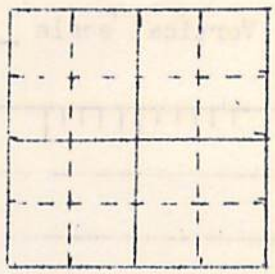
7½' Cresco SE Quad
432217 0920700
099-11W-23 cccc
1980 field located by D. Karsten

IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey

HW-0004

RECORD OF WELL



Location:

Town: Cresco (N E S W); County Howard E.

SW/c sec. 23 T. 99 N., R. 11 W. Twp.

Well name and number Cresco # 4

Owner Town of Cresco Address

Tenant Address

Contractor Sewell Well Co. Address

Drillers David Laird

Drilling dates July 19 to Oct 14, 1924

Well data:

Elevations: Drilling curb 1301. feet; Land surface feet

Determined by J. H. Howe City engineer

Topographic position upland

Total depth: Reported 620 feet, Measured feet

Drilling method cable tool

Hole and casing data

(Give amount, size, kind, and depth of all casing; type and position of seals and packers; cementing; how finished--perforated pipe, screen, gravel pack, open hole, etc.)

Original depth to water 151 ft. above below Date

Original elevation of water level 1150 ft.; Source of data

Sources of water: Principal St Peter; Others

415' Prairie

Production data: Date 1924

Static depth to water 151 Measuring point

Pumping level 200 at 250 g.p.m.

Nov. 1943 sw/ 172

at 248 224

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 sampled				
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 0-67 No. spls. 66 No. dupls. & cond. 18 pints good

Spls. prepared by Washed range by

Driller's log and cond.

Insoluble residues: Prepared by Studied by Strip log

Microscopic study 0-67a strip log

Gen. log Correl. by gulf

0 0004 DL

MASTER CARD-A

9-26-69
RP 1-26-73

STATE		COUNTY		LATITUDE DEG		MIN		SEC		N or S	LONGITUDE DEG.			MIN		SEC.		SEQ NO
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	9	4	5	4	3	2	2	2	5	N	0	9	2	0	6	5	7	1

WELL SCHEDULE

US GEOLOGICAL SURVEY

IOWA DISTRICT WRD

WELL NO. 099-11W-23 CCA CO. HOWARD

OWNER CRESCO CITY WELL ADDRESS CRESCO

DRILLER SEWELL DATE DRLD 10-14-24

MAP

SOURCE OF DATA FILE

DESCRIPTION M. P. LSD FEET (ABOVE) (BELOW) LSD

CONTINUED FROM ABOVE	ACCURACY	LOCAL WELL NUMBER: T	R	E/W	SEC.	QUARTERS	LOCAL USE: W-NUMBER	OPTIONAL	OWNER OR NAME	OWNERSHIP	WATER USE	WELL USE	WELL DATA	FREQ. W/L	FIELD CHAR.	HYD LAB	QW-DATA	QW-FREQ.	PUMPAGE	APERTURE	LOG DATA	CARD DESIG.
	20	21 22 23	24 25	26	27 28	29 30 31 32 33 34	35 36 37 38 39	40 41 42 43 44 45 46 47 48 49 50 51	52 53 54 55 56 57 58 59 60 61 62 63 64 65 66	67	68	69	70	71	72	73	74	75	76	77	78 79	80
	2	099	11	W	23	CCA	00004	1/24CITY	CRESCØ IØWA	M	P	W		I							G	A

WELL-DESCRIPTION CARD-B

DUPLICATE CARD A CC 1-19	DEPTH OF WELL	ACCURACY	DEPTH CASED OR FIRST PERF.	DIAM INCHES	WELL FINISH	METH DRILLED	YEAR DRILLED	PUMP SETTING	METH. LIFT	DEEP SHALLOW	POWER	ALTITUDE OF LSD (FEET)	ACCURACY	WATER LEVEL (FEET)	ACCURACY	DATE: MONTH	YEAR	YIELD OF WELL (GPM)	METH. DET.	DRAW-DOWN (FEET)	ACCURACY	PUMPING PERIOD (HOURS)	QUALITY OF WATER: IRON	SULF.	CHLOR.	HARD	SP. COND.	TEMP.	DATE SAMPLED	CARD DESIG.
	20 21 22 23	24	25 26 27 28	29 30	31	32	33 34 35	36 37 38	39	40	41	42 43 44 45 46	47	48 49 50 51	52	53	54 55	56 57 58 59 60	61	62 63 64	65	66 67 68	69	70	71	72	73	74 75 76	77 78 79	80
	670	3	258	16	X	C	924					1301	7	172	D		51	224		76	3									B

HYDROGEOLOGIC CARD-C

DUPLICATE CARD A CC 1-19	PHYSIOGRAPHY PROV.	SEC	DRAINAGE BASIN	SUBBASIN	TOPO SETTING	MAJOR AQUIFER: SYSTEM	SERIES USGS	IGS	UNIT	LITHOLOGY	ORIG.	THICKNESS	LENGTH WELL OPEN TO	DEPTH TO TOP OF	MINOR AQUIFER: SYSTEM	SERIES USGS	IGS	UNIT	LITHOLOGY	ORIG.	THICKNESS	LENGTH WELL OPEN TO	DEPTH TO TOP OF	DEPTH TO CONSOLIDATED ROCK	SOURCE	DEPTH TO BASEMENT	SOURCE	SURF. MAT. LITHOLOGY	INFIL.	COEF. TRAN. SIG. FIG.	XIO	COEF. STOR. SIG. FIG.	XIO-	OTHER CARDS	CARD DESIG.
	20 21	22	23 24 25	26	27	28	29	30	31	32 33	34	35 36 37	38 39 40	41 42 43	44	45	46	47	48 49	50	51 52 53	54 55 56	57 58 59	60 61 62 63	64	65 66 67 68	69	70 71	72	73 74	75	76 77	78	79	80
	12	E	27A		F	Ø	2	M	P	N	6	78	68	587	Ø	2	M	G	L	6	220	204	290	30	C										C

CASING AND SCREEN (SIZE, TYPE, INTERVALS):

16" csg. 0-258'
12¼" csg. from 494' to 597'

CODED BY Allaire as. DATE 123074

PUNCHED BY ________ DATE ________

VERIFIED BY ________ DATE ________

SKETCH ON REVERSE: YES ________ NO ________

23

WELL NO. 099-11W-23 CCA/c

CITY WELL, CRESCO IOWA

Sent by J. H. Howe, City Engineer, 1927
See Driller's log.

1. 0 - 10 Loess or soil, yellowish-gray, leached (log 0 - 5)
2. 10 - 20 Gravel (Log 5 - 15)
3. 20 - 30 Same (Log, blue mud 15 - 25)
4. 30 - 40 Gravel, clayey, probably weathered till (Log. yellow clay and bowlders 25 - 80)
5. 40 - 50 Gravel, coarse, broken, probably washed from till
6. 50 - 60 Till, gray, stony
7. 60 - 70 Gravel, broken, probably washed from till
8. 70 - 80 Till, gray, stony. Total drift 80 feet
9. 80 - 90 Devonian - Limestone(?) light gray (Log shale and limestone 80 - 89)
10. 90 - 100 Same (Log, limestone 89 - 170)
11. 100 - 110 Same
12. 110 - 120 Same
13. 120 - 130 Same
14. 130 - 140 Same
15. 140 - 150 Same
16. 150 - 160 Same
17. 160 - 170 Limestone(?), light bluish gray
18. 170 - 180 Note dried before sample was sacked. (Log 170 - 180 shale) Shale, gray, very calcareous
19. 180 - 190 Log - limestone with some shale 180 - 195. Limestone(?), dark gray
20. 190 - 200 Same (Log 195 - 255 limestone)
21. 200 - 210 Same
22. 210 - 220 Limestone, gray, violent effervescence - much faster than above this depth
23. 220 - 230 Same
24. 230 - 240 Same
25. 240 - 250 Same
26. 250 - 260 Same
27. 260 - 270 Same
28. 270 - 280 Same (water at 280)
29. 280 - 290 Same
30. 290 - 300 Same
31. 300 - 310 Same
32. 310 - 320 Same
33. 320 - 330 Same
34. 330 - 340 Same
35. 340 - 350 Same
36. 350 - 360 Same
37. 360 - 370 Same
38. 370 - 380 Same
39. 380 - 390 Same (some blue specks)
40. 390 - 400 Same
41. 400 - 410 Same
42. 410 - 420 Same
43. 420 - 430 Same
44. 430 - 440 Same (with dark gray chert)

City Well, Cresco, Iowa (cont.)

45. 440 - 450 Dolomite or limestone, light gray
46. 450 - 460 Same
47. 460 - 470 Same
48. 470 - 480 Same
49. 480 - 490 Same
50. 490 - 500 Same
51. 500 - 510 Same
52. 510 - 520 Same (apparently mixed with blue shale)
53. 520 - 530 Shale, blue, calcareous (Log 520 - 525 shale and limestone)
54. 530 - 540 Log 525 - 557 shale - Shale, blue calcareous
55. 540 - 550 Same
56. 550 - 560 Same
57. 560 - 570 Log - 557 - 582 limestone - Limestone, very light gray, certainly calcitic
58. 570 - 580 Same
59. 580 - 590 Log - 582 - 592 shale - Shale, dark blue, calcareous
60. 590 - 600 Log - 592 - 597 sandy shale - Sandstone, coarse, white; shale, greenish gray
61. 600 - 610 Log - 597 - 667 St. Peter sandstone. Sandstone, medium, white, calcareous
62. 610 - 620 Same
63. 620 - 630 Same
64. 630 - 640 Same
65. 640 - 650 Same
66. 650 - 660 Same
67. 660 - 670 Note: through St. Peter sand. Same with some chips of gray dolomite. Log - 667 - 670 limestone

- F. T. Thwaites
January 22, 1927.

CITY WELL, CRESCO, IOWA
J. H. Howe, Engineer
Sewell Well Co., Contractors
David Laird, Driller, July 12-Oct. 23, 1926 ?
Samples examined by F. T. Thwaites

DRIFT 80	0-5	5		Loess or soil, yellowish gray
	5-15	10		Gravel and sand
	15-25	10		Clay or till, blue
	25-80	55		Till, yellowish gray, stony
GALENA-PLATTEVILLE	80-89	9		Dolomite, light gray, some shale
	89-160	71		Dolomite, light gray
	160-170	10		Dolomite, light bluish gray
	170-180	10		Shale, gray, very dolomitic
	180-195	15		Dolomite, dark gray; shale like above
	195-210	15		Dolomite, dark gray
	210-430	220		Limestone, gray
	430-440	10		Limestone, gray with dark gray chert
	440-520	80		Limestone, light gray
	520-525	5		Limestone, light gray; shale, blue, calcareous
STPETER 417	525-557	32		Shale, blue, calcareous
	557-582	25		Limestone, very light gray
	582-592	10		Shale, dark blue, calcareous
	592-597	5		Sandstone, coarse, white; shale, greenish gray
LM 70	597-667	70		Sandstone, medium, white, calcareous
3	667-670	3		Dolomite, gray, no sample

20" o.d. pipe
81'9"
19-¼" hole
16" o.d. g.w.i. pipe
258'10"
15-¼" hole
494'
12 1/2" g.w.i. pipe
597'
12-¼" hole

SALES ENGINEERING AND INSTALLATION
OF ALL TYPES OF PUMPS

NEW AND USED PUMPING EQUIPMENT
TURBINE PUMPS

LOUIS F. WHITNEY

PUMP SERVICE

2745 WILSON AVE. S. W. PHONE 2-5122

CEDAR RAPIDS, IOWA

Nov. 29 1943

Mr, H.G.Hershey:

State Geology Dept.

Iowa City, Ia.

Dear Sir;

For your information we repaired the well at Cresco,Ia and we tested out the water level at the time. The following data was obtained;

Static water level 172 ft. from center of discharge pipe on pump

Pumping level 248 ft @ 224 gallons per minute

Length of draw down tube 283 ft 8"

Depth of well 666 ft. This is the wame as when originally drilled

Diameter of well 10 inch.

Center of discharge is 6" above foundation level

Location of well S.W. corner of pump house.

yours truly,

Louis F. Whitney.

J. H. HOWE
ARCHITECTURE. ENGINEERING
126 SIXTH AVENUE EAST
CRESCO, IOWA

Cresco, Iowa, Feb. 23, 1927.

W. H. Norton, Geologist, Iowa Geological Survey,
Mount Vernon, Iowa.

Dear Sir: I received your letter of Jan. 24 relative to the Cresco well. I was very glad to get your statement of the strata and will show this information on the section I am making.

In regard to the levels etc., I hope I have not delayed you on this matter. I was intending taking some levels in connection with this matter and the weather went bad; everything covered with a layer of ice.

I have now run the levels instead of trying to estimate the elevations, the results being as follows:

Elevation of City Bench Mark above sea level	1303.29
Elev. top north rail, C.M.& St. P. Ry. Main Trk. at west line North Elm St.	1300.22
Elev. top of concrete floor and top of well,	1301.09
Elev. bottom of well,	631.09

The pump house floor is six to eight tenths of a foot above the natural ground.

I hope this is the information you wish. If there is anything further which I can supply, please call upon me.

Yours truly,

J. H. Howe

J. H. HOWE
CITY ENGINEER
CRESCO, IOWA Dec.31,1926.

Dean George F.Kay,

State University of Iowa,
Iowa City,Iowa.

Dear Sir:-

For various reasons it was not practicable to send you the intended data on the Cresco City Well,when completed in the fall of 1924. I am therefore attending to this matter at this time.

The depth of this well is 670 feet.It passes through the St.Peter sand stone and enters about 3 feet into the lime stone immediately below the St.Peter.

I am inclosing a copy of the drillers log,a section of the well on tracing paper and a boiler water analysis of the water by Dr.Bartow.

In a separate package I am sending 67 sacks of cuttings;these being taken every 10 feet.

The well was drilled 46 feet away from the 396 ft.well and the pump house extended to cover the machinery.

The undertaking was entirely successful so far as can be discovered and apparantly a supply of good water sufficient for the needs of the City was secured.

At a depth of 258 ft. a concrete seal 15 ft. thick was poured and the casing extending to the surface lowered into it. When this seal had set a hole was drilled through the seal and continued as shown in the section.

A strong flow of water was encountered at 415 ft.and also in the St.Peter sand stone.The water is much softer than the old supply.

J. H. HOWE
CITY ENGINEER
CRESCO, IOWA

The depth of water during the test was determined by an electrical device, operated from the lighting circuit, which lit an electric lamp when a switch was lowered to the surface of the water.

The water stood at 151 ft. below the surface before pumping.

When pumping started it fell immediately to 200 feet and could not be pumped below that level. When pumping was discontinued for a few moments at various times the level of the water came back almost immediately to 151 ft. The hole would refill at the rate of about 7 ft. per minute gradually slowing up to a total time of about 20 minutes.

The test was continued about 16 hours running time, using a No. 35 18 inch stroke Downie pump with 7-3/4 inch working barrel set 247 ft. below the surface and operated at speeds from 30 to 40 R.P.M. The speed of 37 strokes representing 250 G.P.M. was maintained as nearly as practicable.

A considerable amount of sludge from the green shale just above had fallen into the St. Peter sand stone before it was finally cased off, to prevent further caving. For this reason or some other the St. Peter was extremely hard to drill. Only two or three feet depth a day could be secured.

As soon as the pumping test started, there seemdd to be a strong upward flow from the St. Peter, which carried up a considerable amount of green sludge from the shale into the pump, although the pump cylinder was far above this stratum. This flow was so pronounced that the drillers, who had been skeptical about the amount of water and who wanted to continue drilling to the Jordan sand stone conceded that a good supply of water had been reached. The pumping as conducted represented about

J. H. HOWE
CITY ENGINEER
CRESCO, IOWA

250 G.P.M. without lowering the level below 200 feet.

Drilling was started July 19,1924 and discontinued Oct.14,1924. The test was made Oct.14 and 15,1924.

The contractor was the Sewell Well Company of St.Louis,Mo.

I am wondering if it will be too much trouble to have the cuttings, which I am sending examined and a correct section of the various geological strata noted to scale upon ~~one of~~ the inclosed tracings.

If this can be done I will send you blue prints of the results if you desire them.

I wish to thank you,Dean Kay for the valuable information,which you furnished me in reference to this project and for your co-operation at all times. The information was of great value in arousing the interest of the Public and in getting the project started.

If I can secure a suitable print showing the strata penetrated by the well,I intend having this framed and hung in the pumping plant, so as to give the public a better idea of the practical value of making such investigations from the stand point of Geology.

Yours truly,

J.H.Howe

Cresco-Howard Co.

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J. H. HOWE
CITY ENGINEER
CRESCO, IOWA

April 21, 1924.

Please return to

Prof. George F. Kay,
State Geologist,
Iowa City, Iowa.

Dear Sir:

I have your letter of April 11 in reference to the underground water conditions in Cresco and am, of course, somewhat disappointed at your findings. I have the volume referred to(XXI) and was aware of the comment made that no satisfactory supply was found by the Railroad people.

This reference to the results secured does not however coincide with several other sources of information bearing on the matter, and I was in hopes when I called at your office to be able to clear up the matter more definitely.

The City does not want to take too long a chance in making an expenditure of some $30,000 on a deep well, and, on the other hand, if a series of shallow wells are drilled they could hardly be located near the present pumping station; the reasons being two fold:

First, that the water from the present s supply is not always safe, being water from some of the upper strata and in an unsewered district and second that one of the city's two wells, about 200 feet deep, has been dry over a year and the remaining well (about 400 feet deep) is slowly failing and now has to be pumped day and night at a reduction of one-third in speed.

If shallow wells are drilled an expensive rearrangement of water mains would be required to distribute from the new location to the existing mains, and the work of superintendance of two stations instead of one would make some extra expense. I assume that a deep well could be located along side the existing pumping station and the upper waters securely cased off; the water could then be distributed through the existing facilities.

J. H. HOWE
CITY ENGINEER
CRESCO, IOWA

GFK 2

Now as to the data referred to:

It seems to be conceeded by old times who lived here in 1878:

First, that the C. M. & St. P. Ry undertook to secure a flowing well.

Second, that they failed to secure this and discontinued drilling.

Third, the supply of water secured was large.

Fourth, the quality of the water was such that it was not good for use in steam boilers.

Fifth, the well after completion was pumped continuously for three or four days and nights for a test and the streets and gutters carried a considerable stream of water and the well was not pumped dry, the supply being regarded as ample.

Sixth, the well was abandoned because the water was not satisfactory for steam boilers. The documentary evidence so far collected is as follows:

Letter dated August 6, 1923, from Mr. Loweth, Chief Engineer of the C. M. & St. P. Ry (copy attached) in which it appears that their original notes show "water not suitable for steam purposes and well abandoned."

From files of The Howard County Times published at Cresco, Iowa:

April 25, 1878. "The well at the depot is about 760 feet deep and still getting deeper."

June 13, 1878 "The artesian well is down to a depth of 1050 feet with a good supply of water, but not sufficient for a flow, the drillers will resume work as soon as they can repair some of their machinery, hoping to secure a flow that will at least supply the tank with water without the aid of a windmill."

June 27, 1878. "The Railroad well is now drilled to the depth of 1045 feet, the noise of a large vein of water can be heard but no flow has been secured up to this date."

J. H. HOWE
CITY ENGINEER
CRESCO, IOWA

GFK 3

Oct. 24, 1878. "The drilling has been discontiuned on the railroad well at this place, the well is drilled to the depth of 1051 feet and there is water within 50 feet of the surface though a flow was not secured as hoped for. The R. R. Company will now put in a strong pump and windmill. The Swan Brothers went from here to Emmetsburg to drill a railroad well there."

I found two old men, former residents, who without any promptings from myself stated that the railroad hoped to secure a flowing well, that they failed in this although there was supposed to have been plenty of water. That the water was too hard for steam boiler purposes and was therefore abandoned.

Another man, the editor of one of the local newspapers, remembers the pumping test which he says was continuous, three or four days and nights, naturally he would not know the capacity of the pump. This man states that the water stood about 100 feet below the surface-whether before or after the test is not stated. You will note from one of the newspaper clippings that the water is said to come within 50 feet of the surface.

A copy of a letter from Thorp Brothers of Des Moines addressed to one of our city councilmen, Mr. Addie, herewith attached, states that the supply was unsatisfactory from the stand point of its use in steam boilers.

I am inclined to believe that in the case of a well drilled as long ago as 1878 that the upper waters were not securely sealed off, and that this might account for the hardness of the water.

Now, of course, I am aware that some of the evidence I have gathered up may not be of the best, but all of it seemed to be of sufficient interest to bear mention and it all points the same way.

As this matter is of considerable importance to this City, and we want the benefit of the most expert testimonty available, I am taking the liberty of asking you to express your further views on the matter. Can you at this time recall, or have you the data at hand from which could be shown that the comment that the railroad well "was abandoned because no satisfactory supply was found" may mean instead of a scarcity of water that the supply was unsatisfactory on account of the quality of the water as indicated in Mr. Loweth's letter.

J. H. HOWE
CITY ENGINEER
CRESCO, IOWA

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GFK 4

I note that the report on Howard County in Volume XXI is made by O. E. Meinzer. Is he at present connected with the Geological Survey, and could he be interrogated on the points I have endeavored to bring out?

I hope, Prof. Kay, that you will pardon my rather lengthy communication on this matter, and if possible look into the matter again. Your opinion on the matter will naturally have the greatest possible weight, and as a rather lively discussion about this is going on here and a wrong decision will be quite expensive we seem justified in making the preliminary investigation as exhaustive as possible.

Thorpe Brothers of Des Moines, already referred to, told me that so confident were they that a suitable supply could be obtained in the Jordan sand that if it failed they would accept half the contract price only in satisfaction of their account. This, of course, is not evidence at all and is mentioned as indicating an opinion which they would back up financially to a certain extent.

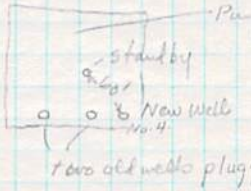
Yours truly,

J. H. Howe

Howard County

Cresco Iowa APR. 7, 1944

City wells are located in SW/C of Sec. 23, T. 99 N. R. 11 W.



DW No 4 ~~in~~ Nov 1943, 171 feet below pump base

1301'
631
670