BRITT WATERWORKS EXTENSIONS

PUMPING TEST MADE OF WELL, STARTING AT 2:00 P.M. March 22, 1937 WELL IS APPROXIMATELY 265 FEET DEEP, AND IN LIMESTONE FORMATION TEST MADE BY MEANS OF $2\frac{1}{2}$ INCH OPENING IN DISCHARGE LINE, AND BY THE USE OF A PITOT GAUGE, USING WATERWORKS MANUAL CALIBRATIONS.

Time	Depth to Water	Discharge-GPM
2:00 P.M.	20.5'	0
2:07 P.M.	24.0'	190
2:35 P.M.	24.3'	240
3:17 P.M.	Not Taken	270
3:40 P.M.	26.2	270
3:40 P.M.	26.2	270
4:05 P.M.	Not Taken	300
4:20 P.M.	26.9	Not Taken
4:25 P.M.	Not Taken	340
4:30 P.M.	28.1	Not Taken
4:50 P.M.	Not Taken	350
5:10 P.M.	29.7	Not Taken
5:25 P.M.	Not Taken	420
5:45 P.M.	33.4	420
7:20 P.M.	38.5	420
8:20 P.M.	38.3	420
10:10 P.M.	39.4	400
4:00 A.M.	38.7	410
4:01 A.M.	Not Taken	310
7:00 A.M.	32.3	310
7:05 A.M.	22.5	Pumping Completed

S.L. 20½' ?

39.4 - Level @ 400 gpm.
20.5 - Level at start
18.9 D.D.

39.4
17.5
21.9

Hancock

May 3, 1937

Mr. A. H. Wieters, Sanitary Engineer
Health Department
State Capitol
Des Moines, Iowa

Dear Sir:

The following is the log and description of the well constructed at Britt, Iowa

	Feet	Total	
Clay and Drift	125	125	
Solid Lime	3	128	
Broken Lime with Crevasses	4	132	
Very Hard Lime	23	155	
Limestone	25	180	
Limestone with thin Shale Bands	20	200	
Sandy Lime	45	245	
Limestone, Shale Bands	18	263	Total Depth

Casing Record

12" 50 lb. pipe, 127'-6", driven into the solid lime formation 1' 6"
10" 35 lb. pipe, 147'-10", equipped with fabric and rubber seal placed immediately above drive shoe and driven tight at a depth of 147'-10" below the surface.
Water level, 22' below surface
Pumping 120 g. p. m. draw-down, 7'
Pumping 420 g. p. m. draw-down, 14'

If any further information is desired, I will be very glad to cooperate with you to the best of my ability.

Sincerely,

McCutcheon Well Company

Hancock

February 10, 1948

Mr. R. W. Brooks
Layne-Western Company
P. O. Box 662
Ames, Iowa

Dear Mr. Brooks:

Your letter of February 6 requesting information upon the Britt town well has been received, and the following data from the open files of the Geological Survey have been assembled for your use.

Britt City Well No. 2
Completed 1937

Driller's Log:

Description	Thickness	From	To
Clay and drift	125	0	125
Solid lime	3	125	128
Broken lime, crevices	4	128	132
Very hard lime	23	132	155
Limestone	25	155	180
Limestone with thin shale bands	20	180	200
Sandy lime	45	200	245
Limestone, shale bands	18	245	263
			TD

Our correlations are as follows:

Glacial drift	125	0	125
Devonian system			
Lime Creek formation	60	125	185
Shell Rock formation	25	185	210
Cedar Valley formation	53	210	263
			TD

Casing Record:

127'6" of 12" pipe, 50 lb. weight, driven into solid lime formation 1'6".
147'10" of 10" pipe, 35 lb. weight, equipped with fabric and rubber seal placed immediately above drive shoe and driven tight at a depth of 147'10" below the surface.

Water Level: 22 feet below surface

Pumping Record: 120 g.p.m. with 7 feet d.d.
420 g.p.m. with 14 feet d.d.

Elevation of Curb: 1223 feet above sea level.

During drilling a pumping test was reported to have been made at a depth of approximately 140 feet. The well was pumped at 120 g.p.m. with a 7 foot d.d. At the end of 8 hours much fine sand was being pumped from the hole. The well was then drilled to a depth of 263 feet and this upper water and sand were cased out. It is therefore possible that the casing has given way and allowed the sand to enter the hole.

There is a sketchy reference in our files that refers to the filling of the old well at Britt. In this old well the drift was 127½ feet thick. Forty and one-half feet of limestone comprises the upper producing zone which is underlain by 17 feet of shale with 15 feet of limestone below to a depth of 200 feet.

In early 1937 this well had filled to a depth of approximately 168 to 170 feet and the filling was attributed to the caving of the lower shale.

The driller's log of the new well indicated shale bands from 180 to 200 feet and from 245 to 263 feet.

Our log after microscopic study of the samples shows that the interval from 175 to 215 feet and from 255 to 263 feet contain varying amounts of green shale. The percentage of shale is not large. Two intervals of 5 feet each contain up to 20 percent of green shale. Ten percent or less is recorded for the remainder of the interval.

It thus appears that the filling of the well might possibly be due to either caving shale in the uncased portion of the hole or defective casing which allows fine sand to enter the hole.

I hope this information will be of help to you. If we can be of any further service in this matter please let us know.

Very truly yours,

H. G. Hershey

HGH:JBC:BH

LAYNE-WESTERN COMPANY

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HOUSTON, TEXAS
LOS ANGELES, CALIF.
BRANCHES - REPRESENTATIVES
THROUGHOUT THE COUNTRY

AMES, IOWA

February 6, 1948

FEB 7 1948

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

Dear Dr. Hershey:

If you have any record on the last well drilled for the Town of Britt, amount of casing installed, log, etc., we would appreciate having it. They advised that the well has apparently filled up from 263' to 175'. It is my understanding that this well is getting its water from limestone and if it has filled up I assume that there must be a hole in the casing or that there was some sand directly on top of the rock that might be coming underneath it. I would be glad to have any comments that you can make.

Yours very truly,

LAYNE-WESTERN COMPANY

R. W. Brooks

RWB:mpb

Britt – Hancock Co.

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Hancock

March 19, 1937

Currie Engineering Company
Webster City, Iowa

Attention: F. H. Austin

Gentlemen:

Reply to your letter has been delayed due to my absence from the office. I have received some information on the Britt project from Mr. McCutcheon. In fact, I understand that an adequate supply of water has been obtained at a depth of approximately 260 feet and that a pumping test will be run on Monday. However, I am glad to be able to furnish you with some information concerning the St. Peter and Jordan sandstone of Hancock County, so in case you should decide to drill the well deeper you can be guided by these records.

In the deep well at Klemme, which is approximately 11 miles southeast of Britt, the St. Peter sandstone was encountered at 980 feet below the surface or about 260 feet above sea level. The Jordan sandstone is 1380 feet below the surface or approximately 140 feet below sea level. The water level in the St. Peter and overlying formations was about 60 feet below the surface, but as drilling continued and when the well was completed in the Jordan sandstone and pumping tests run the static level became permanent at 1132 feet below the surface. The well produced on pumping tests 310 gallons per minute with a drawdown of 68 feet to a depth of 250 feet below curb. We do not have a complete set of samples from this well, but have examined the cuttings from the St. Peter and Jordan sandstone zones and recognize the characteristic features of these formations. For your information, I am enclosing a copy showing the chemical composition of the deep well water at Klemme. It is

reported that approximately 90 percent of this water comes from the Jordan sandstone.

The deep well at Algona, which is reported to have a total depth of 1885 feet, produces some water from the Jordan sandstone and in addition water from the Dresbach and Red Clastic groups. It is possible that the slightly greater mineralization of the Algona water is produced by the deeper beds below the Jordan sandstone. The Jordan sandstone at Algona was encountered at approximately 1250 feet below the curb and has a thickness of about 90 feet.

The shallow well at Algona is in the lower part of the glacial drift, which may be of an older glacial stage than that which is in the Britt well immediately above the limestone.

With reference to your last paragraph, am sorry to say that we do not have have the information relative to static level, drawdown, or composition of water in the new shallow Algona well. If you have any of these data, we will be pleased to receive them. We have, however, fourteen samples representing the interval from the surface to 140 feet depth.

Yours very truly,

A. C. Tester

ACT:A
Enc.

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WASTE ENGINEERING

20 YEARS SPECIALIZING IN
SEWAGE WORKS AND
WATER WORKS

CURRIE ENGINEERING COMPANY

WEBSTER CITY, IOWA

3

March 15, 1937

BRITT WATERWORKS

A. C. Tester,
Iowa Geological Survey,
Iowa City, Iowa.

Dear Mr. Tester:

The Town of Britt is now drilling a well. They hit limestone at a depth of 124'. Between depths of 126 and 136 they went through broken limestone which carried quite a little water.

The well was pumped to this elevation at the rate of 120 GPM. The water before pumping stood at 22' below the ground surface. The drawdown was 7'.

At the end of an eight hour pumping period, they were still pumping so much fine sand that anything short of a gravel pack construction would not screen out the sand.

They have now drilled the well to a depth of 220' and are apparently in dolomite.

It appears to us that there are two courses open to the Council.

1. Continue down to the Jordan sand stone.
2. Back up to the 130' strata and construct a gravel pack well.

What information can you give us on the depth below the surface, the drawdown, and the nature of the water that we could expect from the Jordan Sand Stone?

We understand that Algona and Klemme have Jordan Sand Stone water. We also understand that the last well at Algona is in a strata at about 150 or 160 feet depp which may be the same strata we hit at Britt at 130.

Do you have the information on the last Algona well relative to depth to water, drawdown, and nature of water?

Very truly yours,

F. H. Austin, Sec'y-Treas.,
CURRIE ENGINEERING COMPANY

K

file 4

March 9, 1937

Mr. F. S. McCutcheon
Rogers Hotel
Des Moines, Iowa

Dear Mr. McCutcheon:

With regard to your request for information on the Britt proposition, will say that it is unfortunate that the upper water could not be developed satisfactorily.

As you know, our records are very meager for Hancock County. However, the well at Klemme, which is 10 or 11 miles southeast of Britt, shows the St. Peter encountered at 980 feet below the surface or about 260 feet above sea level. The Jordan sandstone was encountered at 1380 feet or 145 feet below sea level. The water level is high, and approximately 350 g.p.m. were developed during the test pumping of the completed well. It is believed that the major portion of the water came from the Jordan. The quality of water is good, showing a hardness of about 20 grains.

St Peter S.L. @ 60'
S.L. 182' on completion of well—in Jordan.

The record for the Klemme well does not show any water below the Mississippian, and the generalized record (we do not have any samples) indicates a sequence of almost 700 feet of nearly solid limestone and dolomite with very few breaks of shale. It is hard for me to believe that this zone does not contain some water, but we know that there are places in the Maquoketa and Galena which are nearly continuous limestone and dolomite and are so tight that they will not yield. You may find it necessary to go to the Jordan sandstone.

182 + 68 = 250'

I hope you will continue to keep a good set of cuttings from this well, as it may give us our only good, complete, and reliable section for the territory.

yours very truly,

A. C. Tester

P.S. Do you need more bags?

I have asked Professor Hinman to rush the report on fluorine content of the Waukee sample.

A. C. T.

PHONE 4-9948

6

McCUTCHEON WELL COMPANY

WELLS, EQUIPMENT AND TEST WORK

H. P. BOX NO. 6

Des Moines, Iowa

March 5, 1937

Dr A C Tester
Iowa Geological Survey
Iowa City, Iowa

Dear Dr Tester:

In reply to your letter of March second, the driller's log of the well at Farnhamville, Iowa has been misplaced, and I am unable to locate it at this time. However, my records show the total depth of the Farnhamville well to be 776 feet. As I have no record of the formations below this depth, I can not give you the desired information.

I am inclosing the driller's log for the well at the Bradley Hatchery, also other information requested in your letter. Trusting this will be of assistance to you, I am

Very truly,

F. S. McCutcheon

P.S. The water at Britt, Iowa, head 22-0 below surface, tested 120 g p m with 7½ feet of draw-down. Because of sand can not be saved, casing this out and going deeper. Give me any information you have available where the next large producing strata may be found. How about the St Peter Sandstone? At what depth to expect, also the Jordan.

Sample of water from Waukee sent in today. Please try to hurry the Fluorine analysis for us. Thank you.

F. S. McC.

At Klemme -

Top of Stpeter @ 980'± or 260' above sea level

" Jordan @ 1360'± or -145' below sea level -

Should get water in Maquoketa dolo or Galena dolo at less than 600 ft.

January 4, 1937

Mr. F. S. McCutcheon
Rogers Hotel
Des Moines, Iowa

Dear Mr. McCutcheon:

With reference to the project at Britt, Hancock County, I have examined our records and find several points which may be of interest to you.

The glacial drift in the old well is reported as 127½ feet in thickness, the limestone being encountered at that depth. Forty and one-half feet of limestone comprises the upper producing zone which is underlain by 17 feet of shale and below 15 feet of limestone were drilled, making a total depth of 200 feet. In other words, it would seem that the present depth of the well at approximately 168 to 170 feet is the result of caving of the lower shale which has filled the hole to the bottom of the upper limestone. I do not have a record of the railroad well which is approximately 684 feet deep.

According to the information on water resources of Britt, it is reported that the first limestone in the interval of 127½ to 168 feet depth yielded 60 gallons a minute and that the finished well including the lower limestone tested at the rate of 400 gallons a minute. It would seem highly desirable to case out the upper limestone water and the shale with a continuous string of pipe and utilize the water from the lower limestone bed. It appears that a well of approximately 225 to 250 feet total depth should be adequate for the requirements of Britt. However, the formations should be watched carefully, as the lower limestone

may have some shale members which would cause a caving and an unsatisfactory condition in the hole, and it appears that it would not be necessary to drill to that depth if the water quantity is available at about 200 feet.

It is known that the glacial drift has considerable thickness in the area west of Britt, as records show as much as 250 feet in wells 5 to 6 miles west of Britt.

Yours very truly,

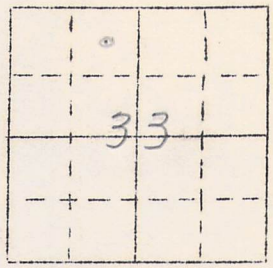
A. C. Tester

ACT:A

W-0554

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

RECORD OF WELL



Location:

Town: Britt (N E / S W); County Hancock

C NE NW sec. 33 T. 96 N., R. 25 E. W. Britt Twp.

Well name and number City Well No 2

Owner _____ Address _____

Tenant _____ Address _____

_____

Contractor McCutcheon Address _____

Drillers _____

Drilling dates Feb 1937

Well data:

Elevations: Drilling curb 1223 feet; Land surface _____ feet

_____

_____

Determined by _____

Topographic position Flat (Residential district)

Total depth: Reported 263 feet, Measured 265 feet

_____

Drilling method _____

Hole and casing data 12 7½' of 12" casing +2' to 12 5½. 147' of 10" Casing +2 to 145'

(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.)

Fabric & rubber seal at bottom

_____

_____

_____

Original depth to water 20.5 ft. ~~above~~ below curb Date _____

Original elevation of water level 1225.5 ft.; Source of data Pump test

_____

Sources of water: Principal Alden Valley; Others _____

_____

CASING DIAGRAM Vertical scale ______	LOG	
	0-125	Clay & drift
	125-128	Solid lime
	128-132	Broken lime with crevasses
	132-155	Very hard lime
	155-180	Limestone
	180-200	Limestone with thin shale bands
	200-245	Sandy lime
	245-263	Limestone, shale bands

Production data: Date _____

Static depth to water 20.5 Measuring point _____

Pumping level 39.4 at 400 g.p.m.

Specific capacity 21 g.p.m. per ft. drawdown; Temperature 47 °F.

Pump data; Type pump Turbine Column Dia. _____ Length _____

Cylinder or bowls: Dia. _____ Length _____ Suction pipe _____

Power Diesel Airline _____

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

Use of water Town supply

WATER ANALYSES (in parts per million)

Date sampled	April 13, 1937			
Sampled by	Fiala & Richey			
Total solids	-			
Insoluble matter	23.2			
Alkalinity (Meo)	354.0			
Alkalinity (Phn)	0.0			
pH	7.0			
$Fe_2O_3 + Mn_2O_3 + Al_2O_3$	7.6			
Alkali as sodium	3.9			
Calcium	94.3			
Magnesium	29.1			
Iron (unfiltered)	0.5			
Manganese	0.04			
Nitrate	0.44			
Fluoride	1.0			
Chloride	5.0			
Sulfate	10.2			
Bicarbonate	431.9			
Hardness (ppm)	356.0			
Hardness (gpg)	20.9			

Remarks _____

Laboratory data: Sample storage location _____

Sample range 1-265 No. spls. 56 No. dupls. & cond. 52 f-g

Spls. prepared by _____ Washed range _____ by _____

Driller's log and cond. Yes

Insoluble residues: Prepared by _____ Studied by _____ Strip log _____

Microscopic study 1-265 Gulf strip log 1939 Gulf

Gen. log _____ Correl. by Condeman