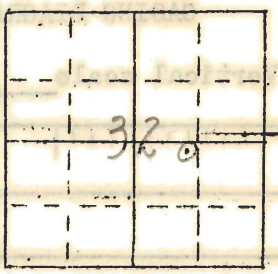
IOWA GEOLOGICAL SURVEY W-0126

In Cooperation with U. S. Geological Survey

RECORD OF WELL



Location:

Town: ORANGE City (N E / S W):County SIOUX E.

NE/c - NW - SE sec. 32 T 95 N., R. 44 W. Holland Twp.

Well name and number City Well No 2 Abandoned

Owner _____ Address _____

Tenant _____ Address _____

Located in fire house - abandoned June 1932

Contractor Thorpe Well Co Address _____

Drillers _____

Drilling dates 1921

Well data:

Elevations: Drilling curb 1431 feet; Land surface _____ feet

1428 - HGH

Determined by W.C. Schuldt

Topographic position _____

Total depth: Reported 825 feet, Measured _____ feet

Drilling method _____

Hole and casing data _____

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

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

Sources of water: Principal _____; Others _____

Production data: Date _____

Static depth to water _____ Measuring point _____
Pumping level _____ at _____ g.p.m.

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

Pump data: Type pump _____ Column Dia. _____ Length _____
Cylinder or bowls: Dia. _____ Length _____ Suction pipe _____

Power _____ Airline _____

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

WATER ANALYSES (in parts per million)

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

Remarks _____

Laboratory data: Sample storage location _____

Sample range 10-825 No. spls. 82 No. dupls. & cond. _____
Spls. prepared by _____ Washed range 10-825 by Gulf at Wichita
Driller's log and cond. _____
Insoluble residues: Prepared by _____ Studied by _____ Strip log _____
Microscopic study 10-825 Gulf strip log Gulf
Gen. log _____ Correl. by Carmody

Powers

Orange City, Iowa
City Deep Well No. 2
Thorpe Brothers Well Company, contractors
Drilling completed 1931
Elevation ~~1471~~ 1412 — 1428 feet

Sioux Co.

PLEISTOCENE (350 feet)	10	0-10	Clay; gray, brownish; plastic; calcareous; sandy; few granules and small pebbles; subangular to curvilinear; many grains of quartz; few grains of quartzite, limestone, gypsum, basalt(?), biotite, loess concretions.
	30	10-40	Clay; gray, brownish; calcareous; sandy; coarse; granules and pebbles, few; subangular to curvilinear; quartz predominant detrital mineral; also quartzite, limestone, basalt(?), chert, siltstone, loess concretions.
	10	40-50	
	10	50-60	Clay; gray, brownish; sandy; gravelly, granules and small pebbles; angular to curvilinear; quartz, predominant; also quartzite, limestone, basalt(?), gypsum, loess concretions.
	20	60-80	Clay; brown, gray to buff; calcareous; sandy; 35%±; granules; quartz, predominant; also chert, limestone, gypsum, basalt(?), angular to curvilinear.
	20	80-100	Sand; gray, brownish; medium to coarse, with granules; clay, little; angular to curvilinear; quartz, predominant; also quartzite, gypsum, basalt(?), chert, limestone, coal.
	20	100-120	Clay; gray, drab; plastic; sandy, with granules; quartz, quartzite, basalt(?), limestone, loess concretions; angular to curvilinear.
	10	120-130	Sand; gray, brownish; medium-coarse, small granules to 8-4 mm.; subangular to subround; cement, clay, small amount; quartz, primary constituent, with quartzite, basalt(?), limestone, gypsum, ilmenite, tourmaline; biotite.
	20	130-150	Clay; gray, brownish; calcareous; sandy, silty, with granules, few; quartz, with some quartzite, basalt(?), limestone, gypsum, biotite, coal, high angular to subround, 30%±.
	10	150-160	Sand; gray, brownish; granules, few; angular to subangular; quartz primary constituent, with quartzite, limestone, basalt(?), gypsum, biotite.
	10	160-170	Sand; gray, brownish; medium-coarse; angular to subround; cement, calcareous, small amount; quartz, primary constituent, with quartzite, basalt(?), limestone, pyrite(cubes), an amphibole(?).
	20	170-190	Clay; gray; calcareous; sandy, medium-coarse, 5%±; sand content of quartz, quartzite, basalt(?), gypsum, limestone, coal.
	20	190-210	Sand; gray, brownish; medium; friable; angular to low subround; mostly curvilinear; cement, weak, ferruginous and calcareous(?); quartz, primary constituent, with quartzite, limestone, basalt(?), ilmenite, chert, calcite(rhombs), gypsum, tourmaline, muscovite, biotite.
	20	210-230	Silt; gray-buff; friable; larger grains high subangular to curvilinear; quartz, primary constituent, with quartzite, limestone, basalt(?), muscovite, amphibole(?).
	10	230-240	Clay; gray; unctuous to silty; compact; thin laminae.
	20	240-250	Silt; gray-drab; sand and granules, few grains up to 1 cm.; compact; quartz, primary constituent, with limestone, coal, muscovite, glauconite.
	90	250-350	
Pleist Cretaceous 300' WCS 12/2/39			
Colorado (100 ft.)	30	350-380	Clay, gray, drab; calcareous, compact, unctuous; tough; sand and granules, especially at 370-380; grains of quartz, quartzite, coal, limestone, muscovite, garnet, magnetite, with shapes similar to overlying sand.
	10	380-390	Sand; gray, brownish; friable; medium-coarse; cement, weak, clay-like; high subangular to low subround; quartz, primary constituent, with limestone, muscovite, biotite, amphibole(?), claystone, pyrite, garnet, and glauconite at 360-370.
	60	390-450	Sand; gray, drab; medium; shaly; cement, weak, clay-like; friable; curvilinear to low subround; quartz, primary constituent, with glauconite, limestone, muscovite, clay. Shale; gray, drab; compact; unctuous; thinly laminated; silty; grains of quartz, gypsum, lignitic fragments, and glauconite at 440-450.
Colorado	10	450-460	Sand; gray-buff; medium-coarse; subangular to curvilinear; cement, calcareous, ferruginous and siliceous in fragments of siltstone; quartz, primary constituent, with limestone, garnet, siltstone fragments.
	40	460-490	Sand; gray-brownish; medium-coarse; cement, weak, clay-like; mostly curvilinear, concretions of siderite roundish; quartz, primary constituent, with siderite concretions(2-1/2 mm), and pyrite, chert, muscovite, amphibole(?), coal.
	10	490-500	

Dakota (285 feet)

10	450-460	Sand; gray-buff; medium-coarse; subangular to curvilinear; cement, calcareous, ferruginous and siliceous in fragments of siltstone; quartz, primary constituent, with limestone, garnet, siltstone fragments.
40	460-490	Sand; gray-brownish; medium-coarse; cement, weak, clay-like; mostly curvilinear, concretions of siderite roundish; quartz, primary constituent, with siderite concretions(2-1/2 mm), and pyrite, chert, muscovite, amphibole(?), coal.
10	490-500	Sand; gray, brownish; medium to coarse with granules; high subangular to low subround; quartz, primary constituent, with siderite, garnet, pyrite, tourmaline.
135	500-635	Sand; gray, light brownish; clean; loose; cement, weak-absent, clay-like; medium-coarse; high subangular to low subround; quartz, primary constituent, with siderite, pyrite, tourmaline, garnet, basalt-like grains(occasional), amphibole(?), coal.
		Sandstone and claystone; brownish, light; compact; cement very effective, siliceous and ferruginous; sand mostly curvilinear; quartz, cheifly.
		Sand; brownish, light; medium to coarse; angular to subround; cement, weak to absent, clay-like; quartz, primary constituent, with glauconite, talc-like grains, siderite, limonite, garnet, gypsum, coal, limestone, quartzite
		Sand; brownish, light; loose, medium; shapes as in 637-660; quartz, with siderite, pyrite, clay chips; silty at 671.
2	635-637	Sand; brownish; medium-coarse; granules; cement, weak, clay-like; clay chips; quartz with siderite, limestone, pyrite, garnet.
23	637-660	Clay; brownish; sandy; tough to unctuous; sand, as above, with clear, clean crystals of quartz.
10	660-670	Sand; brownish; loose; medium; cement, as above; minerals as in 670-680.
10	670-680	Sand; brownish; friable; medium-coarse, granules up to 4 mm; angular to subround; euhedra of quartz and rhombs of siderite; quartz, with siderite concretions and rhombs, quartz crystals, pyrite(tetrahedra and aggregates), coal.
5	680-685	
11	685-696	
		Shale; brown to greenish; compact; unctuous to "gritty", sandy, small amount, similar to overlying sands; non-calcareous.
49	696-745	
		Sand; gray, brownish, light; loose, friable; medium-coarse; cement, clay, weak to absent; high subangular to low subround; mostly curvilinear; quartz, primary constituent, with siderite(several pellets(and rhombs); clay chips(probably lag from overlying beds); note similarity of sand to that at and above 745 in appearance and mineral content.
57	745-802	
23	802-825	

Sheet No. 1 Name of Well. Orange City Well # 2 Survey No. W-0126

Location (Sioux County) Date Drilled Analyst Schuldt

Curb Elev. 1429

00 No Sple. Sples taken at 10' intervals

10 Drift, Buff, oxidized, sandy, silty, oxidized, strongly Calc., Gran.g sm. Pebbles Dol.g lg. mat. pres.

20 Drift, Sim. to sple 10'-20'. 20% lt. buff dol, 5% Ig. mat.

30 Drift, sim. to sple 10'-20'. 5% lt. buff dol, 5% Ig. mat.

40 Gravel, pebble, clay bound, 50% lt. buff dol, 20% Ig., 30% clay.

50 Drift, Buff, oxidized (?), sandy, Silty, strongly Calc, with 20% gran.g sm. Pebbles dol.g Ig. Mat.

60 Drift, " " (?), " " " " 30% " " " " " " " ".

70 Drift, " " (?), " " " " 20% " " " " " " " ".

80 Sand, V. crse, (MG. 2-1mm, PS 4-2 mm g 1-½ mm), ang., 50% Qz, 25% lt. buff dol, 25% Ig. 1% Gypsum

90 Sand., V. crse, sim. to sple. 80'-90'.

00

Sheet No. 2 Name of Well Orange City Well No 2 Survey No. W-0126

Location Orange City, Sioux Co Date Drilled 1921 Analyst Hershey Schuldt. Sept. 11 '36.

Must be checked

100 Drift, med. gray, non calc., with gran., & sm. pebbles lt. buff ls & ig. mat. (dom.). 20%

110 Drift, " " , calc., " " " " " " " " (Dom) = " " 20%

120 Sand, glacial., crse. (ms. 1-½ mm, PS ½-¼ mm), ang., fair sorting, 15% drk. Ig.,

130 Drift, buff, silty, v. calc., 5% sm. ig. pebbles. 4% Gypsum.

140

Clay, silt and sand mixed - light brownish buff, highly calc., unleached oxidized drift.

150

Sand & Granules - well sorted highly variable in size and color; maj. gr. 2-1 mm max. 10 mm., min. gr. 1 - ½ mm.; ang. to sub-ang.; qtz, qtzite, feld., ls., dolom., dark and less light igneous material.

160

Sand - light grayish drab, maj. gr. ½-¼ mm. prin subs ¼-⅛, 1-½ mm. max. 8 mm. ang. to sub-ang., chiefly clear qtz (60%), with dark ig. material, ls, dolom., qtzite, little pyrite, etc.

170

Drift

Clay or silt - brownish gray, calc., silty with 10% cts Sand and granules, ang. to sub-ang. ls., dolom., qtz., qtzite etc.

180 Drift

Silt - bluish light gray, highly calc., clayey and containing some sand which is finer grained than in 170-180. (Paper) Sand in less amt. than in 170-180 (<5%)

190

Sand - brownish light gray, maj. gr ½-¼, prin subs 1-½, ¼-⅛ mm ang. to sub-ang. qtz, ls., dark igneous., ferromag., qtzite, mica. Several fragments of silt from above.

200

Sheet No. 3 Name of Well Orange City Well No. 2 Survey No. W-0126

Location Orange City, Sioux Co. Date Drilled 1921 Analyst Hershey

00 — 200

Sand - dirty buff, maj. gr. ¼ - ⅛ prin. sub. ½ - ¼, max. gr. 4-2 mm. ang. to curv. clear qtz., ls., dark and less light igneous material, mica (muscov.) qtzite., shell fragments, feld.

10 — 210 X

White
Silt - very highly calc., very light yellowish gray, micaceous, some very fine sand and a little fine gravel

20 — 220

Sand, v. fine, to silt,
~~Silt~~ - buff calc., coarser grained than 210-220, ~~may be~~ very fine sand. chiefly qtz + ferromag, micaceous. Few shell fragments

30 — 230

Some white
Clay - light gray, calc. with a little sand and few fine gravel pebbles

40 — 240

Drift

R-

Silt - light brownish gray, highly calc., micaceous, with soft calc. small pellets of clay.

50 — 250

Drift

R+

Silt - clayey, light brownish gray, calc., accompanied by a little coarse ~~Smooth~~ sand and fine gravel probably of glacial origin.

60 — 260

Drift

R

Silt - similar to 250-260 but with slightly less sand and gravel.

70 — 270

Drift

Silt - light brownish gray, calc., with sand and fine gravel, similar 250-270

80 — 280

Drift.

R

Silt - light brownish gray, highly calc., with mixed sand and fine gravel. qtz, ls., etc. rare
Less sand and gravel than 270-280, but otherwise similar.

90 — 290

Drift

M

Silt - med light gray, slightly darker than above, calc., with mixed sand and fine gravel. One fragment of granite 20 mm long.
Little white chalky material.

00 — 300

Definitely Glacial.

Sheet No. 4 Name of Well Orange City Well No 2 Survey No. W-0126

Location Orange City, Sioux Co Date Drilled 1921 Analyst Hershey

00 — 300 X

R. Silt - light brownish gray calc., with much less sand and fine gravel than 290-300. Some white clayey inclusions.

10 — 310

R Silt - paper thin fragments of light brownish gray, slightly sandy calc. material which may be siltstone.

20 — 320

R Silt - light brownish gray calc., similar to 310-320 but in larger fragments. Micaceous

30 — 330

R Silt - sample similar to 320-330, but less calc and with white small calc fragments.

40 — 340

R Silt - similar to 320-340

50 — 350 X

Glacial

Sand - brownish light gray, maj. gr. ½-¼ mm. prin. sub. ¼-⅛ mm. max. 7 mm. grains highly variable in size and composition. Ang. to sub-ang. qtz., qtzite feldspar, mica, ls, dolom., chert, light + dark igneous rx., green schist Fragments of oyster and other shells. (Glacial sd of Dakota ss orig.)

60 — 360

Sand - brownish light gray, maj. gr. ½-¼ mm. prin. sub. ¼-⅛ mm., max. 4 mm. (few) ang. to sub-ang., qtz. chiefly with, ls., gneiss (one fragment), shell fragments, mica. Sample contains 10-15% brownish very dark gray, micaceous, non-calc, shale with plant remains. Some sooty material. Ferromag. minerals, qtzite (red) etc. Tr. pyrite

70 — 370

Sand - similar to sample 360-370, with some light gray calc. silty clay. Large (8 mm) fragments of ls., and dark ig material. (Appears glacial)

80 — 380

Drift

X Silt and sand - light gray calc., micaceous, with some dark shale with plant remains. Snail shell

90 — 390

Drift

M Silt and sand - light gray, calc., micaceous with snail shell fragments

00 — 400 X

Sheet No. 5 Name of Well Orange City Well No 2 Survey No. W-0126

Location Orange City, Sioux Co. Date Drilled 1921 Analyst Hershey

00 — 400 ×

Shale - light gray, slightly silty and sandy, non-calc., micaceous, contains small dark carbonaceous fragments. Some white partially calc material and a few limey fragments. (2 samples marked 400-410)

10 — 410

Shale - similar to 400-410 but with less sand and carbonaceous material and no white. Non-calc. One fragment of massive pyrite seen.

20 — 420

Shale - similar to 410-420 but less silty and only few sand grains seen.

30 — 430

Shale - similar to 410-420 but with more carbon. material and much soft white non-calc material.

40 — 440

Shale - light gray, very slightly silty and sandy, non-calc., pyritic micaceous. Some fragments of dark gray shale and little coaly material

50 — 450

× Sand - light gray, maj. gr. ½-¼ mm, prin. subs. 1-½ mm ¼-⅛ mm., ang. to sub-rng. qtz, dolom., ls, ~~dark igneous material~~, little chert. Crinoid stems. Glauconite? Grain size highly variable max. gr. 4-2 mm. Many usually rounded brown grains 1 mm Poorly sorted ~~Looks glacial.~~ Much pyrite. → Pyrite Concretions (siderite?)

60 — 460

Concretion Sand (Qz Gr. Rare

Sand - reddish and gray, maj. gr 1-½ mm. Chiefly siderite ang to sub-rd, little qtz, qtzite & dark igneous material, ls, pyrite, few gravel pebbles. (Alteration)

70 — 470

(stone)

Sand - light grey, maj. gr. ¼-½, prin subs ½-⅛ & ½-¼ mm., non-calc, ang. qtz chiefly. 40% reddish siderite as in 460-470 Mica, little pyrite, ls, qtzite., etc., in small amts.

80 — 480

(stone)

Sand - similar to 470-480, but with less siderite

90 — 490 ×

Sandstone - maj. gr ½-¼ mm., prin. sub. 1-½ mm., grains more nearly of equal size than in sands above. Ang. to sub-rng. clear qtz, chiefly Some dark? gray non-calc. carbonaceous shale, pyrite, dark igneous material (Altered siderite) Much material 4-2 mm.

00 — 500

Sheet No. 6 Name of Well Orange City Well No. 2 Survey No. W-0126

Location Orange City, Sioux Co. Date Drilled 1921 Analyst Hershey
Schuldt

00 — 500

Sandstone - maj. gr. ½-¼ prin. sub 1-½ mm most grains just about ½ mm. ang. to sub-ang clear qtz. Some light orange and yellow. Some larger fragments probably from above. some bn concr. & massive siderite (?), 5%; 3% pyrite micac.

10 — 510

Sandstone 80% - similar to 500-510
Shale - dark gray, non-calc., gritty, with good shale structure

20 — 520

Sandstone - maj. gr. ½-¼ mm, prin-sub ¼-⅛ mm, ang. to sub. ang. clear qtz chiefly,

30 — 530

Sandstone - maj. gr. ½-¼ prin. sub ¼-⅛, ang. qtz. chiefly, micaceous, pyritic
Small amt. of gray, non-calc. shale.

40 — 540

Sandstone and shale - similar to 530-540 but with slight increase in amt. of shale

50 — 550

SS, & Sh. Ss lt. gray, med. gr., ang. to subang, Well sorted, frosted, 70 %; with 5% grn gray pyrite, 10% concr. & massive siderite (?). Shale lt. gray, homogen., no shaly struct. 15% <1% cht.

60 — 560

Sandstone - maj. gr. ½-¼ prin subs. ½-¼, ¼-⅛, ang. to sub ang., Well sorted
Some coaly fragments. 8% concr.)

70 — 570

Sandstone - & Sh. SS sim. to SS unit 550-560', Sh med. to dk gray, fair shaly struct., non-calc, with small % Wh. sh., <1% coalified wood. frag. concr., pyrite, etc.

80 — 580

SS, Wh. to lt. yell, med. gr. (but finer than above) (MG. ½-¼, PS. ¼-⅛), av. size ¼mm, well sorted, clean, < 2% concr. & pyrite.

90 —

SS, lt. buff, med. gr. (MG. ½-¼, PS. 1-½ mm), ang. to subang., frosted, < 2% Iron Oxide & pyrite & concr.

00 —

Sheet No. 7 Name of Well Orange City Well No 2 Survey No. W-0126

Location Orange City, Sioux Co. Date Drilled 1921 Analyst Hershey Schuldt

600

SS, lt. buff, med. gr. (MG ½-¼, PS ¼-⅛ gl-½ mm) ang to subang., slightly frosted, with 7% grn pyritic mat., concr.; lt. gray sh, g <1% black glossy slag (?). occas. crse Qz gr.
2 spls 600-610' (none 610-620 - Prob. misnumbered - sim. to 600-610')

610

620

SS, lt. buff, sim. to spl 600-610', sorting only fair. Traces cindery material. Less pyrite & concr.

630

SS, sim. to spl. 620-630'

635

637

SS, sim. to spl 620-630 but strongly dol. cem (?) g claystone, slightly sandy, pink to br.
NS 637-640

640

SS, lt. buff, med. to crse. (MG. ½-¼, PS 1-½, poorly sorted, occas. granules, 2% dk-lt grn mat. not lg. (?) <1% weath. cht. 1 foss.
Traces lg mat. (schist & feldspar gr.

650

SS, lt. buff, sim. to spl 640-650', but with 5% lg. mat. (drk lg, Gr, Feld.) g <1% blk. glossy slag (?), mica c. sorting fair to poor

660

SS, lt. buff, sim. to spl 650-660' <2% lg (?) mat. sorting poor

670

672

Cht, wh., Porc. text., , hrd. porous, foss., non calc.) 1 Lg. frag. Pyrite. (Pyritized foss (?)); 30% Coalified wood frag.

SS, Wh, crse, (MG 1-½, PS 2-1 mm) well sorted, ang. to subang., some yellow & Pink Qz, <2% drk lg. mat.

680

SS, lt. buff, med. gr. (MG ½-¼ mm, PS 1-½ mm.), subang., well sorted, slightly iron stained.

Cret.

685

690

Sh, lt. green & buff (oxidized) strongly concretionary with occas. crse, sd. gr.

NS

Shale, buff, med. sandy,

696

SS, lt. buff, crse (MG. 1-½ mm, PS. ½-¼ mm.), subang. to crvl., frosted, 1% Lg. Authigenic Qz, 2% sid. concr., 2% lt. grn. shale (sandy) 1% Iron oxide.

700

Sheet No. 8 Name of Well Orange City Well No 2. Survey No. W-0126

Location Orange City Sioux Co. Date Drilled 1921 Analyst Hershey

700

Sandstone - light pinkish buff, maj. gr ½-¼, prin. sub 1-½ mm. ang to curv. clear qtz chiefly; some grains slightly frosted. Small amt of pale green shale and little white chert.

710

SS, lt. buff, crse, (M.G. 1-½, PS ½-¼, mm), subang., well sorted, slightly clay coated, <1% lt. grn. sh., ~~Tr. o~~

720

SS, lt. buff, crse to fine, (M.G. 1-½ mm, Ps. ¼-⅛ mm), subang., slightly frosted, with 5% massive & concr. siderite (?), Tr. auth. oz.

730

SS, lt. buff, sim. to spl., <2% concr.

740

Sandstone - maj. gr ½-¼ mm., prin. sub. 1-½ mm., ang. to curv. clear qtz. chiefly; frosted in part. 5-10% pale green, sandy, shale. Some white chert and a little dolomite.

750

753 Shale - red, calc., silty to sandy, compact.

755

760

770

Shale, drk med. gray, & lt. gray, non calc., hrd, lt. gray sh. pyritic. Lg. frag blk. sh

780

790

800

802

Sheet No. 9 Name of Well Orange City Well No 2 Survey No. W-0126

Location Orange City, Sioux Co Date Drilled 1921 Analyst Hershey

00

802

10

Sandstone - light pinkish buff; maj. gr. ½ - ¼ mm 1-½ almost equal prin subs ¼ - ⅛ mm., max 2 mm., subang. to curv. qtz., frosted in part

Shale 25% - gray, slightly calc., pyritic in part (Glenwood from above unctuous

20

825

30

40

50

60

70

80

90

00

File G-W

IOWA STATE
DEPARTMENT OF HEALTH

January 17, 1945

JAN 18 1945

Mr. Cor. Vande Steeg, Mayor
Orange City
Iowa

Re: Water Supply
Orange City, Iowa

Dear Mr. Vande Steeg:

With further reference to augmenting your water supply at Orange City, I have had an opportunity to discuss this matter with Dr. Hershey of the State Geological Survey since writing you on January 5.

Dr. Hershey is definitely of the opinion that another deep well in the Dakota sandstone near your present well would probably tap water of about the same mineral quality as your present well. As stated in my letter of January 5, there appears to be an area of soft water in the Dakota sandstone in the extreme northwestern part of the state and another area to the south of you. However, in the ridge on which Orange City is located, all of the water derived from the Dakota is very highly mineralized. He states that of course there is always a possibility of hitting a freak well which does not conform with the area immediately surrounding; however, such possibility is very remote and due to the cost of test boring at such depth, he would not think it worth while but rather would think that you proceed on the assumption that any water derived from the Dakota sandstone will be similar in quality to water from your present deep well.

With this in mind, I would definitely recommend, and Dr. Hershey concurs, that some test borings be made in the Floyd River Valley to determine the extent and character of the gravel. From the formations encountered in the exploratory drillings, the exact type of well could be determined. Dr. Hershey is of the opinion that you can get wells in this area capable of producing 200 to 250 gallons per minute without excessive drawdown. If this is the case, probably two shallow wells would meet your needs. Since you will be dependent on a single pipe line from the shallow well field to town, it probably would be advisable to keep your deep well pumping equipment intact for emergency fire use. I believe that the Insurance Inspection Bureau would insist on either keeping the deep well intact or a fairly large storage in the city. This, however, can be checked in detail with the Iowa Insurance Inspection Bureau.

If there is any other information which I might get for you, please let me know.

Very truly yours,

A. H. Wieters, Director
Division of Public Health Engineering

AHW/mm
Copy to Dr. H. G. Hershey
" " Mr. J. L. Stober

Allen F. Agnew

8/23/46

ORANGE CITY #2

Between 755 and 825 (T.D.) feet considerable green shale is encountered. Is it Ordovician? If so, what formations?

There is a 2' weathered red zone from 753-755. Not necessarily the base of the Cretaceous.

Spl 755-802, 1 sample, showed dull gray & black blocky to subfissile shale with abundant carbonaceous plant material
Spl 802-825, 1 sample, showed fine to coarse, angular quartz sand similar to the above, except the sand in this sample is frosted. There is 20% green pebbly shale sandy with fine quartz and some pinkish arkosic sand.

Sample	Allen Agnew	A.G. Unklesbay Unk	Parker Mary	(Ethylmae Schulz) Bubs
1.) 755-802	Penn	K	Kind.	Kind.
2.) 802-825	Dev.	Miss	Dev	Dev.

Agnew says #1 is either Penn. or K, picks Penn arbitrarily
Unk " " " " " " " ", " K because nearest Penn is 100 mi. SE

Mary & Bubs say #1 is Kinderhook; Agnew & Unk didn't know that there was that much carbonaceous and lignitic

matter in the Kinderhook. It, like Agnew's Penn, would have to be an outlier.

Agnew, Mary, and Bubs say that #2 looks like Devonian sandy shale; Unk says Mississippian. In either case, it would have to be an outlier.

General statements:

Neither shale is micaceous — Penn. & K. are micac.

Hull City well, 15 mi. N, shows a K, with a lower gray shale, lying directly on Pre-Cambrian.

Devonian at West Bend, 75 mi. E, and Sioux City, 35 mi. SW, is a dolomite

Absolutely not Ordovician, as Carmody calls it.

Most probable conclusion:

All Cretaceous

Punched FCH

WRD Exp. (CW)
Aug. 1964

Verified PMI

U. S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

Record by P.T. Horick Source of data Files Date 5/28/65 Map H. & T.

State Iowa 16 County (or town) Sioux 27

Latitude: 43 01 0 N Longitude: 096 03 48 Sequential number: 1

Lat-long accuracy: 2m T 95 N S, R 44 W Sec 32 NENE ¼, NW ¼, SE ¼ 5PM

Local well number: 095 44W 32 d a a Other number: W-0126 B & M

Local use: 00 26 CITY 2 Owner or name: ORANGE CITY

Owner or name: ORANGE CITY Address: Orange 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 Z

DATA AVAILABLE: Well data S Freq. W/L meas.: NONE N Field aquifer char.

Hyd. lab. data:

Qual. water data; type:

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

Aperture cards: yes

Log data: GEOLOGIST LOG G

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 825 ft 825 Meas. / rept. accuracy

Depth cased; (first perf.) ft Casing type: ; Diam. 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, (W) other, (Z) other

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: 1921 9 21 Pump intake setting: ft

Driller: Thorpe Well Co. (name), Des Moines, Iowa (address)

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

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

Descrip. MP LSD ft above / below lsd, Alt. MP 1931

Alt. LSD: 1931 1431 Accuracy: (source) ALTIMETER 7

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

Date meas: Yield: gpm Method determined

Drawdown: ft Accuracy: Pumping period hrs

QUALITY OF WATER DATA: Iron ppm Sulfate ppm Chloride ppm Hard. ppm

Sp. Conduct K x 10^6 Temp. °F Date sampled

Taste, color, etc.

Orange City, Iowa, June 14-1945.

Iowa Geological Survey,
Iowa City, Iowa.

Gentlemen:

Kindly send me a map or description of the location of the Dakota Sandstone formation. How far it reaches, North, South, East and West.

Very truly yours,

Charles L. Dyke

Charles L. Dyke,

035-44w-32 d baa

Well Number 43 00 10 N 096 03 48.1 W
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: CENTRAL LOWLAND 12 | Section: DISSECTED

TILL PLAIN e | Drainage Basin: FLOYD 368 | Subbasin:

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

MAJOR AQUIFER: system, series, aquifer, formation, group

Lithology: | Origin: | Aquifer Thickness: ft

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

MINOR AQUIFER: system, series, aquifer, formation, group

Lithology: | Origin: | Aquifer Thickness: ft

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

Intervals Screened:

Depth to consolidated rock: approx 350 ft 350 | Source of data: C

Depth to basement: ft | Source of data:

Surficial material: SANDY TILL T | Infiltration characteristics: POOR 4

Coefficient Trans: gpd/ft | Coefficient Storage:

Coefficient Perm: gpd/ft²; Spec cap: gpm/ft; Number of geologic cards:

Note: well reportedly dismantled 6/32

32-0

Geology (questionable)

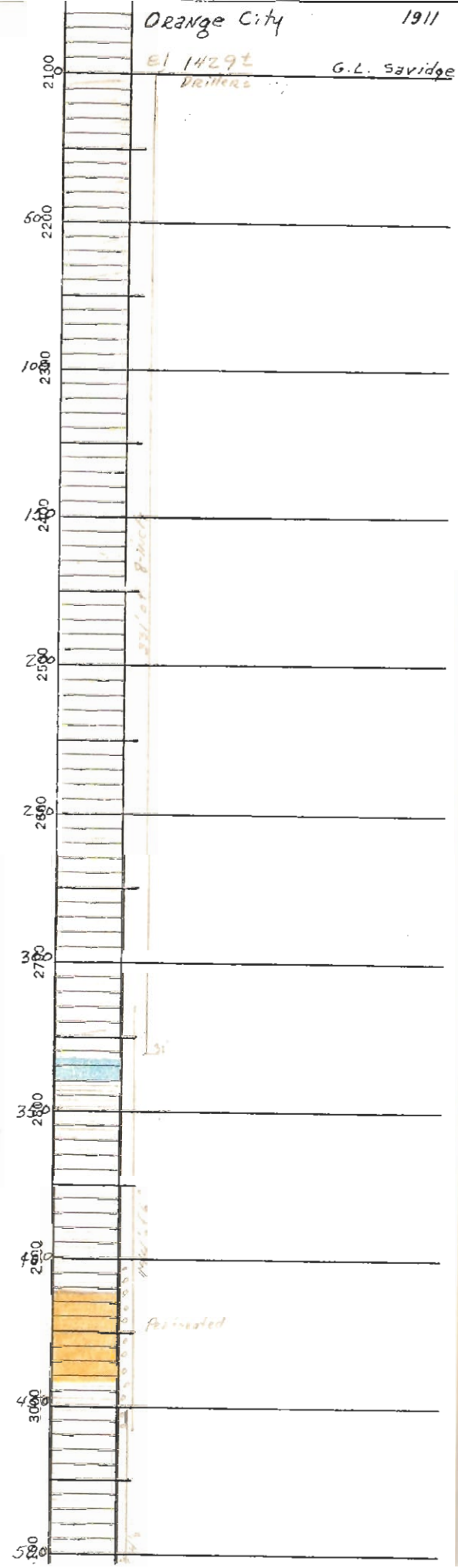
Pleistocene drift	0 - 350'
Cretaceous, silt, sand, and shale	350 - 695'
Paleozoic	
Undifferentiated sand	695 - 753'
" shale	753 - 802'
" sand	802 - 825'

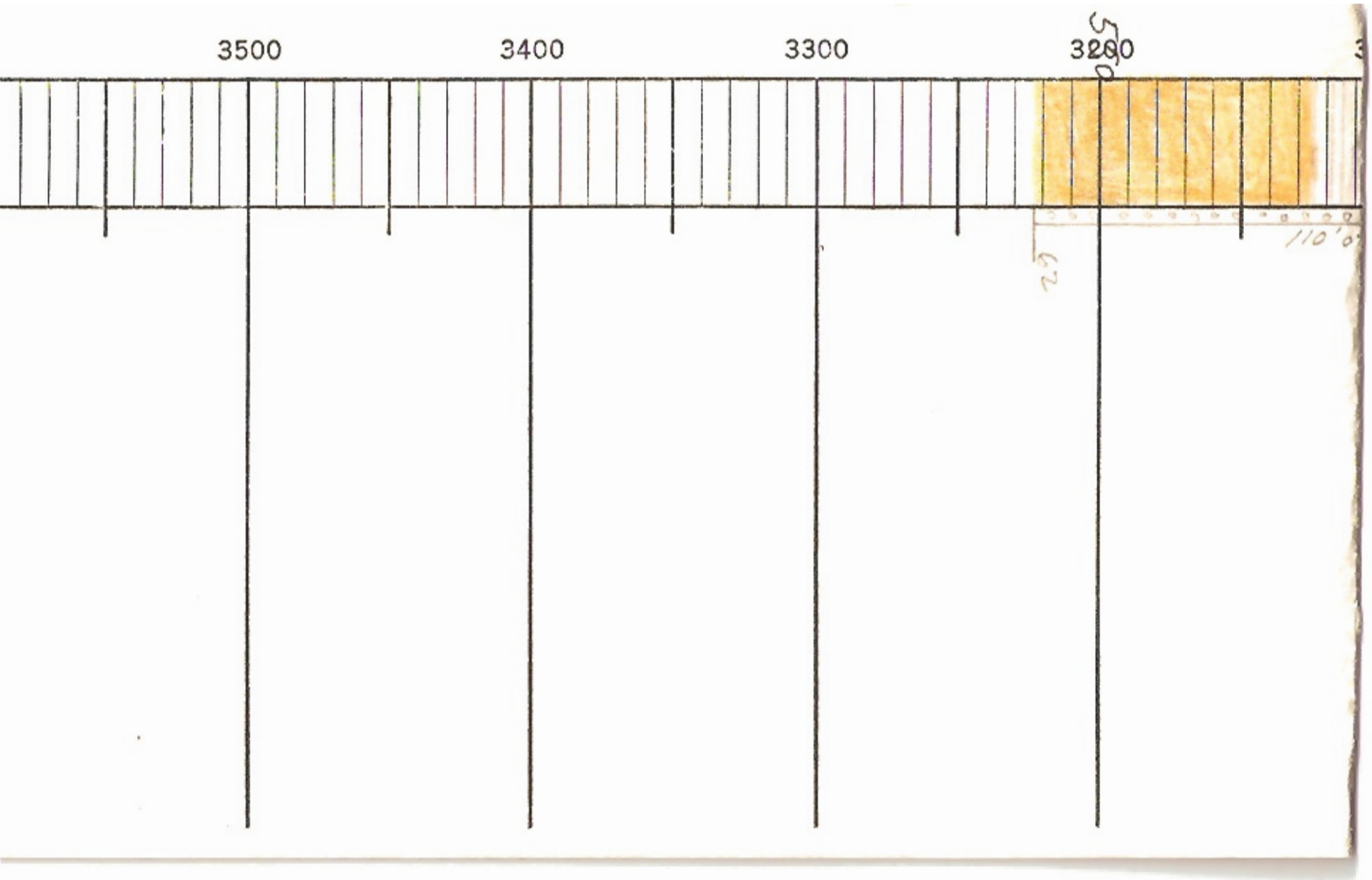
GPO 844-22

Orange City 1911

El 1429± Drillers

G.L. Savidge

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