

Production data:

Date

Static depth to water

79.3

Measuring point

1.6 a.l.s.

Pumping level

156

at

200

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 (Phm)

pH

Fe₂O₃-Mn₂O₃-Al₂O₃

Alkali as sodium

Calcium

Magnesium

Iron (unfiltered)

Manganese

Nitrate

Fluoride

Chloride

Sulfate

Bicarbonate

Hardness (ppm)

Hardness (gpg)

Remarks

Laboratory data:

Sample storage location CGG-3,4

Sample range 0-700

No. spls. 145

No. dupls. & cond. 145 F-G

Spls. prepared by PJH/RPC

Washed range 40-700

by PJH/VLM

Driller's log and cond.

Insoluble residues: Prepared by

Studied by

Strip log

Microscopic study

strip log

Gen. log

Correl. by

Range 3/23/50

C.W. Chyle is operator of pump & lives on property near pump house.

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa

Well Log Record

Owner of well Town of Protivin County HOWARD

Tenant _____ Town PROTIVIN

Location SW NW SE sec. 13, T. 97 N., R. 11 W. _____ Twp.

Curb elevation _____ ft. depth _____ ft. depth 699 ft.

Static level: (Depth to water above curb) 79.3 ft. level 156 ft. at 200 g.m.

Contractor Hoes & Ames Date drilled Jan. 2 - Mar. 3, 1950
Ed Martin

Description*	F E E T			Description*	F E E T		
	Thick	From	To		Thick	From	To
Black Dirt	2	0	2	Ls. Brown	15	150	165
Sd. & Gr. (dry)	6	2	8	Rx. bands & Shale	10	165	175
Yellow Clay	12	8	20	Shale & Rx.	15	175	190
Blue Clay	11	20	31	Shale	30	190	220
Yellow Clay	6	31	37	Rock	30	220	250
Broken Rx. & Clay	4	37	41	Shale & Rx	22	250	272
Ls. (broken)	24	41	65	Ls. Brown	33	272	305
Ls. Brown	30	65	95	Ls. Lt. Brown	50	305	455
Ls. Grey	55	95	150	continued on next page			

*Abbreviate descriptions: use one line for each formation.

Remarks on water zones and casings 16" pipe from 1.4' a.l.s. to 41'
10" pipe from 1.6' a.l.s. to 294'
8" pipe from 491'-6" to 622'
6" pipe from 615' to 699' to
with slots approx. 1/2"-wide & 10" long in bottom 40'
Continued on next page

Temperature: Air _____ °F., Water _____ °F. at _____ A.M. _____ P.M. _____ 19____

and obtained from Ed Martin Recorded by J B Cooper

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa

Well Log Record

Owner of well _____ County _____
 Tenant _____ Town _____
 Location _____ sec. _____, T. _____ N., R. _____ E. _____ W. _____ Twp. _____
 Curb elevation _____ ft. depth _____ ft. depth _____ ft. final _____ ft.
 Static level: (Depth to water above curb) _____ ft. level _____ ft. at _____ g.m.
 Contractor _____ Date drilled _____

Description*	F E E T			Description*	F E E T		
	Thick	From	To		Thick	From	To
Grayish Rx.	45	455	500	Rock	11	688	699
Rx. & Some Shale	45	500	545				TD
Shale	40	545	585				
Rock	27	585	612				
Shale	3	612	615				
Rock	3	615	618				
Sandstone	4	618	622				
Shaley SS.	28	622	650				
Sandstone	38	650	688				

*Abbreviate descriptions; use one line for each formation.

Remarks on water zones and casings 16" hole 0' to 170'
12" hole 170' to 294'
Plans call for hole to be cemented down 16" & 12"
holes to within 100' of surface, crushed rock
to be poured down hole from 100' to 41' of surface
and cement from 41' to surface. (Crushed rock
is an attempt not to interfere with broken rock from 41' to 100'
 Temperature: Air _____ °F., Water _____ °F. at _____ A.M. _____ P.M. _____ 19____
 Record obtained from _____ Recorded by _____
from relief old town well obtains water supply

December 16, 1949

Howard

Mr. S. R. Ames
Hoeg & Ames
Lincoln, Iowa

Dear Mr. Ames:

In response to your letter of December 8 requesting information on the geology and ground-water conditions at Protivin, Iowa, we have reviewed the data available for the area in the open files of the Geological Survey. Although the data are meager for the immediate locality, the following discussion may be helpful to you in planning the construction of a new well for the town of Protivin.

The town of Protivin is located in the southeast part of Howard County. The topography in this area is rolling. The altitude of the upland is estimated to be about 1200 feet while that of the stream near the town is estimated to be about 1150 feet.

To facilitate discussion we have assumed that the starting elevation at a proposed well site is 1170 feet above sea level. The following tabular forecast of the geologic section through the St. Peter sandstone at Protivin is based on the assumed starting elevation.

<u>Formation and Description</u>	<u>Thickness (ft.)</u>	<u>From (ft.)</u>	<u>To (ft.)</u>
Pleistocene system (undifferentiated) (mostly pebbly clays)	25±	0	25±
Devonian system			
Cedar Valley formation (dolomite and limestone)	60±	25±	85
Ordovician system			
Maquoketa formation (shale and dolomite with some beds of limestone and chert)	160	85	245
Galena formation (limestone and dolomite with some beds of chert)	210	245	455
Decorah-Platteville formations (alter- nating limestone and shale strata)	95	455	550
St. Peter formation (sandstone)	60	550	610

Mr. S. R. Ames

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Dec. 16, 1949

No data are available on the occurrence of sands and gravels in the immediate vicinity of Protivin but it is doubtful if a satisfactory town supply can be developed in glacial deposits.

The bedrock is probably limestone or dolomite belonging to the Cedar Valley formation. The present town well is reported to be finished in this formation at a depth of 75 feet. Shale belonging to the Maquoketa formation may have been encountered in the well at this depth. The quality of the water in the present town well is fair, as shown on the attached data sheet. Production and water level data on the well are not available. If an auxiliary supply is to be developed from the Cedar Valley formation you may wish to consider locating the new well as far as is feasible from the present well.

Additional water may be expected to occur in the Galena formation. Yields of as high as 100 gallons a minute are obtained from wells finished in this formation at Calmar to the east of Protivin. The non-pumping water level in a well finished in this formation at Protivin may be expected to stand at an altitude of about 1140 feet.

Water may also be expected to occur in the St. Peter sandstone but the water level in a well finished in the sandstone and obtaining most of its water from the sandstone may be expected to stand 40 or 50 feet below that in the higher formations. The quality of the water which may be expected from a well finished in the sandstone is shown by the analysis of the water pumped from the Cresco city well.

In summary, there is a good prospect of developing an ample supply of water for the town of Protivin from a well drilled to the St. Peter sandstone and possibly to no greater depth than the present town well.

We will appreciate receiving any data you may obtain on the production from and water levels in the present town well. Please let us know if we can be of further assistance to you or the town officials in regard to this proposed project.

Very truly yours,

H. G. Hershey

HGH:WEH:AM

Encl.

IOWA GEOLOGICAL SURVEY
Water Analysis Comparison
(Parts per Million)

	1	2	3	4	5	6
Town	PROTIVIN	CALMAR	CRESCO			
Well Name	Town well	Town Well	City well			
Depth of Well	75'±	350	670'			
Formation Source	Cedar Valley	Galena	Galena + St. Peter			
Water Level Below Curb		50'	151'			
How Sampled						
Sampled by						
Date Sampled		Oct, 1944				
Total Solids	274	501	343			
pH						
Insoluble Matter	23	5.0	22			
Alkalinity (MeO)						
(Phn)						
Nitrate (NO ₃)	27	0.5	11			
Sodium (Na) & Potassium (K)*	5.6	12	12			
Calcium (Ca)	64	116	73			
Magnesium (Mg)	15	38	26			
Iron (Fe)	0.1	0.9	0.1			
Iron (Unfiltered)**						
Manganese (Mn)	0.0	0.2	0.0			
Fe ₂ O ₃ +Al ₂ O ₃ +Mn ₂ O ₃						
Fluoride (F)	Trace	0.3	0.0			
Chloride (Cl)	5.0	15	15			
Sulphates (SO ₄)	19	103	47			
Bicarbonates (HCO ₃)	239	400	285			
Carbonates (CO ₃)						
Silica (SiO ₂)						
Calculated Hardness***	220	441	291			
Hardness (Grains per Gal.)	13	26	17			

*Na and K not separated, calculated as Sodium (Na): **Includes iron precipitated or flocculated after sample collected: ***Calculated as CaCO₃.

W