

MASTER CARD - A

STATE	COUNTRY	LATITUDE				LONGITUDE				SEQ. NO						
		DEG.	MIN.	SEC.	N or S	DEG.	MIN.	SEC.								
1932	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1932	4	3	1	7	5	0	N	0	9	4	3	0	3	0	1	

WELL SCHEDULE

US GEOLOGICAL SURVEY

IOWA	DISTRICT	WRD
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WELL NO. 098-31W-21 AB

CO. EMMET

ZINGSTED TOWN #3 1952-53

ADDRESS KINGSTED, LA

DRILLER KNUTE BONNICKSEN DATE DRD SEPT 1952 - JUNE 1953

MAP COUNTY HUY 1:63,360

SOURCE OF DATA File

DESCRIPTION	M. P.	FEET	(ABOVE BELOW)	LSD
				1282

LSD 1282

[illegible]

WELL-DESCRIPTION CARD -- B

[illegible]

HYDROGEOLOGIC CARD - C

[illegible]

CASING AND SCREEN (SIZE, TYPE, INTERVALS):

CODED BY D. AARONSON

DATE 20 JAN. 1970

WELL NO. 098-31W-21AB

10" PIPE 0-364 FT.

8" PIPE 300FT - 635FT

PINCHED BY

DATE _____

VERIFIED BY

DATE _____

SKETCH ON REVERSE: YES

NO

UNITED STATES DEPARTMENT OF THE INTERIOR

Geological Survey
Water Resources DivisionLocal Well No. 098-3/W-21ABAquifer Code(s) C355 OILPWater Quality
(ppm)Owner's Name RINGSTED, LA #3 1953W Number 5759

Card Q

State: Iowa 1 9 County: EMMET 3 2 Town: RINGSTED, Iowa

Well No. 4 3 1 7 5 0 N Latitude Longitude 0 9 4 3 0 3 0 Seq. No. 1 Date 0 7 2 0 5 4

Sampling Depth 1 0 6 7 Type 1 Kx10⁶ 1 5 0 0 pH 7 1 Temp. °F

SiO₂ Ca 1 9 7 Mg 6 8 Na 7 0 K 6 0

HCO₃ 3 7 8 CO₃ 0 SO₄ 5 5 6 Cl 3 5 Source No. 3 Q

Card R

Duplicate Columns 1-25 from Card Q

F 5 NO₃ 0 PO₄ B Al Fe 3 0

Mn 1 9 Cu Pb Zn

Determined 1 2 1 0 Solids Calc. Ca, Mg 7 7 7 Hardness Non-Carb. 4 6 7

Color No. R

Card S

Duplicate Columns 1-25 from Card Q

Br I Alk. as CaCO₃ 3 1 0 Free CO₂ SAR

RSC ABS

Alpha (pc/l) Beta (pc/l) Ra (pc/l) U (ug/l)

No. 5
80Recorded by: D. AARONSONPunched by: T Date: Published:

UNITED STATES DEPARTMENT OF THE INTERIOR

Geological Survey
Water Resources Division

Local Well No. 098-3/W-2/AB

Aquifer Code(s) C355 01LP

Water Quality
(ppm)

Owner's Name RINGSTED, IOWA

W Number 5759

Card Q

State: IOWA 19 County: EMMET 32 Town: RINGSTED, IOWA

Latitude Longitude Seq. No. Date

Well No. 431750N 0943030 1 100658

Sampling Depth 1067 Type 1 Kx10⁶ 1500 pH 7.4 Temp. °F

SiO₂ Ca 196 Mg 64 Na 68 K 52

HCO₃ 406 CO₃ 0 SO₄ 548 Cl 1 Source No. 3 Q

Card R

Duplicate Columns 1-25 from Card Q

F 3 NO₃ 9 PO₄ B Al Fe 38

Mn 14 Cu Pb Zn

Solids Hardness 754 Non-Carb. 421

Determined 1200 Calc. Ca, Mg 754

Color No. R

Card S

Duplicate Columns 1-25 from Card Q

Br I Alk. as CaCO₃ 333 Free CO₂ SAR

RSC ABS

Alpha (pc/l) Beta (pc/l) Ra (pc/l) U (ug/l)

No. S
80

Recorded by: D. AARONSON

Punched by: T Date:

Published:

UNITED STATES DEPARTMENT OF THE INTERIOR

Geological Survey
Water Resources Division

Local Well No. 098-31W-21AB

Aquifer Code(s) C355 01LP

Water Quality
(ppm)

Owner's Name RINGSTED, Iowa

W Number 5759

Card Q

State: IOWA 1.9 County: EMMET 3.2 Town: RINGSTED, IOWA

Well No. 431750N 0943030 Seq. No. 1 Date 032862

Sampling Depth 1067 Type 1 Kx10⁶ 1540 pH 7.0 Temp. °F

SiO₂ 191 Ca 192 Mg 681 Na 661 K 52

HCO₃ 405 CO₃ 0 SO₄ 5531 Cl 31 Source No. 3 Q

Card R

Duplicate Columns 1-25 from Card Q

F 4 NO₃ 4 PO₄ B Al Fe 32

Mn 13 Cu Pb Zn

Solids Hardness 760 Non-Carb. 428

Determined 1130 Calc. Ca, Mg 760 Carb. 428

Color No. R

Card S

Duplicate Columns 1-25 from Card Q

Br I Alk. as CaCO₃ 332 Free CO₂ SAR

RSC ABS

Alpha (pc/l) Beta (pc/l) Ra (pc/l) U (ug/l)

No. 5
80

Recorded by: D. AARONSON

Punched by: T Date:

Published:

UNITED STATES DEPARTMENT OF THE INTERIOR

Geological Survey
Water Resources DivisionLocal Well No. 098-31W-21ABAquifer Code(s) C35J OILPWater Quality
(ppm)Owner's Name RINGSTED, IOWAW Number 5759

Card Q

State: IOWA 19 County: EMMET 32 Town: RINGSTED, IOWA

Well No. 431750N 0943030 Seq. No. 1 Date 02/06/9

Latitude Longitude

Sampling Depth 1067 Type 1 Kx10⁶ 1500 pH 6.9 Temp. °F 48

SiO₂ 21 Ca 196 Mg 66 Na 75 K 63

HCO₃ 400 CO₃ 0 SO₄ 550 Cl 3 Source No. 3Q

Card R

Duplicate Columns 1-25 from Card Q

F 4 NO₃ 28 PO₄ 33 B 36 Al 39 Fe 32

Mn 17 Cu 50 Pb 53 Zn 55

Determined 1190 Solids 63 Calc. 64 Ca, Mg 760 Hardness Non-Carb. 432

Color 78 No. R

Card S

Duplicate Columns 1-25 from Card Q

Br 26 I 29 Alk. as CaCO₃ 328 Free CO₂ 36 SAR 39

RSC 42 ABS 45 48 50

Alpha (pc/l) 55 Beta (pc/l) 58 Ra (pc/l) 61 U (ug/l) 64

No. S
80Recorded by: D. AARONSONPunched by: T Date: _____

Published: _____

W. 57 59

Location:

Town: Ringsted { N E } : County Emmet
 { S W }
 E.

sec. 21 T 98 N., R. 31 W. Twp

Well name and number *Ringsted Town Well (1952-53)*

Owner Town of Ringsted Address _____

[illegible]

Contractor Knut Bonnicksen Address _____

Drillers Don & Harry Bonnicksen

Drilling dates Sept. 23, 1952

Well data:

Elevations: Drilling curb feet; Land surface feet

Determined by

Topographic position

Total depth: Reported 1060 feet, Measured _____ feet

Drilling method *Cable Tool*

Hole and casing data

Original depth to water ^{above} _{ft. below} Date

Original elevation of water level _____ ft.; Source of data _____

Sources of water: Principal : Others:

Production data: Date 1953

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: Sample storage location EC6-4,5,6

Sample range 0-1060 No. spls. 213 No. dupls. & Cond. 153 Good
Spls. prepared by Palemsky, De Roma Washed range 265-1060 by Palemsky, De Roma
Driller's log and cond. _____

Insoluble residues: Prepared by _____ Studied by _____ Strip log _____
Microscopic study _____ strip log 0-655 MARCH 1953
Gen. log _____ Correl. by NORTHUP 655-1060-01C-1953

E. Emmet

March 4, 1953

Mr. Knut Bonnicksen
Ringsted, Iowa

Dear Mr. Bonnicksen:

We have completed the examination of the drill cuttings from the well you are now drilling for the Town of Ringsted. The present depth of the well, as indicated by the samples, is 655 feet. The last 22 feet of the sample is St. Peter sandstone and is expected at this location to be about 75 to 80 feet thick. The nature of the sandstone may be expected to vary in grain size and hardness.

If a suitable supply of water is not found in the St. Peter sandstone and the well is drilled deeper, a dolomite (limestone) should be encountered at approximately 710 feet. This dolomite should be about 250 feet thick. It is believed that crevices will be encountered within this section which should furnish a sufficient supply of water.

The geologic section drilled to a depth of 655 feet and forecast from 655 to 960 feet is as follows:

<u>Formation and description</u>	<u>From</u> (feet)	<u>To</u>
Pleistocene		
Glacial drift (clay and sand)	0	305
Cretaceous system		
Dakota formation (shale)	305	364
Ordovician system		
Maquoketa formation (dolomite)	364	435
Galena formation (limestone-dolomite)	435	515
Decorah-Platteville formation (limestone and shale)	515	633

Mr. Knut Bonnicksen

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March 4, 1953

St. Peter sandstone	633	710
Prairie du Chien formation (dolomite, some sandstone near middle)	710	960
Jordan sandstone	960	

We are very much interested in this well and hope you are able to obtain a good supply of water for the town. If you have further questions, please do not hesitate to write us.

Very truly yours,

H. G. Hershey

HGH:JBC:emh

Ringsted, Iowa May 26 1953

MAY 27 1953

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Iowa State Geological Survey
Iowa City, Iowa.

Att Dr Garland Hershey

Dear Sir:--

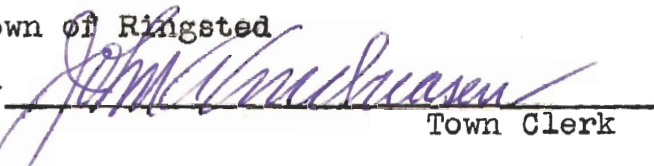
Bonnicksen & Sons have been in the process of drilling a well for the Town of Ringsted since last September. Today they have reached a depth of 920 feet and not sufficient water as yet.

The Town Council directed me to write you for any information which you can give relative to the prospect of finding water in this area.

Respectfully yours

Town of Ringsted

By


Town Clerk

Emmet

May 28, 1953

Mr. John A. Andreasen
Town Clerk
Ringsted, Iowa

Dear Mr. Andreasen:

We are replying to your letter of May 26 concerning the water supply problem at Ringsted, Iowa. Information bearing on this problem was obtained from the open files of the cooperative ground-water investigations of the Iowa and U. S. Geological Surveys.

Drilling samples of the new Ringsted well down to 655 feet were obtained from the contractor, Bonnicksen & Sons, about 2 months ago and examined by our geologists. The geologic section drilled to 655 feet and additional anticipated strata down to the Jordan sandstone are given below:

<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)	305	0	305
Cretaceous system			
Dakota formation (shale)	59	305	364
Ordovician system			
Maquoketa formation (dolomite)	71	364	435
Galena formation (limestone and dolomite)	80	435	515
Decorah-Platteville formation (limestone and shale)	118	515	633
St. Peter sandstone	22	633	655
Additional anticipated strata:			
St. Peter sandstone	55	655	710

May 28, 1953

Prairie du Chien sandy dolomite	250	710	960
Cambrian system			
Jordan sandstone		960	

We are somewhat surprised to hear that a sufficient amount of water for Ringsted (1950 population, 508) has not been developed after drilling 920 feet. A yield of 75 gallons a minute would seem to be an adequate supply for a community of this size. The existing town well drilled in 1945 produced 90 gallons a minute from the Maquoketa and Galena dolomites from 364 to 505 feet. The initial static water level was reported to be 80 feet and the pumping level 120 feet. In July 1951 a pumping test of half an hour's duration reportedly obtained 100 gallons a minute from this well.

The few deep well records from this part of the State indicate the St. Peter sandstone, Prairie du Chien dolomite, and Jordan sandstone formations usually are additional sources of supply. Of course, there is always a possibility that these aquifers may be locally cemented so tightly as to yield little water which might be the case in the new Ringsted well. However, the Jordan aquifer remains to be tested. Based on the drill cuttings of the new Ringsted well and our forecast of additional underlying strata, about 40 feet of drilling will be required before the well penetrates the Jordan sandstone at 960 feet. Algona city well No. 3 reportedly obtained its main supply from the upper part of the Prairie du Chien formation and the Jordan sandstone. A yield of 200 gallons a minute with 100 feet of draw-down was developed from this well. The static water level in 1925 was 100 feet below surface.

Below the Jordan sandstone the principal rock types are dolomite and sandstone containing glauconite. Little information is available on the water-bearing characteristics of these deep strata in the Ringsted area.

If a satisfactory supply well is not obtained after completely penetrating the Jordan sandstone, the yield of the well might be increased appreciably by acidizing the Galena limestone, which apparently was the chief water-bed in the town well of 1945.

We are very interested in the water development program at Ringsted and plan to have one of our field men stop for the samples below 655 feet in a few days.

We hope this report contains the information you wished. If you have any questions on the foregoing data or if we can be of further service in this matter, please let us know.

Very truly yours,

Emmett

June 9, 1953

Mr. Chalmer Bonnicksen
Ringsted, Iowa

Dear Mr. Bonnicksen:

Examination has just been completed on the samples taken from the Ringsted city well from 650 to 950 feet. The section shows St. Peter sandstone to 720 feet, Prairie du Chien dolomite, sandy dolomite and sandstone from 720 to 890 feet, and Jordan sandstone from 890 to 950 feet. We are very interested in the progress on this well and in the geologic section shown in the samples. Thank you for your usual kind cooperation with the Survey.

We are rather surprised that the St. Peter, Prairie du Chien, and Jordan formations have all failed to yield water in commercial quantities. The Prairie du Chien and Jordan are usually very reliable water-bearing formations in Iowa, although admittedly very few wells have penetrated this deep in the northwest part of the State. As a result, we do not have too much to go on as to quantity or quality of water likely to be obtained. We do note that the sandstone in the St. Peter, Jordan, and sandy zones in the Prairie du Chien are rather fine grained for the most part, which might account for a somewhat small yield of water. Also, these sandstones may be cemented with a clayey material making them impervious, although such a cement would not necessarily show up in the cuttings. The dolomite in the Prairie du Chien showed very little porosity, although crevices would be more important as a source of water.

It might pay to "shoot" the Jordan sandstone after drilling through it. Many wells which have produced no water or only a small amount have had their yields increased substantially by shooting, and such a method might be of value at Ringsted. However, shooting should be used only as a last resort. Another alternative would be to acidize the dolomites in the Prairie du Chien formation. This procedure is also used extensively to increase production in wells, especially in oil wells where accumulation is in limestone or dolomite. If neither of the above methods is employed, there are possibilities of water in the St. Lawrence dolomite immediately below the Jordan and in the underlying sandstones. Just how much of this underlying section is present at Ringsted is a bit uncertain as no nearby wells have drilled through the entire section. The Algona city well No. 3 encountered 450 feet of Cambrian dolomite, sandstone, and shale between the base of the Jordan sandstone and granite,

Mr. Chalmer Bonnickson

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June 9, 1953

but as the entire Paleozoic section thins and finally goes out to the northwest, it is likely to be considerably thinner at Ringsted.

Please feel free to call on us if we can be of further service.

Very truly yours,

H. G. Hershey

HGH:RCN:ges

cc: City Clerk
Ringsted, Iowa