

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

Name of Well Sergeant Bluff City Well No. 2 Survey No. W- 0692  
Location C/SE $\frac{1}{4}$  SE $\frac{1}{4}$  sec. 30, T. 88 N., R. 47 W., Woodbury County  
Drilled by Howard Rasmussen, Sioux City December 1937 to January 1938  
Total Depth 456 ft. Curb Elevation 1092 ft. Static Level At ground surface ft.  
Pumping Test \_\_\_\_\_ Hours \_\_\_\_\_ Min; Gal. per min. \_\_\_\_\_ Drawdown \_\_\_\_\_ ft. in \_\_\_\_\_ min.  
Casing Data \_\_\_\_\_

Description of Formations

| <u>No.</u>                       | <u>Rock Unit</u>                                                                                                                                                                                                                                                                                                                                                                                                       | <u>Thick.</u> | <u>From</u><br>(feet) | <u>To</u> |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|-----------|
| <b><u>PLEISTOCENE SYSTEM</u></b> |                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                       |           |
| 1.                               | Sand, medium grained (major grade, 1/2-1/4 mm., principal subsidiary grades 1/4-1/8 and 1/2-1 mm.), grading to coarse in upper 5' and to medium fine in lower 5', angular to subangular, for most part fairly well sorted, clean, containing very little silt and no clay. Quartz, feldspar, limestone, chert, dark igneous, granite, and a trace of mica are present. Containing 10-15% of granules and small pebbles | 30'           | 30'                   | 60'       |
| 2.                               | Gravel, granule to small pebble sized, 70-100% from 4-2 mm. in diameter, with major grade usually from 5-2 mm., clean, little silt and no clay, subangular, with coarse sand layer from 85-91'. Composed of granite, dark igneous material, quartz, weathered and fresh chert, feldspar, etc. Upper 5' unit contains one shell and numerous shell fragments                                                            | 45'           | 60'                   | 105'      |

**CRETACEOUS SYSTEM**

Dakota shale

|    |                                                                                                                                                                   |     |      |      |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|------|
| 3. | Shale, red and very light gray interbanded, non-calcareous, soft, containing numerous drab colored concretions, upper 1/2 of this unit contains 50% caved gravel. | 15' | 105' | 120' |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|------|

Notes: Copy to L. A. Peter, Buell and Winter Eng. Co., Sioux City, Iowa, April 3, 1942  
Copy to Howard Rasmussen, Sioux City, Iowa, April 3, 1942

Survey No. W-0692

| <u>Description</u>                                                                                                                                                                                                                       | <u>Thick.</u> | <u>From</u> | <u>To</u> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-----------|
| 4. Shale, light gray to very dark gray, soft, very little to no shaly structure, unctuous, traces of coal; 1% red, hard, non-calcareous iron oxide material                                                                              | 10'           | 120'        | 130'      |
| 5. Shale, light gray with reddish tone, uniform color, no banding, fine silty texture near the top grading to more coarsely silty with depth, non-calcareous                                                                             | 60'           | 130'        | 190'      |
| Dakota sandstone                                                                                                                                                                                                                         |               |             |           |
| 6. Sandstone, light gray, fine grained (major grade 1/4-1/8 mm., Principal subsidiary grade 1/2-1/4 mm.), angular, fairly well cemented, very silty, rather poorly sorted, non-calcareous, gradational from silty shale above            | 5'            | 190'        | 195'      |
| 7. Sandstone, light gray, very silty, slightly micaceous, fine grained (major grade 1/4-1/8 mm., principal subsidiary grade 1/8-1/16 mm.), non-calcareous, angular                                                                       | 10'           | 195'        | 205'      |
| 8. Sandstone, light gray, medium grained to fine (major grade 1/2-1/4 mm., principal subsidiary grade 1/4-1/8 mm.), moderately to well sorted, clean, very little silt and no clay, less than 1% of pyrite, mainly as cementing material | 25'           | 205'        | 230'      |
| 9. Sandstone, light gray, medium grained to coarse, similar to unit above, but more silty and slightly more coarse grained, fair sorting                                                                                                 | 15'           | 230'        | 245'      |
| 10. Shale, light gray and dark gray, micaceous, fine to medium silty textured, weak<br>(Possibly Pennsylvanian)                                                                                                                          | 15'           | 245'        | 260'      |
| 11. Shale, very light gray (mud) and medium gray (as fragments), weak, non-calcareous                                                                                                                                                    | 5'            | 260'        | 265'      |
| 12. Shale, pale grayish red, very fine silty texture, as well mud                                                                                                                                                                        | 5'            | 265'        | 270'      |
| 13. Shale, light gray and pebbly in upper 5', grading to medium gray in lower 4', very fine silty texture, non-calcareous, containing small siderite(?) concretions                                                                      | 9'            | 270'        | 279'      |
| 14. Shale, gray and red interbanded, fine silty texture, non-calcareous                                                                                                                                                                  | 6'            | 279'        | 285'      |

Survey No. W-0692

| <u>Description</u>                                                                                                                                                                                        | <u>Thick.</u> | <u>From</u> | <u>To</u> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-----------|
| 15. Sandstone, light drab gray, fine grained (major grade 1/4-1/8 mm., principal subsidiary grade 1/2-1/4 mm.), angular, fairly well sorted, pyritic, carrying a thin band of drab dolomite at the top    | 10'           | 285'        | 295'      |
| 16. Shale, white to very pale buff, micaceous, soft, flaky, slightly talcose texture. Up to 30% of small siderite (?) concretions in upper 10' and in lower 5'                                            | 30'           | 295'        | 325'      |
| 17. Shale, white to very pale buff, very sandy (up to 50%), sand angular to subangular and very poorly sorted with maximum grain size at 3 mm.                                                            | 10'           | 325'        | 335'      |
| 18. Shale, very light gray to light buff (well mud) with large fragments of medium gray, homogeneous shale. Up to 20% of angular chert fragments                                                          | 10'           | 335'        | 345'      |
| 19. Sandstone, pale gray, coarse, very poorly sorted with maximum diameter at 8 mm., dominantly quartz with 20% of angular translucent chert, 2% of dark igneous material, and 5% of concretionary masses | 10'           | 345'        | 355'      |
| MISSISSIPPIAN SYSTEM (Undifferentiated)                                                                                                                                                                   |               |             |           |
| 20. Chert, very pale buff to white, translucent to porcelain textured, hard                                                                                                                               | 10'           | 355'        | 365'      |
| 21. Dolomite, light buff, very fine crystalline sandy textured, rather porous, fossiliferous very hard                                                                                                    | 8'            | 365'        | 373'      |
| 22. Chert (?) (possibly cave), very pale buff                                                                                                                                                             | 4'            | 373'        | 377'      |
| 23. Limestone, drab to light gray, very fine crystalline texture                                                                                                                                          | 3'            | 377'        | 380'      |
| 24. Dolomite, calcareous, pale buff to drab, fine to medium crystalline, rather porous, no chert in lower 5'. Somewhat glauconitic in lower 5'.                                                           | 10'           | 380'        | 390'      |
| 25. Dolomite, pale gray, slightly drabish, fine to medium-grained, subsaccharoidal, slightly porous in part. Trace of shale, greenish gray                                                                | 5'            | 390'        | 395'      |
| 26. Dolomite, pale gray, medium-grained, granular, argillaceous, drilled to flour                                                                                                                         | 5'            | 395'        | 400'      |

Survey No. W-0692

| <u>Description</u>                                                                                                                                                                        | <u>Thick.</u> | <u>From</u> | <u>To</u> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-----------|
| 27. Dolomite, pale yellowish to drabish gray, medium-grained, granular, slightly argillaceous, 10% chert, white, porous, 20% quartz, clear broken fragments, few euhedral crystals        | 5'            | 400'        | 405'      |
| 28. Dolomite, pale yellowish to drabish gray, medium-grained granular, subsaccharoidal, 50% chert, white to light gray, mottled. 5% quartz, clear broken fragments, few euhedral crystals | 5'            | 405'        | 410'      |
| 29. Dolomite, pale gray, medium-grained, crystalline, mostly dense, saccharoidal in part. 15% chert, pale gray to white. Some caved sand and pink clay                                    | 5'            | 410'        | 415'      |
| 30. Dolomite, pale gray to pale buff, medium-grained, granular, 25% shale, light grayish green. Some caved sand and pink clay                                                             | 5'            | 415'        | 420'      |
| 31. Dolomite, pale to light gray, slightly buffish in part, fine-grained, dense. Trace of chert, pale gray                                                                                | 5'            | 420'        | 425'      |
| 32. Dolomite, light to medium gray, fine-grained, dense, few small vesicles                                                                                                               | 10'           | 425'        | 435'      |
| 33. Dolomite, light drabish gray, fine to medium-grained, crystalline, dense. Trace of chert, white, fine granular, dense                                                                 | 10'           | 435'        | 445'      |
| 34. Dolomite, pale yellowish to drabish gray, medium-grained, granular, drilled to "sand". 40% dolomite, light drabish gray, fine to medium-grained, dense                                | 5'            | 445'        | 450'      |
| 35. Dolomite, pale, slightly yellowish gray, medium-grained, granular, drilled to fine "sand"                                                                                             | 5'            | 450'        | 455'      |
| 36. No sample                                                                                                                                                                             | 1'            | 455'        | 456'      |
| Total depth                                                                                                                                                                               |               |             | 456'      |

## UNITED STATES DEPARTMENT OF THE INTERIOR

Geological Survey  
Water Resources DivisionLocal Well No. 088-47W-30DCCAAquifer Code(s) DXWater Quality  
(ppm)Owner's Name SERGEANT BLUFF CITY (1939)W Number 00692

Card Q

State: IOWA 119 County: WOODBURY 97 Town: SERGEANT BLUFF, IOWA

Well No. 422400N 0962125 Seq. No. 1 Date 050267

Sampling Depth 455 Type 1 Kx10<sup>6</sup> 1300 pH 7.1 Temp. °F 54

SiO<sub>2</sub> 14 Ca 184 Mg 36 Na 58 K 16

HCO<sub>3</sub> 432 CO<sub>3</sub> 0 SO<sub>4</sub> 370 Cl 13 Source No. 3 Q

Card R

Duplicate Columns 1-25 from Card Q

F 11 NO<sub>3</sub> 1 PO<sub>4</sub> 1 B 1 Al 1 Fe 17

Mn 12 Cu 1 Pb 1 Zn 1

Solids 920 Calc. 1 Ca, Mg 610 Hardness Non-Carb. 256

Determined 920 Color 1 No. R

Card S

Duplicate Columns 1-25 from Card Q

Br 1 I 1 Alk. as CaCO<sub>3</sub> 354 Free CO<sub>2</sub> 1 SAR 1

RSC 1 ABS 1 1

Alpha (pc/l) 1 Beta (pc/l) 1 Ra (pc/l) 1 U (ug/l) 1

No. S  
80Recorded by: D. AARONSONPunched by: T Date: 10

Published: \_\_\_\_\_

WRD Exp. (GW)  
Aug. 1964

## U. S. DEPARTMENT OF THE INTERIOR

## GEOLOGICAL SURVEY

## Water Resources Division Well Schedule Form

MASTER CARD

Record by D. ARROWSON Source of data FILE Date 9/20/65 Map COUNTY HWY

State IOWA County (or town) WOODBURY

Latitude: 42° 24' 00" N Longitude: 096° 21' 25" W

Lat-long accuracy: 2" 88' 00" S, R 47' 00" E Sec 30 NE 1/4 SWSW 1/4 SE 5

Local well number: 08847W30DCICA Other number: W-0692

Local use: 00692 38 CITY Owner or name: SERGEANT BLUFF

Owner or name: SERGEANT BLUFF Address: SERGEANT BLUFF, IA

Ownership: County, Fed Gov't, City, Corp or Co, Private, State Agency, Water Dist

Use of water: Air cond, Comm, Dewatering, Fire, Dom, Irr, Ind, P-S, Stock, Instit, Unused

Use of well: Anode, Drain, Seismic, Obs, Oil-gas, Recharge, Spring, Test, Unused, Withdraw, Waste, Destroyed

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

Hyd. lab. data:

Qual. water data; type: COMPLETE

Freq. sampling: IRREGULAR Pumpage inventory: yes 1 no, period:

Aperture cards: yes

Log data: GEOLOGIST LOG

## WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD

Depth well: 455 ft

Meas. 455

Depth cased: 423 ft

Casing type: STEEL

accuracy 8 in

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

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

Date Drilled: APR. 1938 938

Pump intake setting: 40 ft

Driller: HAROLD RASMUSSEN, SIOUX CITY, IOWA

name address

Deep 100 Shallow 40

Power (type): diesel (elec) gas, gasoline, hand, gas, wind; H.P. 5 Trans. or meter no.

Descrip. MP LSD

Alt. LSD: 1092

Accuracy: (source) ALTIMETER

Water Level 0 ft above below MP; Ft above below lsd

Date 4/38

Yield: 70 gpm

Method determined

Drawdown: 70 ft

Accuracy: 3

Pumping period 3 hrs

QUALITY OF WATER DATA: Iron 1.6 Sulfate 6308 Chloride 302 Hard. 7478

Sp. Conduct K x 10<sup>6</sup> 51 Temp. 51 F

Date sampled 4/38

Taste, color, etc.

088-47W-30 DCCA

Well Number 42 24 00 (N) 096 21 25 S

## HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD Section: DISSECTED

Physiographic Province: CENTRAL LOWLAND

TILL PLAIN Drainage Basin: MISSOURI

Top of well site: (D) (F) (H) (S) (T) (V) Subbasin:

MAJOR Aquifer: DEVONIAN? aquifer, formation, group

Lithology: CHERY DOLOM Origin: MARINE

Length of well open to: 33 ft Depth to top of:

MINOR Aquifer: aquifer, formation, group

Lithology: Origin:

Length of well open to: ft Depth to top of:

Intervals Screened: NONE Source of data: WELL CUTTINGS

Depth to consolidated rock: 105 ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics: POOR

Coefficient Trans: Coefficient Storage:

Coefficient Perm: gpd/ft; Spec cap: gpm/ft; Number of geologic cards:

CASING:

8 INCH HOLE

8-INCH CASING 0-198'

6- " " TO 376'

4 " " TO 423'

OPEN HOLE 423' - 456'

|  |  |    |  |
|--|--|----|--|
|  |  |    |  |
|  |  | 30 |  |
|  |  | 0  |  |

Sergeant Bluff City Well (No. 2)

Elevation: 1092 ft.

Location: sec. 30, T. 88 N., R. 47 W., Woodbury Twp.

Total Depth: 456 ft.

Driller:

Contractor: Howard Rasmussen, Sioux City

Drilling dates: Dec. 1937 to January 3, 1938 (Dring. Depth 242') deepened to total depth until April 5, 1938.

Hole size at surface: 8-inches

Casing: Originally 10" temporary pipe  
8" from 0 to 157 ft.  
6" from 157 to 188 ft.  
open hole from 188 to 242 ft.  
(When well was pumped, the 6" came to the surface, so the 8" pipe was then extended on down deeper)

Final 8" from 0 to 198 ft.  
6" to 376 ft.  
4" to 423 ft.  
open hole from 423 to 456 ft.

Static level: Was about 30 ft. below curb, raising at about 395 ft.  
Final static level is at curb.

Temperature: Reported 51° F.

Production: No information on production from Dakota sandstone  
When completed, well would furnish 70 g.p.m. with a pumping level of 70 ft. below curb, or about 1 g.p.m. per ft. drawdown.  
When pumped at 160 g.p.m. the water level would pump down to 70 ft. (pump setting) in about 5 minutes.

Remarks: Old well is about 440 ft. deep (8-6-5-inch casings)  
New well (No. 2) shot with 40 and 30 sticks of dynamite, causing old well to flow.  
(Reportedly drilled to Miss. to obtain softer water)

Gen. log: Pleistocene (sand & gravel) 0 to 105 ft.  
Cretaceous (shale) 105 to 190 ft.  
(Dakota ss.) 190 to 245 ft.  
(shale) 245 to 285 ft.  
(shale, some sandstone) 285 to 355 ft.  
Mississippian (?)  
(chert, dol., ls.) 355 to 456 ft. (T.D.)

Memorandum: Dr. Hershey

Subject: Identification of buff fossiliferous dolomite & chert specimens, from an unknown depth below the surface at Sergeant Bluff, Woodbury Co, Iowa.

The chert fragments composing 65% of the sample compare closely in lithology and color to the chert found between 355 & 365' in the Sergeant Bluff City well #2 (W-0692). Its presence in quantity also favors this horizon.

The buff, highly fossiliferous, porous textured dolomite present in the sample compares closely with the buff dolomite between 365 & 373' in the same well. The lithologies match closely and little doubt is held concerning the proper placing of this specimen in the Sergeant Bluff Well

W.C.S

11/8/38

IOWA GEOLOGICAL SURVEY  
Ground Water Investigation

TOWN: Sergeant Bluffs      COUNTY: Woodbury

LOCATION: Sec. 30, Township 88, N.,      R. 47 W.      Woodbury Township

Owner of Well -- City of Sergeant Bluffs

USE OF WATER -- CITY SUPPLY.

CONSTRUCTION OF WELL: Drilled

CONTRACTOR: Harold Rasmussen.      Date drilled 4-5-38

WELL DATA:

Total depth: 456 feet.

Topographic position of well : Level ground

Static level: Even with ground.

No data as yet on drawdown.

Temperature of water at pump 51° F.      Air temperature: 38° F.

Type of pump: Turbine      Power: Electric

Depth of Impello setting: 40 feet

SOURCE OF WATER: Dr. Hershey will review drillings and determine formation.

Sample taken for mineral analysis.

Data collected by E.J. Marzec, 4/5/38.

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

*Folger*  
*Hager (2)*  
*Norton*  
*Beau*  
*Phipps*

Sargent Bluff Well  
S $\frac{1}{2}$ , Sec. 30, T88N, R47W.  
Woodbury County

Curb elevation = 1082

|                                                                                                                                                             | <u>Thick</u> | <u>From</u> | <u>No</u> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|-----------|
| <u>PLEISTOCENE SYSTEM</u>                                                                                                                                   |              |             |           |
| 1. No sample.                                                                                                                                               | 0            | 0           | 30        |
| 2. Sand, medium grained, grading to coarse in upper 5 ft. and to medium fine in lower 5 ft, subangular, well sorted, clean. 15% granules and small pebbles. | 30           | 30          | 60        |
| 3. Gravel, granule to small pebble sized, with coarse sand layer from 85 to 91 ft. Sub-angular, clean, with numerous shell fragments in upper 5 ft.         | 45           | 60          | 105       |
| <u>CRETACEOUS SYSTEM</u>                                                                                                                                    |              |             |           |
| Dakota Shale                                                                                                                                                |              |             |           |
| 4. Shale, red and very light gray interbanded, non-calcareous, soft, with numerous concretions                                                              | 15           | 105         | 120       |
| 5. Shale, light and very dark gray interbanded, soft, unctuous, traces of coal.                                                                             | 10           | 120         | 130       |
| 6. Shale, light gray, silty textured, homogeneous                                                                                                           | 60           | 130         | 190       |
| Dakota Sandstone                                                                                                                                            |              |             |           |
| 7. Sandstone, light gray, fine grained, angular, fairly well cemented, very silty, poorly sorted.                                                           | 5            | 190         | 195       |
| 8. Sandstone, light gray, very silty, micaceous, fine grained, angular.                                                                                     | 10           | 195         | 205       |
| 9. Sandstone, light gray, medium grained to fine, well sorted, clean, traces of pyrite as cementing material.                                               | 25           | 205         | 230       |
| 10. Sandstone, light gray, medium to coarse grained, fair sorting, but silty.                                                                               | 15           | 230         | 245       |
| 11. Shale, light gray and dark gray, micaceous, fine silty textured, soft.                                                                                  | 15           | 245         | 260       |
| 12. Shale, very light gray, weak, non-calcareous                                                                                                            | 5            | 260         | 265       |
| 13. Shale, pale grayish red, very fine silty texture.                                                                                                       | 5            | 265         | 270       |

|                                                                                                                                                       | <u>Thick</u> | <u>From</u> | <u>To</u> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|-----------|
| 14. Shale, light gray and pebbly in upper 5 ft., grading to medium gray in lower 4 ft., very fine silty texture, non-calcareous, small concretions.   | 9            | 270         | 279       |
| 15. Shale, gray and red interbanded, fine silty texture, non-calcareous.                                                                              | 6            | 279         | 285       |
| 16. Sandstone, light drab gray, fine grained, angular, well sorted, pyritic, with a thin band of drab dolomite at the top.                            | 10           | 285         | 295       |
| 17. Shale, white to pale buff, micaceous, soft, flaky, 30% small concretions in upper 10 ft. and lower 5 ft.                                          | 30           | 295         | 325       |
| 18. Shale, white to pale buff, very sandy. Sand angular, very poorly sorted.                                                                          | 10           | 325         | 335       |
| 19. Shale, very light gray to light buff. 20% angular chert fragments.                                                                                | 10           | 335         | 345       |
| 20. Sandstone, pale gray, coarse, very poorly sorted with maximum grains at 8 millimeters, dominantly quartz with 20% chert, 5% concretionary masses. | 10           | 345         | 355       |

#### MISSISSIPPIAN SYSTEM

|                                                                                                                      |    |     |     |
|----------------------------------------------------------------------------------------------------------------------|----|-----|-----|
| 21. Chert, very pale buff to white, translucent, hard.                                                               | 10 | 355 | 365 |
| 22. Dolomite, light buff, fine crystalline, saccaroidal textured, porous, fossiliferous, hard.                       | 8  | 365 | 373 |
| 23. Chert (?) (possibly cave), very pale buff                                                                        | 4  | 373 | 377 |
| 24. Limestone, drab to light gray, very fine crystalline.                                                            | 3  | 377 | 380 |
| 25. Dolomite, calcareous, pale buff to drab, fine to medium crystalline, porous, somewhat glauconitic in lower 5 ft. | 10 | 380 | 390 |



Strike St. Peter Woodbury Co

Dip 19.5' / mi

Dip 4 1/2' / mi

Dip 11' per mi

Charokan

1335 } 323'  
1035 }

Holstein

} 27'

X Sargent Bluff

Top St. Peter = 403' (calculated)

Plot to determine top of St. Peter  
at Sargent Bluff, Woodbury

6 mi

42

45  
3  
135

TREASURY DEPARTMENT  
BUREAU OF  
UNITED STATES PUBLIC HEALTH SERVICE  
CO-OPERATING WITH  
WOODBURY COUNTY HEALTH UNIT  
SIOUX CITY, IOWA

JAN 4 P.M.

W. S. PETTY, M. D. DIRECTOR

January 3, 1938

Water Division  
State Hygienic Laboratories  
Iowa City, Iowa.

Gentlemen:

Am sending a water sample for mineral analysis.  
This sample was collected from a depth of 242 feet at a  
new well at Sargeant Bluffs. Please run the usual  
analysis to determine the suitability of this water.  
As construction of this well is being held up until  
results of the analysis are know, I would like to get  
an analysis as soon as possible.

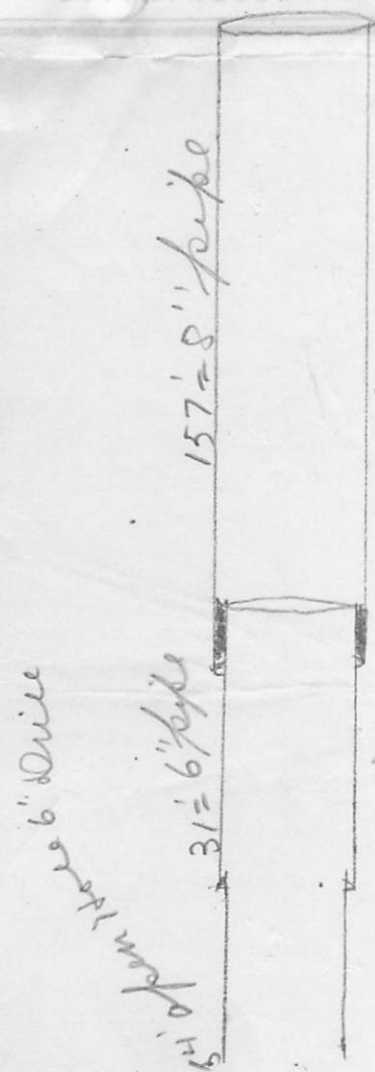
HM

Very truly yours

EDMUND J. MARZEC  
Woodbury County Sanitary Engineer.

Copy to-  
Dr. Hershey  
Iowa Geological Survey.

Sargent Bluff Ca  
 Jan 3-38  
 4" 8" Well. Trees



when this  
 well was pumped  
 the 6" pipe come  
 to the top of  
 well

will try to get them  
 to set the 8" to sand  
 stone.

we are waiting  
 on the return of these  
 samples to complete  
 the work.  
 Hoping to hear from  
 you as soon as  
 possible.

H. Rasmussen

January 22, 1938

Mr. Howard Rasmussen  
Rasmussen Well Company  
Sioux City, Iowa

Dear Mr. Rasmussen:

Thank you very much for the samples from the Aurelia and Sergeant Bluff wells. They arrived while I was away from the office and were not opened immediately. Your note saying that you were waiting for a report on the Sergeant Bluff samples was discovered only today when those samples were being prepared for study. The microscopic determinations are now being made, and a report on them will be sent to you not later than tomorrow morning. I am extremely sorry for the delay and assure you that it will not happen again.

Very truly yours,

H. G. Hershey

HGH:A

See Mineral  
Analysis

January 23, 1938

Mr. Howard Rasmussen  
Rasmussen Well Company  
Sioux City, Iowa

Dear Mr. Rasmussen:

Enclosed is our generalized log based on the detailed description of the drill cuttings of your well at Sargeant Bluff. You will notice that, according to the interpretation, the glacial material is continuous from the surface to 105 feet and is underlain by Cretaceous Dakota shale to a depth of 190 feet. Beneath the shale is the Dakota sandstone to a depth of 245 feet and this is underlain in turn by a shale which may be a member of the coal measures. Additional samples from the bottom shale would be necessary before an accurate determination could be made. The Dakota Sandstone, of course, is the best available aquifer at the present well site.

Regarding the construction of the well, I agree with you that the best results will be obtained if the 8-inch casing is set on top of the sandstone or a short distance within it. I will appreciate it if you will send me the final data on construction, static water level, production and pumping levels, and any other material that you believe to be important.

We now have a new system for handling samples which are received at the laboratory and in the future there will be no delay in getting reports back to you on material which you want rushed.

If I can be of further service on the Sargeant Bluff project please do not hesitate to call on me.

Very truly yours,

H. G. Hershey

February 2, 1938

Mr. Howard Rasmussen  
Rasmussen Well Company  
Sioux City, Iowa

*Woodbury*

Dear Mr. Rasmussen:

Thank you for your letter of January 27th concerning the Sergeant Bluff well. The further deepening of the well will make it one of the most important wells in western Iowa, and I appreciate it greatly that you realize this and are saving samples from each 5-foot interval of drilling. We will study the samples down to 400 feet as soon as they arrive.

I expect to make a trip to northwest Iowa in the near future and will make it a point to see you in Sioux City at that time. If possible, I will let you know in advance when I will be there.

Very truly yours,

H. G. Hershey

HGH:A

# RASMUSSEN BROS. WELL CO.

RUSSELL  
PHONE  
8-4181

3604 FOURTH AVENUE  
SIOUX CITY, IOWA

HOWARD  
PHONE  
6-6219

January 27, 1938

Mr. H. G. Hershey  
103 Geology Bldg.  
Iowa City, Ia.

Dear Mr. Hershey:

In regard to the Sergeant Bluff Well, we tested out at 250 ft. and samples of the water were sent in for tests, but the Council decided to go deeper with it, so we are now 380 ft. into limestone.

We are taking samples every 5 ft. and will send them to you at the 400 ft. depth.

If you are up this way soon I would like to have you stop.

Thanking you very much for your return on the samples.

Very truly yours,

*Harold Rasmussen*

February 19, 1938

Mr. Howard Rasmussen  
Rasmussen Well Company  
4229 Floyd Avenue  
Sioux City, Iowa

Gentlemen:

A detailed study of samples from the Sergeant Bluff well has just been completed, and a generalized summary is attached. The formation summary of the upper portion of this well was sent to you some time ago. The Cretaceous, of which the Dakota sandstone is a part, continues to a depth of 347 feet. Its basal member is a shale at this locality and below it are limestones, dolomites, and cherts with a small amount of sandstone which have been tentatively correlated as Mississippian in age.

The material which we called sandstone at the time of my visit to Sergeant Bluff is in reality a porous dolomite which drills up to resemble a sandstone. This material may contain all of the water necessary for the town supply. I will be very anxious to know the results of your pumping test on it.

Below the present bottom of the hole I would expect limestones and dolomites with a few thin sandstone beds to continue to a depth of approximately 680 feet. At about 680 feet the top of the St. Peter sandstone should be reached. Its thickness at Sergeant Bluff is calculated as 25 feet, but we have no information on the quality or quantity of the water which may be expected from it. If you decide to drill deeper, I will be glad to furnish a more detailed forecast of the formations between the bottom of the hole and the St. Peter sandstone.

Very truly yours,

H. G. Hershey

HGH:A  
Enc.

April 25, 1938

Mr. E. J. Marzec  
Sanitary Engineer  
Woodbury County Health Unit  
Sioux City, Iowa

Dear Mr. Marzec:

Thank you very much for the data on the Sergeant Bluff and the Stone Park wells and for the data sheet for the water sample which you collected from city well No. 5 at Sioux City.

I am somewhat concerned by the fact that the Stone Park well did not clear up when pumping 30 gallons per minute. Does the driller have any explanation of this fact? From the data which I have available there appears to be no reason why the well should not clear up in a relatively short time.

I had hoped to visit Sioux City during the week just passed, but other work prevented my doing so, and at the present time it is improbable that I will get to the northwestern part of the state until some time in June.

Very truly yours,

H. G. Hershey

HGH:A

TREASURY DEPARTMENT  
BUREAU OF  
UNITED STATES PUBLIC HEALTH SERVICE  
CO-OPERATING WITH  
WOODBURY COUNTY HEALTH UNIT  
SIOUX CITY, IOWA

W. S. PETTY, M. D., DIRECTOR

April 20, 1938

Dr. Hershey  
Iowa Geological Survey  
Iowa City, Iowa.

Dear Doctor:

The curb elevation at the Sargeant Bluff well is about 1092.2.  
The eight inch casing is down to 198 feet, Six inch casing down  
to 376 feet, Four inch casing down to 423 feet and down to 456  
feet is an open hole.

Pumping at 160 gpm with a 70 foot impellar setting drew the water  
below the suction tube in five minutes. The pump will throw about  
70 gpm at a 70 foot setting. No data as to drawdown was available.

Enclosed is a copy of the data sheet on the No.5., well at Sioux City.

*Transferred  
H.J.R. 5/27/38* [The well at Stone Park is still unfinished. Most of the six inch  
casing was replaced with eight inch. The well will not clear up  
at a pumpage of 30 gpm. No work was being done on the 19th at this  
well.]

HM

Very truly yours

*E. J. Marzec*

E. J. MARZEC  
Sanitary Engineer.

W-0692

|  |    |   |
|--|----|---|
|  |    |   |
|  |    |   |
|  | 30 |   |
|  |    | ⊙ |

Town: Sergeant Bluff ( N E )  
 ( S W ): County Woodbury  
C/SW - 5E sec. 30 T 88 N., R. 47 W. Woodbury Twp.

Well name and number City Well #2

[illegible][illegible]

Contractor H. Rasmussen Address Sioux City

Drillers

Drilling dates Dec. 1, 1937 - April 5, 1938

Elevations: Drilling curb 1092 feet; Land surface 1092.189 feet

Determined by

Topographic position

Total depth: Reported 456 feet, Measured feet

Drilling method . . . . .

Hole and casing data 8-inch hole

8-inch casing 0 to 198'

6-17ch " 4.0" 376

4-inch " to 423'

open hole 423 - 456'

Original depth to water 0 ft. <sup>above</sup> curb Date

Original elevation of water level 1092 ft.; Source of data Obs.

Sources of water: Principal *Silurian* ? ; Others

Production data:

Date

Static depth to water at surface Measuring pointPumping level 70 at 70 g.p.m.Specific capacity 1 g.p.m. per ft. drawdown; Temperature 51 °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 April 5, 1938Sampled by E. J. MarzeeTotal solids 1353.0Insoluble matter 29.0Alkalinity (Meo) 260.0Alkalinity (Phn) 0.0pH 6.8Fe<sub>2</sub>O<sub>3</sub> + Mn<sub>2</sub>O<sub>3</sub> + Al<sub>2</sub>O<sub>3</sub> 16.0Alkali as sodium 122.0Calcium 233.0Magnesium 39.5Iron (unfiltered) 1.6Manganese 0.08Nitrate 0.00Fluoride 1.5Chloride 30.0Sulfate 689.9Bicarbonate 317.2Hardness (ppm) 747.0Hardness (gpg) 43.7

Remarks \_\_\_\_\_

Laboratory data:

Sample storage location \_\_\_\_\_

Sample range 30-455 No. spls. 85 No. dupls. & cond. 0

Spls. prepared by \_\_\_\_\_ Washed range \_\_\_\_\_ by \_\_\_\_\_

Driller's log and cond. Yes

Insoluble residues: Prepared by \_\_\_\_\_ Studied by \_\_\_\_\_ Strip log \_\_\_\_\_

Microscopic study 30-455 WCS, DAD strip log 1-22-38Gen. log ✓ Correl. by Schuldt & Davis

# WATER LEVEL DATA

Measuring point \_\_\_\_\_

| Date | Depth to water | Altitude | Remarks |
|------|----------------|----------|---------|
|      |                |          |         |
|      |                |          |         |
|      |                |          |         |
|      |                |          |         |
|      |                |          |         |

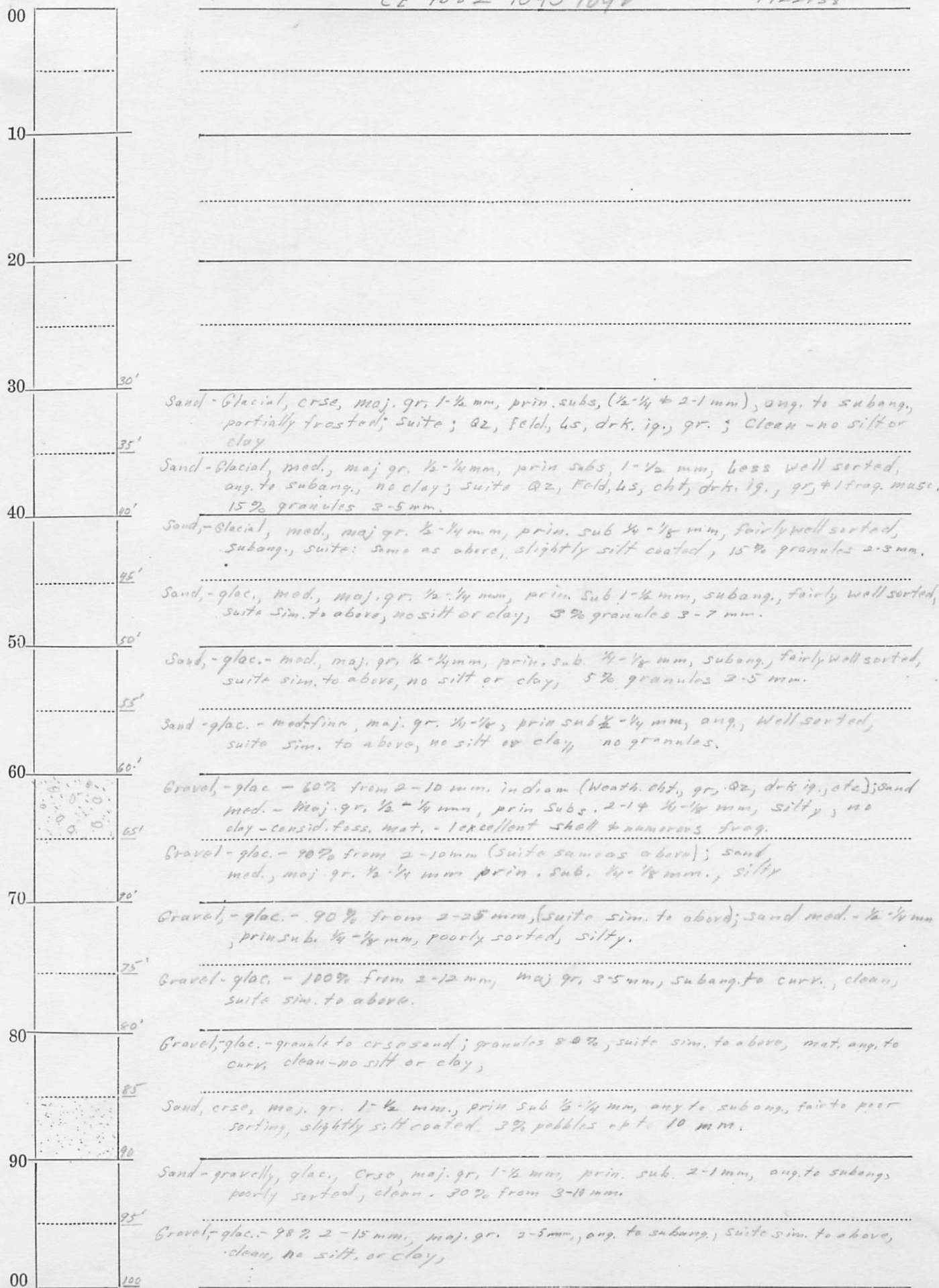
## REMARKS

Shot with 40 & 30 sticks of dynamite  
Reportedly drilled to Miss. to obtain softer water

Location Woodbury Co., Center SW, SE, Sec. 30, T88N, R. 47W Date Drilled Dec. - Jan 3-38 Analyst Schuldt

CE ~~1002~~ 1093 1092

1/22/38



Location \_\_\_\_\_ Date Drilled \_\_\_\_\_ Analyst Schuldt

1/22/38

Dakota Sh.

|     |      |                                                                                                                                                                                                                                              |
|-----|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 100 | 100' | Gravel, glacial - 98% granules to small pebbles (2-20 mm), maj. gr. 2-5 mm, ang. to subang., Suite sim. to above, clean, no silt or clay.                                                                                                    |
|     | 105' | Shale, pebbly, lt. gray and red (banded?) non calc. coarse shaly text, cont. 50% of granules to small pebbles (may be cave from gravel above), slightly micaceous                                                                            |
| 10  | 110' | Sh, pebbly, red with minor % lt. gray, non calc., concretionary, pebbly, but much less so than spl. above, v. fine silty text, as well mud.                                                                                                  |
|     | 115' | Sh, red & lt. gray, sim. in color, char., & comp. to spl. 110-115' concret., <u>no</u> pebbles, as well mud.                                                                                                                                 |
| 20  | 120' | <u>gray to</u><br>Sh, v. drk gray to blk, unctuous soapy feel, v. poor to no shaly struct.; 51% coal frag. - prob. v. thin seam; 1% brick red, hard mat. showing botrioidal surf. in part, native in sh.; 1% carved frag. from gravel above. |
|     | 125' | Sh, v. drk. gray to blk, sim. to spl. 120-125' in color, text, & approx. comp.                                                                                                                                                               |
| 30  | 130' | Sh, <sup>lt.</sup> gray with slightly reddish tone, uniform color, fine silty slightly micac. text, non calc., slightly pebbly (cave), wholly well mud.                                                                                      |
|     | 135' | Sh, lt. reddish gray, sim. to spl. 125-130' in color, text, & approx. comp., wholly well mud.                                                                                                                                                |
| 40  | 140' | Sh, lt. reddish gray, sim. to spl. 125-130' in color, text. more micaceous & much harder (poss. dol.)                                                                                                                                        |
|     | 145' | Sh, lt. reddish gray, sim. to spl. 125-130' in color, text, & approx. comp., mostly well mud.                                                                                                                                                |
| 50  | 150' | Sh, lt. reddish gray, sim. to spl. 125-130' in color, text, & approx. comp., mostly well mud; <sup>new</sup> frag. blk. coal, prob. cave from vic. of 115'                                                                                   |
|     | 155' | Sh, lt. reddish gray, sim. to spl. 125-130' in color, text, & approx. comp., mostly well mud,                                                                                                                                                |
| 60  | 160' | Sh, lt. reddish gray, sim. to spl. 125-130' in color & text, mostly well mud, 20% pebbles & small gravel.                                                                                                                                    |
|     | 165' | Sh, lt. reddish gray, sim. to spl. 125-130' in color, text, & approx. comp., mostly well mud                                                                                                                                                 |
| 70  | 170' | Sh, lt. reddish gray, sim. to spl. 125-130' in color, text, & approx. comp., mostly well mud, becoming more coarsely silty text. with depth.                                                                                                 |
|     | 175' | Sh, lt. reddish gray, sim. to spl. 125-130' in color, text, & approx. comp. rather coarsely silty text.                                                                                                                                      |
| 80  | 180' | Sh, lt. reddish gray, sim. to spl. 125-130' in color, coarsely silty, rather pebbly.                                                                                                                                                         |
|     | 185' | Sh, lt. reddish gray, sim. to spl. 125-130' in color, coarsely silty, pebbly.                                                                                                                                                                |
| 90  | 190' | SS, lt. gray, fine gr. (maj. gr. 1/4-1/8 mm, prin. sub. 1/8-1/16 mm), ang., fairly well cemented, v. silty, rather poorly sorted, non calc., gradational from silty sh. above, slightly micaceous                                            |
|     | 195' | SS - v. silty or sandy sls. or sh., sim. in appear. to sh. 185-195'; sand fine gr., maj. gr. 1/4-1/8, prin. sub. 1/8-1/16 mm., micaceous                                                                                                     |
| 00  |      |                                                                                                                                                                                                                                              |

Location \_\_\_\_\_ Date Drilled \_\_\_\_\_ Analyst Schuldt  
1/22/37

|     |      |                                                                                                                                                                                                                                           |
|-----|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 200 | 200' | SS, v. silty, lt. reddish gray, sim. to splc. 195-200' in color, text, & comp.                                                                                                                                                            |
|     | 205' | SS, lt. gray, clean, med. gr. (maj. gr. $\frac{1}{2}$ - $\frac{1}{4}$ , prin. sub. $\frac{1}{4}$ - $\frac{1}{8}$ mm), well sorted, angular, non calc., no silt.                                                                           |
| 10  | 210' | SS, lt. gray, clean, med. gr., sim. to splc. 205-210' in color, & comp., slightly more coarse than splc. above. trace of pyrite.                                                                                                          |
|     | 215' | SS, lt. gray, clean, med. gr., sim. to splc. 205-210' in color, text, & comp., rather well sorted.                                                                                                                                        |
| 20  | 220' | SS, lt. gray, clean, med. gr., sim. to splc. 205-210' in color, text, & comp., well sorted.                                                                                                                                               |
|     | 225' | SS, lt. gray, clean, med. gr., sim. to splc. 205-210' in color, text, & comp., fairly well sorted; 2% pyrite cemented az. gr. aggregates.                                                                                                 |
| 30  | 230' | SS, lt. gray, med. gr., sim. to splc. 205-210' in color, text, & comp.; slightly silty med. gr.; maj. gr. $\frac{1}{2}$ - $\frac{1}{4}$ mm, prin. sub. grades $\frac{1}{4}$ - $\frac{1}{8}$ & $1\frac{1}{2}$ mm, only fairly well sorted. |
|     | 235' | SS, lt. gray, med. gr., sim. to splc. 230-235' in color, text, & comp.; Trace pyrite.                                                                                                                                                     |
| 40  | 240' | SS, lt. gray, med. gr., sim. to splc. 230-235' in color, text, & comp.                                                                                                                                                                    |
|     | 245' | Sh, lt. gray & drk. gray, fine to med. silty textured, cont. consid. sand which is prob. cave, non calc., as mud, micaceous; 7% of sand                                                                                                   |
| 50  | 250' | Sh, lt. gray, fine silty text, sim. to splc. 245-250', as mud. <span style="float: right;">[2/15/38]</span>                                                                                                                               |
|     | 255' | Sh, lt. gray, fine silty text, sim. to splc. 245-250'; as mud.                                                                                                                                                                            |
| 60  | 260' | Sh, v. lt. gray, & drk. gray, v. fine text., wholly as well mud; 15% drk. drab, resinous dol., much abraded, (poss. cave); sh. non calc.                                                                                                  |
|     | 265' | Sh, pale grayish red, v. fine silty text, cont. decayed org. frag. & 10% of sz. gr. & br. dol. gr., ang. to subang., crsc.                                                                                                                |
| 70  | 270' | Sh, medium gray, v. fine silty text, non calc., as well mud. v. pebbly, (dom. az with br. to gray dolomite).                                                                                                                              |
|     | 275' | Sh, lt. gray with faint reddish tone, fine silty text, as well med, non calc., 1 hard br. concret. non calc. (siderite or phosphate (?))                                                                                                  |
| 80  | 280' | Sh, lt. gray interbanded with red, fine silty text, non calc., as well mud, non frag. drab dol.                                                                                                                                           |
|     | 285' | SS, lt. drab gray, fine (maj. gr. $\frac{1}{4}$ - $\frac{1}{8}$ mm, prin. sub. $\frac{1}{2}$ - $\frac{1}{4}$ mm), ang., fairly well sorted, underlying or containing a thin band of drab dolomite; 15%; 5% pale greenish marcasite.       |
| 90  | 290' | SS, sim. to ss. splc. 285-290' but cont. 1% of dol. & 1% pyrite                                                                                                                                                                           |
|     | 295' | Sh, wh., micaceous, soft, flaky, 30% drab siderite (?) concretions.                                                                                                                                                                       |
| 00  |      |                                                                                                                                                                                                                                           |

Location \_\_\_\_\_ Date Drilled \_\_\_\_\_ Analyst Schuldt

|     |      |                                                                                                                                                                                                                        |
|-----|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 300 | 300' | Sh, pale buff near base & white above. Wh. portion sim to above, buff portion sim. to above but less micaceous; concret. & larger frag. siderite or dol., drab, 15%.                                                   |
|     | 325' | Sh, wh. to pale pink, talcose feel & text., micaceous appearing, v. soft, as mud; 3% drab concret.                                                                                                                     |
| 10  | 310' | Sh, wh. to lt. pale gray, slightly talcose in text. & feel, micaceous, v. soft, as mud; 1% concret.                                                                                                                    |
|     | 315' | Sh, lt. pale buff to wh., slightly talcose in text & feel, micaceous, v. soft, as mud; 15% concret.                                                                                                                    |
| 20  | 320' | Sh, buff & wh., slightly talcose in appear., l. sandy (med gr, ang. to subang.); sand crss. at least 50% of splc. sand v. poorly sorted - gr. up to 3mm. in diam. Qz & sid. concret. few frag. pinkish highly carb. ss |
|     | 325' | Sh, lt. buff, v. sandy, sim. to splc. 320-325'                                                                                                                                                                         |
| 30  | 327' | Sh, lt. buff (well mud) with large frag. (orig.) of Sh, french gray, v. homogeneous text., platy parting, 15% 5' 10% ch. frag. & Qz, ch. dom.                                                                          |
|     | 335' | Sh, lt. buff (well mud) with lg. frag. (orig.) of Sh, french gray, homogeneous, platy parting, 20%, bearing concretions; 10% lt. buff to lt. gray ch. frag.; minor % Qz gr. 1 faded Qz. cryst. (authigenic)            |
| 40  | 340' | Sh, lt. gray, dom. well mud, with 25% lt. gray, v. fine silty text. Sh frag & 20% ang. ch. frag. & siderite (?) concretions.                                                                                           |
|     | 345' | ss or sd, v. pale gray, crss, v. poorly sorted, max. size 8mm, ang. to subang., dom. Qz, but 20% lt gray to lt buff trl. ch., 2% drk lg., 5% concretions & concret. masses, pink Qz, pyrite.                           |
| 50  | 350' | ss or sd, pale buff, v. crss. (maj. gr. 2-1 mm, prin. sub. 1-1/2 mm); 50% Qz frag, ang. to subang. 25% of which is as cemented aggregates; 50% ch., v. pale buff to gray, transl. to porcelain text. No lg. material.  |
|     | 355' | cht, v. pale buff to wh., transl. to porcelain text., fresh, brd; 5% Qz frag.; 3% concret. & concretionary masses; (cht. foss); 1% pyrite.                                                                             |
| 60  | 360' | cht, v. pale buff to wh., splc sim. to splc. 355-360' in color, text., & approx. comp.                                                                                                                                 |
|     | 365' | Dol., lt. buff, v. fine sandy text, rather porous, v. hard, foss., v. slow efferv.                                                                                                                                     |
| 70  | 370' | cherty dol., 20% Qz. sand, 30% cht, 4% dol. sim. to dol. 365-370', 5% concret. 1% pyrite                                                                                                                               |
|     | 375' | ls, cherty, drab to lt. gray, v. fine xline text., nearly sim. to splc. 365-370' med. to rapid efferv; concret. <1%.                                                                                                   |
| 80  | 380' | Dol., calcareous, v. pale buff, fine xline (1/4-1/2 mm), rather porous, slow to med. efferv, grading to gray & in parts to green. No chert.                                                                            |
|     | 385' | Dol., calc., drab, med xline, 1/2-1/4 mm, porous, somewhat green speckled (glauconite?) no cht. - as dol. sand. after drilling.                                                                                        |
| 90  | 390' | Dol, pale gray, slightly sl. drabsh, f- —, sub sac sl. porous in part. Tr sh. grn. arg.                                                                                                                                |
|     | 395' | Dol., pale gray, gran. argil. - drilled to flour.                                                                                                                                                                      |
| 400 |      |                                                                                                                                                                                                                        |

Location Date Drilled Analyst Davis 3-31-42

