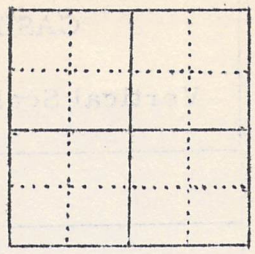
W 8549

IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey
RECORD OF WELL



Location:

Town: RADCLIFFE (N E) (S W) :County HARDIN

sec. 29 T. 87 N., R. 22 W. Twp.

Well name and number

Owner RADCLIFFE CITY WELL (1957) Address

Tenant Address

Contractor HOEG & AMES Address LINCOLN, IOWA

Drillers

Drilling dates JULY 1-26, 1957

Well data:

Altitudes: Drilling curb feet; Land surface feet

Determined by

Topographic position

Total depth: Reported 365' feet, Measured feet

Drilling method CABLE TOOLS

Hole and casing data 12" TEMPORARY PIPE 0-85'. TEMPORARY PIPE WAS LEFT IN AND 10" PIPE WAS SET FROM 85' TO 132'. 10" PIPE WAS PULLED ABOVE 95' AND PERFORATED, INCREASING YIELD OF WELL.

Original depth to water 58'6" ft. above / below Date

Source of data

Sources of water: Principal MISSISSIPPIAN LIMESTONE AND DOLOMITE

Others

Production Data

Date				
Static water level	58'6"			
Measuring point				
Pumping water level	90			
Yield (g. p. m.)	215			
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 (SiO_2)				
Iron (Fe)				
Manganese (Mn)				
Calcium (Ca)				
Magnesium (Mg)				
Potassium (K)				
Sodium (Na)				
Carbonate (CO_3)				
Bicarbonate (HCO_3)				
Sulfate (SO_4)				
Chloride (Cl)				
Fluoride (F)				
Nitrate (NO_3)				
Dissolved solids				
Hardness (as $CaCO_3$)				
Total				
Grains per gallon				
Noncarbonate				
Alkalinity (as $CaCO_3$)				
pH				
Specific conductance (micromhos at 25°C)				
Temperature (°F)				
Analysis No.				

Laboratory Data

Well No. W 8549 Sample range 0-370' No. of samples 74 EA 7-12

No. of dupls. and cond. 74 Good Washed range 85-370

Samples prepared by C. Ivers Date 7-29-57

Logged by NORTHUP Date 8/20/57

Correlations by " Date 8/20/57

Drillers Log - Radcliff City Well

Drilled By Hoeg & Ames

July 1-23, 1957

Feet	Description
0-4	- Black soil
4-20	- Yellow clay
20-30	- Blue clay
30-35	- Sandy Blue clay
45-85	- Brown Shale
85-95	- Broken Limestone and Shale - Some Water
95-110	- Some Sandstone
110-132	- Good Brown Limestone
132-335	- Good Brown and White Limestone
335-355	- Gray Limestone
355-360	- Some Shale Bands
360-365	- Gray Sandstone - Very Little Cuttings
365	- Shale

Radcliffe City Well

Pumping Test #1 - July 23 - 1957

SWL 62'

Time	DD	PL.	GPM.	Remarks
9:15 AM	SWL=62'			SWL 62'
9:35	00		0	Started Pump
9:40	76	138		
9:45	88	150	77	Water Dirty
9:50	93	155		
9:55	100	162		Water almost clear
10:00	108	170		
10:05	128	190		
10:10	143	205		
10:20	163	225	110	Water Dirty - Broke Suction Sceund Pump Down
10:25	100	162		
10:30	128	190	90	Slowed Pump Down
10:40	108	170	80	
10:50	100	162		
11:00	88	150	70	
11:10	80	142		
11:20	92	154	65	
11:30	96	158	70	Water cloudy
12:00	96	158	75	
1:00	104	166	75	

RADCLIFF CITY WELL
PUMPING TEST #1

TIME	DD	PL	GPM	REMARKS
2:00	100	162	75	
3:00	112	174	84	
4:00	100	162	75	CAUGHT WATER SAMPLE
4:05	100	162	75	SPED UP PUMP
4:07	163	225	100	BROKE SUCTION
4:30	163	225	100	BREAKING SUCTION SHUT OFF

87-22-29

Radcliffe City Well - #2
Pumping Test July 26, 1957

Time	DD	PL.	G.P.M.	Remarks
				SWL. 58'6"
8:10 AM.				Started Pump
8:15	18'4"	76.10"	215	
8:25	22'8"	81'2"		Water Cleaning
8:35	25'8"	84'2"		
8:45	27'8"	86'2"		Water Almost Clean
8:55	28'6"	87'		
9:05	29'5"	87'11"	215	
9:15	30	88'6"		Water Dirty Yellow
9:30	30'7"	89'1"		
9:45	31'2"	89'8"		Water Gets Clean
10:00	31'6"	90'		" Dirty Yellow
10:15	31'6"	90'	215	Slowed Pump Down
10:30	28'	86'6"	160	" " "
10:45	22'8"	81'2"	130	
11:00	20'4"	78'10"		Water Cleaning
11:15	20'4"	78'10"		
11:30	19'8"	78'2"		
12:00 Noon	19	77'6"	110	
12:30 PM	19'10"	78'4"	120	
1:00	20'5"	83'11"	165	

TIME	DD	PL	GPM	REMARKS
1:30 PM.	29'	87' 6"	175	WATER CLEAR
2:00	24' 3"	82' 9"	140	
2:30	24' 8"	83' 2"	140	
3:00	26'	84' 6"	160	CLEAR - SOAP TEST INDICATES WATER IS SOFT
3:30	26' 2"	84' 8"		
4:00	26' 5"	85' 1"	160	CAUGHT WATER SAMPLE
4:10	SHUT OFF PUMP			

The second test was better -
We pulled pipe above 95' and increased flow
We had 12" temp. pipe down to 85'
We left 12" pipe in + set 10" pipe from 85 to 182' perforated above shale

August 23, 1956

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

Dear Mr. Ames:

Homer Rhodes stopped in our office last week and requested a summary of the geologic and ground-water conditions at Radcliffe, Iowa where a new municipal well is being planned. We are glad to send you the pertinent data on this area as follows. All information was obtained from cooperative studies of the State-Federal Geological Surveys.

A generalized log of the underlying rocks down to the top of the Maquoketa shale is outlined in the following table (all depths are referred to a starting elevation of 1194 feet above sea level taken from the C & N. W. railway depot at Radcliffe).

Formation	Thickness (ft.)	Depth Range (ft.)
Quaternary system		
Pleistocene series (pebbly glacial till, probably includes some sand and gravel layers)	275±	0- 275
Mississippian system		
Hampton formation (dolomite and limestone, some chert in lower part)	215	275±- 490
Prospect Hill silty dolomite	10	490- 500
Maple Mill shale	40	360 500- 540
Aplington dolomite	25	540- 565
Devonian system		
Sheffield shale	50	565-615

Formation	Thickness (ft.)	Depth Range (ft.)
Devonian system (continued)		
Lime Creek formation (dolomite and shale)	125	615- 740
Cedar Valley formation (dolomite and limestone)	375	740-1115
Wapsipinicon formation (dolomite, silty)	50	1115-1165
Ordovician system		
Maquoketa shale		1165-

A higher or lower starting site probably will modify all these depth figures to some extent.

The latest census figures indicate Radcliffe to have a population of about 638. A town of this size should require at least 50 gallons a minute and perhaps more.

In the past this community is reported to have had at varying times at least three wells which were 95½, 130, and 377 feet deep. The first two apparently were completed in glacial sand and gravel and produced only small supplies. The deepest well according to our calculations would have penetrated the Hampton dolomite. Unfortunately, no information is available on the pumping rates or water levels and whether the supply was adequate or not.

Small quantities of water are anticipated from sand and gravel zones in the glacial materials, but it seems unlikely that a dependable supply well producing 50 gallons a minute will be available from this source. Therefore, drilling probably will have to be continued into the underlying consolidated rocks. The Hampton dolomite which forms the bedrock in this vicinity may yield sufficient water. Several wells in the surrounding region obtain moderate amounts of water from this formation. Hubbard Town Well No. 2 480 feet deep reportedly obtained 112 gallons a minute. The static water level was 27 feet and the pumping level 85 feet lower. About two years ago you reported that the George Dannenberg drainage well south of Hubbard yielded 45 gallons a minute from the Hampton dolomite. Presumably the yield could have been increased somewhat

by acidizing the water beds. The Iowa Farm Development Company well several miles northwest of Radcliffe and also penetrating the Hampton formation produced 20 gallons a minute with 15 feet of drawdown. On the basis of the small drawdown recorded in this well considerably larger supplies might have been obtained. At some wells, for example, the McCallsburg Town Well (1951), the yield from the Mississippian strata has been disappointingly small. This is attributed to the tightly cemented character of the limestones and dolomites. It is difficult to predict whether favorable conditions will occur in this aquifer at Radcliffe, but the chances seem fairly promising.

The next promising aquifer in depth will be the Cedar Valley formation between about 740 and 1000 feet. Drilling much deeper is expected to encounter gypsum bearing rock which will adversely affect the quality of the water making it unsuitable for municipal use. The results obtained at McCallsburg and in the L. H. Eller well which you drilled near Buckeye north of Radcliffe should give you an idea of the possibilities of the Cedar Valley formation. At McCallsburg about 30 gallons a minute were obtained with 80 feet of drawdown; at the Eller well 30 gallons a minute with 30 feet of drawdown.

Mineral analyses of the water from wells penetrating the Mississippian and Devonian rocks are given on a separate sheet. Note that the water from the Mississippian formations is of slightly better quality than the upper Cedar Valley water. The lower Cedar Valley strata at Steamboat Rock are gypsum-bearing and yield water highly mineralized in sulfate and extremely hard.

In summary, this discussion indicates that sufficient water for a municipal well at Radcliffe may be available in either the Hampton dolomite of Mississippian age between about 275 and 490 feet or the Cedar Valley formation between about 740 and 1000 feet. Acidizing the water beds may result in an appreciable increase in yield if necessary.

If there are any questions remaining or if we can provide further information on this problem, please feel free to call or write us.

Very truly yours,

H. G. Hershey

HGH:PJH:L
Enclosure

8549

Name: Radcliffe town well #3

Loc: SE 29-87N-22W, Hardin Co. Located - IN THE PARK

T.D. 365'

Drilled: Hoeg & Ames July, 1957 MAY 1962 - 1,265,000 GALS pumped in 1 month

Log: W-8549 Northup

Casing: 12" pipe 0-85'; 10" pipe set from 85 to 132' perforated at 85-90 above shale at 90-95'

$\frac{6.8}{232} = 2.93 \times 10^{-2}$

Prod. data

SWL 58' 6"

PWL 90'

Yield 215 gpm

90.0 − 58.5 = 31.5 | 6.8 / 2150. 1890 2600 2520

232 | 6.8000 (.0293) 464 2160 2088 720 696

Turn Pump

Analyses: No. 552(879) 10/1/58; No. 2743(5326) 7/26/57

No. 1460(3488) 3/26/62

Need: ~~elev~~ 9' BELOW DEPOT C & NW RR (1189) − 9 = 1180

Jim Johnson W/S

Elevation 1180 ±

pop. 625 (1962)

Formations	Depth	Top	Base	Thick.
Gilmore City	85			70
Hampton	155			140
Maynes Crk.	295			55
Pros. Hill	350			
Maple. Mill	365			

F. Twenter

11,352,825 gals pumped in 1 yr.
from Aug 1, 1961 – July 31, 1962

31535 gpd
360 | 11,352,825
1080
552
360
1928
1800
1282
1080
2025
1800
225

365
85
280

50.4
625 | 31535
3125
2850
2500

IOWA GEOLOGICAL SURVEY
TABULATION OF WATER ANALYSIS
(Dissolved constituents in parts per million)

Town - Well No. Owner	Date of coll.	Depth (ft.)	Geol. source	°F	Diss. solids	Fe	Mn	Ca	Mg	K	Na	CO_3	HCO_3	SO_4	Cl	F	NO_3	Hardness cal. as $CaCO_3$ tot.	carb.	non carb.	pH	Cond
Radcliffe Town Well	6/26/34	377	Hampton ?		369	1.0	0.1	70	30	22			442	5.2	3.0	0.0	0.0	298	298	0.0	7/0	--
Hubbard Town Well No. 2 (1945)	11/45	480	Hampton		283	1.0	0.0	43	32	6.9			293	2.5	1.5	1.0	00	239	239	0.0	7.7	435
McCallsburg Town Well (1951)	6/4/51	1130	Upper Cedar Valley	58	449	2.4	0	72	38	24			405	46	4	1.9	0	336	332	4	7.4	631
Steamboat Rock Town Well (1948)	10/9/48	750	Lower Cedar Valley	53	2003	0.6		342	107	62			293	1148	9.0	0.2	--	1295	240	1055	7.6	2118

NOTES: