

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

RECORD OF WELL

Location:

Town: Arlington (N E)
(S W); County Egypte
SW SE sec. 28 T. 92 N., R. 7 W. Fairfield Twp.

W-1957

	28	

Well name and number Arlington town Well #2

Owner _____ Address _____

Tenant _____ Address _____

Contractor Hoeg & Ames Address Lincoln

Drillers Homer Rhodes

Drilling dates Nov 1-13, 1944

Well data:

Elevations: Drilling curb 1153.6 feet; Land surface _____ feet

Determined by Android - D.A.A.

Topographic position upland

Total depth: Reported _____ feet, Measured 224' feet

Drilling method cable

Hole and casing data 90' of 16" casing, 103' of 12" casing No overlap.
(Give amount, size, kind, and depth of all casing; type and

position of seals and packers; cementing; how finished--perforated pipe, screen,
gravel pack, open hole, etc.)

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

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

Sources of water: Principal silurian; Others _____

Production data: Date _____
 Static depth to water 44 Measuring point _____
 Pumping level 110-111 at 74 g.p.m.

 Specific capacity 1.12 g.p.m. per ft. drawdown; Temperature 49 °F.
 Pump data; Type pump Turbine Column Dia. _____ Length 195
 Cylinder or bowls: Dia. _____ Length _____ Suction pipe _____
 Power Buck gasoline drive Airline _____
 Estimated rate of production: _____ g.p.m. for _____ hrs. a day
 Use of water City supply

WATER ANALYSES (in parts per million)

Date sampled	<u>Nov. 15, 1944</u>	_____	_____	_____
Sampled by	<u>D.A.B.</u>	_____	_____	_____
Total solids	<u>338.7</u>	_____	_____	_____
Insoluble matter	<u>38.0</u>	_____	_____	_____
Alkalinity (Meo)	<u>271.0</u>	_____	_____	_____
Alkalinity (Phn)	<u>0.0</u>	_____	_____	_____
pH	<u>6.2</u>	_____	_____	_____
Fe ₂ O ₃ + Mn ₂ O ₃ + Al ₂ O ₃	<u>17.5</u>	_____	_____	_____
Alkali as sodium	<u>30.5</u>	_____	_____	_____
Calcium	<u>709.0</u>	_____	_____	_____
Magnesium	<u>308.3</u>	_____	_____	_____
Iron (unfiltered)	<u>28.0</u>	_____	_____	_____
Manganese	<u>0.12</u>	_____	_____	_____
Nitrate	<u>1.3</u>	_____	_____	_____
Fluoride	<u>0.2</u>	_____	_____	_____
Chloride	<u>1975.0</u>	_____	_____	_____
Sulfate	<u>45.5</u>	_____	_____	_____
Bicarbonate	<u>330.6</u>	_____	_____	_____
Hardness (ppm)	<u>308.9</u>	_____	_____	_____
Hardness (gpg)	<u>180.6</u>	_____	_____	_____
Remarks	_____	_____	_____	_____

Laboratory data: Sample storage location _____
 Sample range 0-214 No. spls. 26 No. dupls. & cond. 26 F
 Spls. prepared by Rush Washed range _____ by _____
 Driller's log and cond. _____
 Insoluble residues: Prepared by _____ Studied by _____ Strip log _____
 Microscopic study 0-214 E.S. strip log E. S. 12/5/44
 Gen. log _____ Correl. by E.S.

WATER LEVEL DATA

Measuring point _____

Date	Depth to water	Altitude	Remarks

REMARKS

Nov. 14, 1944.

Well acidized with 470 gallons of muriatic acid after
 well originally pumped 94 g.p.m. and d.d. was to bottom of
 pump.

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa

Well Log Record

Owner of well Arlington City Well County Fayette
 Tenant _____ Town Arlington
 Location _____ sec. _____, T. _____ N., R. _____ E. _____ W. _____ Twp. _____
 Curb elevation _____ ft. depth _____ ft. depth _____ ft. depth _____ ft. depth _____ ft.
 Static level: (Depth to water above curb) _____ ft. level _____ ft. at _____ gpm.
 Contractor Harg & Davis - Harmer & Rhoads Date drilled Nov. 15, 1944

Description*	F E E T			Description*	F E E T		
	Thick	From	To		Thick	From	To
<u>Drift</u>		<u>0</u>	<u>99 1/2</u>				
<u>Rock</u>		<u>99.5</u>	<u>113</u>				
<u>Shale</u>		<u>113</u>	<u>114</u>				
<u>Rock</u>		<u>114</u>	<u>214</u>				

*Abbreviate descriptions; use one line for each formation.

Remarks on water zones and casings _____

Set 103' of 12" pipe in 16" hole & pumped cement in 111' - 12" hole
43 carboy of acid were pumped into well
103' of 12"
103' of 16"

Temperature: Air _____ °F., Water _____ °F. at _____ A.M. _____ P.M. _____ 19____

Record obtained from _____ Recorded by _____

IOWA GEOLOGICAL SURVEY
Water Well Data Sheet

Survey
Number W1937

Town Arlington County Jayetta T. 92 N., R. 7 W.
Name Arlington Town Well #2 Location Swan $\frac{1}{2}$ SE $\frac{1}{4}$, Sec. 28
Contractor Keeg & Ames Driller Thomas Rhodes Use City supply
Construction drilled Drilling Dates Nov-13 (1944) Depth 224
Topog. Leland Elev. 1153.6 Ref. Ancient DAB Total Depth 224 feet
Final above
Static below Pumping Draw Time
Level 44 curb Level 110-111 down 66ft gpm 74 pumped Various regulations Date Nov-15-1944
Depth to Calc. g/ft. Prin.
bot. pump 195 ft. with - ft. suction pipe. drawdown 375 Prod. Silurian
Producing
Horizons Silurian

Water levels and pumping tests on various horizons during drilling:

Depth Range	Stat. Level	Pump Level	Draw down	gpm.	Temp.	Producing horizons	Producing formations	Formations cased out
	<u>44</u>	<u>110</u>	<u>66</u>	<u>74</u>	<u>49</u>		<u>Silurian.</u>	<u>cemented out to depth of 103 feet.</u>

Additional information Well acidized on report of Nov 14 with 470 gallons of Muriatic acid after well had produced 94 gallons per minute and drawdown was to bottom of pump setting of 195 feet.

Laboratory Data
Sample range 0'-214' Number samples 26 Number Duplicates 26 Cond. F215
Yes
Log No, Cond. Boxed Push Back Range 0'-214' Date 11/17/44

Remarks

Microscopic Study Range Strip Log Gen. Log Blue Print Samples Washed
Insol. Res. Study Range Strip Log Gen. Log Insol. Res. Well Prepared Corel.

STATE OF IOWA
IOWA GEOLOGICAL SURVEY
GEOLOGY ANNEX
IOWA CITY

Results of Pumping Test

of

Arlington Town Well #2
Arlington, Iowa

November 14-15, 1944

Name: Arlington Town Well
Location: SW cor SE $\frac{1}{4}$ sec. 28, T. 92 N., R. 7 W.
Elevation of drilling curb: 1153.6
Owner: Town of Arlington
Contractor: Hoeg and Ames
Driller: Homer Rhodes
Date started: November 1, approximately. 7 intermittent days actual drilling.
Date finished: November 14, 1944
Depth: 214 feet
Casing: 90 feet of 16-inch casing, 16-inch hole to 103 feet. 3 feet into rock.
99.5 feet to rock. 103 feet 12-inch casing into rock. No overlap.
12-inch sets at bottom of 16-inch.
Test pump: Turbine pump. 6 stages - depth of pump is 195 feet with 5-foot suction pipe and 5 feet of bowls. Driven with 100 h.p. Buick gasoline motor on car chassis with right angle drive shaft.
Producing horizon: Silurian
Discharge pipe: 60-90 feet of 2 $\frac{1}{2}$ -inch fire hose.
Measuring point: Top of 16-inch casing, 1.6 feet above land surface. All measurements made with electric line. No air pressure gage used.
Production: Discharge determined by filling 420 gallon galvanized tanks, 17 gallons to the inch.

cc to Hoeg and Ames, Lincoln, Iowa, November- December 1, 1944
Town of Arlington, City Clerk, Arlington, Iowa, December 1, 1944.

Time	Depth to water in feet	Discharge Gallons per minute	Remarks
November 14, 1944			
8:25 a.m.	*44.0		*Static level.
8:30			*Pump started.
11:20			*Pump stopped. Had pumped 94 gallons per minute previous to shutting down had pumped to bottom of pump column and pumped air.
1:00 p.m.	48.85		
1:12	48.58		
1:18	48.46		
1:23	48.35		
1:45	47.86		
3:07	46.71		
3:57	47.27		
4:25	47.00		
5:00	46.93		
5:15			Sealed casing for acid treatment.
8:15			Started pumping 470 gallons muriatic acid into broken limestone.
11:15			Finished same.
November 15, 1944			
9:40 a.m.			Pump started.
9:47	47.53		
9:48	50.00		
9:50	80.00		
9:51	90.00		
9:52	100.00		
9:53	107.20		
9:55	112.00		
9:57	124.40		
10:00	128.00		
10:02			Temperature 51°F.
10:10	143.2		
10:17	143.1		
10:21	149.59		
10:25		95	3 minutes at 17 g.p. inch
10:26			Motor stopped.
10:30			Motor started.
10:35	132.50		
10:36			Increased discharge and extra 90 feet of hose added
10:36	140.00		
10:48			Motor stopped.
11:13			Motor started at higher speed.

*Reported by Whitney, pump man

Time	Depth to water in feet	Discharge Gallons per minute	Remarks
November 15, 1944			
11:17 a.m.		175	Measured by Whitney.
11:18		195	Pumped air.
11:21			Motor slowed down.
11:30	187.0 - 190.0		Motor jumpy.
11:32	195.0		Pumped air.
11:34	192.5		
11:36			Temperature 49°F.
11:40		88	
11:45	194.0		Pump shut off.
11:46	180.0		
11:47	170.0		
11:49	138.0		
11:50	130.0		
11:51	120.0		
11:52	110.0		
11:53:30	101.0		Noise of falling water stopped.
11:55:0	90.0		
11:56:30	80.0		
12:00 N	70.00		
12:09 p.m.	60.00		
12:40	51.5		
12:44			Motor started.
1:00			Sample G302 of water collected cleanest yet.
1:01	82.0		
1:02		51	
1:05	86.40		
1:10			Discharge increased
1:30	108.82		Pumping steady
1:37	110.95		
1:45			Temperature 49°. Water whitish.
1:49		74	
1:54	111.3		Pump shut off.

Memorandum
Sept 25, 1944

From: W.E. Hale

Subject: Water levels in Creamery Well at Arlington

Whitney stated that the non-pumping water level at the Arlington Creamery well is now 42 feet. The water level was 18 feet below land surface.

Memo:

May 13, 1953

Re: Phone call from Tom Thorpe Jr.
in regard to Arlington Town Well.

Tom Thorpe Jr. called about 9:00 am in regard to obtaining a forecast for a new Town Well at Arlington. He has talked to the council about obtaining 150 GPM and he feels that a well to the St. Peter at least will be necessary. Their present well (he thinks) is finished in Silurian and has been acidized & otherwise worked on and is not satisfactory.

Tom said the council had requested him to contact the Survey and get a forecast and also to arrange a meeting of a Survey Representative with the Council preferably Thurs (May 14) or Fri (May 15). He requested we send the Thorpe Co. a forecast as soon as possible (Today) and call the office tomorrow morning (9-9:30 am) in regard to meeting with the Council.

JBC

January 14, 1947

Office of Town Clerk
Arlington,
Iowa

Dear Sir:

We have received your letter of January 13 in regard to the advisability of installing a pump with a capacity of 200 gallons per minute on the deeper town well.

The shallow town well and several other wells in town are finished in dolomite which we have assigned to the Silurian system of rocks. This dolomite strata extends to a depth of about 185 feet at the deeper town well site. Below this dolomite section is a thick shale strata. The deeper town well is probably finished in dolomite underlying the St. Peter sandstone which is at a considerable depth below the shale strata.

Unfortunately we do not possess a complete record of the construction of the deep well. If this well is cased through the upper rock strata and into the thick shale, then pumping the deep well should have no effect on the shallow town well. If, however, the deep town well is not cased through the upper rock strata then there may be some interference between the deep well and the shallow well if the deep well is pumped heavily. However, since the new shallow town well is a half mile away from the deep well I would not expect enough interference to affect appreciably the yield from the shallow town well.

We might be able to discuss the matter more fully if we had better information on the deep well. We would appreciate receiving any information the town might have on the casing record of the well, the depth to water when the well is not being pumped, the water level when pumping and the approximate rate at which the well was pumped in the past.

If we can be of further service to you or if you have some questions in regard to this discussion please let us know.

Very truly yours,

WEH:AEH

W. E. Hale

Office of Clerk of
The Incorporated Town of Arlington

Arlington, Iowa, Jan 13 1947

Iowa Geological Survey
Iowa City Iowa.

JAN 13 1947

Dear Sir:

The mayor and the town council has ask that
I writ you in regards to our wells here in
town.

We have one well 214 feet deep and one 900 feet deep.
What we want to know is there any danger of
pumping the 214 feet well dry. If we put in a
200 gal a min. pump in the deep well.

The shallow well is on top of a small hill about
one half a miles from the deep well.

Please let me know by return mail

Yours Truly
M. L. Lickins
Clerk.

750
-160
960

1

Proposed Well at Arlington

The town of Arlington is situated in southeastern Fayette County in parts of sections 27, 28, 33 and 34 in T. 92N, R. 2W. The town is near the edge of the upland adjacent to the valley of the Volga river about 6 miles to the north.

Geology - Arlington lies a short distance within the eastern boundary of the ^{area} glaciated. The drift is expected to be relatively thin, probably not more than 50 feet.

Bedrock is Silurian ^{dolomite} of Hopkinton age with alexandrian cherty dolomite underlying it. The top of the Maquoketa shale should be reached at 160 feet so from 110 to 150 feet of rock is present ^{on the thickness of the drift} depending. The Silurian is generally porous and contains water. However, the proximity of the Volga valley which cuts out the Silurian rocks allows rapid discharge and makes the reservoir area small for Arlington.

The Maquoketa formation underlying the Silurian ^{composed of} is about 270 feet of shale and limestone and dolomite beds. Generally even the thicker carbonate layers are argillaceous and interbedded with thin shale beds.

The Galena formation is mostly limestone

some altered to dolomite. Generally the limestone facies of Galena is denser & hence a much poorer aquifer than the dolomite facies. The formation is about 220 feet thick.

Limestones and shales make up the Decatur-Platteville formations approximately 90 feet thick.

St. Peter sandstone (probably including some green shale at the base) is 40 to 50 feet thick. In some places the sandstone is tightly cemented so that movement of water through it is not rapid. Some water can be expected, however.

The Prairie du Chien formation is made up of cherty and sandy dolomites. At Arlington the thickness is about 375 feet. ^{The Root Valley member, a} ~~A~~ very sandy dolomite or dolomitic sandstone, occurs in the lower part of the upper half of the formation and is generally water bearing.

Jordan sandstone lies beneath the Prairie du Chien and, although well cemented in some places, almost always will produce a large quantity of water in a properly constructed well.

St. Lawrence dolomite does not generally yield much water but the underlying Cambrian sandstones will

produce large quantities.

Summary of formation tops:		(based on elev. of 1120')		
		thickness	from	to
Pleistocene drift		10-50	0	10-50
Silurian dolomite		110-150'	10-50	160
Maquoketa shale, dolomite and limestone		270	160	430
Galena limestone		225	430	655
Decorah - Platteville limestone and shale		90	655	745
St. Peter sandstone		45'	745	790
Prairie du Chien sandy and cherty dolomite		375	790	1165
Jordan sandstone		100±	1165	1265
St. Lawrence dolomite				
Franconia sandstone				

Present town supply - The town of Arlington is now supplied by two wells. The #1 well 160 feet deep probably extends to the Maquoketa and hence produces from the Silurian dolomite. It is reported to yield about 25 g.p.m. The diameter of the well is apparently small since water is forced out through $\frac{1}{2}$ " pipe by a $\frac{3}{4}$ " air pipe. The #2 well is reported to be 823 feet deep with the St. Peter top at 775 feet. It has a diameter of from 8 to 5 1/2 inches. This well also yields about 25 g.p.m.

32 g.p.m. 6/1944
Whitney

6/1944
Now 17 g.p.m.
(Whitney)

4

Creamery paid for well 108' deep
Whitney measured it Spring 1944 at 80'
Had deteriorated to practically nothing -
now using town water. Whitney cleaned out much
black mud. Tried acidizing but no go - wrecked hole.
So now no well at all.

The Creamery well 105 feet deep probably penetrates a short distance into the Maquoketa. It is reported to produce just under 20 g.p.m.

It is now desired to drill a well which will yield approximately 200 g.p.m. to supply the city and the creamery.
100 g.p.m. would be very satisfactory

Groundwater - From the foregoing it is evident that the yield of the Silurian is not high. ^{None of} The 3 wells just mentioned at Arlington ~~to~~ ~~produce~~ produce over 25 g.p.m. Farm wells nearby are reported ~~to~~ to yield plenty of water for their own use but probably no more than these wells. At Brushy Creek ^{Canyon} State Park only 10.5 g.p.m. was obtained but the drawdown was only 9 1/2 feet.

The Maquoketa formation is not a good aquifer and even where initial yield is sufficient ^{is usually encountered} trouble with clay and shale clogging the pumps and possibly sealing the dolomite.

The Galena will probably yield a small amount of water but the fact that it is here limestone is not encouraging.

The St. Peter sandstone offers more hope and with proper construction and development

might yield up to 100 g.p.m. However, few ^{large} wells in the region obtain water from it. Apparently the #2 town well obtains 25 g.p.m. from this formation and the Fayette County Home about 12 miles northwest of Arlington also uses it. The exact amount of water produced ^{from the latter well} is not known but a considerable amount was obtained.

At Elkhader ^{about} 190 g.p.m. is pumped from the town well which penetrates the St. Lawrence. Apparently the major portion comes from the Prairie du Chien, though St. Peter and Jordan contribute. The town of Edgewood is reported to obtain 80 g.p.m. from the Prairie du Chien and Jordan. It is not unlikely that the Prairie du Chien will yield the amount of water desired and almost certainly 200 g.p.m. can be obtained from the Prairie du Chien and Jordan if the well is of sufficient diameter and properly constructed.

It is recommended that a relatively large diameter well be drilled to the Maquoketa shale. Should the Silurian seem hopeful, acidization is suggested as a means of increasing the permeability of the dolomite. If insufficient water

is obtained, drilling must then be continued. ~~Probably~~
It will be necessary to go at least to the St. Peter
before the desired quantity of water can reasonably
be expected. If the St. Peter is not a good aquifer
here, the Prairie du Chien and Jordan can be expected
to yield sufficient water.

S. E. H. Jr.

June 20, 1944

Memorandum

To: H.G. Hershey

From: SEH Jr.

Concerning: visit of Whitney ~~and Stevenson~~

Date: June 29, 1944

345.1 ✓
W.E.H. ✓
HGH ✓
SEH - for final
recording of data.
21

Whitney concerning Arlington Problem
(Creamery Well)

Creamery well (see my notes for data) deteriorated & when more water was needed Whitney tried to clean hole, acidized, & ordered new pumps. He found the well full of black muck and clay (probably till is my guess) which apparently was clogging dolomite. He put in 150 gal of acid but very little pressure was produced & no favorable results were obtained. However, when they went to put pump back they couldn't get it down - apparently the well caved on them - possibly the result of the action of acid. He measured hole at 80 ft (our record says 185'). The creamery then started taking water from the town. Town thought they had plenty of water but discovered that when Creamery started using water that houses on hill could get ~~no~~ water except in the ^{late} afternoon. Whitney found that the 160' well would produce only 17 g.p.m., the 823' well 32 g.p.m.

Creamery wants a well of their own but doesn't have money to go very deep. Whitney had thought he might put a larger pump on the deep city well to provide enough for both but our records ~~show~~ indicate that a 6" casing probably extends through the Maquoketa

so ~~that~~ he wouldn't be able to get his pump through it. He will meet with the city council on Friday. Seems satisfied with what I could tell him as far as data is concerned but of course not very encouraged about getting a large quantity of water.

Whitney also reports that there is a rumor that Thorpe will drill a deep hole to New Richmond or possibly a 2200 ft well (Francisco) at Nevada, Story Co. He has pump contract there now.

Reports he has bid on a pump contract at Klemme - but I got sidetracked & forgot to ask if they are now drilling a well. Might be worth having Bill check on it.

Says Sylvan does have samples on the lower part of the Knight farm well. He was to have brought them in but Sylvan hadn't sent them to him.