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Ground-water Study for the city of Oacoma

February 27, 1976

The Honorable Mervin Peterson
Mayor of Oacoma
Oacoma, South Dakota 57365

Dear Mayor Peterson:

At the request of the city of Oacoma, the South Dakota Geological Survey conducted a ground-water study in and around the city of Oacoma. The purpose of this study was to determine if there is satisfactory shallow ground water in the area for the city to use.

The field work was conducted on June 12 and 13, 1975. Included in this study were: (1) the drilling of eight auger test holes; and (2) collecting and analyzing two water samples.

As a result of this survey, it was found that the alluvium in this area is composed of clay with some sand. Consequently, the permeability of these deposits is very low (see app. A for the logs and fig. 1 for the location of the test holes).

The result of the chemical analysis of water sample WB (see table 1 and fig. 1) from a shallow well in the area indicates the dissolved chemicals in this water are higher than in the present city water (sample WC, table 1). The source of water sample WC is the Dakota Formation (approximately 700 feet deep). Both these water samples have higher chemicals than the recommended limits set by the South Dakota Department of Health.

The results of this investigation show no satisfactory shallow ground water in the area for the city to use.

Based on the available data the following recommendations can be made to the city of Oacoma:

(1) The city can continue to use the present water supply which is from the Dakota Formation. This source of water is located at a depth of approximately 700 feet below the land surface in Oacoma. The water in this aquifer is under pressure and flows from wells completed in this Formation in the city. The aquifer will sustain additional wells but the water from this source has high dissolved chemicals. If the city should decide to continue using water from the Dakota Formation, it is recommended that the city consult an engineering firm with regard to the feasibility of a small treatment unit to remove some of these chemicals. Recent advances in water-treatment technology have resulted in more economical water-treatment plants for small towns.

(2) The city could participate in a rural water system. Such a system could provide good quality water to the city from a distant source or treated water from the River could furnish good quality water for both the town and the nearby farms.

(3) The city could use the surface water (river water) either by intake structure or obtaining it from Chamberlain.

Sincerely,

Assad Barari
Geologist

For the State Geologist

AB:co

Enclosures

cc: Cliff Weber

APPENDIX A

Logs of test holes in the Oacoma area (for map location, see fig. 1)

Test Hole 1
Location: SW¼NW¼NE¼SW¼ sec. 24, T. 104 N., R. 71 W.
Surface elevation: 1370 feet
Depth to water: 12 feet

0-10	Clay, dark-brown
10-34	Clay, brown

Test Hole 2
Location: NE¼SE¼NE¼SW¼ sec. 24, T. 104 N., R. 71 W.
Surface elevation: 1370 feet
Depth to water: 15 feet

0-15	Clay, brown
15-49	Clay, brown, some sand

Test Hole 3
Location: SE¼SW¼NW¼SE¼ sec. 24, T. 104 N., R. 71 W.
Surface elevation: 1360 feet
Depth to water: 8? feet

0-11	Clay, dark-brown
11-49	Clay, brown, some very coarse sand

Test Hole 4
Location: NE¼SE¼NE¼SE¼ sec. 24, T. 104 N., R. 71 W.
Surface elevation: 1360 feet
Depth to water: 5? feet

0- 5	Clay, dark-brown
5-15	Clay, brown
15-49	Clay, brown, sandy

Test Hole 5
Location: SE¼SW¼SE¼NE¼ sec. 24, T. 104 N., R. 71 W.
Surface elevation: 1375 feet
Depth to water: 14 feet

0- 7	Clay, dark-brown
7- 9	Sand, very coarse, with clay
9-14	Clay, dark-brown
14-54	Clay, brown, with coarse sand

Test Hole 6
Location: SW¼SW¼SW¼NW¼ sec. 19, T. 104 N., R. 71 W.
Surface elevation: 1370 feet
Depth to water: 16 feet

0- 2	Clay, brown
2- 8	Sand, brown, with clay
8-20	Clay, brown
20-54	Clay, some sand

Test Hole 7
Location: SE¼NW¼NE¼NE¼ sec. 23, T. 104 N., R. 71 W.
Surface elevation: 1365 feet
Depth to water: 9 feet

0- 5	Clay, dark-brown
5- 7	Clay, some pebbles
7-37	Clay, brown, sandy
37-39	Clay, hard

Test Hole 8
Location: SE¼SW¼NE¼NE¼ sec. 23, T. 104 N., R. 71 W.
Surface elevation: 1365 feet
Depth to water: not measured

0-18	Clay, brown
18-55	Clay, some sand

TABLE 1. Chemical Analyses of Water Samples from the Oacoma area
(For map location, see fig. 1)

Sample	Parts Per Million											
	Calcium	Sodium	Magnesium	Chloride	Sulfate	Iron	Manganese	Nitrate Nitrogen	Fluoride	pH	Hardness $CaCO_3$	Total Solids
A				250	500[1]	0.3	0.05	10.0	0.9[2] 1.7			1000[1]
WB	480		160	107	1400	0.05		6			1850	2600
WC	500		100	135	1160	4.1		1.5			1650	2260

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

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

[2]1.2 is optimum for South Dakota

LOCATION OF WATER SAMPLES

WB - Hutmacher well, 61 feet deep

WC - City well, 730 feet deep

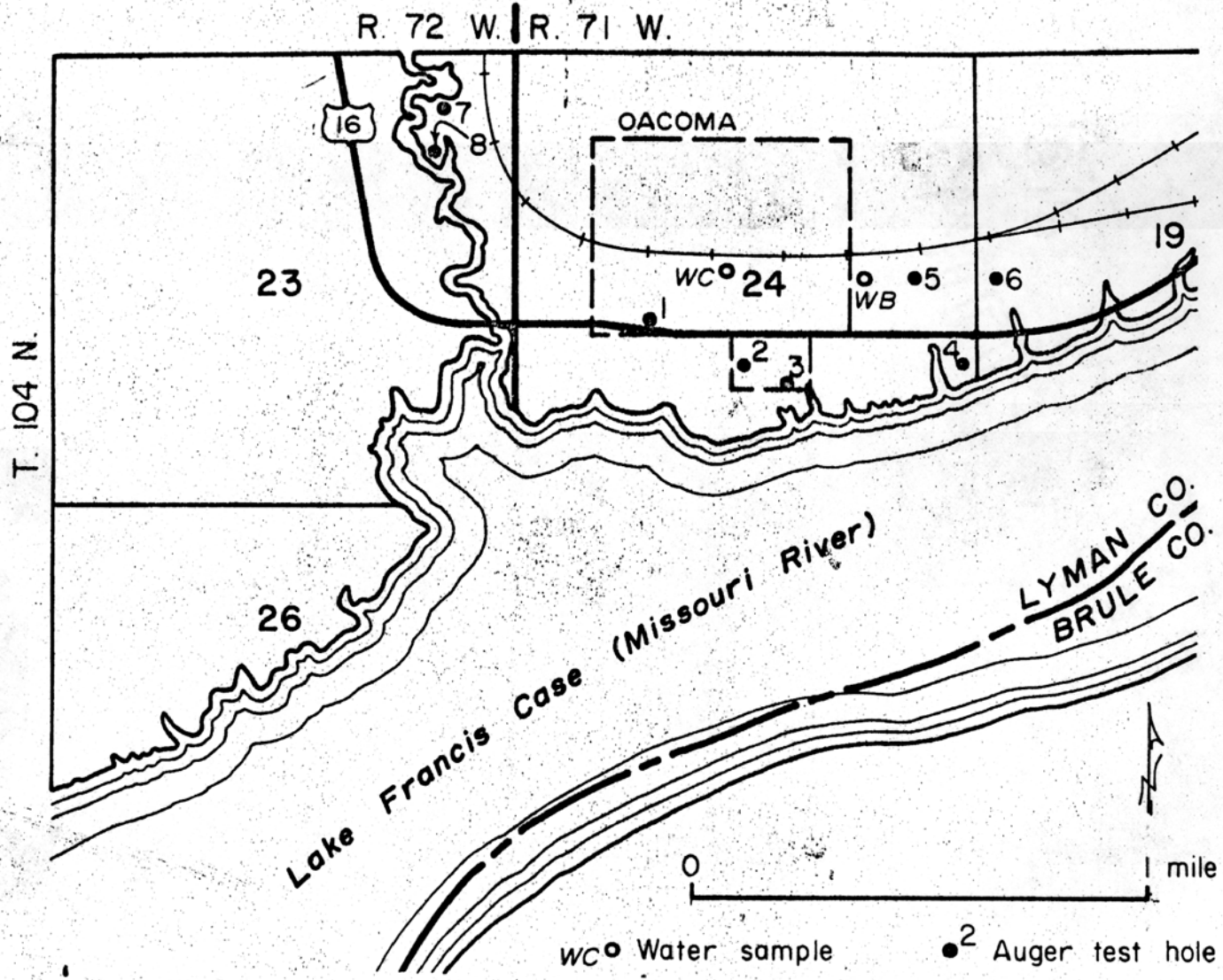

Figure 1. Data map of the Oacoma area.