

MASTER CARD

WELL-DESCRIPTION CARD[illegible]

Well Number 42.23.38 099.38.00

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD ☐ Physiographic Province: CENTRAL LOWLAND 1:2 Section: WESTERN
 LAKE 8 Drainage Basin: Raccoon 2:5 A Subbasin: ☐
 Type of well site: (D) local depression, flat surface, hilltop, hillside, terrace, valley flat, UPLAND 2: F
 MAJOR AQUIFER: CAMBRIAN UPPER C:3 JORDAN SANDSTONE S:5
 system series aquifer, formation, group
 Lithology: WELL-SORTED SS. W:V Origin: MARINE 6 Aquifer Thickness: 65 ft
 Length of well open to: 65 ft Depth to top of: 1800 ft A:8:0
 MINOR AQUIFER: ORDOVICIAN LOWER 0:1 PRADIE DV CHEN L:P
 system series aquifer, formation, group
 Lithology: SANDY DOLOMITE 8:D Origin: MARINE 6 Aquifer Thickness: 270 ft
 Length of well open to: 266 ft Depth to top of: 1530 ft A:5:3
 Locals screened: NONE
 Depth to consolidated rock: 180 ft 1:8:0 Source of data: WELL CUTTINGS C
 Depth to basement: ☐ Source of data: ☐
 Surficial material: SILTY DRIFT (TILL) 7:7 Infiltration characteristics: POOR 9
 Coefficient Trans: ☐ Coefficient Storage: ☐
 Coefficient Perm: ☐ sp/ft²; Spec cap: 6+2 sp/ft; Number of geologic cards: ☐

CASING:

16" OD CASING SET AT 401'
 331' - 725' 12" CASING
 715' - 1534' 10" CASING
 1534' - 1565' 8" OPEN HOLE

40' OF CEMENT FOR SURFACE
 SEAL.



WELL RECORD

Well is located.....miles S and.....miles S from
 N E
 E E
 W W

..... in.....
 (Nearest Town) (County)

in the ¼ ¼ Sec..... T..... R.....

Owner..... Well No.....

Postoffice address

Contractor

Address

Driller

Well begun *Oct-21*, 19*49*;

completed *March 7*, 19*50*..

Rig used—Cable, Rotary, Jet, or.....

Depth of well.....
 (Feet)

Size of hole (note total amount of each size).....

Main water supply at.....
 (Feet below surface)

Final water head.....
 (Feet above or below surface)

Is well pumped?.....

Yield
 (Gallons per minute)

Water level when pumping.....

Position of well.....
 (Upland, valley, side hill, etc.)

RECORD OF PERMANENT CASING

Size Pipe	Amount of Pipe	Depth to Bottom of Pipe	Depth to Top of Pipe	Type* and Weight of Pipe	DIAGRAM OF WELL
K" 0.0	403	401			
12"	348-10	725	377		10' of pipe on top of lead seal.
10"	250'	1534'	684'		10' of pipe on top of lead seal
	40' of cement				

*As cast, wrought iron, steel, concrete, etc.

Is screen used?..... Diameter.....
(Inches)

Length..... Depth to bottom.....
(Feet)

Depth to top..... Slot size.....

Are packers or seals used?.....

Kind

Where used.....

Kind of pump..... Dia.....
(Inches)

Capacity of pump.....
(g.p.m.)

Power used.....
(Kind and amount)

Depth to bottom of pump line..... feet,
including feet tailpiece.

Remarks on construction of well.....

Sample No.	DEPTH		THICKNESS	DESCRIPTION OF BEDS
	From	To		KIND OF ROCK, COLOR, HARD OR SOFT, WATER, ETC.
	0	1	1	Fall
	1	3	2	Black Dirt
	3	8	5	Yellow Clay.
	8	153	145	Blue Clay ^{Sandy} ^{some gravel}
	153	180	27	Shale ?
	180	188	8	Shale Black.
	188	292	104	Shale Gray.
	292	305	13	Shale; Brown
	305	313	8	Shale Gray.
	313	315	2	Lime Stone Brown
	315	320	5	Shale Green
	320	360	40	^{Streaks of shale.} Gray limestone ^(soft) and gypsum
	360	421	61	Lime Stone Brown
	421	425	4	Dark Gray shale
	425	458	33	Lime Stone
	458	510	52	Lime & shale streaks
	510	545	35	Lime honey comb. ^(LITTLE water)

Water Sample No.	DEPTH		THICKNESS	DESCRIPTION OF BEDS	
	From	To		KIND OF ROCK, COLOR, HARD OR SOFT, WATER, ETC.	
	545	633	88	Lime Stone	
100'-90	633	669	36	Lime & Shale streaks	
100'-90	669	803	134	Lime Stone	
100'-90	803	851	48	Lime Shaley (well cave)	
100'-90	851	892	41	Lime	
100'-90	892	928	36	Lime Shaley well cave	
100'-90	928	990	62	Brown Lime Stone	
100-90	999	1007	8	Lime Shaley	
100-90	1007	1014	7	Green Shale	
	1014	1108	94	Lime Stone	
120'-110	1108	1115	7	Lime Stone Honey comb	
	1115	1160	45	Lime Stone	
144'	1160	1210	50	Lime, Sand interlay little settling + water	
154'	1210	1423	213	Lime Stone hard	
143'	1423	1436	13	Lime Shale streaks Blue Green	
	1436	1446	10	Shale Blue Green	
149'	1446	1455	10	Lime Stone hard	

Sources of water: Principal _____; Others _____

Production data:

Date

3-11-50

Static depth to water

170

Measuring point

Drilling curb

Pumping level

275

at

650

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

Sample range

No. spls.

No. dupls. & cond.

Spls. prepared by

Washed range

by

Driller's log and cond.

Insoluble residues: Prepared by

Studied by

Strip log

Microscopic study 2-1965

strip log

April 1950

Gen. log

Correl. by

M. Parker

UNITED STATES DEPARTMENT OF THE INTERIOR

Geological Survey
Water Resources DivisionLocal Well No. 088-33W-36 ADBAquifer Code(s) C35J FILPWater Quality
(ppm)Owner's Name Rockwell City, IowaW Number 04094

Card Q

State: Iowa 19 County: CALHOUN 13 Town: ROCKWELL CITY, IOWA

Well No. 422338N 0943800 Seq. No. 1 Date 081450

Sampling Depth 1965 Type 1 Kx10⁶ pH 7.4 Temp. °F 57

SiO₂ Ca 132 Mg 62 Na 87 K

HCO₃ 385 CO₃ 0 SO₄ 434 Cl 14 Source No. 3Q

Card R

Duplicate Columns 1-25 from Card Q

F 12 NO₃ 4 PO₄ B Al Fe 45

Mn 0 Cu Pb Zn

Determined 1030 Solids Calc. Ca, Mg 586 Hardness 270

Color No. R

Card S

Duplicate Columns 1-25 from Card Q

Br I Alk. as CaCO₃ 316 Free CO₂ SAR

RSC ABS

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

No. S
80Recorded by: D. AARONSONPunched by: J Date: Published: X

UNITED STATES DEPARTMENT OF THE INTERIOR

Geological Survey
Water Resources DivisionLocal Well No. 088-33W-36 ADBAquifer Code(s) C355 01LPWater Quality
(ppm)Owner's Name Rockwell City City #3 (195W Number 04094

Card Q

State: IOWA 1 9 County: CALHOUN 1 3 Town: Rockwell City, Iowa

Well No. 4 2 2 3 3 8 N Latitude Longitude Seq. No. 1 Date 0 6 1 7 6 9

Sampling Depth 1 9 6 5 Type 1 Kx10⁶ 1 6 0 0 pH 7 1 Temp. °F 6 3

SiO₂ 1 2 1 Ca 1 7 2 Mg 6 3 Na 1 1 0 K 2 6

HCO₃ 3 8 4 CO₃ 0 SO₄ 6 0 0 Cl 1 3 Source No. 3 Q

Card R

Duplicate Columns 1-25 from Card Q

F 1 0 NO₃ 1 PO₄ 1 B 1 Al 1 Fe 2 9

Mn 0 5 Cu 1 0 5 Pb 1 0 Zn 1 0

Solids 1 4 6 0 Hardness Non-Carb. 4 7 4

Determined 1 4 6 0 Calc. 1 4 6 0 Ca, Mg 7 7 0 Carb. 4 7 4

Color 1 0 No. R

Card S

Duplicate Columns 1-25 from Card Q

Br 1 0 I 1 0 Alk. as CaCO₃ 2 9 6 Free CO₂ 1 0 SAR 1 0

RSC 1 0 5 ABS 1 0 5 1 0 5

Alpha (pc/l) 1 0 5 Beta (pc/l) 1 0 5 Ra (pc/l) 1 0 5 U (ug/l) 1 0 5

No. S
80Recorded by: D. ARONSONPunched by: T Date: Published:

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

088-33W-36 ADB
CSL

W-4099

Water Quality
(ppm)

Card Q

State: IOWA 16 County: CALHOUN 13 Town: ROCKWELL CITY

Well No. 422338N 0943800 Seq. No. 1 Date 121560

Sampling Depth 965 Type 1 Kx10⁶ 1280 pH 7.1 Temp. °F 52

SiO₂ 111 Ca 143 Mg 57 Na 80 K 13

HCO₃ 417 CO₃ 0 SO₄ 383 Cl 10 Source No. 3 Q

Card R

Duplicate Columns 1-25 from Card Q

F 111 NO₃ 4 PO₄ 1 B 1 Al 1 Fe 16

Mn 05 Cu 1 Pb 1 Zn 1

Determined 86 Solids 1 Calc. 1 Ca, Mg 590 Hardness 248

Color 1 No. R

Card S

Duplicate Columns 1-25 from Card Q

Br 1 I 1 Alk. as CaCO₃ 342 Free CO₂ 1 SAR 1

RSC 1 ABS 1 1 1

Alpha (pc/l) 1 Beta (pc/l) 1 Ra (pc/l) 1 U (ug/l) 1

Verified PMJ

No. 5
80

Punched FCH

Recorded by: D. AARONSON

Punched by: _____ Date: _____

Published: _____

Pump Test Record
On New Well at Rockwell City Iowa

Setting of Bowls 280'
 Depth of well 1965'
 Static head before pumping L70 '
 Temperature of water 54

G	Date	Time	Pumping	Gallons	Remarks
			Head	Per Min.	
	3-11-50	3:00	195		Very Cloudy
		3:00	256	676	Sandy Fine
		4:00	265	600	" "
		4:30	269	600	Little less
		5:00	270	600	Same cloudy
		5:30	269	600	" "
		6:00	269	600	" "
		6:30	269	600	" "
		7:30	270	600	Milky
		7:35	282	675	" air
		8:30	282	675	" "
		9:00	282	650	" "
		9:30	282	650	" "
		10:00	282	650	" "
		10:30	282	650	" "
		11:00	282	650	" "
		11:30	282	650	" "
3-12-50		12:00 M	281	650	" "
		12:30 a.m.	281	650	" "
		11:00	281	650	" "
		1:30	278	650	" "
		2:00	278	650	" "
		2:30	278	650	Clearing some
		3:00	275	650	Pumping clear
		3:35	270	650	" "
		3:55	267	600	clear
		4:00	276	650	clear air in
		4:30	276	650	" water
		5:00	276	650	" "
		5:30	269	600	" "
		6:00	269	600	" "
		6:30	275	675	" "
		7:00	275	675	" "
		7:30	275	650	" "
		8:00	274	650	" "
		8:30	276	650	" "
		9:00	276	650	" "
		9:30	275	650	" "
		10:00	275	650	" "
		10:30	274	650	" "
		11:00	276	650	" "
		11:30	271	650	" "
		12:00	279	625	" "
		12:30 P.M.	274	650	" "
		1:00	279	650	" "
		1:30	Air	650	Shut down

Notes by Paul Horich 5/10/71 related
to possible leaks in casing

Rockwell City #3 (1949-50)

T.D. 1965' into St. Lawrence

Cased from surface to 1534' into top of The Prairie du Chien
follows:

16" O.D. csq. set at 401'

12" csq. set at 725' with 10' of csq. extending up
into 16" above a lead seal.

10" csq. set at 1534' with 10' of csq. extending up
into 12" above a lead seal

8" open hole from 1534'-1965'

40' of cement for a surface seal.

Rockwell City # 3

Possibilities -

- 1) The seal at 400 feet could have broken down allowing water from the St. Louis sandy limestone to move down the outside of the 16-inch casing and around the broken lead seal into the well. This appears to be the only way in which heavy pumpage could interfere with "shallow" wells nearby.

You should check to see if the material being brought in is representative St. Louis type sand or basal Pennsylvanian type sand and shale.

In this case, the solution will be to put in a new seal in the interval of 390-401 feet between the 16" and 12" casings. How about a temporary plug at 400 feet and pressure grouting with neat cement so that the cement forms a new seal between the 16" and 12" casings. The temporary plug could later be drilled out.

- 2) The seal at 725 feet between the 12" and 10"

casings could have broken down and shale entered the hole from the overlying Maple Hill. In addition, some sand might be lifted from the basal St. Peter at the higher pumping rate of 400 gpm.

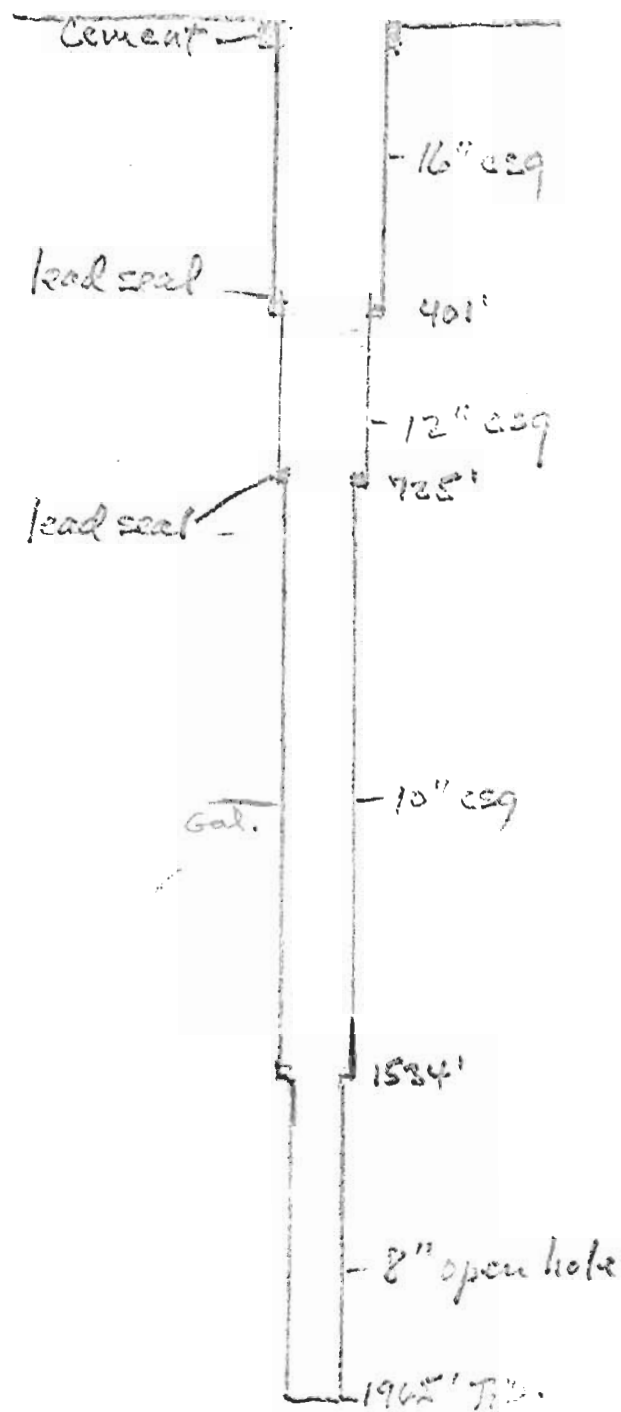
This would not affect "shallow" wells nearby.

- 3) The original construction seems to have 10" csg stopping 5' into the top of the Prairie du Chien Dolomite. Possibly some sand and shale from the overlying St. Peter and Plattville are being drawn through crevices in the upper P.C. into the well at the higher pumping rate. In this case, a liner could be set 50-75 feet into the top of the P.C. and grouted in to prevent any sand from the St. Peter moving down the annular space into the well.

Examination of filter sample shows that most of the material is being derived from the Galena (shale and dol.) and St Peter B.

P.J. Horvick
Chief Ground Water

Reckonell City #2



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19

Make of Pump Head used _____

Number 2Number & size of Bowls used 1

Setting of pump bowl _____

Size & Depth of Well _____

Static Head before pumping _____

After pumping _____

(Tape measurements)

Temperature of water _____

(before testing)

(At end of test after _____

hours

Date	Time	Engine R.P.M.	Pump R.P.M.	Pumping Head	Gallons Per Min.	Recovery From To	Minutes
3611-50	3-00	1100	1100	115		very cloudy	
3-11-50	3-30			256	676	sandy fine	
8-11	4-00	650	1300	266	600	same	
" "	4-30	650	1300	269	600	a little less cloudy	
" "	5-00	650	1300	270	600	same	
" "	5-30	650	1300	269	600	" "	
" "	6-00	650	1300	269	600	" "	
" "	6-30	6-50	1300	269	600	" "	
" "	7-30	650	1300	270	600	milky	
" "	7-35	775	1350	282	675	"	
8-30	8-30	750	1250	282	675	"	
new tack	9-00	650	1200	282	650	"	
" "	9-30	650	1200	282	650	"	
" "	10-00	650	1200	282	650	"	
old tack	10-30	600	1350	282	650	"	
" "	11-00	6-00	1350	282	650	"	
" "	11-30	600	1350	282	650	"	
M	12-00	600	1350	281	650	"	
Mar 12-50	12-30	600	1350	281	650	"	
" "	1-00	600	1350	281	650	"	
12-15	1-30*	600	1350	278	650	"	
" "	2-00	600	1350	278	650	" 20 Grs. clearing some	
" "	2-30	600	1350	278	650	Pumping clear	
" "	3-00	Run out fuel			650	when started	
3-35	3-35	600	1350	drawing down	650		

For _____ Located at _____

Make, Kind & Size of Power _____

Make of Pump Head used _____ Number _____

Number & size of Bowls used _____

Setting of pump bowls _____ Size & Depth of Well _____

Static Head before pumping _____ After pumping _____
(Tape measurements)

Temperature of water _____
(before testing) (At end of test after _____ hours)

Date	Time	Engine R.P.M.	Pump R.P.M.	Pumping Head	Gallons Per Min.	Recovery From To	Minutes
Mar. 12	3-55	600	1350	267	600	clear	
"	4-00	625	1400	276	650	"	air in water
"	4-30	625	1400	275	650	"	"
"	5-00	600	1350	276	650	"	"
"	5-30	600	1300	269	600	"	"
"	6-00	600	1300	269	600	"	"
"	6-30	600	1400	275	675	"	"
"	7-00	600	1400	275	675	"	"
"	7-30	600	1350	275	650	"	"
"	8-00	600	1400	274	650	"	"
"	8-30	550	1400	275	650	"	"
"	9-00	550	1350		650	"	"
"	9-30	575	1400		650	"	"
"	10-00	575	1400		650	"	"
"	10-30	600	1400	274	650	"	"
"	11-00	550	1400	276	650	"	"
"	11-30	600	1400	271	650	"	"
"	12-00	550	1350	279	625	"	"
"	12-30	550	1400	271	650	"	"
"	1-00	550	1400	279	650	"	"
"	1-30	800	1500	278	650	Meeting Shut down	

Drilled for --City of Rockwell City

at - Rockwell City Ia.

Drilling started - Oct. 21 1949

Completed - March 6, 1950

Well-No.-3 Kind of well-drilled

Depth 1965- 34' Size of hole starts

Finish --10'

G.P.M. 650

Static head 172 Pumping head 284 ''

Remarks 16' inch had shoe 12 1/2 inch had lead seal

Size of pipe	Amount of pipe	Depth to bottom of pipe	depth to top of pipe
16'	103	401	ground
12	348-10	725	580
10	850	1534	684

Temporary pipe size 34' amount 12 ''

Driller - Cecil Allen

From surface to 1965 ''

'' '' Tom. Thorpe Jr.

From ---0 feet to 1965

Amount in ft.	Kind of soil formation	Total depth
1	fill	1
2	Black dirt	3
5	Yellow clay	8
145	Blue clay (sand & gravel)	153
27	Shale gray	180
8	Shale & black	188
104	Shale gray	292
13	Shale brown	305
8	Shale gray	313
2	Limestone brown	315
5	Shale green	320
40	Limestone gray (Gypsum) [Shale Streaks]	360
61	Limestone brown	421
4	Dark gray shale	425
33	Limestone	458
52	Lime & shale streaks	510
35	Limestone honey comb	545
28	Limestone	633
36	Limestone & shale streaks of (water 100)	669
134	Limestone	803
48	Limestone shaley will cave	851
41	Limestone	892
36	Limestone shaley '' ''	928
62	Limestone brown	990
8	Limestone shaley	1007
7	Green Shale	1014
94	Limestone	1108
7	Limestone honey comb	1115
45	Limestone	1160
50	Limestone & sand (water 164) (little)	1210
213	Limestone hard (cutting)	1423
13	Limestone & shale streaks (blue green)	1436
10	Shale blue green	1446
10	Limestone hard	1456
14	Shale blue green Water (149)	1470
10	Shale brown green	1480
5	Shale blue green	1485
7	Blue sand	1492
42	White sand	1534
21	Limestone blue gray	1555

Amount of feet

Kind of soil or formation

~~2~~
Total depth feet

68	Brown lime sandy hard (water 140)	1623
57	Brown limestone (little cutting) (water 160)	1680
125	White limestone (170)	1805
60	White sandstone soft (water 172)	1865
100	White limestone	1965

5

CASING IN WELL NO.3

16in. pipe

19.1
17.1
21.8
20.5
21.4
21.2
20
20.3
20.3
19.1
20.10
19.2
20
20.6
16.10
20.6
21.1
21.8
21.4
20.3

402.6

12.in. pipe

20.7
21.3
21.3
20.5
21.8
22.6
21.8
21.3
21.8
20
20.7
19.8
18.4
21
19.7
21.1

338.10

2 ft. lead on
6ft of pipe

10 in. pipe

15.3
15.2
22.2
22.4
22.5
22
21.8
21.7
19.4
22.1
22.9
14.9
20.9
13.6
22.2
22.3
22.3
15.11
17.1
20.8
21.7
20.9
20.7
14.9
19.4
15.8
15.9
22.4
21.1
11.2
22.3
9.10
13.7
17.3
19.4
19.4
21.8
22.4
17
21.8
16.4
15.11
7.9 seal
16.11 shoe
21.6

850.8

THORPE WELL COMPANY

2340 SIXTH AVENUE
DES MOINES, IOWA

Drilled for City of Rockwell City at Rockwell City I.

Well is located miles N-E-S-W and miles N-E-S-W from

in the $\frac{1}{4}$ $\frac{1}{4}$ Section Township Range

Drilling started Oct. 21 19 19 Completed March 6 19 50

Well No. 5 Kind of Well drilled Depth 1965 Size hole started 34" in.

Finish 10' G. P. M. 650 Static head 172 Pumping head 5854 Drawdown

Water was first encountered at in Approx. Amt. Temp.

Remarks. 10' had shoe 122 10 had lead seals & two shoes

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
16'	103	401	ground		34	12'
12	548-10	725	380			
10	850	1534	684			

Driller Cecil Allen From Surface to 1965 feet

Driller Tom Thorpe Jr. From 0 feet to 1965 feet

Driller From feet to feet

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
1	fill	1
2	Black dirt	3
5	yellow clay	8
15	Blue clay (sand & gravel)	153
27	Shale	180
8	Shale & Black	188
101	shale gray	292
13	shale brown	305
8	shale gray	313
2	limestone brown	315
5	shale green	320
40	limestone gray (Gypsum) (shale streaks)	360
61	limestone brown	421
	dark gray shale	425

THORPE WELL COMPANY 2340 SIXTH AVENUE DES MOINES, IOWA

R-1-3

Drilled for _____ at _____

Well is located _____ miles N-E-S-W and _____ miles N-E-S-W from _____

in the _____ 1/4 _____ 1/4 Section _____ Township _____ Range _____

Drilling started _____ 19____ Completed _____ 19____

Well No. _____ Kind of Well _____ Depth _____ Size hole started _____ in.

Finish _____ G. P. M. _____ Static head _____ Drilled down _____

Water was first encountered at _____ in _____ Approx. Amt. _____ Temp. _____

Remarks _____

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
33						

Driller _____ From Surface to _____ feet

Driller _____ From _____ feet to _____ feet

Driller _____ From _____ feet to _____ feet

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
33	limestone	458
52	lime & shale streaks	510
35	limestone honey comb	545
88	limestone	633
36	limestone shaley (well - Gave)	669
82	limestone brown	751
8	limestone shaley	759
7	green shale	766
21	limestone	787
7	limestone honey comb	794
45	limestone	839
50	limestone & sand (water 104) (little cutting)	889
213	limestone	1102
13 Limestone	Limestone & shale streaks (blue green)	1115

3500
back

THORPE WELL COMPANY

2340 SIXTH AVENUE
DES MOINES, IOWA

Drilled for _____ at _____

Well is located _____ miles N-E-S-W and _____ miles N-E-S-W from _____

in the _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ Section _____ Township _____ Range _____

Drilling started _____ 19____ Completed _____ 19____

Well No. _____ Kind of Well _____ Depth _____ Size hole started _____ in.

Finish _____ G. P. M. _____ Static head _____ Drawdown _____

Water was first encountered at _____ in _____ Approx. Amt. _____ Temp. _____

Remarks. _____

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT

Driller _____ From Surface to _____ feet

Driller _____ From _____ feet to _____ feet

Driller _____ From _____ feet to _____ feet

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
10	Shale blue'green	1446
10	Limestone hard	1456
14	Shale blue green (water 149)	1470
10	Shale brown green	1480
5	Shale blue green	1485
7	Blue Sand	1492
42	White sand	1534
21	Limestone blue,gray	1555
68	Brown lime sandy hard (water 110)	1623
17	Brown Limestone (little cuttings)	1680
125	White limestone	1805
60	White sandstone soft (water 172)	1865
100	White limestone	1965

DISTRIBUTORS OF
POMONA
AND
FAIRBANKS-MORSE
DEEP WELL PUMPS



10

WE SERVICE
AND
REPAIR
ALL MAKES OF
DEEP WELL PUMPS

THORPE WELL COMPANY

CONTRACTORS

LATEST ROTARY AND CABLE TOOL EQUIPMENT
THORPE PATENT GRAVEL PACKED WELLS

PLEASE ADDRESS ALL REQUIES
DIRECT TO THE COMPANY
JAN 11 1950

2340 SIXTH AVENUE
TELEPHONE 3-6007

DES MOINES, IOWA

March 17, 1950

Mr. Emmett Williams
Water Works Supt.
Rockwell City, Iowa

Dear Sir:

Enclosed you will find copy of the pump test record which
was conducted last Saturday and Sunday on your new well.
I trust this is the information you desire.

Yours truly,

THORPE WELL COMPANY

J. W. Thorpe
J. W. Thorpe

JWT:rc
Enc.

Sixteen inch pipe that is in our new well.

19.1
17.1
21.8
20.5
21.4¹/₂
21.2
20.
20.3
20.3
19.1
20.10
19.2
20
20.6
16.10
20.6
21.1
21.8
21.4
20.3

20.7
21.3
21.8
20.5
21.8
22.6
21.8
21.3
21.8
20.
20.7
19.8
18.4
~~21.8~~
21.
19.7
21.4
~~21.8~~

338.10 all of 12 in

462.6 - all 16.-

12 inch pipe
2ft. of lead on 6ft. pieces of
pipe for seal.

15.3 7.9 seal
15.2 10.11 shoe
22.2 21.6
22.4
22.5 854. Total
22 850.8
21.8 21.68 shoe joint.
21.7
19.4
22.1
22.8
14.9
20.9
13.6
22.2
22.3
~~22.4~~
22.3
15.11
17.1
20.8
21.7
20.9
20.7
14.9
19.4
15.8
15.9
22.4
21.1
11.2
22.3
9.10
13.7
17.3
19.4
19.4
21.8
22.4
17.
21.8
16.4
15.11

894
20.4
835.8
15.8
850.8

894 21.

PUMP TEST RECORD
ON NEW WELL AT ROCKWELL CITY, IOWA

Setting of Pump Bowls 280'
Depth of Well 1965'
Static Head before pumping 170'
Temperature of water 54°

Date	Time	Pumping Head	Gallons Per Min.	Remarks
3/11/50	3:00 p.m.	195		Very cloudy
	3:00	256	676	Sandy fine
	4:00	265	600	" "
	4:30	269	600	A little less cloudy
	5:00	270	600	Same
	5:30	269	600	"
	6:00	269	600	"
	6:30	269	600	"
	7:30	270	600	Milky
	7:35	282	675	" - Air
	8:30	282	675	"
	9:00	282	650	"
	9:30	282	650	"
	10:00	282	650	"
	10:30	282	650	"
	11:00	282	650	"
	11:30	282	650	"
3/12/50	12:00 M	281	650	"
	12:30 a.m.	281	650	"
	1:00	281	650	"
	1:30	278	650	"
	2:00	278	650	"
	2:30	278	650	Clearing some
	3:00	275	650	Pumping clear
	3:35	270	650	" "
	3:55	267	600	Clear
	4:00	276	650	Clear - Air in water
	4:30	276	650	" " " "
	5:00	276	650	" " " "
	5:30	269	600	" " " "
	6:00	269	600	" "
	6:30	275	675	" "
	7:00	275	675	" "
	7:30	275	650	" "
	8:00	274	650	" "
	8:30	276	650	" "
	9:00	276	650	" "
	9:30	275	650	" "
	10:00	275	650	" "
	10:30	274	650	" "
	11:00	276	650	" "
	11:30	271	650	" "
	12:00	279	625	" "
	12:30 p.m.	274	650	" "
	1:00	279	650	" "
	1:30	Air	650	Shut down

April 4, 1949

Mr. R. W. Brooks
Layne-Western Company
P. O. Box 662
Ames, Iowa

Dear Mr. Brooks:

In reply to your request of March 31, the following information for the Rockwell City area has been assembled from the files of the Geological Survey.

The town of Rockwell City has two deep wells, known as the No. 1 (South) and the No. 2 (North) wells. The No. 1 well was originally drilled by J. P. Miller Artesian Well Co. in 1904 to a depth of 950 feet. It was cased to 264 feet with 10-inch casing, to 355 feet with 8 5/8-inch pipe, and to 490 feet with 6 1/4-inch pipe. The original static water level, ^{in 1904} was below 200 feet and the initial production was 105 gallons a minute. This well was deepened in 1926 to 1670 feet, and again in 1934 to its present depth of 1677 feet.

The No. 2 well was drilled by the McCarthy Well Co. in 1911 to a depth of 1545 feet. The well was deepened in 1931 to its present depth of 1670 feet.

Both of these wells, at their present depth, penetrate the St. Peter sandstone.

We would anticipate the following generalized geologic section for a deep well at Rockwell City, based on a starting altitude of 1230 feet:

Formation and character	Thickness (feet)	Depth (ft.)	
		From	To
Pleistocene system (glacial drift)	160	0	160
Cretaceous-Pennsylvanian systems (shale, some sandstone)	160	160	320
Mississippian system (undifferentiated limestone, dolomite, some thin shales)	355	320	675
Maple Mill formation (shale)	40	675	715

Mr. R. W. Brooks

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April 4, 1949

Devonian-Silurian systems (undifferentiated limestone and dolomite)	535	715	1250
Ordovician system			
Galena formation (cherty dolomite)	160	1250	1410
Decorah-Platteville formation (limestone, dolomite, green shale)	90	1410	1500
St. Peter formation (sandstone)	50	1500	1550
Prairie du Chien formation (cherty dolomite, sandstone)	250	1550	1800
Cambrian system			
Jordan sandstone	65	1800	1865
St. Lawrence dolomite	--	1865	--

I trust that this information will be of help to you. If we can be of further service, do not hesitate to let us know.

Very truly yours,

H. G. Hershey

HGH:KEA:BH

Calhoun Co.
Rockwell City

June 2, 1949

Mr. Emmett Williams,
City Water Superintendent
Rockwell City, Iowa

Dear Mr. Williams:

In reply to your letter of May 26, the following data on geologic conditions and mineral quality of the water near Rockwell City have been compiled from the open files of the Geological Survey.

We should anticipate at Rockwell City the generalized geologic section given below for a deep well starting at an altitude of 1230 feet.

<u>Formation and General Character</u>	<u>Thickness (feet)</u>	<u>Depth (Ft.)</u>	
		<u>From</u>	<u>To</u>
Pleistocene system			
Glacial drift	160	0	160 190
Cretaceous and Pennsylvanian systems			
Shale, some sandstone	160	160	320 360
Mississippian system			
Undifferentiated limestone, dolomite, some thin shales	355	320	675 640
Maple Mill shale	40	675	715 665
Devonian and Silurian systems			
Undifferentiated limestone and dolomite	535	715	1250
Ordovician system			1246-1270 Map
Galena formation (cherty dolomite)	160	1250	1410 1365
Decorah-Platteville formations (limestone, dolomite, green shale)	90	1410	1500 1485
St. Peter sandstone	50	1500	1550 1555
Prairie du Chien formation (cherty dolomite, sandstone)	250	1550	1800 1800
Cambrian system			
Jordan sandstone	65	1800	1865 1865
St. Lawrence dolomite	--	1865	--

It seems probable that additional supplies of water may be obtained from the Jordan sandstone and associated formations at Rockwell City at a greater depth than the present wells. Available data indicate, however, that this water has about the same hardness and a concentration of sodium similar to that now used. An analysis of the water from the Iowa Canning Company well at Sac City which penetrates the Jordan sandstone and about 155 feet of underlying limestone and dolomite is given on the attached sheet.

Mr. Emmett Williams

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June 2, 1949

Somewhat softer water might be obtained from Pleistocene sands and gravels, as along the stream valley just east of the city. We have little information on these deposits in the vicinity of your city so that a carefully planned test drilling and pumping program would be necessary to determine whether adequate supplies of water could be developed from these glacial deposits.

Mississippian formations between a depth of about 320 and 675 feet contain water that is lower in iron and somewhat softer than that now in use. It is doubtful, however, that a supply of water could be obtained from these rocks adequate for the needs of the city.

The geologic conditions at the 1250-foot town well in Manson and others in the vicinity that yield very soft water are notably different from the conditions at Rockwell City. A well that seems to have penetrated a section like that at Manson is located about 4 miles northeast of Rockwell City, but there is little probability that these rocks occur much closer to the city.

Inasmuch as the concentration of sodium seems to be a major problem at your water plant, it may be desirable to consider modification of the softening treatment somewhat. The zeolite-exchange softening process that you installed last year softens water, as you recognize, by exchanging sodium for the calcium and magnesium in the water. Thus, the hardness is reduced only in proportion to the increase in sodium; the concentration of dissolved salts remains the same. Preliminary removal of the carbonate hardness by lime treatment, however, would reduce the total hardness and dissolved solids somewhat without affecting the concentration of sodium. Then, the noncarbonate hardness could be reduced by means of the zeolites to the desired amount. By this double treatment, for example, it may be practicable to reduce the hardness of a water like the raw composite sample (attached sheet) to about 175 parts per million and still keep the concentration of sodium about 25 percent below that shown for the zeolite softened water on the attached sheet.

If you have any questions concerning this information or if we can be of further service, we shall be pleased to hear from you.

Very truly yours,

Russell M. Jeffords

RMJ:AEH
ENC.

COUNTY

TOWN	Well No.	Depth Ft.	Geol. form.	Diss. Solids.	Ins. Mat.	NO ₃	Na	Ca	Mg	Fe	Mn	Al	F	Cl	SO ₄	HCO ₃	Total Carb. (mg/l)	Calc. Hard.	
Rockwell City	Northwell	1670	St. Peter ss	1563		0.00	178	191	76	0.5	0.00		0.4	23	835	337	789	276	513
Rockwell City	Southwell	1677	"	1233		00	133	168	60	.1	.00		.4	15	602	361	666	296	371
Rockwell City	Composite raw water			1450		.7	164	172	68	.2	.00		.4	19	743	342	709	280	427
Rockwell City	Composite treated water		"	1407		.4	399	43	16	<.05	.00		.4	38	695	351	173	173*	0
Rockwell City	Women's Reformatory	1692		1335		.20	64	229	67	2.5	.04		1.5	12	600	397	647	325	322
Sac City	Jordan ss.			1628		5.00	153	193	64	4.0	.35		Tr.	5.0	650	432	745	354	391
Iowa Canning Co.		2047		1580		.00	185	97	120	6.5	.04		Tr.	10.0	778	439	735	360	375
"																			

* Check alkalinity 115 ppm.

VARNER WELL AND PUMP CO. *Established 1906*

WATER WELLS - DEEP WELL PUMPS - WELL REPAIRS - SOUNDINGS

Contractors

TELEPHONE: AREA CODE 319 583-8226
P. O. BOX 237 - 121 E. 4TH STREET
DUBUQUE, IOWA 52001

May 5, 1971

Iowa Geological Survey
Geological Survey Building
Iowa City, Iowa 52240

ATTENTION: Dr. Orville J. VanEck

Dear Orv:

As you can see, it appears that there exists at Rockwell City a well that the state survey has no records of its existence. Enclosed are the various reports given out to the city by the contractor.

This well is producing sand in enough quantity that it plugs the coke trays and cannot be used. The well location is approximately 300' east of well #1 which are all located at the city hall and water department.

Trusting that this information may be useful to you and if possible we will mail to you a sample of the sand for analysis from Rockwell City, we remain,

Yours truly,

VARNER WELL AND PUMP COMPANY

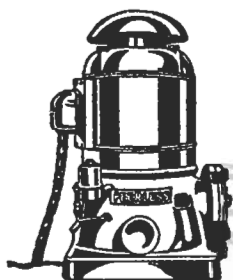
Bill McEllhiney Jr.

William A. McEllhiney, Jr.
President

deg
Enclosures

cc: Mr. Robert Taylor
Rockwell City, Iowa

*we do have samples and a
strip log on the 1950 well,
I.E. W- 4094, NW, SE, NE Sec. 36,
T. 88 N., R. 33 W.*



(DISTRIBUTORS OF PEERLESS PUMPS)