

10435

In Cooperation with U. S. Geological Survey
RECORD OF WELL

Location:

Town: FARNHAMVILLE (NE)
County CALHOUN
sec. 12 T. 86 N. R. 31 (W.) Twp

Well name and number _____

Owner FARNHAMVILLE TOWN WELL Address _____
#4 (1958)

Tenant _____ Address _____

Contractor THORPE WELL CO. Address DES MOINES, IOWA

Drillers _____

Drilling dates JULY 15, 1958 - AUG. 1958

Well data:

Altitudes: Drilling curb _____ feet; Land surface _____ feet

Determined by _____

Topographic position _____

Total depth: Reported 825 feet, Measured _____ feet

Drilling method _____

Hole and casing data _____

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

Source of data _____

Sources of water: Principal _____

Others _____

PRODUCTION DATA

Date _____
Static water level _____
Pumping water level _____
Yield (g. p. m.) 170
Measuring point _____
Duration of pumping 3 HOURS
Specific capacity _____

W10485 LABORATORY DATA **DB3-8,9**

Well No. _____ Sample range 55-825 No. of samples 137
No. of dupls. and cond. 135 Good Washed range 341-8-5
Samples prepared by R. Salentini Date 10/31/48
Logged by NORTHUP Date 5/12/59
Correlations by _____ Date 5/12/59

GEOLOGY AND GROUND-WATER CONDITIONS

AT FARNHAMVILLE, IOWA

The town of Farnhamville lies in southeastern Calhoun County in sec. 12, T. 86 N., R. 31 W. The latest Wisconsin drift (Mankato) covers a wide region surrounding the town. This drift surface forms a nearly flat plain having an elevation of about 1142 feet above sea level. A generalized log of the formations encountered in drilling the Farnhamville town wells No. 2 and No. 3 and additional anticipated strata down through the Cedar Valley formation are outlined as follows (all depth figures are referred to an assumed starting elevation of 1142 feet):

<u>Formation</u>	<u>Thickness (ft)</u>	<u>Depth Range (ft)</u>
Quaternary system		
Pleistocene series (pebbly glacial drift)	165 ₊	0 - 165 ₊
Cretaceous (?) system		
Sandstone	25	165 ₊ - 190
Pennsylvanian system		
Desmoinesian series (shale)	90	190 - 280
Mississippian system		
St. Louis formation (limestone and dolomite)	20	280- 300
Warsaw formation (dolomite, some chert, perhaps some thin shale)	30	300- 330
Keokuk-Burlington formations (limestone and dolomite, some chert)	100	330- 430
Gilmore City limestone, partly oolitic	75	430- 505
Hampton formation (limestone and dolomite, cherty in lower part)	220	505- 725

Geology and Ground-Water Conditions at Farnhamville--2

<u>Formation</u>	<u>Thickness (ft)</u>	<u>Depth Range (ft)</u>
Mississippian system (contd)		
Prospect Hill silty dolomite	10	725- 735
Maple Mill shale	20	735- 755
Devonian system		
Lime Creek formation (mostly limestone, some dolomite)	140	755- 895
Cedar Valley formation (dolomite)	230	895-1125
Wapsipinicon formation (dolomite, minor shale)		1125-

These depth and thickness figures may have to be adjusted to some extent owing to the poor sample record of the deep Farnhamville well and to local changes in the structure and thickness of the beds.

In the past the town has derived its supply from the Cretaceous (?) sandstone immediately underlying the drift clay and the limestone and dolomite strata of Mississippian age below 300 feet. The first town well obtained its supply from the sandstone at 173 feet. It was reported to yield 30 gpm at a pumping water level of 45 feet. In 1932 this well was deepened to a depth of 775 feet into the top of the Devonian rocks. A short pumping test produced 35 gpm with 65 to 75 feet of drawdown. Most of the water was derived from the Mississippian rocks. The non-pumping water level was reported to be between 100 and 110 feet. In 1947 another well was completed in the upper sandstone at 195 feet. A half-hour pumping test indicated the well to be capable of 50 gpm. Mineral analyses from both sources are given on a separate sheet included with this report. Note that the water from the Cretaceous (?) sand seems to be considerably harder and higher in iron and sulfate than the water from the Mississippian rocks.

Additional water-yielding zones probably will occur in the limestone and dolomite strata belonging to the Lime Creek and Cedar Valley formations of Devonian age between 755 and 1125 feet. Harcourt city well No. 2

Geology and Ground-Water Conditions at Farnhamville--5

(1955) was completed in the top layers of the Wapsipinicon formation at a depth of 1245 feet. Unfortunately, the casing record and pumping test data on this well are not available. The existing information indicates the well to have a static water level of $17\frac{1}{2}$ feet and to be capable of at least 60 gpm. Although the water from the Devonian strata seems to be a bit more highly mineralized and harder than the water from the Mississippian rocks, these deeper waters are still acceptable for drinking and other domestic uses based on the Harcourt well and other wells producing from the Cedar Valley formation in this part of Iowa. However, as Harcourt is 12 miles east of Farnhamville, it is difficult to predict accurately the possibilities of the Devonian at the latter site. Actual drilling and pump testing will provide the most reliable data.

On the basis of the foregoing information, sufficient water for the town of Farnhamville may be found in Mississippian and/or Devonian limestones and dolomites between 300 and 1125 feet. Acidizing the water zones might appreciably increase the yield if necessary. If a well is drilled into the Devonian formations, the weak Prospect Hill-Maple Mill interval might need casing to prevent it from caving into the well. The static water level of the Cedar Valley formation is expected to be somewhat higher than the water level in the Mississippian rocks.

Iowa Geological Survey
 PJH 6/58

IOWA GEOLOGICAL SURVEY
 ANALYSIS OF WATER ANALYSIS
 (Dissolved constituents in parts per million)

Town - Well No Owner	Date of coll.	Depth (ft.)	Geol. source	Of Diss. solids	Fe	Mn	Ca	Mg	K	Na	CO ₂	HCO ₃	SO ₄	Cl	F	NO ₃	Hardness		Micro- mhos at pH Cond																							
																	cal. as CaCO ₃	total																								
Farnhamville Town No. 3 (1947)	6/54	195	Cret. (2)	1110	2.6	0.3	201	60	7.0	68	-	554	434	6.0	0.4	8.9	749	454	295	7.5	1299																					
Farnhamville Town No. 2 (1932)	9/42	776	Miss.	53	760	0.7	0.0	107	44	81	-	388	275	20	1.5	0	448	318	130	7.3	-																					
Harcourt Town (1939)	9/50	1093	Dev.	57	911	0.8	0.0	123	70	62	-	359	385	12	2.0	1.8	595	294	301	7.4	1040																					
Harcourt Town No. 2 (1955)	10/55	1242	Dev.	1040	3.5	0.05	146	75	18	50	-	383	370	70	2.4	0	673	314	359	7.7	1379																					

NOTES: < = less than

STATE HYGIENIC LABORATORY, DES MOINES BRANCH
 WATER LABORATORY DIVISION
 MINERAL ANALYSIS

LAB. NO. 2090
 MINERAL NO. 2024
4/12 19 60

TOWN Farnhamville COUNTY Calhoun
 OWNER OF SUPPLY Town IOWA GEOLOGICAL SURVEY
 COLLECTOR'S NAME Harold Cox
 DATE COLLECTED 3/21/60 DATE RECEIVED 3/24/60 APR 14 1960
 REPORT TO: NAME Division of Public Health Engineering
 ADDRESS State Department of Health

FIELD DATA

SOURCE: WELL NAME, NUMBER, POINT OF COLLECTION, DEPTH, CONSTRUCTION DATE, ETC.,
No. 4 Raw water tap in plant, 825' summer 1958.
"We are sending a sample on Well #4 in place of Well #2 as asked. Well #2 has been abandoned and backfilled."
 WELL PUMPED 3 1/2 HRS. AT 50 GPM. DATE OF PREVIOUS SAMPLE _____
 WAS SAMPLE FREE OF TURBIDITY WHEN COLLECTED Yes
 TEMPERATURE 50°F ALKALINITY (ppm CaCO₃) P _____ T _____ pH 7.0
 IS A POLYPHOSPHATE BEING USED? No

LABORATORY ANALYSIS
 (PARTS PER MILLION)

SPECIFIC CONDUCTANCE K AT 25°C 112 x 10⁻⁵ TURBIDITY _____
 DISSOLVED SOLIDS 778 SOLUBLE IRON (Fe) 0.56
 TOTAL SOLIDS 778 SILICA (SiO₂) 8.6 TOTAL IRON (Fe) 0.56
 ALKALINITY (ppm CaCO₃) P None T 328 pH 7.2 DATE 3/24/60

POSITIVE IONS

K⁺ 16.3
 Na⁺ 63.0
 Ca⁺⁺ 101
 Mg⁺⁺ 55.4
 Mn⁺⁺ < 0.05
 Al⁺⁺⁺ _____

NEGATIVE IONS

NO₃ - asN < 0.1
 F⁻ 2.3
 Cl⁻ 16
 SO₄ -- 269
 HCO₃ - 400
 CO₃ -- None

HARDNESS AS CaCO₃ 480 ppm 28.0 gpg

ANALYST Chang, Ehrhardt
ad

(DWE) R. L. MORRIS
 PRINCIPAL CHEMIST

Paul
Please note
This is extra copy and can be kept in this folder.