IOWA GEOLOGICAL SURVEY W 8170 In Cooperation with U. S. Geological Survey
RECORD OF WELL
Town: WAUKON (SW): County ALLAMAKEE
<u>NE SE</u> sec. <u>30</u> T. <u>98</u> N., R. <u>5</u> 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 curbfeet; Land surfacefeet
Determined by
Topographic position
Total depth: Reported 662 feet, Measured feet
Drilling method CABLE Tools
Hole and casing data 133/7" CASING 0-350
TOP 30' ANE CEMENTED
Original depth to water 336 ft. below Date
Source of data
Sources of water: Principal PRAIRIE du CHIEN, JONDAN.
Others

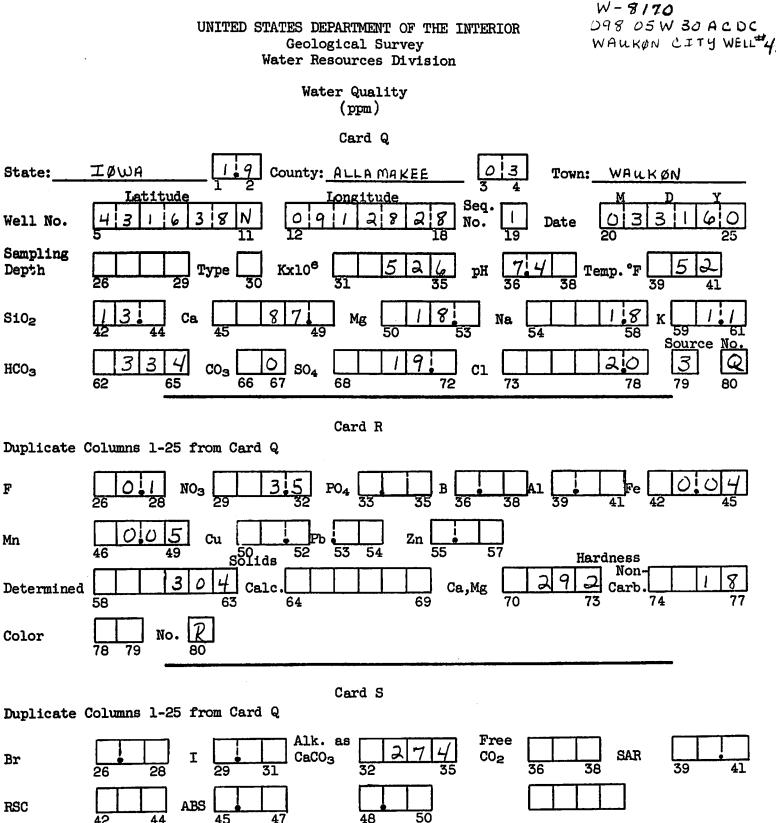
## Production Data

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

	Pum	p Data	
Type pump	Column diamet	er and length	
Cylinder or bowls	diameter and length		and the second strength of the second strengt
Suction pipe		Airline	
Power	Production	g. p. m. for	hours per day
Use of water			Por ury

Dissolved constituents	and properties (in parts per million e	xcept as indicated)
Date sampled		more as and outed,
Sampled by		
Silica (SiO <sub>2</sub> )		
Iron (Fe)		
Manganese (Mn)		
Calcium (Ca)		
Magnesium (Mg)		And a second
Potassium (K)		
Sodium (Na)		
Carbonate (CO3)		and the second se
Bicarbonate (HCO <sub>3</sub> )		
Sulfate (SO <sub>4</sub> )		
Chloride (Cl)		
Fluoride (F)		
Nitrate (NO <sub>3</sub> )		
Dissolved solids		
Hardness (as CaCO <sub>3</sub> )		
Total		
Grains per gallon		
Noncarbonate		
Alkalinity (as CaCO3)		
pH		
Specific conductance (micromhos at 25°C)		
Temperature (°F)		
Analysis No.		

	Laboratory I	
Well No. W 817	O Sample range	18-655 No. of samples 138
No. of dupls, and co	ond. 128 Good (St	washed range 18-655
Samples prepared b		Date 6/5/57
Logged by	JUNE 12, 1957	Date 6/12/57
Correlations by	1. 11	Date 6/12/57



Ra (pc/l)

60

U

(ug/1)

Published:

Punched by: MALGOWAN

Alpha (pc/1)

70

 $\widetilde{\mathfrak{a}}$ 

No. 5

Date: 7-12-72

Recorded by: MACGOWAN

Beta

(pc/l)

57

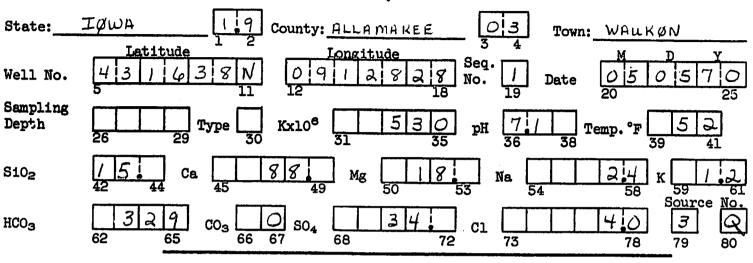


### UNITED STATES DEPARTMENT OF THE INTERIOR Geological Survey Water Resources Division

W- 8170 098 05W 30 ACDC WAUKØN CITY WELL#44

#### Water Quality (ppm)

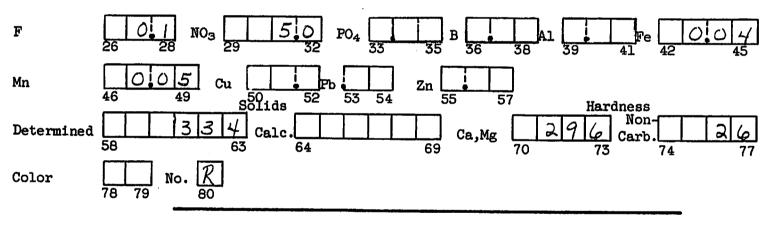
Card Q



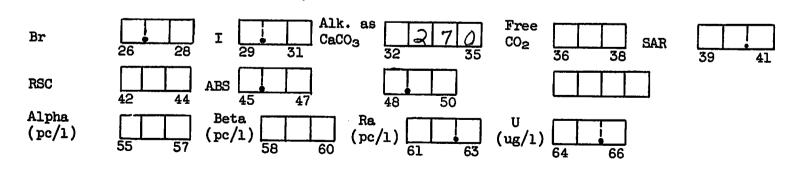


Duplicate Columns 1-25 from Card Q

Duplicate Columns 1-25 from Card Q



Card S



No. 5 80 Punched by: <u>MACGOWAN</u> Date: 7-12-72 Published:\_\_\_\_\_

Recorded by: MACGOWAN

Drog

A.

DATE STARTED Detober 1956 DATE COMPLETED April 1957

LOCATION City of Waukon, Yowa COUNTY Allamakee

DEPTH 6621

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

No. Contractor	ALD O O AL		
From	To	Thickness	Description of Beds
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	53	Brown & gray lime
107	110		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-hardcrevice
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	14	Lime & streak of shale
548	563	15	Brown sandstone-thick
563	572	9	Sandstone-settles fast
GTOV	LUTER I		VAUXON TOPA

CITY WELL

WAUKON, IOWA

From 572	£0 653	Thickness 81	Description of Beds Sandstone	
653	655	2	Gray sandstone	
655	662	7	Lime & gray sandstone-some t	an

# STATIC WATER LEVELS

44

From	To 107	Level None recorded	
107	140	90	
140	335	80	
335	355	315	
355	380	308	St Reter 190-260
380	398	315	
398	426	265	
426	662	315	

alliender Wankin 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

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.

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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

