Punched FCH.

Verified P

WRD Exp. (CM)
Aug. 1964

U. S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

COUNTY NW 4

Record by R.W. COBLE Source of data FI E Date 6/25/65 Map 1:63 360

State IOWA 16 County (or town) POCAHONTAS 76

Latitude: 42 42 00 N Longitude: 094 32 00 Sequential number: 1

Lat-long accuracy: 4 T 92 N S, R 31 W E, Sec 5, NE ¼, ¼, ¼ 5

Local well number: 092 31 W 05 Other number: W-0280 B & M

Local use: 002 EC 35 I Owner or name: CITY OF ROLFE

Owner or name: ROLFE IOWA Address: ROLFE IOWA

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist

Use of water: (A) Air cond, (C) Comm, (D) Dewatering, (F) Fire, (H) Dom, (I) Irr, (N) Ind, (P) P S, (S) Stock, (T) Instit, (U) Unused

Use of well: (A) Anode, (D) Drain, (G) Seismic, (O) Obs, (P) Oil-gas, (R) Recharge, (S) Spring, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed

DATA AVAILABLE: Well data 1 Freq. W/L meas.: ORIGINAL 1 Field aquifer char.

Hyd. lab. data:

Qual. water data: type: COMPLETE

Freq. sampling: ORIGINAL 1 Pumpage inventory: yes (no) period:

Aperture cards: yes

Log data: GEOLOGIC AND DRILLERS LOGS

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 160 ft 120 Meas. kept DRL LOG accuracy

Depth cased: (first perf.) 89 ft 9 Casing type: STEEL ; Diam. 8 in

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other

Method Drilled: (A) air rot., (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, rotary, (R) reverse trenching, (T) driven, (V) drive wash, (W) (Z) other

Date Drilled: 1935 1935 Pump intake setting: ft

Driller: THORPE WELL CO name, DES MOINES, IOWA address

Lift (type): (A) air, (B) bucket, cent, jet, (C) (J) multiple, (cent.) multiple, (turb.) (L) (M) (N) none, piston, rot, submerg, turb, other Deep Shallow

Power (type): diesel, elec, gas, gasoline, hand, gas, wind; H.P. LPG nat Trans. or meter no.

Descrip. MP LAND SURFA ft above below lsd, Alt. MP 1173

Alt. LSD: 1173 1173 Accuracy: (source) ALTIMETER 7

Water Level 25 ft above below MP; Ft above below lsd 25 Accuracy: DRL LOG 3

Date meas: 5/9/1935 1935 Yield: 45 gpm 15 Method determined

Drawdown: 60 ft Accuracy: DRL LOG 3 Pumping period 24 hrs 24

QUALITY OF WATER DATA: Iron 0.75 ppm 1 Sulfate 270 ppm 7 Chloride 13 ppm 1 Hard. 651 ppm 5

Sp. Conduct K x 10^6 Temp. °F Date sampled MAY 3 1965

Taste, color, etc.

31W-05a

Well Number 42 ... N/S ... 32 ...

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD (1–19) | Physiographic Province: CENT. LOW (20–21) | Section: WEST

LAKE (22) | Drainage Basin: DES MOINES (23–25) | Subbasin: (26)

Type of well site: (D) (F) (H) (S) (T) (V) local depression, flat surface, hilltop, hillside, terrace, valley flat, (27)

MAJOR AQUIFER: CRETACEOUS system, LOWER series (28–29) DAK SANDSTONE aquifer, formation, group (30–31)

Lithology: MED. GRAINED SS (32–33) | Origin: MARINE (34) | Aquifer Thickness: ft

(35–37) Length of well open to: 19 ft (38–40) | Depth to top of: ft (41–43)

MINOR AQUIFER: system, series (44–45) aquifer, formation, group (46–47)

Lithology: (48–49) | Origin: (50) | Aquifer Thickness: ft (R)

(51–53) Length of well open to: ft (54–56) | Depth to top of: ft (57–59)

Intervals Screened: 109

Depth to consolidated rock: 11 ft (60–63) | Source of data: SAMPLES (64)

Depth to basement: ft (65–68) | Source of data: (69)

Surficial material: SANDY TILL (70–71) | Infiltration characteristics: POOR (72)

Coefficient Trans: gpd/ft (73–75) | Coefficient Storage: (76–78)

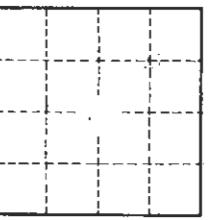
Coefficient Perm: gpd/ft²; Spec cap: 0.75 gpm/ft; Number of geologic cards: (79)

CASIN

... 2 40 89

1/2 SCRE

clay pot



THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

1201-S

CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable sign above or preceding the address.

WESTERN UNION

(31)

R. B. WHITE
PRESIDENT

NEWCOMB CARLTON
CHAIRMAN OF THE BOARD

J. C. WILLE
FIRST VICE-PRESIDENT

SIGNS

DL = Day Letter
NM = Night Message
NL = Night Letter
LC = Deferred Cable
NLT = Cable Night Letter
Ship Radiogram

The filing time as shown in the date line on full-rate telegrams and day letters, and the time of receipt at destination as shown on all messages, is STANDARD TIME.

Received at 110 East Washington St., Iowa City, Iowa. Dial 314 1935 MAY 14 AM 10 32

MINUTES IN TRANSIT	
FULL-RATE	DAY LETTER

MRP12 18=ROLFE IOWA 14 1013A

PROF A C TESTER=

IOWA GEOLOGICAL SURVEY=

PRODUCTION FORTY FIVE GALLONS MINUTE TEN HOURS BOTTOM PUMP EIGHTY SIX FEET RIG SHUT DOWN BUT IN PLACE=

V H JONES.

THE QUICKEST, SUREST AND SAFEST WAY TO SEND MONEY IS BY TELEGRAPH OR CABLE

NOTICE

5/10 193

A. M. 6:55 P. M.

Mr. A. B. Tester Room No.

~~There is a Package for you~~

There was a Phone Call for you; please call Off 5 Parachutes

Remarks:

O.B B CO. 37899

Jones - 935 pm Reid @ Ottumwa

Started 11:15 - 3:15 pm

pump at 91-95'

55 gpm - D-D to 60-70
-65 ft.

Max 45' DD - 67 gpm -

Air gauge -

Drum - 70 gal

Water showed some silty at max -

pumped 55 gpm

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Received at 110 East Washington St., Iowa City, Iowa. Dial 3141

1935 MAY 9 PM 6 29

MINUTES IN TRANSIT

FULL-RATE	DAY LETTER

MRC100 22 XC=ROLFE IOWA 9 605P

A C TESTER=

PUMP BREAKDOWN AFTER ONE HOUR AVERAGE NEAR FORTY FIVE GALLONS PER MINUTE MAXIMUM DRAWDOWN TO EIGHTY FIVE FEET FOUR HOURS TEST TOMORROW=

V H JONES.

1935 MAY 9 PM 6 31

Telephone No. 320

Telephoned To

Time Delivered

To IOWA CITY, IA.

By

THE QUICKEST, SUREST AND SAFEST WAY TO SEND MONEY IS BY TELEGRAPH OR CABLE

IOWA EMERGENCY RELIEF ADMINISTRATION
Geological Division S-E6-1085

Final Summary Report on New City Well at Rolfe, Iowa

Introduction

This report summarizes the information concerning construction of the new city well at Rolfe. Much of the data is taken from the log and field reports of Dr. E. M. Rowser, Field Geologist, who was in charge during the first month of drilling operations. The log of the formations as whown here is copied from his notes.

Construction Data

Owner of well - Iowa Emergency Relief Administration (for the town of Rolfe).

Contractor - Thorpe Well Co., Des Moines.

Driller - O. E. Atcheson.

Drill rig - portable steel rig with 45-foot mast and 15-30 hp. engine. Tools cable operated.

Drilling dates - April 3 to May 14.

Log of Formations

Lithology	(feet) From	To
1. Soil, black, with plant material	0	2
2. Drift, yellow clay and some gravel, iron stained	2	8
3. Drift, dark gray, with some sand and gravel	8	24
4. Drift, darker than stratum 3, with some sand and gravel	24	29½
5. Drift, yellowish gray, tough, sticky, chiefly clay, some sand and gravel ...	29½	33
6. Drift, dark gray, sticky, chiefly clay, some sand and gravel	33	35

Lithology (continued)	(feet) From	To
7. Drift, blue-gray, sticky, less sand and gravel than above	35	43
8. Drift, yellowish, more sand than in stratum 7	43	44
9. Drift, blue-gray, some sand in streaks, slow drilling	44	48
10. Drift, gray-green, chiefly clay, some sand	48	55
11. Drift, gray, some brown and yellow ... chiefly clay but with 40-45% sand and gravel	55	60
12. Drift, clay, yellow, and sand	60	67½
13. Sand, yellow, with some clay, coarse to fine, slow drilling	67½	76
14. Sand, yellow, finer than stratum 13, some clay	76	82
15. Sand, with a little clay, yellow, fairly coarse	82	86
16. Sand, yellow, finer than stratum 15, some fine gravel	86	90
17. Sand, light yellow, very little clay, some fine gravel, coarser than stratum 16	90	94
18. Sand, similar to stratum 17, but with iron cemented concretions	94	108
19. Sand, some clay, coarser than stratum 18, 15-20% gravel	108	110
20. Sand, yellow, gray clay streaks, some coarse to fine gravel	110	115
21. Clay, light gray, calc., some coarse gravel and sand	115	120

Specifications of Well

Diameter of ~~outside~~ hole - 30" from 0 to 12'; 20" from 12' to bottom.

Depth - deepest drilled depth 120 feet of which the lower 10 feet were plugged with clay. Final operating depth 110 feet.

Casing and Packing - temporary casing: 30" O.D. from 0' to 12'; 20" O.D. from ~~curb~~ 0' to 58½'; permanent casing: 8" O.D. wrought iron from 2½' above curb to 89' below. Screen: Everdur metal, Thorpe model slotted strainer, 19' long, 7½" O.D., extending from 89' to 108'. Screen threaded to bottom

of 8" casing.

Gravel pack around screen and 8" casing inside of 20" hole from 81' to 110'. Concrete seals as follows: (1' of clay packing over gravel from 80' to 81') around 8" casing in 20" hole from 65' to 80' below curb; lower 3' neat cement, upper 12' 3 parts sand to 1 part cement mixture. Clay packing around 8" casing in 20" hole from 16' to 65' below curb. Upper concrete seal 30" in diameter from curb to 12', and 20" in diameter from 12' to 16'. Upper 2' neat cement, remainder 3 to 1 mixture.

Special Treatment

Pumping tests as follows:

1. April 25 and 26; 24-hour test.
2. May 2 and 3; 24-hour test.
3. May 7; 6-hour test.
4. May 10; 4-hour test.
5. May 13 and 14; 10-hour test.

A water sample was taken near the close of each pumping period.

Surging treatment - to increase the yield by clearing mud and silt from gravel pack and surrounding sand formations an agitator was used for approximately 1 hour. This treatment virtually doubled the yield. Bottom of the strainer was cleaned thoroughly with suction bailer after surging and pumping operations.

Capacity

45 gallons per minute with bottom of pump 86' below curb; 60 to 75 gallons per minute with bottom of pump at 100' below curb.

Normal static level 25 feet below curb.

Elevation of Curb - 1173 feet A.T.

Location - NE¼, Sec 5, Garfield Township (T29N, R31W).

Respectfully submitted

V. H. Jones

V. H. Jones, Field Geologist
Perry, Iowa, May 17, 1935

ARROW - ROLFE, IA.

MAY 16 1935

Rolfe's New Well Does Not Supply Sufficient Water

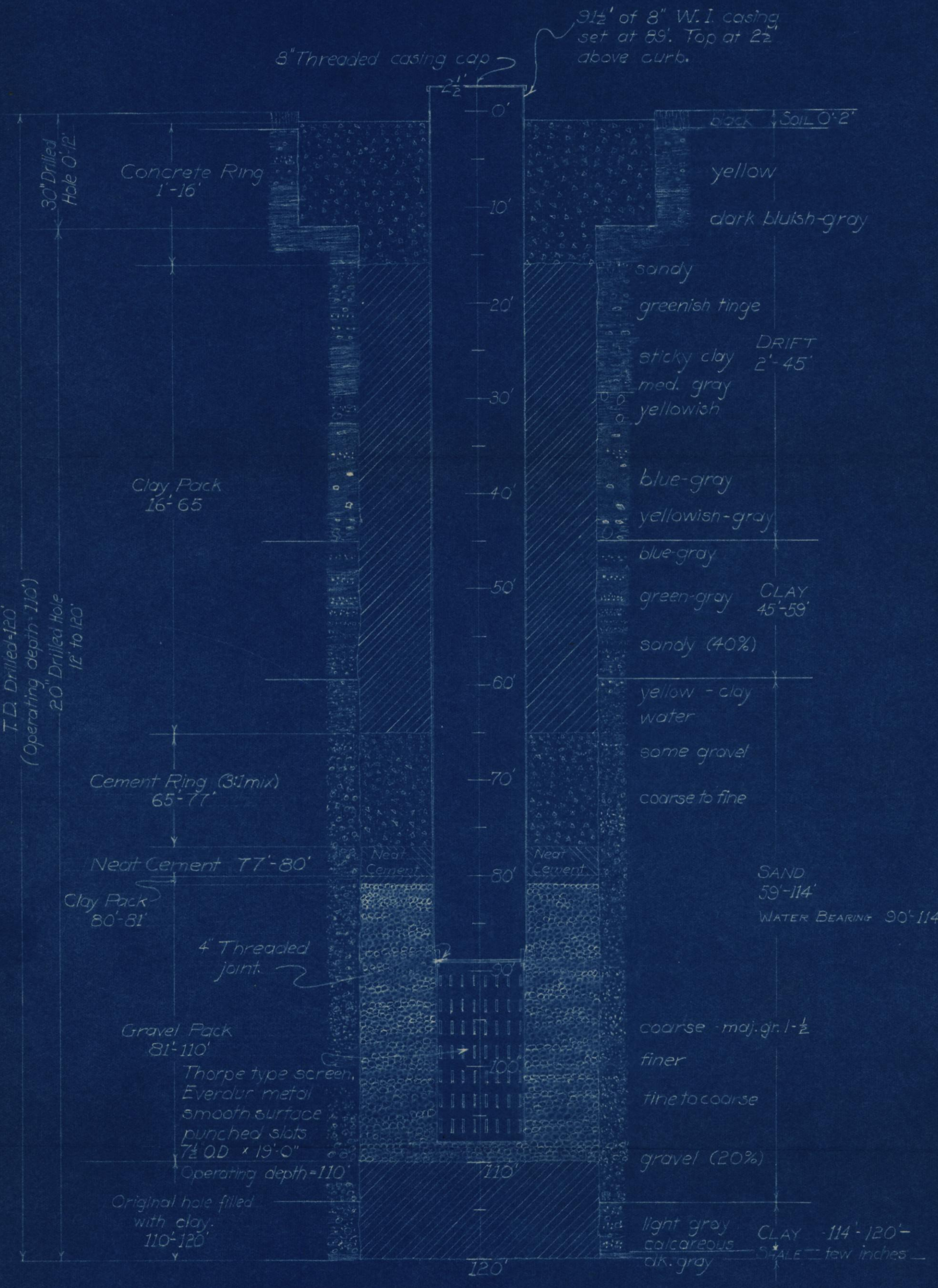
There is one thing certain about the city well, and that is that it is not satisfactory. What the future holds in store for Rolfe along this line is as uncertain today as it was before a test hole was sunk. After the well drill derrick had been taken down and got ready for moving Saturday, word came from state headquarters to remain on the job and give the well another test. This was done Monday, and after pumping all night the well was found to produce but 48 gallons per minute. One of the Thorpe Bros., who had the contract for drilling, was present and agreed with the city council that the production was not sufficient. Thorpe Bros. had carried out their contract and claim to have sunk the well according to the specifications of the state geologist, about 40 feet from the test hole Evidently the vein of water revealed by the test hole was not struck. A state man was also present during the test. The FERA authorities had promised to get Rolfe a well and as yet no decision has been received as to whether they will go any farther or give up the job. The decision of the federal authorities is awaited by the city council before making further moves. We have been informed that if Rolfe will revise its water rates and put the system on a paying basis it can get a well drilled and pay the bill out of revenue obtained, without a bond issue.

Called over phone by Herman 5/20/35 4:00

No. 95438
Collected at Rolfe, Iowa
by V.H. Jones
May 15, 1935.
Depth 230'

Total solids	720.0
Insoluble matter	17.9
Nitrites	0.002
Nitrates	0.12
Chlorides	8.5
Sulphates	21.8
Fluorides	0.5
Alkal. (MeO)	424.0
Alkal. (phn)	0.0
Ca	148.6
Mg	34.9
Iron	0.5
Bicarbonates	517.0
Calc. Hardness	515.0

IOWA EMERGENCY RELIEF ADMINISTRATION



SEMI-GRAVEL PACK WELL CONSTRUCTED
FOR
CITY OF ROLFE
POCAHONTAS CO.
Completed May 14, 1935
THORPE WELL CO.
Contractor

Supervision by
A.C. TESTER, ASS'T STATE GEOLOGIST
Iowa City, Iowa

E.S. BOUDINOT
Drouth Relief Engineer

DAILY DRILLING REPORT St-2057

Period covered: Date April 1&2 1935

From 6:00 A.M. to ____ A.M.
P.M. 6:00 P.M.

Time ____ A.M.
P.M.

April 1st & 2nd

Name of Well: Rolf City Well Bottom-hole Formation -----

Hole drilled today: none ft. of ____" :: ____ ft. of ____".

Depth at end of day: ------ ft. in a ____" hole; Feet drilled since yesterday ____ ft. Amt. of open hole: ____ ft. of ____" dia.

Casing in hole: ____" O.D. from ____ ft. to ____ ft.:: ____" O.D. from ____ ft. to ____ ft:: ____" O.D. from ____ ft. to ____ ft.

Casing put in: ____ ft. ____" of ____" O.D. from ____ ft. to ____ ft.

Water level: ____ ft. below curb; Change since last report ____

Water encountered at ____ ft. of (amount) ____

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
The first two days were spent in getting the rig up and getting lined up to start drilling. No drilling was done at all the ist and 2nd of April. (information given by the driller)		

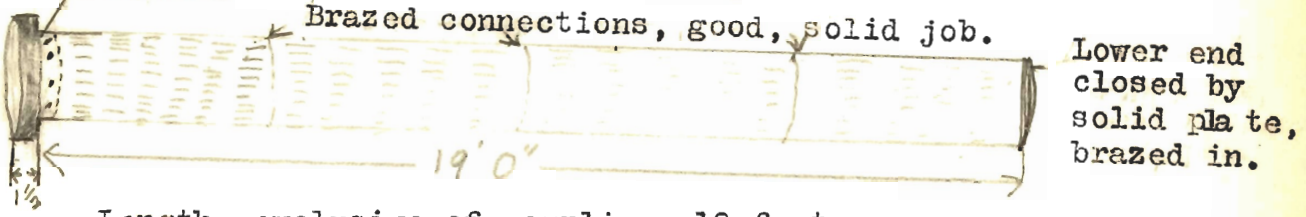
Shut-down: From ____ to ____; Cause ____

Remarks: ____

Use reverse side for additional information

Edwin M. Rowen
Field Geologist

DIAGRAM GIVING MEASUREMENTS OF SCREEN USED in Wellat Ralfe, Iowa.



Length, exclusive of coupling, 19 feet.

Diameter - 8 inches, O.D.

Thickness of material - 5/32"

Slots- 1½" x 1/8" inch.

Coupling - rivited to the screen, with overlap on inside of screen. Inside diameter of coupling where it enters the screen, 6 - 7/8 inches. Outside length of coupling, 1½ inches. Total length, 4 inches. Overlap, with screen, 2½ inches. Length of threads, 1 inch.

Union of sections - brazed connections between sections, appear to be good, strong unions. Lower end is closed by a solid plate, brazed in. There is no overlap of the sections.

DAILY DRILLING REPORT St-2057

Period covered: Date April 3 1935

From 6:00 A.M. to ____ A.M.
P.M. 6:00 P.M.

Time 6:00 A.M.
P.M.

Name of Well: Rolf, City well Bottom-hole Formation drift-gray, clay with snd & some gravel.

Hole drilled today: 12 ft. of 30 " :: 8 ft. of 20 ".

Depth at end of day: 20 ft. in a 20 " hole; Feet drilled since yesterday 20 ft. Amt. of open hole: 8 ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: ____ " O.D. from ____ ft. to ____ ft.:: ____ " O.D. from ____ ft. to ____ ft.

Casing put in: 12 ft. 30 " of ____ " O.D. from ____ ft. to ____ ft.

Water level: ----- ft. below curb; Change since last report ____

Water encountered at ------ ft. of (amount) ____

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Soil, black, mixed with plant material	0	2
Drift, Yellow, chiefly clay, with sand and a little gravel	2	8
Drift, drk bluish gray, silt and sand with a very little gravel	8	10
Drift, similar to 6 to 9,	9	16
Drift, drk blu-gry, with some green-gry, sand and clay, with some gravel	16	20

Shut-down: From none to ____ ; Cause ____

Remarks: The first twelve feet was drilled and then enlarged to thirty inches by hand digging. Spudded in this morning at six.

Use reverse side for additional information

Edwin M. Rowser
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 4 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Roaf City Well Bottom-hole Formation Drift, clay with snd & grav.

Hole drilled today: 8½ ft. of 20 " :: ft. of ".

Depth at end of day: 28½ ft.in a 20 " hole; Feet drilled since yesterday 8½ ft. Amt. of open hole: 16½ ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: " O.D. from ft. to ft:: " O.D. from ft. to ft.

Casing put in: none ft. " of " O.D. from ft. to ft.

Water level: ---- ft. below curb; Change since last report

Water encountered at ---- ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Drift, Drk. Gry, with some yellowish green, sticky, with small amt of snd & gravel	20	22½
Drift, similar to 20 to 22½	22½	24
Drift, dark gry, greenish tinge, sticky clay with some sand and gravel	24	26½
Drift, similar to 24 to 26½	26½	28½

Shut-down: From none to ; Cause

Remarks: The drift is largely clay, and very tough and sticky, making it difficult to drill. It stands well, with no caving.

Use reverse side for additional information

E. Edwin M. Rowser
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 5 1935

From 6:00 A.M. to A.M.
P.M. 6:00 P.M.

Time 6:00 A.M.
P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Drift, Sticky clay

Hole drilled today: 10½ ft. of 20 " :: ft. of ".

Depth at end of day: 39 ft.in a 20 " hole; Feet drilled since yesterday 10½ ft. Amt. of open hole: 27 ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: " O.D. from ft. to ft:: " O.D. from ft. to ft.

Casing put in: ft. " of " O.D. from ft. to ft.

Water level: ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Drift, Med. Gry, Tight, sticky; chiefly cly, with some snd and gravel	28½	29½
Drift, yellowish gry, tough, chiefly clay as above	29½	32
Drift, similar to 29½ to 32	32	33
Drift, Med blu-gry, unctuous, percentage of cly higher than in above samples	33	35
Drift, blu-gry, chiefly clay, very little snd & gravel	35	37½
Drift, similar to 35 to 37½	37½	39

Shut-down: From none to ; Cause

Remarks: Drilling was slow, due to high clay content of drift. This formation is high in clay, with very little sand or gravel.

Use reverse side for additional information

Edwin M. Power
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 6 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Blu-gry clay with snd.

Hole drilled today: 6 ft. of 20 " :: ft. of ".

Depth at end of day: 45 ft.in a 20 " hole; Feet drilled since yesterday 6 ft. Amt. of open hole: 4 ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from +1 ft. to 40 ft:: " O.D. from ft. to ft.

Casing put in: 41 ft.20 " of " O.D. from ft. to ft.

Water level: ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Drift, Med. blu-gry, very sticky, tough, tight, very little snd and gravel	39	40
Drift, similar to 39 to 40	40	43
Drift, yellowish gry, chiefly clay, but with yellow snd in streaks,	43	44
Drift, similar to 43-44	44	45

Note I need more sample bags.

Shut-down: From none to ; Cause

Remarks: Drilling still very slow, due to stiff, unctuous clay. Sticking on sides and shoulders of bit. Ran in two lengths of 20", one 19'7" and the other 21' 5". Drilling should progress faster from this point.

Use reverse side for additional information

Edwin M. Rowan
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 8 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: 22½ ft. of 20 " :: ft. of ".

Depth at end of day: 67½ ft. in a 20 " hole; Feet drilled since yesterday 22½ ft. Amt. of open hole: 27½ ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from + 1 ft. to 40 ft:: " O.D. from ft. to ft.

Casing put in: none ft. " of " O.D. from ft. to ft.

Water level: ft. below curb; Change since last report

Water encountered at 63 ft. of (amount) Can't tell, but water in pipe lowered somewhat. We have kept the 20" nearly full from city supply.

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Clay, blu-gry, streaks of yel., some snd & grav.	45	46
Clay, similar to 45-46	46	48
Clay, gry-green, sticky, fair amt fine snd.	48	50
Clay, similar to 48 - 50	50	52
Clay, with considerable snd. Lgt. gry-grn,	52	55
Clay with 40% snd, brn & yell., some gravel	55	58
Sand and clay. Sand came in at 59, yellow some gravel.	58	60
Sand, yellow, with some clay,	60	63
Sand, coarse to fine, yellow, some clay	63	65
Sand, as in 63 to 65	65	67½
Some water @ 63 ft.		

Shut-down: From none to ; Cause

Remarks: Drilling progressed much more rapidly today. The two logs, that is, of the test hole and the present well are running almost identically the same formational changes. Probably will set more casing the first thing Tuesday morning/

Note: No drilling on Sunday, April 7.

Use reverse side for additional information.

Edwin M. Rawson
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 9 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 67½ ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 27½ ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from +1 ft. to 40 ft:: " O.D. from ft. to ft.

Casing put in: 0 ft. " of " O.D. from ft. to ft.

Water level: -- ft. below curb; Change since last report

Water encountered at -- ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
No drilling today. Tried to set casing this morning, but found the only length of 20" was egg-shaped, and could not get it to seat in the threads of the coupling. Shut down at ten thirty. Relief workers were turned over to the local authority, and were used to clean up around the well, filling in etc.		
New casing due this evening.		

Shut-down: From 10:30 to 6:00 ; Cause See above.

Remarks:

Use reverse side for additional information

Edwin McPowers
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 10 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe, City well Bottom-hole Formation S and(drift)

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 67½ ft. in a 20 " hole; Feet drilled since yesterday ft. Amt. of open hole: 9 ft. of 20 " dia.

Casing in hole: 20 " O.D. from +2 ft. to 58½ ft.:: " O.D. from ft. to ft:: " O.D. from ft. to ft.

Casing put in: 19½ ft. " of 20 " O.D. from ft. to ft.

Water level: ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Casing was put in this morning, and the hole cleaned out. We were just ready to start making new hole when it started to rain. No drilling this afternoon, because of continued rain.		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information 5664

Edwin M. Rowe
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 11 1935

From 6:00 A.M. P.M. to A.M. 6:00 P.M. Time A.M. P.M.

Name of Well: Rolfe, City Well Bottom-hole Formation Drift, Sand

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 67½ ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 9 ft. of 20 " dia.

Casing in hole: 20 " O.D. from 2 ft. to 58½ ft.:: " O.D. from ft. to ft:: " O.D. from ft. to ft.

Casing put in: 0 ft. " of " O.D. from ft. to ft.

Water level: ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
No drilling today because of rain. Used some of the relief labor to dig drainage ditches around the machine to permit the water to run off and prevent the machine from settling.		

Shut-down: From see above to ; Cause

Remarks:

Use reverse side for additional information

Edwin M. Rowas
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 12 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe, City Well Bottom-hole Formation Coarse snd & gravel

Hole drilled today: ____ ft. of ____ " :: ____ ft. of ____ ".

Depth at end of day: 101 ft. in a 20 " hole; Feet drilled since yesterday 33½ ft. Amt. of open hole: 43 ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from +2 ft. to 58½ ft:: ____ " O.D. from ____ ft. to ____ ft.

Casing put in: ____ ft. ____ " of ____ " O.D. from ____ ft. to ____ ft.

Water level: ____ ft. below curb; Change since last report ____

Water encountered at ____ ft. of (amount) ____

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Snd. Yellow, coarse to fine, some clay, slow drilling	67½	70½
Snd, yel., coarse to fine, some gravel, some cly.	70½	72½
Snd., Yel., coarser than 70½-72½, some cly&gravel	72½	75
Snd, Yel., similar to 72½-75. Some clay added to hole to hold up walls.	75	76
Snd, Yel. Finer than 72½-75, some clay	76	78
Snd, similar to 76-78	78	80
Snd., similar to 76-78	80	82
Snd., yellow, some clay. Fairly coarse.	82	86
Snd. Yel, finer than 82-86, some clay	86	90
Snd. Lgt. Yel., very little cly., coarse, some fine gravel.	90	94

SEE OTHER SIDE FOR ADDITIONAL LOG.

Shut-down: From ____ to ____; Cause ____

Remarks: ____

Use reverse side for additional information

Edwin M. Rowe
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 13 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time A.M. P.M.

Name of Well: Rolfe, City Well Bottom-hole Formation Clay, with snd & gravel

Hole drilled today: 19 ft. of 20 " :: ft. of ".

Depth at end of day: 120 ft.in a 20 " hole; Feet drilled since yesterday 19 ft. Amt. of open hole: 61½ ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from +2 ft. to 58½ ft:: " O.D. from ft. to ft.

Casing put in: 0 ft. " of " O.D. from ft. to ft.

Water level: ft. below curb; Change since last report

Water encountered at 90-115 ft. of (amount) Well taking a little water, but level can be kept almost to curb. Lowers about eight feet in ½ hr.

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Sand, fine to coarse, maj. grd. ½-¼, with some yellow clay, some of snd partially cemented with iron.	101	108
Sand, coarser than above, some clay, & with about 20% gravel, some very coarse.	108	109
Sand, similar to 108 to 109	109	110
Sand, yellowm with some coarse gravel, much of it chert pebbles. Clay coming in at about 114	110	115
Clay, light gray, slightly calcareous, some sand and coarse gravel, which is probably caving, as hole caved somewhat at 120 just before pulling out at that depth	115	120

Shut-down: From 12:00 to 6:00 ; Cause Ordered by geologist in charge, until Doctor Tester could be contacted.

Remarks: Drilling stopped at noon, or a little before, because the well was already deeper than the contract called for, and no dolomite had been encountered.

Use reverse side for additional information

Edwin M. Bauer
Field Geologist

S

Sand, lgt. Yel., coarse, Maj. Grd. 1-½, some fine gravel	94	97
Sand, Yellow, much finer than 94-97, some yellow clay. No gravel	97	101

Remarks: Drilling progressed very rapidly today. Sand is standing up well in the hole, with no caving. The well has been kept full of water, so that little can be told of the water which might otherwise come into the hole. However, some head was lost at 90 feet, and the well took more water from that point. The casing in the hole is resting on a firm base, and had to be driven the last fifteen feet.

In as much as the sand is not coming into the hole, and the walls are straight, no more casing has been added. It is doubtful if more twenty inch would go down, but if nothing happens, no more will be needed.

DAILY DRILLING REPORT St-2057

Period covered: Date April 15 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Drift, clay, snd&gravel

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 61½ ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from 2 ft. to 58½ ft:: " O.D. from ft. to ft.

Casing put in: 0 ft. " of " O.D. from ft. to ft.

Water level: 22'10" ft. below curb; Change since last report measured after water had stood 24 hours. Another check will be made tomorrow, without adding more water from the surface.

Water encountered at (Amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
No drilling today. Time was spent in getting ready to run in eight inch if and when it arrives. Gravel, pump etc. all on the grounds ready to go.		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M. Rowe
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 16 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolf City Well Bottom-hole Formation Drift, cly, snd & gravel

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from 2 ft. to 58½ ft:: " O.D. from ft. to ft.

Casing put in: 0 ft. " of " O.D. from ft. to ft.

Water level: 21'4" ft. below curb; Change since last report raised slightly

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Shut down: waiting for eight inch casing.		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M. Rawes
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 17 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Drift, cly, snd & gravel

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 61½ ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from +2 ft. to 58½ ft:: " O.D. from ft. to ft.

Casing put in: 0 ft. " of " O.D. from ft. to ft.

Water level: 21'4" ft. below curb; Change since last report none

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Still waiting on eight inch casing. The driller called Des Moines this morning, but Thorpe Co. have heard nothing as to its whereabouts. The pump and part of the equipment for making the test is on the grounds, including gravel for packing the screen. Thorpe, however, is holding the screen in Des Moines until he knows definitely how much is to be used.		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M Rowes
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 18 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 8:00 ~~A.M.~~ P.M.

Name of Well: Rolfe, City Well Bottom-hole Formation Drift, Cly.,Snd & gravel

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 6½ ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from 2 ft. to 58½ ft:: " O.D. from ft. to ft.

Casing put in: 0 ft. " of " O.D. from ft. to ft.

Water level: 21'4" ft. below curb; Change since last report none

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Shut down: No eight inch casing		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M. Rowe
Field Geologist

Rolfe, Ia.

DAILY DRILLING REPORT St-2057

Period covered: Date April 19 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 8:00 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Drift

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 61½ ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from 2 ft. to 58½ ft:: " O.D. from ft. to ft.

Casing put in: 0 ft. " of " O.D. from ft. to ft.

Water level: 21'4" ft. below curb; Change since last report none

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Shut down, no eight inch casing		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M. Bowen
Field Geologist
Rolfe, Ia.

DAILY DRILLING REPORT St-2057

Period covered: Date April 20,21 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time A.M. P.M.

Name of Well: Rolfe, City Well Bottom-hole Formation Drift

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 61½ ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from 2 ft. to 58½ ft:: " O.D. from ft. to ft.

Casing put in: ft. " of " O.D. from ft. to ft.

Water level: ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Shut down. Casing arrived noon, Saturday.		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M. Power
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 22 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Drift, Cly, snd & gravel

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 61½ ft. of 20 " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from 2 ft. to 58½ ft:: " O.D. from ft. to ft.

Casing put in: ft. " of " O.D. from ft. to ft.

Water level: ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
We did no drilling today, but cleaned out the hole, bailing out the material which had caved into the hole, and got ready to run in casing preparatory to making a pumping test. The sand and clay which had come into the hole since the last bailing was easily removed, and we experienced no trouble in getting the hole ready. The bottom of the hole has been partially filled with clay, and we should get our casing in tomorrow, so that the pump test can be made either Wednesday, or Thursday, at the latest.		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M. Power
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 23rd 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe, City Well Bottom-hole Formation Drift,

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 0 ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from 2 ft. to 58½ ft:: 8 " O.D. from 2½ ft. to 87 ft. with 14 ft. screen.

Casing put in: 89 ft. 6 " of 8 " O.D. from 2½ ft. to 87 ft. and 14' of 8" screen.

Water level: ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
The hole was filled today to 103 feet, then one foot of cement put in. The cement was lowered into the well, and not dumped from the top, and careful measurements were taken at all times to insure the proper depths. We then dumped in one sack of rather coarse gravel, and followed this with slightly finer grade, to slightly less than 101. The cement used was very ~~fresh~~ fresh quick setting cement, purchased direct in Fort Dodge this morning. It was poured at 12:30 this afternoon. The eight inch casing was then run in, reaching bottom at 4:30. The gravel on top of the cement had settled to 101 feet by this time. We are holding the casing at 101, the weight carried by the machine until the cement has time to set properly. The pump will be put in tomorrow.		

Shut-down: From to Cause

Remarks: We also put in gravel around the screen to 84'(to allow for settling) and to prevent caving. A check will be made tomorrow, and during pumping, and more gravel will be added if necessary.

Use reverse side for additional information

E. Edwin McPowers
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 24 1935

From 6:00 A.M. P.M. to A.M. 6:00 P.M. Time A.M. 6:00 P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Drift

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 0 ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from 2 ft. to 58½ ft:: 8 " O.D. from 2½ ft. to 101 in ft. cluding strainer

Casing put in: ft. " of " O.D. from ft. to ft.

Water level: 26 ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
The rotary pump set up today, and operations started, but for some reason the pump failed to produce enough water for a test. This is probably due to the position of bowls in respect to the casing, not leaving enough room for the water to pass. The head remained the same, so water was getting into the casing all right. The pump is being pulled, and a plunger pump will be substituted. Then, if the capacity of the well is in excess of the pump, the turbine will be tried again, with alterations.		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

E. Edwin M. Rowser
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 25&26 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Drift

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from 2 ft. to 58½ ft:: 8 " O.D. from 2½ ft. to 87 ft.

Casing put in: ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Twenty four hour pumping test made today and yesterday, starting 2:00 PM Thursday and ending 2:00 PM today		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M. Rowen
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 27 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Drift

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from plus 2 ft. to 58½ ft.:: 8 " O.D. from plus 2½ ft. to 87 ft.

Casing put in: 0 ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Pulled the pump and eight inch casing preparatory to going down to 108. Casing came out easily, and no damage was done to the screen.		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M. Rowen
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 29 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:00 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Drift

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from plus 2 ft. to 58½ ft:: " O.D. from ft. to ft.

Casing put in: ft. " of " O.D. from ft, to ft.

Water level: ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Pulled the eight inch casing and screen, and today we cleaned the well out down to 110 feet. We have gravel on the job, and are ready for the screen whenever it arrives.		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M Power
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date April 30 1935

From 6:00 A.M. P.M. to 6:00 A.M. P.M. Time 6:10 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Drift

Hole drilled today: 0 ft. of " :: ft. of ".

Depth at end of day: 120 ft. in a 20 " hole; Feet drilled since yesterday 0 ft. Amt. of open hole: 0 ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from plus 2 ft. to 58½ ft:: 8 " O.D. from 0 ft. to 89 ft.

Casing put in: and 19 feet of 8" screen 89 ft. " of 8 " O.D. from 0 ft. to 89 ft.

Water level: 25 ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Set the eight inch casing with 19 feet of screen, packed the screen in gravel and installed the pump, a cylinder type, the same one used on the previous test. We started the pump at 5:15, and only pumped a few minutes when the cylinder clogged with sand, due to the drop pipe being too close to the bottom of the screen. No check could be made of the capacity, but I believe that the production is going to be somewhat better than the first test.		

Shut-down: From to ; Cause

Remarks:

Use reverse side for additional information

Edwin M. Rowen
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Data from Rowser's field reports. Date May 1 1935

From 6 A.M. to 6 P.M. Time 6 P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: None ft. of " :: ft. of ".

Depth at end of day: 108 ft.in a " hole; Feet drilled since yesterday none ft. Amt. of open hole: None ft. of " dia.

Casing in hole: 30" O.D. from 0 ft. to 12 ft.:: 20" O.D. from plus 2 ft. to 58½ ft:: 8" O.D. from 0 ft. to 89 ft.
Screen 8" O.D. from 89 to 108 feet.

Casing put in: None ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report None

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
No drilling. Rain all day.		

Shut-down: From to ; Cause

Remarks: I arrived here this morning. I have Rowser's notes, log, and specifications of well. Pumping test planned tomorrow.

My new address is Rolfe, General Delivery.
Room at Nelson Hotel.

Use reverse side for additional information

V. N. Jones
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date May 2 1935

From 6 A.M. XXX to 4 XXX P.M. Time 4 XXX. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: None ft. of " :: ft. of ".

Depth at end of day: 108 ft. in a 20 " hole; Feet drilled since yesterday none ft. Amt. of open hole: ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from plus 2 ft. to 58½ ft:: 8 " O.D. from 0 ft. to 89 ft.
Screen 8" O.D. from 89 to 108 feet.

Casing put in: none ft. " of " O.D. from ft. to ft.

Water level: 25 (normal) ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Pump dissembled, sand bailed from hole, pump reassembled this morning. Pumping test now in progress. Preliminary report as follows:		
Start of test 1 PM - initial pumping rate 54 gpm., maintained for 20 minutes. Pumping rate since 1:20 PM - constant at 23.3 gpm. Water level is maintained at or near bottom of drop pipe (101' below curb).		
We intend to make 24-hour test, and I shall obtain a water sample at 20 hours.		

Shut-down: From 9 AM to 10 AM ; Cause Rain

Remarks:

Use reverse side for additional information

V. V. Jones
Field Geologist

DAILY DRILLING REPORT -- St-2057

Period covered: Date May 4 1935

From 6 A.M. to 6 XXXX P.M. Time 6 XXX P.M.

Name of Well: New Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: None ft. of " :: ft. of ".

Depth at end of day: 108 ft. in a 20 " hole; Feet drilled since yesterday none ft. Amt. of open hole: ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from plus 2 ft. to 58½ ft:: 8 " O.D. from 0 ft. to 89 ft.
Screen 8" O.D. from 89 to 108 feet.

Casing put in: none ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Pump removed and measurements checked. Total depth 108'; static level 25' below curb.		

to bottom screen T.D. 110'

Shut-down: From 11 AM to 6 PM ; Cause Awaiting decision as to completion of well.

Remarks:

Use reverse side for additional information

V. H. Jones
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date May 5 1935

From 6 A.M. to 6 ~~XXXXX~~ P.M. Time 5 ~~XXXX~~ P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: None ft. of ___" :: ___ ft. of ___".

Depth at end of day: 108 ft. in a 20 " hole; Feet drilled since yesterday none ft. Amt. of open hole: ___ ft. of ___" dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from plus 2 ft. to 58½ ft:: 8 " O.D. from 0 ft. to 89 ft.
Screen 8" from 89 to 108 feet.

Casing put in: none ft. ___" of ___" O.D. from ___ ft. to ___ ft.

Water level: 25 ft. below curb; Change since last report ___

Water encountered at ___ ft. of (amount) ___

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
No drilling today - - Sunday.		

Shut-down: From ___ to ___; Cause ___

Remarks: ___

Use reverse side for additional information

V. H. Jones
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date May 6 1935

From 6 A.M. to 6 XXX P.M. Time 6 XXXXX P.M.

Name of Well: Rolfe Town Well Bottom-hole Formation Sand

Hole drilled today: None ft. of " :: ft. of ".

Depth at end of day: 108 ft. in a 20 " hole; Feet drilled since yesterday none ft. Amt. of open hole: ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from plus 2 ft. to 58½ ft:: 8 " O.D. from 0 ft. to ~~18~~ 89 ft.
Screen 8" O.D. from 89 to 108 feet.

Casing put in: None ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Pump repaired and dismantled.		

Shut-down: From 1 PM to 6 PM ; Cause Awaiting smaller pump.

Remarks:

Use reverse side for additional information

V. H. Jones
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date May 7 1935

From 6 A.M. to 6:30 P.M. Time 9 A.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: None ft. of " :: ft. of ".

Depth at end of day: 108 ft. in a 8 " hole; Feet drilled since yesterday none ft. Amt. of open hole: ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D. from plus 2 ft. to 58½ ft.:: 8 " O.D. from 0 ft. to 89 ft.
Screen 8" O.D. from 89' to 108'.

Casing put in: None ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report none

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Smaller pump arrived 9 AM.		
Pump installed 9 - 12 AM.		
6-hour pumping test - 12:30 to 6:30 PM.		

Shut-down: From 6 AM to 9 AM ; Cause Awaiting smaller pump.

Remarks:

Use reverse side for additional information

E. H. Jones
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date May 8 1935

From 6 A.M. to 6 ~~A.M.~~ P.M. Time 5 ~~P.M.~~ P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: None ft. of " :: ft. of ".

Depth at end of day: 108 ft. in a 8 " hole; Feet drilled since yesterday

none ft. Amt. of open hole: ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D.

from plus 2 ft. to 58½ ft:: 8 " O.D. from 0 ft. to 89 ft.

Screen 8" O.D. from 89' to 108'.

Casing put in: None ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report none

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Operations suspended to await arrival of surging apparatus.		

Shut-down: From 6 AM to a PM ; Cause Awaiting surging apparatus.

Remarks:

Use reverse side for additional information

W. H. Jones
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: ~~Day's work concerning current~~ Date May 9 1935

~~8:30 PM.~~

From 6 A.M. to 6:30 ~~A.M.~~ P.M. Time 6:30 ~~8:30~~ XXXX P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: None ft. of " :: ft. of ".

Depth at end of day: 108 ft. in a 8" hole; Feet drilled since yesterday

none ft. Amt. of open hole: ft. of " dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20 " O.D.

from plus 2 ft. to 58½ ft:: 8 " O.D. from 0 ft. to 89 ft.

Screen 8" O.D. from 89' to 108'.

Casing put in: None ft. " of " O.D. from ft. to ft.

Water level: 25½ ft. below curb; Change since last report ½' lower

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
4-inch pump removed. Agitator attached to drill-stem and operated by spudding on drill-line between 85 and 87 feet below curb. This surging was continued for 1 hour then the bailer used to clean the hole. Six and ½ feet of gravel, sand and silt was pulled into the screen. A second short period of surging, approximately ½ hour, was conducted and less than 1 foot of fine gravel and sand bailed from the bottom of the screen. We judged this amount surging to be sufficient to settle the gravel and clean silt and mud from most of the surrounding sand and gravel formations.		
Data concerning agitator: diameter - 7½", which fits loosely but with small clearance inside 8" casing. Agitator is a 5-foot length of heavy, straight pipe open at lower end, and threaded at upper end for attachment to drill-stem.		
Pump installed by 4:30 and pumping continued for 1 hour after which the pump failed. Helpers had left, hence we decided to make repairs and complete the test tomorrow morning.		

Shut-down: From 9 AM to 10 AM ; Cause Awaiting arrival of agitator.

Remarks:

Use reverse side for additional information

V. H. Jones
Field Geologist

Period covered:

Date May 10, 1935 935

From 6 A.M. to 4 ~~XXX~~ P.M.
~~XXX~~ A.M.

Time 5:00 ~~XXX~~ P.M.

Name of Well: New Rolfe City Well

Bottom-hole Formation Sand

Hole drilled today: None ft. of ___" :: ___ ft. of ___".

Depth at end of day: 108 ft. in a 8 " hole; Feet drilled since yesterday None ft. Amt. of open hole: ___ ft. of ___" dia.

Casing in hole: 30 " O.D. from 0 ft. to 12 ft.:: 20" O.D. from plus 2 ft. to 58½ ft:: 8" O.D. from 0 ft. to 89 ft.
screen 8" OD from 89' to 108'

Casing put in: None ft. ___" of ___" O.D. from ___ ft. to ___ ft.

Water level: 25 ft. below curb; Change since last report 6-inch rise

Water encountered at ___ ft. of (amount) ___

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
Pump was removed and repaired this morning. The plunger had stuck, and the check-valve had become clogged. After cleaning and reassembling, the pump functioned properly. A four-hour pumping test was conducted during the afternoon.		
Gravel now at 81' below curb.		

Shut-down: From None to ___; Cause ___

Remarks: ___

Use reverse side for additional information

W. V. Jones
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date May 11, 1935

From 6 A.M. to 6 ~~xxx~~. Time 6 ~~xxx~~.
~~xxx~~. P.M. P.M.

Name of Well: New Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: None ft. of " :: ft. of ".

Depth at end of day: 110/108 ft. in a 20/8 " hole; Feet drilled since yesterday ft. Amt. of open hole: None ft. of " dia.

Casing in hole: 8 " O.D. from 0 ft. to 89 ft.:: 20 " O.D. from plus 3 ft. to 40 ft:: 30 " O.D. from 0 ft. to 12 ft.
screen 7½" OD from 89 to 108.

Casing put in: None ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report None

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
The 4-inch pump was removed.		
Packing and sealing today as follows:		
1. Clay(1 foot) put in over the gravel around the screen from 80 ft. to 81 ft. below curb. Top of gravel is at 81.		
2. Concrete ring poured in between 8" casing & 20" hole. The ring is ~~15 ft. from top to bottom; the lower 3 feet of neat cement, the~~ upper 12 feet of 3 to 1 mixture. Top at 65 ft., bottom at 80 ft.		
3. Clay packing put in between 50 ft. and 65 ft. below curb,		
4. One length of 20" casing removed from plus 2 feet to 15½ feet.		

Shut-down: From None to ; Cause

Remarks: A 3-foot length of 8" W. I. threaded pipe is needed to bring the permanent casing to 2½ feet above the curb.

Use reverse side for additional information

V. H. Jones.
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date May 12 1935

From 7 A.M. to 5 P.M. Time 5 P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole filled today: 12 ft. of 30 " :: 38 ft. of 20 ".

Depth at end of day: 108 ft. in a 8 " hole; Feet drilled since yesterday
Bottom of gravel pack at 110' in 20" hole.
none ft. Amt. of open hole: none ft. of " dia.

Casing in hole: 8 " O.D. from 0 ft. to 89 ft.:: 7½ " O.D. screen
from 89 ft. to 108 ft:: " O.D. from ft. to ft.

Casing put in: None ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report none

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
1. Clay packing applied in 20-inch hole around 8-inch casing from 50' to 16', and		
2. Remainder of 20-inch casing removed. (plus 3' to 40')		
3. Concrete ring poured around 8" casing from 1' below curb to 12' in 30" hole, and extending to 16' below curb in 20" hole.		

The well is now practically complete. A permanent cap for sealing the top of the casing is not available on the job, and the 3-foot piece of 8" casing, mentioned in the last report, has not yet been supplied. The need for both items has been reported to Mr. Tom Thorpe, and we expect them to be sent from Des Moines tomorrow morning on a truck which will remove some of the drilling equipment. At present an 8" bale with a solid upper end has been screwed into the top of the 8" casing as a temporary cap. The concrete floor of the new pump house will be constructed as soon as the final length of casing is applied.

Shut-down: From None to ; Cause

Remarks:

Use reverse side for additional information

V. H. Jones
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date May 13 1935

From 6 A.M. to 12 ~~P.M.~~ P.M. Written this date Time May 14, 11:30 A.M. P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: None ft. of " :: ft. of ".

Depth at end of day: 108 ft. in a 8 " hole; Feet drilled since yesterday
Gravel pack to 110'.
ft. Amt. of open hole: ft. of " dia.

Casing in hole: 8 " O.D. from 0 ft. to 89 ft.:: " O.D.
Screen 7½" O.D. from 89' to 108'.
from ft. to ft.:: " O.D. from ft. to ft.

Casing put in: None ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report none

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
1. Morning spent in assembling pipe, pumps, and equipment for moving. Rig partially prepared for moving.		
2. From 3 until 9 PM resetting machine and installing 6" pump.		
3. Pumping test from 9:15 PM continued for 10 hours.		

Shut-down: From 1 PM to 3 PM ; Cause Awaiting decision as to pumping test.

Remarks:

Use reverse side for additional information

V. H. Jones
Field Geologist

DAILY DRILLING REPORT St-2057

Period covered: Date May 14 1935

From 12:01 A.M. XXX to 5 XXXXX P.M. Time 5 XXX P.M.

Name of Well: Rolfe City Well Bottom-hole Formation Sand

Hole drilled today: None ft. of " :: ft. of ".

Depth at end of day: 108 ft. in a 8 " hole; Feet drilled since yesterday
Gravel pack to 110'
none ft. Amt. of open hole: ft. of " dia.

Casing in hole: 8" " O.D. from 0 ft. to 89 ft.:: " O.D.
Screen 7½" O.D. from 89' tp 108'.
from ft. to ft:: " O.D. from ft. to ft.

Casing put in: none ft. " of " O.D. from ft. to ft.

Water level: 25 ft. below curb; Change since last report none

Water encountered at ft. of (amount)

LOG OF WELL FOR DAY: (Report each sample)

Lithologic Description	From	To
1. Pumping test concluded at 7:15 AM ..... details in pumping report.		
2. Shut-down from 7:15 to 10:15 AM to await final orders.		
3. Machine dismantled, removed from hole and pulled away to Waterloo.		
4. Temporary cap consisting of 8" bail with solid top is now screwed into the top of the 8" casing. Loading of tools and equipment for removal to be completed tomorrow.		

Shut-down: From 7:15 AM to 10:15 AM Cause Awaiting final orders.

Remarks:

Use reverse side for additional information

V. K. Jones
Field Geologist

DEEP WELL STUDY

Well No. W-- 0280

Depth 70½ to 72½

No. samples used 1

Analyst Rennel

Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0% : 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. ~~Cylinder~~ (+1/32) 31.29 − 2.45 = 28.84 gm. 96.8 %
3. Jar ~~(1/32—1/64)~~ silt 3.24 − 2.29 = .95 gm. 3.2 %
4. Drain . . . . . 79 gm.....%

C. Screen Analysis 28,84

SIZE	GRAMS	%
2 plus		
2+1 mm	1.67	5.8
1–½ mm	7.36	25.7
½–¼ mm	16.16	56.7
¼–⅛ mm	2.65	9.3
⅛–1/16	.60	2.1
Pan	.11	0.4
Total	28.55	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ..... Sp. gr. Size–Grade(s).....mm.

Analyst .....

Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r.....%: R.....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Total		100%

Classification Grouping: Absol. %

Primary Minerals: .....%

Secondary Minerals: .....%

Light Concentrate

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0280

Depth 72½ to 75

No. samples used 1

Analyst Pennel

Date 4/17/36

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0% : 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. ~~Cylinder~~ (+1/32) 31.90 / 2.47 / 2.99 / 2.30 — 29.43 gm. 98.4 %
3. ~~Jar (1/32—1/64)~~ silt — .49 gm. 1.6 %
4. Drain . . . .gm.....%

C. Screen Analysis 29.37

SIZE	GRAMS	%
2 plus		
4+1 mm	2.58	8.8
1–½ mm	9.8	33.6
½–¼ mm	14.8	50.5
¼–⅛ mm	1.63	5.6
⅛–1/16	.37	1.3
Pan	.06	0.2
Total	29.30	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ..... Sp. gr. Size–Grade(s) .....mm.

Analyst .....

Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Total		100%

Classification Grouping: Absol. %

Primary Minerals: .....%

Secondary Minerals: .....%

Light Concentrate		
Total		100%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0% : 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

Well No. W- 0280
Depth 75 to 76
No. samples used 1
Analyst Penne
Date 4/17/35

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. ~~Cylinder~~ (+1/32) ~~32.00~~ 2.06 29.94 gm. 99.9 %
3. ~~Jar (1/32—1/64)~~ Silt 2.22 2.20 .02 gm. 0.1 %
4. Drain . . . .gm.....%

9.96

C. Screen Analysis 29.93

SIZE	GRAMS	%
2 plus		
2+1 mm	2.00	6.7
1–½ mm	9.52	31.9
½–¼ mm	17.36	58.1
¼–⅛ mm	.95	3.2
⅛–1/16	.04	0.1
Pan	Tr.	
Total	29.87	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } .....Sp. gr. Size–Grade(s).....mm.

Analyst .....
Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified; Heavy Concentrate — No. of Grains — Rel. %

Classification Grouping: Absol. %
Primary Minerals: .....%

Total 100%

Light Concentrate

Secondary Minerals: .....%

Total 100%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0280

Depth 76 to 78

No. samples used 1

Analyst Rowe

Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0% : 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm. 100.0%
2. ~~Cylinder~~ (+1/32) 3.167 / 2.19 / 2.45 — 29.48 gm. 99.2 %
3. Jar (~~1/32—1/64~~) Silt 2.20 — .25 gm. 0.8 %
4. Drain . . . .gm.....%

29.73

C. Screen Analysis 29.44

SIZE	GRAMS	%
2 plus		
~~2~~÷1 mm	3.23	11.0
1–½ mm	12.92	44.0
½–¼ mm	12.35	42.1
¼–⅛ mm	.76	2.5
⅛–1/16	.12	0.4
Pan	Tr.	
Total	29.37	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } .....Sp. gr. Size–Grade(s).....mm.

Analyst .....

Date .....

Wt. of sample . . . .gm. 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified; Heavy Concentrate — No. of Grains — Rel. %

Classification Grouping: Absol. %

Primary Minerals: .....%

Total 100%

Light Concentrate

Secondary Minerals: .....%

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 10280

Depth 78 to 80

No. samples used

Analyst Pannel

Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl ..... %)

1. Sample weight . . . . . 30.00 gm. 100.0%: 2. Wt. of F. P. .....
3. Wt. after solution, with filter paper . . . . . gm.
4. Less wt. F. P. (2) . . . . gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . gm. ..... %
6. Wt. lost by solution (1 minus 5) . . . . . gm. ..... %
7. To balance (5 plus 6) . . . . gm. ..... %

B. Subsidation:

1. Original Wt. . . . . gm. 100.0%
2. Cylinder (+1/32) 31.80 / 2.05 ..... 29.75 gm. 99.4 %
3. Jar (1/32—1/64) Silt 2.28 / 2.10 ..... 18 gm. 0.6 %
29.93
4. Drain . . . . gm. ..... %

C. Screen Analysis 29.72

SIZE	GRAMS	%
2 plus		
2+1 mm	3.37	11.4
1–½ mm	9.12	30.9
½–¼ mm	15.19	51.6
¼–⅛ mm	1.66	5.6
⅛–1/16	.15	0.5
Pan	Tr.	
Total	29.49	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ..... Sp. gr. Size–Grade(s) ..... mm.

Analyst .....

Date .....

Wt. of sample . . . . gm. 100.0%

Heavy Minerals . . . . gm. ..... %

Light Minerals . . . . gm. ..... %

Shape Analysis:

A ..... %: a ..... %: C ..... %

r ..... %: R ..... %.

Minerals Identified; Heavy Concentrate — No. of Grains — Rel. % — Absol. %

Classification Grouping:

Primary Minerals: ..... %

Total 100%

Light Concentrate

Secondary Minerals: ..... %

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0280

Depth 80 to 82

No. samples used 1

Analyst Pennel

Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0%: 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. Cylinder (+1/32) 31.82 2.19 29.63 gm. 99.13 %
3. Jar ~~(1/32—1/64)~~ silt 2.28 2.07 .21 gm. 0.7 %
4. Drain . . . . . 29.84 .....gm.....%

C. Screen Analysis 29.62

SIZE	GRAMS	%
2 plus		
2+1 mm	2.18	7.4
1–½ mm	1.43	38.6
½–¼ mm	14.39	48.5
¼–⅛ mm	1.44	4.9
⅛–1/16	.17	0.6
Pan	Tr.	
Total	29.61	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ..... Sp. gr. Size–Grade(s).....mm.

Analyst .....

Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified; Heavy Concentrate — No. of Grains — Rel. %

Classification Grouping: Absol. %

Primary Minerals: .....%

Total 100%

Light Concentrate

Secondary Minerals: .....%

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0280

Depth 82 to 86

No. samples used 1

Analyst Bennel

Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0% : 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. ~~Cylinder~~ (+1/32) 31.98 / 2.16 — 29.82 gm. 99.6 %
3. ~~Jar (1/32—1/64)~~ Silt 2.63 / 2.50 — .13 gm. 0.4 %; 29.93
4. Drain . . . .gm.....%

C. Screen Analysis 29.78

SIZE	GRAMS	%
2 plus		
2–1 mm	4.03	13.5
1–½ mm	13.74	46.2
½–¼ mm	11.35	38.1
¼–⅛ mm	.56	1.9
⅛–1/16	.10	0.3
Pan	Tr	
Total	29.78	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform / ..... } .....Sp. gr. Size–Grade(s).....mm.

Analyst .....

Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Total		100%
Light Concentrate		
Total		100%

Classification Grouping: Absol. %

Primary Minerals: .....%

Secondary Minerals: .....%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W-- 0280
Depth 86 to 90
No. samples used 1
Analyst Penner
Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0%: 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. ~~Cylinder~~ (+1/32) 31.94 / 1.97 ..... 29.97 gm..... 100.0%
3. Jar ~~(1/32—1/64)~~ Silt 2.41 / 2.41 .....gm.....%
4. Drain . . . .gm.....%

C. Screen Analysis 29.93

SIZE	GRAMS	%
2 plus		
~~2~~+1 mm	2.21	7.4
1–½ mm	15.85	53.0
½–¼ mm	11.32	37.8
¼–⅛ mm	.53	1.8
⅛–1/16	Tr.	
Pan	Tr.	
Total	29.91	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } .....Sp. gr. Size–Grade(s).....mm.

Analyst .....
Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Total		100%

Classification Grouping: Absol. %
Primary Minerals: .....%

Light Concentrate

Secondary Minerals: .....%

Total 100%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0280

Depth 90 to 94

No. samples used 1

Analyst Pennel

Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0% : 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. Cylinder (+1/32) 32.29 / 2.33 ..... 29.96 gm. 99.3 %
3. Jar (~~1/32—1/64~~) Silt 2.54 / 2.52 / 02 ..... .02 gm. 0.7 %
4. Drain . . . .gm.....%

29.98

C. Screen Analysis 29.97

SIZE	GRAMS	%
2 plus		
2+1 mm	4.95	16.6
1–½ mm	16.20	54.1
½–¼ mm	8.70	29.0
¼–⅛ mm	.10	0.3
⅛–1/16	Tr.	
Pan	Tr.	
Total	29.95	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ..... Sp. gr. Size–Grade(s)..... mm.

Analyst .....

Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Total		100%

Classification Grouping: Absol. %

Primary Minerals: .....%

Secondary Minerals: .....%

Light Concentrate

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W-- 0280
Depth 94 to 97
No. samples used 1
Analyst Bonnel
Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0%: 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. Cylinder (+1/32) 32.45 2.45 ..... 30.00 gm. 100.0%
3. Jar ~~(1/32—1/64)~~ Silt 2.27 2.27 ..... 0 gm.....%
4. ~~Drain~~ . . . .gm.....%

C. Screen Analysis 29.94

SIZE	GRAMS	%
2 plus		
2+1 mm	2.51	8.4
1–½ mm	17.2	57.7
½–¼ mm	9.69	32.4
¼–⅛ mm	.45	.5
⅛–1/16	Tr	
Pan	Tr	
Total	29.92	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } .....Sp. gr. Size–Grade(s).....mm.

Analyst .....
Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified; Heavy Concentrate — No. of Grains — Rel. %

Classification Grouping: Absol. %
Primary Minerals: .....%

Total 100%

Light Concentrate

Secondary Minerals: .....%

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0280
Depth 97 to 101
No. samples used 1
Analyst Pennel
Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0% : 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. Cylinder (+1/32) 30.23 / 2.05 ..... 28.18 gm. 94.5 %
3. Jar (1/32—1/64) Silt / 3.61 / 1.98 ..... 1.63 gm. 5.5 %
4. Drain . . . .gm.....%

C. Screen Analysis 28.19

SIZE	GRAMS	%
2 plus		
2+1 mm	3.75	13.3
1–½ mm	12.62	44.9
½–¼ mm	9.89	35.2
¼–⅛ mm	1.34	4.8
⅛–1/16	.50	1.8
Pan	Tr.	
Total	28.10	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } .....Sp. gr. Size–Grade(s).....mm.

Analyst .....
Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified; Heavy Concentrate — No. of Grains — Rel. % — Absol. %

Classification Grouping:
Primary Minerals: .....%

Total 100%

Light Concentrate

Secondary Minerals: .....%

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W-- 0280

Depth 101 to 108

No. samples used 1

Analyst Bunnell

Date 4/19/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0% : 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. Cylinder (+1/32) 31.32 / 2.15 ..... 29.17 gm. 99.9 %
3. Jar (~~1/32—1/64~~) Silt 3.10 / 2.48 ..... .62 gm. 2.1 %
4. Drain . . . .gm.....%

C. Screen Analysis 29.2

SIZE	GRAMS	%
2 plus		
2–1 mm	3.15	10.9
1–½ mm	12.85	44.2
½–¼ mm	11.64	40.0
¼–⅛ mm	1.10	3.8
⅛–1/16	.29	1.0
Pan	Tr.	
Total	29.03	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ..... Sp. gr. Size–Grade(s).....mm.

Analyst .....

Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified: Heavy Concentrate	No. of Grains	Rel. %
Total		100%
Light Concentrate		
Total		100%

Classification Grouping: Absol. %

Primary Minerals: .....%

Secondary Minerals: .....%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0280

Depth 98 to 108

No. samples used

Analyst Bruno

Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0% : 2. Wt. of F. P.
3. Wt. after solution, with filter paper . . . . . gm.
4. Less wt. F. P. (2) . . . . gm.
5. Wt. Insol. Residue (3 minus 4) . . . . . gm. %
6. Wt. lost by solution (1 minus 5) . . . . . gm. %
7. To balance (5 plus 6) . . . gm. %

B. Subsidation:

1. Original Wt. . . . . gm. 100.0%
2. ~~Cylinder~~ (+1/32) 31.74 / 2.33 → 29.41 gm. 99.0 %
3. Jar (~~1/32—1/64~~) Silt 2.38 / 2.07 → .31 gm. 1.0 %
4. ~~Drain~~ . . . . . gm. %

C. Screen Analysis 29.43

SIZE	GRAMS	%
2 plus		
~~2~~–1 mm	4.25	14.5
1–½ mm	12.65	43.8
½–¼ mm	10.62	36.2
¼–⅛ mm	1.44	4.9
⅛–1/16	.31	1.
Pan	Tr	
Total	29.27	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ..... Sp. gr. Size–Grade(s) ..... mm.

Analyst

Date

Wt. of sample . . . . gm. 100.0%

Heavy Minerals . . . . gm. %

Light Minerals . . . . gm. %

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified; Heavy Concentrate — No. of Grains — Rel. %

Classification Grouping: Absol. %

Primary Minerals: .....%

Total 100%

Light Concentrate

Secondary Minerals: .....%

Total . . . . . 100% Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0280
Depth 109 to 110
No. samples used 1
Analyst Pennel
Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0% : 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. ~~Cylinder~~ (+1/32) 31.84 / 1.96 — 29.88 gm. 00.0 %
3. Jar ~~(1/32—1/64)~~ Silt 1.98 / 98 — 0 gm. % — 29.88
4. Drain . . . .gm.....%

C. Screen Analysis 29.87

SIZE	GRAMS	%
2 plus		
1 mm	2.57	8.6
1–½ mm	9.79	32.9
½–¼ mm	14.57	48.9
¼–⅛ mm	2.55	8.6
⅛–1/16	.31	.10
Pan	Tr.	
Total	29.79	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform ..... Sp. gr. Size–Grade(s).....mm.

Analyst .....
Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r .....%: R .....%.

Minerals Identified: Heavy Concentrate	No. of Grains	Rel. %
Total		100%
Light Concentrate		
Total		100%

Classification Grouping: Absol. %
Primary Minerals: .....%
Secondary Minerals: .....%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

DEEP WELL STUDY

Well No. W— 0280
Depth 110 to 115
No. samples used 1
Analyst Pannel
Date 4/17/35

MECHANICAL ANALYSIS

A. Acid treatment (HCl.....%)

1. Sample weight . . . . . 30.00 gm. 100.0%: 2. Wt. of F. P.....
3. Wt. after solution, with filter paper . . . .gm.
4. Less wt. F. P. (2) . . . .gm.
5. Wt. Insol. Residue (3 minus 4) . . . .gm.....%
6. Wt. lost by solution (1 minus 5) . . . .gm.....%
7. To balance (5 plus 6) . . ..gm.....%

B. Subsidation:

1. Original Wt. . . . .gm..... 100.0%
2. ~~Cylinder~~ (+1/32) 28.66 / 1.96 ..... 26.70 gm..... 89.8%
3. ~~Jar (1/32–1/64)~~ Silt 5.02 / 1.99 ..... 3.03 gm..... 10.2% (29.73)
4. ~~Drain~~ . . . .gm.....%

C. Screen Analysis 26.62

SIZE	GRAMS	%
2 plus		
~~2~~+1 mm	3.57	13.5
1–½ mm	10.21	38.4
½–¼ mm	9.45	35.6
¼–⅛ mm	1.97	7.5
⅛–1/16	1.21	4.6
Pan	.11	0.4
Total	26.52	100.0

MINERALOGICAL ANALYSIS

(Use opposite side of page for details of minerals)

Acet. Tetrabr. / Bromoform } .....Sp. gr. Size–Grade(s).....mm.

Analyst .....
Date .....

Wt. of sample . . . .gm..... 100.0%

Heavy Minerals . . . .gm.....%

Light Minerals . . . .gm.....%

Shape Analysis:

A.....%: a.....%: C.....%

r.....%: R.....%.

Minerals Identified; Heavy Concentrate	No. of Grains	Rel. %
Total		100%

Classification Grouping: Absol. %
Primary Minerals: .....%

Light Concentrate

Secondary Minerals: .....%

Total 100%

Total 100%

Revised Lithologic Description (from descriptive log and laboratory data).

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

092-31W-05 A

W-0280

KDD

Water Quality
(ppm)

Card Q

State: IOWA (16) County: POCAHONTAS (76) Town: POLK

Well No. Latitude 42 49 00 N (5–11) Longitude 094 32 00 0 (12–18) Seq. No. 1 (19) Date M 05 D 33 Y 75 (20–25)

Sampling Depth 120. (26–29) Type (30) Kx10^6 (31–35) pH 7.1 (36–38) Temp. °F (39–41)

SiO_2 (42–44) Ca 162. (45–49) Mg 52. (50–53) Na+k 47. (54–58) K .0 (59–61)

HCO_3 486 (62–65) CO_3 0 (66–67) SO_4 272. (68–72) Cl 3. (73–78) Source No. 3 0 (79–80)

Card R

Duplicate Columns 1-25 from Card Q

F .5 (26–28) NO_3 .5 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe (42–45)

Mn .5 (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 830 (58–63) Calc. (64–69) Hardness Ca,Mg 619 (70–73) Non-Carb. 221 (74–77)

Color (78–79) No. R (80)

Card S

Duplicate Columns 1-25 from Card Q

Br (26–28) I (29–31) Alk. as $CaCO_3$ 398 (32–35) Free CO_2 (36–38) SAR (39–41)

RSC (42–44) ABS (45–47) (48–50)

Alpha (pc/l) (55–57) Beta (pc/l) (58–60) Ra (pc/l) (61–63) U (ug/l) (64–66)

No. 5 (80)

Verified PMJ

Recorded by: R.W. COBLE

Punched by: Punched FCH Date:

Published:

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

W-0280

RECORD OF WELL



Location:

Town: Rolfe (N E / S W); County Pocahontas

NE sec. 5 T. 92 N., R. 31 W. Garfield Twp.

Well name and number Rolfe City Well (1935)

Owner Town Address

Tenant Address

Lots 1 & 2. SW/c Walnut & Lincoln St.

Contractor Thorpe Well Co. Address Des Moines

Drillers

Drilling dates April 3 - May 14, 1935

Well data:

Elevations: Drilling curb 1173 feet; Land surface feet

Determined by

Topographic position Upland

Total depth: Reported 120 feet, Measured feet

Operating depth 110'. Clay filled 110-120'

Drilling method

Hole and casing data Gravel pack 30" hole 0-12', Concrete ring +1 to -16'; 91½' of 8" W.I. casing from +2½' to 89'; 20" hole from 12-120'; clay pack 16'-65'; cementring 65-77'; neat cement 77-80'; clay pack 80-81'; Gravel pack 81-110'. 4" threaded joint at bottom of 8" casing coupled to screen-punched slots. Screen 7½" diameter, 19' length. Original hole clay filled from 110-120'

(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 ft. below above Date

Original elevation of water level ft.; Source of data

Sources of water: Principal Glacial 90-114; Others

Production data: Date _____

Static depth to water 25 Measuring point _____

Pumping level 85 at 45 g.p.m.

Specific capacity _____ g.p.m. per ft. drawdown; Temperature 49 °F.

Pump data; Type pump Cylinder Column Dia. _____ Length 88'4"

Cylinder or bowls: Dia. 5 3/4" Length 64" Suction pipe 6'-8"

Power Electric motor 1040 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	Jan 28, 1937			
Sampled by	H.G. Hershey			
Total solids	655.0			
Insoluble matter	5.0			
Alkalinity (Meo)	414.0			
Alkalinity (Phn)	0.0			
pH 3/6/37	6.9			
$Fe_2O_3 + Mn_2O_3 + Al_2O_3$	10.0			
Alkali as sodium	20.1			
Calcium	140.8			
Magnesium	40.2			
Iron (unfiltered)	1.2			
Manganese	0.30			
Nitrate	1.30			
Fluoride	0.0			
Chloride	6.0			
Sulfate	117.2			
Bicarbonate	505.1			
Hardness (ppm)	520.0			
Hardness (gpg)				

Remarks Has H_2S odor

Laboratory data: Sample storage location _____

Sample range 2-120 No. spls. 47 No. dupls. & cond. 47 good

Spls. prepared by _____ Washed range _____ by _____

Driller's log and cond. _____

Insoluble residues: Prepared by _____ Studied by _____ Strip log _____

Microscopic study 2-120 strip log 9-29-50

Gen. log _____ Correl. by R. Scrivener

Arrow, Rolfe, Ia.
April 4, 1935

WORK ON NEW WELL FOR ROLFE BEGAN THIS WEEK.

Wednesday of last week the FERA department of the national government relief program let the contract for digging Rolfe's new well, and on Saturday the Thorpe Well Co. which received the contract, had its machine on the ground ready to begin operations. Weather delayed them several days in getting ready, but the grind has begun, and the promise now is that the well will be ready in ample time to take care of the heavy demand of summertime.

The drill was set up near the center of the quarter block owned by the McIntires east of the water tower, not far from the test hole recently made, which indicated plenty of water of good quality. The geologist on the job says there is a lake under Rolfe at this point in 40 feet of sand and there can be no question of a water supply. A 20-inch hole is being dug in which will be inserted a smaller pipe that will stand for ages. Around this pipe a cement grouting will be poured, which will insure curbing if the pipe rusts out, but the kind that won't rust is being used. It is predicted such a well will stand for our children's grandchildren and even longer. A gravel pack type of well will be completed. As we understand it, the sand is pumped out for a considerable distance around the bottom of the curbing and a coarse gravel inserted, thru which the water must filter. This keeps the sand out and prevents the well from filling with sand from the bottom. Experience has demonstrated this is the type of well for such surroundings. Sand has ruined other wells for Rolfe that were not gravel packed, and it is hoped this system will stop the waste.

Supt. Atchinson of the Thorp Co. is in charge of the drilling with local men assisting. He is the gentleman who made the test holes in Rolfe during the winter.

Written at Iowa City

April 6, 1935

Mr. A. E. Michel
Chief Engineer
Iowa Emergency Relief Administration
314 West Eighth Street
Des Moines, Iowa

Dear Mr. Michel:

Several days ago during our conference concerning the Rolfe drilling project statements were made concerning the newspaper article which appeared in the Rolfe Arrow of January 17. Some question was raised about the statements that were made by the field geologist in charge of this test drilling, and in order to clear the subject I asked Mr. Stookey to make a statement for your information. A copy of Mr. Stookey's report to me is quoted below.

"I have just re-read the article that you called to my attention which appeared in the Rolfe Arrow on January 17th, 1935. I saw this article when it first appeared, but gave it little attention, since I could not see how anyone at all familiar with the situation could attach any importance to it.

"The statements in the third paragraph might be interpreted to mean that the FERA geologist had expressed fear that Rolfe could not obtain a water supply without heavy expense. As you know, the geological evidence indicated the exact reverse of this. I made no statement to anyone in Rolfe which might have been construed as expressing fear or doubt.

"In regard to the discussion in the fourth paragraph which concerns the type of well to be constructed, I was of course not in a position to express an opinion as to the type of well to be constructed, since only one test-hole had been completed at the date of this article. Furthermore, when the second and final test-hole was

later completed, I expressed no opinion as to the type of well best suited to the geological conditions as determined. The only statement I made to anyone in regard to the Manson well was an attempt to explain that the "lower strata of sand" which furnishes water at Manson could not be reached at Rolfe at 1200 feet or any other depth.

"The other misstatements in the article have no foundation but show ignorance of the true facts, and may be disregarded.

"I am not acquainted with the editor of the paper or any of his staff, and made no statement for publication. Neither did I make a statement to any individual in Rolfe upon which such an article could be based."

As we all recognize, newspaper articles should never be taken very seriously, as many misquotations occur. This article, however, was not based upon any information given by the geologist. It appears, however, that other people not in our organization ~~but~~ connected with the drilling project made statements which might have lead to the material in the newspaper.

Yours very truly,

A. C. Tester

ACT:A
CC: E. S. Boudinot

Iowa City, Iowa
April 6, 1935

Dr. A. C. Tester
Iowa City, Iowa

Dear Doctor Tester:

I have just re-read the article that you called to my attention which appeared in the Rolfe Arrow on January 17th, 1935. I saw this article when it first appeared, but gave it little attention, since I could not see how anyone at all familiar with the situation could attach any importance to it.

The statements in the third paragraph might be interpreted to mean that the FERA geologist had expressed fear that Rolfe could not obtain a water supply without heavy expense. As you know, the geological evidence indicated the exact reverse of this. I made no statement to anyone in Rolfe which might have been construed as expressing fear or doubt.

In regard to the discussion in the fourth paragraph which concerns the type of well to be constructed, I was of course not in a position to express an opinion as to the type of well to be constructed, since only one test-hole had been completed at the date of this article. Furthermore, when the second and final test-hole was later completed, I expressed no opinion as to the type of well best suited to the geological conditions as determined. The only statement I made to anyone in regard to the Manson well was an attempt to explain that the "lower strata of sand" which furnishes water at Manson could not be reached at Rolfe at 1200 feet or any other depth.

The other misstatements in the article have no foundation but show ignorance of the true facts, and may be disregarded.

I am not acquainted with the editor of the paper or any of his staff, and made no statement for publication. Neither did I make a statement to any individual in Rolfe upon which such an article could be based.

Sincerely yours,

D. G. Stookey

POCAHONTAS COUNTY: The Arrow - January 17, 1935.

FERA Trying to Find Good Water For Rolfe

Ever since the town well filled up with about 500 feet of sand, shale and other underground material and the casing caved in, city officials have been trying to get the FERA to provide a new town well for Rolfe.

The FERA employed Thorpe Bros. of Des Moines to come to Rolfe and drill test holes. One was sunk on the Butler lots north of the old egg house site on Sunset Hill. A vein of water-bearing sand was struck at about 100 feet and water rose in the well 55 feet, but the sand vein wes not supposed to be of sufficient size to carry volume of water to supply the town, and the drilling was continued down into the limestone, where the same iron-laden water was struck that has dammed the city water in years past.

A FERA geologist has been superintending operations thus far and making observations. It begins to look like a transposition of letters in FERA to FEAR--fear that Rolfe can't get a good water supply without heavy expense--that about defines the present situation.

It is felt that the best water can be obtained by stopping in the sand, and this would require sinking several wells and packing them to prevent filling up. This is often done and we understand Pocahontas has such a well at this time. It is either this or go thru to the lower strata of sand such as Manson did to obtain soft water. The Manson well is about 1,200 feet deep. But would a casing thru this iron-bearing water resist corroding any more than the one in the well that went wrong--a well that cost well up toward $10,000.00.

It seems that a lake underlies Rolfe at about 100 feet, which if true ought to supply plenty of water. The problem is to prevent sand from rising and plugging the hole and cutting out the pump. Rolfe's original well was about this depth and was continually bothering, but the science of digging wells has advanced considerably since that time. The well had to be abandoned because of the sand and contamination by oil and gasoline. When first dug the supply was plentiful and it was good water.

The water that has been used the past few years has a powerful influence on iron, so powerful that it has eaten 23 holes in the bottom of the tank which have been plugged up successfully. What it is doing to our service pipes is being discovered almost weekly when the plumber gets a job putting in a new pipe.

All the housewives in Rolfe who use city water know what it does to their porcelain and what black coffee they can make with it. It just seems necessary that Rolfe secure better water or go out of the water business entirely. It would seem nonsensical to put in aerators and softeners until better water is secured, for it would be just that much more material to be rusted out.

We understand that further tests will be made and the hope is earnestly expressed that FERA will be able to solve our problem for us.

MEMORANDUM

Des Moines, Iowa
April 15, 1935

TO: E. S. Boudinot

FROM: A. C. Tester

SUBJECT: Rolfe City Well Status on April 14, 1935.

On Sunday, April 14th, I visited Rolfe and learned the exact condition of the formations penetrated in the 20-inch hole being drilled for the Rolfe city water supply. Below I am listing the formations as I described them from the samples which I saw at Rolfe. I did not examine the cuttings above 78 feet as this material does not enter the picture so far as the final completion of the well is concerned.

From	To	
78'	80'	Sand, medium grained, yellow with some clay which is interbedded, and also distributed as a mixture in the sand material. Little Water.
80'	82'	Sand, yellow, dirty with considerable clay.
82'	86'	Sand, medium grained to coarse, some clay. Largest grains about .16 of an inch diameter.
86'	90'	Sand, medium to coarse grain, tan to gray, very little clay. Maximum size grains about 0.2 of an inch by majority of material between .02 of an inch and .01 of an inch. Contains some water and should develop as a good producer.
90'	94'	Sand, like 86 feet to 90 feet, moderately clean and free of clay. In this interval the water level which had been within 2 feet of the surface dropped about 10 feet during drilling. This is probably one of the best water producers in the well.
94'	97'	Sand, buff to light yellow, medium grained, slightly finer than 90 to 94 foot zone.

From	To	
97'	101'	Sand, medium to coarse grain, slightly coarser with more of the extreme coarse and finer materials than 94 to 97 feet. Contains considerable clay which probably occurs as separate bands in the formation.
101'	108'	Sand, medium to coarse with largest grains up to 0.5 of an inch and considerable between .25 and 0.4 of an inch; also much very fine sand less than .01 of an inch and clay. This is a very dirty sand and much of the yellow clay shows iron stain. This zone drilled quickly and probably is very soft and loose. Water level was maintained to the surface in order to prevent caving of the sand and there was no opportunity to determine the drilling mud in part sealed the outer surface of the sand to hold it up.
108'	109'	Sand, medium to coarse with about 20% larger than 0.1 of an inch, but with considerable sand finer than .01 of an inch. Some clay balls which may be from higher formations. This is probably a good water producing sand.
109'	110'	Sand, buff to yellow, medium to coarse grain, uniform texture and cleaner than 108' to 109'.
110'	115'	Sand and gravel with many pieces, .75 inch to one inch size with a mixture of coarse sand; also many yellow clay balls. Gravel to about 113' probably, with clay below.
115'	120'	Drift, clay and small gravel. Heterogeneous mixture. Some fragments which look like blue shale. Bedrock probably in the last foot of drilling. This is a characteristic glacial drift below the sand, and the first deposit on top of the bedrock.

I discussed these formations with the driller in charge and it was decided to take some water samples by bailing so as to determine, if possible, the difference in the character of water from the bottom of the hole and particularly between 101 and 108 feet, and the water from 86 to 101 feet. These samples should be taken today and will be sent to the water analysis laboratory at once. The sand samples are going to Iowa City today and we will make some comparisons in the laboratory within the next few days.

Judging from the character of the formations, it seems desirable to plug the hole from the bottom at 120 feet to 110 feet, as this is a zone in which the water would be of poor quality and probably have a high content of iron. This part of the hole would be filled and tamped tightly with clay and I believe should have a cap of 8 to 10 inches of concrete to make the seal tight. Above the top of this seal would be placed about one foot of gravel between 109 and 110 feet. At the top of the gravel the bottom of the screen would be set and after using the 15 feet of screen specified, that would put the top of the screen at 94 feet. However, as there is some considerable clean water-bearing sand above the 94 foot level as indicated in the log described above, I believe that it will be desirable to add an additional 5-foot section to make a total of 20 feet of screen. The top of the screen would then be at 89 feet below the surface which is 3 feet below the top of the first clean water sand. Gravel will then be packed 3 feet above the top of the screen to the 86-foot level. The 15 feet of concrete would be placed between 71 feet and 86 feet. At the base of this concrete, about 2 or 3 inches of clay would be tamped to hold the concrete from cementing the gravel. Above the concrete from 71 feet up to 15 feet below the surface, clay will be puddled and tamped to fill the hole between the 8-inch pipe and the outside. On top will be the 15 feet of concrete as specified. A pencil sketch of this is included for your comparison.

If the water from the 101 to 108 foot zone shows by analysis to be a very poor water and to contain a high content of iron, it might be desirable to shut this off. As there is only 2 or 3 feet of sand below, it is doubtful if it will be worthwhile to try and save the sand between 108 and 110 feet. In that case, the hole will be plugged back to 102 feet and then the screen set above, modifying the outline suggested in the preceding paragraph. In any case, the top of the screen should be set not higher than 86 feet. A decision, of course, could not be reached on this until the water samples could be analyzed, which will not be until the last of the week when preliminary results will be available.

As you will note by comparison with the log in the test hole, there is some difference in the two sections. The principal points to be noted are: first, the section of sand in the permanent well is thicker than in the test hole; second, the sand in the permanent well is not as coarse as in the test hole, as the sand and gravel zone between 93 and 103 feet occurs as a medium to coarse sand in the permanent well, and the gravel zone in the last well is below 110 feet; third, the bedrock surface in the permanent well is about 16 feet lower. There is little question, however, but that a satisfactory well with as good or possibly better production than indicated in the test well, will be completed at Rolfe.

I told the driller that he would probably receive his instructions from Mr. Thorpe after you had discussed the matter with Thorpe and reached a definite conclusion.

The pipe has not yet arrived at Rolfe and it probably should be traced in order to speed up delivery.

A. C. Tester,
Supervisor - IERA Proj. S-E6-1085

ACT:K
CC E. M. Rowser
Rolfe, Iowa

A. E. Michel

I. MULOCK, CHAIRMAN, DES MOINES
CLAUDE A. CLARK, WATERLOO
DR. T. C. DENNY, DES MOINES
J. H. GRIBBEN, NEWTON
HON. N. G. KRASCHEL, HARLAN
J. C. PRYOR, BURLINGTON
HON. FRANK E. WENIG, SPENCER
L. S. WERNLI, SIOUX CITY

Iowa
Emergency Relief Administration

314 West 8th Street
DES MOINES

INA T. TYLER, DIRECTOR OF RELIEF, I. S. E. R. C.
GEO. J. KELLER, STATE ENGINEER, W. D.

Address all Correspondence to the Office
Telephone 4-6201

Rolfe, Iowa
April 16, 1935

Dr. A. C. Tester
Geology Building
Iowa City, Iowa

Dear Allen,

Just received your letter concerning measurements of screen, gravel samples etc. The water sample is in the mail now, and should be in Iowa City Wednesday morning at the latest. 3pm Wed

Just a word about the water sample sent in; we encountered considerable trouble in getting even as good a sample as we did. We finally strapped the jug on a piece of six inch pipe, and lowered it to the 103 foot level. By cutting a very small hole in the cork, I believe we obtained a very good sample of the water at that level, as it took about ten minutes for the jug to fill. We checked this by pulling up too soon the first attempt, and found we had only about one half a gallon of water.

The water was allowed to settle for better than an hour, with no apparent clearing. Since the water in the well had stood twenty four hours without being disturbed, and we were careful not to disturb it in going down, I thought it better to get the sample in the mail as quickly as possible, as it would take another day for the clay to settle out.

The static head of the water seems to be at twenty one feet below curb, as it raised to that level since our last bailing, without more water being added.

I will send all the information on the screen as soon as it arrives. Will also send a sample of the gravel as soon as possible. We have heard nothing concerning the eight inch, though Atcheson is expecting a call from Thorpe this morning.

Sincerely,

Rowser
Edwin M. Rowser

April 20, 1935

Mr. E. M. Rowser
Rolfe, Iowa

Dear Ed:

Thank you for your telegram this morning explaining the condition of the Rolfe project. The pipe is being traced vigorously, and we hope it will be located and delivered at Rolfe very soon. In the meantime, you should have information on the water analysis.

Just a word of comment concerning the drilling at Rolfe. In future cases, be sure to inform me of deviations from specifications. In the case of drilling below 106 feet, it would have been well to have called me asking for definite instructions and that would have saved you that particular responsibility, and then if the driller proceeded, he would have been doing so entirely on his own decision.

Yours very truly,

A. C. Tester
Supervisor, Proj. S-E6-1085

ACT:K

E. H. Mulock, chairman, des moines
Claude A. Clark, waterloo
Dr. T. C. Denny, des moines
J. H. Gribben, newton
Hon. N. G. Kraschel, harlan
J. C. Pryor, burlington
Hon. Frank E. Wenig, spencer
L. S. Wernli, sioux city

Iowa
Emergency Relief Administration
314 West 8th Street
DES MOINES

Rolfe, April 20

Ina T. Tyler, director of relief,
I. S. E. R. C.
Geo. J. Keller, state engineer, W. D.

Address all Correspondence to
the Office
Telephone 4-6201

Dr. A.C.Texter
IERA
Des Moines

Dear Allen:

I just now received your letter, and will try to have this reach you in time.

I am responsible, I suppose, for going beyond the contracted depth. The driller and I talked it over when we failed to find the course sand and gravel at 104 feet, which, as you remember, was just on top of the rock in the test hole. We both thought that we would probably find the same sand and gravel immediately above bed rock as was found in test hole No. 2, so we kept going until we hit the clay in which we stopped. The drilling from 108 to 120 only took about two hours of actual work.

As I remember, the driller did not raise any question as to the deeper drilling in regards to Thorpe's contract. I know of no instructions that he received from the Thorpe office in Des Moines. It was entirely a matter of feeling our way down to bed rock, which we thought must surely be within inches of the drill at every run.

The pipe has not yet arrived.

I have to go to Montezuma on a matter of personal business, starting, probably, at about 6:00 PM, and coming back here Sunday night.

Sincerely,

Edwin M. Rowser
Rowser

Written at Iowa City

April 23, 1935

Dr. E. M. Rowser
Rolfe, Iowa

Dear Ed:

Confirming phone conversation from Des Moines yesterday afternoon, the following measurements are to be used in completing the new city well at Rolfe.

The length of the screen is 14 feet long plus 1½ inches for coupling. A total of 107 feet of 8 inch wrought iron pipe wase delivered at Rolfe.

Starting at the bottom of the hole, which is now 120 feet deep, the hole should be filled with clay carefully puddled and tamped and allowed to set at 103 feet. A cement plug of the necessary quantity of quick setting cement in a neat mixture of 4½ gallons per sack of cement should be set and tamped between 102 and 103 feet. Between 101 and 102 feet the regular washed and graded gravel should then be packed on the cement after it has been allowed to cure for twenty-four hours. The bottom of the screen with its regular base would be set at 101 feet, with the top of the screen at 87 feet. Throughout the length of the screen and extending to 1 foot above the top of the screen or 86 feet below the curb the regular graded and washed gravel would be packed, 15 feet of quick setting neat mixture cement to be packed between 8 71 and 86 feet. Above 71 feet clay will be filled around the 8" pipe to the outside of the hole carefully puddled and tamped up to within 15 feet of the surface. In the upper part 15 feet of cement in a mixture of 2 parts sand and 1 part cement will be placed from the surface to 15 feet. The 8" casing is to be cut off and capped so that the top of the pipe will be at least 2½ feet above the normal ground level.

Yours very truly,

ACT:A

A. C. Tester

April 27, 1935

Mr. E. M. Rowser
Rolfe, Iowa

Dear Ed:

In a discussion with Mr. Boudinot this afternoon concerning the procedure best to follow at Rolfe, it was decided to pull the pipe and screen from the well as it now stands, clean out the hole thoroughly and drill through the concrete plug between 102 and 103 feet, and then clean out the clay below that down to about 110 feet. Before resetting the screen, an additional 5-foot length will be put on to ~~the~~ bottom at 108 feet. The interval between 108 and 110 feet will be filled with gravel. The gravel pack will be placed around the screen above 110 feet up to the same level as specified in the previous instructions, which means 87 feet. Then the well will be developed with a pumping test to establish the production, and the well completed in the specified manner.

I trust that you took a water sample near the end of the pumping test period, although I did not receive a copy of the information on form St-1559. In case you did not take this sample, then it will be necessary to pump the well before removing the pumping equipment and starting on the replacement. The pumping should be continued until the water is clear and the water is being definitely pulled from the producing formation as the well now stands. This is also desirable in order that a test can be made as to the water capacity after the well has been allowed to stand. In running this short test, be sure and keep complete records on water levels and measure the quantity. It may be necessary to pump 3 or 4 hours in order to obtain these data.

In case a marked increase of production is found, report this to me by telephone before proceeding with the tearing down of the pumping equipment and remodeling of the well.

After the well has been remodeled and when the final pumping test is made, be sure and take the water sample after approximately 20 hours of pumping.

Yours very truly,

A. C. Tester
Assistant State Geologist
Supervisor, Proj. S-E6-1085

ACT:K

MEMORANDUM

Des Moines, Iowa
April 29, 1935

TO: E. S. Boudinot

FROM: A. C. Tester

SUBJECT: Results of pumping test of Rolfe well, April 25th and 26th.

As reported to you verbally Friday afternoon, the 24-hour pumping test on the Rolfe well, following setting of screen and packing of gravel, was started at 2:00 P.M., April 25th, and completed at 2:00 P.M., April 26th. A cylinder pump was installed after the turbine pump failed to operate properly. A complete statement of condition of equipment and the results of pumping are given below:

Total Drilled Depth: 120 feet. Operating depth at 102 feet. Concrete plug 102 feet to 103 feet.

Screen: Base at 101 feet, top at 87 feet, packed in gravel.

Casing: 30" O.D. from 0 to 12 feet, 20" O.D. from plus 2½ feet to 58½ feet, 8" O.D. from plus 2½ feet to 87 feet; Screen, 8" O.D. from 87 to 101 feet.

Pump: Cylinder pump, 5¾"x24" I.D., drop pipe 6" O.D. Bottom of cylinder set at 86 feet, no drop pipe below cylinder. Pump rod 2" pipe. Pumped by drilling jerk line.

Gauge of Water Depth: Electric circuit with light bulb.

Gauge of Volume: A 65 gallon barrel.

Time	GPM	SPM	Water Head	Condition of Water	Remarks
2:00 PM	0	0	25'	muddy	
2:00	35	26	25'	"	
2:01	15	26	86'	"	Pump sucking air
2:15	15	26	86'	"	" " "
2:30	15	26	86'	"	" " "
2:45	15	26	86'	"	" " "
3:00	15	26	86'	Clearing	" " "
3:15	15	26	86'	"	" " "
3:30	15	26	86'	"	" " "
3:45	15⅓	26	86'	"	" " "

Time	GPM	SPM	Water Head	Condition of Water	Remarks
4:00 PM	15½	26	86'	Milky	Pump sucking air
4:15	15½	26	86'	"	" "
4:30	15½	26	86'	"	" "
5:00	16	26	86'	Clear	" "
5:30	16	26	86'	"	" "
6:00	16	26	86'	"	" "
6:30	16½	26	86'	"	" "
7:00	17	26	86'	"	" "
7:30	17	26	86'	"	" "
8:00	17½	26	86'	"	" "
8:30	18	26	86'	"	" "
9:00	18	26	86'	"	" "
9:30	18	26	86'	"	" "
10:00	18	26	86'	"	" "
10:30	19	26	86'	"	" "
11:00	19	26	86'	"	" "
11:30	19	26	86'	"	" "
12:00 M	19	26	86'	"	" "
12:30 AM	19	26	86'	"	" "
1:00	19	26	86'	"	" "
1:30	19	26	86'	"	" "
2:00	19	26	86'	"	" "
2:30	19	26	86'	"	" "
3:00	19	26	86'	"	" "
3:30	19	26	86'	"	" "
4:00	19	26	86'	"	" "
4:30	19	26	86'	"	" "
5:00	19	26	86'	"	" "
5:30	19	26	86'	"	" "
6:00	19	26	86'	"	" "
6:30	19	26	86'	"	" "
7:00	19	26	86'	"	" "
7:30	19	26	86'	"	" "
8:00	19	26	86'	"	" "
9:00	19	38	86'	Slightly milky	" "
9:30	19	38	86'	Clear	" "
10:00	19	26	86'	"	" "
10:30	19	26	86'	"	" "
11:00	19	26	86'	"	" "
12:00 Noon	19	26	86'	"	" "
1:00	19	26	86'	"	" "
1:30	19	26	86'	"	" "
2:00	19	26	86'	"	" "

Stopped pumping at 2:00 P.M., April 26th.
Time pumped, 24 hours continuously.

CC A. E. Michal

A. C. Tester
Supervisor, Proj. S-E6-1085

E. H. Mulock, chairman, des moines
Claude A. Clark, waterloo
Dr. T. C. Denny, des moines
J. H. Gribben, newton
Hon. N. G. Kraschel, harlan
J. C. Pryor, burlington
Hon. Frank E. Wenig, spencer
L. S. Wernli, sioux city

Iowa
Emergency Relief Administration

Ina T. Tyler, director of relief,
I. S. E. R. C.
Geo. J. Keller, state engineer, w. d.

314 West 8th Street
DES MOINES

Written at
Rolfe, Iowa
April 29, 1935

Address all Correspondence to
the Office
Telephone 4-6201

Dr. A.C.Tester
Geology Building
Iowa City, Iowa

Dear Allen:

Received your letter with instructions this morning. Since Atcheson had already had instructions from Thorpes, the pump was pulled before I got the information, and no short pump test was run. However, I had taken a sample of the water at 10:30, April 26th, and sent it in Saturday. I thought I had sent your copy of the information of ST-1559, but found I had failed to enclose it in the letter I sent you in Des Moines.

If everything goes as it has started, without trouble, we should be pumping when Vic arrives.

I expect to stop in Iowa City before I leave, and will certainly want to see you if you are in town. I am planning to be there Thursday or Friday of this week.

The screen should be here this afternoon with the additional five feet added. We are cleaning the hole now, and should get the pump and casing down tomorrow. I am holding the gravel sample until a new load arrives, as there may be some difference in what we used and that which we are getting today.

Sincerely,

Ed

Edwin H. Rowser

1217-A

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TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

Phoned W.U. 8:11 A.M.

MAY 6 1935

VICTOR H JONES
ROLFE IOWA

RUN SIX HOUR PUMP TEST AND REPORT RESULTS

A C TESTER

CHARGE: Phone 5261

THE QUICKEST, SUREST AND SAFEST WAY TO SEND MONEY IS BY TELEGRAPH OR CABLE

Written at
Iowa City
May 7,1935

Dr. Victor Jones
Rolfe, Iowa

Dear Vic:

I am anxiously awaiting the results of the new pumping test with the smaller cylinder set at a lower depth. I am very sorry that it is necessary for me to call your attention to the disregard of instructions concerning the report on the last pumping test. However, I wish you would watch this matter closely because it is rather embarrassing when incorrect information reaches Boucinot. If you will review your report, you will note there are several errors which normally would be of minor nature, but may not be so considered by other people.

Yours very truly

ACT:CB

Allen C. Tester
Assistant State Geologist
Supervisor, Proj. S-E6-1085

Written at Iowa City.

May 8, 1935

Mr. E. S. Boudinot
Iowa Emergency Relief Administration
314 West 8th Street
Des Moines, Iowa

Dear Mr. Boudinot:

Confirming our phone conversation this morning, the four-hour test run yesterday afternoon on the Rolfe well showed a production of 75 gallons per minute. This was with a drawdown from 25 to 104½ feet. The water level recovered in approximately ten minutes to a level of 30 feet after the pumping was stopped. Pumping was stopped at three different intervals to check these tests.

At the beginning of the pumping test some silt and sand was pumped and at each time the well was shut down for the short period for the water to return to head the silt and sand appeared again. In order to correct this condition and reduce the amount of silt and sand and possibly to cure the difficulty entirely, it will be necessary to surge the well heavily for intermittent short periods covering two or three hours total work. This should have been done in the early stages of the work and before pumping was started. Also, this will undoubtedly increase the pumping capacity of the well and possibly reduce the drawdown so that the pump can be set above the screen.

After the surging has been completed and the driller and geologist are satisfied that no further benefit may be derived, a pumping test of four hours should again be run with the same accurate measurements.

Yours very truly,

A. C. Tester

ACT:A
CC: V. H. Jones

Jones.

35 gpm -
12:30 pm - 6:30

3 3/4" I.D.
4' long -

Fall 10 4½ ft.
Fall 9' long
Cylinder 4 v
9½ 9½ -

Cleared ½ hrs.
Stopped pump
@ 10 min -

Head 25'
DD 10 4½
in 25 min -
38 gpm -

33-37 gpm -

Returned to 30'
in 10 min -

Cloudy 30 min

E. H. Mulock, chairman, des moines
Claude A. Clark, waterloo
Dr. T. C. Denny, des moines
J. H. Gribben, newton
Hon. N. G. Kraschel, harlan
J. C. Pryor, burlington
Hon. Frank E. Wenig, spencer
L. S. Wernli, sioux city

Iowa
Emergency Relief Administration

314 West 8th Street
DES MOINES

Ina T. Tyler, director of relief, I. S. E. R. C.
Geo. J. Keller, state engineer, W. D.

Address all Correspondence to the Office
Telephone 4-6201

Written at

Rolfe, Iowa
May 8, 1935

Professor A. C. Tester
Iowa Geological Survey
Iowa City, Iowa

Dear Tester;

This letter is to inform you of our plans for surging the well here tomorrow. Mr. Boudinot called me this morning from Des Moines and informed me of your plan to surge the well for approximately two hours. The driller, Mr. Atcheson, likewise received a call from Mr. Tom Thorpe, who explained the procedure. He is shipping an agitator by freight today which should arrive at 8 AM tomorrow. The agitator, as I understand it, is a length of heavy pipe which will slip with small clearance inside the 8-inch casing. It has one end capped, and is to be used by spudding on the drill line just above the screen. This will produce a surging action in and out and back and forth in the producing formations around the screen.

We plan to run this agitator for two hours, then to install the pump and run it for perhaps another two hours. This should be sufficient to obtain a fair measurement of the output. If you have additional suggestions concerning our procedure, you can call me during the morning.

Very truly yours,
V. H. Jones

Iowa City, Iowa
May 9, 1935

MEMORANDUM

TO: E. S. Boudinot
FROM: A. C. Tester
SUBJECT: Results of pumping test of Rolfe well, May 2 and 3, 1935.

Total Drilled Depth: 120 feet. Operating depth 110 feet. 110 feet to 120 feet filled with clay and tamped. 108 feet to 110 feet filled with gravel.

Screen: Base at 108 feet, top at 89 feet.

Casing: 30" O.D. from 0 to 12 feet; 20" O.D. from plus 2 to 58½ feet; 8" O.D. permanent from 0 to 89 feet.

Pump: Cylinder pump 5'x6" O.D. set from 68 feet to 73 feet; 5¾"x28" I.D. Stroke 24 inches. 28 feet 6" drop pipe, tail piece bottom at 101 feet. Pump rod 2" pipe. Pulled by drilling jerk line. Capacity of pump maximum 250 GPM.

Gauge of Water Depth: Air line and disk gauge.

Gauge of Volume: 70 gallon drum.

Water level at Start of Test: 25 feet below curb.

Test started at 1:00 PM May 2 and run continuously to 11:45 AM May 3.

Details of Test :

Time	GPM	Water Level	Remarks
1:00 PM	54.0	25 ft.	Water very muddy.
1:20 PM	24.0	100	27 GPM.
1:50 PM	23.3	100	Water less muddy.
2:15 PM	23.3	100	
2:45 PM	23.3	100	

Time	GPM	Water Level	Remarks
3:15 PM	23.3	100 ft.	
3:45 PM	23.3	100	
4:15 PM	23.3	100	
4:45 PM	23.3	100	Water nearly clear.
5:15 PM	25.5	100	28 SPM
5:45 PM	25.5	100	
6:15 PM	25.5	100	
6:45 PM	23.3	100	
7:15 PM	23.3	100	
7:45 PM	25.5	100	30 SPM
8:15 PM	28.8	100	
8:45 PM	28.0	100	
9:15 PM	28.0	100	
9:45 PM	28.0	100	Pumped stopped 5 min. Rise to 81 feet. Silty for 15 min.
10:15 PM	28.0	100	
10:45 PM	27.1	100	Water clear.
11:15 PM	27.0	100	
11:45 PM	27.5	100	
12:15 AM	27.0	100	
12:45 AM	27.0	100	
1:15 AM	26.5	100	
1:45 AM	26.5	100	
2:15 AM	26.0	100	28 SPM.
2:45 AM	26.0	100	32 SPM.
3:15 AM	26.0	100	
3:45 AM	25.6	100	
4:15 AM	26.2	100	
4:45 AM	26.2	100	
5:15 AM	26.0	100	32 SPM
5:45 AM	26.2	100	
6:15 AM	25.7	100	Water sample taken 6:00 AM.
6:45 AM	25.0	100	
7:15 AM	25.0	100	30 SPM
7:45 AM	25.5	100	
8:15 AM	26.0	100	
6:45 AM	25.5	100	
9:15 AM	26.2	100	
9:45 AM	26.0	100	
10:15 AM	25.5	100	
10:45 AM	25.5	100	
11:15 AM	25.0	100	Pump stopped 5 min. Rise to 82 feet. Water silty for 10 min.
11:45 AM	25.0	100	
12:00 N	Plugs fouled in engine. Pumping discontinued.		

This pumping test shows an increase of approximately 8 to 9 gallong per minute over the first test run on April 25 and 26.

A. C. Tester,
Supervisor, Proj. S-E6-1085

CC: A. E. Michel
V. H. Jones

Iowa City, Iowa
May 9, 1935

MEMORANDUM

TO: E. S. Boudinot

FROM: A. C. Tester

SUBJECT: Results of surging operation at Rolfe, May 9.

In accordance with our phone conversation of May 8 and instructions to Mr. Jones, field geologist, the Rolfe well was surged by inserting a cylindrical surger with approximately 1/8 inch clearance inside the 8 inch casing and pulled with drilling line and tools. This operation was continued for a little over an hour during which time the overflow water developed a very muddy and silty mixture. At the end of the surging period approximately 6 feet of silt, fine sand, and the finer grades of gravel settled to the bottom of the well. This material was removed by bailing and when the water was completely cleaned a new pumping test started.

After more than one hour of pumping, the pump broke down and the test was discontinued. However, during this period of pumping the average production was 45 gallons per minute with a maximum drawdown to 85 feet.

A four-hour pumping test will be run May 10 as soon as the pump is repaired.

The above information is preliminary, based upon telegraphic communications with Mr. Jones tonight.

A. C. Tester

ACT:A
CC: A. E. Michel

Iowa City, Iowa
May 9, 1935

MEMORANDUM

TO: E. S. Boudinot

FROM: A. C. Tester

SUBJECT: Results of six-hour pumping test of Rolfe well May 7, 1935.

As reported to you verbally by telephone Wednesday, May 8, the pumping test on May 7 shows the results as tabulated below. The circumstances of the well are also summarized, as they have been changed slightly from previous tests.

Total Drilled Depth: 120 feet. Operating depth 110 feet. From 110 to 120 feet filled with clay and tamped. From 108 to 110 feet filled with gravel.

Screen: Base at 108 feet, top at 89 feet, 8" O.D.

Casing: 30" O.D. from 0 to 12 feet; 20" O.D. from plus 2 to 58½ feet; 8" I.D. permanent from 0 to 89 feet.

Gravel Pack: From 81 feet to 110 feet, surrounding screen from 89 to 108 feet.

Pump: Cylinder pump, 4'x4" O.D.; 3¾"x28" I.D.; set between 91½ and 95½ feet; 9 feet of 4" drop pipe, tail piece bottom at 104½ feet. Length of stroke 24 inches. Pump rod 2" pipe. Pulled by drilling jerkline. Pump capacity maximum 90 GPM.

Gauge of Water Depth: Air line and disk gauge.

Gauge of Volume: 70 gallon drum.

Water Level at Start of Test: 25 feet below curb.

Details of Test:

Time	GPM	Water Level (Below Curb)	Remarks
12:30 PM	28.0	25 ft.	Initial pumping rate. Water silty. SPM - 22.
1:00 PM	35.0	90	Strokes per min. 27. Water nearly clear.
1:15 PM	38.1	104	SPM - 30. Water clear.
1:40 PM	33.3	104	

Time	GPM	Water Level	Remarks
2:00 PM	35.0	104 ft.	SPM - 30.
2:20 PM	37.0	104	Pumping discontinued 2:23 PM.
2:25 PM	Pump stopped	92	
2:28 PM	Pump stopped	65	Pumping resumed 2:30 PM
2:30 PM	38.0	65	Water slightly silty. SPM - 29.
2:40 PM	38.0	90	
2:50 PM	38.0	104	Water nearly clear.
3:00 PM	35.0	104	SPM - 30. Water clear.
3:20 PM	32.0	104	SPM - 28.
3:40 PM	33.0	104	
4:00 PM	33.0	104	
4:20 PM	34.0	104	Pump stopped 4:40 PM.
4:42 PM	Pump stopped	92	
4:45 PM	Pump stopped	55	
4:50 PM	Pump stopped	30	This point 5' below static level. Pumping resumed 4:50 PM.
5:00 PM	43.7	80	SPM - 29. Water somewhat silty.
5:10 PM	40.0	85	Water Clearing
5:30 PM	34.4	104	SPM - 30. Water clear.
5:50 PM	34.0	104	
6:15 PM	34.5	104	Pumping discontinued.

Rise of water level: at 6:20 - 62' below curb; at 6:25 - 30' below curb; at 6:30 - 25' below curb (static level).

Water sample: taken just before stopping pump.

You will note that the capacity of this well was increased from an average of 17½-18 gallons per minute as of April 25 to an average of 34-35 gallons per minute. This was accomplished by lowering the position of the pump cylinder approximately 10 feet which reduced the drawdown to a position of approximately 104 feet below curb.

The pumping test made on May 2 and 3 showed and average of approximately 26 gallons per minute for 23-hour pumping test. This increase was accomplished by setting the cylinder approximately 18 feet lower and reducing the tail piece from 28 feet to 9 feet.

A. C. Tester,
Supervisor, Proj. 3-E6-1085

CC: A. E. Michel
V. H. Jones

Iowa City, Iowa
May 9, 1935

MEMORANDUM

TO: E. S. Boudinot

FROM: A. C. Tester

SUBJECT: Preliminary analysis of water sample from Rolfe well taken at 6:00 AM, May 3, after 17 hours of pumping.

	No. 95310
Total Solids	830.0
Susp. Solids	0.0
Diss. Solids	830.0
Insol. Matter	23.6
NO_2	.004
NO_3	0.0
Cl	13.0
SO_4	270.4
F	0.5
Alkal. (MeO)	398.0
Alkal. (phn)	0.0
Ca	160.8
Mg	60.5
Fe	0.75
HCO_3	485.6
Calc. Hardness	651.0

ACT:A
CC: A. E. Michel

A. C. Tester

Iowa City, Iowa
May 9, 1935

MEMORANDUM

To: E. S. Boudinot

From: A. C. Tester

SUBJECT: Size of gravel used to pack Rolfe well.

Screen Analysis:

Mesh per inch	Millimeter Grade	Per Cent
5	8-4	22.1
9	2-4	71.5
16	2-1	5.2
Pan	1-1/32	1.2
		100.0

Before the screen analysis was run the gravel was washed and approximately one per cent of silt removed.

A. C. Tester

ACT:A
CC: A. E. Michel

Iowa City, Iowa
May 8, 1935

MEMORANDUM

TO: E. S. Boudinot

FROM: A. C. Tester

SUBJECT: Final analysis of water sample taken from Rolfe well April 16 by bailer from producing zone between 101 and 107 feet. Total depth of well at time 120 feet.

	No. 94799
Total Solids	71,550.0
Susp. Solids	70,680.0
Diss. Solids	870.0
Insol. Matter	18.9
Alkal. (MeO)	419.0
Alkal. (phn)	0.0
R_2O_3	1.4
pH	7.3
N as NH_4	1.8
Alkalies (as Na)	78.3
Ca	150.9
Mg	49.0
Fe (filtered)	0.20
(unfiltered)	300.0
Mn	0.0
Al	0.6
Nitrites	0.040
Nitrates	0.80
F	2.0
Cl	8.0
SO_4	284.4
HCO_3	511.2
PO_4	0.35
BO_3	3.0
Calc. Hardness	579.0

A. C. Tester

ACT:A

CC: A. E. Michel

E. H. Mulock, chairman, des moines
Claude A. Clark, waterloo
Dr. T. C. Denny, des moines
J. H. Gribben, newton
Hon. N. G. Kraschel, harlan
J. C. Pryor, burlington
Hon. Frank E. Wenig, spencer
L. S. Wernli, sioux city

Ina T. Tyler, director of relief, I. S. E. R. C.
Geo. J. Keller, state engineer, W. D.

Iowa
Emergency Relief Administration

314 West 8th Street
DES MOINES

Address all Correspondence to the Office
Telephone 4-6201

Written at Rolfe
May 10, 1935.
7PM

Dr. A. C. Tester
Kirkwood Hotel
Des Moines, Iowa.

Dear Allen:

I have just received your letter of May 9, with the enclosed reports to Mr. Boudinot. I have noted the figures on your reports, and find that they correspond to my information. My daily drilling reports have shown the bottom of screen at 108' and gravel to 110'.

You will observe by the enclosed pumping report that my telegram of last evening was very conservative in reporting the well's capacity. The drum we have been using measures 70 gallons capacity, and our timing has been done with my watch which has a large second-hand dial.

We shall proceed with the completion of the well according to the specifications. I believe it will pump 75 gallons a minute with the water level above the top of the screen. I shall be ready for any new assignment when the project here is finished.

Yours sincerely,

Vic

to be mailed at Manson,

Des Moines, Iowa
May 13, 1935

MEMORANDUM

TO: E. S. Boudinot

FROM: A. C. Tester

SUBJECT: Result of four-hour pumping test of Rolfe, Iowa, well, May 9, 1935.

Pumping started at 11:15 A.M. and continued to 3:15 P.M. This work was done after the heavy surging for approximately one hour. You will note the increase in production and the significant raise of water-level. With the static head at 25 feet at the beginning of the test, a maximum draw-down of 45 feet to 70 feet below the curb at a rate of 67 gallons per minute was obtained. This is the highest water-level and production obtained in any of the pumping tests at Rolfe.

Total Drilled Depth: 120 feet. Operating depth 110 feet. From 110 to 120 feet filled with clay and tamped. From 108 to 110 feet filled with gravel.

Screen: Base at 108 feet, top at 89 feet, 7½" O.D.

Casing: 30" O.D. from 0 to 12 feet; 20" O.D. from plus 2 to 58⅓ feet; 8" I.D. permanent from 0 to 89 feet.

Pump: Cylinder pump, 4'x4" O.D.; 3¾"x28" I.D.; set between 91⅓ and 95⅓ feet; 9 feet of 4" drop pipe, tail piece bottom at 104⅓ feet. Length of stroke 24 inches. Pump rod 2" pipe. Pulled by drilling jerkline. Pump capacity maximum 90 GPM.

Gauge of Water Depth: Air line and disk gauge.

Gauge of Volume: 70 gallon drum

Water Level at Start of Test: 25 feet below curb.

Details of Test:

Time	GPM	Water Level (Below Curb)	Remarks
11:15 AM	42.0 GPM	25'	First water very muddy. SPM - 29
11:30 AM	45.0 GPM	60'	Water silty, clearing. SPM - 30

Time	GPM	Water Level (Below Curb)	Remarks
11:45 AM	42.0 GPM	60'	Water somewhat silty.
12:00 M	46.0 GPM	60'	SPM - 32
12:30 PM	46.0 GPM	62'	Water slightly silty.
1:00 PM	46.5 GPM	62'	Water nearly clear.
1:30 PM	43.0 GPM	64'	
1:45 PM	47.0 GPM	64'	SPM - 34
2:00 PM	58.0 GPM	68'	SPM - 38. Water much more silty.
2:30 PM	58.0 GPM	60'	Water level steady. Water still silty.
3:00 PM	58.0 GPM	60'	Water clearing. Water Sample taken.
3:05 PM	67.0 GPM	70'	SPM - 42
3:10 PM	60.0 GPM	67'	SPM - 39

At the end of the pumping test the water level returned to 28 feet below curb in six minutes, indicating a rapid recovery and a free passage of the water through the sandstone bed into the well. This suggests that the drilling mud and the fine sand and gravel has been fairly well cleared out of the formation and the gravel pack. During this pumping test the water did not become entirely clear of mud and fine silt, although there were short periods when it approached a satisfactory condition. It is believed that subsequent pumping will remove this slight muddy condition, and the water will be entirely satisfactory.

It appears that a capacity of 50 gallons per minute can be easily maintained with a draw-down to approximately 55 to 58 feet below the curb, or 30 to 33 feet below the static level.

A. C. Tester
Assistant State Geologist
Supervisor, Proj. S-E6-1085

ACT:K

Iowa City, Iowa
May 15, 1935

MEMORANDUM

TO: E. S. Boudinot

FROM: A. C. Tester

SUBJECT: Result of final ten-hour pumping test of Rolfe, Iowa, gravel pack well, May 13 and 14, 1935.

In accordance with our understanding, the final pumping test was run for a duration of ten hours after pulling of temporary ~~pack~~ pipe, packing of gravel and clay, and cementing for sanitary purposes were completed. The information indicated below is similar to the data obtained from the pumping test of May 9, except that the water production is not quite as great as shown in the four-hour pumping test just mentioned.

Several reasons may be given to explain the smaller production in this last pumping test: (1) the rate of pumping was distinctly slower, as indicated in a comparison of strokes per minute developed; (2) the bottom of the pump was at a higher position than in the former test and no tail piece was used during the last test; (3) the attempt was to maintain a uniform level or drawdown of water below the curb and to reduce the heighth of the lifting column to the minimum amount but still produce the average requirements for water.

Total Drilled Depth: 120 feet. Operating depth 110 feet. From 110 to 120 feet filled with clay and tamped. From 108 to 110 feet filled with gravel.

Screen: Base at 108 feet, top at 89 feet, 7½" O.D.

Casing: 8" O.D. permanent from 0 to 89' (2½ feet of 8" O.D. to be added at top when well completed); screen 7½" O. D. from 89' to 108'.

Pump: Cylinder pump, 5'x6" O.D.; 5¾"x28" I.D., set between 81 and 86'; no tail piece. Length of stroke 24". Strokes per minute between 26 and 29. Pump rod of 2" pipe. Pulled by drilling jerk line. Capacity of pump approximately 200 gallons per minute.

Conductor Pipe: 6" drop pipe from surface outlet to top of screen at 89 feet.

Gauge of Water Depth: Air line and disk gauge.

Gauge of Volume: Timing flow into 70 gallon drum.

Water Level at Start of Test: 25 feet below curb.

Details of Test:

Time	GPM	Water Level (Below Curb) Feet	Remarks
9:15 PM	53.0	25	SPM 29. Water brownish, silty
9:45 PM	45.5	85	Water nearly clear.
10:15 PM	45.5	85	Water clear.
10:45 PM	46.0	85	Pumping air.
11:15 PM	46.0	85	SPM 28.
11:45 PM	46.0	85	
12:15 AM	46.0	85	
12:45 AM	45.0	85	
1:15 AM	45.0	85	
1:45 AM	45.0	85	Water clear.
2:15 AM	45.5	85	
2:45 AM	45.5	85	
3:15 AM	46.0	85	SPM 26. Water clear.
3:45 AM	45.0	85	
4:15 AM	46.0	85	
4:45 AM	45.0	85	
5:15 AM	45.0	85	
5:45 AM	45.0	85	Water clear
6:15 AM	46.5	85	Water sample taken.
6:45 AM	45.0	85	
7:15 AM	45.0	85	

When the pumping test was completed, the water returned to the static level of 25 feet below the curb in 5½ minutes, indicating again the rapid recovery of the well and the adequacy of the supply. By setting the base of the pump cylinder at 89 feet and putting on a 7 to 10 foot tail piece and increasing the speed of pumping, the production can be increased to at least 55 gallons per minute and possibly 60 gallons perminute, as indicated by the pumping test of May 9. In fact, it appears that a slighly accelerated pumping rate creates a better water circulation than the slow pumping rate used in the last test.

Water samples have been taken during each pumping test, and the preliminary analysis for the sample taken on May 7 is shown below.

	No. 95354 110' T.D.
Total Diss. Solids	845.0
Insoluble Matter	56.0
NO_2	0.004
NO_3	0.0
Cl	18.0
SO_4	267.0
F	1.0
Alkal. (MeO)	410.0
Alkal. (phn)	0.0
Ca	172.0
Mg	50.0
Fe	0.8
HCO_3	500.0
Calc. Hard.	637.0

The well has been plugged and is now considered a completed project so far as the field supervision is concerned.

A. C. Tester,
Assistant State Geologist
Supervisor, Proj. S-E6-1085

CC: A. E. Michel
V. H. Jones
V. H. Green

C
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y

Iowa Emergency Relief Administration
Des Moines

Written at Rolfe, Iowa
May 15, 1935

Pocahontas County

Action of the town council of Rolfe in disapproving of the well is official, as I explained by 'phone this morning. Mr. Peterson has been instructed not to install the new Keystone pumphead on the new well, and to postpone construction of a pumphouse. By talking with the water superintendent and a member of the council, I learned that Mr. George Thorpe advised them against installing a pump on the new well with the drop-pipe extending into the screen. His reasons were vague. His "ideal water supply for Rolfe," it seems, would be a deep well. He did not criticize the new well, exactly (considering the contractor), but simply explained in a friendly way to the councilmen what the best possible well for Rolfe might be.

The erroneous impression you received from our telephone conversation Monday was entirely inadvertent on my part. I did not state specifically that the mast had been lowered on the machine, but said only that it was being prepared for moving. I am sorry that a misunderstanding arose and shall be careful to give exact information concerning future assignments.

Victor H. Jones

E. H. Mulock, chairman, des moines
Claude A. Clark, waterloo
Dr. T. C. Denny, des moines
J. H. Gribben, newton
Hon. N. G. Kraschel, harlan
J. C. Pryor, burlington
Hon. Frank E. Wenig, spencer
L. S. Wernli, sioux city

Ina T. Tyler, director of relief,
I. S. E. R. C.
Geo. J. Keller, state engineer, W. D.

Iowa
Emergency Relief Administration

314 West 8th Street
DES MOINES

Address all Correspondence to the Office
Telephone 4-6201

Written at
Rolfe, Iowa
May 15, 1935

Professor A. C. Tester
Iowa Geological Survey
Iowa City, Iowa

Dear Tester;

This letter accompanies the water sample report and confirms telephone conversations of yesterday and today.

Only incomplete information on the 230-foot well now in use is available here at Rolfe. Its depth is about 230 feet, according to Mr. Peterson, Water Superintendent. The casing is 8 inches in diameter, and extends to a depth of about 130 feet. The pump is double action cylinder type with the bottom of the drop-pipe about 125 feet below curb. With a normal pumping rate of 45 gallons per minute this pump is operated from 10 to 15 hours per day to supply the needs of the town. This well has been used about 6 months continuously after lying idle for some years. In compliance with your telegram received at noon today, I have shipped a water sample from this well.

Action of the town Council of Rolfe in disapproving of the well is official, as I explained by phone this morning. Mr. Peterson has been instructed not to install the new Keystone pumphead on the new well, and to postpone construction of a pumphouse. By talking with the water superintendent and a member of the council I learned that Mr. George Thorpe advised them against installing a pump on the new well with the drop-pipe extending into the screen. His reasons were vague. His "ideal water supply for Rolfe", it seems, would be a deep well. He did not criticize the new well, exactly, (considering the contractor), but simply explained in a friendly way to the councilmen what the best possible well for Rolfe might be.

The erroneous impression you received from our telephone conversation Monday was entirely inadvertant on my part. I did not state specifically that the mast had been lowered on the machine, but said only that it was

being prepared for moving. I am sorry that a misunderstanding arose and shall be careful to give exact information concerning future assignments.

I am preparing to leave Rolfe late this evening or early Thursday morning. On the way to Perry I shall stop at the Wiggins oil prospect well near Jefferson to learn of recent progress there. Send mail to General Delivery at Perry until I send you an exact address.

I am preparing a final report on the well project just completed here at Rolfe, but it is not ready for the mail today. My determination of the altitude at the new well is 1173 feet.

Yours sincerely,

Vic Jones

3-foot piece of 8" casing and cap for well have not yet been received. 4 P.M.

June 13, 1935

Mr. A. B. Michel
Chief Engineer
Iowa Emergency Relief Admin.
O F F I C E

Dear Mr. Michel:

On May 14, the well at Rolfe, Pocahontas County, was completed following a series of developments and pumping tests. Previous communications to you give the full details concerning these pumping tests and the material should be carefully summarized in reviewing the situation. The pumping tests of May 2 and 3, May 7, May 9, and May 13 and 14 show an interesting history of development. The pumping test on May 9, following the surging operations, if of especial interest, and is also the pumping test made on May 13 and 14.

Immediately after the surging operation on May 9, a pumping capacity of 60 gallons per minute was obtained with a drawdown of 35 feet to 60 feet below the ground surface from a static level of 25 feet below the ground surface. At this time, the 4-inch O.D. pump cylinder was set between 91½ and 95½ feet with 9 feet of 4-inch drop pipe and with a tail piece bottom at 104½ feet.

In the 10-hour pumping test started May 13, a 6-inch O.D. cylinder pump was set between 81 and 86½ feet with no tail piece. This test produced 45 gallons per minute for 9½ hours of pumping with a drawdown to 85 feet maintained constantly. In other words, the water was one foot higher than the bottom of the pump cylinder and the pump could not suck air. At the close of the pumping test, the water returned to the static level of 25 feet below the curb in 5 minutes, which indicates a free flow of water, providing a rapid recovery of the well after pumping. In my report on this test, I stated that the production could be increased to at least 55 gallons per minute and possibly 60 gallons per minute by setting the pump cylinder at 89 feet and putting on a 7 to 10 foot tail piece below the pump. This setting would place the pump above the screen and only the tail piece would enter the screened area, and should not in any way contact the screen and interfere or damage the screen. I believe

that this information should be brought to the attention of the council at Rolfe.

On an accompanying sheet, I have summarized the analyses of the water samples taken from the Rolfe well at various periods of development and pumping, and as a matter of comparison, Analysis No. 5 is of water taken from the 230-foot well now supplying the town. Two important facts may be noted by comparing these analyses. First, the quality of the water taken from the new well shows a marked improvement from the first sample to the last sample, which means that the operation in the well was cleaning out much of the pulverized rock material that contributes to the quality of the water, and that a better circulation is developed in the aquifier surrounding the new well. The second interesting fact, is that the water from the old 230-foot well is similar to the water from the new well, and in some respects shows a better quality. This suggests that at least a part of the water produced in the old well is being obtained from the same water zone, which is producing for the new well, and that it is being diluted by a softer water, which is probably coming from the upper water-bearing sand lying just below the surface soil.

No log is available on the old 230-foot well, so it is uncertain what type of formation may contribute below 120 feet of depth. The water supplied by this well has never been criticized by the town, so far as quality is concerned; and as the analysis shows, it is a good water but slightly hard.

The 640-foot well drilled in 1924 and abandoned in the summer of 1934, is the well that has given so much trouble from the standpoint of quality. This water ran high in iron and sulphates which corroded the pipe badly and apparently caused staining of fixtures and was difficult to use for laundry purposes.

At the time the field geologist made the investigation in Rolfe the last week of October, 1934, the Water Superintendent reported that the 230-foot well was pumped on an average of 12 hours per day and produced approximately 23 gallons per minute, which just met their normal requirements for water; and that the summer requirements were about 50 per cent more. The present production of this well is rated by the Water Superintendent at approximately 50 gallons per minute with a drawdown to 120 feet below the surface and good for about 6 hours of pumping. It would seem that the new well with a production of 45 gallons per minute with a drawdown to 85 feet below the surface and good for 10 hours, would be useful as a replacement for the old well, and with the additional advantage of being

able to produce approximately 60 gallons per minute with a drawdown to 105 feet

Mention has been made in a previous paragraph that the 230-foot well is probably gaining some of its water from an upper formation. If this is the case, as comparative drawdown records indicate, then the pipe is not sealed properly at the base, or it is perforated by corrosion to admit this water. Such a source of water may become contaminated from sewers and septic tanks, and surface run-off. I believe the town of Rolfe should be warned against this possibility and their attention should be called to the fact that the new well is so constructed that such surface or near surface contamination can not occur. The new well is a better well from the standpoint of quantity of water and cost of production, and is without question, one of the finest wells from the standpoint of sanitary protection that could be constructed, and the town should take advantage of this situation.

Very truly yours,

A. C. TESTER
Assistant State Geologist
Supervisor, Proj. S-E6-1085

ACT:K

CC: B. H. Greene
E. S. Boudinot

Written at Iowa City

June 22, 1935

Mr. B. H. Greene
Utilities Engineer
Iowa Emergency Relief Administration
Des Moines, Iowa

Dear Mr. Greene:

Your letter of June 20 addressed to Mr. Boudinot came to my attention in proper time.

With reference to the second paragraph of your letter in which you state that the Council at Rolfe claims that I practically promised the town of Rolfe a one-hundred gallon per minute well, I wish it emphatically understood that no such promise was made by me or any of my representatives. When the test well was completed and we developed a production of thirty-five gallons per minute, we recognized that this formation would yield in a properly constructed well sufficient water for the town, and our estimate was that between forty-five and fifty gallons per minute would be adequate. A geologist often makes estimates of expected production based upon probabilities and the history of the formation in other wells, but most geologists are too conservative to make promises. It is very true, as you state, that there are elements of uncertainty and chance in the bringing in of a certain quantity of water. It is, however, true that our final well followed very closely the test well with the one exception, and that is that the basal sand is thicker in the developed well than in the test well and the bedrock is approximately sixteen feet deeper in the last well drilled.

I agree with you that the experience we have had with Rolfe is exasperating and that we all wish to close the incident in the most satisfactory manner possible, but at the same time we need not consider it a tragedy. After reading your statement that the city owns two separate sets of pumping equipment, one of which is now idle, and could be installed on the new well, it begins to look as though Rolfe is pulling some sort of slap-stick comedy.

Yours very truly,

A. C. Tester

ACT:A
CC: E. S. Boudinot

Iowa
Emergency Relief Administration
314 WEST EIGHTH STREET
TELEPHONE 4-6201
DES MOINES

June 26, 1935

Dr. A. C. Tester
Assistant State Geologist
Iowa Geological Survey
Geology Building
Iowa City, Iowa

Dear Dr. Tester:

In a conference with Mr. Greene this morning, it was decided upon receipt of your copy of his letter of June 20, relating to the Rolfe well, and the surrender of my letter to you, a new report will be made. This report will eliminate any reference to the number of gallons of water per minute promised, and all reference to the last paragraph of his report of June 20.

Will you kindly forward to me your copy of Mr. Greene's report and the letter I wrote June 21. A copy of the revised report will be mailed to you.

Very truly yours,

E. S. Boudinot

E. S. BOUDINOT, Engineer (K)
Water Conservation and
Drought Relief Program

ESB:K
CC: H. H. Greene

Dr. Tester

July 11, 1935

J. H. Brinkman, Mayor
Rolfe, Iowa

Re: I.E.R.A. Well
Rolfe, Iowa

Dear Sir:

Your letter of June 22 came while I was out of the city.

In regard to the well situation at Rolfe, I wish to give you some of the principal facts concerning this well. On May 14 the IERA well was completed following a series of developments and pumping tests. The pumping test on May 9 following the surging operations is of special interest, as is also the pumpting tests made on May 13 and 14. I will quote directly from the report made by Dr. A. C. Tester, Assistant State Geologist, regarding the well:

"Immediately after the surging operation on May 9, a pumping capacity of 60 gallons per minute was obtained with a drawdown of 35 feet to 60 feet below the ground srface from a static level of 25 feet below the ground surface. At this time, the 4 inch O.D. pump cylinder was set between 91½ and 95½ feet with 9 feet of 4 inch drop pipe and with a tail piece bottom at 104½ feet.

"In the 10 hour pumping test started May 13, a 6 inch O.D. cylinder pump was set between 81 and 86½ feet with no tail piece. This test produced 45 gallons per minute for 9½ hours of pumping with a drawdown to 85 feet maintained constantly. In other words, the water was one foot higher than the bottom of the pump cylinder and the pump could not suck air. At the close of the pumping test, the water returned to the static level of 25 feet below the curb in five minutes, which indicates a free flow of water, providing a rapid recovery of the well after pumping. In my report on

this test, I stated that the production could be increased to at least 55 gallons per minute and possibly 60 gallons per minute by setting the pump cylinder at 89 feet and putting on a 7 to 10 foot tail piece below the pump. This setting would place the pump above the screen and only the tail piece would enter the screened area, and should not in any way contact the screen and interfere or damage the screen.

"On an accompanying sheet, I have summarized the analyses of the water samples taken from the Rolfe well at various periods of development and pumping, and as a matter of comparison, Analysis No. 5 is of water taken from the 230 foot well now supplying the town. Two important facts may be noted by comparing these analyses. First, the quality of the water taken from the new well shows a marked improvement from the first sample to the last sample, which means that the operation in the well was cleaning out much of the pulverized rock material that contributes to the quality of the water, and that a better circulation is developed in the aquifier surrounding the new well. The second interesting fact, is that the water from the old 230 foot well is similar to the water from the new well, and in some respects shows a better quality. This suggests that at least a part of the water produced in the old well is being obtained from the same water zone, which is producing for the new well, and that it is being diluted by a softer water, which is probably coming from the upper water-bearing sand lying just below the surface soil.

"At the time the field geologist made the investigation in Rolfe the last week of October, 1934, the Water Superintendent reported that the 230 foot well was pumped on an average of 12 hours per day and produced approximately 23 gallons per minute, which just met their normal requirements for water; and that the summer requirements were about 50 per cent more. The present production of this well is rated by the Water Superintendent at approximately 50 gallons per minute with a drawdown of 120 feet below the surface and good for about 6 hours of pumping. It would seem that the new well with a production of 45 gallons per minute with a drawdown to 85 feet below the surface and good for 10 hours, would be useful as a replacement for the old well, and with the additional advantage of being able to produce approximately 60 gallons per minute with a drawdown to 105 feet.

"Mention has been made in a previous paragraph that the 230 foot well is probably gaining some of its water from an upper formation. If this is the case, as comparative drawdown records indicate, then the pipe is not sealed properly at the

base, or it is perforated by corrosion to admit this water. Such a source of water may become contaminated from sewers and septic tanks, and surface run-off. I believe the town of Rolfe should be warned against this possibility and their attention should be called to the fact that the new well is so constructed that such surface or near surface contamination can not occur. The new well is a better well from the standpoint of quantity of water and cost of production, and is without question, one of the finest wells from the standpoint of sanitary protection that could be constructed, and the town should take advantage of this situation."

It is my understanding that you have been furnished with the summary of the water analyses of the well, and I am, therefore, not attaching a copy of these reports.

As you must appreciate, the drilling of wells even under the most favorable conditions and the use of test holes, still has elements of uncertainty and chance in the bringing in of a certain quantity of water. As stated by your Plant Superintendent, your old well was pumped on an average of 12 hours per day, and produced approximately 25 gallon per minute, or slightly over 16,000 gallon per day. As you will note from the pumping record of the new well this produced 45 gallon per minute with a drawdown maintained at a constant head during a 12 hour pumping period. This would produce over 32,000 gallon of water which is considerably more than ample to take care of your needs. This undoubtedly is not the maximum production of the well, and more water could probably be obtained with the proper pumping equipment installed, including tail piece to the pump.

The Emergency Relief Administration's entrance into the picture was purely to alleviate drought conditions. Inasmuch as the drought condition does not exist any longer, and most of the funds appropriated for this purpose have been expended, our program of well drilling is ended. You will, therefore, consider your well program absolutely closed as far as the Iowa Emergency Relief Administration is concerned.

Yours very truly,

A. E. Michel
Chief Engineer

AEM:G
CC:E.S. Boudinot, Engr.
B. H. Greene, Engr.
A. C. Tester, Ass't.
State Geologist, Iowa City

Mr. Tester

June 20, 1935.

E. S. Boudinot, District Engineer,
Iowa Emergency Relief Administration,
B U I L D I N G

SUBJECT: Acceptance of Rolfe Well by the Town of Rolfe

Dear Sir:

On Wednesday, June 19th, while in my district I spent about two hours with the Mayor and Town Council of Rolfe endeavoring to get them to see the light, and pass a resolution to accept the well, as a 45-gallon per minute well. I did not succeed.

This group seemed very disappointed that you and Doctor Tester did not secure a 100-gallon per minute well for them. I did my best to assure them that drilling wells even under the most favorable conditions of exploration, using test holes, still had elements of uncertainty and chance in the bringing in of a certain quantity of water. I believe that they realize this down in their hearts but cannot get over their disappointment in this particular case.

I told them that you had assured me emphatically that you were finished with the Rolfe job and that your program there was absolutely closed.

Since this matter has gone as far as it has and it has become necessary to call the Council together as I did and to transmit to them what you told me concerning the absolute stopping of the work at Rolfe, I shall expect you to abide by what you told me and to not re-open the Rolfe job. I say this for several reasons, one of which is the fact that I delivered your message as I have stated above, and sponsored it, and therefore having acted in good faith I expect this job to be definitely closed, otherwise I would be placed in the embarrassing position of being a polished liar, which I am not. Another reason is the fact that the Town of Rolfe has done nothing to help themselves out in this emergency, not even to the extent of raising their water rates or otherwise, but have taken the part of critics on the side-lines. I mentioned this fact to them, and they did not deny it. They also admit that they realize the water rate must be raised but felt that it would be better to do it after a copious supply of water was available. To my mind this line of reasoning is entirely incomprehensible.

A still further reason which I have for leaving them alone is the fact that they now have two wells, each of which is capable of producing more than 40 gallons per minute continuously; they have two separate sets of

(over)

pumping equipment, one of which is now idle in the abandoned well, and which could be installed in the new well without a great deal of expense, and the fact that I stand ready as district engineer to assist them with work relief labor, and some material to connect up the new well and to build a small pump houseower it.

In view of the above situation I do not feel that Rolfe has any further claim or justification for expecting us to spend any more money on wells or well development. That activity should be their own responsibility in the future.

I believe that formal acceptance of the new well could be had if you will write to the Mayor and Council and explain clearly, concisely, and definitely that your program of well drilling (at least insofar as Rolfe is concerned) is ended and that you have no further money or authority to do anything more for them in the well line. The Mayor asked me to have you send him this letter so that he and the Council can have something to exhibit in the event that their constituents or critics attack them for the acceptance of the well. I, personally, do not see any reason why there would be any danger of sending them such a letter and I am requesting that you get it to them just as quickly as possible so that they will have definite knowledge of your intention to do no more well work in Rolfe.

Yours very truly,

B. H. GREENE,
Utilities Engineer.

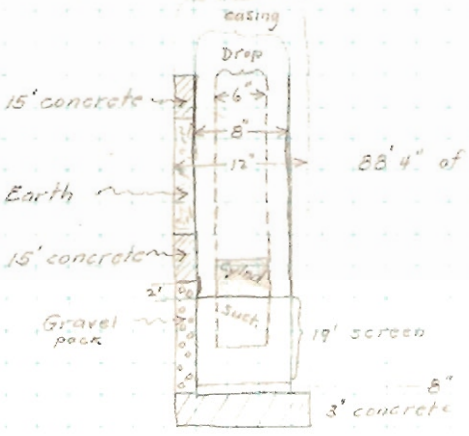
BHG/db
cc--A. E. Michel, Chief Engineer
Dr. A. C. Tester

John C. Moore Corporation, Rochester, N.Y. Binder and holes in leaves, each Patented 1905. 390345

MOORE'S MODERN METHODS

Ralfe, Pocahontas Co.
Town well - Information from L. P. Peterson - Water Supt.
Jan. 28, 1937

One block N. 2 blocks E of center of town
Information from L.P. Peterson, Supt. of Water, Marshall.
Depth 108' with 3' of concrete below.
Drilled 1935 by Thorpe Bros., after testing
Static level 25'
Drawdown 28' ± est. in about 5 min. est.
Well casing 8" dia. to 88' 4" ± with 19' brass screen screwed in which is 8" off bottom
Cylinder 5¾ dia, 64" long, (18" stroke - measured)
with 6'-8' suction. Bottom of cylinder at 88' ±
Now running 13 hrs per day. 17½ strokes per min. 42 gpm.



Water has H_2S odor
Air 41
Water 49 (10' away)

88' 4" of 8" casing

Curb elev = 11?
Jug G-15

Section: All yellow clay - no gravel
Pumping test. "44 gpm. made well suck air clerk, F.E. Grant
Static level 25' drawdown 28'-30' at 45 gpm in 5' min.
Pumping test 24 hrs — No figures
Well accepted under protest (clerk)

When both wells pump new one lasts 45 min. then pounds.
Keystone pump. Run by Century 10 HP 3 ph. 60 c 220 v 25 amp.

Test well 41' SSE showed 42' gravel above 108', where ls. was struck. Pumped 60 gpm with 20' drawdown from 25' static level.

Saw clerk & mayor — No figures on pump set or well.

Information from memory - See more accurate report in this file.

August 19, 1935

Dr. Victor H. Jones
General Delivery
Jefferson, Iowa

Dear Vic:

Your letter of August 12 in which you acknowledge the $20 loan and the various salary and expense account checks.is received.

I was interested to note that the town of Rolfe is building a new pumphouse over the new well. I thought that this would be done in due course of time and that they would finally appreciate the value of this well and the advantage of using it instead of the old well. It is interesting, however, that nothing has been said of this project at Des Moines. I do not know if they are familiar with the situation although I imagine that work relief is assisting with the construction work.

Yours very truly,

A. C. Tester

ACT:ML