WRD Exp. (GW)
Aug. 1964
Verified PMJ 1/W

U. S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

Record by D. A. AARONSON Source of data FILE Date 7/13/65 Map JEFFERSON, IA 1:62,500

State IOWA 16 County (or town) GREENE 31

Latitude: 42 05 18 N/S Longitude: 094223 Sequential number: 1

Lat-long accuracy: 2 T. 83 N/S R. 30 E/W Sec. 6, NW¼, NW¼, SW¼ 5

Local well number: 083300 DBCBB Other number: W-4914 B & M

Local use: C49119 51 CITY 3 Owner or name: JEFFERSON CITY WELL

Owner or name: JEFFERSON IOWA Address: JEFFERSON, IA

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

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 P

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

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

Hyd. lab. data:

Qual. water data; type: COMPLETE C

Freq. sampling: INTERMITTENT I Pumpage inventory: yes / no, period:

Aperture cards: yes

Log data: GEOLOGIST LOG - DRILLER'S LOG D

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 2307 ft 2307 Meas. rept 6

Depth cased; (first perf.) 1795 ft 1795 Casing type: STEEL ; Diam. 12 in accuracy 12

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

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

Date Drilled: OCT 1950-AUG 1955 9 51 Pump intake setting: 510 ft 51 C

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

Lift (type): (A) air, (B) bucker, (C) cent, (J) jet, (L) multiple, cent., (M) multiple, turb., (N) none, (P) piston, (R) rot., (S) submerg., (T) turb, (Z) other Deep Shallow D

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

Descrip. MP LSD 0 ft above / below lsd, Alt. MP 1065

Alt. LSD: 1065 1065 Accuracy: (source) ALTIMETER

Water Level 78.6 ft above / below MP; Ft above / below lsd 79 Accuracy: REPORTED

Date meas: AUG 1951 8 51 Yield: 375 375 Method determined

Drawdown: 378 ft 378 Accuracy: REPT E Pumping period hrs

QUALITY OF WATER DATA: Iron 5.93 ppm 7 Sulfate 418 ppm 7 Chloride 97 ppm 2 Hard. 234 ppm

Sp. Conduct 1590 K x 10⁶ 5 Temp. 60 °F 60 Date sampled DEC. 1960 D 6 0

Taste, color, etc.

083-30W-08 c b1

Well Number 42,00,51 (N) 094,22,33 (W)
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD (1-19)

Physiographic Province: CENTRAL LOWLAND (20-21: 12) Section: WESTERN LAKE (22: B)

Drainage Basin: RACCOON (23-25: 25A) Subbasin: (26)

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

MAJOR AQUIFER: CAMBRIAN (system), UPPER (series) (28-29: C3) JORDAN SANDSTONE (aquifer, formation, group) (30-31: SJ)

Lithology: COARSE SANDST. (32-33: SV) Origin: MARINE (34: E) Aquifer Thickness: 60 ft

(35-37: 60) Length of well open to: 60 ft (38-40: 60) Depth to top of: 2055 ft (41-43: 206)

MINOR AQUIFER: CAMBRIAN (system), UPPER (series) (44-45: C3) FRANCONIAN ST LAWRENCE (aquifer, formation, group) (46-47: SF)

Lithology: DOLOMITE (48-49: D) Origin: MARINE (50: E) Aquifer Thickness: ft

(51-53:) Length of well open to: 200 ft (54-56: 200) Depth to top of: 2100 ft (57-59: 210)

Intervals Screened: NONE

Depth to consolidated rock: 148 ft (60-63:) Source of data: WELL-CUTTING (64:)

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

Surficial material: SAND, CLAY (70-71: S) Infiltration characteristics: POOR (72:)

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

Coefficient Perm: gpd/ft^2; Spec cap: .99 gpm/ft; Number of geologic cards: (79:)

CASING:
260' 12" 0-260'
3891 10" SET AT 602'
1215' 8" SET AT 1795'
107'2" OF 6" FROM 2020'10" TO 2128' PERFORATED
FROM 2021' TO 2105'.

8

REVERSE ROTARY FROM SURFACE TO 400', CABLE TOOL TO BOTTOM 2500 GAL ACID F[illegible] 1796'-BOTTOM.
SHOT FROM 2070-2105.

4914

Name: Jefferson city well (1951)

Loc: NW NW SW sec. 8-83N-30W, Greene Co.

Drilling depth: 745± base Maple Mill

Drilled: by Thorpe Oct 1950 - Aug 1951

Log: W-4914 Northup & Screven

Remarks: Well was completed in Franconia at 2307'

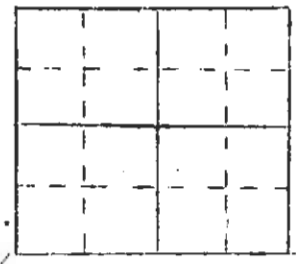
Elevation 1065'

Formations	Depth	Top	Base
Top Miss.?	350?		
Maynes Crk.	640		
Chapin	700		
Maple Mill	722		

W-4914

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

RECORD OF WELL



Location:

Town: Jefferson (N E) (S W): County Greene

NW NW SW sec. 8 T. 83 N., R. 30 W. Twp.

Well name and number Jefferson Town Well 1951

Owner Town of Jefferson Address

Tenant Address

Contractor Thorpe Well Co. Address Des Moines

Drillers Ed Egan & Cecil Alan

Drilling dates 1951

Well data:

Elevations: Drilling curb feet: Land surface 1065 feet

Determined by N.L. from USGS

Topographic position Upland

Total depth: Reported 708 feet, Measured feet

Drilling method Cable tool

Hole and casing data 260' of 12" csg set at 260'

378' of 10" csg set at 602'

1215' of 8" csg set at 1795

8" open hole to 2308

Original depth to water ft. above / below Date

Original elevation of water level ft.; Source of data

Sources of water: Principal ; Others

Production data: Date _____

Static depth to water 54 Measuring point L.S

Pumping level 457 at 375 g.p.m.

_____ _____

_____ _____

_____ _____

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

Pump data: Type pump _____ Column Dia. _____ Length _____

Cylinder or bowls: Dia. _____ Length _____ Suction pipe _____

Power _____ Airline _____

Estimated rate or productions: _____ g.p.m. for _____ hrs. a day

Use of water _____

WATER ANALYSES (in parts per million)

Date samples				
Samples by				
Total solids				
Insoluble matter				
Alkalinity (Meo)				
Alkalinity (Phn)				
pH				
$Fe_2O_3 + Mn_2O_3 + Al_2O_3$				
Alkali as sodium				
Calcium				
Magnesium				
Iron (unfiltered)				
Manganese				
Nitrate				
Fluoride				
Chloride				
Sulfate				
Bicarbonate				
Hardness (ppm)				
Hardness (gpg)				

Remarks _____

Laboratory data: 415-17', 426-46', 482-90', 600' June 11, 1951 Sample storage location _____

Sample range 615-2305' No. spls. _____ No. dupls. & cond. _____

Spls. prepared by _____ Washed range _____ by _____

Driller's log and cond. _____

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

Microscopic study _____ strip log June 1951

Gen. log _____ Correl. by NORTHUP

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Local Well No. 083-30W-08CBB
Aquifer Code(s) C3SJ C3SF
Owner's Name JEFFERSON CITY #3 (1951)
W Number 04914

Water Quality
(ppm)

Card Q

State: IOWA [19] (1 2) County: GREENE [37] (3 4) Town: JEFFERSON, IOWA

Well No. Latitude [420051N] (5–11) Longitude [0942233] (12–18) Seq. No. [1] (19) Date M D Y [11 27 56] (20–25)

Sampling Depth [2307] (26–29) Type [ ] (30) Kx10^6 [1570] (31–35) pH [8.1] (36–38) Temp. °F [60] (39–41)

SiO_2 [16.] (42–44) Ca [53.] (45–49) Mg [33.] (50–53) Na [255.] (54–58) K [18.] (59–61)

HCO_3 [290] (62–65) CO_3 [0] (66 67) SO_4 [444.] (68–72) Cl [100.] (73–78) Source No. [3] (79) [Q] (80)

Card R

Duplicate Columns 1-25 from Card Q

F [3.9] (26–28) NO_3 [4] (29–32) PO_4 [ ] (33–35) B [ ] (36–38) Al [ ] (39–41) Fe [.05] (42–45)

Mn [.06] (46–49) Cu [ ] (50–52) Pb [ ] (53 54) Zn [ ] (55–57)

Solids Determined [1070] (58–63) Calc. [ ] (64–69) Hardness Ca,Mg [268] (70–73) Non-Carb. [30] (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 $CaCO_3$ [238] (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. [S] (80)

Recorded by: D. AARONSON

Punched by: _____ Date: _____

Published: _____

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 083-30W-08CBB
Aquifer Code(s) C35S C35F
Owner's Name JEFFERSON CITY #3 (1951)
W Number 04914

Card Q

State: IOWA [19] (1 2) County: GREENE [37] (3 4) Town: JEFFERSON, IOWA

Well No. Latitude [420051N] (5–11) Longitude [094223 3] (12–18) Seq. No. [1] (19) Date M D Y [100652] (20–25)

Sampling Depth [2307] (26–29) Type [1] (30) Kx10⁶ [17 60] (31–35) pH [7.5] (36–38) Temp. °F [ ] (39–41)

SiO_2 [.] (42–44) Ca [149.] (45–49) Mg [62.] (50–53) Na [230.] (54–58) K [35.] (59–61)

HCO_3 [256] (62–65) CO_3 [0] (66 67) SO_4 [789.] (68–72) Cl [98.] (73–78) Source No. [3] [Q] (79 80)

Card R

Duplicate Columns 1-25 from Card Q

F [2.6] (26–28) NO_3 [35.] (29–32) PO_4 [.] (33–35) B [.] (36–38) Al [.] (39–41) Fe [.8] (42–45)

Mn [0.] (46–49) Cu [.] (50–52) Pb [ ] (53 54) Zn [.] (55–57)

Determined Solids [1580] (58–63) Calc. [ ] (64–69) Ca,Mg Hardness [627] (70–73) Non-Carb. [417] (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 $CaCO_3$ [210] (32–35) Free CO_2 [ ] (36–38) SAR [.] (39–41)

RSC [ ] (42–44) ABS [.] (45–47) [.] (48–50) [ ] (51–54)

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

No. [S] (80)

Recorded by: D. AARONSON

Punched by: _____ Date: _____

Published: _____

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Local Well No. 083-30W-08 CBB
Aquifer Code(s) C35J C35F
Owner's Name JEFFERSON CITY #3 (1951)
W Number 04914

Water Quality
(ppm)

Card Q

State: IOWA (19) County: GREENE (37) Town: JEFFERSON, IOWA

Well No. Latitude 42005 1 N (5–11) Longitude 094223 3 (12–18) Seq. No. 1 (19) Date M D Y 04 22 52 (20–25)

Sampling Depth 2307 (26–29) Type 1 (30) Kx10⁶ 1520 (31–35) pH 7.7 (36–38) Temp. °F (39–41)

SiO_2 (42–44) Ca 55. (45–49) Mg 26. (50–53) Na 285. (54–58) K 20. (59–61)

Source No. 3 Q (79–80)

HCO_3 289 (62–65) CO_3 0 (66–67) SO_4 465. (68–72) Cl 100. (73–78)

Card R

Duplicate Columns 1-25 from Card Q

F 6.5 (26–28) NO_3 0. (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe 2.3 (42–45)

Mn 0. (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 11110 (58–63) Calc. (64–69) Hardness Ca,Mg 244 (70–73) Non-Carb. 7 (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 $CaCO_3$ 237 (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. S (80)

Recorded by: D. HARRISON

Punched by: _____ Date: _____

Published: _____

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 083-30W-08 CBB
Aquifer Code(s) C35J C35F
Owner's Name JEFFERSON CITY #3 (1951)
W Number 04914

Card Q

State: IOWA (19) County: GREENE (37) Town: JEFFERSON, IOWA

Well No. Latitude 42 00 51 N (5–11) Longitude 094 22 33 (12–18) Seq. No. 1 (19) Date M D Y 08 03 51 (20–25)

Sampling Depth 2307 (26–29) Type 1 (30) Kx10⁶ 2020 (31–35) pH 7.5 (36–38) Temp. °F (39–41)

SiO_2 (42–44) Ca 157 (45–49) Mg 63 (50–53) Na +K 269 (54–58) K C (59–61)

HCO_3 259 (62–65) CO_3 0 (66–67) SO_4 838 (68–72) Cl 107 (73–78) Source No. 3 Q (79–80)

Card R

Duplicate Columns 1-25 from Card Q

F 2.8 (26–28) NO_3 0. (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe .3 (42–45)

Mn 0. (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Determined Solids 1650 (58–63) Calc. (64–69) Ca,Mg 651 (70–73) Hardness Non-Carb. 439 (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 $CaCO_3$ 212 (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. S (80)

Recorded by: D. AARONSON

Punched by: _____ Date: _____

Published: _____

W-4914

083-30W-08 CBB
C3SJC C3SF
JEFFERSON CITY #3 (1951)
04914

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Card Q

State: IOWA (16) County: GREENE (37) Town: JEFFERSON

Well No. (Latitude 41 [illegible] 31 N; Longitude [illegible] 42 [illegible]) Seq. No. 1 Date M 12 D 08 Y 60

Sampling Depth 307 Type 1 Kx10^6 1590 pH 8[illegible] Temp. °F [illegible]

SiO_2 83 Ca 56[illegible] Mg 23[illegible] Na 25[illegible] K 18[illegible]

HCO_3 312 CO_3 0 SO_4 418[illegible] Cl 97[illegible] Source No. 3 [illegible]

Card R

Duplicate Columns 1-25 from Card Q

F 15 NO_3 9 PO_4 [illegible] B [illegible] Al [illegible] Fe 59

Mn LESS THAN .05 Cu [illegible] Pb [illegible] Zn [illegible]

Solids Determined 1050 Calc. [illegible] Ca,Mg 239 Hardness Non-Carb. 0

Color [illegible] No. R

Card S

Duplicate Columns 1-25 from Card Q

Br [illegible] I [illegible] Alk. as $CaCO_3$ 156 Free CO_2 [illegible] SAR [illegible]

RSC [illegible] ABS [illegible] [illegible] [illegible]

Alpha (pc/l) [illegible] Beta (pc/l) [illegible] Ra (pc/l) [illegible] U (ug/l) [illegible]

No. 5

Recorded by: D. AARONSON

Verified PMD
Punched by: Punched FCH Date: [illegible]

Published: [illegible]

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Local Well No. 083-30W-08CBB
Aquifer Code(s) C3SJ C3SF
Owner's Name JEFFERSON CITY #3 (1951)
W Number 04914

Water Quality
(ppm)

Card Q

State: IOWA (19) County: GREENE (37) Town: JEFFERSON, IOWA

Well No. Latitude 42 00 51 N (5–11) Longitude 094 22 33 (12–18) Seq. No. 1 (19) Date M D Y 08 30 60 (20–25)

Sampling Depth 2307 (26–29) Type 1 (30) Kx10^6 1640 (31–35) pH 8.4 (36–38) Temp. °F 57 (39–41)

SiO_2 76 (42–44) Ca 45 (45–49) Mg 27 (50–53) Na 266 (54–58) K 17 (59–61)

HCO_3 312 (62–65) CO_3 2 (66–67) SO_4 419 (68–72) Cl 98 (73–78) Source No. 3 (79) Q (80)

Card R

Duplicate Columns 1-25 from Card Q

F 3.8 (26–28) NO_3 18 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe .34 (42–45)

Mn .05 (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 1060 (58–63) Calc. (64–69) Hardness Ca,Mg 224 (70–73) Non-Carb. 0 (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 $CaCO_3$ 260 (32–35) Free CO_2 (36–38) SAR (39–41)

RSC (42–44) ABS .0 (45–47) (48–50)

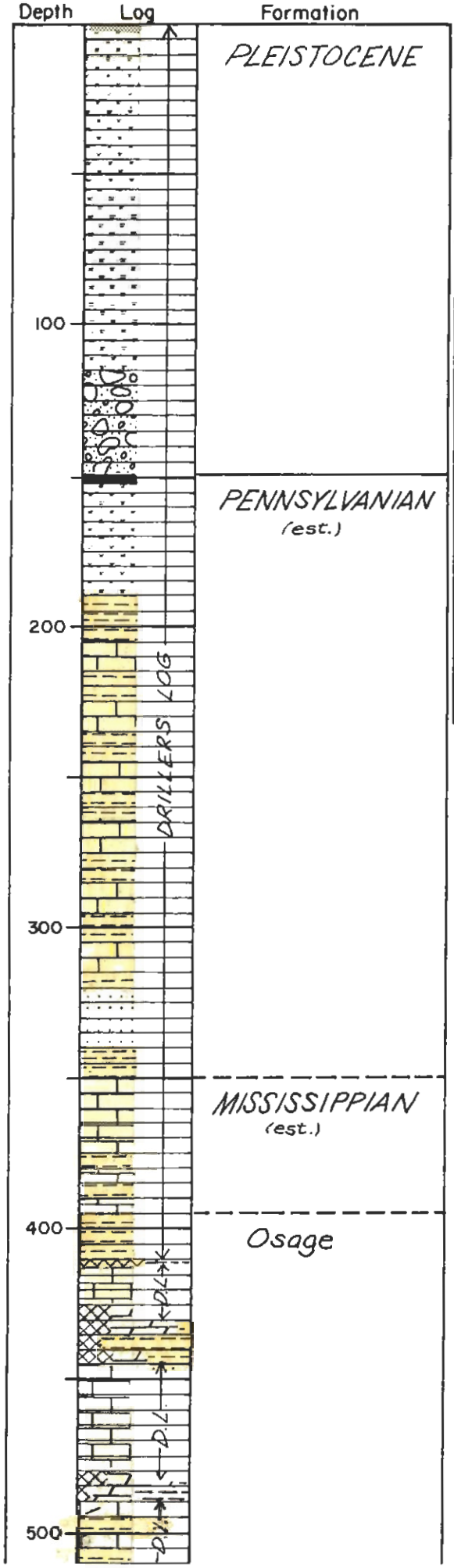
Alpha (pc/l) (55–57) Beta (pc/l) (58–60) Ra (pc/l) (61–63) U (ug/l) (64–66)

No. S (80)

Recorded by: D. AARONSON

Punched by: T Date:

Published:

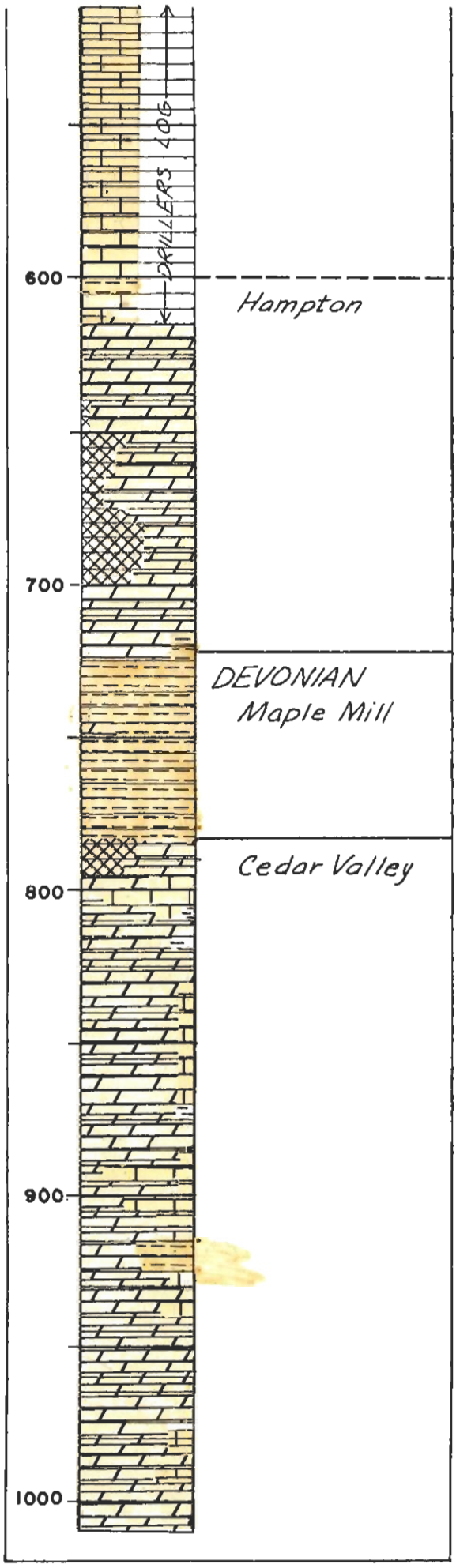


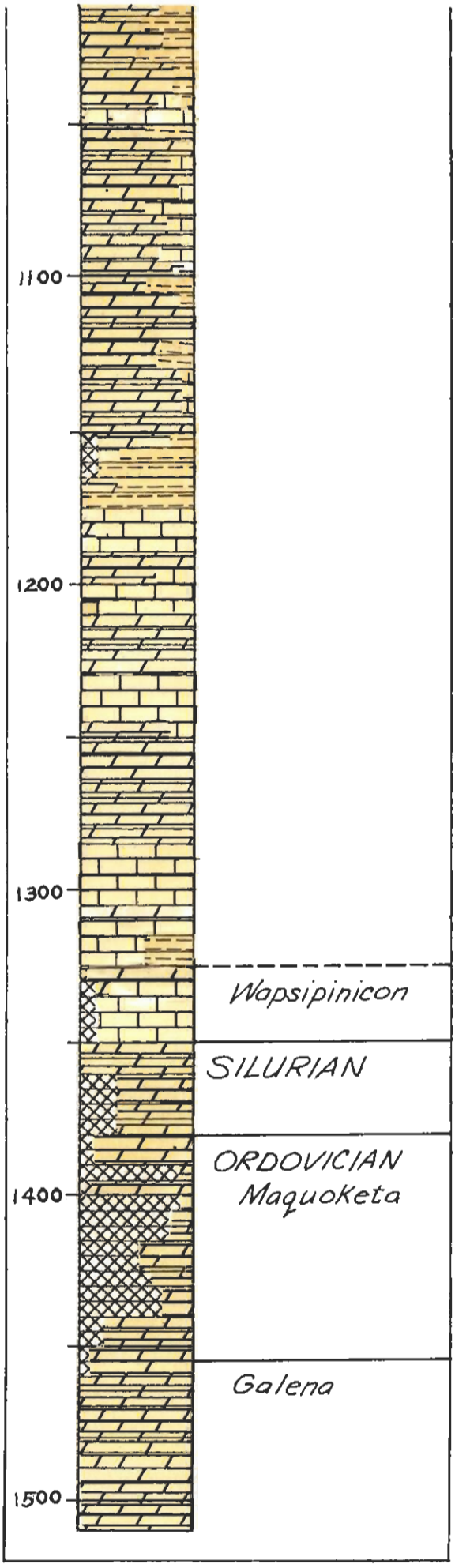
IOWA GEOLOGICAL SURVEY
In Cooperation with
U. S. GEOLOGICAL SURVEY
Iowa City, Iowa

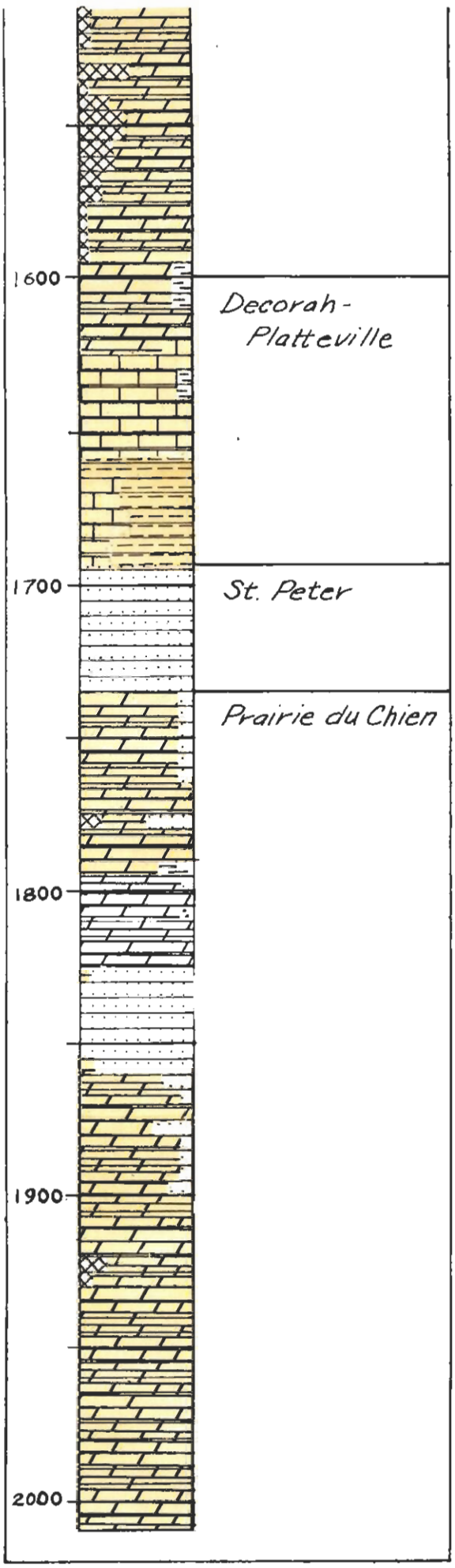
Name *City of Jefferson*	State *Iowa*
Town *Jefferson* County *Greene*	Loc. *NW, NW, SW*
Contractor Driller *Thorpe Well Co.*	Sec. *8*
Drilling Dates *Oct. 26, 1950 - Aug. 1, 1951*	T. *83* N., R. *30W.*
Casing Record *260' of 12"*	
389' of 10" set at 602' *1215' of 8" set at 1795'*	
S.W.L. *78.6'* G.P.M. *375* D.D. *378.4'*	
Remarks *Acidized 1500 GAL. Increased water flow from* *125 GAL. to 300 GAL per min.* *Acidized 2000 GAL. No increase*	Elev. *1065'*
	T.D. *2307'*
Logged By *R.C.N. 6-10-51*	I.G.S. No. *W-4914*

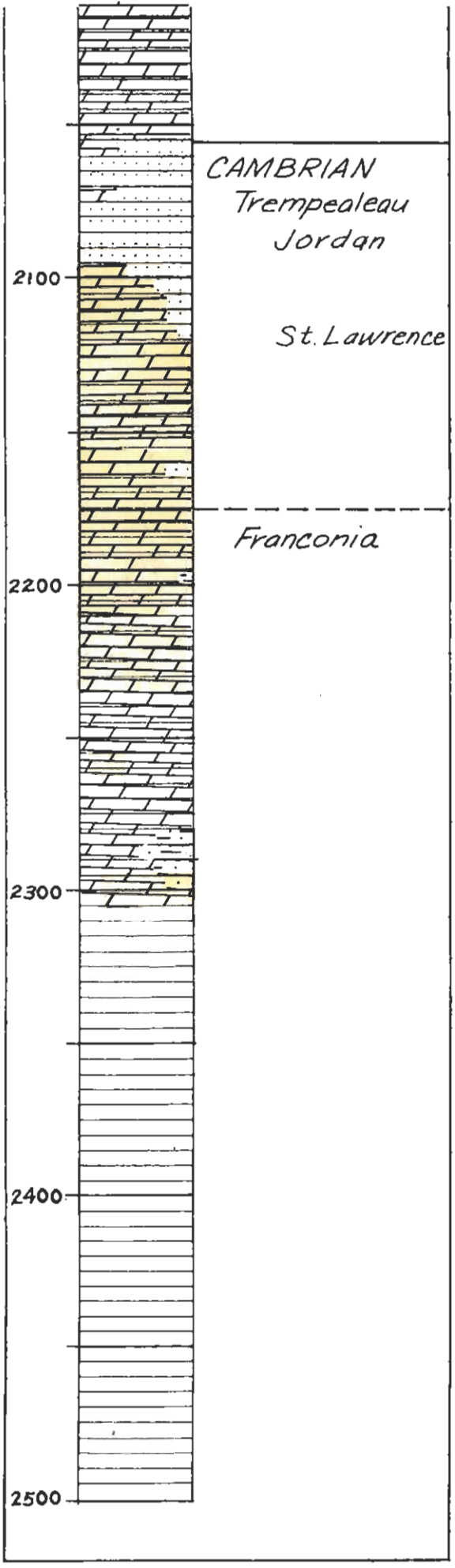
Explonation of Colors

- Soil
- Loess, Silt on Siltstone
- Drift
- Sand & Gravel
- Shale
- Sandstone
- Limestone
- Dolomite
- Chert
- Gypsum or Anhydrite
- Coal
- N+S No Samples


DRILLERS 406
600
Hampton
700
DEVONIAN
Maple Mill
Cedar Valley
800
900
1000


1100
1200
1300
1400
1500
Wapsipinicon
SILURIAN
ORDOVICIAN
Maquoketa
Galena


1600
1700
1800
1900
2000
Decorah-
Platteville
St. Peter
Prairie du Chien


CAMBRIAN
Trempealeau
Jordan
St. Lawrence
Franconia
2100
2200
2300
2400
2500

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

COUNTY Greene

TOWN - Well No. / Use - Location	Date of coll.	Depth (ft.)	Geol. source	°F.	Diss. solids	Fe	Mn	Ca	Mg	Na+K(as Na)	HCO_3	SO_4	Cl	F	NO_3	Hardness (calc. as $CaCO_3$) Tot.	Carb.	Non-carb.	pH	Cond.
Cased to 602' after 12 hr. at 25 gpm	1951 4/13/51	1795				.2	0	46	21	195	CO_3 35 234	318	75	2.6	0	201	200	1	8.1	1250
After well pumped 4 hr. at 130 gpm	6-7	2308	Miss.& Below	63									104			Vers. 616	226		7.5	1930
After well pumped 2 hr. at 130 gpm	6-8	2308	St.P. do	63	PARTIAL								104			Vers. 616	238		7.5	1850
May represent upper water from 10-12" csg.	8:15a 6-12	2308	Upper water?		PARTIAL	0.1							51			308	278		7.65	1110
Largely upper water	10:25a 6-12	2308	upper water 80%		PARTIAL	.15	cloudy, sample decanted						96			432	232		7.45	1650
May represent lower water	10:50a 6-12	2308	lower water?		PARTIAL	1.7							110			584	210		7.55	2010

NOTES: Various analyses from Jefferson City Well. Water can enter well between junction of 10 and 12-inch casing at approximate depth of 213 feet.

R-1-B

THORPE WELL COMPANY

2340 SIXTH AVENUE
DES MOINES, IOWA

Drilled for City of Jefferson *at* Jefferson, Iowa

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

in the _____ ¼ _____ ¼ *Section* _____ *Township* _____ *Range* _____

Drilling started October, *19* 50 *Completed* June 2, *19* 51

Well No. 3 *Kind of Well* Drilled *Depth* 2308 *Size hole started* 20 *in.*

Finish 8 *G. P. M.* 375 *Static Head* 78 *Pumping level from surface* 379

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

Remarks Reverse rotary from surface to 400' cable tools to 2308'. 2500 gal acid from 1796 to bottom Shot from 2070 to 2105

(GIVE DETAILS OF PERFORATED PIPE AND SEALS)

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
12"	260'	260'	surface	cemented from surface		
10"	389'	602	213	Entering shoe - lead seal Drive shoe		
8"	1215	1796	581	Entering shoe - lead seal Drive shoe		
6"	107' 2"	2128	2020' 10"	Perforated from 2021 to 2105' Larkin Packer on bottom		

Driller _____ *From Surface to* _____ *feet*

Driller _____ *From* _____ *feet to* _____ *feet*

Driller _____ *From* _____ *feet to* _____ *feet*

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
12	Fill & top soil	12'
27	Blue clay	39
21	Gray clay	60
2	Limestone	62
38	Gray clay	100
13	Sandy grey clay	113
12	Sand and gravel	125
2	Limestone	127
21	Sand and gravel	148
4	Coal	152
28	Gray clay	180
7	Yellow clay and gravel	187
135	Shale - limestone streaks	322
20	Sandstone - muddy	342

58	Shale and limestone	400
60	Limestone - shale streaks	460
22	Limestone - sandy streaks	482
33	Limestone - shale streaks	515
85	Limestone	600
4	Gray shale	604
106	Brown and gray limestone	710
15	Grey limestone - shaly	725
58	Blue - green shale	783
92	Gray limestone	875
35	Grey and brown limestone	910
20	Brown limestone - shale streaks	930
230	Brown and grey limestone	1160
14	Gray shale	1174
291	Gray and brown limestone	1465
194	Brown and gray dolomite	1659
5	Green shale	1664
28	Gray dolomite	1692
4	Green shale	1696
39	St. Peter sandstone	1735
90	Grey dolomite	1825
5	Sandy dolomite	1839
25	Sandstone - New Richmond	1855
5	Sandy dolomite	1860
195	Gray dolomite	2055
10	Gray dolomite, sandy	2065
5	Gray dolomite - shale streaks	2070
10	Gray dolomite - sandy	2080
20	Sandstone - Jordan	2100
75	Gray and brown dolomite	2175
30	Brown dolomite shale streaks	2205
15	Brown and gray dolomite	2220
88	Gray dolomite	2308

R-1-B

THORPE WELL COMPANY

2340 SIXTH AVENUE

DES MOINES, IOWA

Drilled for Jefferson Water Works *at* Jefferson, Iowa

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

in the ____ ¼ ____ ¼ *Section* ____ *Township* ____ *Range* ____

Drilling started October 26 *19* 50 *Completed* Not completed *19* ____

Well No. ____ *Kind of Well* ____ *Depth* ____ *Size hole started* 48" *in.*

Finish ____ *G. P. M.* ____ *Static Head* 75' *Pumping level from surface* ____

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

Remarks 12' of 30" pipe cemented to top

(GIVE DETAILS OF PERFORATED PIPE AND SEALS)

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
12"	260'	260'			20"	137'11"
10"	378'10"	530'				
8"	1203'8"	1775'				

372'
209 gpm
180' pump
69' sw

Driller ____ *From Surface to* ____ *feet*

Driller ____ *From* ____ *feet to* ____ *feet*

Driller ____ *From* ____ *feet to* ____ *feet*

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
12	Topsoil, Sand, Clay	12
27	Blue clay	39
21	Hard Gray Clay	60
2	Lime shale	62
38	Gray clay	100
13	Sandy gray clay	113
12	Sand & gravel rocks	125
2	Rock	127
4	Cemented sand & gravel with rocks	131
1	Cemented sand	132
11	Sand & gravel	143
5	Sand	148
28	Coal to 152. Dark gray clay	180
7	Yellow clay to 185 with gravel	187
19	Hard gray shale	206
2	Limestone & shale	208
2	Shale	210
5	Lime in shale	215
7	Shale	222
8	Shale with lime	230
19	Shale & limestone	249
1	Hard Limestone	250
9	Lime & shale	259
2	Limestone	261
8	Shale	269
53	Lime & shale	322
2	Sandstone	324
18	Dirty sandstone	342
9	Black shale, oily	351
18	Brown limestone	369
3	Limestone - shaly	372

7	Shale & Limestone	379
5	Limestone	384
12	Hard Shale & some lime	396
7	Shale	403
	Corrected to	408
15	Limestone (Shale from 415' to 417')	423
32	Limestone (Shale streaks)	455
13	Limestone	468
14	Sandy limestone	482
6	Green shale	488
13	Limestone with streaks of gray shale	501
17	Limestone - shale streaks	518
10	Limestone (Hard)	528
32	Limestone	560
33	Limestone (hard)	593
7	Limestone	600
4	Gray shale	604
3	Limestone (very hard)	607
8	Limestone (hard)	615
10	Brown limestone	625
10	Gray limestone	635
36	Gray limestone (hard)	671
29	Gray limestone	700
10	Brown limestone (very hard)	710
2	Brown limestone (shaly)	712
12	Gray limestone (thin shale streaks)	724
1	Limestone	725
58	Blue-green shale	783
30	Gray limestone (hard from 800' to 913'	813
44	Limestone	857
39	Limestone (hard)	896
14	Limestone	910
20	Limestone (shale streaks)	930
32	Gray limestone	962
18	Limestone (hard)	980
10	Brown limestone	990
13	Gray limestone	1003
154	Brown limestone	1157
5	Limestone	1162
12	Gray shale	1174
7	Brown limestone	1181
34	Brown & gray limestone	1215
35	Brown limestone	1250
50	Gray limestone	1300
13	Light brown limestone	1313
42	Brown limestone	1355
6	Gray limestone	1361
27	Gray-brown limestone	1388
53	Gray limestone	1441
24	Brown & gray limestone	1465
19	Brown limestone	1484
41	Brown dolomite	1525
18	Brown dolomite (hard)	1543
22	Brown dolomite	1565
37	Gray dolomite	1602
18	Brown dolomite	1620
14	Brown & gray limestone (very hard)	1634
12	Brown & gray dolomite (hard)	1646
13	Gray dolomite (hard)	1659
5	Green shale	1664
20	Gray dolomite (hard)	1684
8	Dolomite (hard)	1692
4	Green shale	1696
39	Sandstone	1735
8	Gray dolomite	1743
11	Gray dolomite (hard)	1754
28	Gray dolomite	1782
8	Sandy dolomite	1790
7	Gray dolomite (hard)	1797
	Corrected to	1798
12	Gray dolomite	1810
19	Gray dolomite (hard	1829
26	Sandstone	1855
5	Dolomite (Sandy)	1860
4	Dolomite	1864
16	Gray dolomite	1880

A-1-B

THORPE WELL COMPANY

2340 SIXTH AVENUE
DES MOINES, IOWA

Sheet No. 2

Drilled for Jefferson Water Works *at* Jefferson, Iowa

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

in the ____ ¼ ____ ¼ *Section* ____ *Township* ____ *Range* ____

Drilling started ____ 19__ *Completed* ____ 19__

Well No. ____ *Kind of Well* ____ *Depth* ____ *Size hole started* ____ *in.*

Finish ____ *G. P. M.* ____ *Static Head* ____ *Pumping level from surface* ____

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

Remarks ____

(GIVE DETAILS OF PERFORATED PIPE AND SEALS)

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

Driller ____ *From Surface to* ____ *feet*

Driller ____ *From* ____ *feet to* ____ *feet*

Driller ____ *From* ____ *feet to* ____ *feet*

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
14	Brown & grey limestone	1894
15	Gray dolomite (hard)	1909
30	Gray dolomite	1939
118	Gray dolomite (hard)	2057
3	Dolomite (sandy)	2060
5	Dolomite (shale streaks)	2065
32	Sandy dolomite	2097
3	Sandstone	2100
62	Gray dolomite (hard)	2162
3	Gray dolomite	2165
31	Brown dolomite (shale streaks)	2196
19	Brown dolomite	2215
5	Gray dolomite	2220
9	Gray dolomite (sandy)	2229
11	Gray dolomite	2240
5	Gray dolomite (shale streaks)	2245
44	Gray dolomite	2289
12	Gray dolomite (hard from 2289' to 2294')	2301
7	Gray dolomite (shale streaks)	2308

Memorandum

Re: Developements at Nevada, Jefferson and Rock Rapids

Drilling on the new Nevada City well had reached a depth of 1445 ft. on May 24 and at that time they were cementing off the Maquoketa shale, at a depth of 1350 to 1412 ft., which was caving badly. Permanent casing to date includes 285 ft. of 24 in. set at 285 ft. and 673 ft. of 20 in. set at 673 ft. This casing was all cemented from the bottom to the surface. At present a 19 in. hole is being carried on down. Samples and drillers log to the present depth were collected.

Data included in Nevada City Well Folder

At Jefferson the new city well had reached a depth of 2145 ft. on May 22. This carries the well below the Jordan and drilling is expected to continue from 100 to 200 ft. below the Jordan. The well will be test pumped in the near future. Permanent casing to date includes 260 ft. of 12 in. cemented from the bottom to the surface, 389 ft. of 10 in. set at 602 ft. and 1215 ft. of 8 in. set at 1795 ft. with a lead seal between the 8 and 10 in. casing. Water level 72' on May 10, drilling depth 2000' W.E.H.

St.P - 1700'
New Rich - 1830-55'
W.E.H.

At Rock Rapids a series of 10 test holes were drilled in April of this year by Layne Western of Omaha. One well was completed but failed to produce the 200 gpm desired so casing and screen were pulled and the hole abandoned. It is planned to make further tests in the northwest part of town this summer and install a horizontal collector. Developments on this project will be watched.

Attached is a city plat of Rock Rapids with the test hole locations marked and logs of four test holes which were available at this time.

August 6, 1951

Mr. John E. Whiting
City Engineer
Jefferson, Iowa

Dear Mr. Whiting:

Enclosed is a report of the results of the partial analysis made on the water sample you collected from the new city well on August 3, 1951.

It will probably be about 2 weeks before the complete analysis is available, but please feel assured that you will receive a report as soon as feasible.

In the meantime, if we can be of any further assistance to you, please let me know.

Very truly yours,

H. G. Hershey

HGH:WEH:emh

1600 —

54' St P

Jefferson City Well - June 1, 1951

2297. — Water level about same

71 - S.W.L. May 10 2000' 72
2145

2070

St P 1700

Red Rock 1800 1850 100' St. L.

Jordan 2050 - 2± —

Cased to 1795 ✓

Thorpe — Ayers —

36107

2251

~~21~~ 55.

2040 } Gry Dol hd 70' SWL
2067 }

2057-2060 Dol sdy
2 " Dol Shale sdy 71' SWL
2076 " sdy
2076 2083 " " 72'

2097 ~~67~~ 70'

2097-2100 Sandstone 72' S

2109 } Gry Dol hard " 72'
2117 " 71'
2128 " 70
2138 71
2149 71
2162 71
2165 71

2178 Brn Dol Shale streaks 71'
2196 " 71'
2209 "
2215 "
2220 2229 Gry " sdy

June 21, 1951

OFFICE MEMORANDUM

From: W. E. Hale

Re: Jefferson City Well (1951)

June 11 - As a result of various phone calls from city officials and T. W. Thorpe, we met with T. W. Thorpe in Des Moines on Monday afternoon (June 11) and with the City Council of Jefferson on Monday evening to discuss the status of the new city well (present depth 2308') which at this time did not yield enough water. Well cased to 1800' through St. Peter sandstone.

After some discussion, the following procedure seemed most logical to follow:

1. Conduct short test using dye to determine (1) how much water, if any, was moving down hole during idle conditions and (2) how much might be contributed by leak at casing junction at depth of approximately 213 feet (between 10 and 12 inch). Pump setting 510 feet.

2. Acidize well by means of drop pipe to below casing using approximately 1500 gallons of acid. Pump out as soon as possible.

3. Should acidizing fail (as well it might) to improve yield, consider drilling to lower sand. (My thought was that lower sand might contain highly mineralized water but that I had no real evidence.)

4. Shoot sandstones after all drilling is finished.

Results of dye investigation:

A small but concentrated volume of dye was put down the pump column and forced out into the well at depth of 510 feet at midnight June 11-12. The next morning the well was pumped to determine how far the dye had moved. The results suggested little circulation in upper cased part of well, possibly 1 gallon per minute moving down hole.

Dye was also put down the hole outside the pump column while pumping the well at such a rate to maintain the pumping level below the casing junction at 212± feet. It was found that under these conditions water was entering the well at this casing junction at a rate of about 45-50 gallons a minute. As the well produced only 130-140 gallons a minute at a 500-foot pumping level, this left about 80-95 gallons a minute coming in from below 600 feet and probably below 1800 feet.

Item 2.

The Thorpe Well Company acidized well and were pumping out well on Thursday, June 21. Mr. Thorpe had no information at that time as to whether acidizing had

done any good. Charles Lane will stop at Jefferson on his way to Carroll today.

Item 3 and/or 4 will develop after results of acidizing job are known.

Well cuttings were submitted to us. We made a cut and returned set to Thorpe Well Company. The samples have been studied and strip log prepared.