebbly; soft (till)
33- 77	Clay, gray, extremely sandy; drills harder, no water loss (till)
77- 85	Clay, gray, silty, sandy, pebbly; soft (till)
85- 97	Shale, dark grayish-brown (Pierre)

\* \* \* \*



Test Hole SP-80-19 (SP-80H)

Location: SE SE SE SE sec. 22, T. 114 N., R. 64 W.

Date Drilled: July 30, 1980

Elevation: 1326.27 (I)

0- 2 Topsoil, brown, silty, sandy  
2- 12 Clay, yellow-brown, silty, sandy, pebbly (till)  
12- 32 Clay, medium dark gray, silty, sandy, pebbly (till)  
32- 35 Gravel, brown, fine  
35- 64 Clay, medium dark gray matrix, gravelly, sandy;  
drills hard and contains typical cream to pale  
orange colored rock fragments (till)  
64- 85 Sand, gray, medium to coarse; sometimes clayey  
85-113 Sand, gray, coarse to very coarse with fine gravel;  
rig chattered through this interval, some  
clayey spots  
113-117 Clay, medium dark gray, silty, sandy, pebbly (till)

Installed 100 feet of 2-inch PVC casing and a 5-foot  
sandpoint. Slotted lower 20 feet of casing.

\* \* \* \*

Test Hole SP-80-20 (SP-80G)

Location: NE NE NE NE sec. 15, T. 114 N., R. 64 W.

Date Drilled: July 30, 1980

Elevation: 1311.91 (I)

0- 1 Topsoil, brown  
1- 12 Sand, brown, medium to coarse  
12- 31 Clay, medium dark gray, silty, sandy, pebbly (till)  
31- 33 Sand, gray, coarse to very coarse, clayey  
33- 48 Clay, medium dark gray, silty, sandy, pebbly (till)  
48- 95 Sand, gray, medium, well-sorted; sticky texture  
95- 97 Clay, no sample  
97- 98 Sand, no sample  
98-100 Clay, no sample

Installed 80 feet of 2-inch PVC casing and a 10-foot  
sandpoint. No slots cut because of grain size.

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APPENDIX B  
Locations of water samples  
collected during this study

New observation wells in study area that were sampled

Well Name	Legal Location
SP-80B	SE SE SE SE sec. 33, T. 115 N., R. 63 W.
SP-80C	NW NW NW NW sec. 16, T. 114 N., R. 64 W.
SP-80D	NE NE NE NE sec. 15, T. 114 N., R. 63 W.
SP-80E	SE NE NE NE sec. 29, T. 114 N., R. 64 W.
SP-80F	SE SE SE SE sec. 21, T. 114 N., R. 63 W.
SP-80G	NE NE NE NE sec. 15, T. 114 N., R. 64 W.
SP-80H	SE SE SE SE sec. 22, T. 114 N., R. 64 W.
BD-80A	SE SE SE SE sec. 4, T. 113 N., R. 64 W.
BD-80B	NE NE NE NE sec. 15, T. 113 N., R. 64 W.

Previously existing observation wells that were sampled

Well Name	Legal Location
SP-77G	SW SE SE SE sec. 16, T. 114 N., R. 64 W.
SP-77H	NW NW NW NW sec. 7, T. 114 N., R. 62 W.
SP-77I	SW SW SW SW sec. 19, T. 114 N., R. 62 W.
SP-77X	NW NW NW NW sec. 20, T. 114 N., R. 63 W.
SP-78C	SW SW SW SW sec. 5, T. 114 N., R. 63 W.
SP-78D	NW NW NW NW sec. 25, T. 114 N., R. 64 W.
BD-77A	NW NW NW NW sec. 2, T. 113 N., R. 63 W.