

was 17'-9 3/8" when you left WL
 5.20 - 7 1/2" = 17'-1 3/8"
 17.16

29th
 8.00 45 1/2" #3 on = 13'-9 3/8"
 13.53
 11.00 45" = 13'-10 3/8"
 13.32
 #1 was off. started it so #3 will
 go off soon

12.00 46" #3 off = 13'-9 3/8"
 13.78
 12.15 #3 on
 1.00 47" #3 on = 13'-10 3/8"
 13.86
 2.00 49 #3 on 13.70 = 13'-8 3/8"
 3.30 50 3/4 #3 on 13.55 = 13'-6 5/8"

30th
 8.15 65 3/4 #3 on 12.3 F
 12.30

Drover will take recovery
 till Wed & send in card
 out

29.4
 17.16
 12.59

date	time	WL
30th	12:00 PM	12'-4 1/2"
	3:30 PM	11'-10 1/4"
	6:00 PM	11'-9 1/4"
MAY 1st	8:00 AM	11'-4"
	1:00 PM	11'-2"
	7:00 PM	11 ft.
MAY 2-	8:00 AM	10'-10 1/2"
	12:00 AM	10'-6 1/2"
	7:00 PM	10'-6 1/2"
MAY 3	8:00 AM	10'-4 1/2"
	6:00 PM	10'-3 1/2"
MAY 4	8:00 AM	10'-1 3/4"
	6:00 PM	10'-00"

U. S. GEOLOGICAL SURVEY
 MAY 9 1966

Leighton Well -

4-28-5 20 P - 485 - 17.16
 4-29 8 50 A - 1365 - ? 13.99
 13.86 11 A - 1545 - ? 14.03
 13.75? N - 16052 - ? 13.95
 1 50 P - 1665 - ? 13.86
 2 20 P - 1725 - 13.70
 3 30 P - 1815 - 13.55
 4-30 8 15 A - 2820 - 12.30

~~5 20 P = 1231 8 15 A - 1716~~
~~8 50 A 15.47~~
~~11 A 15.43~~
~~N 15.51~~
~~1 50 P 15.60~~
~~2 20 P 15.76~~
~~3 30 P 15.91~~

17- 9 3/8 } 8 5/8 A
 13- 57 3/8 }
 45 1/2 }
 13- 11 7/8 } ZT

13- 45 7 3/8 } 11 1/4 A
 45 - }
 13- 12 3/8 }

13- 57 3/8 } N 100 N
 46 }
 13- 11 3/8 }

13- 57 3/8 } 1 50 P
 47 }
 13 10 3/4 }

$$\begin{array}{r} 45 \frac{1}{2} \\ 9 \frac{3}{8} \\ \hline \end{array}$$

56

$$17 - 9 \frac{7}{8} \frac{11}{8}$$

$$L \quad 45 \frac{4}{8}$$

$$13 - 1 \frac{7}{8}$$

45 1/2

36

$$3 - 9 \frac{1}{2}$$

1778

4.08

$$\hline 1370$$

1778

4.23

$$\hline 13.55$$

17.78

63

$$\hline 17.15$$

17.78

3.79

$$\hline 13.99$$

1778

3.75

$$\hline 14.03$$

17.78

3.83

$$\hline 13.95$$

17.78

3.92

$$\hline 13.86$$

1778

5.48

$$\hline 12.30$$

	9 3 5,0	0	0.0	0	*
		2	8.9	2	
			9.4	2	-
		1	9.5	0	*
		2	8.4	1	
			9.4	2	-
	1-	1	8.9	9	*
		2	7.5	8	
			9.4	2	-
	2-	1	8.1	6	*
		2	6.9	2	
			9.4	2	-
	3-	1	7.5	0	*
		2	6.4	5	
			9.4	2	-
	4-	1	7.0	3	*
		2	6.0	7	
			9.4	2	-
	+ 1 5-	1	6.6	5	*
		2	4.5	0	
			9.4	2	-
7-	16.08	1	5.0	8	*
		2	5.0	5	
			9.4	2	-
	9-	1	5.6	3	*
		2	4.5	9	
			9.4	2	-
	12-	1	5.1	7	*
		2	4.2	4	
			9.4	2	-
	15-	1	4.8	2	*
		2	3.7	1	
			9.4	2	-
	20-	1	4.2	9	*
		2	3.4	3	
			9.4	2	-
	25-	1	4.0	1	*
		2	3.1	5	
			9.4	2	-
	30-	1	3.7	3	*
		2	2.3	2	
			9.4	2	-
	50-	1	2.9	0	*
		2	1.6	8	
			9.4	2	-
	70-	1	2.2	6	*
		2	1.1	9	
			9.4	2	-
	90-	1	1.7	7	*
		2	0.8	7	
			9.4	2	-
	105-	1	1.4	5	*
		2	0.6	1	
			9.4	2	-
	120-	1	1.1	9	*
		2	0.1	1	
			9.4	2	-
	150-	1	0.6	9	*
		1	9.6	9	
			9.4	2	-
	180-	1	0.2	7	*

	1	9.33	-
		9.42	-
210-		9.91	*
	1	8.95	-
		9.42	-
240-		9.53	*
	1	8.72	-
		9.42	-
270-		9.30	*
	1	8.43	-
		9.42	-
300		9.01	*
	1	8.20	-
		9.42	-
330-		8.78	*
	1	7.96	-
		9.42	-
360-		8.54	*
	1	7.16	-
		9.42	-
485-		7.74	*
	1	3.99	-
		9.42	-
1365-		4.57	*
	1	4.03	-
		9.42	-
1545-		4.61	*
	1	3.95	-
		9.42	-
1605-		4.53	*
	1	3.86	-
		9.42	-
1665-		4.44	*
	1	3.70	-
		9.42	-
1725-		4.28	*
	1	3.55	-
		9.42	-
1815-		4.13	*
	1	2.30	-
		9.42	-
2820-		2.88	*

17152

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

Location: 3 BKS. S. OF MAIN East-West ST. (HIGHWAY #9)
ON HIGHWAY #17
Town: ESTHERVILLE (NE) County EMMET
(SW)
S² Sec. 10, T. 99, N., R. 34 (W) Twp.

Well name and number _____

Owner ESTHERVILLE CITY WELL #9 Address ESTHERVILLE, IOWA

Tenant _____ Address _____

Contractor LAYNE - WESTON CO Address AMES, IOWA

Drillers _____

Drilling dates 1965 completed March 1965

Well data:
Altitudes: Drilling curb _____ feet; Land surface _____ feet

Determined by _____

Topographic position _____

Total depth: Reported _____ feet; Measured 750 feet

Drilling method _____

Well and casing data 462' OF CASING - CASING INTO ST. PETER

462' of 16" O.D. cas., cemented 0-462

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

Source of data _____

Sources of water: Principal
Others

ST. PETER, PRINCE DE CUBAN, JORDAN
ST. LAWRENCE?

PRODUCTION DATA

Date _____
Static water level 112'
Pumping water level 160'
Yield (g.p.m.) 1025
Measuring point _____
Duration of pumping _____
Specific capacity 21.3

LABORATORY DATA

PLG-37-38

Well No. #17152 Sample range 0-750 No. of samples 148

No. of dupls. and cond. 148 FAIR Washed range 285-750

Samples prepared by LOVETT Date 3/19/65

Logged by Koch Date 4/17/65

Correlations by Koch Date 4/17/65

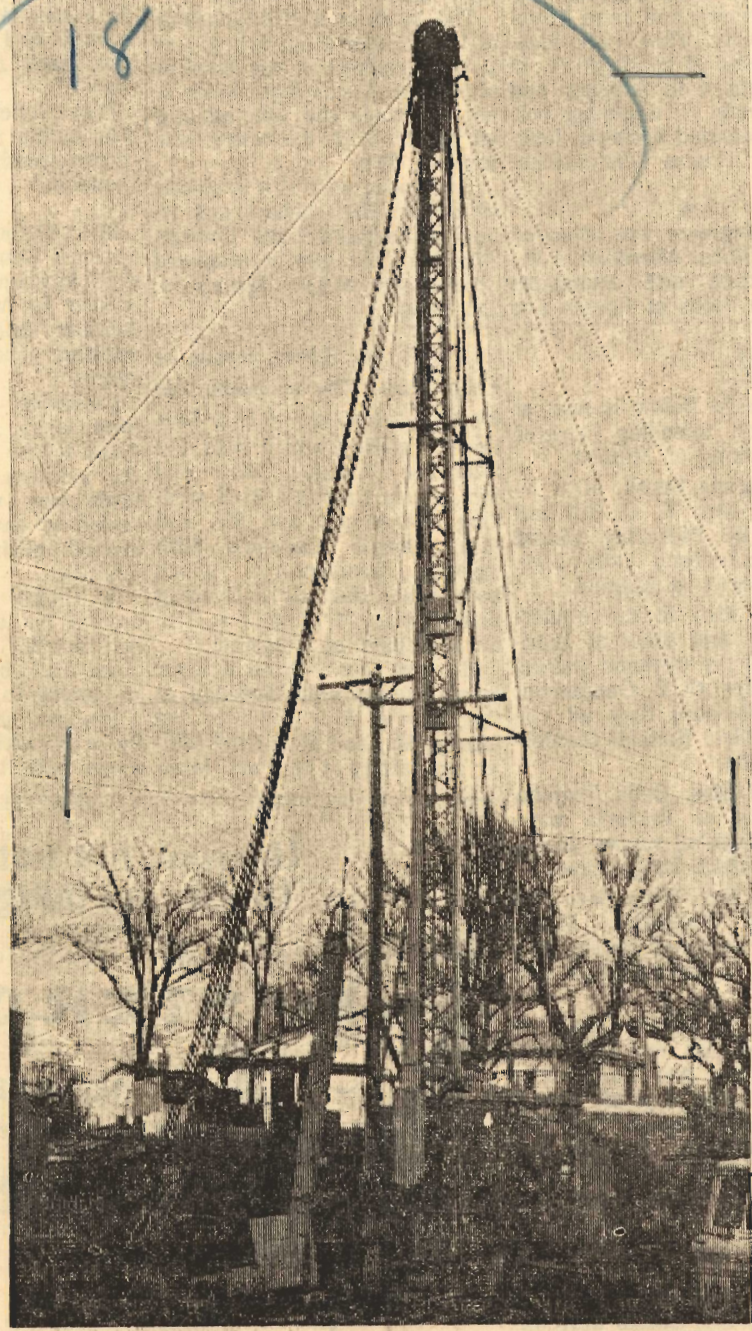
Estherville (Emmet)

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

News
Estherville, Iowa

NOV 28 1964

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DRILL GOES DEEPER as workmen, pass halfway point in construction of 700-foot water well. The new well, to be part of the municipal water system, is being constructed to bolster the supply of raw water to John Morrell and Co. and is located north of the Morrell plant. The project is scheduled for completion this spring. (Photo, Terry Borchers)

GW Estherville Gen. Data
Emmett Co.

MEMORANDUM

March 25, 1965

To: Dr. H. G. Hershey
From: Richard C. Northup
Re: Estherville city well #9

Dwight Brainard, Layne-Western Company at Ames, called Thursday morning to report that their new well (Jordan-St. Lawrence) has been completed and test pumped at 1025 gpm. Static water level is 112' with 48' of drawdown. This gives a specific capacity of 21.3, a very good well. They do seem to be having a minor problem in that the well is still pumping some sand, and this has made the city engineer a bit anxious. However, the amount of sand has decreased steadily since they started to pump on Tuesday. I suggested that they keep pumping several more days, if necessary, in an effort to clean it up entirely. They can probably get by with a minor amount of sand, even so, as they only plan to pump the well at about 800 gpm, when the permanent pump is installed. As of now there is only a very small amount of sand coming up when the pump is cut back to this rate. The chances seem good that the well should pump free of sand after a day or two, although they can't be sure. Mr. Brainard is sending us a sample of the sand in the hope that we can identify the source, but this may be a bit difficult as everything below the first ten feet of the St. Peter is open, and the sands look so much alike. All samples are in, and I will run the well soon.

RCN/m

GW Estherville (Emmett)
City well #9 folder

April 27, 1965

Mr. Dwight Brainard
Layne-Western Company
705 South Duff Street
Ames, Iowa 50010

Dear Mr. Brainard:

Enclosed you will find a generalized copy of the #9 Estherville city well. A copy has also been forwarded to Mr. Russell Peterson.

Mr. Northup is currently on vacation and the drill cuttings from the #9 well have been studied by another staff member.

It is generally very difficult to distinguish between sand grains of the St. Peter formation and those of the Jordan formation. Examination of the drill cuttings, and a comparison with the sample of sand being pumped, indicates normal St. Peter-Jordan sand plus two additional separable types for the pumped sand.

The first type consists of coarse to fine (1-1/8mm) hematite (?) - stained sub-angular to sub-rounded moderately frosted quartz grains. These grains appear first in the interval from 525-528'. They are mixed with the more rounded and frosted St. Peter grains and may occur in crevices or irregular solution channel fills in the top of the Prairie du Chien formation. They are also present within a weakly cemented zone in the interval from 560 to 565' and generally, throughout the interval from 600 to 650'. It is not possible to state definitely which interval these grains are derived from.

The second separable type of sand present in the pumped sample consists dominantly of very fine-grained (1/8 - 1/16mm) colorless, translucent, sub-angular to angular quartz grains. This zone is recognizable in the drill

April 27, 1965

cuttings within the interval from 680' to 700'. The unit is very weakly cemented with dolomite and is very friable. A few fine sand grade (1/4-1/8mm) sub-angular limonite (?) - stained grains are scattered throughout the interval. This zone appears to be the only source for the quantity of the finer sand fraction present in the pumped sample.

We have not received any data regarding the main water-bearing zones. If the interval from 680 to 700' is contributing little to the production from the well you may wish to set a liner through this interval.

If the well is ultimately treated to increase the production we would be extremely interested in the method to be employed and the subsequent results. In the meantime, if I can be of further service, please feel free to call on me.

Very truly yours,

H. G. Hershey

HGH/dlk/m
Enclosure