

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

Name of Well Grinnell City Well No. 5 Survey No. W- 1571
 Location NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 16, T. 80 N., R. 16 W.
 Drilled by Thorpe Well Co.*
 Total Depth 2260 ft. Curb Elevation 1020 ft. Static Level 271 ft.
 Pumping Test 6 Hours 30 Min; Gal. per min. 397 Drawdown 46 ft. in min.
 Casing Data 315' of 16" C.I. pipe 0 to 315'; 240' of 10 5/8" liner 1170-1410';
1441' of 8" C.I. pipe 300 to 1741'.

No.	Rock Unit	Description of Formations		
		Thick.	From (feet)	To
1.	No samples	2006	0	2006
ORDOVICIAN SYSTEM				
Prairie du Chien group				
Onondaga formation				
2.	Dolomite, pale gray, medium-grained, crystalline. Chert 2% to 5%, white, oolitic in part	9	2006	2015
3.	Dolomite, pale gray, medium-grained, crystalline. Chert 30% to 50%, white, oolitic in small part. Sand trace	10	2015	2025
4.	Dolomite, pale drabish gray, medium-grained. Chert 10%, white. Sand trace.	5	2025	2030
5.	Dolomite, pale drabish gray with trace of pink, medium-grained, crystalline. Chert 15% to 45%, white	15	2030	2045
6.	Dolomite, pale drabish gray with trace of pink, medium-grained, crystalline. Chert 5% to 15%, white	30	2045	2075
7.	Dolomite, pale drabish gray, with trace of pink, medium-grained, crystalline. Chert trace to 2%	20	2075	2095
8.	Dolomite, pale drabish gray, fine- to medium-grained, crystalline. Chert 10%, white, very fine-grained, granular	5	2095	2100

Notes: * Well originally drilled to 2006' in 1919-20 by Thorpe Well Co.
 Deepened 2006' to 2260' in 1942.

cc to Ray Saunders, WW Supt., Grinnell, July 20, 1942.
 Thorpe Well Co., Des Moines, July 20, 1942.

Survey No. 1571

Description	Thick.	From (feet)	To
9. Dolomite, pale drabish gray, medium-grained, crystalline. Chert trace to 1%, very fine grained, granular, trace oolitic	20	2100	2120
10. Dolomite, pale to light drabish gray medium- to coarse-grained, crystalline, chert 10% to 30%, white, very fine-grained, granular, quartzose	15	2120	2135
11. Dolomite, pale to light drabish gray, medium-grained, crystalline, subsaccharoidal and vuggy in part. Quartz crystals trace	25	2135	2160
12. Dolomite, pale yellowish gray to light drabish gray, fine to medium-grained. Sand 2% to 5%, medium-grained, subangular to curvilinear, many grains showing secondary enlargement	25	2160	2185
13. Dolomite, pale grayish yellow to light gray, medium-grained. Sand 25%, medium-grained, subangular to curvilinear, grains frosted in part	5	2185	2190
CAMBRIAN SYSTEM Trempealeau formation Jordan member			
14. Sandstone, mostly medium-grained, angular to curvilinear, frosted in part, ($\frac{1}{2}$ - $\frac{1}{4}$ mm. 35% to 50%, $\frac{1}{4}$ - $\frac{1}{8}$ mm. 25% to 40%, $\frac{1}{8}$ - $\frac{1}{16}$ mm. 10% to 20%). Dolomite 5% to 25%, pale drabish gray to grayish yellow, medium-grained, sandy	20	2190	2210
15. Sandstone, mostly medium-grained, subangular to subround, frosted in part, (1 to $\frac{1}{2}$ mm. 15% to 40%, $\frac{1}{2}$ to $\frac{1}{4}$ mm. 20% to 50%, $\frac{1}{4}$ - $\frac{1}{8}$ mm. 15% to 25%, $\frac{1}{8}$ - $\frac{1}{16}$ mm. 10% to 20%). Dolomite 10% to 35%, pale gray, cementing sand grains	35	2210	2245
16. Sandstone, fine grained, subangular to subround, frosted in part, (1 to $\frac{1}{2}$ mm. 5%, $\frac{1}{2}$ to $\frac{1}{4}$ 25%, $\frac{1}{4}$ to $\frac{1}{8}$ 35%, $\frac{1}{8}$ to $\frac{1}{16}$ 35%), cemented by dolomite in part	5	2245	2250
17. Dolomite, pale gray, medium-grained, crystalline. Sandstone 25% to 60% fine-grained, ($\frac{1}{2}$ to $\frac{1}{4}$ mm. 10%, $\frac{1}{4}$ to $\frac{1}{8}$ mm., 45%, $\frac{1}{8}$ to $\frac{1}{16}$ mm., 35%)	10	2250	2260
Total Depth			2260

Poweshiek

April 10, 1951

Mr. R. R. Saunders
Water Superintendent
Grinnell, Iowa

Dear Mr. Saunders:

We were pleased to hear about the development you are making in your well field. It is doubtful that we will have one of our men in Grinnell to observe the plugging of the well; however, we will visit you at our first opportunity to inquire about the success of the operation.

#4 being plugged

We appreciate hearing from you in regard to such developments and are always glad to cooperate with you in any way possible.

Very truly yours,

C. Richard Murray

CRM:emh

APR 10 '51

CITY OFFICERS

City Clerk, Homer B. Lowrey
Treasurer, Carl E. Child
Health Officer, Dr. C. E. Harris
Solicitor, Chas. P. Vogel

Chief of Police, Glen Bell

Street Commissioner, W. J. Osborn

City of Grinnell

M. F. ZIMMERMAN, MAYOR

GRINNELL, IOWA

April 9 1951

CITY COUNCILMEN

At Large { Edwin Pedersen
Stanley Jorgensen
First Ward, Raymond George
Second Ward, Arthur Robison
Third Ward, Everett Armstrong
Fourth Ward, Carl Speth

Water Supt., R. R. Saunders

Iowa Geological Survey
Iowa City,
Iowa.

Dear Sirs:

This is to advise you that we are now working on our old #4 well preparing to seal it and fill it.

The old air line and drop pipe have been pulled out and the pipe line used to pump cement through is being lowered into the hole. If everything goes O.K. we should be ready to pump cement through it by Tuesday (April 10th) noon.

I almost forgot to notify you as they moved in on me rather unexpected. I am sorry that I could not let you know sooner.

Very truly Yours

R. R. Saunders
Water Supt.

RRS/hls

Amended

4-11-51

C. R. A.

Perryville

June 9, 1954

Mr. D. W. Ferguson
City Engineer
Grinnell, Iowa

Dear Mr. Ferguson:

The sample of material obtained recently from Grinnell City well No. 5 during well cleaning operations and furnished our office by yourself and Mr. Matherly has been examined by members of our staff.

Microscopic and preliminary chemical examination of the sample indicates it is composed primarily of material containing large amounts of iron. Some manganese is present. Minor amounts of very fine, angular, clear quartz grains were also observed in the sample. Particularly noticeable when wet, is the greasy black feel and look of the material. While not established, this condition may be due to the presence of carbon.

It does not seem probable that material of this composition would form deposits in the well through natural chemical reactions. However, there are reports of manganese and iron forming deposits in water lines to such an extent that the lines are partially to fully blocked.

As the well at this time is reported to have again declined in yield and it is suspected that foreign material may again be present in the hole, it is our understanding that you are formulating plans to repair this well in an attempt to restore the yield to its former capacity and to preserve the well for future use.

We cannot definitely state the source of the iron material taken from this well except that it is not part of any known rock formation which was penetrated during the drilling of the well.

The presence of this material in such quantities as to cause partial blocking of water flow certainly suggests that a complete investigation of the well casing and hole condition is requisite at this time. A well service company or well drilling contractor would be best able to advise you on methods of procedure.

Mr. D. W. Ferguson

Page Two

June 9, 1954

If the hole is cleaned out, any material removed may furnish information which would aid in obtaining a clearer picture of the present condition of the well and in determining whether or not repairs were needed.

We will be interested in any investigations made upon this well and if this office can provide you any further information, please do not hesitate to call on us.

Very truly yours,

H. G. Hershey

HGH:JBC:r

Poweshick

MEMORANDUM

June 15, 1954

To: H. G. Hershey
From: J. B. Cooper

Contacted Bernard Matherly, Water Superintendent, Grinnell, June 14, 1954 in regard to investigations recently made on Grinnell City Well No. 5.

Thorpe Well Company pulled pump, lowered bit into well, encountered no obstruction, bailer lowered into well, two bailers of material taken out; , workers believe bottom 6' of hole also contains material.

Well was electric logged by ^{Schlumberger} Slumberjay on Friday June 11. (This office will receive copies of logs later.) Apparently no obvious defects were noted in well.

Caliper log showed about 1" reduction in hole size at point about 1902' which is in New Richmond sandstone. Matherly thought perhaps this indicated a weak zone which was caving and causing their trouble. He suggested a perforated liner from bottom of well through New Richmond.

Sample of material bailed from well obtained by us and examined June 15, 1954 under microscope by Dick Northup and J. B. Cooper. Sample appeared to be about 70% iron scale; 25% fine, angular sand and 5% NR-Jordan type rounded grains.

Called Matherly June 15, 1954 and told him our analysis ^{et} and sample and discussed possibility of Pleistocene sand entering hole. Matherly plans to discuss this with Thorpe Co. today. (June 15, 1954)

JBC
CWL

GW Grinnell Gas & Oil
Poweshuck Co.

January 22, 1971

Mr. Don Watt
Varner Well & Pump Company
121 East Fourth Street
Dubuque, Iowa 52001

Dear Don,

In regard to your request for information on the deep wells at Grinnell, I am enclosing a sample log for the No. 7 well completed by Thorpe Well Co. in 1955, which should be reasonably accurate. Unfortunately our records on wells No. 5 and 6 drilled in 1920 and 1926 respectively are somewhat sketchy. However, these were all drilled in the same quarter section and so the geologic logs are almost identical.

We do have the casing records for what they are worth and copies are being enclosed herewith.

There is nothing in our files on well information antedating the 1920 well.

Please let us know if we can be of further service.

Very truly yours,

Richard C. Northrup
Chief of Subsurface Geology

RCN:cs
Enclosure

Casing Record for Grinnell City Well No. 5
Completed 1920

NW SW NW Sec. 16, T. 80N., R. 16W.

Elevation 1020'

317' 6" of 16" casing 0-317' 6"

1436' of 8" casing 305'-1741'

Open hole 1741'-2260' - Total depth

Casing Record for Grinnell City Well No. 6
Completed 1926

NW SW NW Sec. 16, T. 80N., R. 16W.

Elevation 1020'

210' of 22" casing 0-207'

300' of 16" casing 0-300'

240' of 14" liner 458'-698'

210' of 12" liner 1198'-1408'

908' of 12" liner 290'-1198'

502' of 10" liner 1198'-1700'

Open hole 1700'-2500' - Total Depth

No. 5

Reportedly cased to

2060' as of 3/73

6" pipe

2000 - 2060'

IOWA GEOLOGICAL SURVEY
Water Well Data Sheet

Survey Number **W-1571**

Town Grinnell County Poweshiek T. N., R. E. W.

Name Grinnell City Well # 5 Location $\frac{1}{4}$ $\frac{1}{4}$ Sec.

Contractor Thorpe Well Co. Driller Use

Construction Drilling Dates 1942 Drilling Depth

Topog. Curb Elev. 1013 Ref. Vol. XXXII 165 Total Depth 2260'

Final above

Static below Pumping Draw Time

Level curb Level down gpm pumped Date

Depth to Calc. g/ft. Prin.

bot. pump ft. with ft. suction pipe. drawdown 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 The well was originally drilled 0'-2006' in 1919-20 by Thorpe Well Co. Deepened (2006'-2260') in 1942 by Thorpe Well Co. No samples for (0'-2006')

Laboratory Data

Sample range 2005'-2260' Number samples 51 Number Duplicates 51 Cond. 900d

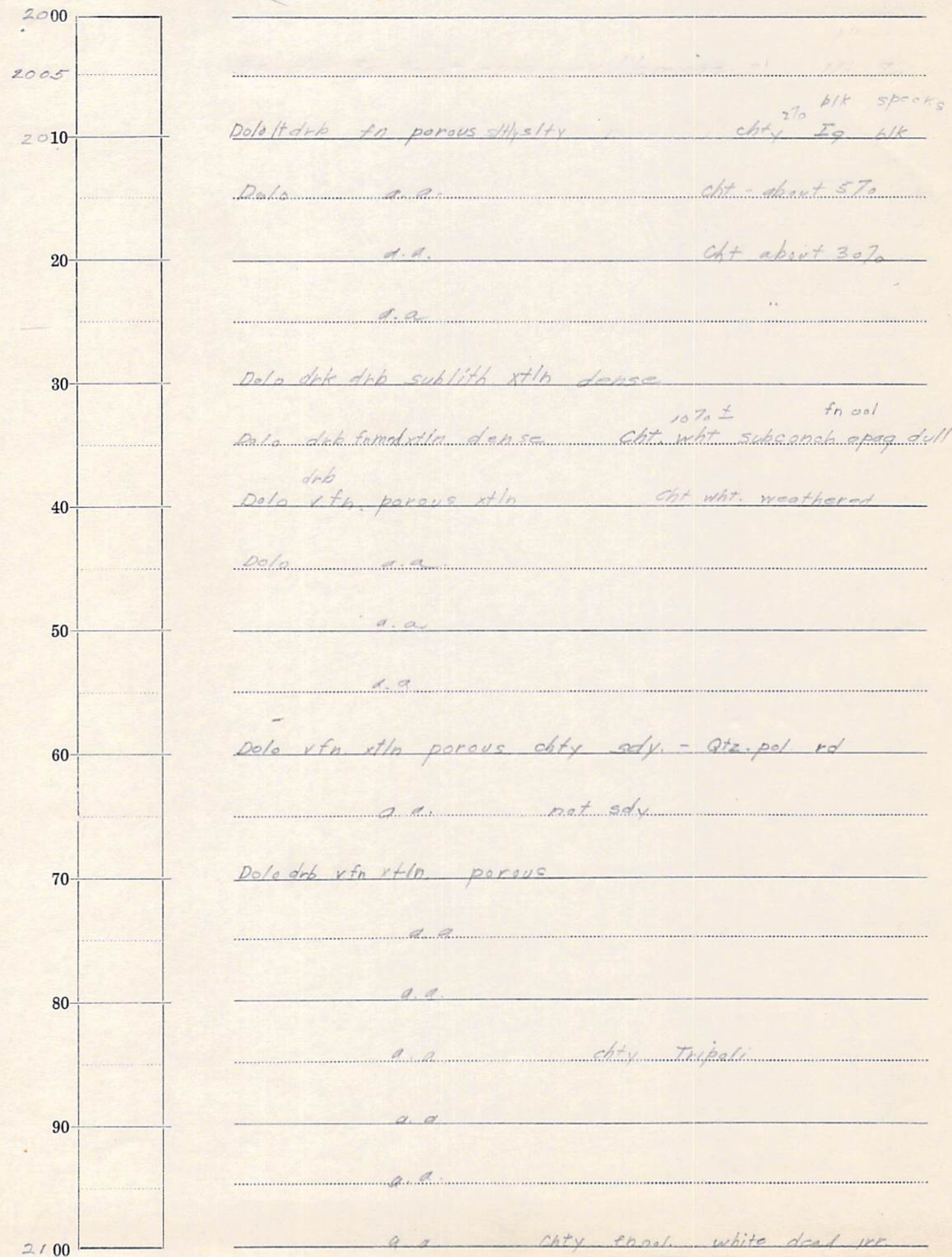
Log No Cond. Boxed M. Hawkins Range 2005'-2260' Date 6/1/42

Remarks

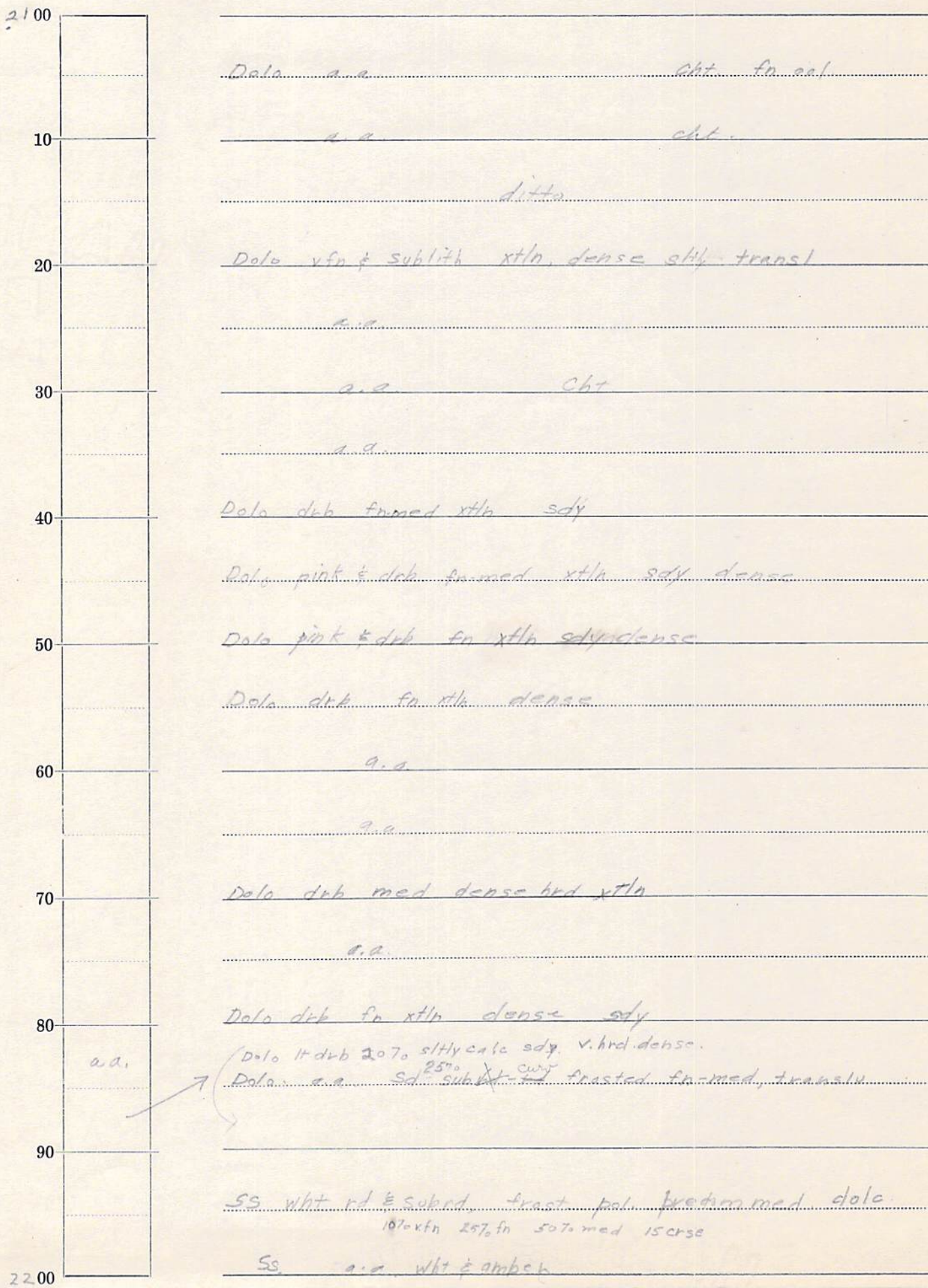
Microscopic Strip Gen. Blue Samples
Study Range Log Log Print Washed
Insol. Res. Strip Gen. Insol. Res. Well
Study Range Log Log Prepared Corel.

Sheet No. 1 Name of Well City Well #5 Survey No. W-1571

Location Grinnell (Pawnee) Date Drilled Analyst Schultz

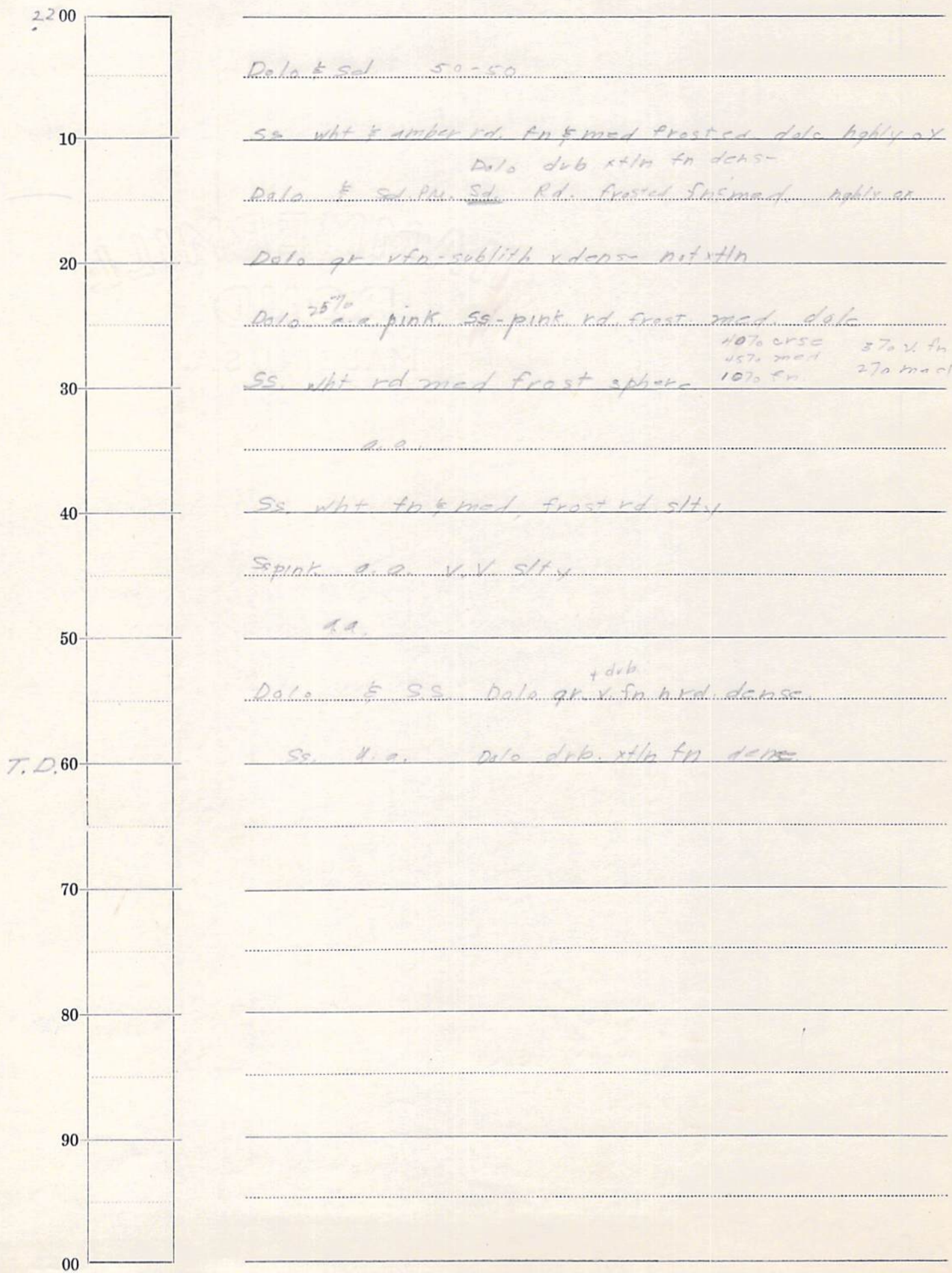


Location Grinnell Date Drilled Analyst



Sheet No. 3 Name of Well Survey No. 1571

Location Grinnell Date Drilled Analyst Schultz



Location Date Drilled Analyst Davis June 3, 42

2000

10

20

30

40

2050

60

70

80

90

2100

Dolomite, pale gry, m-xl. 2%cht. wh.

sple finely ground

Dol., pale gry, m. xl, 5%cht wh, few ool. Tr. sd.

sple finely ground.

Dol., pale gry, m. xl. 50%cht. wh, few.ool. Trsd.

sple finely ground

Dol, pale gry, m xl. 30%cht. wh.

Dol. pale drbsh gry, 10%cht. wh. Tr. sd.
m xl.

Dol. pale drbsh gry, m xl. 45%cht. wh.
trace pinksh.

Dol. pale drbsh gry m xl. 30%cht. wh

sple finely ground.

Dol. pale drbsh gry m. xl. 15%cht wh.

trace pinksh

sple finely ground

Dol. pale drbsh gry, tr. pinksh, m. xl. 10%cht. wh.

sple finely ground

Dol. pale yellsh gry, m, xl. 15%cht. wh.

sple finely ground.

Dol. pale drbsh gry, m. xl. 10%cht. wh.

sple. finely ground.

Dol. pale drbsh gry m xl. 5%cht. wh.

sple finely ground

Dol. pale drbsh gry, pinksh in small part, m xl,
5%cht wh.

sple v. finely ground.

Dol. pale drbsh gry, tr. pinksh. m xl.
5%cht. wh.

Dol. pale drbsh gry, tr. pinksh m xl. 2%cht. wh.

Dol. pale drbsh gry, tr. pinksh, m xl. Tr%cht. wh.

Dol. pale gry, m xl. Tr. cht. wh.

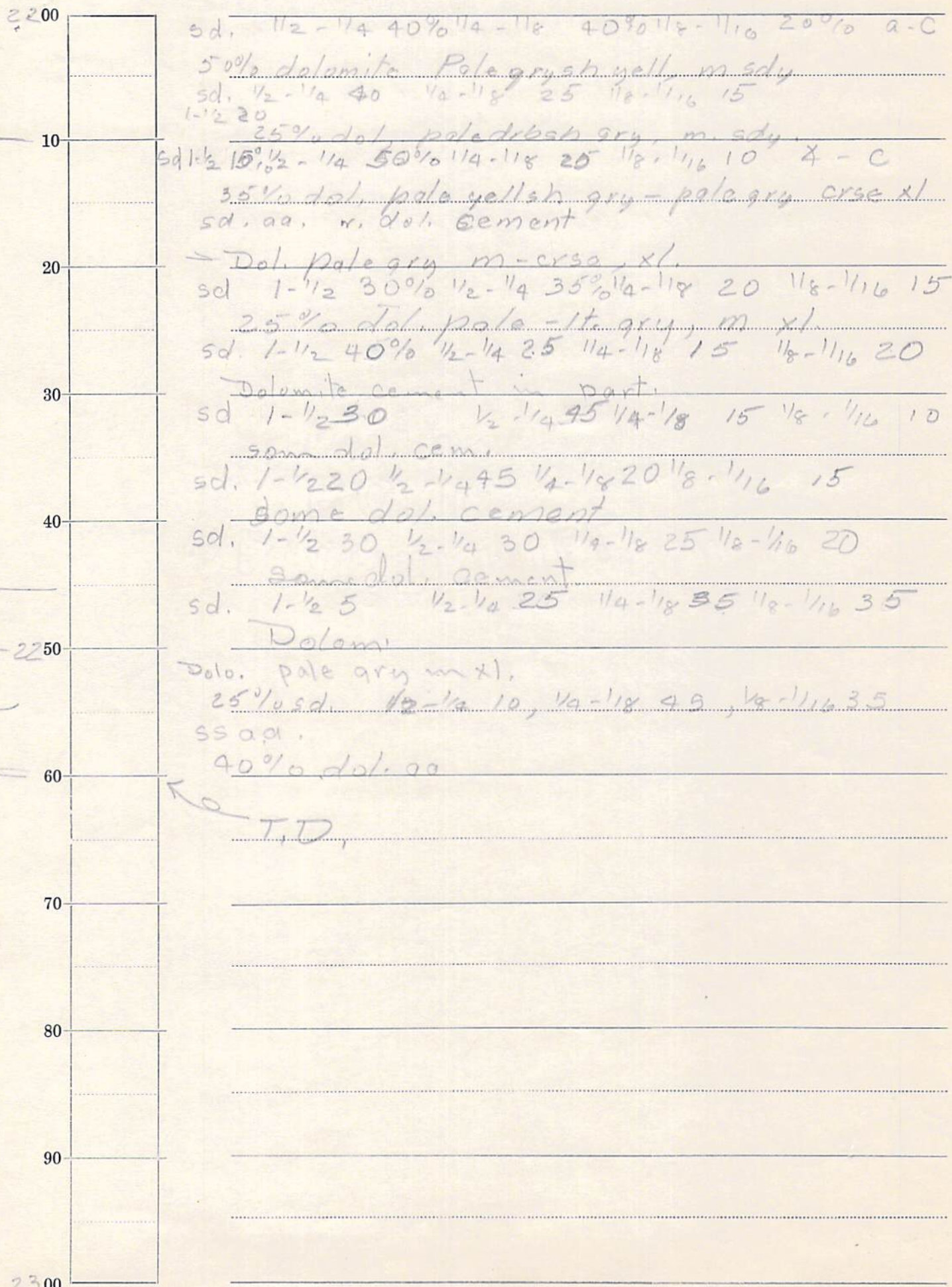
Dol. pale drbsh gry, m xl. Tr. cht. wh.

Dol. pale drbsh gry, f-m xl. 10%cht. wh v. green.

Location Date Drilled Analyst Davis June 8, 1942

21 00	Dol, pale drbsh gry, m. xl. Tr. cht wh, v. f. gran
	Dol, pale drbsh gry, m. xl. 10% cht wh, v. f. gran.
10	Dol, pale drbsh gry m. xl. Tr. cht, wh, v. f. gran.
	Dol, pale drbsh gry, m. xl. Tr. cht, wh, v. f. gran.
20	Dol, pale - lt. drbsh gry, m - crse, xl, Tr. cht ^{wh} , v. f. gran Tr.ool.
	Dol., pale - lt. drbsh gry, m - crse, xl. 30% cht, wh, v. f. gran, gtzose.
30	Dol. pale - lt. drbsh gry, m - crse xl, 10% cht, wh v. f. gran, gtzose
	Dol. lt. - m. drbsh. gry, m xl dse Tr xl. gtz.
40	Dol., pale drbsh gry, m - crse xl. vuggy.
	Dol, v. pale drbsh gry m xl.
21 50	Dol, pale - lt. drbsh gry, m xl. subsac in part.
	Dol, pale - lt. drbsh. gry, m xl. Tr. xl. gtz.
60	Dol, pale yellow gry, f-m.
	Dol, pale grysh yell to pale drbsh gry 2% sd. m, 2nd grth
70	Dol, pale grysh yell to lt. drbsh gry f-m 5% sd. m, mostly 2nd xl. few fstd grains
	Dol, pale grysh yell to lt. drbsh gry m. 2% sd. aq.
80	Dol, pale grysh yell. to lt. drbsh gry, m 2% sd aq.
	Dol, pale grysh yell. to lt. gry m. 25% sd, m. s ₂ to C, fstd
90	sd. 1/2-1/4 35 1/4-1/8 50% 1/8-1/16 15 a-C, fstd in part
	sd. 1/2-1/4 50% 1/4-1/8 40% 1/8-1/16 10% a-C, fstd in part.
22 00	25% dol, pale grysh yell, sd

Location Date Drilled Analyst June 9, 1942



Grinnell 251
Ver. 875
Pinky 656
71

Description of Samples of Drillings from Well Number 5,
Grinnell, Iowa.

Drilled in 1919-1920 by Thorpe Brothers,
Des Moines, Iowa.

Pleistocene.

200-210. Sand and gravel, some limestone fragments, to 1/2 inch diameter some quartz and greenstone grains. Possibly this sample represents both glacial gravel and bed rock.

Mississippian .

Saint Louis Limestone and Osage shale

- 210-220. Limestone, gray, in fine powder concreted in sample, some clayey residue.
- 220-230. Limestone, like above
- 230-240. Limestone, light gray, finely crystalline, sugary texture? Some light and dark sand and pebbles are doubtless from higher levels.
- 240-250. Limestone, dark gray, in fragments and powder
- 250-260. Limestone, dark gray, in fragments and powder; some dark clay
- 260-270. Limestone, similar to above; more ready response to acid
- 270-280. Limestone, similar to above, but somewhat lighter
- 280-290. Limestone, gray, similar to above, more fine powder
- 290-300. Limestone, gray, in small fragments, very little powder
- 300-310. Limestone, similar to above, but with more powder
- 310-320. Limestone, fragments of both light and dark gray, finely sugary texture
- 320-330. Limestone, medium gray, chiefly in fine powder
- 330-340. Limestone, rather light gray, fine powder
- 340-350. Limestone, light gray, fine powder
- 350-360. Limestone, similar to above
- 360-370. Limestone, similar to above
- 370-380. Limestone, gray, in powder and small chips
- 380-390. Limestone, gray, chiefly fine powder

Kinderhook shale

- 390-400. Shale, limy, darker gray than sample above, in very fine powder concreted into lumps
- 400-410. Shale, in finely gritty blue-gray powder, ready response to acid but large residue of clay
- 410-420. Shale, similar to above
- 420-430. Shale, similar to above
- ~~420-430. Shale, similar to above~~
- 430-440. Shale, similar to above
- 440-450. Shale, similar to above

- 450-460. Shale, darker gray, in powder and chips
- 460-470. Shale, hard, rather dark gray, very little response to hydrochloric acid
- 470-480. Shale, dark gray, hard, almost no response to acid
- 480-490. Shale, dark gray, no response to acid
- 490-500. Shale, similar to above
- 500-510. Shale, similar to above
- 510-520. Shale, similar to above
- 520-530. Shale, similar to above, slight response to acid
- 530-540. Shale, rather dark gray smooth soapy feel, no response to acid
- 530-540. Shale, similar to above
- 550-560. Shale, limy, or shaly limestone, medium dark gray; ready response to acid but large clay residue
- 560-570. Shale, medium dark gray; no response to acid

Devonian

- 570-580. Limestone, shaly, finely gritty, medium dark gray; large clayey residue after treating with cold acid
- 580-590. Limestone, shaly, similar to above
- 590-600. Limestone, shaly, similar to above
- 600-610. Limestone, shaly, similar to above
- 610-620. Limestone, shaly, gritty, dark bluish gray; brisk response to acid, some clayey residue
- 620-630. Limestone, similar to above
- 630-640. Limestone, similar to above
- 640-650. Limestone, similar to above
- 650-660. Limestone, similar to above
- 660-670. Limestone, similar to above
- 670-680. Limestone, similar to above
- 680-690. Limestone, similar to above
- 690-700. Limestone dark gray some hard chips; response to acid more brisk than in samples above
- 700-710. Limestone, dark gray, in coarse powder and hard fine-grained chips
- 710-720. Limestone, similar to above
- 720-730. Limestone, similar to above
- 730-740. Limestone, similar to above
- 740-750. Limestone, similar to above
- 750-760. Limestone, similar to above
- 760-770. Limestone, similar to above
- 770-780. Limestone, similar to above but in fine powder

780-790. Limestone, similar to that above

Silurian.

790-800. Limestone, light gray, in fine gritty powder, concreted

800-810. Limestone, rather dark gray, in coarse powder

810-820. Limestone, similar to above, some chips

820-830. Limestone, similar to above in coarse powder

830-840. Limestone, similar to above in coarse powder

840-850. Limestone, similar to above, some fine powder

850-860. Limestone, similar to above

860-870. Limestone, similar to above, chips and powder

870-880. Limestone, similar to above

880-890. Limestone, gray, small chips, coarse powder

890-900. Limestone, lighter gray, small chips, coarse powder

900-910. Limestone, similar to above

910-920. Limestone, similar to above

920-930. Limestone, similar to above, some soft white grains

930-940. Limestone, similar to above

940-950. Limestone, similar to above

950-960. Limestone, similar to above

960-970. Limestone, similar to above

970-980. Limestone, similar to above

980-990. Limestone, dark gray, some light gray chips, fragments chiefly less than 1/8 inch diameter

990-1000. Limestone, similar to above

1000-1010. Limestone, similar to above

1010-1020. Limestone, lighter gray than sample above, much powder.
Gypsum, in light blue-gray chips.

1020-1030. Limestone, light gray, rather fine powder and small chips.
Gypsum, in light blue-gray chips.

1030-1040. Limestone, light gray, in fine powder, concreted; brisk effervescence in cold acid. No gypsum apparent; some small grains of white and bluish chert

1040-1050. Limestone, similar to above, powder quite fine

1050-1060. Limestone, similar to above; considerable clayey residue

1060-1070. Limestone, light gray, with some chips of dark green shale.
Sample chiefly small chips

1070-1080. Limestone, similar to above

1080-1090. Limestone, similar to above

1090-1100. Limestone, similar to above, but with more powder

1100-1110. Limestone, similar to above

1110-1120. Limestone, reddish, very fine-grained, much residue after digestion with acid.

1120-1130. Limestone, mixed light and dark gray chips, not so much reaction with acid

1130-1140. Limestone, similar to above, brisk reaction to acid

1140-1150. Limestone, similar to above

1150-1160. Limestone, similar to above

1160-1170. Limestone, dolomitic, very slight reaction with cold acid, abundant with hot acid; fragments light gray, finely crystalline

1170-1180. Limestone, similar to above, some chips darker gray

1180-1190. Limestone, similar to sample above

Ordovician

Maquoketa shale

1190-1200. Shale, dark gray, slightly limy

1200-1210. Shale, similar to above

1210-1220. Shale, similar to above, small fragments of pyrite

1220-1230. Shale, similar to above

1230-1240. Shale, similar to above

1240-1250. Shale, similar to above

1250-1260. Shale, similar to above

1260-1270. Shale, darker gray, no response to acid

1270-1280. Shale, similar to above

1280-1290. Shale, lighter gray, some response to acid, fine texture, soft

1290-1300. Shale, similar to above

1300-1310. Shale, similar to above

1310-1320. Shale, similar to above, but somewhat darker

1320-1330. Shale, similar to sample at 1310-1320

1330-1340. Shale, similar to above; no response to acid

1340-1350. Shale, very dark gray, no response to acid

1350-1360. Shale, similar to above, but some response to acid

1360-1370. Shale, dark gray, no response to acid

1370-1380. Shale, similar to above, some response to acid

1380-1390. Shale, similar to above

1390-1400. Shale, similar to above

1400-1410. Shale, similar to above, with some lighter gray limy fragments

1410-1420. Shale, similar to sample above

1420-1430. Shale, similar to sample above, very limy

Galena-Platteville limestone

1430-1440. Limestone, dolomitic, brownish gray, finely granular powder, almost completely soluble in hot acid.

1440-1450. Limestone, dolomitic, similar to sample above

1450-1460. Limestone, dolomitic, similar to sample above

1460-1470. Limestone, dolomitic, similar to sample above

1470-1480. Limestone, dolomitic, similar to sample above

1480-1490. Limestone, dolomitic, similar to above, but lighter brownish

1490-1500. Limestone, ready response to acid, light brownish gray

1500-1510. Limestone, similar to above, medium gray

1510-1520. Limestone, similar to above, medium gray

1520-1530. Limestone, gray, dolomitic, some insoluble residue in hot acid

1530-1540. Limestone,

similar to above; some brown fragments are probably iron. Considerable residue in hot acid

1540-1550. Limestone, similar to above

1550-1560. Limestone, similar to above

1560-1570. Limestone, ready response to cold acid, medium gray

1570-1580. Limestone, similar to above

1580-1590. Limestone, similar to above

1590-1600. Limestone, or dolomite, gray, no response in cold acid, ready effervescence in hot acid

1600-1610. Limestone, dolomitic, similar to above

1610-1620. Limestone, dolomitic, gray, granular texture

1620-1630. Limestone, mingled with light and dark gray fragments; fairly ready response to cold acid

1630-1640. Limestone, dark gray, in small chips and fairly fine powder; very ready effervescence in cold acid. Numerous small brown chips probably are rusty iron

1640-1650. Shale, limy, greenish, fairly fine texture, some pyrite grains

1650-1660. Limestone in small chips and powder; ready response to acid; dark gray

1660-1670. Limestone, similar to above

1670-1680. Limestone, lighter gray, finer texture than above

1680-1690. Limestone, similar to above, powder a little more gritty

1690-1700. Shale, green, not limy, fine texture, ready effervescence in cold acid

1700-1710. Limestone, gray, in rather fine powder, ready effervescence in cold acid

Saint Peter sandstone

1710-1720. Sandstone, light gray, almost white, very fine grains, reaction

with acid, slight, not increased by boiling

1720-1730. Sandstone, similar to above

Prairie du Chiën

Shakopee dolomite

1730-1740. Limestone, dolomitic, dark gray; slight reaction in cold acid, vigorous in hot acid

1740-1750. Limestone, similar to above, in rather fine powder

1750-1760. Limestone, similar to above

1760-1770. Limestone, similar to above

1770-1780. Limestone, similar to above

1780-1790. Limestone, light gray, very fine grained, dolomitic; some response in cold acid, abundant in hot acid, considerable fine sandy residue

1790-1800. Limestone, similar to above; a little darker

1800-1810. Limestone, similar to above

1810-1820. Limestone, similar to above

1820-1830. Limestone, dolomitic, light gray, fine powder; some effervescence in cold acid, abundant in hot acid.

1830-1840. Limestone, similar to above

1840-1850. Limestone, similar to above, a little lighter gray

1850-1860. Limestone, similar to above, but a little darker gray

1860-1870. Limestone similar to above, but a little darker gray

1870-1880. Limestone, dolomitic, medium gray, coarser grained than above, no response in cold acid, considerable white sandy residue after treatment in hot acid. Sample is in sub-rounded sparkling granules

1880-1890. Limestone, lighter gray and in much finer grains than sample above, otherwise similar

1890-1900. Limestone, very fine grained, light gray; ready effervescence in cold acid, large sandy residue after boiling in acid

New Richmond sandstone

1900-1910. Sandstone, coarser and somewhat darker than sample above; no response in cold acid, but a little response upon treating with hot acid.

1910-1920. Limestone, very fine grained, cream colored ready; response to cold acid. Sample similar to 1890-1900

1920-1930. Sandstone, similar to sample at 1900-1910
(Are not 1900-1910 and 1910-1920 reversed?)

1930-1940. Sandstone, small light gray, sparkling grains; almost no response to hot acid

1940-1950. Sandstone, in fine sparkling grains, mixed light and dark gray; no response in cold acid, some in hot acid, but large sandy residue

195 0-1960. Sandstone, similar to above

1960 0-1970. Sandstone, light gray, larger grains than samples above; no response to cold acid, slight response to hot acid

197 0-1980. Limestone, dolomitic, sandy, finer grained and lighter colored than sample above; no response to cold acid, some fine sandy residue after treating with hot acid

Oneota dolomite

1980-1990. Limestone, darker gray than sample above, fine sparkling grains; considerable response in cold acid, increased on heating, some sandy residue

19 90-2006. Limestone, similar to sample at 1970-1980, small sandy residue

1490

DRILLER'S RECORD OF HOLE NO. 5, GRINNELL, IOWA

Geologic Interpretation by James H. Lees, Assistant State Geologist.

<u>Pleistocene</u>	Feet	Feet
Black Soil	2	2
Yellow Clay	23	25
Blue Clay	16	41
Yellow Sandy Clay	49	90
Blue Clay some gravel	90	180
Yellow Clay and Sand	29	209
Broken Limestone	5	214
<u>Mississippian</u>		
Saint Louis and Osage		
Shaly Limestone	26	240
Limestone Harder	6	246
Shale	2	248
Limestone	8	256
Shale	12	268
Hard Limestone	132	400
Limestone, Sandy	11	411
Shale	14	425
<u>W. Kinderhook Shale</u>		
Light blue shale	65	490
Shale, Darker	40	530
Shale, Light Green	37	567
<u>Devonian</u>		
Limestone and Shale Streak	27	594
Shale	7	601
Limestone	29	630
Shale, Streak of Lime	68	698
Limestone	15	713
Shale and Lime	11	724
Hard Lime	26	750
Very Hard Lime	24	774
Hard Shale and Lime	18	792
<u>Silurian</u>		
Limestone, Light Color	70	862
Limestone, Brown	13	875
Limestone, Light Color	14	889
Sandy Shale, Mixed Lime	26	915
Limestone	197	1112
Shale, Reddish	8	1120
Limestone, Sandy	31	1151
Limestone	46	1197
<u>Ordovician</u>		
<u>Waukegan</u>		
Green Shale	23	1220
Shale, Light	13	1233
Chocolate Shale	27	1260
Lime Dark	3	1263
Shale, Dark	20	1283
Lime, Black	6	1289
Lime Rock, Shale Streak	61	1350
Shale and Lime	11	1361
Limestone, some Shale	46	1407

Record of Hole No. 5, Grinnell Well

Continued

Galena-Platteville

Limestone	153	1560
Limestone, Sandy	35	1595 Cuttings Washed
Limestone	54	1649
Shale, Green	3	1652
Limestone, Sandy	38	1690
Shale, Green	6	1696
Sandy Lime	2	1698

Saint Peter Sandstone

32 1730

Prairie du Chien

Shakopee

Hard Lime, Sandy	39	1769 Cuttings Washed
Limestone	70	1839 away
Sandy Lime and Sandstone	21	1860
Sandstone	8	1868 Cuttings Washed
Limestone	34	1902 away

172

New Richmond Sandstone

77 1979

Oneota

Limestone, Sandy	3	1982
Sandstone	4	1986
Sandy Limestone	20	2006

The estimated capacity of this well on completion is from 450 to 500 gallons per minute. On completion this well was cased with 16" I.D. cast-iron pipe to a depth of 317 ft-6 inches, inside of this a line of 8" I.D. cast-iron pipe was placed from a depth of 305 ft to 1741 ft. from the surface. A special expansion packing joint was used between the outside of the 8" pipe and inside the 16" pipe. The bottom of the 8" pipe was fitted with a special expansion lead shoe and on the bottom of the 16" cast-iron pipe it was cemented up to 45 feet from the bottom. The special construction was designed by Thorpe Brothers, Des Moines, Iowa, who also had the contract on this work.

7 1/2' 414432N-0924332-01

414429N-0924331-02

80-16W-16 BCBD

1980 field located by D. Karsten

IOWA GEOLOGICAL SURVEY

In Cooperation with U. S. Geological Survey

W-1571

RECORD OF WELL

Location:

Town: Grinnell

(N E)
(S W)

County Poweshiek

NN-SW-NW sec. 16 T 80 N., R. 16 W. Grant Twp.



Well name and number Grinnell #5

Owner City of Grinnell

Address _____

Tenant _____

Address _____

Contractor Thorpe Well Co.

Address _____

Drillers _____

Drilling dates 1920 to 2006 Deepened 1942 from 2006 to 2260'

Well data:

Elevations: Drilling curb 1020 feet; Land surface _____ feet

Determined by _____

Topographic position Upland

Total depth: Reported 2260 feet, Measured 2260 feet

Drilling method Cable

Hole and casing data 215' of 16" C.I. pipe 0-215' 240' of 10 5/8" liner 1170' to

1410' 1441' of 8" C.I. pipe 800-1741'

(* 317' 6" of 16" casing; 8" cast iron pipe from 305 to 1741';
expansion packer between 16" & 8"; special lead expansion
shoe on bottom of 8")

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

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

Sources of water: Principal _____; Others _____

* Data obtained from Thorpe records by C.W. Lane 1951

Production data:

Date _____

Static depth to water _____

265

Measuring point _____

Pumping level _____

at _____

250

g.p.m.

estimated capacity -
450 to 500 gpm

Specific capacity _____

g.p.m. per ft. drawdown; Temperature _____

°F.

Pump data:

Type pump

Airlift

Column Dia. _____

Length

600'

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	March 12, 1937	Aug. 30, 1940		
Sampled by	A.C. Tester	H.G.H.		
Total solids	713.0	714		
Insoluble matter	4.0	11.0		
Alkalinity (Meo)	282.0	294.0		
Alkalinity (Phn)	0.0	0.0		
pH	7.4	7.7		
Fe ₂ O ₃ + Mn ₂ O ₃ + Al ₂ O ₃	2.0	3.0		
Alkali as sodium	97.2	88.9		
Calcium	91.5	84.3		
Magnesium	32.1	36.9		
Iron (unfiltered)	0.8	0.3		
Manganese	0.00	0.00		
Nitrate	0.30	0.00		
Fluoride	1.0	1.9		
Chloride	20.0	19.0		
Sulfate	260.0	260.8		
Bicarbonate	344.0	358.7		
Hardness (ppm)	362.0	363		
Hardness (gpg)	21.3	21.2		
Remarks				

Laboratory data:

Sample storage location _____

Sample range

2005-2260

No. spls.

51

No. dupls. & cond.

51

Spls. prepared by _____

Washed range _____

by _____

Driller's log and cond. _____

Insoluble residues: Prepared by _____

Studied by _____

Strip log _____

Microscopic study _____

strip log _____

Gen. log _____

Correl. by _____