

STATE OF SOUTH DAKOTA  
William Janklow, Governor

DEPARTMENT OF WATER AND NATURAL RESOURCES  
Warren Neufeld, Secretary

GEOLOGICAL SURVEY  
Duncan J. McGregor, State Geologist

Open-File Report No. *25-UR*

GROUND WATER STUDY FOR THE  
CLARK RURAL WATER SYSTEM

by

Stephen L. Burch

Science Center  
University of South Dakota  
Vermillion, South Dakota  
1979

## TABLE OF CONTENTS

### GENERAL INFORMATION

### RESULTS

The Clark Area

The Wallace Area

### RECOMMENDATIONS

The Clark Area

The Wallace Area

### REFERENCES

### APPENDICES

- A. Test Hole Logs
- B. Water Quality Data in the Clark Area
- C. Water Quality Data in the Wallace Area
- D. Locations of Water Sampling Points

### FIGURES

- 1. Map showing areal extent of the Prairie Coteau aquifers (after Hamilton, 1978)
- 2. Map showing locations of SDGS test holes and observation wells south of Clark
- 3. Map showing locations of test holes and observation wells near Wallace
- 4. Map showing areal extent of the surficial aquifer near Wallace
- 5. Map showing areal extent of the buried aquifer near Wallace
- 6. Cross section AA' showing configuration of the buried aquifer near Wallace
- 7. Map showing saturated thickness in the surficial aquifer south of Clark
- 8. Map showing approximate water table elevations, August 9-10, 1978

## GENERAL INFORMATION

At the request of the Clark Rural Water System, the South Dakota Geological Survey (SDGS) conducted a 2-phase groundwater investigation near the communities of Clark and Wallace, South Dakota. The Survey's purpose was to assist the Rural Water System in locating a dependable source of acceptable quality water.

The prime area of interest was located 2 to 5 miles south of Clark because previous investigations (Hamilton, 1978, and Schroeder, 1978) had located a glacial aquifer at or near the surface. Referred to as the Prairie Coteau Aquifer No. 1 (figs. 1 and 2) it trends almost north-south through Clark County. This water-bearing unit also yields water to the municipal wells in Clark (Barari, in preparation).

The second area of interest was located about 1 to 2 miles east and northeast of Wallace. Two aquifers were found in this area: a narrow one at the surface and a buried one at depths of 45 to 60 feet (figs. 3, 4, 5, and 6). The buried aquifer consists of coarse sand and some gravel and is correlated, stratigraphically, with the Prairie Coteau Aquifer No. 2 in Clark County.

To evaluate the areas of study 72 rotary holes were drilled. Thirty-three test holes were converted for use as observation wells when 2-inch PVC casings were installed in each of them. The lithologic logs from these holes are shown in the Appendix.

Thirty-nine water samples were collected from the study areas. Seventeen of these samples were taken from private wells,

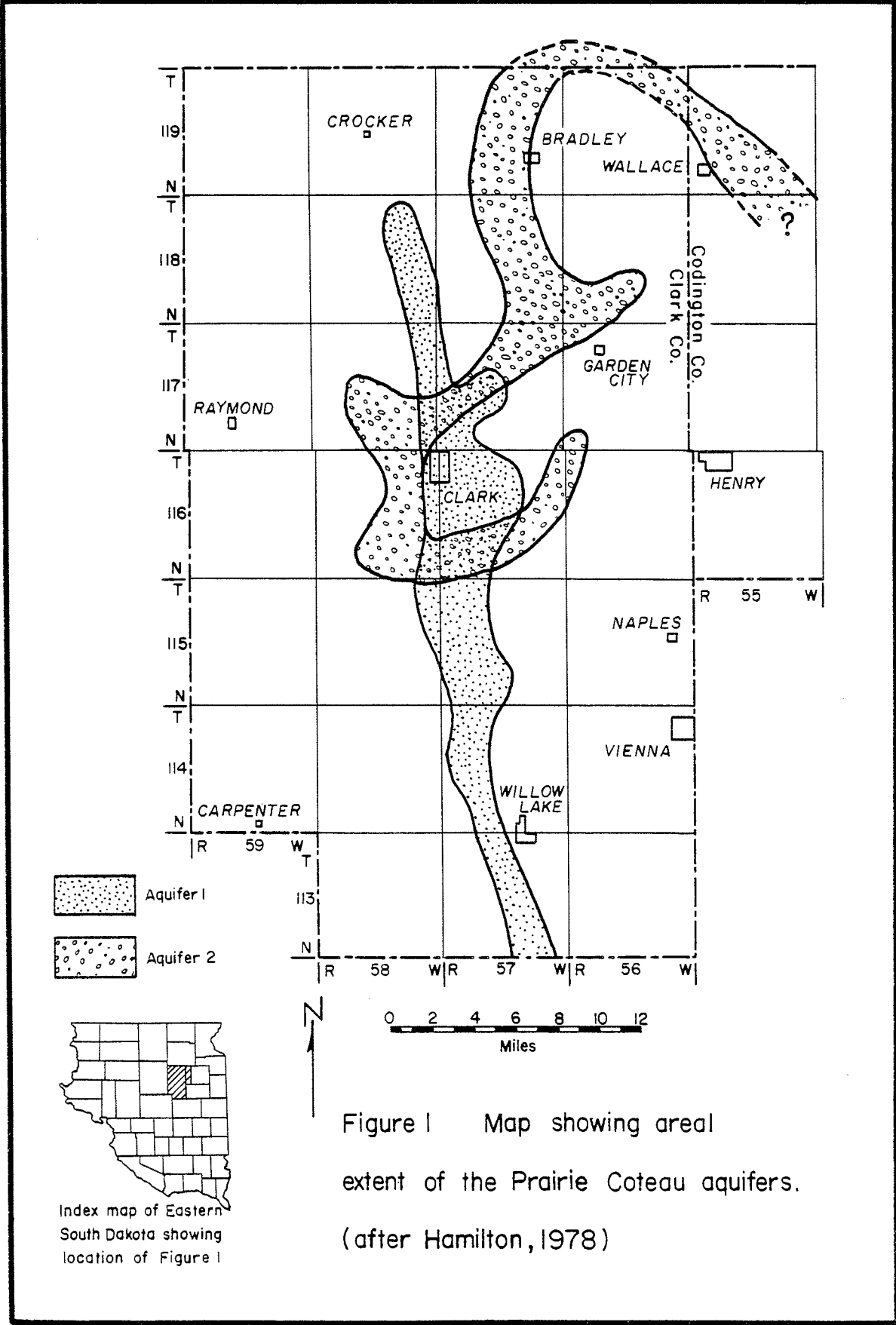
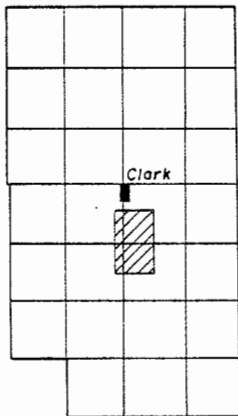


Figure 1 Map showing areal extent of the Prairie Coteau aquifers. (after Hamilton, 1978)

- Test hole ,number indicates test hole number.
- Test hole with observation well,number indicates obs. well number. Number in ( ) indicates test hole number.



Index map of Clark County showing location of Figure 2.

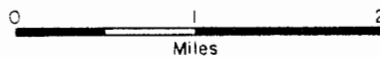
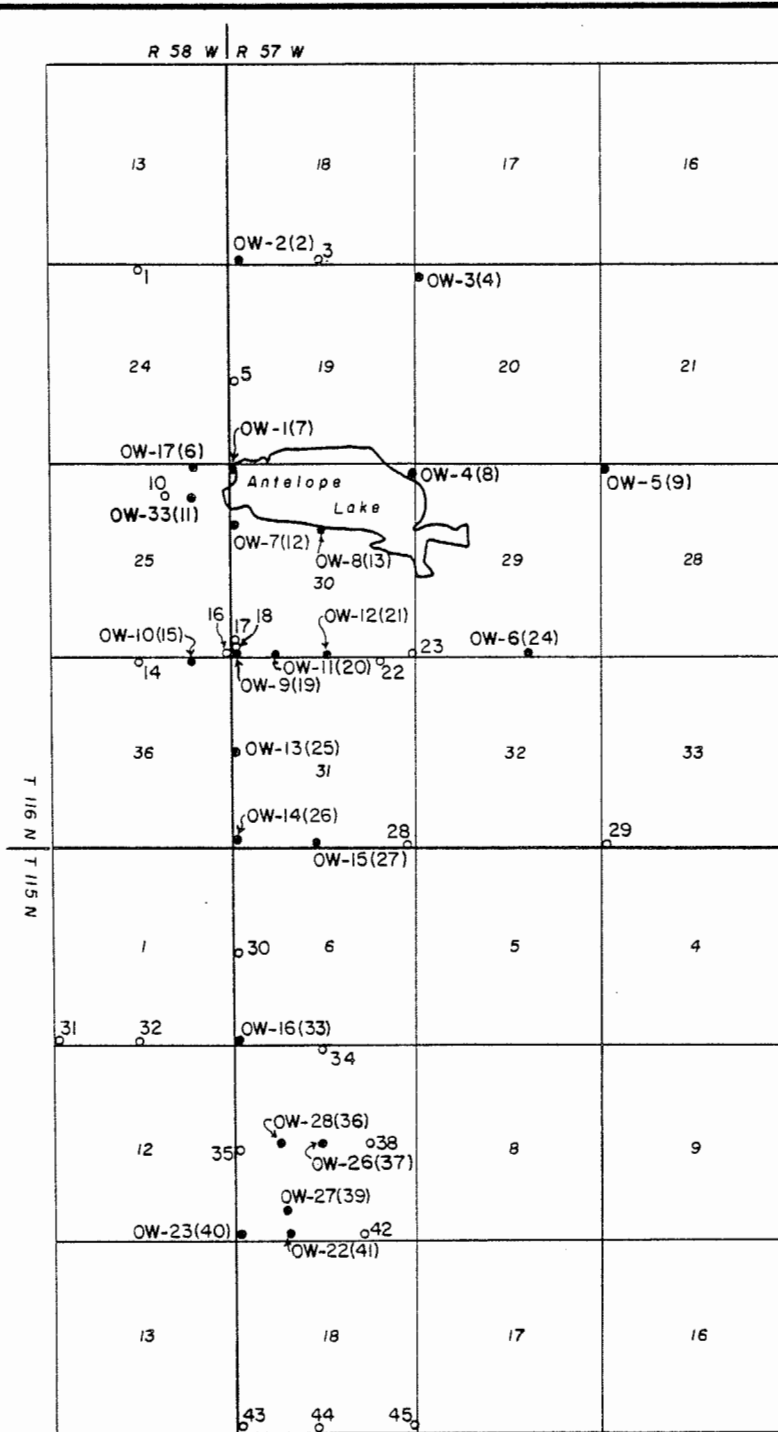
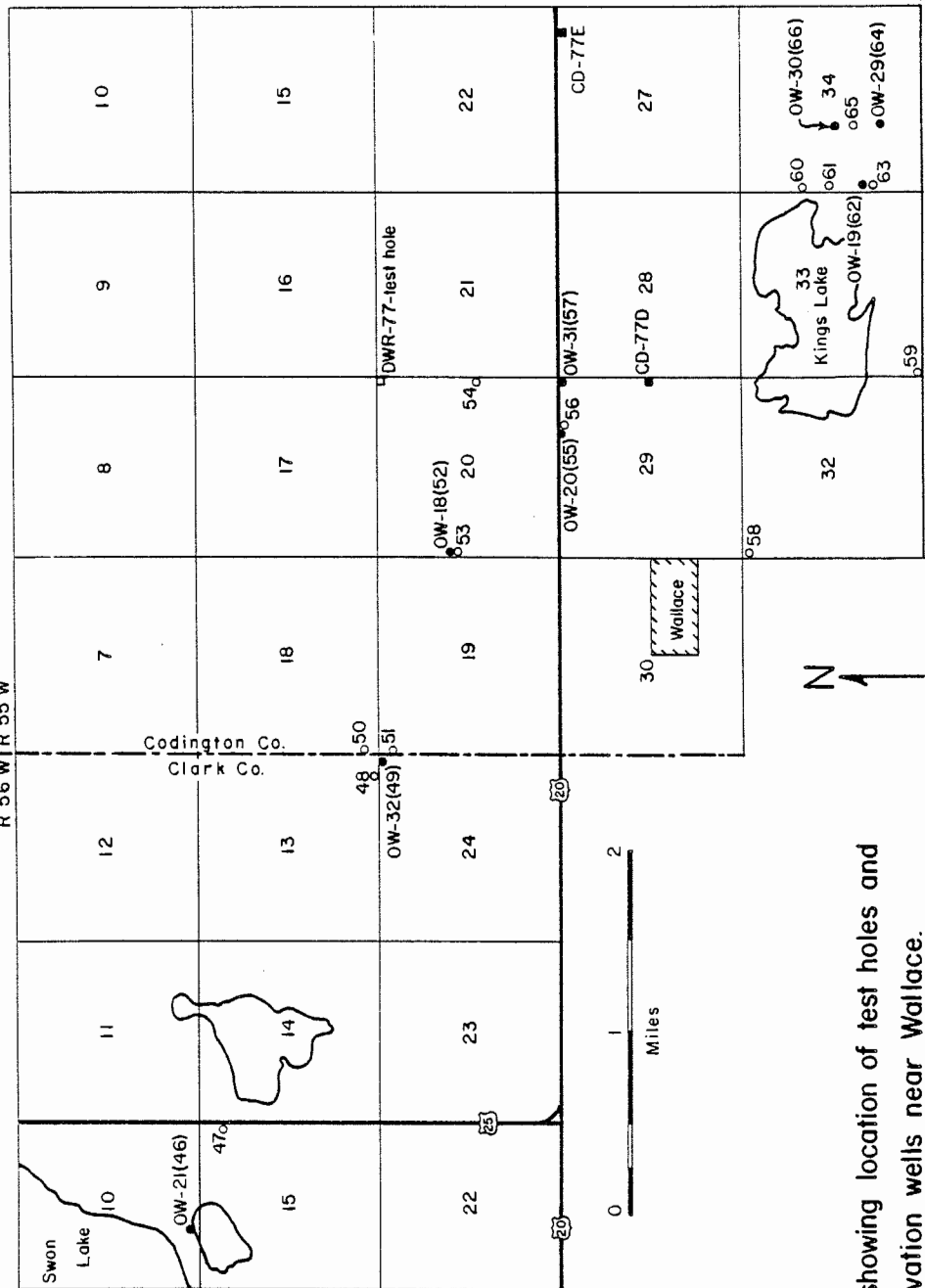
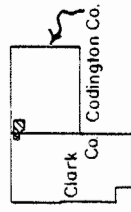


Figure 2

Map showing locations of SDGS test holes and observation wells south of Clark.

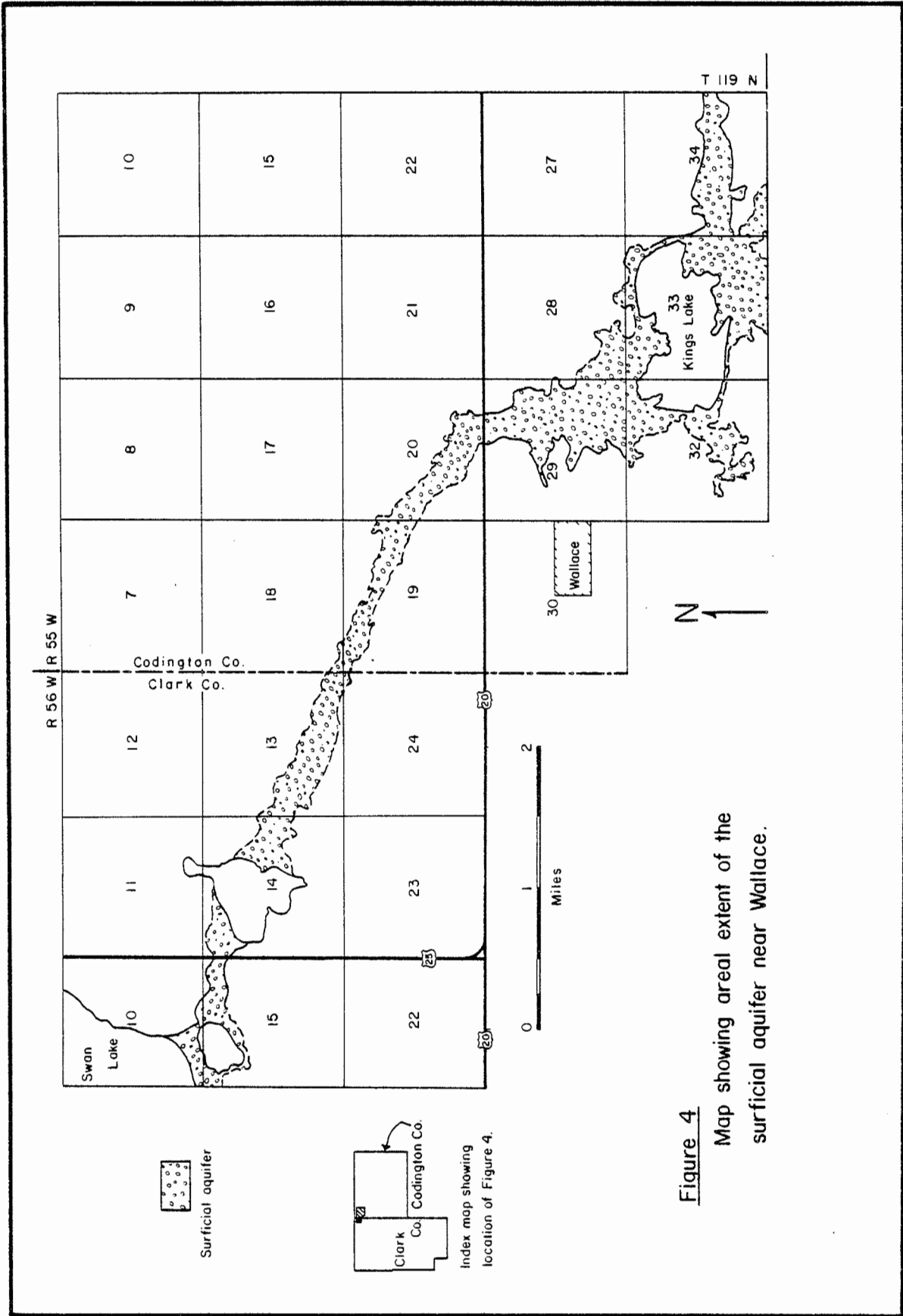


- Test hole, number indicates test hole number
- Test hole with observation well, number indicates obs. well number. Number in ( ) indicates test hole number.
- Division of Water Rights test hole.
- Division of Water Rights observation well, number indicates obs. well number.



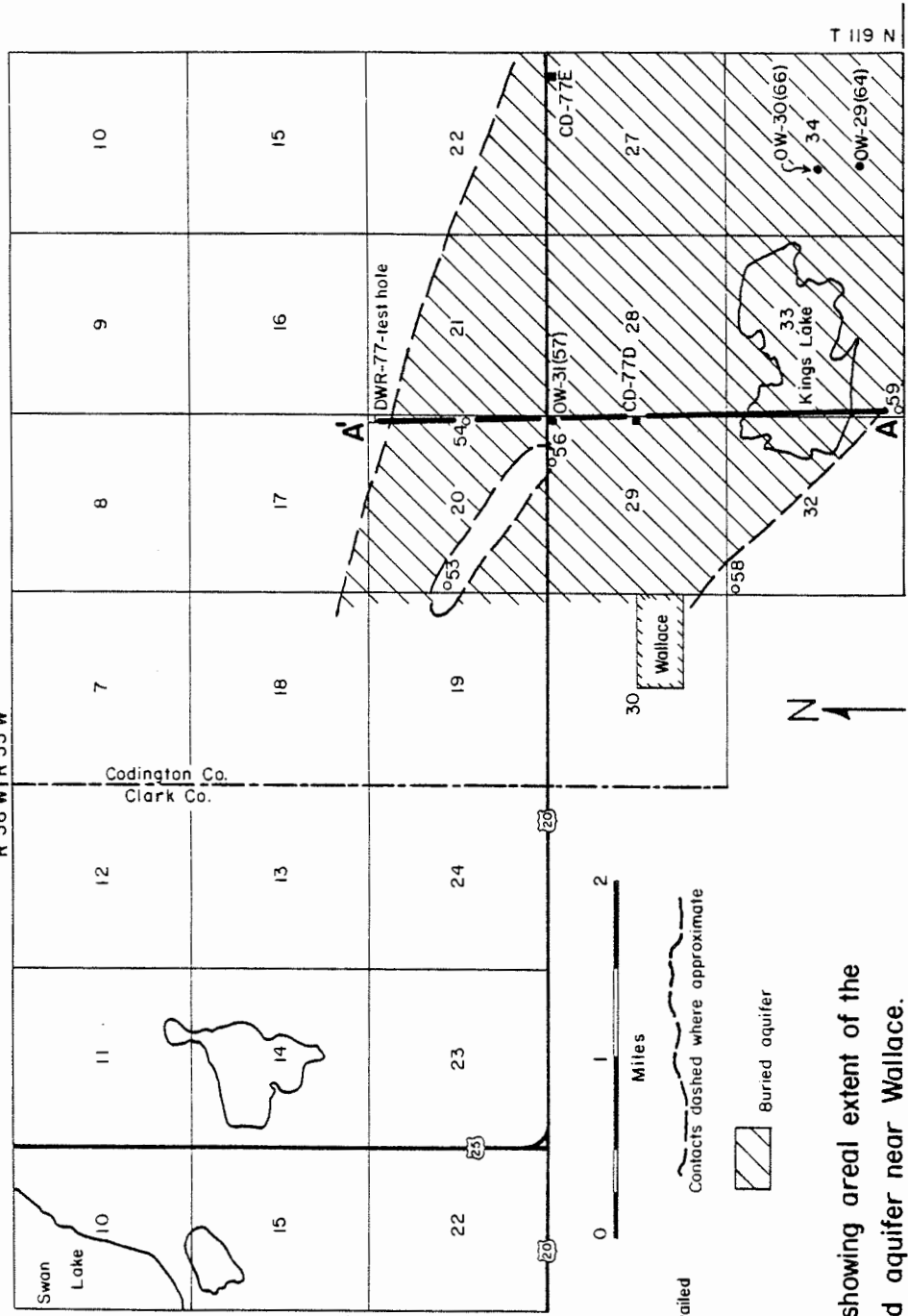
Index map showing location of Figure 3.

**Figure 3**  
Map showing location of test holes and observation wells near Wallace.

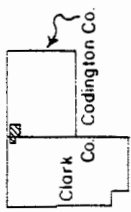


**Figure 4**

Map showing areal extent of the surficial aquifer near Wallace.



- o Test hole, number indicates test hole number.
- Test hole with observation well, number indicates obs. well number. Number in ( ) indicates test hole number.
- Division of Water Rights test hole.
- Division of Water Rights observation well, number indicates obs. well number.



Index map showing location of Figure 5.

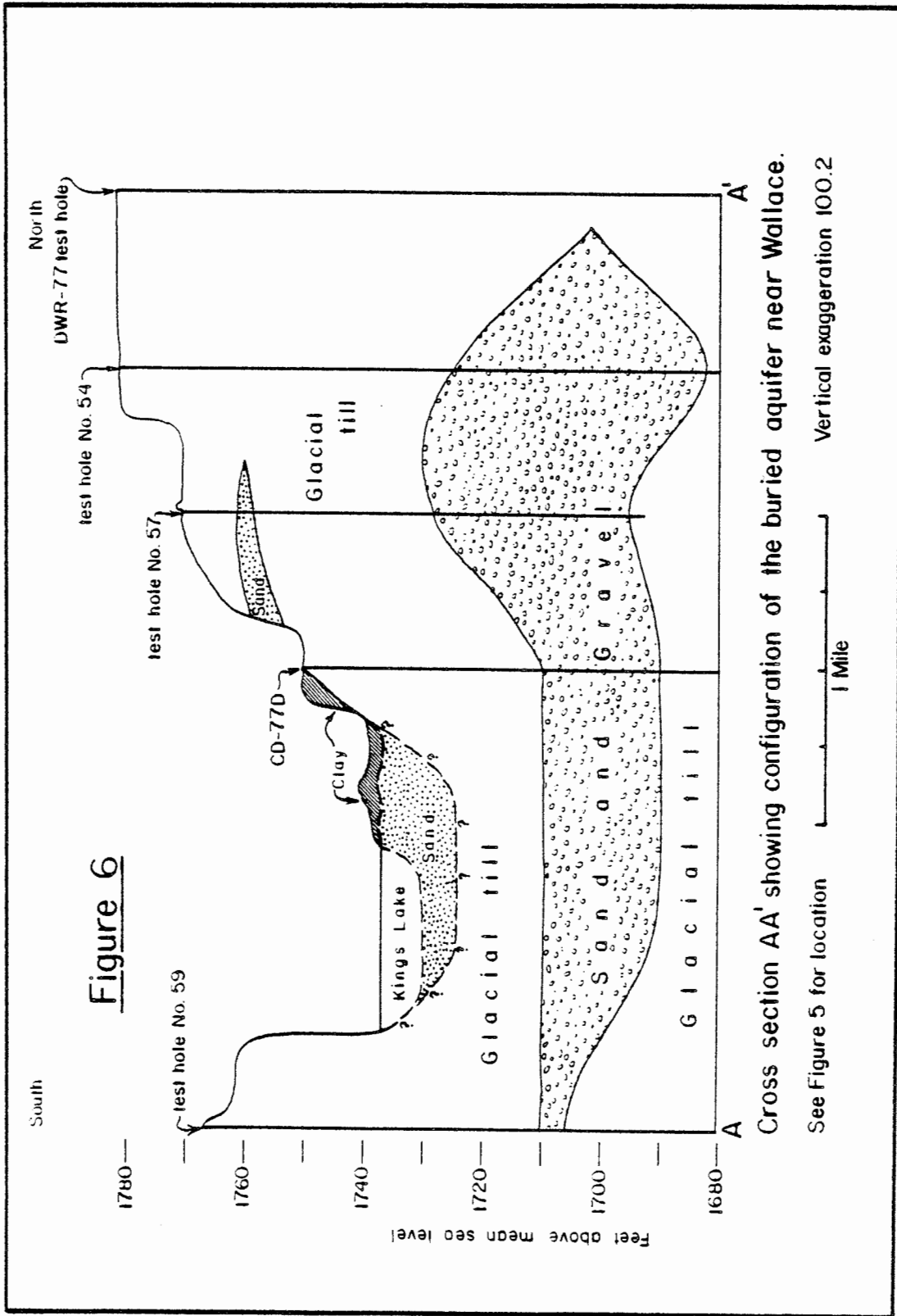


- Contact dashed where approximate
- ▨ Buried aquifer

— A — A' —  
 Cross section AA'. For detailed drawing see Figure 8.

**Figure 5**  
 Map showing areal extent of the buried aquifer near Wallace.





**Figure 6**

**Cross section AA' showing configuration of the buried aquifer near Wallace.**

See Figure 5 for location

1 Mile

Vertical exaggeration 100.2

17 from SDGS observation wells, two from the Water Rights Division observation wells, two from surface impoundments, and one from the Town of Florence. The results of the water analyses are also shown in the Appendix.

## RESULTS

### The Clark Area

The surficial aquifer (the Prairie Coteau Aquifer No. 1) ranges in saturated thickness from less than 2 feet to as much as 47 feet (fig. 7).

Antelope Lake serves as a discharge area for the surficial aquifer (fig. 8).

The ground water will require iron and manganese removal to meet drinking water standards. Values of iron range from 0.05 to 1.83 ppm. Manganese values range from 0.1 to 1.78 ppm.

Total hardness of the ground water usually is about 430 ppm (or about 25 grains).

### The Wallace Area

The surficial aquifer is a very narrow outwash of very coarse sand which has between 8 and 17 feet of saturated sand in the observed wells. It is noted, however, that many of the nearby gravel pits are dry.

Only minimal data was collected concerning the water quality of the surficial aquifer near Wallace. That information is summarized in the following table.

Range of total dissolved solids	520 to 952 ppm
Range of total hardness	376 to 667 ppm (22-39 grains)
Range of iron	.05 to .75 ppm
Range of manganese	.05 to 1.8 ppm

Wells near lakes often induce recharge as they are pumped. At Wallace, induced recharge from Kings Lake is not desirable because of its very high salinity (total dissolved solids exceeded 9,400 ppm).

The buried aquifer is a 2½ mile wide outwash of coarse sand and some gravel. Typical depths to the top of this artesian unit range from 45 to 60 feet (fig. 6).

The buried aquifer has ground water that is chemically distinct from that of the surficial aquifer. Average total dissolved solids in the sampled wells equaled 1,554 ppm with sulfates, repeatedly, being the major constituent.

Near the center of the aquifer a thickness of 43 feet was observed. Along the margins of the aquifer, however, the thickness thins to a featheredge.

## RECOMMENDATIONS

### The Clark Area

The Clark Rural Water System apparently has three prospects for its well field. One site is west of Antelope Lake, the second site is the area between SDGS observation wells 11 and 12, and the third site is the area near SDGS observation wells 22 and 27 (fig. 2).

Although each proposed site seems to have water supply potential the System could consider a multi-site concept. That is, have one or two moderate capacity wells (100-150 gpm) at each site with connections to a central water treatment plant. It is believed that this dispersion of the water demand may be advantageous, particularly during dry years, when nearby irri-

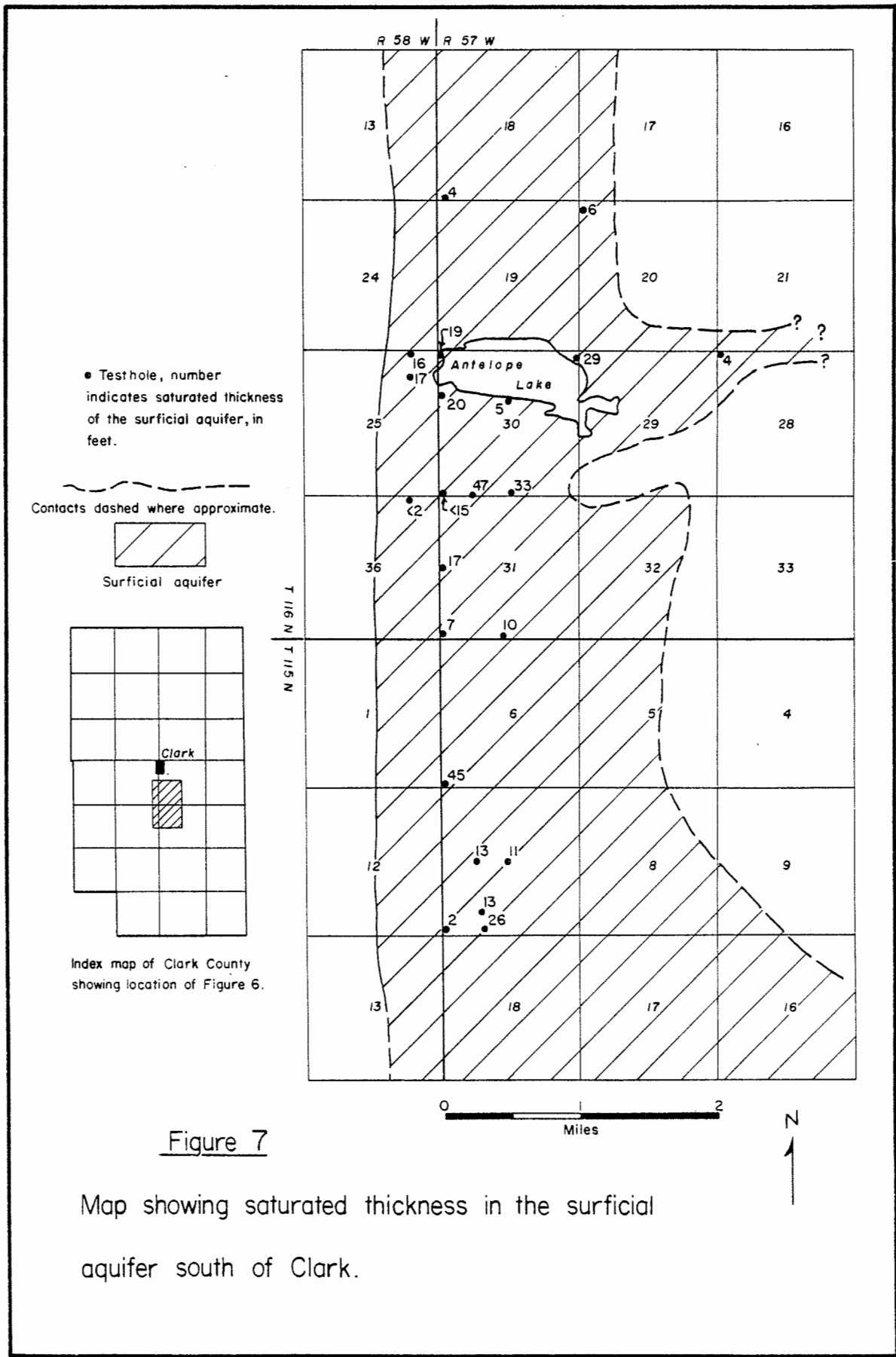
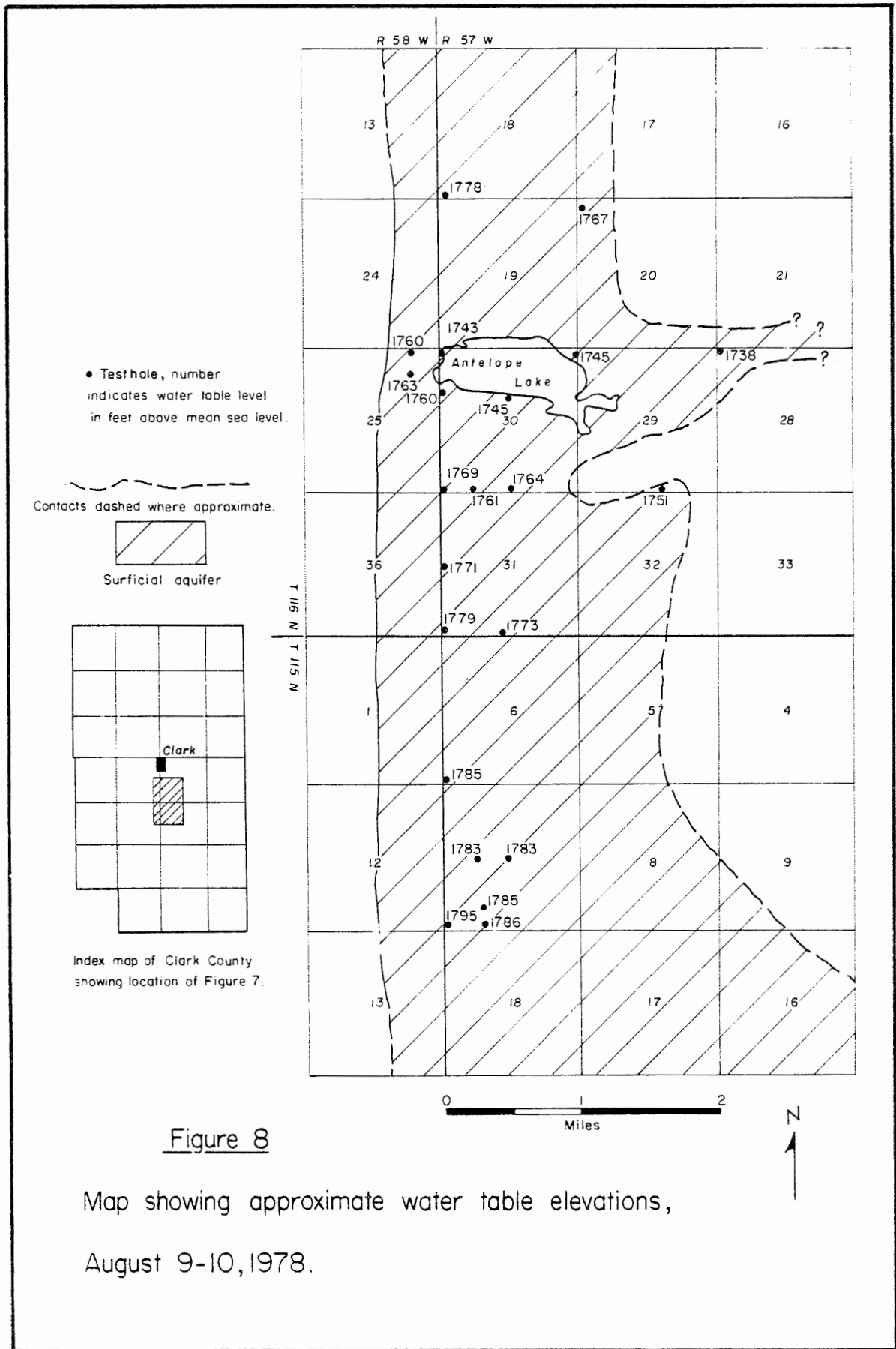


Figure 7

Map showing saturated thickness in the surficial aquifer south of Clark.



**Figure 8**

Map showing approximate water table elevations,  
August 9-10, 1978.

gators are also attempting to meet their water needs.

It is suggested that the Rural Water System continue to monitor and document water levels in the observation wells near its pumping wells.

#### The Wallace Area

If wells should be drilled in the Wallace area, it is recommended that they be developed in the surficial aquifer. Although the quantity of available ground water, in this unit, is limited, the quality is superior to that of the buried aquifer. Based upon the available data the most suitable place for wells is in the NW $\frac{1}{4}$  sec. 29, T. 119 N., R. 55 W., because the aquifer has its maximum width at this location.

In the surficial aquifer at Wallace, horizontal infiltration galleries are more suitable than the traditional vertical wells because the aquifer is thin. The alternative to a horizontal infiltration gallery is pumping water from the Rural Water treatment plant at Clark because its quality is better than that of the buried aquifer at Wallace.

Finally, if the System should plan to develop a water supply at Wallace, then more test drilling is advised. But before any production wells are constructed, the South Dakota Division of Water Rights should be contacted. Likewise, the biological and chemical suitability of the ground water should be approved by the proper authority.

## REFERENCES

- Barari, Assad, in preparation, Ground water investigation for the City of Clark: South Dakota Geological Survey, Special Report.
- Hamilton, L. J., 1978, Major aquifers in Clark County, South Dakota: South Dakota Geological Survey, Information Pamphlet No. 16.
- Schroeder, W., 1978, Sand and gravel resources in Clark County, South Dakota: South Dakota Geological Survey, Information Pamphlet No. 15.

APPENDIX A: TEST HOLE LOGS

(T) = Topographic map

Test Hole 1

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 24, T. 116 N., R. 58 W.

Date Drilled: July 28, 1978

Elevation: 1790 feet (T)

0- 1 Topsoil, brownish-black; sandy with silt  
1-10 Till, yellow-brown; clay matrix with an assortment of sand  
10-28 Till, medium gray; clay matrix with an assortment of sand and gravel

\* \* \* \*

Test Hole 2 (Observation Well 2)

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 18, T. 116 N., R. 57 W.

Date Drilled: July 20, 1978

Elevation: 1784 feet (T)

0- 4 Topsoil, yellow-brown; very sandy clay  
4-11 Sand, coarse to very coarse sand with some granules and gravel, angular sand grains  
11-33 Clay, medium gray; varve?, no sand to taste  
33-37 Till, medium gray

\* \* \* \*

Test Hole 3

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 18, T. 116 N., R. 57 W.

Date Drilled: July 20, 1978

Elevation: 1789 feet (T)

0- 5 Topsoil, yellow-brown; very dry; sandy  
5- 12 Sand, brown; medium to very coarse  
12- 34 Clay, medium gray, silty  
34-157 Till, medium gray; abundance of dark gray shale fragments

\* \* \* \*

Test Hole 4 (Observation Well 3)

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 20, T. 116 N., R. 57 W.

Date Drilled: July 20, 1978

Elevation: 1774 feet (T)

0- 13 Sand, yellow-brown; very fine to coarse; no gravel; thin veneer of topsoil  
13- 38 Clay, medium gray, upper foot was oxidized, no sand  
38- 57 Till, medium gray

\* \* \* \*



Test Hole 5

Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 19, T. 116 N., R. 57 W.

Date Drilled: July 28, 1978

Elevation: 1780 feet (T)

- 0- 17 Sand, predominantly medium and coarse sand,  
very little gravel
- 17- 28 Clay, medium dark gray; laminated

\* \* \* \*

Test Hole 6 (Observation Well 17)

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 25, T. 116 N., R. 58 W.

Date Drilled: July 27, 1978

Elevation: 1789 feet (T)

- 0- 1 Topsoil, brown; clay rich
- 1- 12 Clay, yellow-brown; sandy and resembles till
- 12- 36 Sand, brown; medium to coarse sand, some gravel
- 36- 45 Clay, gray; apparently not till
- 45- 88 Till, medium gray

\* \* \* \*

Test Hole 7 (Observation Well 1)

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 30, T. 116 N., R. 57 W.

Date Drilled: July 20, 1978

Elevation: 1756 feet (T)

- 0- 3 Topsoil, brown; sandy
- 3- 26 Sand, very coarse with some gravel, also medium  
and coarse sand
- 26- 48 Clay, gray; laminated lake clay
- 48- 57 Till, medium gray

\* \* \* \*

Test Hole 8 (Observation Well 4)

Location: SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 30, T. 116 N., R. 57 W.

Date Drilled: July 20, 1978

Elevation: 1755 feet (T)

- 0- 13 Sand, yellow-brown; very fine to medium
- 13- 34 Sand, gray; very fine to medium
- 34- 47 Clay, medium gray; no sand, resembles lake clay

\* \* \* \*

Test Hole 9 (Observation Well 5)

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 28, T. 116 N., R. 57 W.

Date Drilled: July 21, 1978

Elevation: 1745 feet (T)

- 0- 1 Topsoil, yellow-brown; sandy clay

Test Hole 9 -- continued.

- 1- 10 Sand, fine sand is predominant but some very fine sand is also present
- 10- 17 Clay, medium gray; upper foot was oxidized, no sand present, definitely not till

\* \* \* \*

Test Hole 10

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 25, T. 116 N., R. 58 W.  
Date Drilled: October 10, 1978  
Elevation: 1775 feet (T)

- 0- 1 Topsoil, brown; sandy
- 1- 4 Sand, brown; fine
- 4- 10 Till, yellow-brown; hit large rock

\* \* \* \*

Test Hole 11 (Observation Well 33)

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 25, T. 116 N., R. 58 W.  
Date Drilled: October 10, 1978  
Elevation: 1778 feet (T)

- 0- 2 Topsoil, black; sandy
- 2- 32 Sand, brown; medium to very coarse, also some gravel
- 32- 37 Clay, gray (lake clay?)

\* \* \* \*

Test Hole 12 (Observation Well 7)

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 30, T. 116 N., R. 57 W.  
Date Drilled: July 21, 1978  
Elevation: 1769 feet (T)

- 0- 1 Topsoil, black; very sandy
- 1- 48 Sand, medium to very coarse, with some granules and gravel
- 48- 58 Clay, medium gray

\* \* \* \*

Test Hole 13 (Observation Well 8)

Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 30, T. 116 N., R. 57 W.  
Date Drilled: July 24, 1978  
Elevation: 1750 feet (T)

- 0- 15 Sand, medium to very coarse, some granules and  $\frac{1}{4}$ -inch gravel
- 15- 24 Clay, medium dark gray; no sand or silt
- 24- 38 Till, medium gray; noted some yellow-brown (oxidized) till at top of this unit

\* \* \* \*

Test Hole 14

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 36, T. 116 N., R. 58 W.

Date Drilled: July 25, 1978

Elevation: 1795 feet (T)

- 0- 1 Topsoil, black; clay rich
- 1- 10 Alluvium, brownish-black; mixture dominantly of clay with silt and some very fine sand
- 10- 21 Alluvium, yellowish-brown; mixture dominantly of clay with silt and some very fine sand
- 21- 48 Till, bluish-green in upper 9 feet and then becomes medium gray

\* \* \* \*

Test Hole 15 (Observation Well 10)

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 36, T. 116 N., R. 58 W.

Date Drilled:

Elevation: 1788 feet (T)

- 0- 5 Clay, brown; hard, clay with sand
- 5- 15 Sand, yellow-brown; medium to very coarse sand with some gravel
- 15- 18 Till, yellow-brown

\* \* \* \*

Test Hole 16

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 25, T. 116 N., R. 58 W.

Date Drilled: July 25, 1978

Elevation: 1809 feet (T)

- 0- 6 Clay, yellow-brown; sandy
- 6- 53 Sand, coarse and very coarse, some granules and gravel
- 53- 63 Clay, medium dark gray; not till
- 63-147 Till, medium gray; some oxidized streaks at first in the clay matrix, the till becomes more gravelly below 103 feet

\* \* \* \*

Test Hole 17

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 30, T. 116 N., R. 57 W.

Date Drilled: July 25, 1978

Elevation: 1808 feet (T)

- 0- 5 Clay, yellow-brown; with some silt and sand
- 5- 20 Sand, very coarse, some granules and gravel, also minor amounts of fine and medium sand

\* \* \* \*

Test Hole 18

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 30, T. 116 N., R. 57 W.

Date Drilled: July 25, 1978

Elevation: 1808 feet (T)

0- 5	Clay, yellow-brown; clay rich with silt and sand
5- 44	Sand, brown; coarse and very coarse sand, with secondary amounts of granules and $\frac{1}{4}$ -inch gravel, trace of fine to medium sand
44- 50	Clay, medium dark clay; no sand (lake clay?)
50-105	Till, medium gray

\* \* \* \*

Test Hole 19 (Observation Well 9)

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 30, T. 116 N., R. 57 W.

Date Drilled: July 24, 1978

Elevation: 1808 feet (T)

0- 5	Clay, yellow-brown; with some silt and sand
5- 52	Sand, coarse to very coarse, granules and $\frac{1}{4}$ -inch gravel, trace of fine and medium sand
52- 58	Till, medium gray

\* \* \* \*

Test Hole 20 (Observation Well 11)

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 30, T. 116 N., R. 57 W.

Date Drilled: July 26, 1978

Elevation: 1783 feet (T)

0- 8	Clay, black; sandy and hard
8- 30	Sand, yellow-brown; medium to very coarse
30- 41	Sand, gray; medium to very coarse
41- 54	Sand, gray; very coarse, also granules with small gravel
54- 58	Clay, medium gray
58- 68	Till, medium gray

\* \* \* \*

Test Hole 21 (Observation Well 12)

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 30, T. 116 N., R. 57 W.

Date Drilled: July 26, 1978

Elevation: 1769 feet (T)

0- 3	Topsoil, black to brown; clay rich
3- 16	Sand, yellow-brown; medium to coarse
16- 37	Sand, gray; very coarse, with some small gravel
37- 41	Clay, medium gray; not till (probably lake clay)
41- 48	Till, medium dark gray

\* \* \* \*

Test Hole 22

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 31, T. 116 N., R. 57 W.

Date Drilled: July 26, 1978

Elevation: 1790 feet (T)

0- 1	Topsoil, yellow-brown clay
1- 8	Sand, yellow-brown, very fine with clay
8- 31	Clay, yellow-brown to 18 feet, then color changes to medium dark gray with iron stainings, slightly laminated (lake clay)
31- 48	Till, medium gray

\* \* \* \*

Test Hole 23

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 30, T. 116 N., R. 57 W.

Date Drilled: July 21, 1978

Elevation: 1770 feet (T)

0- 1	Topsoil, black; clay with some sand and silt
1- 24	Till, yellow-brown
24- 67	Till, medium gray

\* \* \* \*

Test Hole 24 (Observation Well 6)

Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 29, T. 116 N., R. 57 W.

Date Drilled: July 21, 1978

Elevation: 1760 feet (T)

0- 1	Topsoil, black; clayey, some silt and sand
1- 9	Clay, yellow-brown; silty
9- 12	Sand, brown; fine to medium without gravel
12- 18	Clay, medium gray; upper foot was yellow-brown (oxidized), not glacial till

\* \* \* \*

Test Hole 25 (Observation Well 13)

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 31, T. 116 N., R. 57 W.

Date Drilled: July 26, 1978

Elevation: 1803 feet (T)

0- 20	Sand, yellow-brown; medium to coarse
20- 48	Sand, yellow-brown, very coarse to very small gravel
48- 52	Sand, gray; very coarse with granules
52- 69	Clay, yellow-brown
69- 78	Till, medium gray

\* \* \* \*

Test Hole 26 (Observation Well 14)

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 31, T. 116 N., R. 57 W.

Date Drilled: July 26, 1978

Elevation: 1799 feet (T)

- 0- 25 Sand, yellow-brown; coarse, with some fine to medium grains, minor amounts of gravel
- 25- 38 Till, yellow oxidized zone to 33 feet, then medium gray

\* \* \* \*

Test Hole 27 (Observation Well 15)

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 31, T. 116 N., R. 57 W.

Date Drilled: July 26, 1978

Elevation: 1795 feet (T)

- 0- 1 Topsoil, brown, clay rich
- 1- 25 Sand, yellow-brown; medium to coarse sand, some fine and very coarse sand
- 25- 29 Sand, gray; medium to coarse sand, with some fine and very coarse sand
- 29- 38 Clay, gray; not glacial till, may be somewhat silty

\* \* \* \*

Test Hole 28

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 31, T. 116 N., R. 57 W.

Date Drilled: July 27, 1978

Elevation: 1790 feet (T)

- 0- 1 Topsoil, blackish-brown; slightly sandy
- 1- 12 Sand, coarse sand, some fine to medium grains, minor amounts of very coarse sand and granules
- 12- 39 Clay, medium dark gray; very finely laminated, differs from underlying glacial till
- 39- 48 Till, medium gray

\* \* \* \*

Test Hole 29

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 33, T. 116 N., R. 57 W.

Date Drilled: July 26, 1978

Elevation: 1803 feet (T)

- 0- 20 Clay, light yellowish-gray; sandy streak at 18 feet
- 20- 30 Clay, medium dark gray; not glacial till; no sand
- 30- 38 Till, medium gray

\* \* \* \*

Test Hole 30

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 6, T. 115 N., R. 57 W.

Date Drilled: July 27, 1978

Elevation: 1787 feet (T)

0- 1	Topsoil, black; very sandy
1- 22	Sand, brownish dark gray; coarse and very coarse, with some fine to medium grains; cuttings resemble those to the north rather than the large grains south of this location
22- 29	Clay, medium dark gray; slightly silty
29- 38	Till, gray

\* \* \* \*

Test Hole 31

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 1, T. 115 N., R. 58 W.

Date Drilled: July 27, 1978

Elevation: 1848 feet (T)

0- 3	Topsoil, black; clay with some sand
3- 24	Till, grayish-brown
24- 27	Till, medium gray

\* \* \* \*

Test Hole 32

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 1, T. 115 N., R. 58 W.

Date Drilled: July 27, 1978

Elevation: 1826 feet (T)

0- 41	Till, yellow-brown
41- 48	Till, medium gray

\* \* \* \*

Test Hole 33 (Observation Well 16)

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 6, T. 115 N., R. 57 W.

Date Drilled: July 27, 1978

Elevation: 1796 feet (T)

0- 3	Topsoil, black; clay rich with some sand
3- 6	Clay, yellow-brown; sandy
6- 52	Sand, very coarse, with granules, some gravel, trace of fine, medium and coarse sand (here the aquifer is coarser than we have seen it in the area south of Clark)
52- 58	Clay, medium dark gray; (do not believe this represents the till unit)

\* \* \* \*

Test Hole 34

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 7, T. 115 N., R. 57 W.

Date Drilled: July 27, 1978

Elevation: 1789 feet (T)

0- 6	Clay, black to brown; sandy
6- 20	Sand, brownish-gray; medium to coarse, with some fine sand, minor amounts of very coarse sand
20- 43	Sand, dark gray; fine to medium sand
43- 58	Till, medium gray

\* \* \* \*

Test Hole 35

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 7, T. 115 N., R. 57 W.

Date Drilled: August 31, 1978

Elevation: 1803 feet (T)

0- 1	Topsoil, black to brown; sandy clay
1- 28	Sand, brown; coarse to granules, some gravel, trace of fine to medium sand
28- 37	Till, medium gray; a lot of dark gray shale fragments

\* \* \* \*

Test Hole 36 (Observation Well 28)

Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 7, T. 115 N., R. 57 W.

Date Drilled: September 15, 1978

Elevation: 1794 feet (T)

0- 2	Clay, black; sandy
2- 23	Sand, brown; coarse to very coarse, with some gravel
23- 27	Clay, gray; no sand (lake clay)

\* \* \* \*

Test Hole 37 (Observation Well 26)

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 7, T. 115 N., R. 57 W.

Date Drilled: September 15, 1978

Elevation: 1794 feet (T)

0- 3	Clay, black; sandy, thin veneer of topsoil
3- 25	Sand, brown; coarse to very coarse, also gravel and some medium sand
25- 37	Clay, gray; soft

\* \* \* \*

Test Hole 38

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 7, T. 115 N., R. 57 W.

Date Drilled: September 15, 1978

Elevation: 1792 feet (T)

0- 4	Clay, black; sandy, veneer of topsoil
------	---------------------------------------



Test Hole 38 -- continued.

- 4- 34 Sand, brownish-gray; fine to medium, no gravel and only a trace of very coarse sand
- 34- 37 Till, medium gray; abundance of gray shale fragments

\* \* \* \*

Test Hole 39 (Observation Well 27)

Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 7, T. 115 N., R. 57 W.

Date Drilled: September 15, 1978

Elevation: 1792 feet (T)

- 0- 2 Clay, black; sandy
- 2- 20 Sand, brown; coarse sand, some very coarse sand and gravel
- 20- 27 Till, medium gray

\* \* \* \*

Test Hole 40 (Observation Well 23)

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 7, T. 115 N., R. 57 W.

Date Drilled: August 31, 1978

Elevation: 1805 feet (T)

- 0- 2 Clay, brownish-black; sandy
- 2- 12 Sand, brown; medium to coarse, with some granules
- 12- 17 Till, yellow-brown

\* \* \* \*

Test Hole 41 (Observation Well 22)

Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 7, T. 115 N., R. 57 W.

Date Drilled: August 31, 1978

Elevation: 1793 feet (T)

- 0- 7 Clay, light gray, with a thin veneer of topsoil
- 7- 33 Sand, brown; very coarse, grain size ranges down to fine sand, some gravel
- 33- 37 Till, medium dark gray; dark gray shale fragments

\* \* \* \*

Test Hole 42

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 7, T. 115 N., R. 57 W.

Date Drilled: August 31, 1978

Elevation: 1793 feet (T)

- 0- 7 Sand, brown; coarse to very coarse, trace of gravel
- 7- 22 Clay, medium gray; soft (lake clay)
- 22- 27 Till, medium dark gray; noted abundant fragments of dark gray shale

\* \* \* \*

Test Hole 43

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 18, T. 115 N., R. 57 W.

Date Drilled: August 31, 1978

Elevation: 1803 feet (T)

- 0- 2 Topsoil, black to brown; sandy clay
- 2- 14 Sand, brown; very coarse, also granules and  
¼ to ½ inch gravel, trace of fine and  
medium sand
- 14- 27 Till, yellow-brown changing to medium dark  
gray

\* \* \* \*

Test Hole 44

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 18, T. 115 N., R. 57 W.

Date Drilled: August 31, 1978

Elevation: 1802 feet (T)

- 0- 5 Topsoil, black to brown; sandy clay
- 5- 9 Sand, brown; coarse to very coarse, with trace  
of gravel
- 9- 27 Till, medium gray

\* \* \* \*

Test Hole 45

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 18, T. 115 N., R. 57 W.

Date Drilled: August 31, 1978

Elevation: 1793 feet (T)

- 0- 1 Topsoil, black; clayey
- 1- 3 Clay, light gray; soft
- 3- 7 Sand, brown; medium to very coarse
- 7- 19 Clay, gray; very soft (lake clay?)
- 19- 27 Till, gray

\* \* \* \*

Test Hole 46 (Observation Well 21)

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 10, T. 119 N., R. 56 W.

Date Drilled: August 30, 1978

Elevation: 1760 feet (T)

- 0- 25 Sand, brown; very coarse, with gravel
- 25- 37 Till, medium dark gray

\* \* \* \*

Test Hole 47

Location: SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 15, T. 119 N., R. 56 W.

Date Drilled: August 30, 1978

Elevation: 1778 feet (T)

Test Hole 47 -- continued.

0- 5 Clay, black; compact  
5- 17 Sand, brown; medium to coarse, with gravel  
17- 57 Till, medium dark gray

\* \* \* \*

Test Hole 48

Location: SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 13, T. 119 N., R. 56 W.  
Date Drilled: October 6, 1978  
Elevation: 1750 feet (T)

0- 1 Topsoil, black  
1- 12 Sand, very coarse, poorly sorted  
12- 64 Till, medium gray clay matrix  
64- 76 Sand, coarse to very coarse  
76- 87 Till, medium gray clay matrix

\* \* \* \*

Test Hole 49 (Observation Well 32)

Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 24, T. 119 N., R. 56 W.  
Date Drilled: October 6, 1978  
Elevation: 1759 feet (T)

0- 25 Sand, brown; very coarse, some medium to coarse  
sand, minor amounts of gravel  
25- 27 Till, medium gray clay matrix

\* \* \* \*

Test Hole 50

Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 18, T. 119 N., R. 56 W.  
Date Drilled: October 6, 1978  
Elevation: 1800 feet (T)

0- 1 Topsoil, black  
1- 18 Sand, brown; coarse to very coarse, with some  
small gravel  
18- 38 Till, medium gray

\* \* \* \*

Test Hole 51

Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 19, T. 119 N., R. 55 W.  
Date Drilled: October 6, 1978  
Elevation: 1763 feet (T)

0- 5 Clay, yellow-brown; very silty  
5- 14 Sand, brown; coarse to very coarse, with some  
gravel  
14- 16 Till, yellow-brown  
16- 57 Till, medium gray

\* \* \* \*

Test Hole 52 (Observation Well 18)

Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 20, T. 119 N., R. 55 W.

Date Drilled: August 29, 1978

Elevation: 1750 feet (T)

0- 17 Sand, brown; medium to coarse, with some gravel

\* \* \* \*

Test Hole 53

Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 20, T. 119 N., R. 55 W.

Date Drilled: August 20, 1978

Elevation: 1750 feet (T)

0- 21 Sand, brown; medium to coarse, with some gravel  
21-147 Till, medium gray

\* \* \* \*

Test Hole 54

Location: SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 20, T. 119 N., R. 55 W.

Date Drilled: October 5, 1978

Elevation: 1783 feet (T)

0- 2 Topsoil, black  
2- 25 Till, yellow-brown  
25- 56 Till, medium gray  
56- 99 Gravel, brown; very coarse, with gravel up to  
 $\frac{1}{4}$  inch  
99-107 Till, medium gray

\* \* \* \*

Test Hole 55 (Observation Well 20)

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 29, T. 119 N., R. 55 W.

Date Drilled: August 30, 1978

Elevation: 1750 feet (T)

0- 5 Clay, black to brown (alluvium?)  
5- 15 Sand, brown; medium to coarse, with some gravel,  
granules, and very coarse sand grains  
15- 17 Till, yellow-brown

\* \* \* \*

Test Hole 56

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 29, T. 119 N., R. 55 W.

Date Drilled: October 4, 1978

Elevation: 1750 feet (T)

0- 1 Topsoil, black  
1- 9 Clay, yellow-brown; sandy

Test Hole 56 -- continued.

9- 29 Sand, brown; coarse to very coarse, with some  
gravel  
29- 77 Till, medium gray

\* \* \* \*

Test Hole 57 (Observation Well 31)

Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 29, T. 119 N., R. 55 W.

Date Drilled: October 4 - 5, 1978

Elevation: 1768 feet (T)

0- 1 Topsoil, black  
1- 9 Clay, yellow-brown; very sandy  
9- 12 Sand, yellow-brown; coarse to very coarse  
12- 15 Till, yellow-brown  
15- 42 Till, gray; clay matrix with an assortment of  
sand grains  
42- 75 Sand, gray; very coarse with gravel  
75- 77 Till, medium gray; clay matrix with silt and sand

\* \* \* \*

Test Hole 58

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 32, T. 119 N., R. 55 W.

Date Drilled: October 5, 1978

Elevation: 1773 feet (T)

0- 1 Topsoil, black  
1- 17 Till, yellow-brown  
17- 35 Till, medium gray  
35- 40 Sand, brown; very coarse to gravel  
40- 67 Till, medium gray

\* \* \* \*

Test Hole 59

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 33, T. 119 N., R. 55 W.

Date Drilled: October 5, 1978

Elevation: 1767 feet (T)

0- 1 Topsoil, black  
1- 17 Till, yellow-brown  
17- 57 Till, medium gray  
57- 61 Sand, coarse to very coarse, with some gravel  
61- 87 Till, medium gray

\* \* \* \*

Test Hole 60

Location: SW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 34, T. 119 N., R. 55 W.

Date Drilled: August 29, 1978

Elevation: 1744 feet (T)

0- 18 Till, light yellow-brown

\* \* \* \*

Test Hole 61

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 34, T. 119 N., R. 55 W.

Date Drilled: August 29, 1978

Elevation: 1749 feet (T)

0- 18 Sand, brown; medium to coarse, secondary amounts  
of fine and very coarse sand, trace of  
gravel

18- 27 Till, medium gray with faint bluish cast

\* \* \* \*

Test Hole 62 (Observation Well 19)

Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 34, T. 119 N., R. 55 W.

Date Drilled: August 30, 1978

Elevation: 1747 feet (T)

0- 8 Clay, black to yellow-brown; compact

8- 22 Sand, brown; very coarse, with  $\frac{1}{4}$ -inch gravel,  
also granules and coarse sand, minor amounts  
of fine and medium sand

22- 37 Till, medium dark gray with some oxidized clay  
at first

\* \* \* \*

Test Hole 63

Location: NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 34, T. 119 N., R. 55 W.

Date Drilled: August 30, 1978

Elevation: 1750 feet (T)

0- 1 Topsoil, black; clayey

1- 4 Clay, yellow-brown; sandy

4- 10 Sand, brown; medium to very coarse

10- 14 Till, yellow-brown

14- 17 Till, medium dark gray

\* \* \* \*

Test Hole 64 (Observation Well 29)

Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 34, T. 119 N., R. 55 W.

Date Drilled: October 3, 1978

Elevation: 1754 feet (T)

0- 5 Clay, light brown; very silty

Test Hole 64 -- continued.

5- 11	Sand, brown; very coarse to coarse, poorly sorted
11- 35	Till, medium gray
35- 70	Sand, gray; medium to coarse
70- 77	Till, medium gray

\* \* \* \*

Test Hole 65

Location: NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 34, T. 119 N., R. 55 W.  
Date Drilled: October 3, 1978  
Elevation: 1747 feet (T)

0- 6	Clay, light to medium olive gray
6- 17	Sand, brown; very coarse to coarse
17- 30	Till, medium gray
30- 70	Sand, gray; coarse to very coarse
70- 77	Till, medium gray

\* \* \* \*

Test Hole 66 (Observation Well 30)

Location: NE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 34, T. 119 N., R. 55 W.  
Date Drilled: October 4, 1978  
Elevation: 1748 feet (T)

0- 2	Topsoil, black
2- 7	Clay, light brown
7- 10	Gravel, brown; small gravel up to 3/8 inch with coarse and very coarse sand
10- 25	Till, medium gray
25- 41	Sand, gray; medium to very coarse, minor amounts of gravel
41- 57	Clay, medium dark gray; soft and silty with numerous sand lenses

\* \* \* \*

Test Hole 67

Location: SE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 18, T. 118 N., R. 55 W.  
Date Drilled: September 14, 1978  
Elevation: 1785 feet (T)

0- 2	Topsoil, brown; clayey
2- 11	Till, yellow-brown
11- 28	Till, medium dark gray

\* \* \* \*

Test Hole 68

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$  sec. 20, T. 118 N., R. 55 W.

Date Drilled: September 14, 1978

Elevation: 1814 feet (T)

0- 2 Topsoil, black; clayey  
2- 48 Till, yellow-brown  
48- 57 Till, medium dark gray

\* \* \* \*

Test Hole 69 (Observation Well 25)

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 20, T. 118 N., R. 55 W.

Date Drilled: September 14, 1978

Elevation: 1797 feet (T)

0- 1 Topsoil, black; sandy clay  
1- 19 Sand, brown; very coarse, some fine, medium, and  
coarse sand, minor amounts of granules and  
small gravel  
19- 27 Till, yellow-brown

\* \* \* \*

Test Hole 70

Location: SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$  sec. 21, T. 118 N., R. 55 W.

Date Drilled: September 14, 1978

Elevation: 1789 feet (T)

0- 1 Topsoil, black; sandy  
1- 8 Sand, brown; coarse sand, some medium and very  
coarse sand  
8- 14 Till, yellow-brown  
14- 17 Till, medium gray

\* \* \* \*

Test Hole 71 (Observation Well 24)

Location: SE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$  sec. 30, T. 118 N., R. 55 W.

Date Drilled: September 14, 1978

Elevation: 1800 feet (T)

0- 1 Clay, black to yellow-brown  
1- 14 Sand, brown; fine to coarse in the upper 3 feet,  
then becomes very coarse sand with gravel  
14- 17 Till, gray

\* \* \* \*

Test Hole 72

Location: NE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$  sec. 30, T. 118 N., R. 55 W.

Date Drilled: September 14, 1978

Elevation: 1795 feet (T)

0- 1 Topsoil, black; clayey



Test Hole 72 -- continued.

1- 24	Till, yellow-brown
24- 37	Till, gray

\* \* \* \*

APPENDIX B: WATER QUALITY IN THE CLARK AREA

SD Geological Survey observation wells south of Clark

Well Iden.	Parts Per Million											Conductivity	Hardness as CaCO <sub>3</sub>
	Calcium	Sodium	Magnesium	Iron	Manganese	Chloride	Fluoride	Nitrate Nitrogen	Sulfate	Total Dissolved Solids			
A	---	---	---	0.3*	0.05*	250*	1.4- 2.4**	10**	250*	500*	---	---	
1	117	10	31	0.05	0.1	1	---	0.5	275	472	720	419	
1	112	10	32	0.09	3.3	11	0.21	0.7	175	560	745	410	
11	115	9	52	0.75	1.52	2	---	0.6	220	548	840	500	
11	99	9	48	1.14	1.59	8	0.21	0.8	140	600	810	443	
12***	77	11	21	0.32	0.78	15	---	-0.5	17	284	520	278	
12***	68	9	19	-0.05	0.70	10	0.31	0.5	25	320	480	247	
16	135	72	44	0.05	0.39	53	---	-0.5	300	744	980	517	
16	130	33	41	0.30	0.5	10	0.23	1.2	260	725	930	492	
22***	70	63	25	-0.05	1.32	49	0.42	-0.5	100	548	800	277	

27	63	5	17	1.53	1.75	2	0.16	-0.5	-25	240	460	226
33	113	21	42	1.83	1.78	6	0.14	-0.5	210	588	840	454

Sample A:

\*Proposed National Secondary Drinking Water Regulations, March 31, 1977  
(recommended limits).

\*\*National Interim Primary Drinking Water Regulations, December 24, 1975  
(enforceable limits).

-Less than.

\*\*Turbid water sample before filtering and seems to possess anomalously low calcium, magnesium, iron and sulfate values associated with increased chlorides.

APPENDIX B -- continued.

Well Inventory south of Clark

Well Iden.	Parts Per Million										Total Dissolved Solids	Conductivity	Hardness as CaCO <sub>3</sub>
	Calcium	Sodium	Magnesium	Iron	Manganese	Chloride	Fluoride	Nitrate Nitrogen	Sulfate				
A	---	---	---	0.3*	0.05*	250*	1.4- 2.4**	10**	250*	500*	---	---	---
Antelope Lake	90	15	50	-0.05	0.1	2	---	-0.5	180	504	790	430	
Seefeldt Irrigation	92	7	32	1.27	0.28	3	---	1.4	100	392	660	361	
Domestic Well 116-57-31cccc	86	0	32	-0.05	-0.05	2	---	11.4	45	336	580	346	
Domestic Well 116-57-19aaad	102	123	42	2.05	0.72	44	---	0.8	215	700	1140	427	
Gravel Pit 115-57-18 cacc	33	1	34	0.90	0.50	1	---	0.6	1	168	390	222	

Sample A:

\*Proposed National Secondary Drinking Water Regulations, March 31, 1977  
(recommended limits).

\*\*National Interim Primary Drinking Water Regulations, December 24, 1975  
(enforceable limits).

-Less than.

APPENDIX C: WATER QUALITY DATA IN THE WALLACE AREA

SD Geological Survey observation wells in surficial aquifer at Wallace

Well Iden.	Parts Per Million											Hardness as CaCO <sub>3</sub>
	Calcium	Sodium	Magnesium	Iron	Manganese	Chloride	Fluoride	Nitrate Nitrogen	Sulfate	Total Dissolved Solids	Conductivity	
A	---	---	---	0.3*	0.05*	250*	1.4- 2.4**	10**	250*	500*	---	---
18	104	17	44	0.37	1.65	8	0.21	2.0	185	605	810	440
20	95	15	34	-0.05	0.60	---	0.36	---	125	520	710	376
32	153	21	72	-0.05	1.75	12	0.13	2.6	360	952	1140	667

Sample A:

\*Proposed National Secondary Drinking Water Regulations, March 31, 1977  
(recommended limits).

\*\*National Interim Primary Drinking Water Regulations, December 24, 1975  
(enforceable limits).

-Less than.

APPENDIX C -- continued.

South Dakota Geological Survey and Water Rights observation wells  
in buried aquifer at Wallace

Well Iden.	Parts Per Million											Hardness as CaCO <sub>3</sub>
	Calcium	Sodium	Magnesium	Iron	Manganese	Chloride	Fluoride	Nitrate Nitrogen	Sulfate	Total Dissolved Solids	Conductivity	
A	---	---	---	0.3*	0.05*	250*	1.4- 2.4**	10**	250*	500*	---	---
29	300	83	80	-0.05	1.65	10	0.26	-0.5	810	1656	1800	1076
30	280	78	80	-0.05	2.14	9	0.25	-0.5	800	1548	1710	1026
31	293	72	120	0.25	2.95	10	0.41	-0.5	920	1860	1910	1223
CD-77E	202	61	147	0.20	2.3	7	0.3	-0.5	890	1660	1800	1107
CD-77D	177	41	60	0.61	1.86	12	0.35	0.5	500	1090	1260	687
City of Florence	248	103	78	2.25	1.4	8	0.35	-0.5	790	1510	1730	938

Sample A:

\*Proposed National Secondary Drinking Water Regulations, March 31, 1977  
(recommended limits).

\*\*National Interim Primary Drinking Water Regulations, December 24, 1975  
(enforceable limits).

-Less than.

APPENDIX C -- continued.

The well inventory at Wallace

Owner	Parts Per Million											Total Dissolved Solids	Conductivity	Hardness as CaCO <sub>3</sub>
	Calcium	Sodium	Magnesium	Iron	Manganese	Chloride	Fluoride	Nitrate Nitrogen	Sulfate					
A	---	---	---	0.3*	0.05*	250*	1.4- 2.4**	10**	250*	500*	---	---	---	---
Brekke	155	23	67	0.75	-0.05	10	0.28	10	350	770	1100	661	661	
Sonstebo	413	65	163	0.37	2.4	30	0.37	8.5	1320	2250	2400	1698	1698	
Wasland, A.	295	35	73	0.05	2.5	12	0.28	0.5	765	1250	1540	1035	1035	
Hasin	334	56	145	-0.05	0.3	47	0.56	4.5	1190	1930	2100	1428	1428	
Wasland, T.	391	47	94	0.05	0.7	18	0.38	1.0	920	1500	1770	1360	1360	
Wibeto	234	137	87	-0.05	0.48	15	0.31	2.5	835	1630	1790	940	940	
Johnson	423	79	250	0.25	0.76	81	0.45	55	1280	3150	3000	2081	2081	
Brufat	182	225	86	-0.05	0.21	40	0.29	1.0	1005	1750	1975	807	807	
Maag	282	33	65	0.07	2.07	8	0.29	0.5	640	1220	1380	969	969	
Berg	192	62	80	0.10	0.60	11	0.66	0.5	660	1220	1330	807	807	
Faen	690	100	375	1.28	0.09	210	0.29	65	1740	4620	4400	3259	3259	

The well inventory at Wallace -- continued.

Owner	Parts Per Million											Total Dissolved Solids	Conductivity	Hardness as CaCO <sub>3</sub>
	Calcium	Sodium	Magnesium	Iron	Manganese	Chloride	Fluoride	Nitrate Nitrogen	Sulfate	Total	Dissolved			
Gulbraa	278	112	88	4.1	0.62	6	0.45	1.0	1035	1710	1830	1054		
Hallaver	372	237	195	18.8	1.59	10	0.42	0.5	1810	3120	3000	1728		
Hagen	332	70	136	0.06	0.54	20	0.40	17	1090	2040	2100	1386		
Sakariason	215	21	51	0.62	2.65	2	----	--0.5	500	904	1220	745		

Sample A:

\*Proposed National Secondary Drinking Water Regulations, March 31, 1977  
(recommended limits).

\*\*National Interim Primary Drinking Water Regulations, December 24, 1975  
(enforceable limits).

-Less than.



APPENDIX D: LOCATIONS OF WATER SAMPLING POINTS

From the well inventory near Wallace

<u>Well Owner</u>	<u>Township (N)-Range (W)-Section</u>	<u>Approximate Depth in feet</u>
Berg	119-55-15 cccd	180
Brekke	119-55-29 dbbd	18
Brufplat	119-55-30 dccb	400
Faen	119-56-25 cccb	45-50
Gulbraa	119-55-21 abdb	160
Hagen	119-55-18 dadd	74
Hallaver	119-55-32 dcdb	325
Hasin	119-56-35 ddcc	30
Johnson	119-56-24 aacd	50
Maag	119-56-25 dbca	107
Sakariason	119-56-14 cbda	90
Sonstebo	119-55-30 acda	80
Wasland, A.	118-55- 6 adaa	185
Wasland, T.	119-56-33 dddb	300
Wibeto	119-55-31 adba	400

From other wells in Wallace area

Water Rights (CD-77E)	119-55-27 aabb	80
Water Rights (CD-77D)	119-55-29 daaa	80
City of Florence	118-54- 4 bccc	120

Locations of water sampling points -- continued

<u>Well Owner</u>	<u>Township (N)-Range (W)-Section</u>	<u>Approximate Depth in feet</u>
From the well inventory south of Clark		
Antelope Lake	116-57-30 bbc	---
Seefeldt Irrigation	116-57-30 bccb	52
Domestic Well	116-57-31 cccc	35
Domestic Well	116-57-19 aaad	80
Gravel Pit	115-57-18 cacc	---

## APPENDIX D -- CONTINUED.

## Summary of SD Geological Survey observation well locations

<u>Well Number</u>	<u>Township (N)-Range (W)-Section</u>	<u>Approximate Depth in feet</u>
1	116-57-30 bbbb	26
2	116-57-18 cccc	13
3	116-57-20 bbbb	17
4	116-57-30 aaad	25
5	116-57-28 bbbb	13
6	116-57-29 dccd	20
7	116-57-30 bcbb	27
8	116-57-30 bdaa	20
9	116-57-30 cccc	40
10	116-58-36 aabb	17
11	116-57-30 ccdd	40
12	116-57-30 cddd	40
13	116-57-31 bccc	40
14	116-57-31 cccc	20
15	116-57-31 cddd	30
16	115-57- 6 cccc	40
17	116-58-25 aabb	38
18	119-55-20 bccb	18
19	119-55-34 cbc b	37
20	119-55-29 aabb	19
21	119-56-10 cddd	35
22	115-57- 7 cdcd	40
23	115-57- 7 cccc	19
24	118-55-30 aadd	19

Summary of observation well locations -- continued.

<u>Well Number</u>	<u>Township (N)-Range (W)-Section</u>	<u>Approximate Depth in feet</u>
25	118-55-20 dddd	19
26	115-57- 7 dbbb	25
27	115-57- 7 cdbc	20
28	115-57- 7 cbaa	20
29	119-55-34 cdba	60
30	119-55-34 caba	40
31	119-55-29 aaaa	60
32	119-56-24 aaaa	20
33	116-58-25 aacc	30