

IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey

W 8170

RECORD OF WELL

Location:

Town: WAUKON (NE) (SW) : County ALLAMAKEE
NE SE sec. 30 T. 98 N., R. 5 W. Twp.

Well name and number _____

Owner WAUKON CITY WELL (1957) Address _____

Tenant _____ Address _____

Contractor VARNER WELL CO. Address DUBUQUE

Drillers _____

Drilling dates OCT. 2, 1956 - APRIL 1957

Well data:

Altitudes: Drilling curb _____ feet; Land surface _____ feet

Determined by _____

Topographic position _____

Total depth: Reported 662' feet, Measured _____ feet

Drilling method CABLE TOOLS

Hole and casing data 13 3/8" CASING 0-350'

TOP 30' ARE CEMENTED

Original depth to water 336' above ft. below _____ Date _____

Source of data _____

Sources of water: Principal PRAIRIE du CHIEN, JORDAN.

Others _____

Production Data

Date _____
 Static water level 336 _____
 Measuring point _____
 Pumping water level 370 _____
 Yield (g. p. m.) 477 _____
 Duration of pumping _____
 Specific capacity _____

Pump Data

Type pump _____ Column diameter and length _____
 Cylinder or bowls diameter and length _____
 Suction pipe _____ Airline _____
 Power _____ Production _____ g. p. m. for _____ hours per day
 Use of water _____

Dissolved constituents and properties (in parts per million except as indicated)

Date sampled _____
 Sampled by _____
 Silica (SiO₂) _____
 Iron (Fe) _____
 Manganese (Mn) _____
 Calcium (Ca) _____
 Magnesium (Mg) _____
 Potassium (K) _____
 Sodium (Na) _____
 Carbonate (CO₃) _____
 Bicarbonate (HCO₃) _____
 Sulfate (SO₄) _____
 Chloride (Cl) _____
 Fluoride (F) _____
 Nitrate (NO₃) _____
 Dissolved solids _____
 Hardness (as CaCO₃) _____
 Total _____
 Grains per gallon _____
 Noncarbonate _____
 Alkalinity (as CaCO₃) _____
 pH _____
 Specific conductance _____
 (micromhos at 25°C) _____
 Temperature (°F) _____
 Analysis No. _____

Laboratory Data

Well No. W 8170 Sample range 18-655 No. of samples EMI-7, EMI-8 138
 No. of dupls. and cond. 138 6001 (some poor) Washed range 18-655
 Samples prepared by V. Dow Date 6/5/57
 Logged by JUNE 12, 1957 Date 6/12/57
 Correlations by " " Date 6/12/57

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

W-8170
098 05 W 30 ACDC
WAUKØN CITY WELL #4

8170

Water Quality
(ppm)

Card Q

State: IOWA 19 County: ALLAMAKEE 03 Town: WAUKØN

Well No. 431638N 0912828 Seq. No. 1 Date 050570

Latitude Longitude M D Y

Sampling Depth Type Kx10⁶ 530 pH 71 Temp. °F 52

SiO₂ 15 Ca 88 Mg 18 Na 24 K 12

HCO₃ 329 CO₃ 0 SO₄ 34 Cl 40 Source No. 3 Q

Card R

Duplicate Columns 1-25 from Card Q

F 01 NO₃ 50 PO₄ B Al Fe 004

Mn 005 Cu Pb Zn

SOLIDS 50 52 53 54 55 57

Determined 334 Calc. Ca, Mg 296 Hardness Non-Carb. 26

Color No. R

Card S

Duplicate Columns 1-25 from Card Q

Br I Alk. as CaCO₃ 270 Free CO₂ SAR

RSC ABS

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

No. S
80

Recorded by: MACGOWAN

Punched by: MACGOWAN Date: 7-12-72

Published: _____

Dlog

DATE STARTED October 1956 DATE COMPLETED April 1957LOCATION City of Waukon, Iowa COUNTY AllamakeeDEPTH 662'DIAMETERS: 16" from Surface to 350'; 12" from 350' to 662'CASING RECORD: 13-3/8" OD pipe from surface to 350'. Top 30' cemented.

STRATA RECORD

<u>From</u>	<u>To</u>	<u>Thickness</u>	<u>Description of Beds</u>
0	35	35	None recorded
35	42	7	Brown & gray lime-hard
42	70	28	Gray lime-hard
70	77	7	Brown lime-hard
77	80	3	Gray clay
80	102	22	Brown lime
102	107	5	Brown & gray lime
107	110	3	Gray blue shale & brown lime
110	140	30	Blue shale
140	147	7	Blue shale & gray lime
147	167	20	Blue lime & shale
167	190	23	Brown & gray lime
190	195	5	Brown lime & blue & white shale
195	210	15	St. Peter sand, red
210	250	40	St. Peter sand, white
250	265	15	St. Peter sand, red
265	275	10	Brown lime & sand
275	310	35	Brown lime & white flint-hard
310	315	5	White sand
315	330	15	White sand & yellow clay
330	335	5	Yellow sand
335	346	11	Brown & yellow sand
346	355	9	Blue sandstone-hard
355	400	45	Blue gray sandstone
400	422	22	Lime
422	431	9	Gray & brown lime
431	440	9	Lime & blue shale
440	449	9	Lime-hard--crevice
449	477	28	Gray lime-chalky
477	482	5	Chalky lime & shale
482	502	20	Chalky lime
502	527	25	Gray chalky lime & shale
527	544	17	Chalky lime-heavy
544	548	4	Lime & streak of shale
548	563	15	Brown sandstone-thick
563	572	9	Sandstone-settles fast

CITY WELL

WAUKON, IOWA

<u>From</u>	<u>To</u>	<u>Thickness</u>	<u>Description of Beds</u>
572	653	81	Sandstone
653	655	2	Gray sandstone
655	662	7	Lime & gray sandstone-some tan

STATIC WATER LEVELS

<u>From</u>	<u>To</u>	<u>Level</u>
0	107	None recorded
107	140	90
140	335	80
335	355	315
355	380	308
380	398	315
398	426	265
426	662	315

St Peter 190-260

80 SWL

*Waukon
City No. 4*

Gen

June 19, 1959

Mr. Sylvan Ames
Hoeg & Ames, Inc.
Lincoln, Iowa

Dear Mr. Ames:

In response to your recent telephone conversation with Dr. Charles Brown regarding the sand pumping trouble in the Waukon city well No. 4 (1957) and the possibilities of a deepening through the Mt. Simon sandstone, we have assembled the accompanying discussion. An illustrated log of well No. 4 is appended to these pages.

We can think of at least three possible methods for solving the sand pumping trouble without drilling to the Mt. Simon sandstone. The original casing schedule of well No. 4 included 350 feet of 13 3/8-inch casing from the surface to 350 feet which the log indicates will be in the basal Root Valley sandstone. However, it may be that the casing is set on the top of the dolomite and either the driller's sample record or our rock identification is in error. Although some loose sand might be coming from the basal Root Valley, it is not considered very likely because the driller's log indicates a hard sandstone.

The various solutions are summarized as follows:

1. By setting a temporary open hole plug at 520 feet at the base of the Oneota and test pumping for yield, it may be found that sufficient water will occur above the Jordan. This would shut off the underlying Jordan sandstone which is thought to be the source of sand pumped up the well. No change was observed in the original static water level of 336 feet from a depth of 426 feet to the bottom of the well at 662 feet. Therefore large yields might be obtained from the Oneota dolomite. Acidizing the dolomite may appreciably increase the yield. This will also reveal whether any sand is entering the well from the basal Root Valley.
2. The well could be deepened about 100 to 115 feet through the St. Lawrence dolomite and a liner placed through the Jordan from about 520 to 665 feet. The St. Lawrence can then be acidized. This will shut out the Jordan sand, but should still permit large quantities of water to enter the well because a good hydraulic connection probably exists between the Jordan and St. Lawrence formations.

Mr. Sylvan Ames

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June 19, 1959

3. During the drilling of the old Waukon city well No. 3 (1914) sand caved from the upper part of the Jordan at 585 feet. It was reported to have been cased off with 59 feet of 10-inch liner from 541 to 600 feet and set in hard sandstone. This type of casing might solve the sand pumping trouble in the existing well No. 4. Since the dolomite immediately overlying the Jordan is sandy, it would seem best to hang the liner in solid dolomite at about 515 or 520 feet and have a shoe at the bottom at about 600 feet. The hole should be bailed before pumping since a considerable amount of loose sand may have filled the bottom of the well.

4. A fourth possibility would be to case off the Jordan sandstone and drill down through the Mt. Simon sandstone. It is difficult to make an accurate estimate of the additional depth needed to penetrate the Mt. Simon, but based on municipal wells at Decorah and Lansing, drilling will have to continue down to about 1400 to 1550 feet. The top of the Mt. Simon is expected at about 1180 feet and should extend between 350 to 400 feet below. Some casing probably will be required in the interval below the St. Lawrence dolomite down to the top of the Mt. Simon. The Decorah well apparently caved and filled in up to the middle of the Franconia formation underlying the St. Lawrence. The Eau Claire member comprising the lower third of the Franconia is mostly shale. There is always the possibility that sand pumping trouble will also occur in the Mt. Simon sandstone. Decorah and Lansing seem to have developed at least 300 to 450 g. p. m. of acceptable quality water from this source. At McGregor the water was salty.

We hope this discussion will aid you in solving the water problem at Waukon. If you have any questions on the foregoing or if we can provide further information in any way, please let us hear from you.

Very truly yours,

H. G. Hershey

PJH:t
Enclosure

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LOG - PRESENT WELLS

WAKKON, IOWA

