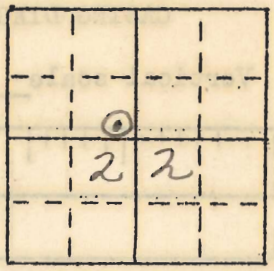
IOWA GEOLOGICAL SURVEY W-1775

In Cooperation with U. S. Geological Survey

RECORD OF WELL



Location:

Town: Sioux City (N E / S W): County Woodbury E.

SE - SE - NW sec. 22 T 89 N., R. 47 W. Sioux City Twp.

Well name and number City of Sioux City - No. 7 (Lowell)

Owner _____ Address _____

Tenant _____ Address _____

Contractor H. Rasmussen Address Sioux City

Drillers Howard Rasmussen

Drilling dates October - December 1, 1943

Well data:

Elevations: Drilling curb 1103.9 feet; Land surface 1103.9 feet

Determined by _____

Topographic position Valley of Floyd

Total depth: Reported 288½ feet, Measured _____ feet

Drilling method _____

Hole and casing data 165'6" of 20-inch casing from 0 to 165'6"
134'8" of 16-inch casing from 153'10" to 288'6"
Lead seal between 16" & 20" casing. 16" casing
perforated with ¾ inch holes, 4" centers for 102'3"
from 160' to 263'1"

Original depth to water 35 ft. ~~above~~ below _____ Date _____

Original elevation of water level 1068.9 ft.; Source of data _____

Sources of water: Principal Dakota Ss.; Others _____

Production data: Date

Static depth to water 35 Measuring point

Pumping level 68 at 907 g.p.m. in 10 hrs

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

Pump data: Type pump Turbine Column Dia. 6" Length 120'

Cylinder or bowls: Dia. Length 91 Suction pipe 6'

Power 150 h.p. Electric Airline

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

Use of water

WATER ANALYSES (in parts per million)

Date samples	Dec. 18, 1943			
Sampled by	W. E. Hale			
Total solids	833			
Insoluble matter	72.5			
Alkalinity (Meo)	352.0			
Alkalinity (Phn)	0.0			
pH	7.2			
$Fe_2O_3 + Mn_2O_3 + Al_2O_3$	8.0			
Alkali as sodium	26.6			
Calcium	172.6			
Magnesium	45.8			
Iron (unfiltered)	3.4			
Manganese	trace			
Nitrate	3.5			
Fluoride	1.5			
Chloride	10.0			
Sulfate	272.8			
Bicarbonate	429.4			
Hardness (ppm)	626			
Hardness (gpg)	36.6			

Remarks

Laboratory data: Sample storage location

Sample range 0-285 No. spls. 55 No. dupls. & cond. 55 fair

Spls. prepared by Washed range. by

Driller's log and cond. Yes good

Insoluble residues: Prepared by Studied by Strip log

Microscopic study 0-285 SEH strip log Jan 6, 1944 SEH

Gen. log ✓ SEHarris Correl. by Harris

WATER LEVEL DATA

Measuring point _____

Date	Depth to water	Altitude	Remarks

REMARKS

This well is to replace the old No 1 Lowell well.

Sheet No. 1 Name of Well Sioux City #2 Lowell Survey No. W-1775

Location Floyd R. floodplain Sioux City Date Drilled ..... Analyst S.E.Hoy

00 — silt & clay, drb brn, v. sltly calc, sltly mic — Alluvium

Alluvium, yel brn, clayey silt much fn sd some highly ox

10 — Alluv. drb brn, as from 0-5

Alluv ditto med brn

20 — Alluv. med drb brn, clayey silt v. sdy from v. fn to v. crse

sand & gr. glac. not well sorted, clayey, A to a ig, ls oxidized

28

30 — sd & gr clayey, gr, fresh ditto but crser more pebbly

gravel clean in spl mostly ig much ls

40 — gravel

sd, & fn gr, mostly qtz grains A to a ls, & ig yel ox

50 — sd, silt, & cla wood & shell frags v. sltly calc

sd crse & v. crse ig, ls & qtz A to a

60 — sd, clean, fn to med, qtz w. ig grains

65

driller 68

sd, ditto pbly probably Dakota ss

70 — ss, med well sorted, A to a sltly micac sltly pol. some grains r frosted many pink grains

ss, ditto pale pink pink grains much marc

80 — ss ditto sltly micac pyrc 1-1/2 cave 0 · 1/2-1/4 60%; 1/4-1/8, 25%; 1/8-1/16, 15%; silt 1%

ss ditto tr mica tr darkies pyrc

90 — ss ditto v. pyrc

ss ditto v. pyrc

Sheet No. 2 Name of Well Sioux City #2 Lowell Survey No. W-1775

Location ____ Date Drilled ____ Analyst S.E.H.J.

00

ss, med & fner pale pnk, A to a less pyrc
some large xtln pellets py. few darkies

ss ditto

10

ss ditto
siltstone pnkish yel, dnse hrd well cemented 5%

ss ditto
siltst - 5%

20

ss ditto
slt tr siltst

ss ditto

30

ss ditto

ss ditto

40

ss med & fner, A to a yel & pnk grains pyrc

slts lt med gr. sdy mica noncalc
py masses.

50

sh, lt med gr rough lam, micac noncalc

sh ditto greasy

60

–162– driller spl half sh & half ss

ss, crser than from 65 - 145 A to a yel & pnk grains
lt gr clr grains

ss lt yel a pol many yel some pnk tr dk red

+1; 1; 1-½, 49; ½-¼, 45; ¼-⅛, 5; 2; ⅛-1/16, tr; slt. 0 little py

70

ss ditto bot fner

80

ss yel gr med to crse

ss ditto med A to a

90

ss ditto med

ss ditto

Sheet No. 3 Name of Well Sioux City #2 Lowell Survey No. W-1225

Location ..... Date Drilled ..... Analyst S.E.T.

200

ss ditto dirty

ss med to crse yel & pnk · few darkies
some pol a marc

10

ss ditto

ss ditto

20

ss ditto

sh 5% med gr micac, lam

ss ditto

30

N.S.

40

ss ditto all dirty

ss, dit med

50

ss fn to crs

ss ditto PY

sh lt med gr 15%

60

sh, lt med gr, fn blk sphs noncalc massive
silty

sh ditto

70

sh ditto

driller ss

sh lt med gr fn mic fner

80

sh ditto micac fner

86 ~~T.D.~~ TD 288'6

90

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STATE OF IOWA
IOWA GEOLOGICAL SURVEY
GEOLOGY ANNEX
IOWA CITY

RESULTS OF PUMPING TEST

LOWELL NO. 7 WELL
Sioux City, Iowa
December 18, 1943

Preliminary to testing the Lowell No. 7 well, pumpage was stopped from the entire well field on December 16 at 7:00 a.m. Previously the Lowell No. 4 well had been pumped at the rate of 1655 gallons a minute from 8:00 a.m. December 14 to 6:50 a.m. December 16 and the Lowell No. 6 well had been pumped from 8:15 a.m. December 15 to 7:00 a.m. December 16. All the wells except the well being tested remained idle during the pumping test and period in which recovery measurements were made.

During the pumping test water level measurements were made on the Lowell No. 1, 3 and 4 wells.

Lowell No. 1--located 23.5 feet northwest of Lowell No. 7 well. The measuring point is top of casing 10.85 feet below pump house floor which is about flush with adjacent land surface. Altitude of measuring point is 1094.0 feet.

Lowell No. 3--located about 845 feet north northwest of Lowell No. 7 well. Measuring point is top of 2½-inch breather pipe, 8.17 feet below pump house floor which is about flush with adjacent land surface. Altitude of measuring point is 1102.4 feet.

Lowell No. 4--located about 2015 feet north northeast of Lowell No. 7 well. Measuring point is top of 2½-inch breather pipe 8.38 feet below pump house floor which is about flush with adjacent land surface. Altitude of measuring point is 1099.9 feet.

Name: Lowell No. 7
Location: SE¼ SE¼ NW¼ sec. 22, T. 89 N., R. 47 W.
Elevation of drilling curb: 1103.9 feet
Owner: City of Sioux City
Contractor: Rasmussen Well Company
Driller: Howard Rasmussen
Date started: October, 1943
Date finished: December 1, 1943
Depth 288.5 feet
Casing: 165'6" of 20" casing from 0 to 165'6"
134'8" of 16" casing from 153'10" to 288'6"
Lead seal between 16" and 20" casing. 16" casing perforated with 3/4 inch holes, 4" centers for 102'3" from 160' to 263'1"
Producing horizon: Dakota sandstone
Test pump: Turbine pump with 120 feet of 6-inch column, 9 feet of bowls (8 stages) and 6 feet of suction pipe. Driven with 150 h.p. electric motor, connected with belt drive.
Discharge pipe: 8' of 6-inch pipe.

cc to Mr. Howard Rasmussen, 4225 Floyd Ave., Sioux City, Iowa, January 11, 1944
Mr. Oscar Sutherland, Supt., Water Department, Sioux City, Iowa, January 11, 1944

STATE OF IOWA

IOWA GEOLOGICAL SURVEY

GEOLOGY ANNEX

IOWA CITY

DRILLER'S LOG

Lowell No. 7 Well
Sioux City, Iowa

Contractor: Rasmussen Well Company, Sioux City, Iowa
Driller: H. Rasmussen
Date started: October, 1943
Date finished: December 1, 1943
Depth: 288'6"
Size of hole: 165'6" of 20"
132'8" of 16"
Main water supply at 162 to 265'
Final water head: 39'

Description	Thick.	From	To
Clay	28	0	28
Sand and gravel	37	28	65
Sandstone	80	65	145
Shale	17	145	162
Sandstone	101	162	263
Shale	12	263	275
Sandstone	3	275	278
Shale	8	278	286

Casing: 165'8" of 20" O.D. 3/8" black water well pipe.
134'8" of 16" O.D. 3/8" black water well pipe. The top 10' is blank; the next 102'3" perforated with 3/4" holes 4" center; the bottom 21'5" is blank pipe.

153'10" to top of 16" pipe
16" lap up in 20", 12'8"
20" pipe has long drive shoe on the bottom.

Lead seal between 16" and 20" casing.

X

IOWA GEOLOGICAL SURVEY
Water Well Data Sheet

Survey Number W-1775

Town Sioux City County Woodbury T.___ N., R.___ E. W.

Name City of Sioux City - No. 7 (Lowell) Location ___ ¼ ___ ¼, Sec. ___

Contractor Howard Rasmussen Driller ___ Use ___

Construction Drilled Drilling Dates Sept. - Nov. 1943 Drilling Depth ___

Topog. Valley of Floyd River Curb Elev. ___ Ref. ___ Total Depth ___

Final Static Level ___ above / below curb Pumping Level ___ Draw down ___ gpm ___ Time pumped ___ Date ___

Depth to bot. pump ___ ft. with ___ ft. suction pipe. Calc. g/ft. drawdown ___ Prin. Prod. ___

Producing Horizons ___

Water levels and pumping tests on various horizons during drilling:

Depth Range	Stat. Level	Pump Level	Draw down	gpm.	Temp.	Producing horizons	Producing formations	Formations cased out

Additional information This well is to replace the old No. 1 Lowell well.

Laboratory Data

Sample range 0-285 Number samples 55 Number Duplicates 55 Cond. fair

Log Yes / No, Cond. ___ Boxed 55 Range 0-285 Date 12-25-43

Remarks gaps 230-40

Microscopic Study Range 0-286	Strip Log ✓	Gen. Log ___	Blue Print ___	Samples Washed No	
Insol. Res. Study Range ___	Strip Log ___	Gen. Log ___	Insol. Res. Prepared ___	Well Corel. SE¼	

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

Name of Well Sioux City #7 Lowell Survey No. W-1775

Location SE¼ SE¼ NW¼ sec. 22 T. 89 N., R. 47 W., Sioux City

Drilled by H. Rasmussen Date Oct. to Dec. 1, 1943

Total Depth 288½ ft. Curb Elevation 1103.9 ft. Static Level 35 ft.

Pumping Test 10 Hours 16 Min; Gal. per min. 907 Drawdown 33 ft. in min.

Casing Data 165'6" of 20" casing from 0-165'6"; 134'8" of 16" casing from 153'10" to 288'6". Lead seal between 16" and 20" casings. 16" casing perforated with 3/4" holes, 4" centers for 102'3" from 160' to 263'1".

Description of Formations

No.		Thick.	From (feet)	To
	Pleistocene system Eldoran series			
1.	Alluvium, drabbish brown, silt and clay, very slightly calcareous	28	0	28
2.	Sand and gravel, poorly sorted, angular to subangular, oxidized at the top, quartz, igneous and some limestone grains	22	28	50
3.	Sand and fine gravel, mostly quartz grains, angular to subangular	15	50	65
	Cretaceous system Dakota group			
4.	Sandstone, many pink grains, medium-grained, well-sorted, angular to subangular, slightly polished, slightly micaceous, pyritic, (1-½, 0%, 1/2-1/4, 59%; 1/4-1/8, 25%; 1/8-1/16, 15%; silt, 1%)	80	65	145
5.	Siltstone, light medium gray, sandy, micaceous, noncalcareous. Pyrite masses	5	145	150
6.	Shale, light medium gray, micaceous noncalcareous, greasy, roughly laminated	12	150	162

Notes:

CC TO Mr. Oscar Sutherland, Water Superintendent, City Hall, Sioux City, Feb. 2, 1944
Mr. Howard Rasmussen, 4225 Floyd Avenue, Sioux City, Iowa, Feb. 2, 1944

Survey No. W-1775

	Description	Thick.	From	To
7.	Sandstone, light yellowish gray in mass, yellow and some pink grains, predominantly subangular, polished (+1, 1%, 1-1/2, 49%; 1/2-1/4, 45%, 1/4-1/8, 5%; 1/8-1/16, trace; silt, 0)	101	162	263
8.	Shale, light medium gray, fine black specks, noncalcareous, massive, silty	12	263	275
9.	Sandstone (driller's log)	3	275	278
10.	Shale light medium gray, finely micaceous, noncalcareous	10½	278	288½

Total depth 288'6"

Notes on Sioux City #7 Lowell

W-1775

Samples from #7 Lowell are excellent, taken at five-foot intervals. Changes in lithology were marked on the driller's log which appears to be accurate. I have taken the driller's top rather than the sample change when the two differed. The resultant log correlates very closely with #5 Lowell.

Twenty-eight feet of alluvial silt and clay was first penetrated followed by 37 feet of glacial valley fill composed of sand and gravel. The lower portion contains much reworked Dakota sand and there appears to be a gradation from true glacial sand to fresh Dakota sandstone.

Dakota sandstone is 195 feet thick divided in two by 18 feet of shale. The sandstone is well sorted with the major grade in the medium-grained range. The lower sandstone is coarser than the upper. The character of the grains differed somewhat from what I think of as "good Dakota". The grains were subangular and, except for the coarsest grains of the lower sandstone, very little polishing was noted. "Darkies" also were rare though a large proportion of the sand grains were pink or yellow. Pink predominated in the upper sandstone, yellow in the lower.

Comparison with #5 Lowell indicates that another 15 feet of drilling would penetrate limestone. The #5 well shows 3 feet of limestone above the upper sandstone but I saw no evidence of it in this well. In other respects the two wells are almost exactly alike. I expected to find siderite pellets which were so abundant in the Airbase wells and also at the Martin Store, but none were observed.

I judge that the Dakota sandstone found in the downtown area of deep (150 feet ±) glacial fill is the lower of the two sandstones encountered in the Lowell field. By my interpretation of the driller's logs the city field west of the downtown area penetrates both sandstones, which are separated by about 25 feet of shale. Though I cannot be sure, it would seem that the Airbase sandstone represents the lower sandstone horizon.

S. E. Harris, Jr.
January 7, 1944

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 089-47W-22BDD
Aquifer Code(s) KIDX
Owner's Name Sioux City #7 Lowell (1943
W Number 01775

Card Q

State: Iowa [19] (1 2) County: Woodbury [97] (3 4) Town: Sioux City, Iowa

Well No. Latitude [4230394N] (5–11) Longitude [0962255] (12–18) Seq. No. [1] (19) Date M D Y [06 19 46] (20–25)

Sampling Depth [288] (26–29) Type [1] (30) Kx10^6 (31–35) pH [7.6] (36–38) Temp. °F (39–41)

SiO_2 (42–44) Ca [129] (45–49) Mg [32.] (50–53) Na +K [23.] (54–58) K [.C] (59–61)

HCO_3 [434] (62–65) CO_3 (66–67) SO_4 [122.] (68–72) Cl [10.] (73–78) Source No. [3] (79) [Q] (80)

Card R

Duplicate Columns 1-25 from Card Q

F [.7] (26–28) NO_3 [.5] (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe [1.1] (42–45)

Mn [.3] (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined [543] (58–63) Calc. (64–69) Hardness Ca,Mg [456] (70–73) Non-Carb. [100] (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 $CaCO_3$ [356] (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: 11

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Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 089-47W-22 BDD
Aquifer Code(s) KIDX
Owner's Name Sioux City #7 Lowell (1943)
W Number 01775

Card Q

State: IOWA [19] (1 2) County: WOODBURY [97] (3 4) Town: SIOUX CITY, IOWA

Well No. Latitude [423039N] (5–11) Longitude [0962255] (12–18) Seq. No. [1] (19) Date M D Y [062355] (20–25)

Sampling Depth [288] (26–29) Type [1] (30) Kx10^6 [904] (31–35) pH [73] (36–38) Temp. °F [55] (39–41)

SiO_2 [ ] (42–44) Ca [130] (45–49) Mg [35] (50–53) Na [19] (54–58) K [8.0] (59–61)

HCO_3 [403] (62–65) CO_3 [0] (66 67) SO_4 [162] (68–72) Cl [12] (73–78) Source No. [3] (79) [Q] (80)

Card R

Duplicate Columns 1-25 from Card Q

F [7] (26–28) NO_3 [0] (29–32) PO_4 [ ] (33–35) B [ ] (36–38) Al [ ] (39–41) Fe [1.1] (42–45)

Mn [3] (46–49) Cu [ ] (50–52) Pb [ ] (53 54) Zn [ ] (55–57)

Solids Determined [600] (58–63) Calc. [ ] (64–69) Ca,Mg [469] (70–73) Hardness Non-Carb. [139] (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 $CaCO_3$ [330] (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: 12

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Geological Survey
Water Resources Division

Local Well No. 089-47W-22BDD
Aquifer Code(s) KIDX
Owner's Name SIOUX CITY #7 LOVELL (104)
W Number 01775

Water Quality
(ppm)

Card Q

State: IOWA (19) County: WOODBURY (97) Town: SIOUX CITY, IOWA

Well No. Latitude 42 30 39 N (5–11) Longitude 096 22 55 (12–18) Seq. No. 1 (19) Date M D Y 12 18 43 (20–25)

Sampling Depth 288 (26–29) Type 1 (30) Kx10^6 (31–35) pH 7.2 (36–38) Temp. °F 53 (39–41)

SiO_2 (42–44) Ca 173 (45–49) Mg 46 (50–53) Na +K 27 (54–58) K .C (59–61)

HCO_3 429 (62–65) CO_3 (66–67) SO_4 273 (68–72) Cl 10 (73–78) Source No. 3 Q (79–80)

Card R

Duplicate Columns 1-25 from Card Q

F .15 (26–28) NO_3 .8 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe .34 (42–45)

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

Solids Determined 833 (58–63) Calc. (64–69) Ca,Mg 626 (70–73) Hardness Non-Carb. 274 (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 $CaCO_3$ 352 (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: [illegible] Date: [illegible]

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Geological Survey
Water Resources Division

Local Well No. 089-47W-22 BDD
Aquifer Code(s) KIDX
Owner's Name Sioux City #7 Lovell (1943)
W Number 01775

Water Quality
(ppm)

Card Q

State: Iowa (19) County: Woodbury (97) Town: Sioux City, Iowa

Well No. Latitude 42 30 39 N (5–11) Longitude 096 22 55 (12–18) Seq. No. 1 (19) Date M 08 D 04 Y 67 (20–25)

Sampling Depth 288 (26–29) Type 1 (30) Kx10^6 11100 (31–35) pH 7.0 (36–38) Temp. °F (39–41)

SiO_2 22. (42–44) Ca 160 (45–49) Mg 32. (50–53) Na 30. (54–58) K 9.2 (59–61)

HCO_3 447 (62–65) CO_3 0 (66–67) SO_4 180. (68–72) Cl 42. (73–78) Source No. 3 (79) Q (80)

Card R

Duplicate Columns 1-25 from Card Q

F .4 (26–28) NO_3 .1 (29–32) PO_4 . (33–35) B . (36–38) Al . (39–41) Fe .25 (42–45)

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

Solids Determined 709 (58–63) Calc. (64–69) Hardness Ca,Mg 530 (70–73) Non-Carb. 164 (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 $CaCO_3$ 366 (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: 4/7

Published:

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 089-47W-22 BDD
Aquifer Code(s) KIDX
Owner's Name Sioux City #7 Lowell (1943)
W Number 01775

Card Q

State: Iowa [19] (1-2) County: Woodbury [97] (3-4) Town: Sioux City, Iowa

Well No. Latitude [4230394N] (5-11) Longitude [0962255] (12-18) Seq. No. [1] (19) Date (M D Y) [092965] (20-25)

Sampling Depth [288] (26-29) Type [1] (30) Kx10^6 [11130] (31-35) pH [7.0] (36-38) Temp. °F [ ] (39-41)

SiO_2 [29.] (42-44) Ca [156.] (45-49) Mg [41.] (50-53) Na [28.] (54-58) K [8.6] (59-61)

HCO_3 [459] (62-65) CO_3 [0] (66-67) SO_4 [172.] (68-72) Cl [45.] (73-78) Source No. [3] (79) [Q] (80)

Card R

Duplicate Columns 1-25 from Card Q

F [.4] (26-28) NO_3 [.1] (29-32) PO_4 [ ] (33-35) B [ ] (36-38) Al [ ] (39-41) Fe [2.2] (42-45)

Mn [.36] (46-49) Cu [ ] (50-52) Pb [ ] (53-54) Zn [ ] (55-57)

Solids Determined [733] (58-63) Calc. [ ] (64-69) Hardness Ca,Mg [560] (70-73) Non-Carb. [184] (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 $CaCO_3$ [376] (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: 1

Published:

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

KDD
089-47W-22BDD

W-1775

Water Quality
(ppm)

Card Q

State: IOWA (1 2) 16 County: WOODBURY (3 4) 97 Town: SIOUX CITY

Well No. 423039N (5–11) Latitude
096225 (12–18) Longitude
Seq. No. 1 (19)
Date M D Y: 120562 (20–25)

Sampling Depth: 288 (26–29)
Type: 1 (30)
Kx10⁶: 1260 (31–35)
pH: 695 (36–38)
Temp. °F: (39–41)

SiO_2: 21X (42–44)
Ca: 196 (45–49)
Mg: 42X (50–53)
Na: 31X (54–58)
K: 97 (59–61)

HCO_3: 493 (62–65)
CO_3: 0 (66–67)
SO_4: 236 (68–72)
Cl: 59 (73–78)
Source No.: 3 Q (79–80)

Card R

Duplicate Columns 1-25 from Card Q

F: 04 (26–28)
NO_3: 9 (29–32)
PO_4: (33–35)
B: (36–38)
Al: (39–41)
Fe: 19 (42–45)

Mn: 04 (46–49)
Cu: (50–52)
Pb: (53–54)
Zn: (55–57)

Solids Determined: 902 (58–63)
Solids Calc.: (64–69)
Ca,Mg: 6655 (70–73)
Hardness Non-Carb.: 261 (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 $CaCO_3$: 404 (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)

Verified PMJ No. 5 (80)

Recorded by: D. AARONSON

Punched by: Punched PMJ Date:

Published:

IOWA GEOLOGICAL SURVEY
Water Analysis Comparison

Town: _____ County: _____ Location: _____ Sec. ____ T. ____ N., R. ____ E. W.

Owner: _____ Contractor: _____ Date Started: _____

Well Number or Location	1	2	3	4	5	6
	#5		#3			#7
Depth of Sample	340					288.5
Formation Source						
Water Level Below Curb						
How Sampled						
Sampled by						
Date Sampled	May 4, 1938		June 13, 1940			Dec. 18, 1943
Total Solids	502		1431			833
Dissolved Solids						
Insoluble Matter						
Alkalinity (MeO)						
Nitrite (NO_2)						
Nitrate (NO_3)						
Sodium(Na) & Potassium(K)*	24.8		82.2			26.6
Calcium (Ca)	101.9		239.4			172.6
Magnesium (Mg)	24.4		62.6			45.8
Iron (Fe)						
Iron (Unfiltered)**	1.0		0.5			3.4
Manganese (Mn)	0.05		0.0			Trace
Aluminum (Al)						
Fluorine (F)	Trace		1.8			1.5
Chlorine (Cl)	8.0		15.0			10.0
Sulphates (SO_4)	119.4		734.3			272.8
Bicarbonates (HCO_3)	353.8		334.3			429.4
Phosphates (PO_4)	0.1					
Borates (BO_3)						
Calculated Hardness***	357.0		854.0			626
Water Lab. Number						

*Na & K not separated, calculated as Sodium(Na): **Includes iron precipitated or flocculated after sample collected: ***Calculated as $CaCO_3$.

Completed Depth _____ ft.; Final Static Water Level _____ ft.; Production _____ GPM; Draw-down _____ ft., at _____ GPM; Gallons per foot draw-down _____. Date Completed _____ 193_.

Remarks: _____

W.E.H

Iowa State Department of Health

OFFICE OF THE
WOODBURY COUNTY HEALTH SERVICE
AND
DISTRICT HEALTH SERVICE 4
SIOUX CITY, IOWA

DANIEL C. BARRETT, M. D., M. P. H.
ACTING DIRECTOR
SIOUX CITY, IOWA

WALTER L. BIERRING, M. D.
COMMISSIONER
DES MOINES, IOWA

March 30, 1945

H. G. Hershey
Associate State Geologist
Iowa Geological Survey
Iowa City, Iowa

Dear Sir:

Replying to your letter of March 29 this is to advise that I did not know that a sample from Lowell #7 well was previously analyzed in your laboratory. Inasmuch as this work has already been done, there is no necessity of making an analysis of this sample.

I would appreciate receiving a copy of the mineral analysis for Lowell #7 well.

Yours very truly,

J. L. Stober

J. L. Stober
Public Health Engineer

JLS:arj

April 2, 1945

Mr. J. L. Stober
Public Health Engineer
District Health Service 4
Sioux City, Iowa

Dear Mr. Stober:

In response to your letter of March 30 we are enclosing a copy of the report on the analysis of water from the Lowell #7 well at Sioux City, as shown by a sample collected on December 18, 1943.

Very truly yours,

H. G. Hershey

HGH'm

Enc:

May 4, 1945

Mr. J. L. Stober
Public Health Engineer
District Health Service 4
Sioux City, Iowa

Dear Mr. Stober:

We made a manganese determination from the water sample which you submitted in bottles U259 and U300x from Lowell Well No. 7 at Sioux City. The manganese content as we determined it was 0.28 parts per million. No other constituents were determined.

If is my thought that you may wish to make this a matter of record in your office.

Very truly yours,

H. G. Hershey

HGH'm

March 29, 1945

Mr. J. L. Stober
Public Health Engineer
District Health Service No. 4
Sioux City, Iowa

Dear Mr. Stober:

Recently you sent in a sample of water for mineral analysis marked as having come from Sioux City Lowell No. 7 well and indicated that it was a new well. We will be glad to analyze the sample but we should like very much to have information concerning the collection. We are particularly interested in knowing how long the well had pumped and the rate of pumping before the sample was collected, and the distance of collection from the well site.

I presume you know that in December, 1943 a sample was collected from the Lowell No. 7 well and was analyzed in our laboratory.

I will appreciate hearing from you at your convenience.

Very truly yours,

H. G. Hershey

HGH:KNB

Notes on Sioux City #7 Lowell

W-1775

Samples from #7 Lowell are excellent, taken at five-foot intervals. Changes in lithology were marked on the driller's log which appears to be accurate. I have taken the driller's top rather than the sample change when the two differed. The resultant log correlates very closely with #5 Lowell.

Twenty-eight feet of alluvial silt and clay was first penetrated followed by 37 feet of glacial valley fill composed of sand and gravel. The lower portion contains much reworked Dakota sand and there appears to be a gradation from true glacial sand to fresh Dakota sandstone.

Dakota sandstone is 195 feet thick divided in two by 18 feet of shale. The sandstone is well sorted with the major grade in the medium-grained range. The lower sandstone is coarser than the upper. The character of the grains differed somewhat from what I think of as "good Dakota". The grains were subangular and, except for the coarsest grains of the lower sandstone, very little polishing was noted. "Darkies" also were rare though a large proportion of the sand grains were pink or yellow. Pink predominated in the upper sandstone, yellow in the lower.

Comparison with #5 Lowell indicates that another 15 feet of drilling would penetrate limestone. The #5 well shows 3 feet of limestone above the upper sandstone but I saw no evidence of it in this well. In other respects the two wells are almost exactly alike. I expected to find siderite pellets which were so abundant in the Airbase wells and also at the Martin Store, but none were observed.

I judge that the Dakota sandstone found in the downtown area of deep (150 feet ±) glacial fill is the lower of the two sandstones encountered in the Lowell field. By my interpretation of the driller's logs the city field west of the downtown area penetrates both sandstones, which are separated by about 25 feet of shale. Though I cannot be sure, it would seem that the Airbase sandstone represents the lower sandstone horizon.

S. E. Harris, Jr.
January 7, 1944

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves Patented. FORM 410546

Sioux City city well No. 7 (Lowell) ICEA
Sioux City (Woodbury Co.) 12-9-43

T.D. 286 ft., producing from lower part of Dakota ss.

Howard Rasmussen, contractor.

Mr. Rasmussen will furnish us with log, etc.

Plan to pump the well for testing on Wed., Dec. 15, 1943. The No. 1 well (nearby) will be open for observational measurements.

Samples furnished to the Survey for this well, including large spls. of the Dakota ss.

WRD Exp. (GW)
Aug. 1964

Verif: PMJ

U. S. DEPARTMENT OF THE INTERIOR Punched PMJ GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

Record by: TWENTER Source of data: FILES Date: 7/8/65 Map: 1:63360 COUNTY NUMBER

State: IOWA (16) County (or town): WOODBURY (97)

Latitude: 42 38 29 N Longitude: 096 22 55 Sequential number: 1

Lat-long accuracy: 2 T. 89 N S, R 47 W E Sec. 22, SE¼, ¼, NW ¼, ¼

Local well number: 089N047W22bdd Other number: B & M W-1225

Local use: 17 25 42 C 1 Owner or name: CITY OF SIOUX CITY

Owner or name: SIOUX CITY IOWA Address: SIOUX CITY IOWA

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) 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, (P) 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.: INVENTORY Field aquifer char.:

Hyd. lab. data:

Qual. water data: type: COMPLETE

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

Aperture cards: yes

Log data: SAMPLE LOG

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 288 ft Meas. rept accuracy: 8

Depth cased: (first perf.) 165'6" ft Casing type: STEEL ; Diam. 20 in

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, (T) open hole, (U) other, (Z)

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) driven, (W) drive wash, (Z) other

Date Drilled: DEC, 1943 9 4 3 Pump intake setting: ft

Driller: H RASMUSSEN (name) SIOUX CITY IA (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple, (cent.), (M) multiple, (turb.), (N) recip, (P) piston, (R) rot, submerg, (S) turb, (T) other Deep Shallow

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

Descrip. MP 1.5 ft above below lsd, Alt. MP 1109

Alt. LSD: 1109 Accuracy: (source) ALTIMETER

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

Date meas: DEC 1943 12 4 3 Yield: 707 GPM: 700 Method determined

Drawdown: 33 ft Accuracy: DRILLERS LOG 3 Pumping period hrs

QUALITY OF WATER DATA: Iron 1.9 ppm Sulfate 236 ppm 6 Chloride 59 ppm 2 Hard. 665 ppm

Sp. Conduct 1260 X x 10^6 Temp. 53 °F 53 Date sampled DEC 5, 1962 D 6 2

Taste, color, etc. VERY SLIGHTLY CLOUDY WITH PALE YELLOW [illegible] DEPOSITS IN LAB

Dr. Hershey:

George called and said that Stober, State Engineer from Sioux City sent in a sample of water from the Lowell Station, Well No. 7, Sioux City for a mineral analysis. The memorandum stated that the well was a new one.

Upon checking George found that an analysis of water from that well had been run in December, 1943.

KNB

J L

P H E

Dist E No 4

Sioux City

+ George

~~Monthly report~~

H.G.H. - We apparently have no analyses from same well for a comparison. the variation in the quality of the water from well to well is pronounced.

A partial on the new sample from Lowell No. 7 might be desirable.

W.E.H.