Rural Water Supplies in South Dakota: Union County

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Rural Water Supplies in South Dakota

UNION County

January, 1940
Special Extension Circular
Number 47

Extension Service
South Dakota State College
Brookings, S. D.
RURAL WATER SUPPLIES
IN
SOUTH DAKOTA

UNION COUNTY

BY
WALTER V. SEARIGHT
AND
ELMER E. MELEEN

PREPARED BY THE WORK PROJECTS ADMINISTRATION
AS A REPORT ON THE WELL SURVEY CONDUCTED
AS WORK PROJECTS ADMINISTRATION OFFICIAL PROJECT 665-74-3-126; SPONSORED BY THE EXTENSION SERVICE AND THE EXPERIMENT STATION SOUTH DAKOTA STATE COLLEGE, IN COOPERATION WITH THE STATE GEOLOGICAL SURVEY.

JANUARY 1940
FOREWORD

This study was first proposed as a project of the Mineral Resources Committee of the State Planning Board under the direction of the State Geological survey and undertaken as a Work Projects Administration project sponsored by the State Planning Board, and was continued under the Planning Board until that body was abolished July 1, 1939 by the State Legislature. At that time sponsorship was transferred to the South Dakota Agricultural Experiment Station and the State College Extension Service, South Dakota State College. Field work was begun October 1, 1938 and was practically completed by February 15, 1939. Workers were assigned in the several counties under the supervision and direction of the County Agricultural Agents and Field Supervisors who were employed by the Work Projects Administration. Questionnaires were mailed out from the offices of the County Agents and were checked and tabulated in these offices. The material was then forwarded to the central office for final tabulation and analysis under the direction of Elmer E. Meleen and Walter V. Searight.

Particular credit should be given to the individual County Agricultural Agents in the various counties of the state who arranged the contacts with the individuals from whom these data were collected, furnished a large portion of the necessary supplies for field work, and directed the workers engaged in collecting field data. Without this assistance in gathering basic data, this study could not have been conducted. The value of the report is therefore in direct proportion to the accuracy and adequacy of these basic data.
INTRODUCTION

PURPOSE

This report on rural water supplies of South Dakota has been prepared to present data recently made available on the types and the sources of water supply, exclusive of stream, lake and dam waters. The information presented is of importance to evaluate present supplies. It should also prove useful as a basis for further development of supplies where they are needed or become necessary. Further, it is hoped that the facts presented may prove of value in any program of water conservation.

SOURCES OF INFORMATION

Questionnaires were sent to all, or essentially all of the farmers of the state, asking for complete data on farm wells and supplementary supplies, with the exception of the supplies above noted. A most gratifying number returned questionnaires, actually 60.1% average for the entire state. The coverage is probably more than 60.1% since it is likely that many unanswered inquiries were those to farmers who were without wells, the type of supply emphasized in the questionnaires. The data thus obtained were supplemented with information contained in the files of the State Geological Survey, the office of the State Engineer, and reports of the United States Geological Survey. This supplementary information, together with that contained in questionnaires was used in making the well location maps included in this report.

PROCEDURE

All data from the questionnaires were tabulated and analyzed statistically by counties, which were made the areal units of study. Within the county, Acknowledgments - The authors wish especially to acknowledge and commend the conscientious assistance of Mr. E. L. Woodburn, Supervisor, for careful and painstaking supervision of statistical work. The authors also desire to express appreciation for the constant interest and support of this project by Mr. Bob Butts, Director of Research and Records Projects, South Dakota Work Projects Administration.
supplies were allocated as to kind on county maps. Since shallow waters are
the most important source of rural supply in South Dakota, wells 200 feet deep
and less were plotted on county maps from which maps indicating depths of
wells by 50 foot intervals were made. Springs, shown on the well location map,
and cisterns were also tabulated as important supplementary supplies, although
the latter do not appear on maps or in the tables in this report.

PRESENTATION OF DATA

For convenience and utility, this report has been divided into sections,
each covering one county, and each county section bound separately. Each
county report contains the following material wherever possible.

1. **Well Location Map:** This map shows the location of all wells and
springs within the county, so far as information is now available. These have
been plotted in such a manner that artesian and shallow wells can be differenti-
tated readily by the reader. Artesian wells, where they occur, are divided
into flowing and pumped. Artesian wells showing decreased flow and those re-
ported as controlled are also indicated by symbols. Shallow wells are differen-
tiated as adequate and inadequate, and dry holes as of 1938 are located.
Wells from other sources of information other than questionnaires collected
by this survey are shown in blue.

2. **Shallow Well Map:** This map shows, as accurately as possible, in
50 foot intervals, the depths at which shallow supplies are commonly obtained.
Where shallow wells are abundant, as indicated by the well location map, the
map is as accurate as the information on which it is based, but where such
wells are sparsely distributed errors are likely to occur. In many places re-
ports of shallow wells are absent, in which case the area has been left blank.

3. **Table of Pumped Wells, from 0 to 200 feet (inclusive) in depth:**
This table shows minimum, maximum, and average depths of wells within the
county, as reported in the questionnaires. Tabulations are by townships. The
general character of the water, hard, medium, and soft, as reported by farm-
ers, and the number of wells suitable or unsuitable for drinking are shown in this table. Further, the adequacy of supply, as indicated on the questionnaires, and use for irrigation are shown here.

4. **Table of Wells greater in depth than 200 feet:** Minimum, maximum, and average depths are indicated. Character, reported as hard, medium or soft is tabulated. Adequacy and use for irrigation are shown as in the preceding table.

5. **Table of flowing wells:** Minimum, maximum, and average depths are shown together with general character and use for irrigation. The volume of flow as reported, and the number of flowing wells reported as equipped with control valves is also included in this table.

**SUMMARY OF STATE SUPPLIES**

In the entire state, a total of 48,479 wells were reported in response to questionnaires, returned by 60.1% of the recipients. If those who did not respond have a number of wells in proportion to those who reported, there are approximately 80,000 wells in South Dakota. There are possibly many less than this number since several counties with large numbers of wells returned over 75% of the questionnaires and since many farmers without wells did not reply because they were not requested to do so in the formal questionnaire. Of the wells reported, 16.2% are artesian, including both pumped and flowing wells. Shallow wells are 83.8% of the wells reported. Wells from shallow sources are thus obviously by far the most important means for obtaining water in rural South Dakota.

Important supplementary supplies are cisterns and springs. Roughly, there is more than one cistern to each 40 wells. Many springs are reported, however, in counties with very few wells, so that in some localities they are of considerable importance.
Union County

Union county is in the extreme southeastern corner of South Dakota. It is bounded on the north by Lincoln county, on the east by the state of Minnesota, on the south by the state of Nebraska, and on the west by Clay county.

 ![Map of South Dakota showing location of Union county](image)

Union county is devoted mainly to agriculture, having approximately 270,651 acres (93.6 per cent) of its total 289,280 acres in farms, divided into 1,955 farm units of approximately 174 acres each. Corn, wheat, barley, oats, hay and rye are the important field crops, being produced in the order named. Livestock is also important; cattle, hogs, horses and mules, and sheep and lambs are of greatest value. Poultry is also important in the county.

Farm units devoted to livestock and dairy cattle require generally distributed sources of water supply. The supplies required are not great, but adequate and constant supplies of suitable water at low cost are necessary to operate farms of these sizes and organization profitably. The well location map of Union county indicates that, in general, such supplies are available and are widely distributed.

On the well location map of Union county, all deep pumped wells obtaining water from artesian sources, mostly the Dakota sandstone, are shown in black as artesian wells. On this map all other wells are shown in red and are called shallow wells regardless of depth. On all other maps and in the tables

*South Dakota Agricultural Statistics, Annual Report, 1937.*
LOCATION OF ARTESIAN AND SHALLOW WELLS IN UNION COUNTY

ARTESIAN WELLS

- Pumped

SHALLOW WELLS

- Adequate Supply
- Inadequate Supply

DRY WELLS

SPRINGS

WELLS FROM OTHER SOURCES

CITY WELLS
and text of this report, the term shallow wells applies to those wells of 200 feet depth or less and those greater than 200 feet deep are treated as deep wells, unless otherwise stated.

Returns from the questionnaires sent to farmers and land owners of Union county give information on 770 wells, 506 cisterns, and five springs in 21 townships, or 36.8 wells per township. This 43.5 per cent coverage of the county wells is adequate to support the conclusions drawn in this report.

DEPTH AND DISTRIBUTION

All of the rural water supplies of Union county were obtained from pumped wells, shallow and deep, which were rather widely distributed throughout the county.

Shallow wells: Approximately 98 per cent (97.7) of all wells reported in Union county were shallow pumped wells. Of the 752 shallow wells reported, 55.7 per cent were from 0 to 50 feet deep; 23.6 per cent from 50 to 100 feet; 14.9 per cent from 100 to 150 feet in depth; and 5.8 per cent from 150 to 200 feet deep. Shallow wells were reported in each township of the county. All except seven townships reported all wells to be shallow. A tabulation of these seven townships with the percentage of shallow and deep wells in each is given below:

<table>
<thead>
<tr>
<th>Twp.</th>
<th>Rge.</th>
<th>Shallow</th>
<th>Deep</th>
<th>Per cent Shallow</th>
<th>Per cent Deep</th>
</tr>
</thead>
<tbody>
<tr>
<td>93N</td>
<td>48W</td>
<td>14</td>
<td>1</td>
<td>93.3</td>
<td>6.7</td>
</tr>
<tr>
<td>92</td>
<td>49</td>
<td>41</td>
<td>1</td>
<td>97.6</td>
<td>2.4</td>
</tr>
<tr>
<td>92</td>
<td>50</td>
<td>48</td>
<td>1</td>
<td>97.9</td>
<td>2.1</td>
</tr>
<tr>
<td>93</td>
<td>48</td>
<td>7</td>
<td>1</td>
<td>87.5</td>
<td>12.5</td>
</tr>
<tr>
<td>93</td>
<td>49</td>
<td>73</td>
<td>3</td>
<td>96.0</td>
<td>4.0</td>
</tr>
<tr>
<td>93</td>
<td>50</td>
<td>49</td>
<td>3</td>
<td>94.2</td>
<td>5.8</td>
</tr>
<tr>
<td>94</td>
<td>50</td>
<td>51</td>
<td>8</td>
<td>86.4</td>
<td>13.6</td>
</tr>
</tbody>
</table>

The 396 shallow wells between 0 and 50 feet were reported in all townships; wells from 50 to 100 feet were also distributed throughout all townships; wells from 100 to 150 feet in depth were reported in all but the following townships:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>93N</td>
<td>48W</td>
<td>93N</td>
<td>48W</td>
<td>90N</td>
<td>49W</td>
<td>89N</td>
<td>48W</td>
<td>29N</td>
<td>8W</td>
<td>30</td>
<td>7W</td>
</tr>
</tbody>
</table>
SHALLOW WELLS (0-200FT)

DEPTHS AT WHICH SUPPLIES ARE COMMONLY OBTAINED

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WORK PROJECTS ADMINISTRATION
O.P. 665-74-3-126  W.P. 36.36
Shallow wells between 150 and 200 feet were reported in all townships of the county except the following:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>92N</td>
<td>49W</td>
<td>91N</td>
<td>50W</td>
<td>90N</td>
<td>49W</td>
<td>84N</td>
<td>48W</td>
</tr>
<tr>
<td>93</td>
<td>49</td>
<td>91</td>
<td>49</td>
<td>90</td>
<td>48</td>
<td>29</td>
<td>8</td>
</tr>
<tr>
<td>92</td>
<td>49</td>
<td>90</td>
<td>50</td>
<td>89</td>
<td>49</td>
<td>30</td>
<td>7</td>
</tr>
</tbody>
</table>

Eight townships in the county reported shallow wells within all depth ranges. These townships are given in the following tabulation:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>92N</td>
<td>50W</td>
<td>93N</td>
<td>50W</td>
<td>94N</td>
<td>50W</td>
<td>95N</td>
<td>49W</td>
</tr>
<tr>
<td>93</td>
<td>49</td>
<td>94</td>
<td>49</td>
<td>95</td>
<td>48</td>
<td>95</td>
<td>50</td>
</tr>
</tbody>
</table>

Five townships, Twp. 92N, Rge. 50W, Twp. 90N, Rge. 50W, Twp. 94N, Rge. 49W, Twp. 30N, Rge. 7W, and Twp. 30N, Rge. 8W, reported no wells greater than 50 feet in depth.

No shallow flowing wells were reported in Union county and none are known to occur.

Deep wells: Approximately two per cent (2.3) of the rural water supplies of Union county were obtained from deep pumped wells which terminate in the Dakota sandstone series. Of the 18 deep wells reported, seven (39 per cent) were from 201 to 300 feet deep; six wells were from 300 to 400 feet in depth; three were between 400 and 500 feet deep; and two wells in Twp. 94N, Rge. 50W, were reported at 501 and 640 feet in depth. The following tabulation shows the location, number, and minimum and maximum depths of the deep wells in Union county:

<table>
<thead>
<tr>
<th>Twp.</th>
<th>Rge.</th>
<th>Number of Wells</th>
<th>Depths (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>89N</td>
<td>48W</td>
<td>1</td>
<td>450</td>
</tr>
<tr>
<td>92</td>
<td>49</td>
<td>1</td>
<td>228</td>
</tr>
<tr>
<td>92</td>
<td>50</td>
<td>1</td>
<td>286</td>
</tr>
<tr>
<td>93</td>
<td>48</td>
<td>1</td>
<td>207</td>
</tr>
<tr>
<td>93</td>
<td>49</td>
<td>3</td>
<td>252 to 340</td>
</tr>
<tr>
<td>93</td>
<td>50</td>
<td>3</td>
<td>256 to 360</td>
</tr>
<tr>
<td>94</td>
<td>50</td>
<td>8</td>
<td>224 to 640</td>
</tr>
</tbody>
</table>

No deep flowing wells were reported from Union county.

CHARACTER OF WELL WATERS

In order to determine character of water in the county, users were asked
ARTESIAN AREAS OF SOUTH DAKOTA
1938

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WORK PROJECTS ADMINISTRATION
O.P. 655-74-3-126
WP 3636

FLOWING WELLS
PUMPED ARTESIAN WELLS
to indicate whether they considered supplies to be hard, moderately hard, or soft. Although chemical analyses are not generally available to farmers, usage of the water is a fairly satisfactory criterion of character and must suffice until adequate laboratory analyses are available.

In general, well supplies in Union county produce hard water. Among the shallow wells, 44 per cent were reported with hard water; 51 per cent with moderately hard water; and five per cent with soft water. The following tabulation shows the character of water in shallow wells within each depth range:

<table>
<thead>
<tr>
<th>Depth Range</th>
<th>Hard (Per cent)</th>
<th>Medium (Per cent)</th>
<th>Soft (Per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 50 feet</td>
<td>34.9</td>
<td>57.2</td>
<td>7.9</td>
</tr>
<tr>
<td>50 to 100 &quot;</td>
<td>48.7</td>
<td>46.2</td>
<td>5.1</td>
</tr>
<tr>
<td>100 to 150 &quot;</td>
<td>67.</td>
<td>30.9</td>
<td>2.1</td>
</tr>
<tr>
<td>150 to 200 &quot;</td>
<td>50.</td>
<td>50.</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Thus, approximately 95 per cent of the shallow wells in Union county produce moderately or definitely hard water. Hard water in the wells from 0 to 50 feet was reported in all but two townships, and ten townships reported all well water hard at this depth range as follows:

-----------|------------|------------|------------|------------|------------|------------|
89N 49W    | 90N 48W    | 91N 50W    | 94N 48W    | 29N 8N     |
89 49      | 90 50      | 92 50      | 93 48      | 30 7       |

Soft water wells were reported within the 0 to 50 foot depth range in all townships except those above and in the 50 to 100 foot depths in only five townships as follows:

-----------|------------|------------|------------|------------|------------|
92N 49W    | 93N 49W    | 93N 50W    | 94N 50W    | 95N 50W    |

In the 100 to 150 foot depth range, two soft water wells were reported, one each, in Twps.93N., Rge.49W., and Twps.95N., Rge.50W.

Among the deep wells, seven (44 per cent) were reported with hard water; eight (50 per cent) with moderately hard; and only one (6 per cent) with soft water. The only deep soft water well was reported in the 200 to 300 foot depth range. The deepest well reported in the county, at a depth of 640 feet, produces hard water.

In general, well waters in Union county are suitable for drinking pur-
poses. Fifty two wells (approximately one out of every 15) was reported to produce water unsuitable for drinking. Of these 52 unsuitable wells, fifty one were shallow and one was a deep well. Most of the unsatisfactory water was reported among the shallow wells within the 100 to 200 foot depth range in which one out of every 12 wells was reported unsuitable for drinking. Only eight out of 168 wells in the 50 to 100 foot depth range was reported unsuitable for drinking.

Only one deep well was reported unsuitable for drinking. This well was reported in Twp.9N., Rge.50W., at a depth of 400 feet.

There are several possible reasons for unsuitability, including surface contamination and the presence of objectionable chemicals in the water. There is the possibility also that in some cases injurious ingredients may be present.

ADEQUACY OF WELL WATERS

Water supplies in Union county are, in general, adequate for present needs. Needs vary, however, and changes in land usage, modification of farm management, or dry cycles in this and surrounding land areas affect both the source and usage of supplies.

Approximately 9.5 per cent of the well supplies of Union county were reported inadequate for current needs. All of the inadequacy was reported among 71 shallow wells, a relatively small number. No inadequate deep wells were reported. Most of the inadequacy was reported from wells less than 50 feet deep, among which 12 per cent were reported inadequate. The deeper shallow wells reported only slight inadequacy, since only two wells between 100 and 200 feet were reported inadequate.

IRRIGATION

Nine shallow wells were used for the irrigation of approximately one fourth acre, and one deep well, 224 feet in depth, was reported used to irri-
SUPPLEMENTARY SUPPLIES

Springs are not a very important source of supplementary supplies in Union county, since only five were reported. Only one of these was inadequate for present use. Three springs were used for both stock and domestic purposes. The following tabulation shows the location and number of springs reported in Union county:

<table>
<thead>
<tr>
<th>Twp.</th>
<th>Rge.</th>
<th>Number of Springs</th>
</tr>
</thead>
<tbody>
<tr>
<td>93N 48W</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>94 48</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>94N 49W</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>94 50</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Cisterns are an important source of supplementary supplies in Union county, since 506 were reported in the 18 townships of the county. Approximately 83 per cent of these cisterns were rather evenly distributed in the townships from range 92 northward. A total of 486 cisterns were supplied by rain and 11 were filled by water hauled from other sources. Cisterns in Union county, as elsewhere in the state, were used for laundry purposes in areas of regular hard water supplies, or for drinking and cooking where supplies were inadequate or unsuitable. Of the 506 cisterns reported, 126 were used for drinking and cooking and 475 for laundry.
<table>
<thead>
<tr>
<th>LOCATION</th>
<th>Number of Wells</th>
<th>DEPTH OF WELLS</th>
<th>CHARACTER OF WATER</th>
<th>ADEQUACY OF SUPPLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twp. Rge.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>89 48</td>
<td>14</td>
<td>20</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td>89 49</td>
<td>14</td>
<td>20</td>
<td>42</td>
<td>27</td>
</tr>
<tr>
<td>90 48</td>
<td>26</td>
<td>12</td>
<td>68</td>
<td>38</td>
</tr>
<tr>
<td>90 49</td>
<td>58</td>
<td>15</td>
<td>90</td>
<td>30</td>
</tr>
<tr>
<td>90 50</td>
<td>13</td>
<td>15</td>
<td>40</td>
<td>29</td>
</tr>
<tr>
<td>91 49</td>
<td>43</td>
<td>20</td>
<td>80</td>
<td>43</td>
</tr>
<tr>
<td>91 50</td>
<td>25</td>
<td>16</td>
<td>70</td>
<td>37</td>
</tr>
<tr>
<td>92 49</td>
<td>41</td>
<td>14</td>
<td>120</td>
<td>46</td>
</tr>
<tr>
<td>92 50</td>
<td>48</td>
<td>15</td>
<td>190</td>
<td>100</td>
</tr>
<tr>
<td>93 48</td>
<td>7</td>
<td>16</td>
<td>50</td>
<td>33</td>
</tr>
<tr>
<td>93 49</td>
<td>73</td>
<td>8</td>
<td>180</td>
<td>52</td>
</tr>
<tr>
<td>93 50</td>
<td>49</td>
<td>16</td>
<td>179</td>
<td>74</td>
</tr>
<tr>
<td>94 48</td>
<td>29</td>
<td>15</td>
<td>110</td>
<td>45</td>
</tr>
<tr>
<td>94 49</td>
<td>60</td>
<td>19</td>
<td>170</td>
<td>65</td>
</tr>
<tr>
<td>94 50</td>
<td>51</td>
<td>14</td>
<td>187</td>
<td>66</td>
</tr>
<tr>
<td>95 48</td>
<td>70</td>
<td>10</td>
<td>185</td>
<td>50</td>
</tr>
<tr>
<td>95 49</td>
<td>64</td>
<td>14</td>
<td>184</td>
<td>94</td>
</tr>
<tr>
<td>95 50</td>
<td>60</td>
<td>12</td>
<td>200</td>
<td>87</td>
</tr>
<tr>
<td>29 8</td>
<td>4</td>
<td>20</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>30 7</td>
<td>2</td>
<td>25</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>30 8</td>
<td>1</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>752</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: No Flowing Wells reported for Union County.
## UNION COUNTY
### Table 2.
#### DATA ON PUMPED WELLS OVER 200 FEET IN DEPTH

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>Number of Wells</th>
<th>DEPTH OF WELLS</th>
<th>CHARACTER OF WATER</th>
<th>ADEQUACY OF SUPPLY</th>
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**NOTE:** No wells reported for this group from the following townships and ranges: T.89N., R.49W.; T.90N., R.48W., 49W., 50W.; T.91N., R.47W. 48W., 49W., 50W.; T.91N., R.38W., T.38N., R.7W., 8W.
Union County Well Notes

The following are pertinent remarks quoted from questionnaires returned by farmers and are included opinions of the water situation as expressed by the individual farmers and must be so applied.

Twp.89N., Rge.48W.
NW 1/4 Sec. 3
26 feet: Water for stock, domestic
"I have three wells approximately the same kind of well, they are all bored with an auger and tiled up. I have one about 15 yrs, old which we use for stock, they all are the same as to depth, width and the amount of water available."

Twp.89N., Rge.48W.
SW 1/4 Sec. 15
28 feet: Water for stock, domestic
"This well is a tubular well and is down 80 ft. It is in coarse sand, it has been in use about 35 yrs. I can let the mill run all day and it won't go dry, there's nothing better than a good well."

Twp.89N., Rge.48W.
NW 1/4 Sec. 15
76 feet: Water is not good
"It isn't difficult to get water here because we have had both drilled and dug wells and there seems to be plenty of water."

Twp.89N., Rge.49W.
SW 1/4 Sec. 2
42 feet: Water for stock, domestic
"Our water gets red or rusty after standing for a while. Some of our neighbors have clear water and does not get rusty. Our well is of the driven type about 42 ft. of pipe. There seems to be a vein of water about 18 ft. down and another about 40 ft. down."

Twp.89N., Rge.49W.
SE 1/4 Sec. 14
32 feet: Water for stock, domestic
"Water is clear when pumped but rapidly turns cloudy with iron rust. This well was moved about 4 ft. 3 or 4 years ago from its old location."

Twp.91N., Rge.50W.
NE 1/4 Sec. 5
60 feet: Water satisfactory
"Water is clear, very cold and good for drinking when fresh. After standing it becomes reddish in color."

Twp.92N., Rge.49W.
NW 1/4 Sec. 11
22 feet: Water for stock, domestic
"Two wells on this farm, one used exclusively for house use, other for stock. Depth and water supply equal in both wells. Have had water tested by State at University of South Dakota and it was found pure. Both wells on building site."

Twp.92N., Rge.49W.
NW 1/4 Sec. 15
18 feet: Water for stock, domestic (clay)
"The well described was first dug about 60 yrs. ago. Always furnished plenty of water until the last few years, the water kept getting lower until it would not furnish enough for use. There was from six to eight foot of water for years. After being dug it has settled now to about 2 ft. In the fall of 1936 I drilled another well about 200 ft, further up the hill. At 61 ft. we struck a fine flow of water. A windmill is now attached and furnishes plenty of clear soft water. The mill has run several days pumping into the reservoir which has no effect on the supply of water. We struck water in medium sand."
282 feet: Water for stock, domestic
"Water vein played out after one year. Drills got down to about 200 ft. and could go no further. Water in old well was hard and alkali."

100 feet: Water for stock only
"There was trouble getting water here as they had to go so deep. One well 180 ft. was drilled but no water. Some years later this well was drilled on a new location and there was plenty of water but the vein of sand was very shallow."

35 feet: Water for stock, domestic (blue clay)
"Struck blue clay at 35 ft, drilled 175 ft, same soil."

25 feet: Water for stock, domestic
"When well was first dug there was plenty water but is getting so it pumps dry in short time."

30 feet: Water for stock, domestic
"There is a sand point driven down 10 ft which gives a depth of 30 ft. There is no limit to the supply, the wells have never gone dry."

58 feet: Water for domestic only
"We have three wells, one indicated is in the yard close to the house, another put down in 1937 just outside of grove. This last well has been in use since 1937. The water soil is quicksand and blue clay, water comes in slow has a tendency to fill in. The well indicated can be pumped dry once every 24 hrs. The water is good to drink, very soft, has some lime in it which gathers on pump."

35 feet: Water for stock domestic
"We have experienced a lot of difficulty having a well good enough to supply the required amount of water. We drilled one well up on hill and had good water plenty of it for two months then it went dry. We now have three wells along creek and two of them have been very good. We use one mill for both of them."

70 feet: Water for domestic only
"There had been several bored wells on this school plot with no results. I drilled another at 150 ft, no water. The one there now (70 ft) has plenty of water. It was pumped with a drilling machine and seems to have plenty of water."

20 feet: Water for domestic only
"There is not much water in our well, the water is excellent for drinking but hard. There are many springs on this farm which supply water for livestock. I don't know what mineral this water contains but the ground gets slightly white where these springs are located."

25 feet: Water for stock only
"In the homestead days it was considered difficult to find water here, until the present well was put down."
Twp. 92N., Rge. 50W.
SE 1/4 Sec. 1
282 feet: Water for stock, domestic
"Water vein played out after one year. Drills got down to about 200 ft. and could go no further. Water in old well was hard and alkali."

Twp. 92N., Rge. 50W.
NE 1/4 Sec. 12
100 feet: Water for stock only
"There was trouble getting water here as they had to go so deep. One well 180 ft. was drilled but no water. Some years later this well was drilled on a new location and there was plenty of water but the vein of sand was very shallow."

Twp. 93N., Rge. 49W.
SE 1/4 Sec. 11
35 feet: Water for stock, domestic (blue clay)
"Struck blue clay at 35 ft, drilled 175 ft. same soil."

Twp. 93N., Rge. 49W.
SE 1/4 Sec. 29
28 feet: Water for stock, domestic
"When well was first dug there was plenty water but is getting so it pumps dry in short time."

Twp. 93N., Rge. 50W.
SE 1/4 Sec. 5
30 feet: Water for stock, domestic
"There is a sandpoint driven down 10 ft. which gives a depth of 30 ft. There is no limit to the supply, the wells have never gone dry."

Twp. 93N., Rge. 50W.
SW 1/4 Sec. 6
58 feet: Water for domestic only
"We have three wells, one indicated is in the yard close to the house, another put down in 1937 just outside of grove. This last well has been in use since 1937. The water soil is quicksand and blue clay, water comes in slow has a tendency to fill in. The well indicated can be pumped dry once every 24 hrs. The water is good to drink, very soft, has some lime in it which gathers on pump."

Twp. 93N., Rge. 50W.
NE 1/4 Sec. 12
35 feet: Water for stock domestic
"We have experienced a lot of difficulty having a well good enough to supply the required amount of water. We drilled one well up on hill and had good water plenty of it for two months then it went dry. We now have two wells along creek and two of them have been very good. We use one well for both of them."

Twp. 94N., Rge. 48W.
SW 1/4 Sec. 5
70 feet: Water for domestic only
"There had been several bored wells on this school plot with no results. I drilled another at 150 ft. no water. The one there now (70 ft.) has plenty of water. It was pumped with a drilling machine and seems to have plenty of water."

Twp. 94N., Rge. 48W.
NW 1/4 Sec. 6
20 feet: Water for domestic only
"There is not much water in our well, the water is excellent for drinking but hard. There are many springs on this farm which supply water for livestock. I don't know what mineral this water contains but the ground gets slightly white where these springs are located."

Twp. 94N., Rge. 49W.
NW 1/4 Sec. 17
25 feet: Water for stock only
"In the homestead days it was considered difficult to find water here, until the present well was put down."
<table>
<thead>
<tr>
<th>Township</th>
<th>Range</th>
<th>Section</th>
<th>Depth</th>
<th>Description</th>
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<td>Twp 94N, Rge 49W, SW 1/4 Sec. 26</td>
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<td>450 feet</td>
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<td>39 feet</td>
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<tr>
<td>Twp 95N, Rge 48W, NW 1/4 Sec. 18</td>
<td>17 feet</td>
<td>Water not good</td>
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<td>Twp 95N, Rge 48W, SW 1/4 Sec. 20</td>
<td>32 feet</td>
<td>Water for stock, domestic</td>
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There seems to be only surface water in this locality. I have drilled two wells in 1936, both were dry holes, about 80 ft. we run into soapstone both places.

I have tried to drill a well three times and have been down over 300 ft. but failed to strike a good well.

"We must drill 128 to 130" to get water but we have a rise of 125 ft. when we hit this coarse sand and it is impossible to lower the water level at this point."

There were two bored wells 60 ft. deep that went dry. About 5 or 6 holes were drilled to a depth of 120-130 ft. plenty of water but dirt and sand would clog points, in other words they would not clear up.

We never had sufficient water until we drilled a tubular well.

Around the buildings there seems to be no end to the depth of blue clay. We dug as deep as 70 ft. in blue clay without success.

I have a well 40 ft. deep 3 ft. wide, it is tiled and 40 yrs. old. It has a chalk rock bottom. The water is nice and clear and very good. It has a windmill could pump all day and night and not go dry. I pump with a gas engine and it pumps it dry in 15 minutes, it pumps too fast, I should have a windmill but can't afford it.

Have tried drilling wells with no success so have to rely on bored wells and they pump dry. But having a supply cistern helps keep a supply of water on hand.

This well has been condemned by the health office after reaching a depth of 17 ft. we have difficulty because of large rocks and coarse gravel. I would like to have a new well north of the house with a supply tank.

I drilled a well 600 feet from present well to a depth of 250 ft. some water at 45 ft. but struck blue clay at 60 ft. but could not drill through it.
Twp.95N., Rge.4EW.
NW 1/4 Sec. 30
118 feet: Water for stock, domestic
"In 1935 when our shallow well failed to supply enough water we drilled down 216 ft., struck soapstone and stopped. Moved 30 rds. east, elevation 10 ft., lower, drilled 90 ft. soapstone stopped for that year. In 1936 continued at a point about 60 rds. S.E. from supply tank drilled 150 ft. soapstone. Moved to a point about 60 rds. N.E. from supply tank, same elevation, drilled 150 ft. same result. Then we moved south to a point 70 rds east and 20 ft., higher than supply tank, drilled 113 ft. struck a strata of water bearing sand 5 ft. deep which gave a good supply of water."

Twp.95N., Rge.48W.
NW 1/4 Sec. 32
90 feet: Water not good
"It is necessary to drill down a great many feet to get water. No surface water. Water is unfit to drink or cook with."

Twp.95N., Rge.49W.
NE 1/4 Sec. 17
52 feet: Water for stock only
"Have had trouble getting sufficient water have had 7 holes drilled ranging in depth from 100 to 900 ft. Then at that depth they struck soapstone which is in this district about 200 ft., but the wells that have been dug are not good."

Twp.95N., Rge.50W.
NE 1/4 Sec. 6
117 feet: Water for stock, domestic
"Our well is packed in the bottom with glass pebbles about 1/4 in. square, this holding down the fine sand and eliminating sandpoint. Thought I would mention this, as there is only one more glass packed well around here that I know of."

Twp.95N., Rge.50W.
NW 1/4 Sec. 30
160 feet:
"The sand veins are very shallow and are fine and there is also blue mud in the sand."

Twp.95N., Rge.50W.
SW 1/4 Sec. 33
44 feet: (chalk rock)
"Have two wells on home farm, one in chalk rock on hill 36 ft. reservoir supplies stock and house. (Soft water) One in valley not in use, gravel, unlimited water but hard."