

STATE OF SOUTH DAKOTA
Ralph Herseth, Governor

STATE GEOLOGICAL SURVEY
Allen F. Agnew, State Geologist

SPECIAL REPORT 3

SHALLOW WATER SUPPLY
FOR THE CITY OF VIBORG

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Shallow Water Supply
for the
City of Viborg

At the request of the Viborg city council, the State Geological Survey made a four-day survey of the city's shallow water supply in September of 1959.

In past years the city has relied for its water supply on several deep artesian wells, plus a shallow, large-diameter well in the chalk. These wells have never produced large quantities of water, yielding at the most 75 gallons per minute and recently only about 20 gallons per minute; consequently, the city council decided to find a larger water supply.

It was known that the city could pipe water from the Parker-Centerville outwash reservoir about six miles northeast of the city, but the cost of a six-mile pipeline would be very high. Before attempting such a project, the city officials felt that they should learn if any shallow supplies could be found nearer the city, and therefore asked the State Geological Survey to make such a study. However, because of the lateness in the field season when the Survey was contacted, only a very limited study could be made; ten holes were drilled by Clark Mulliner and James Hammell with the Survey's jeep-mounted auger. Nevertheless, what is thought to be a good shallow water supply was found within a mile of the city.

The first shallow water possibility to be investigated was the alluvial material along Turkey Ridge Creek (see index map). However, it was found that these deposits contain too much silt and clay to produce enough water for the city. Next, the deposits along the creek

a mile south of town (see index map) were investigated, but they likewise contain too much silt and clay.

Mr. Martin Hansen, a local well driller, related that most farm wells north of the city are completed in sand (see index map), which was penetrated about 80 feet below the surface. On the other hand, most farm wells south of the city are completed in chalk rock. Mr. Hansen had not drilled very far into the sand north of the city, but said that it produced abundant water wherever he did drill a well into it. Because of this favorable report from the apparant large areal extent of the sand, two test holes (nos. 7 and 8) were put down about a mile northeast of town along the railroad track. In these two holes, sand and gravel was penetrated from about 70 feet to 119 feet (see logs at end of report). The drill was still in sand at 119 feet when the holes were abandoned because of the depth limitation of the drill.

A well in these sands and gravels should produce enough water for the city; however, the sand may contain some clay layers, so it is recommended that the city contract with a commercial well driller licensed by the State, to do further test drilling in the area of these test holes in order to determine more closely the productive capability of the sands and gravels. The city must obtain a water permit from the State Water Resources Commission, and it is recommended that the city check with the State Board of Health with regard to chemical analysis of the water and for the well construction requirements, and that the city employ an engineering firm licensed in South Dakota to plan and construct the water system.

Logs of Geological Survey Test Holes in Viborg Area

(for location see index map)

Test Hole 1

0-4 black clay
4-9 brown sandy wet clay
9-14 clayey gravel
14-19 clay
19-24 clayey gravel
24-39 clay
Depth to water: $6\frac{1}{2}$ feet

Test Hole 2

0-4 lime and dry clay
4-29 damp brown clay
Depth to water: $7\frac{1}{2}$ feet

Test Hole 3

0-4 black clay
4-14 blue clay
14-19 no sample
19-24 sandy clay
24-39 sand, gravel, and clay
Depth to water: $4\frac{1}{2}$ feet

Test Hole 4

0-9 clay
9-19 sand and clay
19-24 clay
Depth to water: $4\frac{1}{2}$ feet

Test Hole 5

0-4 black clay
4-19 brown clay
19-39 gravelly blue clay
39-54 sandy clay
Depth to water: 16 feet

Test Hole 6

0-6 clay
6-9 no sample
9-24 sandy clay
24-34 clay
34-74 clay
Depth to water: 11 feet

Test Hole 7

0-4 no sample
4-29 brown clay
29-69 gray and blue clay
69-74 no sample
74-89 sand
89-119 sand and gravel
Depth to water: 69 feet

Test Hole 8

0-29 brown moist clay
29-64 blue clay
64-69 no sample
69-84 sand with some clay
84-99 fine and medium sand
99-119 coarse sand and gravel
Depth to water: 64 feet

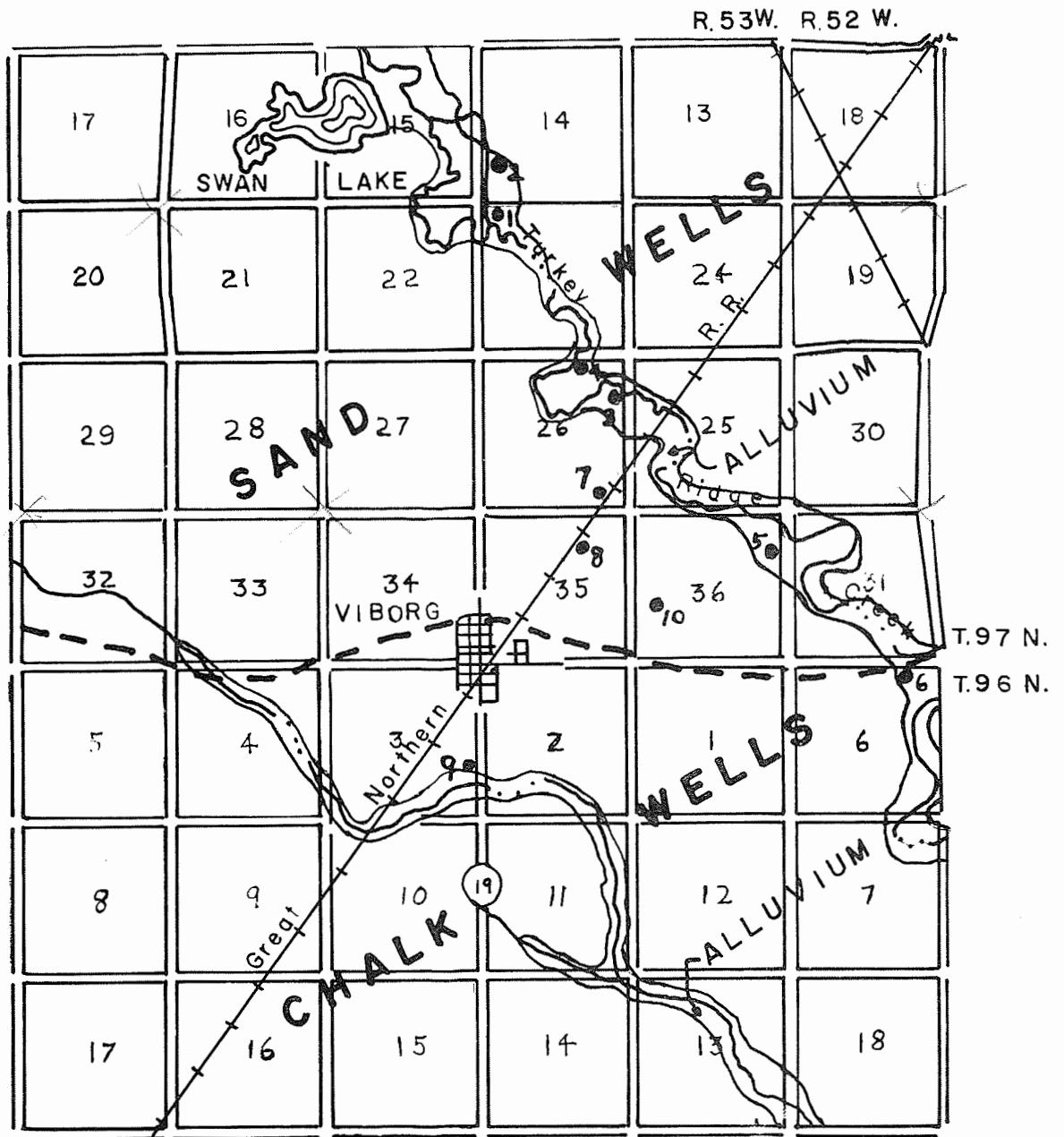
Test Hole 9

0-4 brown silt and clay
4-24 brown silty sand
24-49 gray clay
Depth to water: 20 feet

Test Hole 10

0-4 silt and gravel
4-29 brown silt and clay
29-69 gray and blue clay
69-74 fine sand with some clay
74-89 fine and medium sand
Depth to water: $69\pm$ feet

INDEX MAP OF VIBORG AREA



• TEST HOLE

--- CONTACT BETWEEN SAND AND CHALK WELLS