Punched FCH

WRD Exp. (GW)
Aug. 1964

Verified PMJ

U. S. DEPARTMENT OF THE INTERIOR — GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

Record by R.W. COBLE Source of data FILE Date 7/6/65 Map COUNTY HWY 1:63,360

State IOWA (16) County (or town) HARRISON (43)

Latitude: 41 45 00 N (1-7 deg, 7-9 min, 9-11 sec) Longitude: 095 42 00 W (12 degrees, 15 min, 18 sec) Sequential number: 2 (19)

Lat-long accuracy: 4 (20) T 80 N, R 42 W, Sec 11, SW ¼, SE ¼, ¼ 5

Local well number: (0)80-42W-11dc (21-34) Other number: W-0455 B & M

Local use: DOMESTIC 36 CITY (33-51) Owner or name: TOWN OF WOODBINE

Owner or name: WOODBINE TOWN (52-66) Address: WOODBINE, IOWA

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist — M (67)

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 (68)

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 — W (69)

DATA AVAILABLE: Well data 1 (70) Freq. W/L meas.: ORIGINAL Ø (71) Field aquifer char. (72)

Hyd. lab. data: (73)

Qual. water data; type: COMPLETE (74) C

Freq. sampling: IRREGULAR I (75) Pumpage inventory: yes (no) period: (76)

Aperture cards: yes (77)

Log data: GEOLOGIC G (78-79)

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD (19) Depth well: 91½ ft (20-23) Meas. rept DRL accuracy 3 (24)

Depth cased; (first perf.) 67 ft (25-28) Casing type: ; Diam. 12 in (29-30)

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., screen, sd. pt., (S) (T) (W) shored, open hole, (Z) other — D (31)

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, rotary, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other (32)

Date Drilled: Sept. 1936 (33-35) Pump intake setting: ft (36-38)

Driller: H.R. BROWN (name), BLAIR, NEBRASKA (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple, (cent.), (M) multiple, (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other (39) Deep Shallow (40)

Power (type): diesel, elec, gas, gasoline, hand, nat gas, LPG, wind; H.P. (41) Trans. or meter no.

Descrip. MP LAND SURFACE ft above below lsd, Alt. MP 1055

Alt. LSD: 1055 (42-43) Accuracy: (source) ALT. 7 (47)

Water Level 12 ft above below MP; Ft above below lsd (48-51) Accuracy: DRL 3 (52)

Date meas: Sept. 1936 (53-55) Yield: 200 gpm (56-60) Method determined (61)

Drawdown: 45 ft (62-64) Accuracy: DRL 3 (65) Pumping period 22 hrs (66-68)

QUALITY OF WATER DATA: Iron 0.06 ppm (69) Sulfate 926 ppm (70) Chloride 9 ppm (71) Hard. 400 ppm (72)

Sp. Conduct 809 K x 10^6 (73) Temp. °F (74-76) Date sampled 12/11/62 (77-79)

Taste, color, etc.

0,80-42W-11dc

Well Number 41 (N) 45 00 / 095 (W) 42 00.2 (d m s d m s)

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD (19) Physiographic Province: CENT. LOW (20-21) Section: DISS TILL

PLAINS (22) Drainage Basin: BOYER (23-25) Subbasin: (26)

Topo of well site: (D) local depression, flat surface, hilltop, hillside, terrace, valley flat, (27)

MAJOR AQUIFER: CRET. system, LOWER series (28-29) DAKOTA SANDSTONE aquifer, formation, group (30-31)

Lithology: FINE GRAINED Ss. (32-33) Origin: MARINE (34) Aquifer Thickness: ft

Length of well open to: 24 ft (35-37) Depth to top of: 61 ft (38-40)

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

Lithology: (48-49) Origin: (50) Aquifer Thickness: ft

Length of well open to: ft (51-53) Depth to top of: ft (54-56)

Intervals Screened: PERF 67-91½ (57-59)

Depth to consolidated rock: 61 ft (60-63) Source of data: SAMPLES 64 C

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

Surficial material: LOESS (70-71) Infiltration characteristics: GOOD 72 2

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

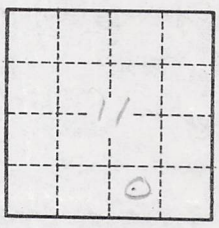
Coefficient Perm: gpd/ft²; Spec cap: 4.4 gpm/ft; Number of geologic cards: (79)

CASING

12" - 0 TO 61' 4"

10" - 60'8" TO 91'6"

PERF 67-91'6"



GPO 844-225

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Local Well No. 080-42W-11DC
Aquifer Code(s) KIDI
Owner's Name WOODBINE CITY #1 (1936)
W Number 00455

Water Quality
(ppm)

Card Q

State: IOWA (19) County: HARRISON (43) Town: WOODBINE, IOWA

Well No. Latitude 41 45 00 N (5–11) Longitude 095 42 00 (12–18) Seq. No. 2 (19) Date M 06 D 11 Y 55 (20–25)

Sampling Depth 92 (26–29) Type 1 (30) Kx10^6 788 (31–35) pH 7.4 (36–38) Temp. °F (39–41)

SiO_2 (42–44) Ca 102 (45–49) Mg 34 (50–53) Na 24 (54–58) K 5.0 (59–61)

Source No. 3 Q (79–80)

HCO_3 395 (62–65) CO_3 0 (66–67) SO_4 97 (68–72) Cl 70 (73–78)

Card R

Duplicate Columns 1-25 from Card Q

F 0.3 (26–28) NO_3 80 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe 0. (42–45)

Mn 0.3 (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 511 (58–63) Calc. (64–69) Hardness Ca,Mg 395 (70–73) Non-Carb. 71 (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 $CaCO_3$ 324 (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: T Date:

Published:

3

080-42W-11 DC .2
KIDI
WOODBINE CITY #1 (1936)
00455

W-0455

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Card Q

State: IOWA (16) County: HARRISON (43) Town: WOODBINE

Well No. Latitude 415000N (5–11) Longitude 0954200 (12–18) Seq. No. 2 (19) Date M 12 D 11 Y 62 (20–25)

Sampling Depth 92 (26–29) Type 1 (30) Kx10⁶ 809 (31–35) pH 7.3 (36–38) Temp. °F (39–41)

SiO_2 31. (42–44) Ca 107. (45–49) Mg 32. (50–53) Na 23. (54–58) K 5.2 (59–61)

Source No. 3 (79) 0 (80)

HCO_3 417 (62–65) CO_3 0 (66–67) SO_4 73. (68–72) Cl 90. (73–78)

Card R

Duplicate Columns 1-25 from Card Q

F .3 (26–28) NO_3 7.1 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe .06 (42–45)

Mn .34 (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 494 (58–63) Calc. (64–69) Hardness Ca,Mg 400 (70–73) Non-Carb. 58 (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 $CaCO_3$ 342 (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:

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 080-42W-11DC
Aquifer Code(s) KIDI
Owner's Name WOODBINE CITY #1 (1936)
W Number 00455 1

Card Q

State: IOWA [19] (1 2) County: HARRISON [43] (3 4) Town: WOODBINE, IOWA

Well No. Latitude [414500N] (5–11) Longitude [0954200] (12–18) Seq. No. [2] (19) Date M D Y [01 13 58] (20–25)

Sampling Depth [92] (26–29) Type [1] (30) Kx10⁶ [770] (31–35) pH [7.4] (36–38) Temp. °F [ ] (39–41)

SiO_2 [29.] (42–44) Ca [92.] (45–49) Mg [40.] (50–53) Na [23.] (54–58) K [5.1] (59–61)

HCO_3 [398] (62–65) CO_3 [0] (66 67) SO_4 [107.] (68–72) Cl [10.] (73–78) Source No. [3] (79) [Q] (80)

Card R

Duplicate Columns 1-25 from Card Q

F [3] (26–28) NO_3 [6.6] (29–32) PO_4 [ ] (33–35) B [ ] (36–38) Al [ ] (39–41) Fe [.05] (42–45)

Mn [.25] (46–49) Cu [ ] (50–52) Pb [ ] (53 54) Zn [ ] (55–57)

Solids Determined [486] (58–63) Calc. [ ] (64–69) Hardness Ca,Mg [395] (70–73) Non-Carb. [69] (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 $CaCO_3$ [326] (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: T Date:

Published:

3

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 080-42W-11DC
Aquifer Code(s) KIDI
Owner's Name Woodbine City #1 (1936)
W Number 00455

Card Q

State: Iowa (19) County: Harrison (43) Town: Woodbine, Iowa

Well No. Latitude 41 45 00 N (5–11) Longitude 095 42 00 (12–18) Seq. No. 2 (19) Date M D Y 08 20 37 (20–25)

Sampling Depth 92 (26–29) Type 1 (30) Kx10^6 (31–35) pH 7.2 (36–38) Temp. °F 51 (39–41)

SiO_2 (42–44) Ca 91 (45–49) Mg 28 (50–53) Na +K 335 (54–58) K C (59–61)

Source No. 3 Q (79–80)

HCO_3 409 (62–65) CO_3 (66–67) SO_4 49 (68–72) Cl 70 (73–78)

Card R

Duplicate Columns 1-25 from Card Q

F 0. (26–28) NO_3 .1 (29–32) PO_4 0. (33–35) B (36–38) Al (39–41) Fe TRACE 0. (42–45)

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

Solids Determined 327 (58–63) Calc. (64–69) Hardness Ca,Mg 342 (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 $CaCO_3$ 335 (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: T Date:

Published:

3

- Log of Permanent City Supply Well

1 to 32 feet soil yellow & blue clay -

32-35 feet Course gravel

35 to 37 feet sand

37 to 51 feet shale

51 to 57 feet 6" in Sand-Stone

57 feet 6 in. to 59 feet White shale

59 To 91 feet 6 in sand stone

Test well #2 200 feet

c/. well at old Pump house right

1-30 - feet Soil + Clay
30-40 - Coarse sand.
40-63 - shale (gray + red)
63-65 Lime rock (white)

(acid test used to determine Lime Stone)

Test well #1

S. W. corner of Bare field.

1 - 30 feet Yellow clay

30 - 52 " Soft wavy yellow brown clay

52 - 69 feet Blue clay

69 - 76 " Coarse gravel - [a layer of hard shale above + below thin gravel with trace of lime stone]

76 - 89 - " Layer of blue green + cream colored shale

89 - 97 feet - Hard layer (dark gray)

97 - 101 feet shale

101 - 103 feet lime rock (gray)

103 - 106 " Red shale

106 - 107 " Lime rock (white)

- (acid test used to determine lime stone)

Test #3 - 16.00 feet
east of present pump station
on east of gravel road. just
west of T & E R.R. tracks

1 - 32 - feet soil & yellow clay
32 - 37 - " shale
56 - 57.6 in Sand stone
57.6 in To 59 " White shale
59 to 91.75.6 in " Sandstone

This well was pumped
with out screen sand showed
fairly hard.

IOWA GEOLOGICAL SURVEY
Generalized Log Based on Detailed
Description of Drill Cuttings

Name of Well: City of Woodbine(Harrison Co.) Survey No. W-0455

Drilled by: H. R. Brown, Blair, Nebraska Date September ,1936

Total Depth: 91½ ft;Curb Elevation: 1055 ft;Static Level: ~~1043~~ 17 ft.

Casing Data: 12" casing to 61'4". 10" perforated casing to 91'6". 10" casing overlaps 12" casing 14". Overlap sealed with leather. Perforated casing begins 67' below curb.

Pump and Screen Data: Pomona pump.

Pumping Test: 22 Hours 25 Min; Gal. Per Min. 200 ;Drawdown 57 ft. in ____ min.

Description of Formations

No.	Rock Unit	Thick.	From (Feet)	To
	Pleistocene			
1.	Glacial clay--brownish gray, slightly calcareous, silty, sandy, pebbly.	32	0	32
2.	Glacial gravel, pebbles and small cobbles--dark and light igneous rocks and limestone present.	3	32	35
3.	Glacial sand to fine gravel--sand, coarse, major grade 1-½ mm., principal subsidiary 2-1 mm. Shale and limestone, curvilinear to subround; quartz, angular to subangular.	2	35	37
	Cretaceous			
4.	Siltstone and 15-20% clay shale (gray with thin streaks pink to red mottled silty clay), micaceous, medium brown siliceous sandstone.	19	37	56
5.	Sandstone--light gray, medium to fine grained, major grade 1/4 - 1/8 mm., angular to subangular, much pinkish quartz grains, and considerable sericite. Sandstone lumps are non-calcareous.	1½	56	57½
6.	Sandstone and siltstone--sandstone very fine, 1/8 - 1/16 mm., gray, micaceous, with thin bands gray siltstone.	1½	57½	59
7.	Sandstone--gray, medium fine grained, similar to 56-57½ (Dakota).	32½	59	91½ T.D.

Notes:
Sent to Mr. L. W. Wood, Ames, Nov. 5, 1937.

IOWA GEOLOGICAL SURVEY
Generalized Log Based on Detailed
Description of Drill Cuttings

Name of Well: City of Woodbine (Harrison Co) Survey No. W-0455

Drilled by: H.R. Brown, Blair, Nebr. Date Sept., 1936

Total Depth: 91½' ft; Curb Elevation: 1055 ft; Static Level: 1043 ft.

Casing Data: 12" casing to 61' 4" 10" preforated casing to 91' 6".
10" casing overlaps 12" casing 14". Overlap sealed with leather. Pref. begin 67' below curb.

Pump and Screen Data: Pomona pump

Pumping Test: 22 Hours 25 Min; Gal. Per Min. 200 ; Drawdown 57' ft. in ____ min.

Description of Formations

No.	Rock Unit	Thick.	From (Feet)	To
	Pleistocene			
1.	Glacial clay, brownish gray, slightly calcareous, silty, sandy, pebbly.	32'	0	32'
2.	Glacial gravel, pebbles and small cobbles, dark light Igneous, and limestone present.	3'	32'	35'
3.	Glacial sand to fine gravel, Sd. coarse Maj. Gr. 1-½ mm., Prin. Sub. 2-1 mm. Shale and Limestone curl. to subr., Quartz ang. to subang. Cur bilenear	2'	35'	37'
	Cretaceous			
4.	Siltstone and 15-20% clay shale (gray with thin streaks pink to red mottled silty clay), micaceous, medium brown siliceous sandstone.	19'	37'	56'
5.	Sandstone, light gray, medium to fine grained, Maj. Gr. 1/4 - 1/8 mm, angular to subangular, much pinkish qzt. grains, and considerable sericite. Ss lumps are non calc.	1½'	56'	57½'
6.	Sandstone and siltstone, sandstone very fine, 1/8 - 1/16 mm., gray, micaceous, with thin bands gray siltstone.	1½'	57½'	59'
7.	Sandstone, gray, medium fine grained, similar to 56-57½' (Dakota)	32½'	59'	91½'

W.C.S.

Notes:

Sheet No. 1 Name of Well City of Woodbine (Harrison Co) Survey No. W-0455

Location Boyer R valley NE part of town Date Drilled Sept. 1936 Analyst A.C. Tester

Curb Elev. 1055 Schuldt-0-35'

00 Clay, Glacial; br. gray, slightly calc., silty, sandy, pebbly.; suite: schist & drk ig 5%, qtz & acid ig 5%, ls, lt. colored, 2%.

10

20

30

32' Gravel, glacial; subang, max. size 5 cm., maj. gr. 1-4 mm, prin. sub. 4-2 mm. suite: bark ig., lt. ig., +Qz with drk. ig predom.

35' Sand + fine gravel: maj. gr. 1-½ prin. sub. 2-1; 5-10% gry & lt pk grains, 2%± gry-grn sh grains all curl.-subrd.; qtz, ang-to sub-angl with 5%± curl. to sub-rd. Various qtzte, granitic & basic ign grains.

Pleistocene

Cretaceous ?

37'

40

Siltstone and 15-20% clay shale; gry with thin streaks pink to red mottled silty clay - Sls non calc with some calc clay; nodules of brn silic. siltstone. Micac

50

56' Sandstone; light gry, med to fine maj-gr. 1/4-1/8 mm, ang-subang.; qtz and much pinkish qtzte grns, some felds; much sericite detr (?) mica; lumps of SS are non-calc & friable.

57½'

59' SS & sls; SS very fine 1/8-1/16 mm: gray, micac with thin altern. bands of gry sls. Shows some ls grns prob. mixed from glac. sd above. - Non-calc.

60

70

Ss, gry, med-fine grnd similar to 56'-57½'; maj-gr. ¼-⅛ mm; qtzte grns abund; micac; ang-with some sub-angl.: non-calc; friable; very porous, 20-25%± porosity.

[Dakota Ss]

80

90

91½'

00

Sheet No. 1 Name of Well City of Woodbine (Harrison) Survey No. 0455

Location Boyer R. valley, NE part of town Date Drilled ____ Analyst Harris

00

10

a) silt crse with some sd yelish gr., v. micac, v. sl/ly calc

loess or river silts

20

b) silt v clayey v micac similar to (a) sl/ly calc, possibly till

30

32 Gravel - mostly ig but some ls pbls

35 +1 10%; 1-½ 45%; ½-¼ 40%; ¼-⅛ 5%; ⅛-1/16 tr -1/16 tr

37 sd A, much ls, light

40

sltstone, brnish drb, v. ~~sdy~~ arg, v. micac, calc blk spks

50

56 ss, v. lt. gr. fine-grained, well sorted, friable, loosely cemented by white clay

57½ sltst, v. arg with much fn sd, gr. micac, sd laminae v. sl/ly calc

59

60

blk spks

ss fine-med, wh to pale pnk, mostly A some a with sec enlarge

micac v. sl/ly cemented by wh clay

70

80

90

00

New Town Well at Woodbine, Harrison Co.

Pumping Test

Test started at 1:35. Static water level = 12 ft

Time	Flow meter readings in gallons	G.P.M. obtained by timing flow meter	Water level below curb in feet
1:35	11197100	170	12
2:15	11202600	170	45
3:15	11212600	200	46
4:15	11202800	Stop	50
5:15	11232700	200	50
6:15	11242200		50
7:15	11254100		52
9:15	11278100		52
10:15	11289100		53
11:15	11300500		
12:15	11312600		
1:15	11323700		
2:15	11335300	200	
3:15	11347400		
4:15	11359200		
5:15	11370800		
6:15	11382700		
7:15	11395100		
9:15	11418000		
11:15	11442700		57
12:15	11452400		57

Data obtained from Mr. M.E. Hill, Water Supt. of Woodbine. No figures on recovery.

IOWA GEOLOGICAL SURVEY

No. (Not sampled ?) 115,268 ? 2

Well or Water Sample Data

TOWN: Woodbine COUNTY: Harrison

LOCATION: SW¼SE¼ Sec. 11 T. 80 N., R. 42 W. Boyer Twp.

OWNER OF WELL: Town of Woodbine (Individual; Farm;) (Industry; City)

USE OF WATER: City Supply ( ); Private-Domestic ( ); Public Drinking ( ); Livestock ( ); Industrial ( ); School Supply ( ); Cooling or Air Conditioning ( ); _____ ( ).

CONSTRUCTION OF WELL: Drilled ( ); Gravel-Pack type ( ); Dug ( ); Driven ( ); Bored ( ); Jetting process ( ).

CONTRACTOR: H. R. Brown Blair Nebr. DATE DRILLED: Sept. 1936

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.) See over

WELL DATA: Curb Elevation 1055 Ft. ~~Drilling~~ Total Depth 91.5 Ft.

Topographic Position of Well: Boyer River Valley.

Static Level (Depth to Water below ~~or above~~ Curb) 12 Ft.

Drawdown (Depth below static level) 45 ft. to 57 ft., below curb, pumping at 200± g.p.m. in 22 hours 25 minutes. Calculated gals. per ft. drawdown 3.5 g.p.m. Capacity of well 200 g.p.m. at 45 ft. drawdown.

Type of Pump Pomona. Power Mc Cormic-Deering Tractor.

Depth of bottom of Pump Unknown ft. with — ft. of suction pipe.

TEMPERATURE: Water 51.4 °F, Air 37 °F, measured at in well 38 ft below curb.

SOURCE OF WATER: River Alluvium (Type and Depth) _____

Glacial Formations (Type) _____ at ___ ft. to ___ ft.

Limestone or Dolomite (Age) _____ at ___ ft. to ___ ft.

Sandstone (Age) Cretaceous (?) at 59 ft. to 91.5 ft.

Principal Producing Formation Dakota (?) sandstone

No REMARKS: Source of information: Mr. Murray E. Hill, Water Supt. of Woodbine

Temperatures taken by H. G. Hershey

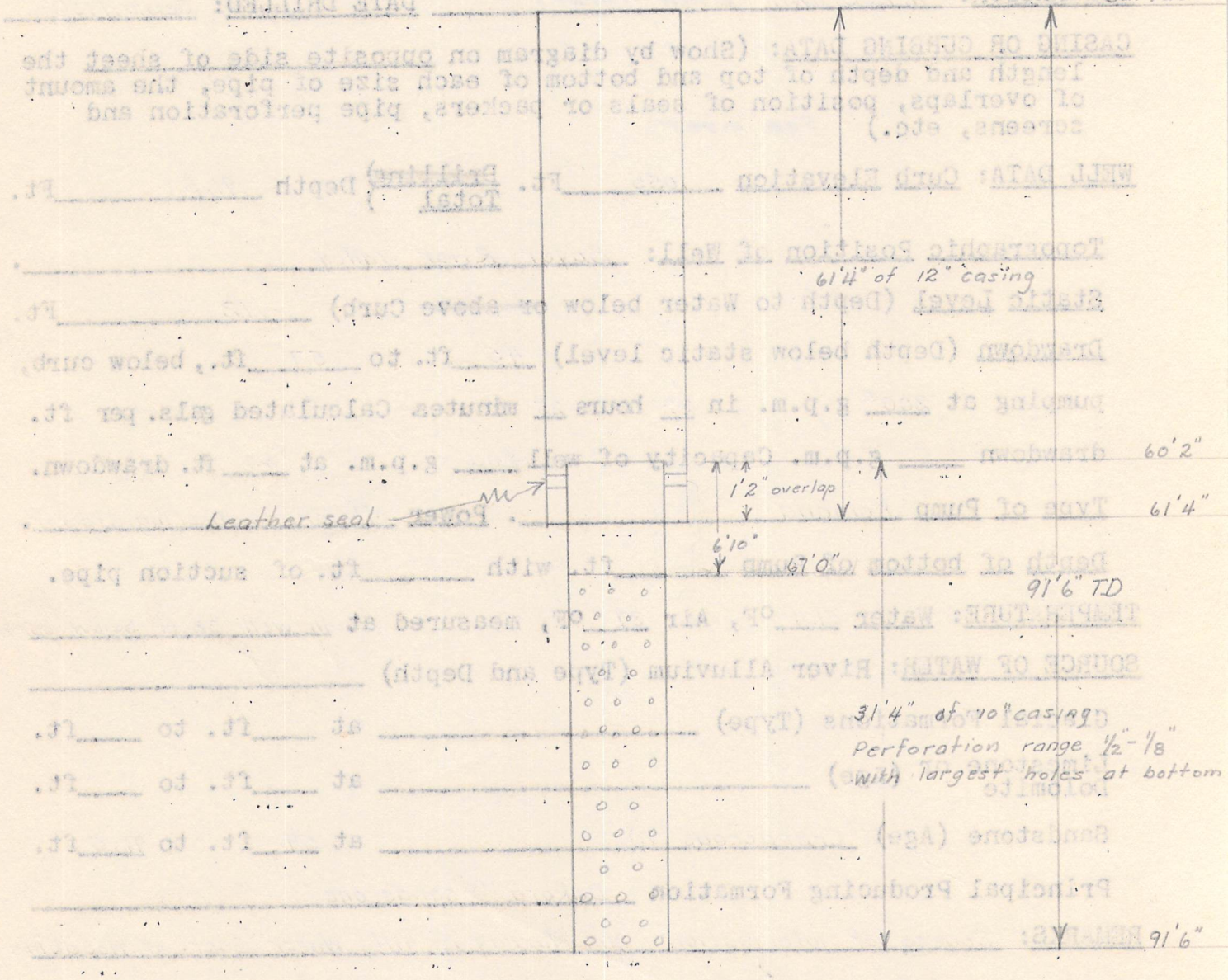
No pumping equipment in well at present.

No Sample taken for: Mineral Analysis ( ); Sanitary Analysis ( ).

Data Collected by H. G. Hershey; Date Dec. 19 1936.

Report Analysis to A. C. Tester, Iowa Geological Survey, Iowa City.

3


Surface
61'4" of 12" casing
60'2"
1'2" overlap
61'4"
Leather seal
6'10"
67'0"
91'6" TD
31'4" of 10" casing
Perforation range ½"-⅛"
with largest holes at bottom
91'6"

December 21, 1936

Mr. M. E. Hill
Water Superintendent
Woodbine, Iowa

Dear Mr. Hill:

In the report which Dr. Hershey sent in concerning the investigation he made last week at Woodbine, he mentioned that you would like to have information concerning the taking of sample for sanitary analysis. I am asking Dr. J. J. Hinman, of the State Hygienic Laboratory, to write you with the proper information.

With regard to the taking of sample for mineral chemical analysis, will say that this sample must be taken by a representative of the Iowa Geological Survey. This is to avoid confusion or mixing of samples, so that all of our information will be exactly comparable. After your final pump is installed and the well has been in production for several weeks, one of us will be in the territory and take a sample at the first available opportunity. I will appreciate, therefore, your advising me when the pump is set and your plans concerning the use of the well so that I can be governed accordingly.

With reference to your question concerning the setting of the intake pipe of the pump and the bowls of the turbine, I would suggest on the basis of the character of the rock formations that considerable caution be exercised. In other words, looking at it purely from the standpoint of the nature of the sandstone, it will be much more satisfactory to maintain as shallow a setting as is possible to provide the quantity of water that you require. In other words, it would seem to me

that ~~something~~ pumping at a rate of 150 g.p.m. will provide sufficient water for your town, even though it may be necessary to pump at two or three different intervals during the day. Experience teaches that a heavy drawdown in a well increases the movement of the loose, uncemented sand grains and also increases the amount of chemical precipitation. If the water level can be maintained as nearly as possible to the normal static level, then these actions can be reduced to a minimum. Another way of stating it is that the greater the amount of drawdown obtained the greater the velocity of water flowing through the sandstone and into the perforated part of the casing, and hence the more sand material will be moved by mechanical force and the greater amount of chemicals in solution and greater agitation and aeration of the water will aid in chemical precipitation. Therefore, I would suggest that the bowls of the turbine pump be set at 50 feet with a drop pipe and intake screen set at 60 feet, or 10 feet below the bowls and at approximately the top of the sandstone. Also, I would suggest that the valve on the pump be set so as to limit the production at 150 gallons per minute. With such a setting it is possible to open the valve and to produce 200 gallons a minute to meet an emergency, such as a fire. You may find it desirable to keep the valve shut so as to produce only 100 or 125 gallons per minute for normal times.

I have examined the cuttings sent at the time the well was completed and have based my statements above upon this information. I appreciate having this material available and trust that you will keep me informed of subsequent developments of your new well. Do not hesitate to call on us at any time that we can be of assistance.

Yours very truly,

A. C. Tester

ACT:A

December 21, 1936

Dr. J. J. Hinman, Chief
State Water Analysis Laboratory
Medical Building
Iowa City, Iowa

Dear Dr. Hinman:

In connection with Survey investigations at Woodbine, Iowa, Mr. Murray E. Hill, Water Superintendent, has asked for suggestions on the taking of a water sample for sanitary analysis from a new well at Woodbine.

The new well is 91½ feet deep and was completed in September. Pumping tests have been made with a temporary pump and tractor for power. The well produces 200 gallons per minute with a drawdown to 57 feet below curb from a static level of 12 feet below curb. The well has a 12-inch casing from the surface to 61 feet 4 inches and 31 feet 4 inches of 10-inch perforated casing which overlaps inside of the 12-inch casing 14 inches. The overlap is sealed with leather, so as to make a tight shut-off between the two different sizes of casing. The perforations begin at 67 feet below curb or 5 feet 8 inches below the base of the 12-inch pipe.

I suggest that you write to Mr. Hill and explain the method of sterilizing the permanent pumping equipment and the water in the well before testing the permanent equipment and the need for cleansing the well thoroughly before taking a sample for sanitary analysis.

Your help on this subject will be greatly appreciated.

Yours very truly,

A. C. Tester

ACT:A
CC: Mr. M. E. Hill

Dec. 29, 1936

Mr. Murray E. Hill,
Supt. of Water Works,
Woodbine, Iowa.

Dear Mr. Hill:

I have been asked by Dr. A.C. Tester, Assistant State Geologist to advise you concerning the sterilization of your new well, and its pumping equipment.

It is important that new wells and new piping be sterilized to destroy both pathogenic bacteria and organisms which are considered to indicate contamination by any sewage-like material. Such bacteria may be found in surface earth and on casing, pumping equipment as well as tools, rope, and other accessories that are handled and laid upon the ground. These objects may carry down into the well some evidence of pollution. Grease such as is used in making up the pipe and casing cause bacteria to be strongly retained. Chloride of lime and hypochlorites are extensively used for destroying the contaminating bacteria which otherwise would require weeks for complete removal.

In using chloride of lime or hypochlorites it is desirable to use a heavy concentration of the material, and to distribute it uniformly so that it will reach all places where it is needed. Concentration of about 100 parts per million of active chlorine by weight is about what is necessary. Chloride of lime when fresh may contain about 33% active chlorine, but usually manfacturers will only guarantee 20% available free chlorine. When the material has been opened or is old, the chlorine concentration is reduced. I have taken samples from the market shelves which contained as little as 2% available free chlorine. The so-called high test hypochlorides sold under such trade names as H.T.H., perchloron, etc., contain about 60-65% available free chlorine, and are more stable than the ordinary chloride of lime.

If you will remember that a gallon of water weighs 8.3 lbs. and that you wish to apply about 100 lbs. of free chlorine per million lbs., of water, I believe you can calculate the necessary amount of substance you use. This should be made up into a suspension in water poured down the well, and if possible thoroughly mixed by means of a surge block, or other displacement devise. It should stay in the well about over night, and then be pumped out until the water no longer tastes offensively of the chemical

used. With your new pumping equipment it would be a good idea to pump the strongly chlorinated material into the apparatus until it was filled, then allowed to stand over night if possible. Pumping to reduce the chlorine concentration in the well will also be useful.

Be sure to use enough of the chlorine compound, because unless enough is applied, results will be disappointing and the effect negligible.

Yours very truly,

Jack J. Hinman, Jr.

Jack J. Hinman, Jr.,
Chief, Water Laboratory Division.

JJH:EM

Copy to Dr. Tester.

GW
Woodbine, Harrison Co

1

April 13, 1943

Thorpe Well Company
2340 Sixth Avenue
Des Moines, Iowa

Attention: Mr. Walter T. Thorpe

Gentlemen:

Several possibilities exist for the development of a ground water supply at Woodbine, Iowa. The possible sources of water include the glacial drift, the alluvium, the Dakota sandstone, the Mississippian limestones, and the deeper formations such as the St. Peter sandstone. Of these the most promising appears to be the Dakota sandstone. All of them are discussed in the following report.

The upland territory in the vicinity of Woodbine is covered with a layer of glacial drift estimated to be 100-120 feet thick which may contain some water-bearing sands. An old well dug for the town a number of years ago produced from a bed of fine sand at a depth of 20 or 25 feet. It did not furnish a large quantity of water, however, and was generally considered unsatisfactory.

The valley of the Boyer River contains alluvial material above the bedrock. Undoubtedly water-bearing materials are present within the alluvium which may, with proper development, yield enough water to supplement the present town supply. The depth to the base of the alluvium should be 65 feet or less depending on the location of the well within the Boyer River Valley. Wells finished in the glacial drift or in the alluvium would require a screen and complete casing above the screen. Since it is believed that the Dakota sandstone shows promise of being a better aquifer the younger deposits need no further description.

Shales and sand stones of the Cretaceous system lie immediately beneath the glacial drift on the upland and the alluvium in the river valley. These shales and sandstones are all believed to be a part of the Dakota formation. The town of Woodbine drilled a well in 1936 into the Dakota sandstone to a total depth of 91.5 feet. The top of the sandstone was encountered at a depth of 59 feet. The well is reported to have produced 200 gallons a minute with a pumping level of 57 feet below curb from a static water level of 12 feet. Under the present set-up it is reported that the static water level is 16 1/4 feet and that at approximately 150 g.p.m. the pumping level is 44.5 feet. Water from this source is of good quality having a total hardness of less than 350 parts per million and only a trace of iron. As you undoubtedly know, the well is located in the Boyer River Valley in the northern part of Woodbine.

It is my understanding that there was 61'4" of 12-inch casing placed in the well from the surface to a depth of 61'4" and that 31'4" of 10-inch casing perforated with holes ranging in size from one-half to one-eighth inch was installed from a depth of 60'2" to 91'6". The report indicates that a leather seal was placed between the 12- and 10-inch casings. In drilling a new well I would suggest that the full thickness of the sandstone be drilled and that the new hole be located as far as is practicable from the existing well in order that there will be as little interference as possible.

Pennsylvanian shales and sandstones underlie the Cretaceous rocks to an estimated depth of 450 feet. Locally some of these sandstones may produce a small quantity of water but no large supply should be expected from them and the quality of the water obtained may not be suitable for a town supply.

Limestones and dolomites of the Mississippian system should lie between 540 and 875 feet in depth. The Warsaw, Keokuk-Burlington, Gilmore City, and Hampton formations should all be present at Woodbine. Some water is usually found in these limestones and dolomites. An old city well at Woodbine to a depth of 840 feet reported to have had an initial flow of 12 gallons a minute probably produced from these Mississippian formations.

The Kinderhook or Maple Mill shale if present will be only a few feet thick. The probability is, however, that it is absent entirely in the Woodbine area and that the basal Mississippian limestones rest upon the Shell Rock or Cedar Valley formation of the Devonian system. The total thickness of the Devonian rocks composed chiefly of dolomites should be about 400 feet. These would be underlain by cherty dolomites of the Silurian system which are followed in depth by cherty dolomites of the Maquoketa and Galena formations. The Maquoketa-Galena sequence is expected to extend to an approximate depth of 1660 feet. The Decorah-Platteville formations composed of limestones with green shales are about 100 feet thick in that area and separate the Galena formation from the underlying St. Peter sandstone. The dolomites from the top of the Devonian at a depth of about 875 feet to the base of the Galena at a depth of about 1660 feet may be expected to be water bearing. Little is known however, of the amount or quality of water that they will yield at Woodbine. A small supply could undoubtedly be obtained but there is no assurance that large quantities are available.

The St. Peter sandstone should be about 60 feet thick. At Denison a well to the St. Peter furnishes at least 200 gallons per minute. The static level of water from the St. Peter at Woodbine is estimated to be less than 100 feet below ground surface.

The summary of these formations with their estimated thicknesses and depths has been prepared and is given on a separate sheet. All depths are based on a starting elevation of 1060 feet above sea level and are subject to revision if the well is started at a different elevation.

We will be extremely interested in the results of any drilling that is done at Woodbine and I will appreciate it greatly if you will request your drillers to save us samples of any wells put down there.

If you have any questions concerning this report or if I can be of further service, please let me hear from you.

Very truly yours,

H. G. Hershey

HGH:N

cc to W.L. Houck, Woodbine -June 21- with WEAtale.

Forecast of Geologic Section

at Woodbine, Iowa

	Thickness	From	To
Pleistocene system			
Glacial drift	60±	0	60±
Cretaceous system			
Dakota formation	40±	60±	100±
Pennsylvanian system			
Cherokee group	440±	100±	540
Mississippian system			
Warsaw formation Keokuk-Burlington formations Gilmore City formation Hampton formation	335	540	875
Devonian system			
Shell Rock-Cedar Valley formations Wapsipinicon formation	405	875	1280
Silurian system	180	1280	1460
Ordovician system			
Maquoketa formation	40	1460	1500
Galena formation	160	1500	1660
Decorah-Platteville formations	100	1660	1760
St. Peter formation	60	1760	1820
Willow River formation	---	1820	---

5



THORPE WELL COMPANY

CONTRACTORS

LATEST ROTARY AND CABLE TOOL EQUIPMENT
THORPE PATENT GRAVEL PACKED WELLS

2340 SIXTH AVENUE
TELEPHONE 3-6107

DES MOINES, IOWA

PLEASE ADDRESS ALL REPLIES
DIRECT TO THE COMPANY
LOCK BOX 1376

April 1st 1943

H.G.Hershey,
Iowa Geological Survey,
Iowa City, Iowa,

Dear Sir:

We would appreciate receiving as soon as possible any information that you can give us on formations at Woodbine, Iowa.

Very truly yours,
Thorpe Well Company
By Walter T. Thorpe

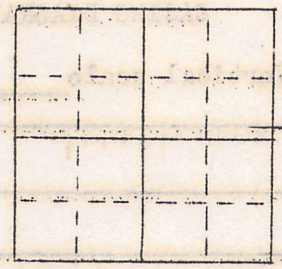
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APR 2 1943

IOWA GEOLOGICAL SURVEY W-0455

In Cooperation with U. S. Geological Survey

RECORD OF WELL



Location: 41 44 39N - 095 41 49W (N E)

Town: Woodbine #1 (S W): County Harrison E.

SW SW NE NE SW¼ SE¼ sec. 14 T 80 N., R. 42 W. Boyer Twp.

Well name and number Town Well

Owner _____ Address _____

Tenant _____ Address _____

Contractor H. R. Brown Address Blair, Nebr

Drillers _____

Drilling dates Sept. 1936

Well data:

Elevations: Drilling curb 1055 feet; Land surface _____ feet

Determined by _____

Topographic position Boyer River valley

Total depth: Reported 91'6" feet, Measured _____ feet

Drilling method _____

Hole and casing data 61'4" of 12" casing from 0 to 61'4"

67'-91'6" perf. ½"-⅛" largest holes at bottom

3'4" of 10-inch casing from 60'2" to 91'6"

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

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

Sources of water: Principal Dakota Ss 59-91.5; Others _____

Production data: Date

Static depth to water 12 Measuring point

Pumping level 57 at 200 g.p.m. after 22 hours

Specific capacity 3.5 g.p.m. per ft. drawdown; Temperature 51.4 °F.

Pump data: Type pump Column Dia. Length

Cylinder or bowls: Dia. Length Suction pipe

Power Airline

Estimated rate of production: g.p.m. for hrs. a day

Use of water

WATER ANALYSES (in parts per million)

Date samples	Aug. 20, 1937			
Sampled by	Mr. Poston			
Total solids	327.0			
Insoluble matter	21.0			
Alkalinity (Meo)	335.0			
Alkalinity (Phn)	0.0			
pH	7.2			
$Fe_2O_3 + Mn_2O_3 + Al_2O_3$	2.5			
Alkali as sodium	12.2			
Calcium	91.7			
Magnesium	27.9			
Iron (unfiltered)	trace			
Manganese	0.00			
Nitrate	0.4			
Fluoride	0.0			
Chloride	7.0			
Sulfate	48.6			
Bicarbonate	408.7			
Hardness (ppm)	342.0			
Hardness (gpg)	20.0			

Remarks

Laboratory data: Sample storage location

Sample range 1 - 91 1/2 No. spls. 8 No. dupls. & cond. 15

Spls. prepared by Washed range by

Driller's log and cond. Yes good

Insoluble residues: Prepared by Studied by Strip log

Microscopic study 1-91 1/2 SEH strip log 4/5/43 SEH

Gen. log Yes W.C.A. Correl. by Harris

WATER LEVEL DATA

Measuring point _____

Date	Depth to water	Altitude	Remarks

REMARKS

3 Test wells drilled