

W 7948

Town: Russell { NE } : County Lucas
SE, NW, NE sec. 6 T 71 N., R. 20 ^{E.} W.

[illegible]

Sources of water: Principal _____; Others _____

Production data:

Date _____

Static depth to water _____

Measuring point _____

Pumping level _____

at _____

g.p.m. _____

Specific capacity _____

g.p.m. per ft. drawdown; Temperature _____

°F.

Pump data: Type pump _____

Column Dia. _____

Length _____

Cylinder or bowls: Dia. _____

Length _____

Suction pipe _____

Power _____

Airline _____

Estimated rate of production: _____

g.p.m. for _____

hrs. a day _____

Use of water _____

WATER ANALYSES (in parts per million)

Date samples _____

Sampled by _____

Total solids _____

Insoluble matter _____

Alkalinity (Meo) _____

Alkalinity (Phn) _____

pH _____

 $\text{Fe}_2\text{O}_3 + \text{Mn}_2\text{O}_3 + \text{Al}_2\text{O}_3$ _____

Alkali as sodium _____

Calcium _____

Magnesium _____

Iron (unfiltered) _____

Manganese _____

Nitrate _____

Fluoride _____

Chloride _____

Sulfate _____

Bicarbonate _____

Hardness (ppm) _____

Hardness (gpg) _____

Remarks _____

Laboratory data: **W 7948**Sample storage location **ELI-6,7,8,9.**Sample range **0-2520**No. spls. **378**No. dupls. & Cond. **377 Good**

Spls. prepared by _____

Washed range **211-2520**

by _____

Driller's log and cond. _____

Insoluble residues: Prepared by _____

Studied by _____

Strip log _____

Microscopic study _____

strip log _____

Gen. log _____

Correl. by _____

OCT. 1956
NOTED

MEMORANDUM

October 12, 1956

To: H. G. Hershey
From: Richard C. Northup
Re: Status of drilling at Russell

A trip was made to the new well at Russell on Friday at the request of the town council to make a formation check of the samples. Drilling had reached a depth of 2345 feet in the Oneota (basal Prairie du Chien). A revised estimate indicates that the Jordan should come in at about 2425 feet, and may be reached today or Saturday. Drilling will continue through the Jordan sandstone, but the town does not plan to drill more than just a few feet into the St. Lawrence. Drilling had progressed very fast since setting and cementing casing at 2025 feet, having made 320 feet in three days. Yesterday, however, drilling slowed considerably because of the chert in the Oneota, and more particularly because of partial lost circulation. Several hours were spent yesterday in mixing a heavier drilling mud which would be less likely to go into the formation. From the behavior of the mud, it would seem that the Oneota section contains fractures which will likely be water bearing. The driller and authorities at Russell will call us today if any new developments occur, and I will be glad to run down there again if needed. If everything works out, they may be able to run a pumping test sometime next week.

1950 top St. Peter

540

2490 Top Jord. 50 St. P
est. 160 Willow R
95 R.V.

Casing to be set at 2040' 235 Oneota
540

Top Jordan estimated to be
540' below top St. Peter

PJH

AUDITOR OF STATE

CHET B. AKERS

PRESIDENT IOWA ACADEMY OF SCIENCE

F. E. BROWN

PRESIDENT IOWA STATE COLLEGE

CHARLES E. FRILEY

PRESIDENT STATE UNIVERSITY OF IOWA

VIRGIL M. HANCHER

GOVERNOR OF IOWA

WILLIAM S. BEARDSLEY

GEOLOGICAL BOARD

CITY

ANNEX

ICAL SURVEY

IOWA

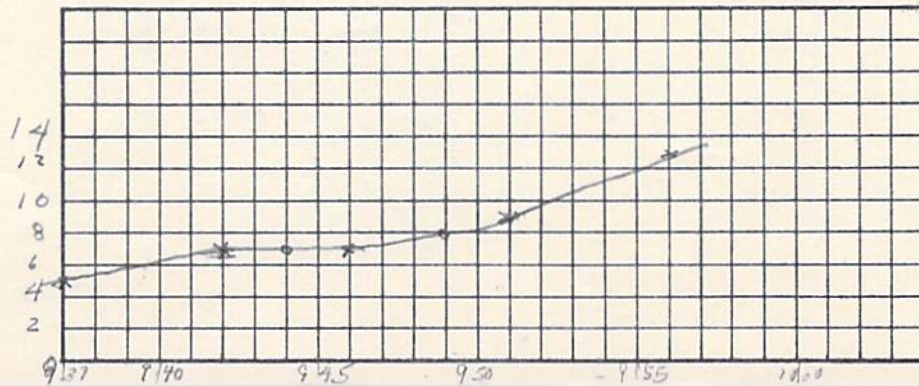
DATE: Aug. 28, 1936 NAME: Van Hook & Campbell
 COUNTY: Lucas WEATHER: Overcast w/ showers

STN.	TIME	RDG.	TEMP. °F	DIFF. IN ELEV.	TEMP. CORR.	TOTAL T.C.	ADJ. RDG.	BAR. CORR.	ELEV.
B.M.	9:37	1030	78	-2	0	0	1030	+5	1035
B.M.	9:42	1028		-2	0	0	1028	+7	1035
Sta. 1	9:44	1026		+2	0	0	1026	+7	1033
B.M.	9:46	1028		-6	0	0	1028	+7	1035
Sta. 1	9:49	1022		+4	0	0	1022	+9	1031
B.M.	9:51	1026		-4	0	0	1026	+9	1035
B.M.	9:56	1022	V			0	1022	+13	1035

B.M. 1035
 Russell R.R. Sta.

Deep well
 City Park
 Ground Elev.
1032

Village of Russell
 well Log.



CHECKED ONE
 RECORDED ONE

Lucas

June 17, 1953

Mr. E. S. Boudinot
Brown Engineering Company
322 K P Building
Des Moines, Iowa

Dear Mr. Boudinot:

Following your recent telephone call to this office, we have assembled the pertinent data on the geology and general ground-water conditions beneath the glacial deposits at Russell, Iowa. Data in the ground-water files of the Iowa and U. S. Geological Surveys cooperating on statewide investigations comprise the basis for this report.

Below in tabular form we have summarized the anticipated geologic section underlying Russell as far as the St. Peter sandstone. Sample cuttings from the recent test drilling indicate the glacial drift to be about 190 feet thick. All depth figures are referred to a starting altitude of 1,035 feet at the C. B. & Q. Railroad station.

<u>Formation and description</u>	<u>Thickness (ft.)</u>	<u>Depth (ft.)</u>	
		<u>From</u>	<u>To</u>
Pleistocene system			
Glacial drift clay and sand	190	0	190
Pennsylvanian system			
Desmoinesian series			
Cherokee group (mostly shale, some sandstone and perhaps a few limestone and coal beds)	345	190	535
Mississippian system			
Ste. Genevieve formation (limestone and shale)	40	535	575
St. Louis-Spergen formations (lime- stone and sandstone)	60	575	635

Warsaw formation (dolomite, perhaps cherty; gypsum and shale in lower part)	60	635	695
Keokuk-Burlington formations (cherty dolomite and a little shale in upper part, limestone and cherty dolomite in lower part)	210	695	905
Hampton formation (cherty and dolomite)	45	905	950
North Hill limestone	20	950	970
Maple Mill shale	40	970	1010
Devonian system			
Lime Creek formation (limestone)	175	1010	1185
Cedar Valley formation (limestone and dolomite)	225	1185	1410
Wapsipinicon formation (dolomite, cherty, silty, and gypsiferous)	175	1410	1585
Ordovician system			
Maquoketa formation (shale and cherty dolomite)	90	1585	1675
Galena formation (dolomite and/or limestone)	125	1675	1800
Decorah-Platteville formations (limestone and shale)	75	1800	1875
St. Peter sandstone		1875	1950

Slight adjustments may be necessary on all these depths according to any difference between the assumed and actual starting altitude at the site of a well.

The population of Russell, about 600, indicates a well capable of at least 50 gallons a minute will be desired by this community.

As you probably know, deep wells are not very plentiful in this part of Iowa, chiefly because of the poor quality water obtained from, or thought to occur, in the deep formations. However, it is possible that a sufficient amount of acceptable quality water might be developed from the Pennsylvanian and Mississippian rocks above the Maple Mill shale. This would require about a 1000-foot well; however, there is no assurance of a successful rock well in this vicinity. In some places, the Pennsylvanian sandstones yield a good quality water that is exceptionally soft, but in most wells these waters are highly mineralized in sulfate, sodium, and iron. The Mississippian formations down to the top of the Maple Mill shale probably will contain water-bearing beds; whether an adequate supply for the town can be developed is uncertain without an actual pumping test.

Most moderately deep wells in this area do not penetrate below the St. Louis-Spergen formations, and yields seldom exceed 15 gallons a minute even with considerable drawdown. One notable exception is the Leon town well (1949) in Decatur County drilled to the Maple Mill shale. The well was cased to the top of the Mississippian limestones with perforations opposite Pennsylvanian sandstones. The main water reportedly was from the Pennsylvanian. On final development, the well produced 180 gallons a minute during a 5-hour test. The static and pumping water levels were given as 402 and 680 feet respectively. Analysis of the water from this well indicates large concentrations of sodium and sulfate and objectionable amounts of fluoride and iron. Despite the high lift and poor quality, the well was placed in service for public use in August 1951.

Anhydrite or gypsum occurs in the upper part of the Warsaw formation in a few wells in Lucas and Monroe Counties. These minerals increase the hardness of water but were not found at Leon; however, the entire Warsaw formation might have to be cased out in a well at Russell should gypsum be encountered there.

The chances for a suitable well in strata below the Maple Mill shale are not very promising based on the limited information available and with increasing depth and distance from surface exposures or areas of intake, the water is likely to become more highly mineralized.

Included with this report is a separate sheet of a few pertinent mineral analyses.

Mr. E. S. Boudinot

- 4 -

June 17, 1953

We hope this material will help you to solve the water-supply problem at Russell. If there are any questions on the foregoing data or if we can be of further service in any way, please write or call us at your convenience.

Very truly yours,

H. G. Hershey

HGH:PJH:emh

Enclosure

cc: Mr. Guy Smith
Russell, Iowa

Copy sent to Art Bruinekool 6-18-53
Copy sent to Mayor of Russell, Ia. 7/9/56

COUNTY

TABULATION OF WATER ANALYSES

(Dissolved constituents in parts per million)

[illegible]

NOTES:

March 20, 1956

**Mr. E. S. Boudinot
Brown Engineering Company
322-334 K P Building
Des Moines, Iowa**

Dear Mr. Boudinot:

In response to your letter of March 16 we have reviewed the existing information on deep well possibilities at Russell, Iowa in light of the new data from the deep drilling at Indianola.

I do not believe there is much more information to add to what has already been sent to you regarding the Jordan well possibilities at Russell. The Indianola drilling provided very valuable information, but it will take more than one deep well to give reliable data on the ground-water conditions in the Jordan aquifer in south central Iowa.

The quantity and quality of water obtained at Indianola was very encouraging except possibly for the excessive fluoride content. Whereas, formerly it was thought that the Prairie du Chien-Jordan-St. Lawrence water would be highly mineralized or at least a very questionable source in south central Iowa, it now seems that this aquifer may yield acceptable water for municipal use over a wide area. With the Indianola well added to the list of successful wells penetrating the Jordan in southeast Iowa, including Altoona, Grinnell, Ottumwa, and Keosauqua, the chances for a good well in this formation at Russell appear more promising than ever before.

However, we feel that the available facts do not yet warrant a definite conclusion that a successful well yielding plenty of water of good quality can be drilled to the Jordan formation as far south as Russell. In other words, the information is not yet adequate to state with assurance what results will be obtained there. We do not feel that the existing information permits us to go further than to say that the chances for a good well at Russell appear very promising and that acceptable water having a quality like that at Indianola or Ottumwa might be found. We feel also that it is

Mr. E. S. Boudinot

2

March 20, 1956

only fair to mention the possibility that the quality might not be as good as hoped for.

To sum up, the chances for a successful well in the Jordan aquifer at Russell seem reasonably promising, but we cannot definitely state what the drilling results will be.

If this well is drilled the method of construction used in the Indianola well would seem to be a good plan to follow-- casing and cementing from the surface for a considerable distance below the St. Peter sandstone.

I hope these comments will explain our thinking on this problem. If there are any questions remaining or if I can provide you further information in any way, please feel free to write me.

Very truly yours,

H. G. Hershey

HGH:PJH:L

copy mailed to Mayor Russell, 7/9/56

Brown Engineering Company

TELEPHONE ATLANTIC 2-8141

REGISTERED
PROFESSIONAL ENGINEERS

CONSULTING ENGINEERS

K. R. BROWN	J. V. GEBUHR	G. C. HAVENS
J. M. FAIRALL	C. L. WARDLOW	C. D. GIBBS
O. GLAUBERG	M. T. McDONALD	R. E. BUTTS
E. S. BOUDINOT	J. S. VETERSNECK	M. D. ANDERSON
G. P. PRITCHETT	C. E. BENNETT	C. R. POE
H. J. JOBSE		

322-334 K P BUILDING
DES MOINES 9, IOWA

March 16, 1956

Doctor H. G. Hershey
Iowa Geological Survey
University of Iowa
Iowa City, Iowa

Dear Doctor Hershey;

The Town Council of Russell, Iowa is anxious to really drill a deep well into the Prairie Duchein or to the Jordon.

Of course a town as small as Russell is very nervous over the whole affair. They keep asking me: "Are you sure we will get plenty of water, and will it be good water?".

At Indianola water was ample, - much more than Russell ever could use and it was good water. The sulphates were a little above Board of Health limits and the fluorides were a little high.

Since the Indianola well is completed, do you think you could give the Town of Russell additional reason to be assured of ample and good water in the Jordon there at Russell?

Would you now want to send us a new prediction at Russell?

May I hear from you?

Very truly yours,

BROWN ENGINEERING COMPANY


E. S. Boudinot

ESB/fu



Layne-Western Company

WATER WELL DRILLING
EXPLORATION BORINGS AND TEST SURVEYS
LAYNE TURBINE PUMPS

TELEPHONE CEDAR 2-3563

October 25, 1956

OFFICES
KANSAS CITY, MISSOURI
WICHITA, KANSAS
OMAHA, NEBRASKA
AMES, IOWA
AURORA, ILLINOIS
ST. LOUIS, MISSOURI
DENVER, COLORADO

SOUTH DUFF STREET
P. O. BOX 662
AMES, IOWA

Brown Engineering Company
K.P. Building
Des Moines, Iowa

Attention Mr. Gene Boudinot

Gentlemen:

This is to inform you that the well at Russell, Iowa has been completed and a 24 hour pumping test conducted.

The well construction is as follows:

A 12" diameter hole was drilled through the St. Peter sandstone and approximately 45' into the Prairie du Chien limestone and below to where it was free of cracks and crevices or to a depth of 2035' from ground level. Then 2031' of 8" steel casing was set concentrically in the 12" hole with guides spaced to assure centering. A pure neat cement was then pressure pumped down through the 8" and forced to the top between the 8" casing and the 12" hole forming a band of cement that completely surrounds the 8" casing within the 12" hole. The top 20' of hole is 24" diameter which is also filled with cement and a 16" hole is drilled down to 190' which is also completely cemented, thereby forming a complete seal of cement from top to bottom surrounding the 8" casing within the drilled hole. After 72 hours of waiting time for the cement to get its set, drilling was again started through the 8" casing and an 8" open hole drilled to 2519' or completely through the New Richmond and Jordan sandstones. Upon completion of the drilling 428' of pump was installed and 18 to 20 hours of developing and clearing the water was carried on. After this a 24 hour test was run with an average of 160 GPM with a 30' drawdown or a pumping level of 373' from ground level, (copies of complete test are attached).

A chemical field test on the water was taken after 2 hours of pumping and found to be 33 grains hard, 4 P.P.M. iron and a Ph. of 8.4. Another test was taken after 5 hours pumping and the hardness was down to 17 grains with the iron at 3 P.P.M. and a Ph. of 8. A third test was taken after the 24 hours of pumping and the hardness was 16 grains with a Ph. of 7.4 and an iron content of 1.5 P.P.M. A one gallon sample was collected at the end of 5 hours and at 24 hours, one of each being sent to Brown Engineering and the other sent to a test laboratory at Ames for analysis. As soon as these are completed a copy of

Layne-Western Company

Brown Engineering Company
October 25, 1956

- 2 -

same will be sent to you.

I trust that this report gives you all of the information that you desire.

If any other information is required we will be happy to cooperate with you.

Yours very truly,

LAYNE-WESTERN COMPANY

M. S. Munson

M. S. Munson

MSM:LFS
Enclosure