

STATE OF SOUTH DAKOTA
William J. Janklow, Governor

DEPARTMENT OF WATER AND NATURAL RESOURCES
Warren R. Neufeld, Secretary

SOUTH DAKOTA GEOLOGICAL SURVEY
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Open-File Report No. 36-UR

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

by

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INTRODUCTION.

This report contains the results of a ground-water investigation conducted by the South Dakota Geological Survey for the City of Iroquois, Kingsbury and Beadle Counties, South Dakota. Field work was conducted from July 8 to July 19, 1980, and included drilling 35 test holes (fig. 1, app. A), construction of 5 observation wells (fig. 1, app. A), and collection and analysis of 16 water samples (fig. 2, table 1, app. B).

The investigation was financed by the South Dakota Geological Survey, the East Dakota Conservancy Sub-District, and the City of Iroquois.

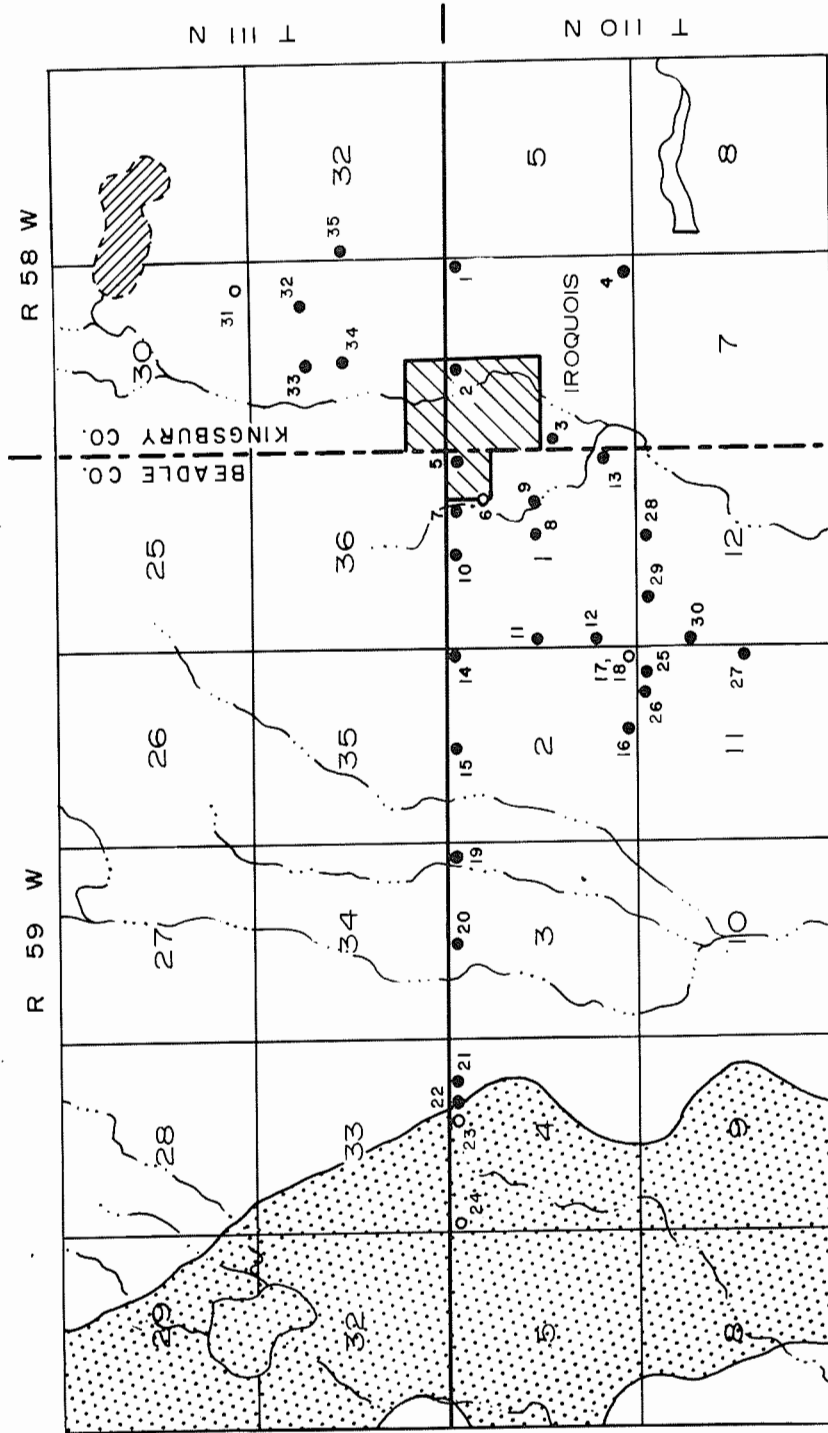
Iroquois obtains its water from two wells constructed into the Dakota Formation. The "south well," located along South Street, is 848 feet deep and serves as the City's main supply well. The auxiliary or "north well," located just north of the Chicago and Northwestern Railroad track, is 950 feet deep.

During the winter of 1979-80, a change was noted in the water quality of the south well. Analysis of the water revealed a drastic increase in the hardness from 30 parts per million (ppm) to 300 ppm. In addition increases in the iron concentration from 0.30 to 0.79 ppm, and the manganese concentration from 0.02 to 0.53 ppm (samples 15 and 16, fig. 2, table 1, app. B) were also noted. It was speculated that the changes in water quality were caused by a hole which had developed in the well casing. This allowed ground water from some other formation higher in the geologic sequence to enter and adversely alter the water quality of the south well.

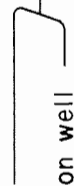
In order to maintain a consistent water supply, Iroquois reverted to the auxiliary well. However, upon switching to the north well, it was discovered that the well's yield was barely adequate to meet the community's modest needs. This discovery prompted Iroquois city officials to contact the South Dakota Geological Survey to explore the immediate area for an alternate water supply.

GROUND WATER IN GLACIAL DEPOSITS

The surficial deposits of the Iroquois area are of glacial origin and have an average thickness of 30 feet. These deposits consist of outwash and till. Outwash is comprised of stratified sands and gravels with minor clay content whereas till consists of unsorted, non-stratified, sand and gravel in a dense, clay matrix. Of these deposits, outwash has the higher permeability and is, therefore, the material of primary interest.



19 ● Test hole
 23 ○ Test hole with observation well



Approximate location of the Pearl Creek management unit of the Floyd Aquifer

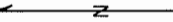


Figure 1. Test hole and observation well locations

Map location numbers refer to logs in Appendix A.

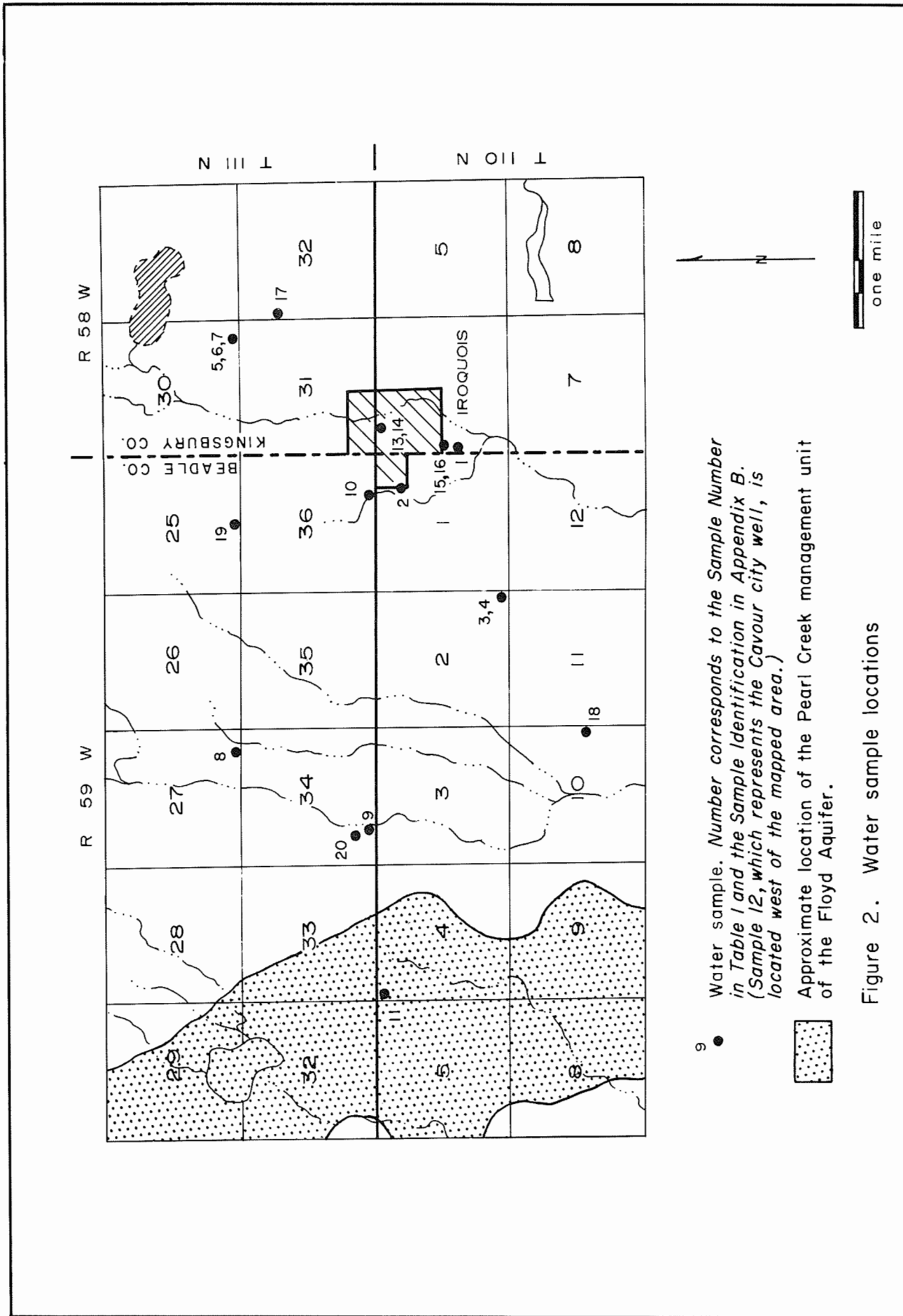


TABLE 1

Chemical analyses of water samples from the Iroquois area
(for location, refer to fig. 2 and app. B)

Sample	Water Source	Sampling Procedure	PARTS PER MILLION				
			Calcium	Sodium	Magnesium	Iron	Manganese
A	--	--	---	---	-----	0.30 ¹	0.05 ¹
1	P	NF	243	174	55.0	<0.05	1.83
2	P	NF	415	510	103.0	0.58	5.00
3	P	NF	57	336	56.3	3.20	2.90
4	P	NF	286	343	68.8	0.30	3.32
5	P	NF	65	189	16.5	1.01	1.13
6	P	F	259	825	44.1	0.07	3.50
7	P	F	261	825	43.8	0.07	3.50
8	P	NF	38	500	10.0	0.75	0.06
9	P	NF	720	690	360.0	<0.05	0.07
10	P	NF	175	225	75.0	0.24	0.42
11	F-PC	NF	57	53	11.3	2.70	1.17
12	Kcc	SA	25	543	4.0	0.00	0.00
13	Kd	SA	10	736	2.0	0.20	<0.20
14	Kd	NF	9	720	3.5	0.19	0.06
15	Kd	SA	8	693	3.0	0.30	0.02
16	Kd	SA	83	579	22.7	0.79	0.53
17	Kd	NF	8	680	4.0	0.84	0.08
18	Kd	NF	9	700	5.0	0.11	<0.05
19	Kd	NF	10	660	4.3	0.31	0.08
20	Kd	NF	18	630	6.0	0.89	0.07

PARTS PER MILLION						MICROMHOS
Chloride	Fluoride	Nitrate Nitrogen	Sulfate	Hardness as CaCO ₃	Total Solids	Conductivity

250.0 ¹	1.40- 2.40 ²	10.00 ¹	250 ¹	----	500 ¹	----
37.5	0.23	2.40	888	831	1552	1650
52.0	0.31	<0.10	950	1457	3768	4010
45.0	0.28	0.20	1220	373	2180	2620
40.0	0.24	<0.01	300	995	2408	2650
70.0	0.30	1.50	330	189	----	1350
125.0	0.26	<0.10	2250	826	3730	4590
110.0	0.26	<0.10	2300	830	3780	4600
105.0	1.80	2.80	1325	136	2084	2810
197.0	0.78	110.00	3000	3272	6364	6150
30.0	0.52	1.30	800	744	1668	2125
11.0	0.18	0.50	250	188	344	710
223.0	1.00	<0.40	665	79	1630	----
150.0	4.20	<1.00	1125	33	2215	----
148.0	4.75	0.20	1075	37	2112	3250
164.0	2.10	<1.00	1070	30	2088	----
131.0	1.69	0.10	1090	300	2169	2750
147.0	3.90	<0.10	----	36	----	3005
135.0	6.10	<0.10	1150	43	2148	3040
150.0	3.11	<0.10	950	43	1980	3010
117.0	2.09	2.00	1200	69	2032	3000

SAMPLE A

- 1 United States Environmental Protection Agency "National Secondary Drinking Water Regulations" - July 19, 1979 (recommended limits).
- 2 United States Environmental Protection Agency "National Interim Primary Drinking Water Regulations" - December 24, 1975 (enforceable limits).

SAMPLES 12, 13, AND 15

South Dakota Public Water Supply Data 1979, South Dakota Department of Environmental Protection.

WATER SOURCE

F-PC Floyd Aquifer - Pearl Creek Management Unit
Kcc Codell Sandstone Member of the Carlile Shale
Kd Dakota Formation
P Miscellaneous Pleistocene sand and gravel aquifers

SAMPLING PROCEDURE

- NF The water sample was collected in two bottles; one bottle was preserved with nitric acid, the other with formaldehyde. The sample was not filtered at the time of collection or analysis.
- F The water sample was collected in two bottles; one bottle was preserved with nitric acid, the other with formaldehyde. The sample was filtered at the time of collection.
- SA The water sample was collected in three bottles; two of the three bottles were treated with chemical preservatives. The sample was not filtered at the time collection, but filtered at the time of analysis.

Samples designated NF and F were analyzed by the South Dakota Geological Survey, Vermillion, South Dakota.

Samples designated SA were analyzed by the State Health Laboratory and financed by the Office of Drinking Water, Department of Water and Natural Resources, Pierre, South Dakota.

Three glacial aquifers were found within 1 mile of the community. These small sand and gravel aquifers were penetrated by observation wells at ML (map location) 6, 18, and 31 (fig. 1, app. A) and ranged from 24 to 38 feet in saturated thickness. Boundaries of the aquifers were omitted from figure 1 because of the lack of data needed to designate the boundaries. Chemical analyses (samples 2-7, fig. 2, table 1, app. B) from these aquifers were observed to have higher concentrations of total dissolved solids, iron, and manganese than the City's current water supply (sample 14, fig. 2, table 1, app. B).

A fourth glacial aquifer located 3.5 miles west of Iroquois was also investigated. This area, termed the Pearl Creek management unit of the Floyd Aquifer, was delineated by the South Dakota Geological Survey while investigating alternate water sources for the City of Huron (Iles, 1979).

The overall water quality of the Pearl Creek Management Unit is good (sample 11, fig. 2, table 1, app. B), although the City should expect increased iron (2.70 ppm), manganese (1.17 ppm), and hardness (188 ppm) as compared to the current water supply (sample 14, table 1). Ground water from the Pearl Creek unit does, however, have low concentrations of chloride (11 ppm), fluoride (0.18 ppm), sodium (53 ppm), and total dissolved solids (334 ppm).

GROUND WATER IN BEDROCK

Bedrock formations in the vicinity of Beadle and Kingsbury Counties consist of Cretaceous strata which unconformably underlie the surficial deposits and overlie the Precambrian surface. Cretaceous strata underlying the glacial sediments, in descending order are: Pierre Shale, Niobrara Marl, Carlile Shale (which contains the Codell Sandstone Member), Greenhorn Limestone, Graneros Shale, and the Dakota Formation. Of these formations, the Niobrara Marl, Codell Sandstone Member of the Carlile Shale and Dakota Formation are the major bedrock aquifers. For the most part, the aquifers consist of sand, sandstone, and/or limestone whereas the confining beds (formations not classified as an aquifer) consist of shale.

The Codell Sandstone Member of the Carlile Shale is located near the top of the formation and is sometimes in contact with the Niobrara Marl. According to Howells and Stephens (1968), the Codell Sandstone Member and a permeable zone at or near the base of the Niobrara Marl, comprise a single aquifer in this region. This aquifer is approximately 78 feet thick as interpreted from the electric log of the borehole at ML 3 (fig. 1, app. A).

Water quality information concerning this aquifer was obtained from the Cavour municipal well, located 9 miles west of Iroquois. Water from this location (sample 12, fig. 2, table 1, app. B) had

lower concentrations of sodium (543 ppm), sulfate (665 ppm), and total dissolved solids (1630 ppm) than Iroquois' present water supply (sample 14, table 1).

The Dakota Formation is the most extensively developed bedrock aquifer in the Iroquois area. This aquifer consists of fine-grained sands and lenticular sandstones interbedded with shales. Ground water derived from this aquifer is generally characterized by high concentrations of sodium and sulfate with moderate to high concentrations of fluoride (Schoon, 1971).

As previously mentioned, Iroquois currently obtains its water supply from the Dakota Formation. This water (sample 14, table 1) has high concentrations of sodium (720 ppm), sulfate (1075 ppm), chloride (148 ppm), fluoride (4.75 ppm), iron (0.19 ppm), and total dissolved solids (2112 ppm). It should also be noted that the fluoride concentration of this water exceeds the enforceable limit set by the United States Environmental Protection Agency in 1975. The sulfate and total dissolved solids concentrations in this water also exceed the recommended limits set by the United States Environmental Protection Agency in 1979 (sample A, table 1).

The water qualities of other Dakota Formation wells in the Iroquois area were comparable to the chemical analysis of the City's water supply. Analyses of water from the private wells also reflected high concentrations of the constituents mentioned above.

CONCLUSIONS AND RECOMMENDATIONS

Within approximately 1 mile of Iroquois, a shallow aquifer cannot be found with water quality better than or comparable to that of the present city water supply. A better source of ground water is available, however, at a distance of 3.5 miles from the community. This potential source of water was discussed with city officials after the field work was completed and it was recommended that the City develop a well, or at least secure a future use water right, in the Pearl Creek Management Unit of the Floyd Aquifer. Ground water from this source has an overall quality which is superior to that of the Dakota Formation. Treatment to reduce the higher iron and manganese concentrations would, however, be needed to meet the recommended drinking water standards.

Because of the distance to the above source of water the City of Iroquois decided to construct a new supply well in the Dakota Formation near the City. Before construction of the well, it was recommended that the City locate the new well near the deteriorated south well (ML 3, fig. 1.). The recommendation for this location was based on the data collected from the City's south well. These data showed that sufficient aquifer material was

present in the upper portion of the Dakota Formation and that the concentration of fluoride was less (sample 15, table 1) than the City's north well (sample 14, table 1). On January 5, 1981, the South Dakota Geological Survey was asked to geophysically log the borehole for this well. According to that log, only 20 continuous feet of sand were detected in the upper part of the Dakota Formation from 840 to 860 feet. Therefore it was recommended that the well be finished at 840 to 860 feet (ML 3).

It is also recommended that the south well be filled with cement and capped to prevent further contamination of the Dakota Aquifer. The Division of Water Rights, Department of Water and Natural Resources, should be contacted for advice in abandoning the old well.

In the future, should the City of Huron decide to develop a well field in the Pearl Creek Management Unit, Iroquois should inquire into the possibility of forming a joint system to reduce, through cost-sharing, the construction costs of a water treatment facility.

REFERENCES CITED

- Howells, Lewis W., and Stephens, Jerry C., 1968, Geology and water resources of Beadle County, South Dakota, Part II: Water Resources: South Dakota Geol. Survey, Bull. 17.
- Iles, Derric L., 1979, Ground-water study for the City of Huron: South Dakota Geol. Survey, Open-File Rept. 24-UR.
- Schoon, Robert A., 1971, Geology and hydrology of the Dakota Formation in South Dakota: South Dakota Geol. Survey, Rept. of Invest. 104.
- South Dakota Department of Environmental Protection, 1979, South Dakota Public water Supply Data.
- United States Environmental Protection Agency "National Interim Primary Drinking water Regulations," Federal Register, v. 40, no. 248, December 24, 1975.
- United States Environmental Protection Agency "National Secondary Drinking water Regulations," Federal Register, v. 40, no. 140, July 19, 1979.

APPENDIX A

Logs of test holes and observation wells

MAP LOCATION (ML): A number arbitrarily assigned to the log according to the order in which it is listed (see LEGAL LOCATION and LOCATION). This number corresponds to the numbers shown on figure 1.

LEGAL LOCATION AND LOCATION: The logs are listed by smallest township number, then the smallest range number, the smallest section number, and then by quarter section: NE (A), NW (B), SW (C), SE (D). In several LOCATIONS, the smallest quarter section is followed by the number 1 or 2, which designates the first or second test hole or observation well drilled at that particular location.

LATITUDE AND LONGITUDE: The format is DDD.MMSS where D is degrees, M is minutes, and S is seconds.

DRILLING COMPANY: SDGS is an abbreviation for South Dakota Geological Survey.

TOTAL DRILL HOLE DEPTH, SCREEN LENGTH, CASING STICK-UP, AND TOTAL CASING AND SCREEN: The numbers are presented in feet.

SCREEN TYPE AND CASING TYPE: PVC (polyvinylchloride); MFG (manufactured).

CASING DIAMETER: The numbers are presented in inches.

CASING TOP ELEVATION AND GROUND SURFACE ELEVATION: The numbers are presented in feet above mean sea level. T - the elevation was estimated from a 7 1/2 minute series topographic map.

DRILLER: DRILLER'S LOG:
 GEOLOGIST: D. ILES GEOLOGIST'S LOG: X
 DATE DRILLED: 01-05-1981 DRILLING METHOD: ROTARY
 E-LOG: YES SAMPLES: NO GROUND SURFACE ELEVATION: 1400.00 T
 TOTAL DRILL HOLE DEPTH: 910.0 TEST HOLE NUMBER:
 SDGS WELL NAME: PRODUCTION WATER RIGHTS WELL NAME:
 AQUIFER: DAKOTA BASIN: JAMES
 MANAGEMENT UNIT:
 SCREEN TYPE: SCREEN LENGTH:
 CASING TYPE: CASING DIAMETER:
 CASING TOP ELEVATION:
 CASING STICK-UP: TOTAL CASING AND SCREEN: 860.0
 WELL MAINTENANCE DATE:

E-LOG: SINGLE POINT RESISTIVITY, SPONTANEOUS
 POTENTIAL, NATURAL GAMMA. FORMATION BREAKS
 WERE INTERPRETED FROM THE E-LOG.

0 -	24	UNREPORTED
24 -	36	CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
36 -	254	SHALE, GRAY; BENTONITIC (PIERRE SHALE)
254 -	336	SHALE, TAN; CALCAREOUS (NIOBRARA MARL)
336 -	344	SHALE, GRAY; NONCALCAREOUS (CARLILE SHALE)
344 -	382	SANDSTONE, WHITE TO RED-BROWN, VERY FINE TO COARSE GRAINED (CODELL MEMBER)
382 -	574	SHALE, GRAY; NONCALCAREOUS (CARLILE SHALE)
574 -	646	SHALE, GRAY; CALCAREOUS (GREENHORN FORMATION)
646 -	760	SHALE, GRAY; NONCALCAREOUS (GRANEROS SHALE)
760 -	840	SHALE, GRAY (DAKOTA FORMATION)
840 -	860	SAND, WHITE, FINE (DAKOTA FORMATION)
860 -	882	SHALE, GRAY (DAKOTA FORMATION)
882 -	888	SAND, WHITE, FINE (DAKOTA FORMATION)
888 -	910	SHALE, GRAY (DAKOTA FORMATION)

* * * *

COUNTY: KINGSBURY LOCATION: 110N-58W-060000
 MAP LOCATION: 4
 LEGAL LOCATION: SE SE SE SE SEC. 06, T. 110 N., R. 58 W.
 LATITUDE: 44.2115 LONGITUDE: 97.4754
 LAND OWNER:
 PROJECT: IROQUOIS CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: B. GARRISON DRILLER'S LOG:
 GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
 DATE DRILLED: 07-18-1980 DRILLING METHOD: ROTARY
 E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1415.00 T
 TOTAL DRILL HOLE DEPTH: 46.0 TEST HOLE NUMBER: IR-34

0 - 2 SILT, BROWN

2 - 11 CLAY, YELLOW, SILTY, SANDY, PEBBLY (TILL)
 11 - 26 CLAY, RED-BROWN, SILTY, SANDY, PEBBLY
 (TILL)
 26 - 37 CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
 37 - 46 SHALE, GRAY (PIERRE SHALE)

* * * *

COUNTY: BEADLE LOCATION: 110N-59W-01AAAA
 MAP LOCATION: 5
 LEGAL LOCATION: NE NE NE NE SEC. 01, T. 110 N., R. 59 W.
 LATITUDE: 44.2207 LONGITUDE: 97.5111
 LAND OWNER:
 PROJECT: IROQUOIS CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: B. GARRISON DRILLER'S LOG:
 GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
 DATE DRILLED: 07-10-1980 DRILLING METHOD: ROTARY
 E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1398.00 T
 TOTAL DRILL HOLE DEPTH: 26.0 TEST HOLE NUMBER: IR-18

0 - 2 SILT, BROWN
 2 - 15 CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
 15 - 20 CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
 20 - 26 SHALE, GRAY (PIERRE SHALE)

* * * *

COUNTY: BEADLE LOCATION: 110N-59W-01AACB
 MAP LOCATION: 6
 LEGAL LOCATION: NW SW NE NE SEC. 01, T. 110 N., R. 59 W.
 LATITUDE: 44.2200 LONGITUDE: 97.5128
 LAND OWNER:
 PROJECT: IROQUOIS CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: B. GARRISON DRILLER'S LOG:
 GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
 DATE DRILLED: 07-11-1980 DRILLING METHOD: ROTARY
 E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1390.00 T
 TOTAL DRILL HOLE DEPTH: 56.0 TEST HOLE NUMBER: IR-19
 SDGS WELL NAME: IR-19 WATER RIGHTS WELL NAME:
 AQUIFER: BASIN: JAMES
 MANAGEMENT UNIT:
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 5.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION:
 CASING STICK-UP: TOTAL CASING AND SCREEN: 47.0
 WELL MAINTENANCE DATE: 07-11-1980

0 - 4 SILT, BROWN, SANDY
 4 - 22 SAND, FINE GRADING TO MEDIUM
 22 - 26 GRAVEL, MEDIUM GRADING TO FINE; SOME
 SHALE PEBBLES
 26 - 42 SAND, FINE GRADING TO MEDIUM, SILTY; SOME

42 - 56 COAL STRINGERS
SHALE, BLACK (PIERRE SHALE)

* * * *

COUNTY: BEADLE LOCATION: 110N-59W-01A3AA
MAP LOCATION: 7
LEGAL LOCATION: NE NE NW NE SEC. 01, T. 110 N., R. 59 W.
LATITUDE: 44.2207 LONGITUDE: 97.5128
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
DATE DRILLED: 07-10-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1390.00 T
TOTAL DRILL HOLE DEPTH: 46.0 TEST HOLE NUMBER: IR-17

0 -	3	SILT, BROWN, SANDY
3 -	11	GRAVEL, COARSE, GRADING TO FINE, SANDY, SILTY
11 -	29	SAND, COARSE, GRADING TO FINE; SOME COAL AND GRAY CLAY STRINGERS
29 -	31	GRAVEL, MEDIUM
31 -	46	SHALE, GRAY (PIERRE SHALE)

* * * *

COUNTY: BEADLE LOCATION: 110N-59W-01ACCC
MAP LOCATION: 8
LEGAL LOCATION: SW SW SW NE SEC. 01, T. 110 N., R. 59 W.
LATITUDE: 44.2142 LONGITUDE: 97.5146
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
DATE DRILLED: 07-11-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1389.00 T
TOTAL DRILL HOLE DEPTH: 26.0 TEST HOLE NUMBER: IR-21

0 -	3	SILT, BROWN, SANDY
3 -	19	CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
19 -	22	CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
22 -	26	SHALE, GRAY (PIERRE SHALE)

* * * *

COUNTY: BEADLE LOCATION: 110N-59W-01ACDD
MAP LOCATION: 9
LEGAL LOCATION: SE SE SW NE SEC. 01, T. 110 N., R. 59 W.
LATITUDE: 44.2142 LONGITUDE: 97.5138
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY

DRILLING COMPANY: SDGS
DRILLER: B. GARRISON
GEOLOGIST: S. GREEN
DATE DRILLED: 07-11-1980
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1390.00 T
TOTAL DRILL HOLE DEPTH: 26.0 TEST HOLE NUMBER: IR-20

DRILLER'S LOG:
GEOLOGIST'S LOG: X

DRILLING METHOD: ROTARY

0 - 3 SILT, BROWN, SANDY
3 - 12 CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
12 - 17 CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
17 - 26 SHALE, GRAY; BENTONITIC (PIERRE SHALE)

* * * *

COUNTY: BEADLE LOCATION: 110N-59W-01BAAA
MAP LOCATION: 10
LEGAL LOCATION: NE NE NE NW SEC. 01, T. 110 N., R. 59 W.
LATITUDE: 44.2207 LONGITUDE: 97.5149
LAND OWNER:

PROJECT: IROQUOIS CITY STUDY

DRILLING COMPANY: SDGS

DRILLER: B. GARRISON

GEOLOGIST: S. GREEN

DATE DRILLED: 07-08-1980

E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1394.00 T

TOTAL DRILL HOLE DEPTH: 36.0 TEST HOLE NUMBER: IR-1

DRILLER'S LOG:

GEOLOGIST'S LOG: X

DRILLING METHOD: ROTARY

0 - 2 SAND, MEDIUM, SILTY
2 - 15 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY
(TILL)
15 - 16 SAND, FINE TO COARSE, SILTY
16 - 23 CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY
(TILL)
23 - 36 SHALE, BLUE-GRAY (PIERRE SHALE)

* * * *

COUNTY: BEADLE LOCATION: 110N-59W-01BCCC
MAP LOCATION: 11
LEGAL LOCATION: SW SW SW NW SEC. 01, T. 110 N., R. 59 W.
LATITUDE: 44.2142 LONGITUDE: 97.5224
LAND OWNER:

PROJECT: IROQUOIS CITY STUDY

DRILLING COMPANY: SDGS

DRILLER: B. GARRISON

GEOLOGIST: S. GREEN

DATE DRILLED: 07-08-1980

E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1387.00 T

TOTAL DRILL HOLE DEPTH: 26.0 TEST HOLE NUMBER: IR-6

DRILLER'S LOG:

GEOLOGIST'S LOG: X

DRILLING METHOD: ROTARY

0 - 1 SILT, BROWN
1 - 18 CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
18 - 20 SAND, FINE TO MEDIUM, SILTY
20 - 22 CLAY, BLACK; SOFT

22 - 26 SHALE, BLUE-GRAY (PIERRE SHALE)

* * * *

COUNTY: BEADLE LOCATION: 110N-59W-01CBCC
MAP LOCATION: 12
LEGAL LOCATION: SW SW NW SW SEC. 01, T. 110 N., R. 59 W.
LATITUDE: 44.2134 LONGITUDE: 97.5224
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
DATE DRILLED: 07-09-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1386.00 T
TOTAL DRILL HOLE DEPTH: 36.0 TEST HOLE NUMBER: IR-13

0 -	3	SILT, BROWN, SANDY
3 -	14	CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
14 -	27	CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
27 -	36	SHALE, GRAY (PIERRE SHALE)

* * * *

COUNTY: BEADLE LOCATION: 110N-59W-01DDAD
MAP LOCATION: 13
LEGAL LOCATION: SE NE SE SE SEC. 01, T. 110 N., R. 59 W.
LATITUDE: 44.2123 LONGITUDE: 97.5111
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
DATE DRILLED: 07-16-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1387.00 T
TOTAL DRILL HOLE DEPTH: 30.0 TEST HOLE NUMBER: IR-28

0 -	5	SILT, BROWN, CLAYEY, SANDY
5 -	8	GRAVEL, FINE, SANDY
8 -	12	CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
12 -	25	CLAY, GRAY, SANDY, PEBBLY; SOME SHALE
25 -	30	SHALE, GRAY; BENTONITIC (PIERRE SHALE)

* * * *

COUNTY: BEADLE LOCATION: 110N-59W-02AAAA
MAP LOCATION: 14
LEGAL LOCATION: NE NE NE NE SEC. 02, T. 110 N., R. 59 W.
LATITUDE: 44.2207 LONGITUDE: 97.5224
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X

DATE DRILLED: 07-08-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1392.00 T
TOTAL DRILL HOLE DEPTH: 36.0 TEST HOLE NUMBER: IR-2

0 -	4	SAND, FINE, SILTY; SOFT
4 -	18	CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY (TILL)
18 -	23	GRAVEL, FINE, SANDY, SILTY; SOME CLAY
23 -	24	CLAY, GRAY-BROWN, SILTY, SANDY, PEBBLY (TILL)
24 -	33	CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
33 -	36	SHALE, BLUE-GRAY (PIERRE SHALE)

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COUNTY: BEADLE LOCATION: 110N-59W-02BAAA

MAP LOCATION: 15

LEGAL LOCATION: NE NE NE NW SEC. 02, T. 110 N., R. 59 W.

LATITUDE: 44.2207

LONGITUDE: 97.5300

LAND OWNER:

PROJECT: IROQUOIS CITY STUDY

DRILLING COMPANY: SDGS

DRILLER: B. GARRISON

DRILLER'S LOG:

GEOLOGIST: S. GREEN

GEOLOGIST'S LOG: X

DATE DRILLED: 07-08-1980

DRILLING METHOD: ROTARY

E-LOG: NO SAMPLES: NO

GROUND SURFACE ELEVATION: 1379.00 T

TOTAL DRILL HOLE DEPTH: 26.0

TEST HOLE NUMBER: IR-3

0 -	3	SILT, BROWN; SOFT
3 -	14	CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
14 -	23	CLAY, GRAY
23 -	26	SHALE, GRAY (PIERRE SHALE)

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COUNTY: BEADLE

LOCATION: 110N-59W-02DCCC

MAP LOCATION: 16

LEGAL LOCATION: SW SW SW SE SEC. 02, T. 110 N., R. 59 W.

LATITUDE: 44.2115

LONGITUDE: 97.5256

LAND OWNER:

PROJECT: IROQUOIS CITY STUDY

DRILLING COMPANY: SDGS

DRILLER: B. GARRISON

DRILLER'S LOG:

GEOLOGIST: S. GREEN

GEOLOGIST'S LOG: X

DATE DRILLED: 07-09-1980

DRILLING METHOD: ROTARY

E-LOG: NO SAMPLES: NO

GROUND SURFACE ELEVATION: 1385.00 T

TOTAL DRILL HOLE DEPTH: 36.0

TEST HOLE NUMBER: IR-9

0 -	1	SILT, BROWN
1 -	12	CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
12 -	21	CLAY, BROWN WITH GRAY MOTTLES, SILTY, SANDY, PEBBLY (TILL)
21 -	29	CLAY, BROWN, SILTY, SANDY (TILL)
29 -	32	CLAY, GRAY, SILTY, SANDY (TILL)

32 - 34 GRAVEL, FINE TO MEDIUM, WELL-ROUNDED
34 - 36 SHALE, BLUE-GRAY (PIERRE SHALE)

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COUNTY: BEADLE LOCATION: 110N-59W-020000 1
MAP LOCATION: 17
LEGAL LOCATION: SE SE SE SE SEC. 02, T. 110 N., R. 59 W.
LATITUDE: 44.2115 LONGITUDE: 97.5225
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
DATE DRILLED: 07-08-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1385.00 T
TOTAL DRILL HOLE DEPTH: 52.0 TEST HOLE NUMBER: IR-7

0 - 1 SILT, BROWN, SANDY
1 - 18 CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
18 - 27 CLAY, GRAY, SLIGHTLY SILTY, SANDY, PEBBLY
(TILL)
27 - 52 SAND, MEDIUM TO COARSE; CLEAN

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COUNTY: BEADLE LOCATION: 110N-59W-020000 2
MAP LOCATION: 18
LEGAL LOCATION: SE SE SE SE SEC. 02, T. 110 N., R. 59 W.
LATITUDE: 44.2115 LONGITUDE: 97.5225
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
DATE DRILLED: 07-09-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1385.00 T
TOTAL DRILL HOLE DEPTH: 56.0 TEST HOLE NUMBER: IR-8
SDGS WELL NAME: IR-8 WATER RIGHTS WELL NAME:
AQUIFER: BASIN: JAMES
MANAGEMENT UNIT:
SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 5.0
CASING TYPE: PVC CASING DIAMETER: 2.0
CASING TOP ELEVATION: 1388.00 T
CASING STICK-UP: 3.0 TOTAL CASING AND SCREEN: 50.0
WELL MAINTENANCE DATE: 07-17-1980

DEPTH TO WATER: 11.0 FEET ON 7-14-80, 13.4 FEET ON
7-17-80.

0 - 1 SILT, BROWN, SANDY
1 - 18 CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
18 - 27 CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
27 - 44 SAND, MEDIUM TO COARSE; CLEAN

44 - 51 GRAVEL, MEDIUM TO COARSE
51 - 56 SHALE, BLACK (PIERRE SHALE)

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COUNTY: BEADLE LOCATION: 110N-59W-03AAAA
MAP LOCATION: 19
LEGAL LOCATION: NE NE NE NE SEC. 03, T. 110 N., R. 59 W.
LATITUDE: 44.2207 LONGITUDE: 97.5336
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
DATE DRILLED: 07-08-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1365.00 T
TOTAL DRILL HOLE DEPTH: 26.0 TEST HOLE NUMBER: IR-4

0 - 3 SILT, BROWN
3 - 14 CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
14 - 23 CLAY, BLACK; SOME YELLOW STRINGERS
(PIERRE SHALE)
23 - 26 SHALE, BLUE-GRAY; BENTONITIC (PIERRE
SHALE)

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COUNTY: BEADLE LOCATION: 110N-59W-03BAAA
MAP LOCATION: 20
LEGAL LOCATION: NE NE NE NW SEC. 03, T. 110 N., R. 59 W.
LATITUDE: 44.2207 LONGITUDE: 97.5413
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
DATE DRILLED: 07-08-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1370.00 T
TOTAL DRILL HOLE DEPTH: 26.0 TEST HOLE NUMBER: IR-5

0 - 1 SILT, BROWN
1 - 3 CLAY, BROWN, SILTY
3 - 8 GRAVEL, REDDISH-BROWN, FINE, SANDY,
SILTY; SOME CLAY
8 - 14 CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
14 - 22 CLAY, BLACK, PEBBLY; SOME SAND, WHITE
CLAY
22 - 26 SHALE, BLACK (PIERRE SHALE)

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COUNTY: BEADLE LOCATION: 110N-59W-04ABAA
MAP LOCATION: 21
LEGAL LOCATION: NE NE NW NE SEC. 04, T. 110 N., R. 59 W.

LATITUDE: 44.2207 LONGITUDE: 97.5506
 LAND OWNER:
 PROJECT: IROQUOIS CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: B. GARRISON DRILLER'S LOG:
 GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
 DATE DRILLED: 07-17-1980 DRILLING METHOD: ROTARY
 E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1353.00 T
 TOTAL DRILL HOLE DEPTH: 28.0 TEST HOLE NUMBER: IR-30

0 -	2	SILT, BROWN, SANDY
2 -	15	CLAY, BROWN WITH GRAY MOTTLING, SILTY, SANDY, PEBBLY (TILL)
15 -	20	CLAY, GRAY, SILTY, SANDY, PEBBLY; SOME SHALE (TILL)
20 -	28	SHALE, DARK-GRAY; BENTONITIC (PIERRE SHALE)

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COUNTY: BEADLE LOCATION: 110N-59W-04ABBA
 MAP LOCATION: 22
 LEGAL LOCATION: NE NW NW NE SEC. 04, T. 110 N., R. 59 W.
 LATITUDE: 44.2207 LONGITUDE: 97.5514
 LAND OWNER:
 PROJECT: IROQUOIS CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: B. GARRISON DRILLER'S LOG:
 GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
 DATE DRILLED: 07-17-1980 DRILLING METHOD: ROTARY
 E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1353.00 T
 TOTAL DRILL HOLE DEPTH: 26.0 TEST HOLE NUMBER: IR-31

0 -	2	SILT, BROWN, SANDY
2 -	10	SILT, YELLOW, SANDY
10 -	14	SAND, FINE, GRADING TO COARSE; CLEAN
14 -	15	GRAVEL, FINE, SANDY
15 -	17	CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
17 -	22	CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
22 -	26	SHALE, BLACK; BENTONITIC (PIERRE SHALE)

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COUNTY: BEADLE LOCATION: 110N-59W-04ABBB
 MAP LOCATION: 23
 LEGAL LOCATION: NW NW NW NE SEC. 04, T. 110 N., R. 59 W.
 LATITUDE: 44.2207 LONGITUDE: 97.5522
 LAND OWNER:
 PROJECT: IROQUOIS CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: B. GARRISON DRILLER'S LOG:
 GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
 DATE DRILLED: 07-17-1980 DRILLING METHOD: ROTARY
 E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1353.00 T

TOTAL DRILL HOLE DEPTH: 16.0 TEST HOLE NUMBER: IR-32
 SDGS WELL NAME: IR-32 WATER RIGHTS WELL NAME:
 AQUIFER: FLOYD BASIN: JAMES
 MANAGEMENT UNIT: PEARL CREEK
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 3.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION:
 CASING STICK-UP: TOTAL CASING AND SCREEN: 9.0
 WELL MAINTENANCE DATE:

0 - 2 SILT, BROWN, SANDY
 2 - 9 SAND, COARSE GRADING TO MEDIUM
 9 - 16 SHALE, BLACK (PIERRE SHALE)

DRY HOLE. EASTERN MARGIN OF THE PEARL CREEK
 AQUIFER.

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COUNTY: BEADLE LOCATION: 110N-59W-048888
 MAP LOCATION: 24
 LEGAL LOCATION: NW NW NW NW SEC. 04, T. 110 N., R. 59 W.
 LATITUDE: 44.2207 LONGITUDE: 97.5600
 LAND OWNER:
 PROJECT: IROQUOIS CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: B. GARRISON DRILLER'S LOG:
 GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
 DATE DRILLED: 07-16-1980 DRILLING METHOD: ROTARY
 E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1343.00 T
 TOTAL DRILL HOLE DEPTH: 70.0 TEST HOLE NUMBER: IR-29
 SDGS WELL NAME: IR-29 WATER RIGHTS WELL NAME:
 AQUIFER: FLOYD BASIN: JAMES
 MANAGEMENT UNIT: PEARL CREEK
 SCREEN TYPE: PVC, MFG. SCREEN LENGTH: 5.0
 CASING TYPE: PVC CASING DIAMETER: 2.0
 CASING TOP ELEVATION:
 CASING STICK-UP: 3.0 TOTAL CASING AND SCREEN: 56.0
 WELL MAINTENANCE DATE:

DEPTH TO WATER: 18 FEET ON 7-17-80.

0 - 2 SILT, BROWN
 2 - 11 CLAY, YELLOW-BROWN, SILTY, SANDY, PEBBLY
 (TILL)
 11 - 12 GRAVEL, MEDIUM
 12 - 25 SAND, COARSE AND GRAVEL, FINE, SILTY
 25 - 36 GRAVEL, MEDIUM
 36 - 47 GRAVEL, COARSE GRADING TO MEDIUM
 47 - 57 GRAVEL, COARSE, WELL-ROUNDED; COAL
 STRINGERS
 57 - 60 CLAY(?); NO SAMPLE
 60 - 70 GRAVEL, MEDIUM GRADING TO FINE, SANDY
 70 - 71 ROCK; NO PENETRATION

DATE DRILLED: 07-09-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1379.00 T
TOTAL DRILL HOLE DEPTH: 36.0 TEST HOLE NUMBER: IR-11

0 -	3	SILT, BROWN
3 -	5	GRAVEL, REDDISH-BROWN, MEDIUM, SILTY
5 -	13	CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
13 -	27	CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
27 -	34	SHALE, GRAY (PIERRE SHALE)
34 -	36	SHALE, GRAY; BRITTLE (PIERRE SHALE)

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COUNTY: BEADLE LOCATION: 110N-59W-12ABBB
MAP LOCATION: 28
LEGAL LOCATION: NW NW NW NE SEC. 12, T. 110 N., R. 59 W.
LATITUDE: 44.2114 LONGITUDE: 97.5146
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
DATE DRILLED: 07-09-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1396.00 T
TOTAL DRILL HOLE DEPTH: 36.0 TEST HOLE NUMBER: IR-10

0 -	1	SILT, BROWN
1 -	20	CLAY, BROWN, SILTY, SANDY, PEBBLY (TILL)
20 -	26	CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
26 -	36	SHALE, BLUE-GRAY (PIERRE SHALE)

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COUNTY: BEADLE LOCATION: 110N-59W-12BBAA
MAP LOCATION: 29
LEGAL LOCATION: NE NE NW NW SEC. 12, T. 110 N., R. 59 W.
LATITUDE: 44.2114 LONGITUDE: 97.5206
LAND OWNER:
PROJECT: IROQUOIS CITY STUDY
DRILLING COMPANY: SDGS
DRILLER: B. GARRISON DRILLER'S LOG:
GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
DATE DRILLED: 07-10-1980 DRILLING METHOD: ROTARY
E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1385.00 T
TOTAL DRILL HOLE DEPTH: 36.0 TEST HOLE NUMBER: IR-14

0 -	2	SILT, BROWN
2 -	12	CLAY, YELLOW-BROWN, SILTY, SANDY, PEBBLY (TILL)
12 -	31	CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
31 -	36	SHALE, DARK-GRAY (PIERRE SHALE)

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0 - 5 SILT, BROWN, SANDY
 5 - 9 GRAVEL, MEDIUM GRADING TO FINE, SANDY
 9 - 14 CLAY, GRAY, SILTY, SANDY, PEBBLY (TILL)
 14 - 26 SHALE, GRAY (PIERRE SHALE)

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COUNTY: KINGSBURY LOCATION: 111N-58W-32BCCC
 MAP LOCATION: 35
 LEGAL LOCATION: SW SW SW NW SEC. 32, T. 111 N., R. 58 W.
 LATITUDE: 44.2234 LONGITUDE: 97.4957
 LAND OWNER:
 PROJECT: IROQUOIS CITY STUDY
 DRILLING COMPANY: SDGS
 DRILLER: B. GARRISON DRILLER'S LOG:
 GEOLOGIST: S. GREEN GEOLOGIST'S LOG: X
 DATE DRILLED: 07-15-1980 DRILLING METHOD: ROTARY
 E-LOG: NO SAMPLES: NO GROUND SURFACE ELEVATION: 1425.00 T
 TOTAL DRILL HOLE DEPTH: 54.0 TEST HOLE NUMBER: IR-24

0 - 2 SILT, BROWN, SANDY
 2 - 13 CLAY, YELLOW-BROWN, SILTY, SANDY, PEBBLY
 (TILL)
 13 - 19 CLAY, YELLOW-BROWN, GRAY MOTTLED, VERY
 SANDY, SILTY, PEBBLY (TILL)
 19 - 48 CLAY, GRAY, SILTY, SANDY, PEBBLY; ROCK AT
 29 FEET (TILL)
 48 - 54 SHALE, LIGHT-GRAY (PIERRE SHALE)

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APPENDIX B

Well Information and Locations of the Water Samples

For logs of the observation wells constructed by the South Dakota Geological Survey, see logs in Appendix A with the same location as the water sample.

SAMPLE IDENTIFICATION

- * For water analyses, see table 1.
- * For map location, see figure 2.

LOCATION

All descriptors for the location within a section (i.e., NE NW SW SE) refer to quarter sections unless otherwise noted.

AQUIFER

F-PC Floyd Aquifer - Pearl Creek Management Unit
Kcc Codell Member, Carlile Formation
Kd Dakota Formation
P Miscellaneous Pleistocene sands and gravels

WELL DEPTH

The depths to water for wells and depth of the wells not controlled by the South Dakota Geological Survey were obtained from the well controller.

WELL CONTROLLER

SDGS - South Dakota Geological Survey

USAGE

D - Domestic
M - Municipal
OB - Observation
S - Stock

Sample Identification: 1

Location: SW NW NW SW sec. 6, T. 110 N., R. 58 W.
Date Sampled: 7-8-80
Aquifer: P
Well Depth (ft): 30
Depth to water from Casing Top (ft): 15.00
Well Controller: E. Stroup
Usage: S

Sample Identification: 2

Location: Nw SW NE NE sec. 1, T. 110 N., R. 59 W.
Date Sampled: 7-11-80
Aquifer: P
Well Depth (ft): ----
Depth to water from Casing Top (ft): ----
Well Controller: SDGS
Usage: OB

Sample Identification: 3

Location: SE SE SE SE sec. 2, T. 110 N., R. 59 W.
Date Sampled: 7-14-80
Aquifer: P
Well Depth (ft): 50
Depth to water from Casing Top (ft): 11.00
Well Controller: SDGS
Usage: OB

Sample Identification: 4

Location: SE SE SE SE sec. 2, T. 110 N., R. 59 W.
Date Sampled: 7-17-80
Aquifer: P
Well Depth (ft): 50
Depth to water from Casing Top (ft): 13.40
Well Controller: SDGS
Usage: OB

Sample Identification: 5

Location: SW SE SE SE sec. 30, T. 111 N., R. 58 W.
Date Sampled: 7-18-80
Aquifer: P
Well Depth (ft): 76
Depth to water from Casing Top (ft): 16.40
Well Controller: SDGS
Usage: OB

Sample Identification: 6

Location: SW SE SE SE sec. 30, T. 111 N., R. 58 W.
Date Sampled: 8-11-80
Aquifer: P
Well Depth (ft): 76
Depth to water from Casing Top (ft): 16.80
Well Controller: SDGS
Usage: OB

Sample Identification: 7

Location: SW SE SE SE sec. 30, T. 111 N., R. 58 W.
Date Sampled: 8-12-80
Aquifer: P
Well Depth (ft): 76
Depth to Water from Casing Top (ft): 16.80
Well Controller: SDGS
Usage: OB

Sample Identification: 8

Location: SE SW SE SE sec. 27, T. 111 N., R. 59 W.
Date Sampled: 7-8-80
Aquifer: P
Well Depth (ft): ----
Depth to Water from Casing Top (ft): ----
Well Controller: R. Korkow
Usage: D

Sample Identification: 9

Location: SW NE SW SW sec. 34, T. 111 N., R. 59 W.
Date Sampled: 7-9-80
Aquifer: P
Well Depth (ft): 32
Depth to Water from Casing Top (ft): ----
Well Controller: R. Lynch
Usage: S

Sample Identification: 10

Location: SE SE SW SE sec. 36, T. 111 N., R. 59 W.
Date Sampled: 7-11-80
Aquifer: P
Well Depth (ft): ----
Depth to Water from Casing Top (ft): ----
Well Controller: M. Lorenz
Usage: D

Sample Identification: 11

Location: NW NW NW NW sec. 4, T. 110 N., R. 59 W.
Date Sampled: 7-17-80
Aquifer: F-PC
Well Depth (ft): 56
Depth to Water from Casing Top (ft): 18.00
Well Controller: SDGS
Usage: OB

Sample Identification: 12

Location: NE SW SE SE sec. 33, T. 111 N., R. 60 W.
Date Sampled: 3-57
Aquifer: Kcc
Well Depth (ft): 200
Depth to Water from Casing Top (ft): ----
Well Controller: City of Cavour

Sample Identification 12 -- continued.

Usage: M

Comment: Data obtained from Howells, L. W. and Stephens, J. C., 1968, Geology and Water Resources of Beadle County, SD, Part II: Water Resources: SD Geological Survey Bull. 17, p. 65.

Sample Identification: 13

Location: NE NE NW NW sec. 6, T. 110 N., R. 58 W.

Date Sampled: 2-59

Aquifer: Kd

Well Depth (ft): 950

Depth to water from Casing Top (ft): ----

Well Controller: City of Iroquois

Usage: M

Comment: Data were obtained from South Dakota Public Water Supply Data, 1979. SD Dept. of Environmental Protection

Sample Identification: 14

Location: NE NE NW NW sec. 6, T. 110 N., R. 58 W.

Date Sampled: 7-11-80

Aquifer: Kd

Well Depth (ft): 950

Depth to water from Casing Top (ft): ----

Well Controller: City of Iroquois

Usage: M

Sample Identification: 15

Location: NW NW NW SW sec. 6, T. 110 N., R. 58 W.

Date Sampled: 1-77

Aquifer: Kd

Well Depth (ft): 848

Depth to water from Casing Top (ft): ----

Well Controller: City of Iroquois

Usage: M

Comment: Data were obtained from South Dakota Public Water Supply Data, 1979, SD Dept. of Environmental Protection

Sample Identification: 16

Location: NW NW NW SW sec. 6, T. 110 N., R. 58 W.

Date Sampled: 12-6-79

Aquifer: Kd

Well Depth (ft): 848

Depth to water from Casing Top (ft): ----

Well Controller: City of Iroquois

Usage: M

Comment: This sample was analyzed by the Division of Water Quality, Dept. of Water and Natural Resources

Sample Identification: 17

Location: NW NW SW NW sec. 32, T. 111 N., R. 58 W.

Date Sampled: 7-10-80

Aquifer: Kd

Sample Identification 17 -- continued.

Well Depth (ft): 1060
Depth to Water from Casing Top (ft): ----
Well Controller: H. Evans
Usage: D, S

Sample Identification: 18

Location: NE NE NE SE sec. 10, T. 110 N., R. 59 W.
Date Sampled: 7-9-80
Aquifer: Kd
Well Depth (ft): 900
Depth to Water from Casing Top (ft): ----
Well Controller: L. Culver
Usage: D, S

Sample Identification: 19

Location: SE SE SE SW sec. 25, T. 111 N., R. 59 W.
Date Sampled: 7-10-80
Aquifer: Kd
Well Depth (ft): 935
Depth to water from Casing Top (ft): ----
Well Controller: J. Baird
Usage: D, S

Sample Identification: 20

Location: SE NE SW SW sec. 34, T. 111 N., R. 59 W.
Date Sampled: 7-9-80
Aquifer: Kd
Well Depth (ft): 980
Depth to Water from Casing Top (ft): ----
Well Controller: R. Lynch
Usage: D