

STATE OF SOUTH DAKOTA
Richard Kneip, Governor

DEPARTMENT OF NATURAL RESOURCE DEVELOPMENT
Vern W. Butler, Secretary

GEOLOGICAL SURVEY
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Open-File Report No. 15-UR

GROUND-WATER STUDY FOR THE
CITY OF GREGORY

by

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GROUND-WATER STUDY FOR THE CITY OF GREGORY

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This report contains the results of a special ground-water investigation conducted by the South Dakota Geological Survey east of the City of Gregory in Gregory County, South Dakota. The project was financed by the South Dakota Geological Survey, the West River Conservancy Sub-District, and the City of Gregory.

Field work was conducted from April 22 to June 17, 1977, and involved: (1) a review of the geology of the area as mapped by the South Dakota Geological Survey (R. E. Stevenson, 1956-57), (2) a review of Special Report 49 (A. Barari, 1969), (3) the drilling of 29 rotary holes and 34 auger holes (see app. A), and (4) the collection and analysis of 10 water samples. Results of the chemical analysis of the water samples can be found in table 1 and figure 1 shows the recommended areas. The location of test holes and water samples are plotted on figure 2 and figure 3 shows the thickness of saturated sand.

At present the City obtains its water supply from 13 wells within the City limits and 7 wells in the southwest 1/4 of sec. 16, T. 97 N., R. 72 W. Combined production from these wells is 300 gallons per minute (personal communication, Robert Smutny). The present investigation was undertaken to locate a source of ground water to augment the present water supply.

Quality of the water in the study area is good, as evidenced by the relatively low value for total dissolved solids, however, the nitrate level varies. Samples W-1, W-5, and W-7 exceed the recommended limits of 10 ppm (table 1) as set by the U.S. Department of Health.

Based on grain size, clay content, areal extent, and thickness of saturated sand, three areas have been outlined for further testing by the City of Gregory. These recommended areas are labeled A, B, and C on figure 1 in accordance with their relative potential as a source for future water supplies.

Another potential area was found in the southwest 1/4 of sec. 23, T. 97 N., R. 72 W. It was not recommended because of the presently high nitrate levels as shown by the chemical analysis of Samples W-1 and W-5 (table 1).

The necessity for additional test holes in the recommended areas is apparent from the rapid change in sand thickness. In addition, farming activities in the recommended areas prevented any additional drilling during the survey.

Before additional testing is undertaken, the City should hire a consulting engineer licensed in South Dakota. The engineer would plan and coordinate any additional testing. On the basis of the engineer's recommendation a commercial well drilling company should be engaged to drill additional test holes. This would allow locating the best site within areas A, B, or C for the installation of a test well. The test well would be used to determine quality of the water, yield, drawdown, and recovery data. Water samples should be collected and analyzed specifically for nitrate content. Based on the results of the pump test, an adequate distance between the future wells can be determined. The pump test should be conducted by a hydrologist or a qualified engineer and run for a minimum of 72 hours.

Before a permanent well is drilled, the City officials should contact the Division of Water Rights, Department of

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

The report was written by Carl Cripe and Assad Barari, September 1977.

TABLE 1. - Chemical analysis of water from the Gregory area

Sample	Calcium	Sodium	Magnesium	Chloride	Sulfate	Hydrogen	Manganese	Nitrogen	Fluoride	pH	Parts per million	
											Hardness	CaCO_3
A	--	--	50	250	500 ¹	0.3	0.0051	10.0	0.92	--	--	1000 ¹
W 1	70	30	30	35	<25	<0.1	<0.05	37	--	--	298	640
W 2	35	33	28	<5	<25	<0.1	<0.05	5	--	--	202	430
W 3	40	23	15	<11	<25	<0.1	<0.05	2.2	--	--	161	340
W 4	40	28	15	<22	<25	<0.1	<0.05	4.2	--	--	161	430
W 5	35	41	23	<13	<25	<0.1	<0.05	17.5	--	--	181	516
W 6	40	18	10	<2	<25	<0.1	<0.05	7	--	--	140	340
W 7	65	33	22	17	<25	<0.1	<0.05	18	--	--	252	530
W 8	30	10	13	<2	<25	<0.1	<0.05	2.6	--	--	128	260
W 9	34	10	12	<5	<25	<0.1	<0.05	3.5	--	--	134	360
W10	29	18	18	<5	<25	<0.1	<0.05	5.8	--	--	146	400

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

¹Modified for South Dakota by the Department of Health (written communication, Water Sanitation Section, September 24, 1968).

21.2 is optimum for South Dakota.

Location of Water Samples
(for map location, see fig. 2)

- W 1. SW SW SE SW sec. 23, T. 97 N., R. 72 W., Gus Callender stock well.
- W 2. NE NE NE NE sec. 27, T. 97 N., R. 72 W., Elmer Horn well.
- W 3. NW NW NW NW sec. 26, T. 97 N., R. 72 W., Clark Horn hydrant.
- W 4. NE NE NW NW sec. 26, T. 97 N., R. 72 W., Elmer Horn stock well.
- W 5. SE SE SE NE sec. 27, T. 97 N., R. 72 W., Elmer/Henry Horn stock well inside steel building.
- W 6. SE SE SE SW sec. 27, T. 97 N., R. 72 W., Elmer/Henry Horn stock well.
- W 7. NE SE SE SE sec. 22, T. 97 N., R. 72 W., Henry Horn hydrant near house.
- W 8. SE SE SE SE sec. 27, T. 97 N., R. 72 W., Water Rights observation well.
- W 9. SW SW SW SW sec. 22, T. 97 N., R. 72 W., Helen Hutchinson household well.
- W10. Sec. 21, T. 97 N., R. 72 W., Joe Kerwin well.

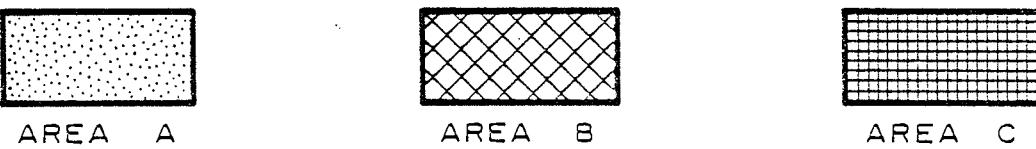
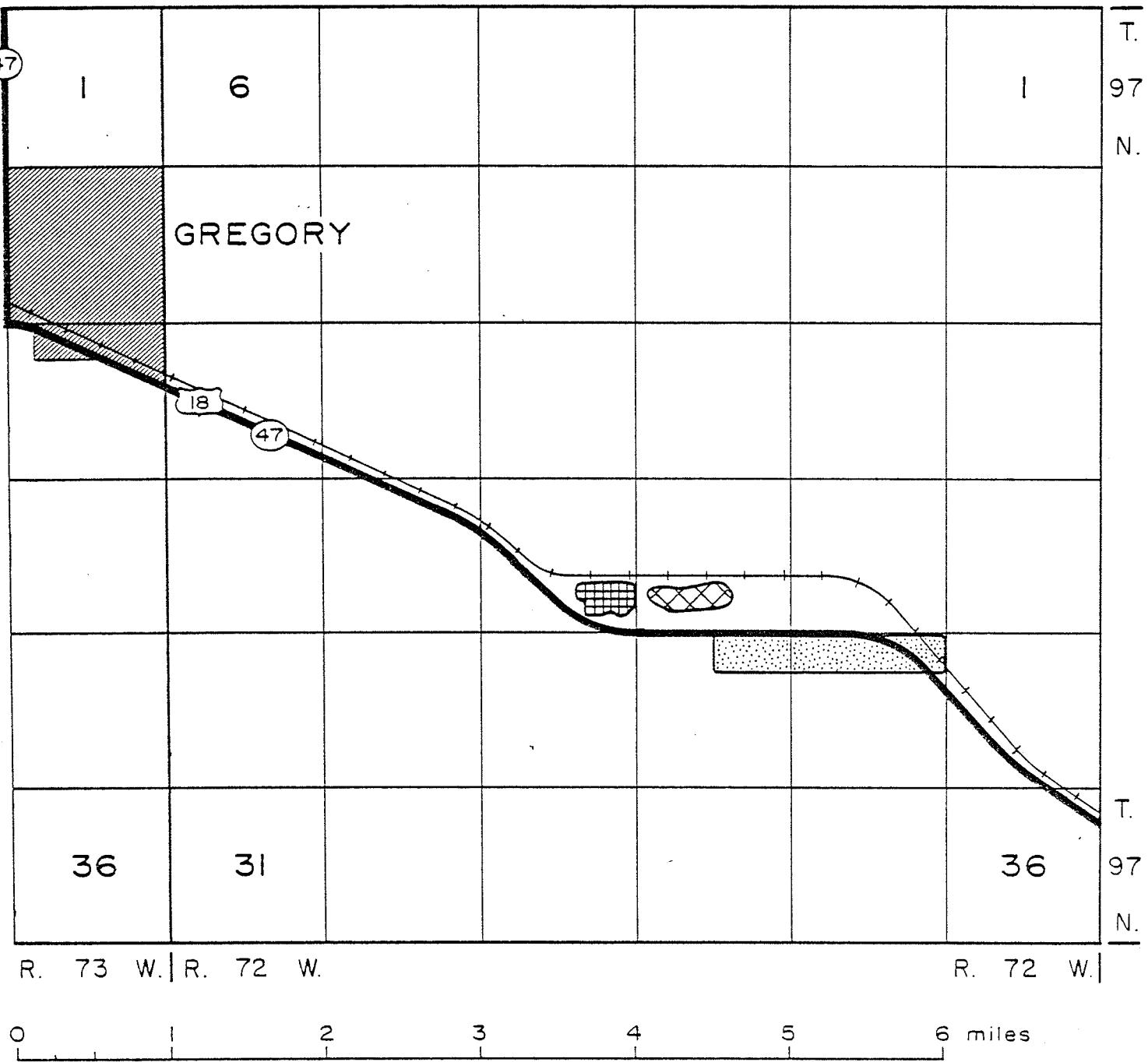
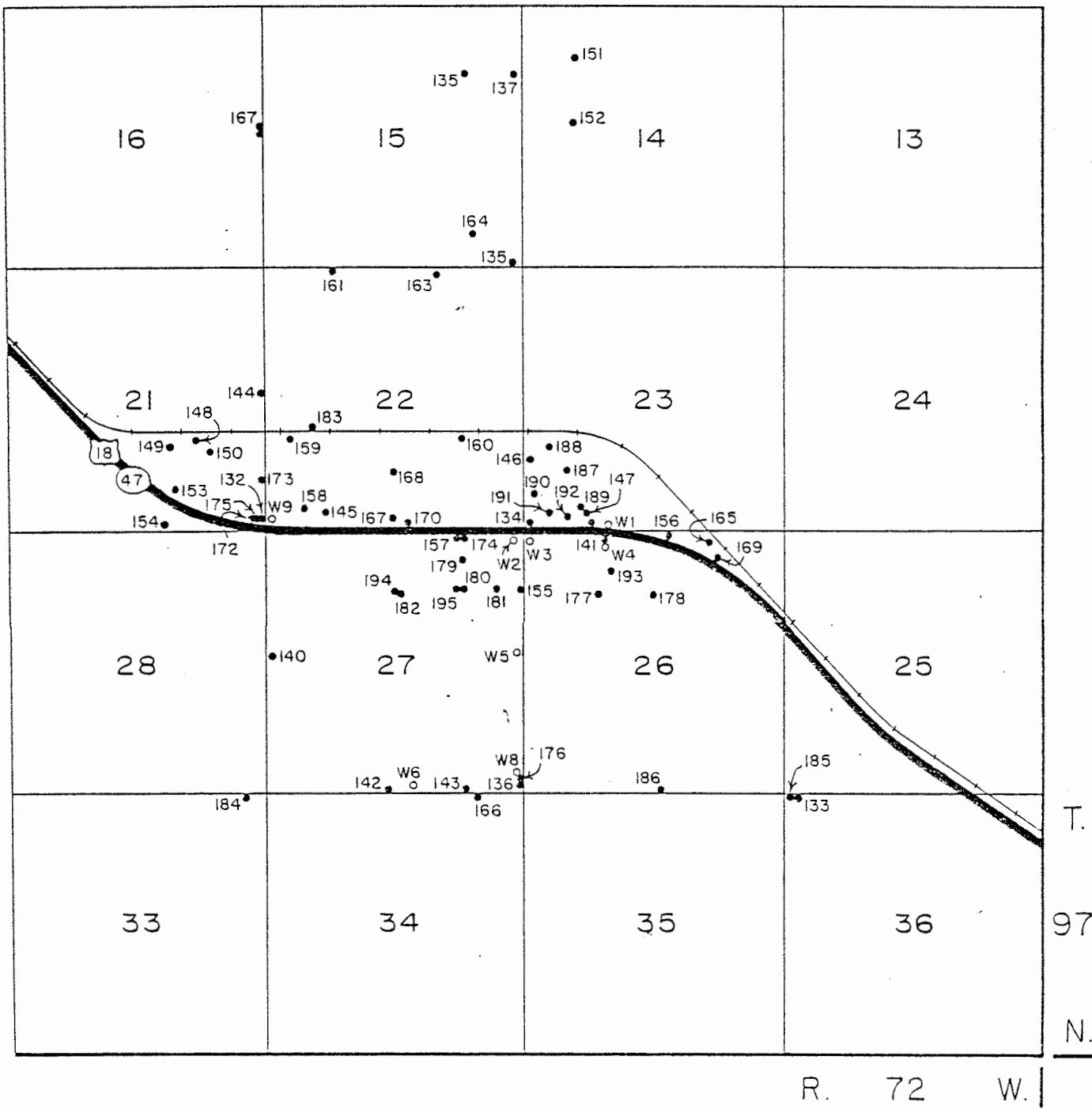


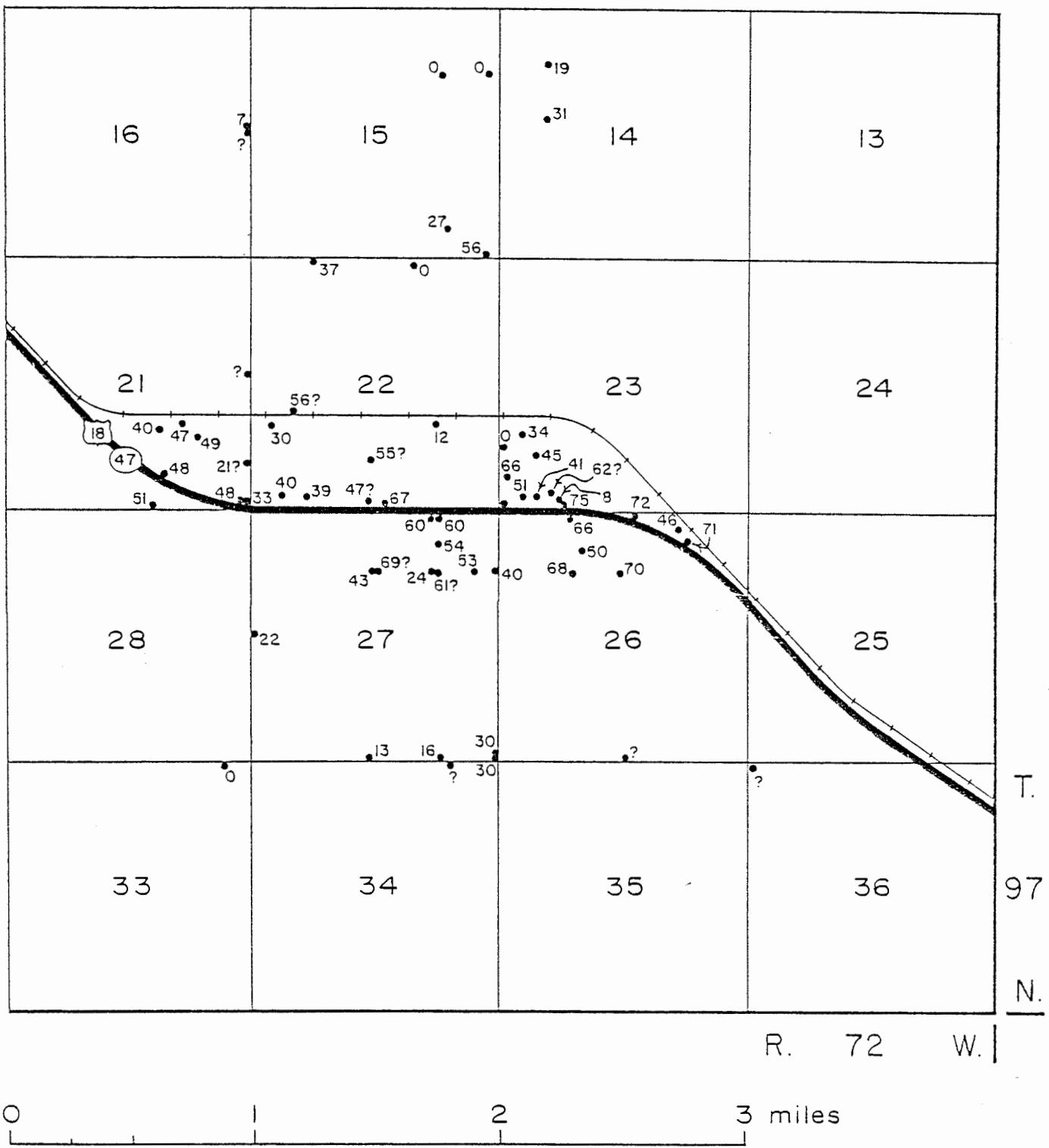
Figure 1. Map showing location of recommended areas for additional water supplies at Gregory.



184* Test hole - number refers to test holes listed in Appendix A.

W50 Water sample-number refers to sample number in Table I.

Figure 2. Data map showing the location of test holes and water samples in the Gregory area.



56 • Test hole - number indicates thickness of saturated sand, in feet.

Figure 3. Map showing approximate thickness of saturated sand in the Gregory area.

APPENDIX A

Logs of test holes drilled in the Gregory area

Log descriptions 1-131 can be found in "Ground-Water Investigations for the City of Gregory" (Special Report 49, Barari, 1969).

97-72-21ddd

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section: 21 T. 97 N. S. R. 72 E. W.
Well: _____ Test Hole: GY-132 Land Owner: _____
County: Gregory Date: 4/21/77 Elevation: 2150 (X X T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - auger 2141/2163 (30' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location THE NINE NINE Section: 36 T. 97 N. 8 R. 72 E. W.

Well: _____ Test Hole: **GY-133** Land Owner: _____

County: Gregory Date: 4/22/77 Elevation: 2253 (X K T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Carl Cripe - rotary and auger

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW¹/₄SW¹/₄SW¹/₄SW¹/₄ Section: 23 T. 97 N. E. R. 72 E. W.

Well: _____ Test Hole: GY-134 Land Owner: _____

County: Gregory Date: 4-25-77 Elevation: 2160 (X, X, T)

E Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Carl Cripe - auger 2146/2084 (62' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section: 15 T. 97 N. XX R. 72 XX W.
Well: _____ Test Hole: GY-135 Land Owner: _____
County: Gregory Date: 4/26/77 Elevation: 2180 (XX X T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - auger 2171/2115 (56' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE¹, SE¹, SE¹, SE¹ Section: 27 T. 97 N. 8 R. 72 E. W.

Well: _____ Test Hole: **GY-13E** Land Owner: _____

County: Gregory Date: 4/26/77 Elevation: 2150 (X X, T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Carl Cripe - auger 2134/2104

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SUNSHINE HOLLOW Section: 15 T. 97 N. E. R. 72 E. W.
 Well: _____ Test Hole: GY-137 Land Owner: Matucha
 County: Gregory Date: 4/27/77 Elevation: 2200 (X X T)
 E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
 Source of Data: Carl Cripe - Rotary 2125/2125

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	4	Topsoil, clay, fine sand to silt	0- 4
	2	Clay, dark gray, fine sand, compact	4- 6
	7	Sand, fine, yellowish-brown, clayey, dry	6- 13
	22	Sand, fine, yellowish-brown, dry	13- 35
	5	Sandstone, fine, medium, brown, slightly calcareous, interbedded layers of fine sand, clay, and silt	35- 40
	2	Sand, fine to medium, yellowish brown	40- 42
	2	Sandstone, fine, medium brown, slightly calcareous, interbedded layers of sand, fine clay and silt.	42- 44
	31	Sand, fine to medium, yellowish-brown	44- 75
	5	Sand, fine, yellow-brown, clay with limonitic con- cretions	75- 80
	55	Silt to fine sand; olive tan, interbedded with clay	80-135
	5	Clay, shale? reworked?? olive-brown, greenish-tan	105-140
		T.D. = 140 feet	
		75 feet to water	

SOUTH DAKOTA GEOLOGICAL SURVEY

Location S 1/4 S 1/4 NE 1/4 NE 1/4 Section: 15 T. 57 N. S R. 72 E. W.
 Well: Test Hole: GY-133 Land Owner: Matucha
 County: Gregory Date: 4/28/77 Elevation: 2100 (X X. T)
 E-Log: Samples: Drilling Company: S.D.G.S.
 Source of Data: Carl Cripe - Rotary

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	5	Clay, sandy, fine, silty, dry	0- 5
	6	Clay, sandy, fine, dark brown, dry	5- 11
	7	Sand, fine, yellow-brown, dry	11- 18
	7	Sand, fine, clayey, brown, dry	18- 25
	16	Sand, fine, greenish-tan, some clay	25- 41
	4	Sand, fine, brown, clayey, drills hard	41- 45
	31	Sand, fine grained, some pebbles, interbedded layers of sandstone, clay, fine sand and silt, greenish-tan	45- 76
	9	Clay, silty, soft, greenish-tan	76- 85
	5	Clay, silty, soft, greenish-tan, with ash white coloring	85- 90
	12	Sand, fine, clayey, silty, brown	90-102
	3	Silt, light tan to orange-brown, limonitic concre- tions, compact	102-110
	5	Shale, ?olive brown, clay	110-115
		T.D. = 115 feet	

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE¹ SE¹ SE¹ NE¹ Section: 16 T. 97 N. S R. 72 E W.

Well: _____ Test Hole: GY-139 Land Owner: _____

County: Gregory Date: 4/29/77 Elevation: 2261 (W X T)

F.I. no.: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Carl Cripe - Rotary

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW 1/4 SW 1/4 SW 1/4 NW 1/4 Section: 27 T. 97 N. S. R. 72 E. W.
Well: GY-140 Test Hole: _____ Land Owner: _____
County: Gregory Date: 5/2/77 Elevation: 2119 (X X T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - auger

97-72-26babb

SOUTH DAKOTA GEOLOGICAL SURVEY

Location Near Nine Mile Creek Section: 26 T. 97 N. S R. 72 E W.

Well: _____ Test Hole: **GY-141** Land Owner: _____

County: Gregory Date: 5/3/77 Elevation: 2146 (M.L.T.)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Carl Cripe - Auger 2139/2073 (66' Sat)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Section: 27 T. 97 N. S R. 72 E. W.
Well: _____ Test Hole: GY-142 Land Owner: _____
County: Gregory Date: 5/3/77 Elevation: 2130 (A, X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - Auger 2120/2112

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section: 27 T. 97 N. X R. 72 E. W.
Well: _____ Test Hole: GY-143 Land Owner: _____
County: Gregory Date: 5/3/77 Elevation: 2143 (X, X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - Auger 2136/2120 (16' Sat)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Section: 21 T. 97 N. S. R. 72 E. W.
Well: _____ Test Hole: GY-144 Land Owner: _____
County: Gregory Date: 5/4/77 Elevation: 2226 (X X T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - Rotary 2151/2137

SOUTH DAKOTA GEOLOGICAL SURVEY

Location H₃SE_{1.5}S_{1.5}P₁ Section: 22 T. 97 N. xiv R. 72 E. W.

Well: _____ Test Hole: **GY-145** Land Owner: _____

County: Gregory Date: 5/5/77 Elevation: 2145 (X X T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Carl Cripe - Auger 2137/2092 (sat 30')

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SWEETWATER Section: 23 T. 27 N. S. R. 72 E. W.
Well: _____ Test Hole: GY-146 Land Owner: _____
County: Gregory Date: 5/5/77 Elevation: 2100 (A X T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - Rotary 2146/2141 (5' Sat)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location S 1/4 SE 1/4 SW 1/4 Section: 23 T. 97 N. S R. 72 E. W.
Well: Test Hole: GY-147 Land Owner: Gus Kallander
County: Gregory Date: 5/5/77 Elevation: 2155 (XX X T)
E-Log: Samples: Drilling Company: S.D.G.S.
Source of Data: Carl Crine - Auger 2141/2128

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NE 1/4 SE 1/4 NW 1/4 SW 1/4 Section: 21 T. 97 N. X R. 72 E. W.

Well: _____ Test Hole: **GY-148** Land Owner: **Henry Sattler**

County: Gregory Date: 5/10/77 Elevation: 2100 (A. K. T.)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Carl Cripe - Auger 2162/2115(?) (47' Sat)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW 1/4 SE 1/4 SW 1/4 SE 1/4 Section: 21 T. 97 N. S. R. 72 E. W.
Well: _____ Test Hole: GY-149 Land Owner: H. Sattler
County: Gregory Date: 5/10/77 Elevation: 2164 (X, X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - Auger 2141/2101 (40' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW 1/4 SW 1/4 SE 1/4 Section: 21 T. 97 N. S R. 72 E. W.
Well: _____ Test Hole: GY-150 Land Owner: H. Sattler
County: Gregory Date: 5/10 & 11/77 Elevation: 2175 (A, X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - Auger 2151/2102 (49' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE 1/4 SE 1/4 NW 1/4 NW 1/4 Section: 14 T. 97 N. S R. 72 E. W.
Well: GY-151 Land Owner: Frank Matucha
County: Gregory Date: 5/11/77 Elevation: 2170 (A, K T)
E-Log: Samples: Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - Auger (19' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section: 14 T. 97 N. S R. 72 E. W.
Well: GY-152 Land Owner: Frank Matucha
County: Gregory Date: 5/11/77 Elevation: 2180 (AX X T)
E Log: Samples: Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - Auger 2150/2123 (31' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW 1/4 NE 1/4 SW 1/4 SE 1/4 Section: 21 T. 97 N. R. 72 PR W.

Well: _____ Test Hole: GY-153 Land Owner: H. Sattler

County: Gregory Date: 5/12/77 Elevation: 2155 (A, X, T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Carl Cripe - Auger 2139/2091 (43' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE¹/₄ SW¹/₄ SW¹/₄ SE¹/₄ Section: 21 T. 97 N. S R. 72 E. W.
Well: _____ Test Hole: GY-154 Land Owner: _____
County: Gregory Date: 5/12/77 Elevation: 2150 (A, K, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - Auger 2125/2120 (5' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Section: 27 T. 97 N. S. R. 72 E. W.

Well: _____ Test Hole: **GY-155** Land Owner: _____

County: Gregory Date: 5/13/77 Elevation: 2142 (A. T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Carl Cripe - Auger 2130/2001 (42' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location WHALEN, WHELEN Section: 25 T. 97 N. S. R. 72 E. W.
 Well: Test Hole: GY-156 Land Owner:
 County: Gregory Date: 5/17/77 Elevation: 2180 (A, X, T)
 E-Log: Samples: Drilling Company: S.D.G.S.
 Source of Data: Carl Cripe - Rotary 2152/2000 (72' Sat.)

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	1	Topsoil, black	0- 1
	3	Sand, fine, clayey, light-tan	1- 9
	5	Same as above, some pebbles and medium sand	9- 14
	23	Sand, fine, interbedded sandstone	14- 42
	2	Magnesia (?)	42- 44
	35	Sand, fine, clayey, light brown, interbedded layers of clay, sandstone and pebbles	44- 79
	21	Sand, fine to medium, interbedded clay	79-100
	16	Clay, greenish tan	100-116
	37	Clay, silty, reddish-tan	116-153
	11	Concretions, rusty-red, oxidized, some medium to very coarse sand, clayey, light to dark brown, traces of petrified wood	153-164
	16	Shale	164-180
		T.D. = 180 feet	
		Depth to water - 28 feet	

97-72-27abaa

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NE $\frac{1}{4}$ NE $\frac{1}{4}$ NNW $\frac{1}{4}$ NE $\frac{1}{4}$ Section: 27 T. 97 N. S. R. 72 E. W.
Well: _____ Test Hole: GY-157 Land Owner: _____
County: Gregory Date: 5/17/77 Elevation: 2150 (X, X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Greg Wallace - Auger 2123/2063 (60' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section: 22 T. 97 N. S. R. 72 EX W.

Well: _____ Test Hole: **GY-158** Land Owner: _____

County: Gregory Date: 5/18/77 Elevation: 2155 (XX, X, T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Greg Wallace - Auger 2142/2102 (40' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NE 1/4 NW 1/4 SW 1/4 Section: 22 T. 97 N. X R. 72 X W.
Well: _____ Test Hole: GY-159 Land Owner: C&NW Railroad
County: Gregory Date: 5/18/77 Elevation: 2191 (A, K T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Greg Wallace - Auger 2153/2128 (30' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section: 22 T. 97 N. S. R. 72 E. W.

Well: _____ Test Hole: GY-160 Land Owner: C&NW Railroad

County: Gregory Date: 5/18/77 Elevation: 2170 (A X T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Greg Wallace - Auger 2144/2132 (12' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NE 1/4 NE 1/4 NW 1/4 Section: 22 T. 07 N. 08 R. 72 E. W.
Well: _____ Test Hole: GY-161 Land Owner: _____
County: Gregory Date: 5/23/77 Elevation: 2250 (A, XW, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Carl Cripe - Rotary 2175/2130 (37' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Section: 16 T. 37 N. 36 R. 72 E. W.
Well: _____ Test Hole: GY-152 Land Owner: _____
County: Gregory Date: 5/24/77 Elevation: 2261 (XX, XX T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Greg Wallace - Rotary

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NW¹/4 SW¹/4 SE¹/4 SE¹/4 Section: 15 T. 97 N. S. R. 72 E. W.
Well: _____ Test Hole: GY-164 Land Owner: Frank Matucha
County: Gregory Date: 5-25-77 Elevation: 2205 (W, X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Driller - Carl Cripe (Auger) Sat. 27'

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SUPERIOR Section: 25 T. 97 N. W R. 72 SW W.

Well: _____ Test Hole: GY-165 Land Owner: _____

County: Gregory Date: 5-31-77 Elevation: 2210 (A, X T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - Carl Cripe & Greg Wallace (Auger)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NW 1/4 NW 1/4 NW 1/4 NE 1/4 Section: 34 T. 97 N. 48 R. 72 E. W.

Well: _____ Test Hole: _____ GY-166 Land Owner: _____

County: Gregory Date: 5-1-77 Elevation: 2150 (X T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - Greg Wallace (Rotary)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE 1/4 NE 1/4 SE 1/4 SW 1/4 Section: 22 T. 97 N. W. R. 72 W.
Well: _____ Test Hole: GY-167 Land Owner: Helen Hutchinson
County: Gregory Date: 6-1-77 Elevation: 2140 (XXXX T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Driller - Greg Wallace (Auger) (Sat. 47')

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NE₁, NE₁, SE₁, SW₁ Section: 22 T. 97 N. S. R. 72 E. W.
Well: _____ Test Hole: GY-168 Land Owner: Helen Hutchinson
County: Gregory Date: 6-1-77 Elevation: 2143 (XX X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Driller - Greg Wallace (Rotary)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE 1/4 NE 1/4 SE 1/4 NE 1/4 Section: 26 T. 37 N. 86 R. 72 E W.

Well: _____ Test Hole: **GY-169** Land Owner: _____

County: Gregory Date: 6-2-77 Elevation: 2210 (XXXX T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - Greg Wallace (Rotary) (71' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location S 1/4 S 1/4 S 1/4 SE 1/4 Section: 22 T. 27 N. S. R. 70 E. W.

Well: _____ Test Hole: _____ GY-170 Land Owner: _____

County: Gregory Date: 6-2-77 Elevation: 2152 (W. H. T.)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - Greg Wallace (Rotary) 2135/2068 (67' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW 1/4 S 1/4 SE 1/4 SW 1/4 Section: 23 T. 97 N. S. R. 72 E. W.
Well: _____ Test Hole: GY-171 Land Owner: _____
County: Gregory Date: 6-2-77 Elevation: 2156 (X, X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Driller - Greg Wallace (Rotary) 2143/2066 (75' Sat.)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section: 21 T. 97 N. S. R. 72 XX W.
Well: _____ Test Hole: GY-172 Land Owner: _____
County: Gregory Date: 6-3-77 Elevation: 2143 (XX, X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Driller - Greg Wallace (Rotary)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section: 21 T. 97 N. X R. 72 X W.

Well: _____ Test Hole: GY-173 Land Owner: _____

County: Gregory Date: 6-3-77 Elevation: 2171 (X X T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - Greg Wallace (Rotary)

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	2	Topsoil, black	0- 2
	4	Sand, fine to medium, subangular, dirty	2- 6
	3	Clay, light-brown, slightly sandy, fine	6- 9
	25	Sand, medium, rounded, clean,	9- 34
	8	Sand, medium to fine, rounded, some interbedded light-green silts	34- 42
	19	Silt, light-green, clayey. Some thin sand lenses, fine and slightly cemented	42- 61
	11	Sand, fine, rounded, some thin, intermittent silt lenses, light-green to light-brown, some cemented sandstone lenses	61- 72
	11	Silt, light-green to light-brown, a cemented layer of magnesia (76'-77'), very hard	72- 83
	17	Clay, light-brown, hard	83-100
		T.D. = 100 feet	
		Water level - 21 feet	

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NW₁/4 NW₁/4 NE₁/4 NE₁/4 Section: 27 T. 97 N. S. R. 72 W.

Well: _____ Test Hole: **GY-174** Land Owner: _____

County: Gregory Date: 6-6-77 Elevation: 2140 (XX. X. T.)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - John Fricke (Auger)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section: 21 T. 97 N. 36 R. 72 W.

Well: _____ Test Hole: **GY-175** Land Owner: _____

County: Gregory Date: 6-7-77 Elevation: 2140 (XX, XX T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - Greg Wallace (Rotary)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE¹/₄ SE¹/₄ SE¹/₄ SE¹/₄ Section: 27 T. 57 N. W. R. 72 W.

Well: _____ Test Hole: **GY-176** Land Owner: _____

County: Gregory Date: 6-7-77 Elevation: 2160 (XXXX T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - Greg Wallace (Rotary)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location S 1/4 S 1/4 NE 1/4 NW 1/4 Section: 26 T. 57 N. S. R. 72 W.

Well: _____ Test Hole: **GY-177** Land Owner: _____

County: Gregory Date: 6-7-77 Elevation: 2152 (A, XX T)

E-Log: _____ Samples: _____ Drilling Company: S.D.C.S.

Source of Data: Driller - Carl Cripe (Rotary) 2130/2270

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE 1/4 SE 1/4 NE 1/4 NW 1/4 Section: 26 T. 97 N. S. R. 72 E. W.
Well: GY-178 Test Hole: GY-178 Land Owner: Elmer Horn
County: Gregory Date: 5-7-77 Elevation: 2170 (XX, XX T)
E-Log: Samples: Drilling Company: S.D.G.S.
Source of Data: Driller - Carl Cripe (Rotary) 2140/2072

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW 1/4 N 1/4 NE 1/4 Section: 27 T. 97 N. 5X R. 72 W.
Well: GY-179 Test Hole: GY-179 Land Owner: Elmer Horn
County: Gregory Date: 6-7-77 Elevation: 2148 (A, XX T)
E-Log: Samples: Drilling Company: S.D.G.S.
Source of Data: Driller - John Fricke (Auger) 2137/2083

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Section: 27 T. 97 N. 5 R. 72 E. W.

Well: _____ Test Hole: GY-180 Land Owner: Elmer Horn

County: Gregory Date: 6-7-77 Elevation: 2139 (W. S. T.)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - John Fricke (Auger) 2131/2070

SOUTH DAKOTA GEOLOGICAL SURVEY

Location S 1/4 SE 1/4 NW 1/4 NE 1/4 Section: 27 T. 97 N. 8 R. 72 X W.
Well: _____ Test Hole: GY-181 Land Owner: Elmer Horn
County: Gregory Date: 6-7-77 Elevation: 2142 (X, X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Driller - John Fricke (Auger) 2130/2001

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW 1/4 SW 1/4 NW 1/4 Section: 27 T. 97 N. S. R. 72 E. W.

Well: _____ Test Hole: GY-182 Land Owner: Elmer Horn

County: Gregory Date: 6-8-77 Elevation: 2150 (X L T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - John Fricke (Auger)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location WILSEY, WASH. Section: 22 T. 37 N. 82 R. 72 px W.

Well: _____ Test Hole: GY-183 Land Owner: Chicago & Northwestern Railroad

County: Gregory Date: 6-8-77 Elevation: 2190 (A X T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - John Fricke (Auger)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NE 1/4 NW 1/4 NE 1/4 Section: 33 T. 97 N. S. R. 72 E W.
Well: GY-184 Test Hole: Land Owner:
County: Gregory Date: 6-3-77 Elevation: 2120 (VA, MX T)
E-Log: Samples: Drilling Company: S.D.C.S.
Source of Data: Driller - John Fricke (Auger)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location S 1/4 S 1/4 S 1/4 S 1/4 Section: 26 T. 57 N. 36 E. R. 72 ~~xx~~ W.

Well: _____ Test Hole: _____ GY-186 _____ Land Owner: _____

County: Gregory Date: 6-8-77 Elevation: 2241 (VA. XIV T.)

E-Log: _____ Samples: _____ Drilling Company: _____ S.D.G.S.

Source of Data: Driller - Greg Wallace (Rotary)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW_{1/4}NE_{1/4}SW_{1/4}SW_{1/4} Section: 23 T. 97 N. S. R. 72 E. W.
Well: GY-187 Test Hole: GY-187 Land Owner: Gus Callender
County: Gregory Date: 6-9-77 Elevation: 2160 (X X, T)
E-Log: Samples: Drilling Company: S.D.G.S.
Source of Data: Driller - Greg Wallace (Rotary) 2140/2059

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE 1/4 SW 1/4 NW 1/4 SW 1/4 Section: 23 T. 97 N. S. R. 72 E W.Well: _____ Test Hole: GY-188 Land Owner: Gus CallenderCounty: Gregory Date: 6-9-77 Elevation: 2170 (XX, XX T)E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.Source of Data: Driller - Greg Wallace (Rotary)

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Topsoil, black	0- 3
	6	Silt, clayey, light to dark brown	3- 9
	23	Clay, light green to light brown, sandy, fine, rounded	9- 32
	13	Sand, (sandstone?), compact, fine, hard, light brown, clayey, bedded with light green silt	32- 45
	27	Silt, clay, light green, interbedded with some thin sandstone layers. Sandstone is compact and light brown, fine grained	45- 72
	34	Sand, compact, (sandstone?), fine, dark brown, subrounded to subangular	72-106
	7	Silt, light green to light gray-brown, very clayey	106-113
	23	Silt, to clay, light brown	113-136
	14	Shale, highly weathered, concretion, deep, red-brown at 147'	136-150
		T.D. = 150 feet	
		No water level - collapsed.	

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NE1/4 SW1/4 SW1/4 Section: 23 T. 97 N. 8 R. 72 E. W.
Well: _____ Test Hole: GY-189 Land Owner: Gus Callander
County: Gregory Date: 6-9-77 Elevation: 2150 (X, X, T)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Driller - Greg Wallace (Rotary) 2135/2064

SOUTH DAKOTA GEOLOGICAL SURVEY

Location NE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section: 23 T. 37 N. S. R. 72 E W.
Well: GY-190 Land Owner: Gus Callender
County: Gregory Date: 6-9-77 Elevation: 2165 (XX, XX T.)
E-Log: Samples: Drilling Company: S.D.G.S.
Source of Data: Driller - John Fricke (Auger)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location S 1/4 S 1/4 NW 1/4 SW 1/4 Section: 23 T. 27 N. 38 R. 72 W.
Well: _____ Test Hole: GY-191 Land Owner: Gus Callender
County: Gregory Date: 6-10-77 Elevation: 2105 (A, XIX T.)
E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.
Source of Data: Driller - Greg Wallace (rotary)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location S^{1/4}SE^{1/4}S^{1/4}SW^{1/4} Section: 23 T. 97 N. 8 R. 72 E. W.Well: _____ Test Hole: GY-192 Land Owner: Gus CallenderCounty: Gregory Date: 5-15-77 Elevation: _____ (X, Y, T)E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.Source of Data: Driller - Greg Wallace (Rotary)

Geologic Unit	Thickness	Lithologic Description	From - to Feet
	3	Topsoil, black	0- 3
	2	Silt, light to dark brown	3- 5
	4	Sand, medium to coarse, subrounded	5- 9
	13	Sand, fine, rounded	9- 22
	1	Sandstone layer cemented, dark green	22- 23
	3	Sand, fine, rounded	23- 26
	1	Silt, clayey, light green	26- 27
	4	Sand, fine, rounded	27- 31
	5	Sand, fine, cemented, like sandstone, brown	31- 37
	25	Sand, fine to medium, rounded	37- 62
	6	Sand, fine, cemented, sandstone	62- 68
	14	Sand, fine, rounded, interbedded sandstone and silt layers	68- 82
	12	Silt, light green, clayey, hard, some sand stringers, thin, fine	82- 94
	26	Silt, to clay, light green to light brown, gradiates to brown	94-120
		T.D. = 120 feet	

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE 1/4 N 1/4 NE 1/4 NW 1/4 Section: 26 T. 97 N. S. R. 72 E. W.
Well: GY-193 Test Hole: Land Owner: Elmer Horn
County: Gregory Date: 6-15-77 Elevation: 2150 (X X. T.)
E-Log: Samples: Drilling Company: S.D.G.S.
Source of Data: Driller - Greg Wallace (Rotary)

SOUTH DAKOTA GEOLOGICAL SURVEY

Location SE¹/₄ SE¹/₄ NE¹/₄ NW¹/₄ Section: 27 T. 97 N. S. R. 72 E. W.
Well: GY-194 Test Hole: GY-194 Land Owner: Elmer Horn
County: Gregory Date: 6-15-77 Elevation: 2140 (X, X, T)
E-Log: Samples: Drilling Company: S.D.G.S.
Source of Data: Driller - Greg Wallace (Rotary)

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SOUTH DAKOTA GEOLOGICAL SURVEY

Location SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Section: 27 T. 97 N. S. R. 72 E. W.

Well: _____ Test Hole: **GY-195** Land Owner: Elmer Horn

County: Gregory Date: 6-17-77 Elevation: _____ (A, I, T)

E-Log: _____ Samples: _____ Drilling Company: S.D.G.S.

Source of Data: Driller - Greg Wallace (Rotary)