IOWA GEOLOGICAL SURVEY W-1307

In Cooperation with U. S. Geological Survey

RECORD OF WELL

Location:

Town: Hedrick (N E / S W): County Keokuk.

NE-SE-NW sec. 36 T 74 N., R. 13 W. Benton Twp.

Well name and number City Test

Owner City of Hedrick. Address

Tenant Address

Contractor Layne-Western. Address

Drillers

Drilling dates Oct. 1940 to Feb. 1941

Well data:

Elevations: Drilling curb 825 feet; Land surface 823 feet

Determined by U.S.E.A.

Topographic position Upland.

Total depth: Reported 530, feet, Measured 532 feet

Drilling method Cable

Hole and casing data 10" casing to 146'. 10" open hole to T.D.

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 74 Measuring point _____
Pumping level _____ at 15 g.p.m.

Specific capacity _____ g.p.m. per ft. drawdown; Temperature 53 °F.

Pump data: Type pump Turbine Column Dia. _____ Length 130 ±
Cylinder or bowls: Dia. _____ Length _____ Suction pipe _____

Power Electric Airline _____

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

WATER ANALYSES (in parts per million)

Date samples	April 29, 1943	May 15, 1948		
Sampled by	K.E. Andersen.	J.R. Cooper (Dissolved)		
Total solids	1044	1167		
Insoluble matter	1.0	24		
Alkalinity (Meo)	496.0	442		
Alkalinity (Phn)	0.0	0		
pH	7.0	7.5		
$Fe_2O_3 + Mn_2O_3 + Al_2O_3$	2.0	17.		
Alkali as sodium	166.1	62.3		
Calcium	200.1	202.9		
Magnesium	66.0	61.5 (Dissolved)		
Iron (unfiltered)	0.3	0		
Manganese	0.00	0		
Nitrate	3.5	0		
Fluoride	0.0	.7		
Chloride	180.0	4.		
Sulfate	379.8	396.5		
Bicarbonate	605.1	539.2		
Hardness (ppm)	771.	760		
Hardness (gpg)	45.0	44.4		

Remarks _____

Laboratory data: Sample storage location _____

Sample range 2-530 No. spls. 89 No. dupls. & cond. 89 Cond.
Spls. prepared by Sunnyford. Washed range _____ by _____
Driller's log and cond. _____
Insoluble residues: Prepared by _____ Studied by _____ Strip log _____
Microscopic study Ellis & Davis strip log Ellis & Davis
Gen. log _____ Correl. by Ellis & Davis.

IOWA GEOLOGICAL SURVEY
Water Well Data Sheet

Survey Number W-1307

Town Hedrick County Keokuk T. 74 N., R. 13 W. E.

Name City Test Location ¼ ¼, Sec.

Contractor Layne Western Driller Use

Construction Drilled Drilling Dates Oct. 1940 to Feb. 41 Drilling Depth

Topog. Curb Elev. Ref. Total Depth 530'

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

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

Producing Horizons

Water levels and pumping tests on various horizons during drilling:

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

Additional information

Laboratory Data

Sample range 2-530 Number samples 89 Number Duplicates 89 Cond. Good

Log Yes No, Cond. Boxed Summerford Range 2-530 Date Dec 40, Feb 41

Remarks Cut made for Gulf (135) (110-530) (84 spls) Dec. 1940 - Feb. 1941

Microscopic Study Range Strip Log Gen. Log Blue Print Samples Washed

Insol. Res. Study Range Strip Log Gen. Log Insol. Res. Prepared Well Corel.

Sheet No. 1 Name of Well Survey No. W-1307

Location Hedrick Keokuk Co. Date Drilled Oct. 1940 Analyst Ellis Dec. 31 1940

00 0

No sample

2

Gumbotil lt. gray sandy 15% clay yellow brown sandy

10

20

30

40

46

Sandy glacial fm. to coarse v. dirty with yellow brown clay (25%?)

50

51 No sample

56

Coarse sand and granules, glacial, v. slightly dirty with yellow clay

60

70 70

Sand, med. to coarse, ang. pink frags. lt. green mica. Penn.?

lt. gray v. slightly dirty

80

90

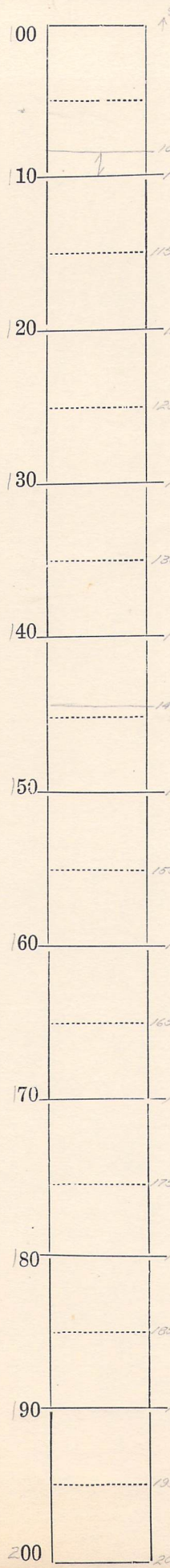
92

Sh. med. to dk. gray mott. laam. med. hd.

100 ± 108

Sheet No. 2 Name of Well Survey No. IW-1307

Location Hedrick Keokuk Co. Date Drilled Dec. 1940 Analyst Elias Dec. 23, 1940



Sheet No. 3 Name of Well Survey No. W-1507

Location Headrick Keokuk Co. Date Drilled Dec. 1940 Analyst Elias Dec. 23, 1940

200 (sandy in part)
Ls. lt. to med. gray brown and brown, brecciated?, frth. to vfn. 15% brown blk. oil residue?

205
Ls. as in 200-5' 15% oil residue; 10% ss. fn. A-a, coherent fn. sphalerite

210 10
Sls. calc. sandy (vfn.) lt. gray, coherent sl. finely micac.

215
" " " " " "

220 20
" " " " " "

225
Dolo. calc. sl. sandy lt. drab brown, vfn. to fn.

230 30
" " " " " " little gray, vfn. to fn.

235
Sh. calc. vfn. lt. gray poor lam. med. hd. 3% pale gray chalcedony

240 40
Dolo. vf. calc. lt. to dk. drab and gray, vfn.

245
" " " " " " <1% chalcedony

250 50
Sh. calc. lt. to med. gray, lam. med. hd.

255
Sh. v. dolo. lt. med. drab brn gray non lam. hd.

260 60
Sh. dolo. lt. sl. drabish gray, poor lam. hd.

265
Sh. dolo. lt. med. gray, poor lam. hd.

270 70
Chert, med. to dk. brown drab opaque wh. + brnish chert + chalcedony mottling 40% dolo. vf. calc. lt. gray slightly brnish, little dk., fn. sach.

275
Chert + 30% dolo. as in 270-75

280 80
Ls. pale to lt. gray med. gray mottling, phenoclastic <1% glauc. 10% chert wh., little drabish mottling, opaque to semi transl.

285
Ls. lt. gray sl. drabish in part med. gray mottled phenoclastic <1% glauc. 10% chert wh. to pale gray, little dk. drab, opaque to semi transl.

290 90
Ls. dolo. lt. gray and buffish gray, vfn. to phenoclastic fn. glauc. 40% chert pale to lt. gray and drab gray, blk. bryozoan opaque to semi transl., mott.

295
Ls. dolo. in small part, lt. gray and buffish gray med. gray mottlings, phenoclastic <1% glauc. 30% chert as in 290-95'

300

Sheet No. 4 Name of Well Survey No. W-1307

Location Hedrick Keokuk Co. Date Drilled Dec. 1940 Analyst Elias Dec. 31 1940

300 – 300

Ls. v. lt. bf. buff gray, phenoclastic, < 1% glauc.
15% chert wh. to pale gray + buffish gray opaque to semitransl. mott.

305

Ls. v. lt. to lt. buff gray to gray, dk. gray spotted, phenoclastic 1% glauc.
20% chert pale to lt gray dk gray spotted opaque to semitransl.

310 – 310

Ls. lt. k little med. buff gray to gray, phenoclastic, < 1% glauc.
10% chert as in 305-10'

315

? Ls. pale to lt. buffish gray, phenoclastic, tr. glauc. 2% chert wh. opaque little dead

320 – 320

Ls. pale to lt. buffish gray phenoclastic 2% glauc. 20% dolo. lt. buff fn. sach.
5% chert + wh. to pale gray opaque vitreous and dead

325

Dolo. lt. buff fn. sach. to ls. pale to lt. buffish gray phenoclastic
30% chert pale to med. gray and drabish gray opaque to semitransl. 5% wh. chalcedony

330 – 330

Dolo. (pale to) lt. buffish gray, fn. sach. 20% ls. aa
35% chert as in 325-30 little dead 5% wh. chalcedony

335

Dolo. pale gray, sl. buffish, fn. sach.
30% chert wh. to med gray opaque to semitransl. little dead 10% wh. chalcedony

340 – 340

As in 335-40 25% chert 10% chalcedony

345

Dolo. lt. buffish gray fn. sach. (areas) 30% ls. pale to lt. buff gray, phenoclastic
15% chert as in 335-40'

350 – 350

Dolo. lt. gray + drabish gray fn. sach. (areas) 20% ls. pale to lt. buff gray phenoclastic < 1% glauc,
40% chert wh. to pale gray mostly dead gran. rest opaque

355

As in 350-55 33% each

360 – 360

Sh. v. dolo. (with fn. rhombs) lt. gray nonlam. hd. 5% chalcedony pale gray + buffish gray

365

" " " " " 8% chalcedony pale gray

370 – 370

Dolo. lt. gray v. fn. to fn. gran. fr. glauc. 5% chalcedony pale gray

375

" " " " " 1% glauc. 5% chert wh. to lt. gray, opaque to semitransl.

380 – 380

Dolo. lt. buff fn. sach. 45% ls. pale to lt. buff phenoclastic
10% chert wh. to pale gray, opaque vitreous and dead; little semitransl.

385

Dolo. and ls. as in 380-85 20% chert wh. to lt gray opaque and semitransl. mottled little dead
transl. bryozoa?

390 – 390

Dolo. lt. buff and buff gray, fn. sach. ls. lt. buff phenoclastic
5% chert wh. to pale gray opaque and transl. mott.

395

Dolo. med. gray, sl. drabish in part, v. fn. to fn. streaks wh. clear calc. xls.

400 – 400

Sheet No. 5 Name of Well Survey No. W-1307

Location Hedrick Keokuk Co. Date Drilled Dec. 1940 Analyst Elias Dec. 24, 1940

400 405 410 415 420 30 40 50 60 70 80 90 00

400 Dolo. lt. med. drab gray, v. fn. to fn. 10% chert, med. to dk. med. drab semi-transl. little wh. mottlings.

405 Dolo. " " " " " "
10% ls. pale buffish gray phenoclastic to lt.

410 Dolo. as in 400-05' 10% ls. lt. buff gray phenoclastic, brach. impressions

Sheet No. 5 Name of Well. Hedrick City Survey No. 1307

Location ..... Date Drilled ..... Analyst Davis 1-31-42

4 00

10

Dol, m gry, f-xl. sub sac - some pale gry, & calc
Tr. dol. ▱ Tr. chalced

20

Ls, lt. gry, vf., gran sl. dolom Tr dol. m. xl. lt brn.

Ls, " " " " " " Tr. dol ← ls. m x lt brn.

30

Ls, lt. gry. v.f. gran. - 40% Dol. lt. brn., m. gran 20%
40% cht, lt. gry, dull somewhat gran.
Fossil frag.

same as 30-35
Fossil frag

40

Ls, lt gry., f. - v. f. gran, shell. frag.
30% cht. lt. gry mott fossil.

Ls, pale yell. - drbsh. gry f-crse, pheno-clastic
15% ls. dolom., m. gran, lt. brn. - gry 10% cht. lt. - m
drbsh gry, mottled, fossil.

4 50

Ls, pale yell - drbsh gry, f-crse pheno-clastic, 15%
ls, m. gran., m. drbsh gry. fossil crin. stems
5% cht. abt same tripolitic. cuttings etc.

Ls, pale yell-drbsh gry f-crse phenoclastic
Dol ▱

60

" " " " " " " "
Dol ▱

" " " " " " " " " "

70

" " " " " " " " " " "

" " " " " " " " " " "

80

" " " " " f-sub lith

" " " " " " " 15% dol, lt. brn
m - ~~gran~~ sub-sac

90

Ls, pale gry m - f - sub lith 40% dol., lt brn,
lgran gran m. gran sub sac.

Ls, pale gry f - sub lith 40% dol. aa.
lgran

5 00

Sheet No. 6 Name of Well. Hedrick City Survey No. 1307

Location ..... Date Drilled ..... Analyst Davis 1-31-42

5 00

Dol. lt. brn., m gran, sub sac. 40% ls, pale gry., f-v. f. gran.

Dol. lt brn a.a. 30% ls, pale gry a.a.

10

Ls. pale gry, f-v.f. sl. dolo. Tr. chalced.

Ls. " " " " Tr. clt, gry mott. brn Tr chalced.

20

Ls. " " " " sl. dolo. 20% dol. lt. brn, m. gran sub sac

Sh. m. gry, dolom. pyrite.

30

40

5 50

60

70

80

90

6 00

Hedrick city well W-1307
Insoluble residues

Note: these appear to represent 10 ft spls for the most part.

235-240 43% clay gray 80% (prob siliceous) ; Chalced 17% wat gr transl, subvit, conch. to xtln qtz Sd, med, crsely fr, C -5

240-245 10% clay ditto Chalced to qtz 5%

245-250 11% clay ditto chalced qtz blgr, vit, conch -5%

250-255 26% silic 2% spongy mass dirty wh; Chalced 2% clay 96% mdle gr. brn

255-260 35% clay gr brn fn soft non silic.

260-265 28% ditto

265-270 52% Sh ltmed brn on fresh surf massive fnly punctate

270-275 68% qtz med 15% -chal, clear, wh to blgr, vit, transl totsp v.little porc drk brn arg prtgs 1% spicules
Cht ltbrn, mot drker s' w. blgr chalced & clear cht spots, granular, fnly dmld
chal to qtz ditto 15% drk brn prtgs

275-280 70% Cht ltbrn mot ditto Spongy mass of spicules -5%
sd, fn, fr, r. tr + marc tr crsly dlmdc G, pist fnly punctatate 1% also drk grn rd esp fos frags

280-285 20% Cht v. ltgr mot brn porc 30%; Cht v ltgr mot brn v. rough ; Cht 10% wh, por to blgr chal microbot

285-290 20% spl ditto possibly more med fr sd
brn arg 5% sd tr. tr G

290-95 40% Cht 50 mot v. ltgr s'brn porc , Cht, 50 ltgr, rough dmldc, soft, arg microbot tr.

295-300 40% ditto
fos sd fn r Qtz 2% * G punct

300-305 28% Cht subwh, mot pale brn dead, subconch to rough microbot tr
sd, fn, fr. 1-2% fos marc G punct 1%

305-310 29% 08 Cht pale gr. subwh dead ← with porc cht included crs dmld punct soft.; Cht, subwh porc 30% microbot tr +
sd marc G punct 1%

310-315 25% Cht ditto dead porc 35% chal tr microbot
sd 10% marc G tr

315-320 5% Cht, porc, subwh w. chal & qtz spots microbot 5%-10%
sd 5% G 15% most punct some drk rd

320-325 8% Cht subwh porc → rough & T 15% microbot 10%
spongy pale brn silic 15% * Chal, blgr, vit, conch G punct tr

325-330 5% Cht subwh to v.lt yel brn, v. fn dlmlds spics subconch microbot -5%
G tr

330-35 50% ditto
Chal & qtz, vit, transl, conch 20% *

335-40 62% Cht subwh, spongy fn dlmld 45% ; Cht 35 subwh w. chal sphs (rh) porc some punctate

340-45 60% spl ditto
cht subwh spongy soft 30 marc → Chal (?) 15% sltly yelsh, spongy crsly dmld

345-50 35% Cht subwh w chal "rh" & dlmld porc 40% ← chal 10% & qtz * microbot 5%
Cht spongy ditto 60%

350-55 49% Cht subwh porc ditto ↔ chal 5% Chal & qtz 5% microbot 5%

Hedrick City Well W-1307
Insoluble Residues

~~350-355~~

chal + qtz = 2% microbot

355-60 50% Cht[50], v. ltgr v. fnly spongy; Cht subwh op to drb transl porc, fnly punct

360-65 85% sh ltgr, v. fnly punct. Cht[15-20%] subwh, few dmld rough; Chal to qtz -5% (too many) G

365-70 85% Burl B1 ditto

370-75 57% silic[70] sh ltgr fnly punct Cht[30] ditto gr lauc much punct w. spics G, drk rd

375-80 63% ditto

Burl A 380-85 15% Cht[45] wh rded wh irreg., silic[5%] (chal?) dirty gr, subvit, transl v. crse dmld Cht[40] subwh w. gr sdrb chal spots, conch; Chal rosettes; silic sh 40% aa G py

385-90 12% ditto

390-95 40 Cht[50%] wh, w. chal spots conch; silic sh punct. ltgr 35 Cht wh lacy w. dolmolds 15% Cht & chal -5% ~~Cht~~ to v. lacy sd, rd, fr v. fn to med +r G py tr
— cht pale gr silic dmld 5%

395-400 1% sh flakes, med brn, mic, ltly glauc Cht as above 15 Cht wh porc[1%] microbot xtln qtz

60 Cht lt brn rded, frag cri Chal gran mdas brn

400-405 7% 40 Chal cht medyel brn mot wh, conch xtln qtz

405-10 2% ~~Chal 40%~~ ~~Cht 60~~ Chal cht medyel -15% sd, fn to med ~~sd~~ sd, v. fnly fr; sh med brn flakes

410-15 2% Cht wh, v. irreg hackly bot; fos Chal & Qtz Chal. qtz, bl gr. vit, conch some rded brn clay tr.

415-20 3% ~~ditto~~ Cht, wh, soft, trip, rough ⟷ pale gr conch 10% sd med, v. fnly fr. G grn puntc.

420-25 5% Cht subwh & lt brn as from 400-405 50% brn clay 50% G
Cht ditto

425-30 4% sd qtz fn to med, v. fnly fr. brn clay brn drk sh punct.

430-35 40% Cht ash gr, irreg to rough some subconch

435-40 42% ditto
Cht. lt brn frag w. bff chal between fos 20% sh drk brn 5%

440-45 35% — Cht ash gr. slt slt sd ditto 1%
Cht frag ditto 20% Ash gr 15% sh drk brn 2%

445-50 15% Cht, subwh rough irreg fos some microbot.; silic chal(?) selenite-like luster
Cht, lt brn spkld conch to frag as above 35 ↓ Qtz * sh drk brn 2%

450-55 13% Cht subwh, rough[to microbot] cht fos & ~~sh~~ chty "shells" porc ditto sd grains
cht microbot 60% Cht spkld to frag ditto 20% drk brn sh 5%

455-60 5% — chal, bffsh[some 20%] selenite luster sd
chal & qtz blgr. vit transl to sp 15% drk brn sh flakes

460-65 3% sd[to] v. fn to med ~~well rded fr~~ C fr; Chal[40] pale bff gr, bril vit, sel-like Microbot 10%
Chal & qtz ditto 25 sh drk brn

465-470 3% sd ditto 25 Chal 60 tr grn ~~frag~~ grains G?
chal bl 5%

470-475 2% sd ditto 50 chal little bffsh to chty 50 sh brn tr.

Hedrick W-1307
insoluble ~~residue~~ residue study

		cht subwh mot gr & brn 5%	PY		clay grn ltt tr
475-80	2%	sd 35 fn to med c, fnly fr.	Chal 60 AA		sh brn drk
		Chal bl 10%	misc cht 10 PY tr.		G tr
480-85	1%	slt pale gr A cem 5% a	sd A 35%		sh brn 35%
		slt. 40	(cave?)		sh lt grn flakes
485-90	1%	sd ditto 40	Cht misc 20%		
		Chal bl 10% vit qtzose			sh gr flakes - 5% a brn
490-95	3%	slt 85	sd 5%		
		Chal bl ditto 10%			G tr.
495-500	6%	slt drb sly 40 dmse	sh gr flakes 30%	sd w-grnsh el 20	
		slt 10%			sh brn flakes 10%
500-505	3%	Chal bl 65% vit qtzose	sd 10%		
			PY 10%		
505-10	3%	ditto maybe more sd			
		sd 25			sh brn, ponct 20
510-15	1%	Chal 55	slt present		
515-20	2%	ditto			
		cht, lt gr to lt brn mot 15%	chal ditto	PY	sh brn 30%
520-25	3%	slt 15	sd ditto 40	large mica flake	sh lt grn tr
			PY		
525-30	80%	Sh lt gr, fis fn mica flakes		5% + ÷	

Town Hedrick W-1307

Location: TWP 74N, R13W County: Keokuk

Owner of well City test well Date started: Oct. 1940

Contractor Layne Western Date completed

No of samples prepared 66

Total depth range of prepared residues: 2'-415', 415-530

Sample range of residues
5' interval except:

2-46

46-54
— missing 54-56
56-70

70-92

92-108
— missing 108-110
140-144

144-150

original amount of sample used
Full vial

Date residues prepared Jan 11, 1941, Feb 17-26
Jan 14, 1941
Jan 16, 1941

Storage location Residue room, drawer # B9

Remarks

Hedrick

No 2

W-1307

Sample Range	Amt of original sample	Amt Insol. Res						
2-46	Full	85%	190-195	Full	10%	295-300	Full	40%
46-54	"	89%	195-200	"	40%	300-305	"	30%
56-70	"	80%	200-205	"	27%	305-310	"	30
70-92	"	75	205-210	"	30%	310-315	"	23
92-108	"	82	210-215	"	60%	315-320	"	6
110-115	"	60	215-220	"	65%	320-325	"	11
115-120	"	50	220-225	"	52%	325-330	"	52
120-125	"	50	225-230	"	13	330-335	"	51
125-130	"	62	230-235	"	14	335-340	"	62
130-135	"	94	235-240	"	39	340-345	"	63
135-140	"	67	240-245	"	12	345-350	"	38
140-144	"	70	245-250	"	11	350-355	"	51
144-150	"	66	250-255	"	21	355-360	"	51
150-155	"	60	255-260	"	35	360-365	"	90
155-160	"	62	260-265	"	25	365-370	"	85
160-165	"	63	265-270	"	50	370-375	"	60
165-170	"	64	270-275	"	70	375-380	"	68
170-175	"	92	275-280	"	71	380-385	"	16
175-180	"	20	280-285	"	22	385-390	"	15
180-185	"	18	285-290	"	22	390-395	"	41
185-190	"	15	290-295	"	43	395-400	"	19%

Hedrick

W-1307

Sample Range	Amt of original sample	Amt of insol. Residue			
400 - 405	Full	9 %	505 - 510	Full	3
405 - 410	"	2 %	510 - 515	"	2
410 - 415	"	2 %	515 - 520	"	3
415 - 420	"	4	520 - 525	"	3
420 - 425	"	5	525 - 530	"	87
425 - 430	"	4			
430 - 435	"	45 %			
435 - 440	"	43			
440 - 445	"	37			
445 - 450	"	15			
450 - 455	"	13			
455 - 460	"	5			
460 - 465	"	2			
465 - 470	"	2			
470 - 475	"	2			
475 - 480	"	3			
480 - 485	"	1			
485 - 490	"	4			
490 - 495	"	4			
495 - 500	"	7			
500 - 505	"	2			

Hedrick (KEOKUK)
2/28/42

MEMORANDUM

To: H. G. Hershey
From: K. E. Anderson

Subject: Ground-water at Hedrick, Iowa (Keokuk Co.)

The town supply is at present derived from one or both of two wells as follows:

Well No. 1
Location: NW-NE-NW-36-74-13
Elevation: 800-805 (approx)
Dug well, 8' diameter
T.D. about 20-25'
S.W.L. about 10'
This well in use for about 20 yrs., originally drilled for R.R.
Water of 36-40 gr./gal. hardness

Well No. 2
Location: NE-SE-NW-36-74-13
Elevation: 823 (concrete floor of pump house)
825 (top of concrete pump base)
Drilled well, Layne-Western 1942
T.D. 532'
S.W.L. ??
Airline set at 129'
Layne electric deep well turbine pump, 5 HP motor.
Pump set on concrete block 2' above concrete floor of pump house and is in N.W. corner of pump house
Insufficient supply.

The city uses roughly 15,000 gallons per day in winter, up to 25,000 gallons per day in summer. At present their pumpage is made up of water from both wells.

Water from Well No. 1 is pumped directly into the mains near that well and thence into the standpipe which is located at the N.W. corner of the pumphouse containing Well No. 2. The standpipe is about 1500' south and east of Well No. 1.

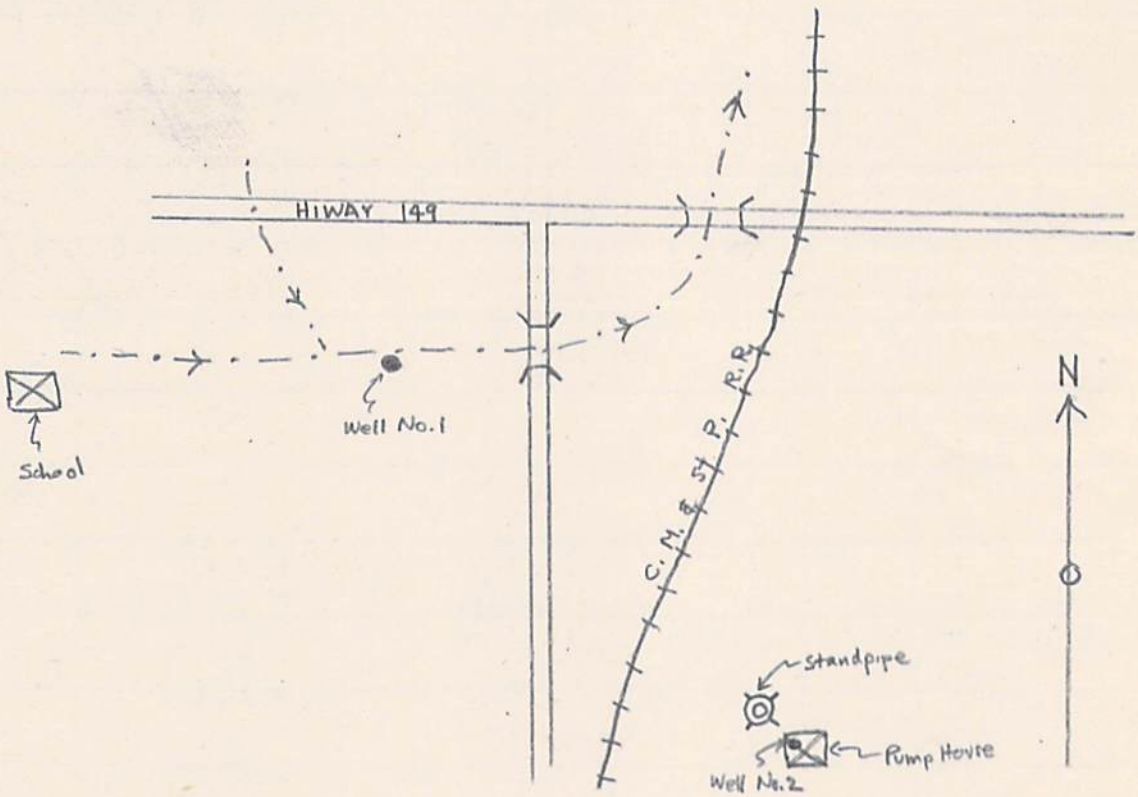
Water from Well No. 1 is used without softening, filtration, or chlorination. There is no sewage system in town and since this well is in the bottom of a slough running through town is subject to surface drainage and possible contamination. A school with a large cesspool is located about 400-600 yds. west of Well No. 1 at the head of this slough. No contamination of water from Well No. 1 has yet been reported, though occasionally analyses of this water show questionable bacteriologic qualities.

With the exception of a few such sloughs in town, the topography is very flat. The drainage divide between Skunk and Des Moines rivers crosses the town of Hedrick.

Most of the above information from:

Ralph E. Jones
Mayor of Hedrick
Hedrick, Iowa

(publisher of the Hedrick Journal)



Scale = approx 10" to 1 mile
(or 1" = 500' ±)

Hedrick, Iowa
(Keokuk Co.)

February 6, 1942

Mr. R. W. Brooks
Layne-Western Company
611 Eleventh Street
Ames, Iowa

Dear Mr. Brooks:

I have your letter of February 5, 1942. Just as soon as possible we will visit Hedrick and report our findings to you.

So far as I know there is no well in or near Ottumwa where one can obtain a sample of water from the Galena-Platteville and St. Peter formations, or from the Cedar Valley-Wapsipinicon formations. The only possibility is from a well which was drilled in about 1937 for the Iowa Poultry Producing and Marketing Association. I have not had an opportunity to investigate this well which is reported to have a depth between 600 and 800 feet. If the depth is 600 feet the well probably ends in the Mississippian above the Maple Mill shale.

Very truly yours,

H. G. Hershey

HGH:N

LAYNE-WESTERN COMPANY

WATER SUPPLY CONTRACTORS

WELL WATER SUPPLIES AND
PUMP EQUIPMENT FOR
MUNICIPALITIES
INDUSTRIES
RAILROADS
MINES AND IRRIGATION

Affiliated With
LAYNE & BOWLER, INC.
LAYNE WELLS AND LAYNE PUMPS

611 ELEVENTH STREET
AMES, IOWA

FACTORIES:
MEMPHIS, TENN.
HOUSTON, TEXAS
LOS ANGELES, CALIF.

BRANCHES - REPRESENTATIVES
THROUGHOUT THE COUNTRY

Feb. 5, 1942

Dr. H. G. Hershey
Assistant State Geologist
Geology Annex
Iowa City, Iowa

Dear Dr. Hershey:

Thank you very much for your report on Hedrick just received. At your convenience we would like very much to have your report on the possibilities of a shallow supply in this vacinity. As you no doubt know this town has a water softener and if they were to locate a well any great distance from this plant it would necessitate a direct line from the well to the plant or moving of the plant nearer to the well site. The cost involved in either case would be almost prohibitive for a town of this size so it is questionable that they would go to this source unless it was a last resort. It has been discussed however and when you are in that vacinity I would appreciate it if you would make an investigation give us a report.

Do you know of any place in Ottumwa where a sample of water from the Galena-Platteville and St. Peter formations would be available also from the Cedar Valley-Wapsipinicon?

Yours very truly,
LAYNE WESTERN CO.

R. W. BROOKS

RWB:br

February 4, 1942

Mr. R. W. Brooks
Layne-Western Company
611 Eleventh Street
Ames, Iowa

Dear Mr. Brooks:

In response to your letter we have restudied the samples of the Hedrick town well in order to be as sure as possible of our basic data. The samples do not indicate a good place to shoot the well nor does the porosity suggest a logical place to acidize except at the sandstone between 155 and 175 feet. My only suggestion for increasing the present production of the well without deeper drilling is to acidize at a point where you encountered water, if such a point is known. I would not favor shooting the well. The sandstone between 155 and 175 feet in depth, if water bearing, could be acidized to advantage because it has a rather high lime content.

The advisability of deeper drilling is questionable. It is possible but not probable that sufficient water of fair quality will be encountered in the Cedar Valley-Wapsipinicon section, beginning at about 770 feet in depth, and the top of the gypsum, beginning at approximately 895 feet in depth. Any water in the lower Wapsipinicon will be highly mineralized because of the gypsum content of the rocks.

The Maquoketa should be extremely thin or entirely lacking at Hedrick. A short distance to the south there is no Maquoketa shale on which we depend in other parts of the State to separate the highly mineralized Wapsipinicon waters from the less mineralized waters of the Galena. Based on these facts it is assumed that any water encountered in the upper portion of the Galena may be contaminated by downward leakage of Wapsipinicon waters. Unfortunately, we do not have water analyses to show the actual mineral content of these lower waters near Hedrick.

Waters from the lower portion of the Galena-Platteville formations were extensively used in the past at Ottumwa for municipal and industrial supply, and apparently the quality was at least fair. The quantity of water obtained from this source was more than enough to satisfy the needs at Hedrick and the head should be high enough to bring the pumping level to within a reasonable distance of the surface. The base of the Platteville and the top of the St. Peter should occur at an approximate depth of 1225 feet. The St. Peter should be about 40 feet thick.

We do not have sufficient information at hand to report on the possibilities of the occurrence of shallow water at Hedrick. If you are not in too much of a hurry we will be glad to make a field study of the area in an attempt to find additional information on the near surface formations. Please let me have your reaction to this.

If deeper drilling is done at Hedrick I hope that you will save a complete set of samples for us. There are numerous changes in the rock formations between Harper in Keokuk County and Ottumwa. Samples from the lower formations at Hedrick would go a long way toward making the geology of that area more understandable to us.

If you have any questions or if I can be of further service on this project, please do not hesitate to call on me.

Very truly yours,

H. G. Hershey

HGH:N

3

LAYNE-WESTERN COMPANY

WATER SUPPLY CONTRACTORS

WELL WATER SUPPLIES AND
PUMP EQUIPMENT FOR
MUNICIPALITIES
INDUSTRIES
RAILROADS
MINES AND IRRIGATION

Affiliated With
LAYNE & BOWLER, INC.
LAYNE WELLS AND LAYNE PUMPS

611 ELEVENTH STREET
AMES, IOWA

FACTORIES:
MEMPHIS, TENN.
HOUSTON, TEXAS
LOS ANGELES, CALIF.

BRANCHES - REPRESENTATIVES
THROUGHOUT THE COUNTRY

Jan. 27, 1942

Dr. H. G. Hershey
Iowa Geological Survey
Geology Annex
Iowa City, Iowa

Dear Dr. Hershey: Subj: Hedrick, Iowa

The town of Hedrick has again reached the point where they have to do something in the way of an increased water supply. As you no doubt recall when we finished drilling there approximately a year ago they were able to take about 15 GPM from their new well and they thought that this together with what they were getting from the old wells might carry them along for awhile. It seems that the old wells have practically given out now and they do not get enough from all of the wells to supply the requirements of the town.

Do you feel that anything would be gained by acidizing or shooting their present well? If so do your records indicate that any particular section of the well would be a logical point to shoot? I have advised them against going to this expense in that I was of the impression that we were getting nearly all that could be expected from this formation. In your opinion is the quality and quantity of water available by going through the Cedar Valley and Wapsipinicon satisfactory to warrant this expense without going on through the Maquoketa shale to the Galena. If the hole was drilled into the Galena I presume that there is little doubt as to the quantity being satisfactory but do you have any information as to the quality that could be expected?

I presume that they might not have much choice but to continue to this lower depth. Do you have any information that would indicate a possible shallow supply in or near the town?

Your comments and answers to the above questions will certainly be very much appreciated. I hope you can give us an early reply.

Yours very truly,
LAYNE WESTERN CO.

R. W. BROOKS

RWB:br

WORLD'S LARGEST WATER DEVELOPERS

LAYNE-WESTERN COMPANY

WATER SUPPLY CONTRACTORS

WELL WATER SYSTEMS AND
PUMP EQUIPMENT FOR
MUNICIPALITIES
INDUSTRIES
RAILROADS
MINES AND IRRIGATION

Affiliated with
LAYNE & BOWLER, INC.
LAYNE SCREEN AND LAYNE PUMPS
611 Eleventh Street
AMES, IOWA

FACTORIES:
MEMPHIS, TENN.
HOUSTON, TEXAS
LOS ANGELES, CALIF.
BRANCHES AND REPRESENTATIVES
THROUGHOUT THE COUNTRY

January 22, 1941

Dr. H. G. Hershey
Iowa Geological Survey
Geology Annex
Iowa City, Iowa

Dear Dr. Hershey:

I wish to acknowledge and thank you for your letter of January 21st in regard to Hedrick, Iowa, and also your letter of the same date with reference to Burlington.

The council at Hedrick decided to stop the drilling at the top of the Maple Mill shale and to use the well at the 15 gpm capacity. They didn't feel at the present time that they could afford to drill beyond the Wapsipinicon and as they realized that there was a possibility that they would not get the quantity of water they needed at this depth, they have decided to utilize the supply that they now have as long as it will supply their needs.

We received specifications and bidding blank on the Burlington well yesterday. Thank you very much for your information.

Yours very truly,

LAYNE-WESTERN COMPANY

R. W. Brooks

R. W. Brooks

RWB:jb

January 21, 1941

Mr. R. W. Brooks
Layne-Western Company
611 Eleventh Street
Ames, Iowa

Dear Mr. Brooks:

I am very sorry that my absence from the office has made it impossible to answer your letter of January 11 until the present time.

Most of the wells which have passed through the Maple Mill and Sheffield formations near Hedrick have been drilled without using casing until after the drilling was completed. However, although these formations were drilled without casing they were cased before the well was put into final service. In eastern Iowa the Maple Mill is often left uncased, but I believe in the territory around Hedrick that it would be hazardous to leave the shales open.

I feel that there is a possibility of obtaining 10-15 g.p.m. from the Cedar Valley limestone. However, there is no assurance that this volume of water is available from that source.

The Cedar Valley-Wapsipinicon contact is a difficult one to identify. The Cedar Valley limestone in the vicinity of Hedrick is cream to brown in color, sub-lithographic to very fine grained, and quite fossiliferous. The fossils usually are colored buff or black. The limestone is more or less interbedded or replaced by drab to brown, fine, sugary dolomite. The base of the Cedar Valley may be marked by a very thin sandy limestone or a sandstone containing medium sized frosted grains.

The topmost Wapsipinicon bed is a chocolate brown, lithographic, non-fossiliferous limestone which may be replaced entirely or in part by a brown sugary dolomite. The Wapsipinicon formation may contain large amounts of anhydrite or gypsum.

Utilizing the information that we have obtained to date on the Hedrick well I would expect the top of the Cedar Valley to be encountered approximately 240 feet below the top of the Maple Mill. There should be approximately 280 feet of Devonian present which should include approximately 165 feet of Cedar Valley and 115 feet of Wapsipinicon. These depths and thicknesses are based on original information that I do not consider entirely trustworthy, so that there may be considerable differences between our forecast and the actual position of the beds. The only way to be absolutely sure of the Cedar Valley-Wapsipinicon contact is by detailed microscopic study of the cuttings.

We will be glad to study samples and report to you immediately if you decide to go deeper in the Hedrick well. On this work we can arrange to have a daily report sent to you which will not be effected by my presence or absence at the office. If you have any questions regarding this report please let me hear from you.

Can you send us the samples down to the Maple Mill shale?

Very truly yours,

H. G. Hershey

HGH:N

3

LAYNE-WESTERN COMPANY

WATER SUPPLY CONTRACTORS

WELL WATER SYSTEMS AND
PUMP EQUIPMENT FOR
MUNICIPALITIES
INDUSTRIES
RAILROADS
MINES AND IRRIGATION

Affiliated with
LAYNE & BOWLER, INC.
LAYNE SCREEN AND LAYNE PUMPS
611 Eleventh Street
AMES, IOWA

FACTORIES:
MEMPHIS, TENN.
HOUSTON, TEXAS
LOS ANGELES, CALIF.
BRANCHES AND REPRESENTATIVES
THROUGHOUT THE COUNTRY

January 11, 1941

Dr. H. G. Hershey
102 Geology Building
Iowa City, Iowa

Dear Dr. Hershey: Subject: Hedrick, Iowa

We encountered the Maple Mill shale at a depth of 525' at the above location. Our static water level was 76' and with a pump setting of 200' the well produces 14 gpm. The well has 10" casing set to the limestone at 146' and is 10" open hole from this depth to 530'.

We are lowering the pump setting to 300' and if the well will produce from 20 to 25 gpm with a pump setting at this depth they will stop and use it as it is.

In this territory could we expect the Maple Mill and Sheffield shale to stand open or would it be necessary to case as it is being drilled. If it stands open for drilling do you think it would be necessary to case it for the completed well?

We plan to drill into the Cedar Valley limestone and would like to stop when the Wapsipinicon is encountered in hopes that the Cedar Valley limestone will furnish enough additional water of a suitable quality to supply the needs of the town. Do you feel that there is a possibility of getting 10 or 15 gpm from this formation? If we drill into this formation we will try and keep you up to date on the samples in hopes that you can tell us when we encounter the Wapsipinicon. Could you give me some idea of the characteristics of this Wapsipinicon as compared with Cedar Valley limestone so our driller might be able to recognize it. From the information we gathered the last time I was in your office, I am of the opinion that we should encounter the Cedar Valley limestone at about 700 to 725' and that it together with the Wapsipinicon should be from 200 to 250' think. I presume the greater part of this would be Cedar Valley limestone, possibly 200'. Am I correct in this assumption.

Dr. H. G. Hershey
January 11, 1941

I would very much appreciate a reply at your earliest convenience.

Yours very truly,

LAYNE-WESTERN COMPANY

R. W. Brooks

R. W. Brooks

RWB:jb

To: H.G. Hershey

From: D.A. Davis

Subject: Hedrick city well

Date: February 3, 1942

The present depth of the Hedrick city well is 530 feet. The top of the Maple Mill was struck at 525 feet.

On the basis of Morrell well No. 7 at Ottumwa the following forecast of tops is made:

Top of Sheffield	660 feet in depth
Top of devonian lime	770
Top of Wapsipinicon gypsum	895
Top of Maquoketa	955
Top of Galena	970
Top of St. Peter	1225

Following are analyses of Devonian and Galena waters:

Washington County Farm well No. 2
Total Depth 675 Aquifer-Wapsipinicon

Total solids	7020	Fe	0.4
Alk. (MeO)	274	Mn	0.0
R_2O_3	6.4	F	1.8
NO_3	0.00	Cl	523.0
Na	1565.0	SO_4	3855.0
Ca	410.4	HCO_3	334.3
Mg	133.0	Calc. Hard	1573

Lake Keomah, Mahaska County
Total Depth 888 Aquifer - Undifferentiated

Total solids	2476	Fe	0.8
Alk. (MeO)	245	Mn	Tr.
R_2O_3	21.0	F	1.0
NO_3	0.90	Cl	220.0
Na	543.3	SO_4	1223.5
Ca	160.8	HCO_3	298.9
Mg	47.8	Calc. Hard.	600

Mt. Pleasant city well No. 2
Total Depth 1802 Aquifer - Galena

Total solids	5980	Fe	0.1
Alk. (MeO)	262	Mn	Tr.
R_2O_3	0.4	F	1.1
NO_3	0.00	Cl	132.0
Na	304.5	SO_4	530.0
Ca	95.8	HCO_3	319.6
Mg	16.1	Calc. Hard.	305

Iowa
State Department of Health
DISTRICT HEALTH SERVICE
NO. 7
Washington, Iowa

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

IN REPLYING
ADDRESS
A. L. Bennett
Public Health Engineer

JAN 23 1952

January 22, 1952

Iowa Geological Survey
Iowa City, Iowa

Gentlemen:

For your information and file I am submitting the following information to you taken from my routine report of survey of the Hedrick, Iowa public water supply.

"During September of 1951 a second cave in occurred in the town well. The well was cleaned out and a liner was placed in the section of the well known to be caving. The liner consisted of 233 feet of 6 inch pipe with the bottom of the liner placed at a depth of 1445 feet. 125 bags of cement grout were forced back of the casing through perforations in the liner. Following this repair work the static water level in the well raised from 172 feet to 142 feet.

In view of the fact that the structural condition of the town well has recently been changed the writer collected a water sample for complete mineral analysis during the course of this visit to determine if such repair work has made any change in the mineral quality of the well water."

Very truly yours,

A. L. Bennett
Public Health Engineer
District #7 of the
State Health Department

ALB:cl