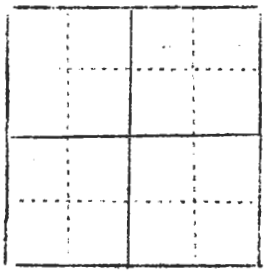
No field loc. by L. Fischer

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

W. 5749

RECORD OF WELL



Location:

Town: Odebolt (N E / S W) :County Sac

SE SE NE NW sec. 34 T. 87 N., R. 38 E. W. Twp.

Well name and number Odebolt Town Well (1952)

Owner Town of Odebolt Address

Tenant Address

Contractor Thorpe Well Co Address

Drillers

Drilling dates aug. 14, 1951 ~~Completed~~ June 18, 1952

Well data:

Elevations: Drilling curb 1405± feet; Land surface feet

Topo. elev. = 1402'
C.I. = 20'

Determined by

Topographic position

Total depth: Reported 2200 feet, Measured feet

Drilling method Cable tool

Hole and casing data 16' of 16" temp. pipe from 1 to 17'; 62' of 13" temp. pipe from 0 to 62'; 468' of 10" permanent pipe from +1' to 467'; 8" liner not perforated from 462' to 1724'.

Original depth to water 342 ft. (above) below Date 7/10/52

Original elevation of water level ft.; Source of data

Sources of water: Principal ; Others

Production data: Date 7/10/52

Static depth to water 342 Measuring point Derrick floor 1' above ground

Pumping level 351 at 147 g.p.m. 24 hour Test

362 228

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 (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 EA4-(1,2,3,4,5,6)

Sample range 0-2200 No. spls. 443 No. dupls. & Cond. 436 good

Spls. prepared by DeRoma Washed range 400-2200 by DeRoma

Driller's log and cond. _____

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

Microscopic study _____ strip log JAN 1953

Gen. log _____ Correl. by NORTHUP

R-1-B

THORPE WELL COMPANY

2340 SIXTH AVENUE

DES MOINES, IOWA

Drilled for City of Odebolt *at* Odebolt, Iowa

Well is located ____ *miles N-E-S-W and* ____ *miles N-E-S-W from* ____

in the ____ ¼ ____ ¼ *Section* ____ *Township* ____ *Range* ____

Drilling started August 14, *19* 51 *Completed* June 18, *19* 52

Well No. ____ *Kind of Well* ____ *Depth* ____ *Size hole started* ____ *in.*

Finish 8" *G. P. M.* 222 *Static Head* 342' *Pumping level from surface* 362'

Water was first encountered at ____ *in* ____ *Approx. Amt.* ____ *Temp.* ____

Remarks ____

(GIVE DETAILS OF PERFORATED PIPE AND SEALS)

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
10"	468'	467'		Weld	16	16'
8	1731½	1721	462'			
10	3"	To weld on top				

Driller ____ *From Surface to* ____ *feet*

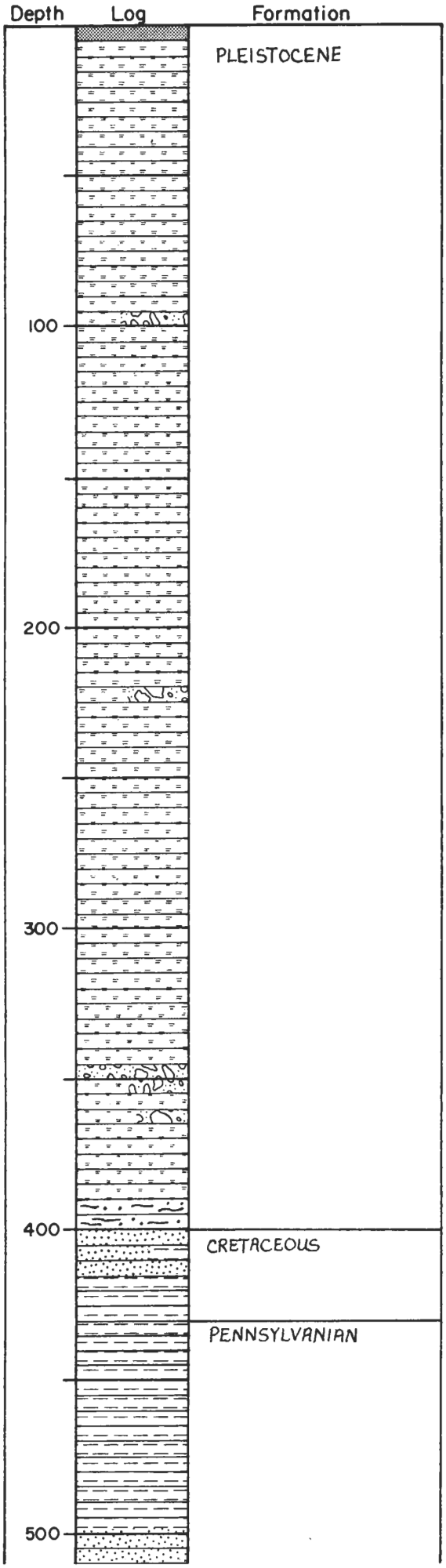
Driller ____ *From* ____ *feet to* ____ *feet*

Driller ____ *From* ____ *feet to* ____ *feet*

AMOUNT IN FEET	KIND OF SOIL OR FORMATION (BE SPECIFIC)	TOTAL DEPTH FEET
4	Black dirt	4
3	Cement	7
6	Sand	13
42	Yellow Clay	55
43	Blue Clay	98
6	Sand	104
49	Blue Clay Sandy	153
27	Yellow Clay Sandy	180
41	Blue Clay Sandy	221
4	Sand	225
119	Blue Clay Sandy	344
3	Sandy - dry	347
3	Blue Clay	350
23	Sand, muddy-like sea mud	373
17	Blue Clay	390

(over)

10	Brown clay sandy silt	400
14	Sand - Very fine, little water	414
1	Yellow clay	415
19	Red Clay	434
1	Black Clay or Shale	435
62	Dark Gray Shale	497
53	Sand stone - 35 GPM 455' pump - 250 Curb	550
12	Lime stone, brown	562
15	Lime and shale streaks	577
31	Broken lime stone	608
44	Lime stone, brown	652
118	Lime and shale streaks	770
85	Brown limestone	855
67	Gray lime stone - sharp	922
31	Blue green shale - light	953
17	Blue green shale and brown lime	970
50	Brown lime stone	1020
40	Gray and brown lime stone	1060
85	Gray Shaley Limestone	1145
95	Brown lime	1240
75	Dark green shale, streaks of lime	1315
36	White lime	1351
49	Lime Stone - light gray	1400
200	Light brown lime	1600
50	Gray lime	1650
12	Dark green shale	1662
12	Light brown lime	1670
27	Dark green shale	1697
58	Sand stone	1755
103	Brown lime	1858
14	White sand stone	1872
23	Lime stone - brown	1895
57	Lime stone - gray	1952
73	Sandstone	2025
175	Brown lime	2200

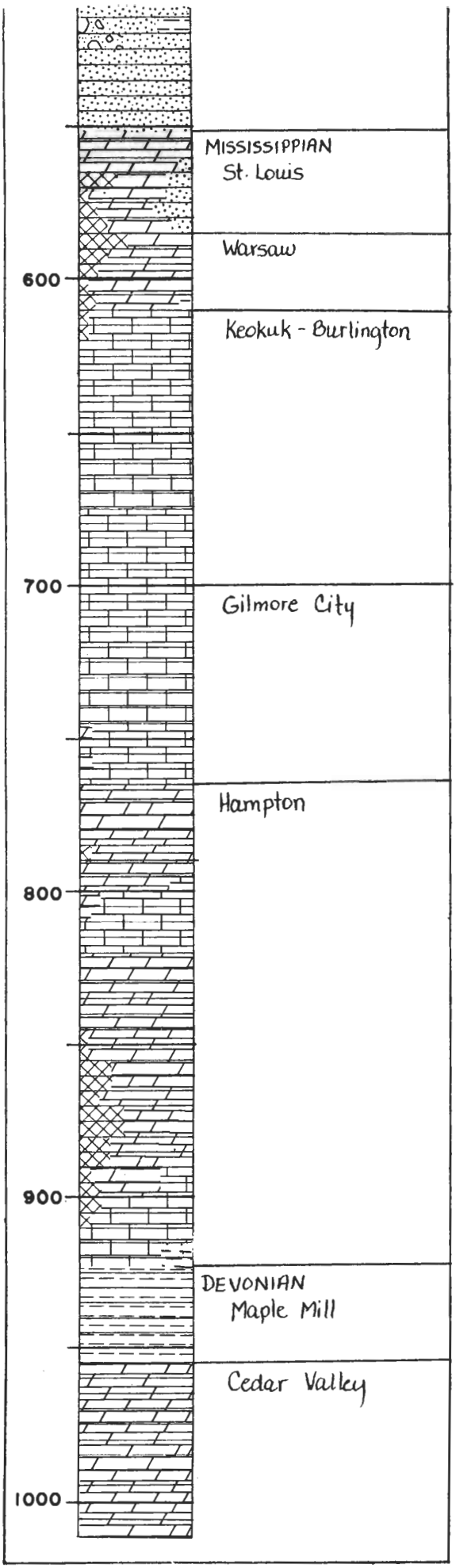


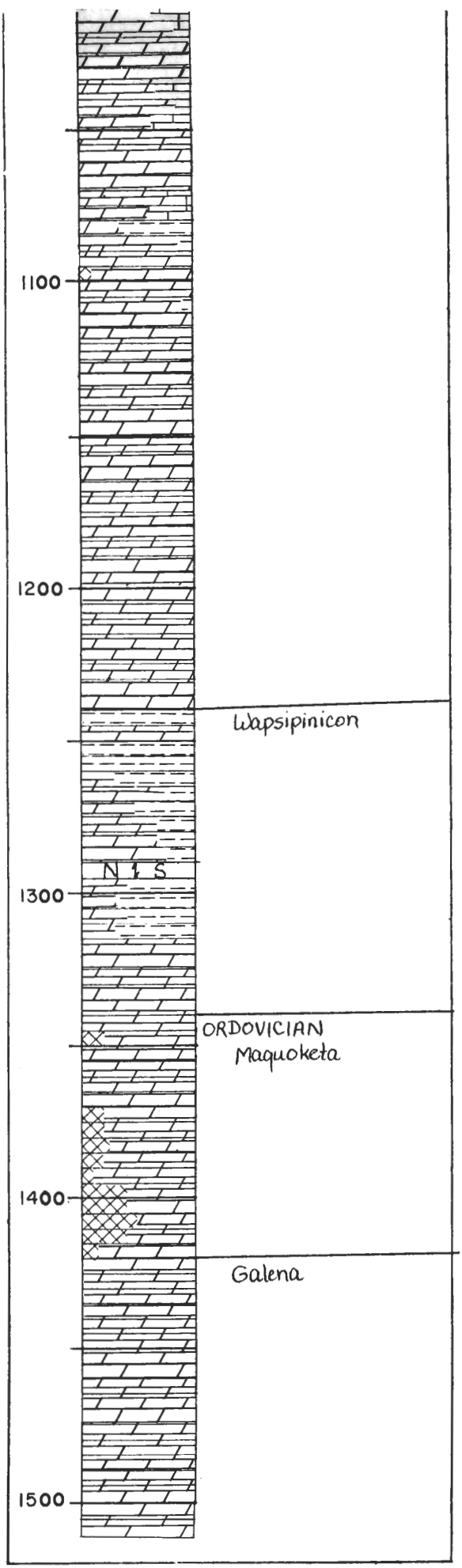
IOWA GEOLOGICAL SURVEY
In Cooperation with
U. S. GEOLOGICAL SURVEY
Iowa City, Iowa

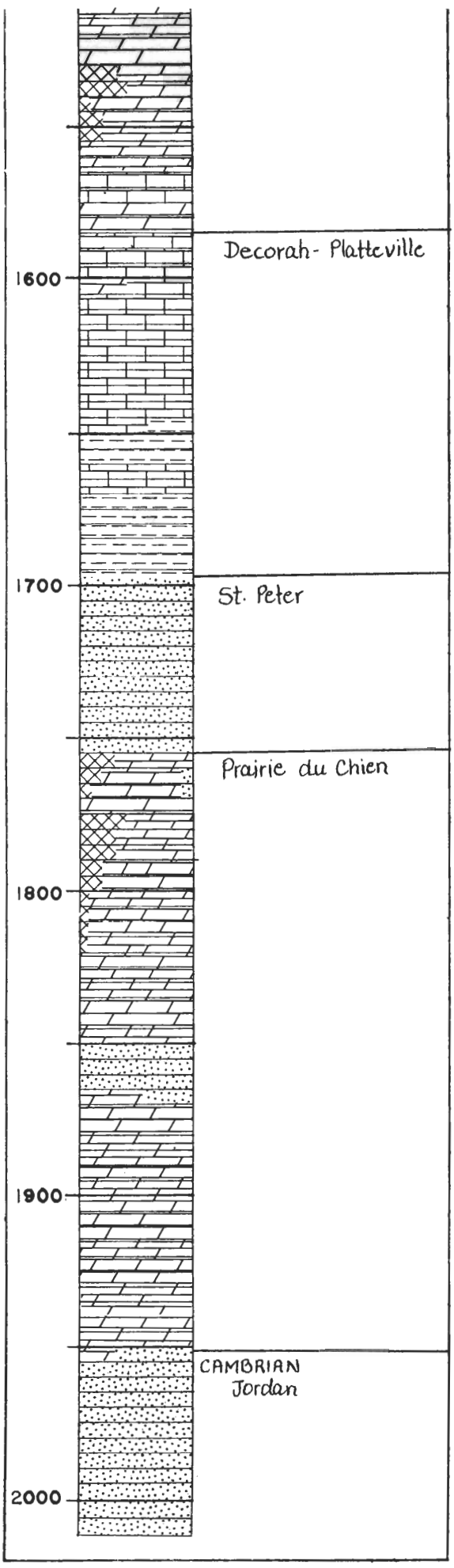
Name ODEBOLT TOWN WELL (1952)	State IOWA
Town ODEBOLT County SAC	Loc. SW/c NE
Contractor THORPE WELL CO. Driller	Sec. 34
Drilling Dates AUG. 14, 1951 - JUNE 18, 1952	T. 87 N., R. 38 W
Casing Record 468' of 10" PIPE +1' to 467'	
8" LINER NOT PERFORATED	
462' – 1721'	
S.W.L. 342' G.P.M. 147 D.D. 9'	
Remarks PL 362' @ 228 GPM on 24 hr. test	Elev. 1409'
	T.D. 2200'
Logged By NORTHUP JANUARY, 1953	I.G.S. No. W-5749

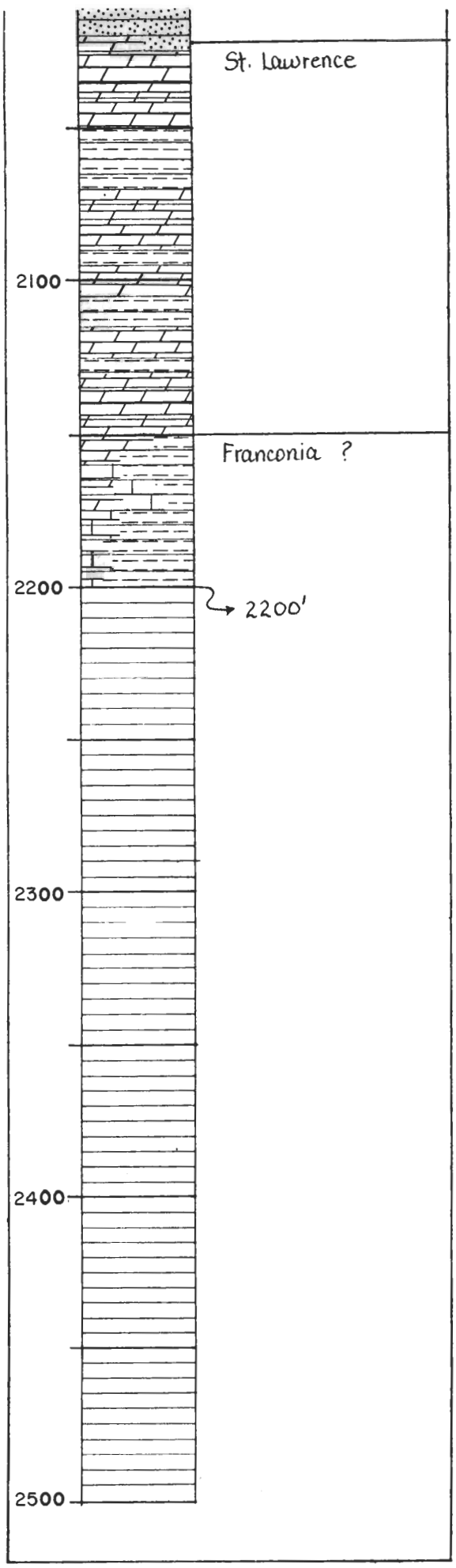
Explanation of Colors

- Soil
- Siltstone
- Drift
- Sand & Gravel
- Shale
- Sandstone
- Limestone
- Dolomite
- Chert
- Gypsum or Anhydrite
- N1S No Samples


MISSISSIPPIAN
St. Louis
Warsaw
600
Keokuk - Burlington
700
Gilmore City
Hampton
800
900
DEVONIAN
Maple Mill
Cedar Valley
1000


1100
1200
Wapsipinicon
N ↑ S
1300
ORDOVICIAN
Maquoketa
1400
Galena
1500


1600
1700
1800
1900
2000
Decorah- Platteville
St. Peter
Prairie du Chien
CAMBRIAN
Jordan


St. Lawrence
2100
Franconia ?
2200
2200'
2300
2400
2500

GW Odebolt Gen Data
(Sac Co.)

May 1, 1968

Mr. Frank E. Flores
W. C. Otto Engineering Co.
P. O. Box 431
Sac City, Iowa 50583

Dear Mr. Flores:

We are glad to send you a modified version of a previous forecast we prepared on Odebolt, Iowa, including a generalized log of the deep municipal well drilled in 1952. This discussion should give you a better understanding of the ground-water situation at Odebolt, although it may not answer all of your questions.

The outlook for developing adequate water from sand and gravel zones in deeper levels of the drift is not promising here. At least we do not have any well records showing thick and extensive gravel aquifers in this vicinity. Further test drilling will be the only way to ascertain this.

The various steps toward a solution to this water problem appear to be: 1) develop a new shallow well field on the Boyer River bottoms east of town and pipe the water to Odebolt; 2) run some down-the-hole surveys to determine if there is a casing leak in the deep well and re-line the hole as necessary (Note: In this respect the water from the Dakota Sandstone and Pennsylvanian rocks in this area is very similar to the water now developed from the Jordan well at Odebolt); 3) set a plug at the top of the St. Lawrence Dolomite in the deep well to see if this improves the quality of the water; 4) install water treatment facilities to improve the quality from the existing wells; and 5) drill another deep well to the St. Peter and Jordan aquifer with the casing set and grouted from the surface into the top of the St. Peter or Prairie du Chien.

We hope this information will be useful to you in solving the water problem at Odebolt. If we can be of additional assistance in any way, please feel free to call or write us.

Very truly yours,

H. G. Hershey

HGH/PJH:njc

Ground-Water Conditions at Odebolt, Iowa

The following commentary represents an interpretation of the available hydrogeologic data in the files of the Iowa and U. S. Geological Surveys.

The town of Odebolt (1960 population 1,331) is located on high and hilly ground in southwestern Sac County mostly in the S½ sec. 27 and N½ sec. 34, T.87N., R.38W. (Richland township). Based on a starting ground level elevation of 1,409 feet above sea level a generalized log of the geologic units encountered in the deep town well drilled in 1952 into the Franconia (?) Formation to a depth of 2,200 feet is outlined in tabular form as follows:

Geologic unit	Thickness(ft)	Depth Range(ft)
Quaternary System		
Pleistocene Series (glacial drift with sand and gravel zones at 220-25 and 344-52, some silt at base)	400	0-400
Cretaceous System		
Undifferentiated sandstone and shale	30	400-430
Pennsylvanian System		
Des Moines Series (shale in upper half, sandstone in lower half)	121	430-551
St. Louis Formation (dolomite, sandy, some chert)	32	551-583
Warsaw-Keokuk-Burlington Formation (dolomite, limestone, and chert, trace of shale, slightly sandy at base)	117	583-700
Gilmore City Limestone	65	700-765
Hampton Formation (dolomite, some limestone in upper part, 10-40% chert in basal 50 feet)	130	765-895
Starrs Cave Limestone	27	895-922
Prospect Hill Siltstone		
Devonian System		
Maple Mill Shale	31	922-953
Cedar Valley Dolomite	287	953-1240
Wapsipinicon Formation (dolomite, with about 60% shale in upper 2/3's)	100	1240-1340
Ordovician System		
Maquoketa Formation (dolomite with considerable chert)	80	1340-1420

Geologic unit	Thickness (ft.)	Depth Range (ft.)
Galena Formation (dolomite with chert zone in lower part)	165	1420-1585
Decorah-Platteville Formations (mostly limestone in upper half, and shale in lower half)	112	1585-1697
St. Peter Sandstone	58	1697-1755
Prairie du Chien Formation		
Willow River Member (dolomite, sandy, some chert)	100	1755-1855
Root Valley Member (sandstone)	18	1855-1873
Oneota Member (dolomite)	79	1873-1952
Cambrian System		
Jordan Sandstone	71	1952-2023
St. Lawrence Formation (dolomite with several interbedded shales, some glauconite)	127	2023-2150
Franconia(?) Formation (shale and dolomite or limestone about 50/50% glauconite)	50	2150-2200

According to the driller, this well was constructed with 468 feet of 10-inch casing from +1 foot to 467 feet and 1,259 feet of 8-inch liner from 467 feet to 1,721 feet, into the St. Peter Sandstone. There is no report the casing was cemented in.

The existing water supply at Odebolt is obtained from 4 shallow wells and the deep well. The shallow wells are finished in recent valley-fill sediments - fine sands, some gravel, and silt - in the valley of Odebolt Creek. These sediments have a maximum thickness of about 30 feet and feather out along the margins of the valleys. Water moves into these fine sands by downward percolation of local rainfall, from the valley slopes, from the stream itself at times, and from tile drains heading in the surrounding uplands.

The shallow wells are both dug and gravel-pack constructions. The yields are not large because of the fairly low permeability of the sediments. However, considerable quantities of water have been developed from the large diameter

dug wells where the water is pumped from storage within the well itself. Up until the present the supply from the shallow wells combined with a deep well seems to have been satisfactory for the town. The principal difficulty with shallow supplies in this area is their dependence on rainfall so that the wells are subject to failure during extended dry periods, and contamination of the water from infiltrating surface drainage.

Another possibility for a shallow supply will be the sands and gravels underlying the valley of the Boyer River about 6 or 7 miles east and southeast of town. The disadvantage of a well field in the Boyer River deposits will be the lengthy pipeline construction needed to bring the water over to the town. However, the mineral quality of the water from the Boyer River alluvium probably will be better than any other waters found in the deep glacial or bedrock formations at Odebolt. Actual drilling, test pumping, and sampling for the mineral quality and sanitary condition of the water will provide the most reliable information.

Many of the upper and intermediate bedrock formations in this area are waterbearing and may yield appreciable quantities of water to wells.

The Dakota Sandstone of Cretaceous age which is the source of supply at Schaller and several other communities in the surrounding area seems to be too thin to yield sufficient water at Odebolt. This formation is only 15 feet thick in the deep town well.

Moderate supplies of rather highly mineralized water might be developed from the limestones and dolomites between the base of the Pennsylvanian shales and the Decorah-Platteville shales. Lytton formerly had a well that produced more than 100 gpm from the Mississippian and Devonian formations with 112 feet of drawdown and a pumping water level of 182 feet. Mineral analysis indicates the water from this well to be acceptable for drinking with a dissolved solids content of 1,471 parts per million and a hardness of 776 ppm (45.4 grains).

The amount of water obtainable from the Mississpppian and Devonian rocks and the underlying Maquoketa and Galena Formations will vary locally depending on whether the well intersects one or more large crevices or solution openings in the limestones and dolomites. Acidizing the water-bearing zones might appreciably increase the yield. Not too much is known about the aquifer potential of the Maquoketa-Galena strata in this area. However, the Marcus town well

in northwestern Cherokee County penetrated large crevices in the Maquoketa Dolomite and produced 233 gpm with only 8 feet of drawdown. The water has a dissolved solids concentration of 1,605 ppm and a hardness of 955 ppm.

After the deep Odebolt well had been drilled to a depth of 2,200 feet a pumping test was run on the St. Peter Sandstone by placing a plug at the bottom of the sandstone to seal off the lower formations. The well was tested for several hours at a rate of 75-100 gpm and a water sample obtained. Mineral analysis showed a concentration of 1,358 ppm dissolved solids and 709 ppm hardness. Prior to 1949 Rockwell City developed at least part of its supply from the St. Peter Sandstone. One of their wells reportedly produced a bit more than 100 gpm.

The final production test on the deep Odebolt well obtained 228 gpm with 20 feet of drawdown from an original static water level of 342 feet. This represents a specific capacity of 11.4 gpm/ft. drawdown and presumably the well is capable of a much larger output. Several mineral analyses obtained from this well indicate the water to be highly mineralized and extremely hard making it objectionable for some uses. The principal producing zone is the Jordan Sandstone and associated dolomites. The town apparently does not have any water conditioning facilities. At Rockwell City, Lytton, Sac City (old canning company), and Storm Lake the water from the Jordan is of much better quality. This fact tends to cast some doubt on whether the water developed in the deep Odebolt well is representative of the Jordan aquifer. There is a possibility of a leak in the casing, for example, at the casing reduction at 467 feet in the Pennsylvanian rocks. Another explanation might be that the high mineralization is coming from the interval representing the lower St. Lawrence and Franconia (?) Formations which contain a large amount of shale and glauconite. On the other hand, since the Odebolt well is an outpost well, i.e., it is farther west and south than any other Jordan well in this part of the state, the water may be truly representative of the aquifer.

To summarize, this report indicates it may be difficult to develop a completely satisfactory water supply at Odebolt. Possible solutions might be to develop a shallow well field in the Boyer River valley several miles to the east and construct a long pipeline, or to install water-conditioning facilities to improve the quality of the water from the existing supply wells both shallow and deep. The town might also consider running some down-the-hole surveys to determine if there are any casing leaks in the deep well. They might also try placing a plug at the top of the St. Lawrence Dolomite

and running a long pumping test to see if this improves the quality of the water. There is some possibility that the well already has been filled in to 2,025 feet, but no data are available on this. If a new deep well is drilled provision should be made to test the quantity and quality of water from the various aquifers. A new Jordan well should be cased from the surface into the top of the Prairie du Chien and the pipe grouted in place with neat cement.for its full length.

PJH/ 4/68

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

Town - Well No. Owner	Date of coll.	Depth (ft.)	Geol. source	°F	Liss. solids	Fe	Mn	Ca	Mg	K	Na	CO_3	HCO_3	SO_4	Cl	F	NO_3	Hardness cal. as $CaCO_3$ tot.	carb	non carb	pH	Cond
Odebolt Town No. 2 (1957)	8/57	40	Sand & Gravel		721	.20	.9	157	39		32	0	364	270	37	0.4	4.0	552	398	255	7.3	1010
Lytton Town (194-)	7/45	971	Miss.-Dev.		1471	0.5	0	184	77	1.52			378	720	21	1.8	0	776	310	466	7.3	-
Marcus Town (1948)	8/49	884	Mag.-Gal.		1605	1.	.03	254	78	1.98			383	824	11	1.4	5.3	955	314	641	7.4	1910
Odebolt Town (1952)	4/52	1750*	St. Peter	61	1358	.44	.03	195	54	3.3	126	0	300	704	35	2.2	0	709	246	463	7.3	1440
Rockwell City No. 3 (1948)	8/50	1965	Jordan	57	1032	.45	0	132	62	3.7			385	434	14	1.2	.44	585	316	269	7.4	1191
Sac City Town [illegible] Co.	8/34	2047	do		1580	4.5	.34	96	120	1.85			459	778	16	1.7	0	734	360	374	7.3	-
Storm Lake City (1938-39)	9/60	1690	do	62	1358	2.6	.12	223	54	2.6	111	0	346	690	18	1.2	0.2	786	200	480	7.1	1770
Odebolt Town (1952)	7/52	2200	do ?	61	2158	0.5	.04	283	94	3.4	221		237	1259	35	2.2	0	1094	194	900	7.6	2340
Schaller Town No. 2 (1957)	4/2/62	460	Dakota		2299	.92	2.8	296	107	8.9	196	0	595	1230	16	.45	0.1	1180	324	856	7.4	2610
Sac City D.G. Schenck	7/25/40	280	Penn.	52	2096	6.5	0	323	90	1.51			495	1081	20	1.0	1.1	1177	406	771	7.1	-

NOTES: * Plugged depth

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

Town - Well No. Owner	DATE OF COLL.	Depth (ft.)	Geol. Source	°F	Diss. Solids	Fe	Mn	Ca	Mg	K	Na	CO_3	HCO_3	SO_4	Cl	F	NO_3	Hardness cal as $CaCO_3$ tot.	carb.	non carb	pH	Cond
Odebolt town No. 2 (1957)	8/57	40	Sand & gravel		721	.20	.39	157	39	23	32	0	364	270	27	0.4	4.0	553	298	255	7.3	1010
Schaller town No. 2 (1957)	4/62	460	Dakota ss.		2299	.92	2.8	296	107	8.9	196	0	395	1230	16	.45	< 0.1	1180	324	856	7.4	2610
Sac City D.G. Schenck	7/40	280	Penn.	52	2096	6.5	0	323	90	151		-	495	1081	20	1.0	1.1	1177	406	771	7.1	-
Lytton town (1945)	7/45	971	Miss.-Dev.		1471	0.5	0	184	77	152		-	378	720	21	18	0	776	310	466	7.3	-
Marcus town (1948)	8/49	884	Mag.-Galena		1605	1.	.03	254	78	108		-	383	824	11	1.4	5.3	955	314	641	7.4	1910
Odebolt town (1952)	6/52	* 1750	St. Peter	61	1358	4.4	.03	195	54	33	126	0	300	704	35	2.2	0	709	246	463	7.3	1440
Rockwell City No. 4 (1970)	2/70	1970	Jordan	67	1180	1.0	< .05	176	58	29	110	0	386	600	13	1.2	0.5	680	316	364	7.1	1600
Sac City Iowa Canning Co.	8/34	2047	"		1580	6.5	.04	96	120	185		-	439	778	10	Tr.	0	734	360	374	7.3	-
Storm Lake city (1959)	9/60	1690	"	62	1358	2.6	.12	223	54	26	111	0	366	690	18	1.2	0.2	780	300	480	7.1	1770
Odebolt town (1952)	7/52	2200	?	61	2158	0.5	.04	283	94	34	221	-	237	1259	35	2.2	0	1094	194	900	7.6	2340

NOTES: * Plugged depth to test St. Peter
< Less than
Tr. Trace

W. C. Otto Engineering Company

W. C. Otto P.E. & L.S.
Howard Watts P.E.

CONSULTING ENGINEERS
WEST MAIN STREET SAC CITY, IOWA 50583
P. O. Box 431 Area Code 712 662-7073

April 23, 1968

APR 25 1968

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

Dear Sir:

First we want to thank you for the information supplied by your office on Early, Manly and Rockwell City.

The Town of Odebolt here in Sac County is having trouble with contamination in their shallow wells. These people also have a deep Jordan well that produces very hard water and they are giving some thought to treatment of this water to improve its quality.

Can you supply us with a log of this deep well.

We are also wondering if your records might indicate the possibility of locating a deeper sand and gravel aquifer in the Odebolt area that might be free of the surface contamination and still have better quality water than the deep well.

Any information you can give us would be greatly appreciated.

Very truly yours,
W. C. OTTO ENGINEERING CO.

Frank H. Flores, P.E.

ekm

July 2, 1952

Mr. Paul J. Houser, Director
Division of Public Health Engineering
Department of Health
Des Moines 19, Iowa

Dear Mr. Houser:

Thank you very much for your letter of June 30 concerning the water samples for mineral analysis from the Odebolt water well now under construction.

We were informed that the pumping test at Odebolt would be of extremely short duration and at the time had no man within easy reach. The results of the analyses will be extremely valuable, and I am grateful that Mr. Evans was able to obtain the samples. We shall look forward to receiving the results of the analyses when they are completed.

Very truly yours,

H. G. Hershey

HGH:emh

2597

WALTER L. BIERRING, M. D.
COMMISSIONER

State of Iowa
Department of Health
Des Moines 19

JUL -2 1952

DIVISION OF
PUBLIC HEALTH ENGINEERING
PAUL J. HOUSER, DIRECTOR

PLEASE ADDRESS ALL CORRESPONDENCE TO THE
DIVISION OF PUBLIC HEALTH ENGINEERING

June 30, 1952

Mr. H. G. Hershey
Director and State Geologist
Iowa Geological Survey
Iowa City, Iowa

Dear Mr. Hershey:

Enclosed for your information is a copy of a memorandum by Mr. F. M. Evans of this Division on his collection of samples of water from the well under construction at Odebolt, Iowa.

At the time of Councilmen Beck's request, I contacted your office via telephone and was informed that none of your staff intended to collect samples for mineral analysis. Hence, Mr. Evans obtained the samples with the understanding that the report of analysis would be available to you. I believe that your office has been contacted by the Thorpe Well Company in connection with the development of aquifers supplying this well.

Very truly yours,

P. J. Houser, Director
Division of Public Health Engineering

PJH:bh
Enc

PB-A-6599

IOWA
STATE DEPARTMENT OF HEALTH
DIVISION OF PUBLIC HEALTH ENGINEERING
DES MOINES

Town Odebolt, Iowa Date June 20, 1952

Report on Collection of Mineral Samples

By F. M. Evans Approved Director
Division of Public Health Engineering

MEMORANDUM

On the above date the writer collected two samples of water for mineral analyses from a new well which is being drilled at Odebolt, Iowa. These samples were collected at the request of Mr. Beck, councilman at Odebolt, so that the mineral characteristics of the water from the St. Peter Sandstone formation could be determined. One sample was collected for a partial mineral analysis and the other sample was collected for a complete mineral analysis.

The well has been drilled to the Jordan Sandstone formation at a depth of 2200 feet; however, a plug had been placed at the bottom of the St. Peter Sandstone formation so that no water was pumped from below this formation. As all water bearing formations above the St. Peter Sandstone have been cased through, water from only the St. Peter formation was being developed by the well.

At the time of the writer's arrival at the well site, about 7:00 PM, the pumping had been halted due to a break in the pump rod. The well had been pumped continuously at a rate of 75-100 gpm for a period of 10 hours before this break occurred. Two lengths of pump rod and drop pipe were removed which left a pump setting of approximately 500 feet. At 9:02 PM pumping of the well was started again but was stopped at 9:17 PM due to a failure in a pump rod joint. After repairs had been made, pumping was began again at 10:05 PM and continued until 11:35 PM when the two samples were collected.

Since all other water bearing formations were cased or plugged to prevent their entrance into the well and the well had been pumped for a total of approximately 11 hours 45 minutes, it was believed by the writer that the samples collected would be representative of the water from the St. Peter Sandstone formation.

The following field determinations were made: Alkalinity 264 ppm, pH 7.5, temperature 16.5°C., pumping rate 75-100 gpm for 1 1/2 hours.

The samples were delivered by the writer to the State Hygienic Laboratory in Iowa City on June 21, 1952.

FME

FME:hc

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa
Water Analysis Report

County Sac Date Sampled 7-11-52

Town Odebolt Sampled by C.R. Murray & A. J. Feulner

Location of well SW/c NE¼ sec. 34, T. 87N., R. 38E W. Twp.

Owner Town of Odebolt Well No. (1952). Depth 2025 Ft.

Type of well cable tool Static level 342 ft. Curb elevation 1405± Ft.

Producing Formation(s) St. Lawrence, Jordan, & St. Peter-Prairie du Chien Depth range

Notes on condition of well, casing, or formations:

468' of 10" from -1 to 467'
1259' of 8" liner 462 to 1721'. Not perforated.

Dissolved constituents and properties (in parts per million except as indicated):

Silica (S_iO_2)		Dissolved solids	2158
Iron (Fe)	0.5	Hardness (calc. as $CaCO_3$)	
Manganese (Mn)	0.04	Total	1094
Calcium (Ca)	283	(as grains per gallon)	63.9
Magnesium (Mg)	94	Carbonate	194
Sodium and potassium (Na+K), as sodium	34 221	Noncarbonate	900
Carbonate (CO_3)	0	Alkalinity (as $CaCO_3$)	194
Bicarbonate (HCO_3)	237	pH	7.6
Sulfate (So_4)	1259	Specific Conductance (micromhos at 25°C.)	2340
Chloride (Cl)	35	Temperature (°F)	61
Fluoride (F)	2.2		
Nitrate (NO_3)	0		

Analysis No. 1274 (3668) Date analyzed 8-22-52 I.G.S. well No. No sample

Remarks: Sample collected after well pumped 22 hrs. at 250 gpm.

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa
WELL OR WATER SAMPLE DATA

Bottle No._____

I.G.S. Well No._____

TOWN Odebolt COUNTY Sac

LOCATION SW/c NE/4 sec. 34 T. 87 N., R. 38 (W.) E. _____ Twp.

OWNER OF WELL Town of Odebolt WELL NO. 1952

USE OF WATER: Municipal supply(X); Private-domestic( ); Public drinking( ); Livestock( ); Industrial( ); School supply( ); Air conditioning( ); Cooling( );
_____ ( ).

CONSTRUCTION OF WELL: Drilled: Cable tool(X), Rotary( ); Gravel-pack type( ); Driven( ); Dug( ); Bored( ); Jetted( ); _____ ( ).

CONTRACTOR Thorpe Drilling Co DATE STARTED 1951
DATE FINISHED 1952, July

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the kind, length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.)

468' of 10" from -1 to 467'
1259' of 8" Liner. 462 to 1721 Not perforated

WELL DATA

Curb Elevation 1405± Ft. Present Depth _____ Ft. Final Depth 2025 Ft.

1721
462
1259

Ground Elevation ± Ft. Topographic Position Hill top

Static Level (Depth to water (above) (below) curb) 342 Ft. Pumping Level 362 Ft.

Amount of Drawdown 20 Ft. pumping at 250 g.p.m. in 22 hrs. 0 minutes.

Specific Capacity 12½ g.p.m. per ft. drawdown in _____ hours.

Type of Pump Turbine Test Pump Power Diesel

Depth of Bottom of Pump 460 ft. with 20 ft. of suction pipe.

TEMPERATURE: Air 80 °F.; Water 6 °F., measured after well had pumped 22 hours and 0 mins. at 250 g.p.m.; 50 ft. from pump after water had passed through the following pipe 7" Discharge Pipe Time 2 pm (A.M.) (P.M.)

SOURCE OF WATER:

Principal producing formation St Lawren ft. to _____ ft.

Other producing formations Jordan & St Peter-Prairie du Chien ft. to _____ ft.

REMARKS: (Taste, odor, and appearance)
Slight odor of H_2S
Slight mineral taste

Sample taken for: Mineral analysis (X); Sanitary analysis ( ).
Data collected by C.R.M.-A.J.F. Date 7-11-52

Copies to: Thorpe Drilling Co
Town clerk, Odebolt

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa
Water Analysis Report

County Sac Date Sampled 6-20-52

Town Odebolt Sampled by F. M. Evans

Location of well ____ sec. ____, T. ___ N., R. ___ E W. ____ Twp.

Owner Town of Odebolt Well No. (1952). Depth 1721 Ft.

Type of well drilled Static level ____ ft. Curb elevation ____ Ft.

Producing Formation(s) St. Peter Depth range ____

Notes on condition of well, casing, or formations:

Well was plugged at base St. Peter to obtain representative St. Peter analysis.

Dissolved constituents and properties (in parts per million except as indicated):

Silica (S_iO_2)		Dissolved solids	1358
Iron (Fe)	4.4	Hardness (calc. as $CaCO_3$)	
Manganese (Mn)	0.03	Total	709
Calcium (Ca)	195	(as grains per gallon)	41.4
Magnesium (Mg)	54	Carbonate	246
~~Sodium~~ potassium	33	Noncarbonate	463
~~(Na+K)~~ sodium	126	Alkalinity (as $CaCO_3$)	246
Carbonate (CO_3)	0	pH	7.3
Bicarbonate (HCO_3)	300	Specific Conductance (micromhos at 25°C.)	1440
Sulfate (So_4)	704	Temperature (°F)	61
Chloride (Cl)	35		
Fluoride (F)	2.2		
Nitrate (NO_3)	0		

Analysis No. 24596 (3649) Date analyzed 7-16-52 I.G.S. well No. ____

Remarks: Sample collected after well pumped 1½ hrs. at 75 gpm.

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa
Water Analysis Report

County Sac Date Sampled 6-20-52

Town Odebolt Sampled by F. M. Evans

Location of well ____ sec. ____, T. ___ N., R. ___ E W. ____ Twp.

Owner Town of Odebolt Well No. (1952) Depth 1,721 Ft.

Type of well drilled Static level ____ ft. Curb elevation ____ Ft.

Producing Formation(s) St. Peter ss Depth range ____

Notes on condition of well, casing, or formations:

Cased to St. Peter sandstone

Dissolved constituents and properties (in parts per million except as indicated):

Silica (S_iO_2)		Dissolved solids	
Iron (Fe)	6.7	Hardness (calc. as $CaCO_3$)	
Manganese (Mn)		Versenate Total	688
Calcium (Ca)		(as grains per gallon)	40.2
Magnesium (Mg)		Carbonate	244
Sodium and potassium (Na+K), as sodium		Noncarbonate	444
Carbonate (CO_3)		Alkalinity (as $CaCO_3$)	244
Bicarbonate (HCO_3)		pH	7.6
Sulfate (So_4)		Specific Conductance (micromhos at 25°C.)	1590
Chloride (Cl)	35	Temperature (°F)	61
Fluoride (F)	2.2		
Nitrate (NO_3)	0		

Analysis No. 24595 (Partial) Date analyzed 6-25-52 I.G.S. well No. ____

Remarks: Well had been pumped for 10 hrs. at 75-100 gpm when pumprod broke. Sample collected after repairs made - only water from St. Peter being pumped.

JUN 26 1952

STATE HYGIENIC LABORATORY, IOWA CITY, IOWA
WATER LABORATORY DIVISION
MINERAL ANALYSIS

LAB. NO. 24595
MINERAL NO. Partial
June 25 19 52

TOWN Odebolt COUNTY Sac
OWNER OF SUPPLY Town
COLLECTOR'S NAME F. M. Evans
DATE COLLECTED 6-20-52 DATE RECEIVED 6-22-52
REPORT TO: NAME State Dept. of Health
ADDRESS Des Moines, Iowa

FIELD DATA

SOURCE: WELL NAME, NUMBER, POINT OF COLLECTION, DEPTH, CONSTRUCTION DATE, ETC., New well being drilled depth 1721 ft. cased to St. Peter Sandstone

WELL PUMPED 1 1/2 HRS. AT 75 GPM. DATE OF PREVIOUS SAMPLE None
WAS SAMPLE FREE OF TURBIDITY WHEN COLLECTED Small amount present
TEMPERATURE °C 16.5 ALKALINITY (ppm $CaCO_3$) P 0 T 264 pH 7.5
Partial analysis only rush results (Well had been pumped for 10 hrs. @ 75 - 100 GPM continuously and then pump rod broke) These samples collected were collected after repairs were made - only water from St. Peter being Pumped.

LABORATORY ANALYSIS
(PARTS PER MILLION)

SPECIFIC CONDUCTANCE K AT 25°C 158.8 x 10^{-5}. TURBIDITY
INSOLUBLE MATTER $Fe_2O_3 + Al_2O_3 + Mn_2O_3 (R_2O_3)$
TOTAL SOLIDS DISSOLVED SOLIDS TOTAL IRON (Fe) 6.7
ALKALINITY (ppm $CaCO_3$) P None T 264 pH 7.6 DATE 6-23-52

POSITIVE IONS	r		rM+	NEGATIVE IONS	r		rA−
[redacted] K		x 0.0256		NO_3 − asN	None	x 0.0714	
Na +		x 0.0435		F −	2.2	x 0.0526	
Ca++		x 0.0499		Cl −	35	x 0.0282	
Mg++		x 0.0822		SO_4 −−		x 0.0208	
Mn++		x 0.0364		HCO_3 −		x 0.0164	
		x		CO_3 −−		x 0.0333	
						x	

TOTALS SUM rM+ SUM rA−
ERROR % PERMISSABLE ERROR ON THIS SAMPLE %

CALCULATED HARDNESS AS $CaCO_3$ = (Ca x 2.497) + (Mg x 4.115) + (Fe x 1.792) + (Mn x 1.882) = ppm gpg

V Hardness = 688 ppm = 40.2 gpg

ANALYST D. Ebert.
emp

R L Morris
PRINCIPAL WATER ANALYST

STATE HYGIENIC LABORATORY, IOWA CITY, IOWA
WATER LABORATORY DIVISION
MINERAL ANALYSIS

LAB. NO. 24595
MINERAL NO. Partial
June 25 19 52

TOWN Odebolt COUNTY Sac
OWNER OF SUPPLY Town
COLLECTOR'S NAME F. M. Evans
DATE COLLECTED 6-20-52 DATE RECEIVED 6-22-52
REPORT TO: NAME State Dept. of Health
ADDRESS Des Moines, Iowa

FIELD DATA

SOURCE: WELL NAME, NUMBER, POINT OF COLLECTION, DEPTH, CONSTRUCTION DATE, ETC., New well being drilled depth 1721 ft. cased to St. Peter Sandstone

WELL PUMPED 16 1/2 HRS. AT 75 GPM. DATE OF PREVIOUS SAMPLE None
WAS SAMPLE FREE OF TURBIDITY WHEN COLLECTED Small amount present
TEMPERATURE °C 16.5 ALKALINITY (ppm $CaCO_3$) P 0 T 264 pH 7.5
Partial mineral only rush results (Well had been pumped for 10 hrs. @ 75 - 100 GPM continuously and then pump rod broke) These samples collected were collected after repairs were made - only water from St. Peter being Pumped.

LABORATORY ANALYSIS
(PARTS PER MILLION)

SPECIFIC CONDUCTANCE K AT 25°C 153.8 x 10^{-5}. TURBIDITY
INSOLUBLE MATTER $Fe_2O_3 + Al_2O_3 + Mn_2O_3 (R_2O_3)$
TOTAL SOLIDS DISSOLVED SOLIDS TOTAL IRON (Fe) 6.7
ALKALINITY (ppm $CaCO_3$) P None T 264 pH 7.6 DATE 6-23-52

POSITIVE IONS	r	rM+	NEGATIVE IONS	r	rA−
[redacted] K		x 0.0256	NO_3 − asN	None	x 0.0714
Na +		x 0.0435	F−	2.2	x 0.0526
Ca++		x 0.0499	Cl−	35	x 0.0282
Mg++		x 0.0822	SO_4−−		x 0.0208
Mn++		x 0.0364	HCO_3−		x 0.0164
		x	CO_3−−		x 0.0333
					x
TOTALS	SUM rM+				SUM rA−

ERROR % PERMISSABLE ERROR ON THIS SAMPLE %

CALCULATED HARDNESS AS $CaCO_3$ = (Ca x 2.497) + (Mg x 4.115) + (Fe x 1.792) + (Mn x 1.882) = ppm gpg

V Hardness = 688 ppm = 40.2 gpg

ANALYST D. Short
emp

R L Morris
PRINCIPAL WATER ANALYST

Re: Odebolt deep well

Paul Houser, State Dept. of Health, called about the pumping test on the well. As he had received information from Thorpe and a council member, they were testing the well with a plug between the St. Peter and the Jordan to determine the quality of the upper water in order to determine if it was suitable for use or should be cased out.

As the office indicated that it had been decided not to sent anyone, Houser though that he probably could sent a man to obtain a sample. Jack Boyles is on vacation but probably a man was going up from Des Moines.

Houser indicated that he felt it wss our responsibility, but it was explained that such short notice made it impossible with the shortage of cars and men already engaged in other equally important field work.

RMJ

June 20, 1952

7381

ODEBOLT WELL TEST

MP = Derrick Floor = 1' above ground level Bottom of air line = 450'

Time	Air line reading (ft.)	Temp. °F.	Water level (ft. below MP)	GPM	Weir height (inches)	RPM (Engine)	RPM (Pump)	GPM (Bucket measurement)	Remarks
7/10/52									
5:15 p.m.	108		342	0					Began pumping
6:15	88.5	59	361.5	222	3.5	1050	1460		
7:15	88.5		361.5	"	3.5	"	"	216	
7:45	88.5		"	"	"	"	"		
8:20	"		"	"	"	"	"		
9:00	"		"	"	"	"	"		
10:00	88.0		362	"	"				
11:00	"		"	228	3-9/16	1100	1350		
12:00	88.5		361.5	"	"				
7/11/52									
4:20 a.m.	"		"	"	"	1050	1500		
7:15	"	60.5	"	"					
9:20	"	61.0	"	"	"	1100	1450		
12:45 p.m.	"	"	"	222	3-8/16	"	1500	250-300	
3:35		"							Decreased discharge
3:40	99	"	351	137	2-1/2			155	
4:45	99(-)	"	"	147	2-5/8	1030	1410		
4:55	98	"	352	"	"	"			
5:00	98(+)		"	"	"				
5:24				0		0	0		Pump off
5:24-2/3	114		336	"					
5:25	128		322	"					
5:25-1/2	124		326	"					
5:25-3/4	120		330	"					
5:26	116		334	"					
5:26-1/2	111		339	"					
5:26-3/4	108		342	"					
5:27	"		"	"					
5:29	"		"	"					

ODEBOLT WELL TEST

MP = Derrick Floor = 1' above ground level Bottom of air line = 450'

Time	Air line reading (ft.)	Temp. °F.	Water level (ft. below MP)	GPM	Weir height (inches)	RPM (Engine)	RPM (Pump)	GPM (Bucket measurement)	Remarks
7/10/52									
5:15 p.m.	108		342	0					Began pumping
6:15	88.5	59	361.5	222	3.5	1050	1460		
7:15	88.5		361.5	"	3.5	"	"	216	
7:45	88.5		"	"	"	"	"		
8:20	"		"	"	"	"	"		
9:00	"		"	"	"	"	"		
10:00	88.0		362	"	"				
11:00	"		"	228	3-9/16	1100	1350		
12:00	88.5		361.5	"	"				
7/11/52									
4:20 a.m.	"		"	"	"	1050	1500		
7:15	"	60.5	"	"					
9:20	"	61.0	"	"	"	1100	1450		
12:45 p.m.	"	"	"	222	3-8/16	"	1500	250-300	
3:35		"							Decreased discharge
3:40	99	"	351	137	2-1/2			155	
4:45	99(-)	"	"	147	2-5/8	1030	1410		
4:55	98	"	352	"	"	"			
5:00	98(+)		"	"	"				
5:24				0		0	0		Pump off
5:24-2/3	114		336	"					
5:25	128		322	"					
5:25-1/2	124		326	"					
5:25-3/4	120		330	"					
5:26	116		334	"					
5:26-1/2	111		339	"					
5:26-3/4	108		342	"					
5:27	"		"	"					
5:29	"		"	"					

9-236

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington _____
District _____

Odebolt Well Test

MP = Vertical
Flow = 1 above 6L

7-10-52		Air line: Reading (Ft.)	Temp °F.	Water level feet below MP	GPM	Weir Height (Inches) = (Feet)	RPM	Time = RPM (Decimal)	450'	GPM (Bucket Measurement)		Remarks
5:15		104		342	0							Began pumping
6:15		88.5	59°	342.5		3.5	1050	1460				
7:15		88.5		342.5		3.5	"			216		
7:45		88.5		342.5		1"						
8:20		88.5										
9:0		87.5										
10		88.0		362								
11		88.0		362	228	3 1/4	1100	1350				
2		88.0										
7/11/52		"		"								
4:20 am		"					1050	150				
7:15			60									
9:20			61				1100	1450				
12:45		"	"	"	222	3 8/16	1100	1500		30-300		
3:35			"									Discharge Decreased
3:40		99	"	351	37	2 1/2				155		
4:45		99-	"	351	147	2 5/8	1050	1410				
4:55		98		352								
5:00		98+		352	"	"						
5:24		—			0		0	0				Pump off
5:24 3/4		112		336								
5:25		128		322								
5:25 1/2		124		326								
5:25 3/4		120		330								
5:26		116		334								
5:26 1/2		111		339								
5:26 3/4		108		342								
5:27		108		342								
5:29		104		342								

U. S. GOVERNMENT PRINTING OFFICE 16—48721-1

Loc

To whom it May concern & file

Results (unofficial) on Odebolt pumping test of the St. Peter June 20, 1952

100 GPM
470 ppM Hardness (27 grains)
pH. 6
Phenolphthalein 0
Chlorine 0
Methyl Orange 180
temp 62°
Smell & taste OK according to the Mayor & the driller of Odebolt

Data obtained from Mayor A on June 23 1952 by C.F. Berkstresser

Date for final pumping test dependent on arrival of pump from Hampton Test.

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 087-38W-34ACCC
Aquifer Code(s) C35J Ø2MP
Owner's Name ODEBOLT CITY (1952)
W Number 05749

Card Q

State: IOWA (19) (1 2) County: SAC (81) (3 4) Town: ODEBOLT, IOWA

Well No. Latitude 42 18 18 N (5–11) Longitude 095 15 13 (12–18) Seq. No. 1 (19) Date M D Y 03 21 65 (20–25)

Sampling Depth 2200 (26–29) Type 1 (30) Kx10^6 2970 (31–35) pH 7.4 (36–38) Temp. °F 58 (39–41)

SiO_2 10. (42–44) Ca 300. (45–49) Mg 107. (50–53) Na 246. (54–58) K 28. (59–61)

HCO_3 274 (62–65) CO_3 0 (66 67) SO_4 1460. (68–72) Cl 29. (73–78) Source No. 3 Q (79 80)

Card R

Duplicate Columns 1-25 from Card Q

F 1.7 (26–28) NO_3 .4 (29–32) PO_4 . (33–35) B . (36–38) Al . (39–41) Fe .49 (42–45)

Mn .05 (46–49) Cu . (50–52) Pb . (53 54) Zn . (55–57)

Solids Determined 2570 (58–63) Calc. (64–69) Hardness Ca,Mg 1190 (70–73) Non-Carb. 965 (74–77)

Color (78 79) No. R (80)

Card S

Duplicate Columns 1-25 from Card Q

Br . (26–28) I . (29–31) Alk. as $CaCO_3$ 225 (32–35) Free CO_2 (36–38) SAR . (39–41)

RSC (42–44) ABS . (45–47) . (48–50)

Alpha (pc/l) (55–57) Beta (pc/l) (58–60) Ra (pc/l) . (61–63) U (ug/l) . (64–66)

No. S (80)

Recorded by: D. AARONSON

Punched by: T Date: V

Published:

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 087-38W-34ACCC
Aquifer Code(s) C355 ØZMP
Owner's Name ODEBOLT CITY (1952)
W Number 05749

Card Q

State: IOWA (19) County: SAC (81) Town: ODEBOLT, IOWA

Well No. Latitude 42 18 18 N (5–11) Longitude 095 15 13 (12–18) Seq. No. 1 (19) Date M D Y 01 06 62 (20–25)

Sampling Depth 2200 (26–29) Type 1 (30) Kx10^6 2050 (31–35) pH 7.2 (36–38) Temp. °F (39–41)

SiO_2 10. (42–44) Ca 210. (45–49) Mg 66. (50–53) Na 160. (54–58) K 33. (59–61)

HCO_3 274 (62–65) CO_3 0 (66–67) SO_4 887. (68–72) Cl 31. (73–78) Source No. 3 (79) Q (80)

Card R

Duplicate Columns 1-25 from Card Q

F 1.6 (26–28) NO_3 .4 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe 2.5 (42–45)

Mn .05 (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 1650 (58–63) Calc. (64–69) Ca,Mg 798 (70–73) Hardness Non-Carb. 573 (74–77)

Color (78–79) No. R (80)

Card S

Duplicate Columns 1-25 from Card Q

Br (26–28) I (29–31) Alk. as $CaCO_3$ 225 (32–35) Free CO_2 (36–38) SAR (39–41)

RSC (42–44) ABS (45–47) (48–50)

Alpha (pc/l) (55–57) Beta (pc/l) (58–60) Ra (pc/l) (61–63) U (ug/l) (64–66)

No. S (80)

Recorded by: D. AARONSON

Punched by: T Date: 1/1

Published:

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Local Well No. 087-38W-34ACCC
Aquifer Code(s) C3SJ Ø2MP
Owner's Name ODEBOLT CITY (1952)
W Number 05749

Water Quality
(ppm)

Card Q

State: IOWA [19] (1 2) County: SAC [81] (3 4) Town: ODEBOLT, IOWA

Well No. Latitude [4218180N] (5–11) Longitude [095151513] (12–18) Seq. No. [1] (19) Date M D Y [081957] (20–25)

Sampling Depth [2200] (26–29) Type [1] (30) Kx10^6 [2490] (31–35) pH [7.4] (36–38) Temp. °F [ ] (39–41)

SiO_2 [7.2] (42–44) Ca [272.] (45–49) Mg [93.] (50–53) Na [243.] (54–58) K [36.] (59–61)

HCO_3 [256] (62–65) CO_3 [0] (66–67) SO_4 [1340.] (68–72) Cl [33.] (73–78) Source No. [3] (79) [Q] (80)

Card R

Duplicate Columns 1-25 from Card Q

F [2.2] (26–28) NO_3 [.4] (29–32) PO_4 [ ] (33–35) B [ ] (36–38) Al [ ] (39–41) Fe [.84] (42–45)

Mn [.05] (46–49) Cu [ ] (50–52) Pb [ ] (53–54) Zn [ ] (55–57)

Solids Determined [2330] (58–63) Calc. [ ] (64–69) Hardness Ca,Mg [1060] (70–73) Non-Carb. [853] (74–77)

Color [ ] (78–79) No. [R] (80)

Card S

Duplicate Columns 1-25 from Card Q

Br [ ] (26–28) I [ ] (29–31) Alk. as $CaCO_3$ [210] (32–35) Free CO_2 [ ] (36–38) SAR [ ] (39–41)

RSC [ ] (42–44) ABS [ ] (45–47) [ ] (48–50) [ ]

Alpha (pc/l) [ ] (55–57) Beta (pc/l) [ ] (58–60) Ra (pc/l) [ ] (61–63) U (ug/l) [ ] (64–66)

No. [S] (80)

Recorded by: D. AARONSON

Punched by: T Date: 1/20

Published:

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 087-38W-34ACCC
Aquifer Code(s) C3SJ Ø2MP
Owner's Name ODEBOLT CITY (1952)
W Number 05749

Card Q

State: IOWA [19] (1-2) County: SAC [81] (3-4) Town: ODEBOLT, IOWA

Well No. Latitude [42 18 18 N] (5-11) Longitude [095 15 13] (12-18) Seq. No. [1] (19) Date M D Y [07 11 52] (20-25)

Sampling Depth [2200] (26-29) Type [1] (30) Kx10^6 [2340] (31-35) pH [7.6] (36-38) Temp. °F [61] (39-41)

SiO_2 [.] (42-44) Ca [283.] (45-49) Mg [94.] (50-53) Na [221.] (54-58) K [34.] (59-61)

Source No. [3] [Q] (79-80)

HCO_3 [237] (62-65) CO_3 [0] (66-67) SO_4 [1260.] (68-72) Cl [35.] (73-78)

Card R

Duplicate Columns 1-25 from Card Q

F [2.2] (26-28) NO_3 [0.] (29-32) PO_4 [.] (33-35) B [.] (36-38) Al [.] (39-41) Fe [.5] (42-45)

Mn [.04] (46-49) Cu [.] (50-52) Pb [ ] (53-54) Zn [.] (55-57)

Solids Determined [2160] (58-63) Calc. [ ] (64-69) Ca,Mg [1090] (70-73) Hardness Non-Carb. [900] (74-77)

Color [ ] (78-79) No. [R] (80)

Card S

Duplicate Columns 1-25 from Card Q

Br [.] (26-28) I [.] (29-31) Alk. as $CaCO_3$ [194] (32-35) Free CO_2 [ ] (36-38) SAR [.] (39-41)

RSC [ ] (42-44) ABS [.] (45-47) [.] (48-50) [ ] (51-54)

Alpha (pc/l) [ ] (55-57) Beta (pc/l) [ ] (58-60) Ra (pc/l) [.] (61-63) U (ug/l) [.] (64-66)

No. [S] (80)

Recorded by: D. AARONSON

Punched by: T Date: 10

Published:

087-38W-34 ACCC
ØMP

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

W-5749

Water Quality
(ppm)

Card Q

State: IOWA (16) County: SAC (81) Town: ODEBOLT

Well No. Latitude 421818N Longitude 0951513 Seq. No. 1 Date M 06 D 20 Y 52

Sampling Depth 2200 Type 1 Kx10^6 pH 7.3 Temp. °F 62

SiO_2 Ca 195 Mg 54 Na 126 K 33

HCO_3 300 CO_3 0 SO_4 704 Cl 35 Source No. 3 Q

Card R

Duplicate Columns 1-25 from Card Q

F 2.2 NO_3 0.0 PO_4 B Al Fe 4.4

Mn .03 Cu Pb Zn

Solids Determined 1360 Calc. Ca,Mg 710 Hardness Non-Carb. 464

Color No. R

Card S

Duplicate Columns 1-25 from Card Q

Br I Alk. as $CaCO_3$ 246 Free CO_2 SAR

RSC ABS

Alpha (pc/l) Beta (pc/l) Ra (pc/l) U (ug/l)

Verified PMJ No. 5

Recorded by: D. AARONSON

Punched FCH
Punched by: _____ Date: _____

Published: _____

Sac

August 17, 1951

Mr. X. P. Boyles
Public Health Engineer
State Department of Health
Fort Dodge, Iowa

Dear Mr. Boyles:

We are replying to your letter of August 14 concerning any information on ground-water conditions at Odebolt, Sac County, Iowa.

The only new information from this general area since our letter to you of September 1947 which we have is on a deep well drilled at Marcus in Cherokee County in 1948, and the deep Jefferson city well in Greene County, just completed. The pertinent data on these wells follows:

Marcus Town Well

Drilled by Layne-Western Company of Omaha, November 1947 to May 1948

Location: NE/c SW¼ SW¼ sec. 34, T. 93 N., R. 42 W., Cherokee County

Elevation: 1460' land surface

Total depth: 884' (reported)

Casing data: 616' of 12" pipe in 15" hole. 58'3" of 10" liner set at 657'. 101'11" of 8" liner set at 745'. 8" open hole to 880'. All pipe is wrought iron.

Production data: Static water level 290', pumping water level 298' at 233 gallons a minute. Principal source thought to be Maquoketa limestone at depth of 800'. Driller reports large crevices at approximately 800' which accounts for good yield. Well was completed in the Galena dolomite.

Water analysis shows the water to be extremely hard and high in sulfate.

Jefferson City Well

Drilled by Thorpe Well Company, October 26, 1950, to July 31, 1951

Location: NW¼ NW¼ SW¼ sec. 8, T. 83 N., R. 30 W., Greene County

Elevation: 1065'

Total depth: 2307'

Casing data: 260' of 12" casing from 0' to 260'; about 389' of 10" casing from 213' to 602'; about 1215' of 8" casing from 580 to 1795'. Lead seal between casings, but ineffective seal between 10 and 12" casings.

Production data: Original static water level reported to be 70' below land surface; pumping level 500'± at 135 gallons a minute. Well acidized with 1500 gallons of acid and yield increased to 300 gallons a minute with pumping level at about 500'. Pump setting is 510'. Well acidized a second time with 2000 gallons of acid but the yield increased little. Next the Jordan sandstones were shot. A pumping test showed that the St. Lawrence and Franconia formations below the Jordan will yield only about 10 gallons a minute. The principal source is Prairie du Chien dolomite and sandstone and the Jordan sandstone from 1795' to 2115'. The well was completed in the Franconia silty dolomite.

Water analysis shows this water to be hard and high in sulfate but of better quality than occurs in the Marcus town well.

A separate sheet of water analyses from these wells is appended to this report.

A letter from this office to Dr. Taylor, Mayor of Odebolt, on June 5, 1950, contained more detail than our letter to you in September 1947. You may wish to consult it.

We are interested in the water development program at Odebolt and shall be glad to assist the town in this matter in any way we can. If you have any questions on the foregoing data, please do not hesitate to contact us.

Very truly yours,

C. Richard Murray

Enclosure

CRM:PJH:emh

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

COUNTY _____

TOWN - Well No. Use - Location	Date of coll.	Depth (ft.)	Geol. source	°F.	Diss. solids	Fe	Mn	Ca	Mg	Na+K(as Na)	HCO_3	SO_4	Cl	F	NO_3	Hardness (calc. as $CaCO_3$) Tot.	Carb.	Non-carb.	pH	Micro-mhos at 25°C Cond.
Marcus town No. 2	3/29/51	884	Dev.-Maq-Gal.		1034	3.0	0	257	74	113	373	821	11	1.4	1.3	946	306	640	7.5	1750
Jefferson city (1951)	6/7/51	2308		63	1554	0*	0	147	61	247	261	783	104	2.4	0	618	214	404	7.5	1930
do	8/3/51	2308	PrduCb. Jordan				0.3	(Partial)					107			664	206	458	7.4	2064

NOTES: *filtered

Iowa
State Department of Health
DISTRICT HEALTH SERVICE
NO. 5
Fort Dodge, Iowa

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

IN REPLYING
ADDRESS
X. P. Boyles
Public Health Engineer

AUG 15 '51

August 14, 1951

H. G. Hershey, Director,
Iowa Geological Survey
Iowa City, Iowa

Dear Dr. Hershey:

Re: Deep well development at Odebolt

As a result of a call from I. Taylor, D.V.M., mayor of Odebolt, a location survey was conducted on two possible sites in the town for the development of a deep well.

The site chosen for development is at a point approximately 30 ft. south and 30 ft. east of the center of the elevated storage tower. Said tower being located in the west central portion of town and on about the highest elevation in the vicinity.

The Thorpe Well Co. moved onto the site August 9 and drilling is probably under way at this date.

As near as could be determined at the time, it is proposed to complete the well in the Drift area somewhere above the 415 ft. level.

In 1947 I had secured a forecast from you consisting of a copy of the forecast addressed to Buell & Winter consulting engineers, Sioux City. This forecast is being used as a guide on anticipated formations and included the "Geological Section, SW ¼, NE ¼, Sec. 34, T 87, N., R. 38 W." This section tabulates the various formation thicknesses. In the event any additional information is available since the above forecast was prepared, I would be pleased to have that information. If none is available, will use the existing information as a guide.

Thanks again for your assistance.

Very truly yours,

X. P. Boyles
Public Health Engineer

XPB:DES

cc: Div. of Public Health Engineering
State Dept. of Health

April 2, 1953

Mr. Lee Miller
Water Superintendent
Odebolt, Iowa

Dear Mr. Miller:

We have completed the examination of well cuttings from the Odebolt town well drilled by the Thorpe Well Company.

A copy of our geologic log is being sent under separate cover.

Very truly yours,

H. G. Hershey

HGH:emh

5/10/72

Paul:

subject: Odebolt Town Well
TD 2200'
Drilled 1952, Thorpe

Problem: water supply falling off. Layne Western has determined that the well has caved in and either filled in from TD to 700' or bridged from some intermediate depth and filled in to 700 feet. Layne Western has indicated reluctance to go back into the well and attempt to repair it. They had a similar problem at Rockwell City and they lost their tools. Rather, they suggest drilling a temporary well into Cretaceous and then construct a new Jordan well. The town clerk has asked for a statement from us as to concurrence with Layne Western or an alternate solution. Thorpe or Layne Western drilled a number of 500' depth tests in 1951 or 1952 before drilling the Jordan well, and supposedly not enough water was available. If these tests were only to 500' they probably bottomed in shale above a 50 foot interval of Ss as indicated on the Jordan log. Would you write a letter to the Council? I suggested that if a temporary well in

contructed, they drill as close to the present Gordon well as they can.

Maybe they could get any water from the "Dakota" so that a new Jordan well would be unnecessary - except for iron content, the quality of the Cret. water probably wouldn't be too much worse than the Jordan. What do you think?

Address letter to:

Louise Zignan
City Clerk
Odebolt, Iowa

Letter sent 5/15/72
cc: Charles Haas, Layne-Western Co., Omaha

PJ Horick

Dick: (Murray)

11/27/51

Maybe we ought to have someone check on Odebolt? I think Thorpe has this job.

Paul

Odeboldt (Sac)

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Chronicle
Odebolt, Iowa

JUN 12 1952

Odebolt's City Well Now Down 2000 Feet

Odebolt's deep well is now down to a depth of 2,000 feet. The drillers are penetrating a strata of limestone and feel encouraged that a supply of water will be reached to supply all needs of the water department.

A level of water has been struck which rises to a height of 365 feet but that is not deemed sufficient.

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Chronicle
Odebolt, Iowa

JUN 19 1952

Test Water in New Well

Odebolt's new well is at a depth of more than 2,000 feet and tests will be made the first of next week to estimate the amount of water now available. Samples of water will be sent to the state for chemical analysis to ascertain quality and content and if suitable for public use, according to Mayor I. Taylor.

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Chronicle
Odebolt, Iowa

NOV 22 1951

City Well Down 745 Feet

Odebolt's new city well has reached a depth of 745 feet, and has not yet reached the desirable limestone in which it is thought abundant quantity of water will be found.

A spokesman for the city council said it was the intention to continue until water is found in quantity desired. Jocularly speaking the spokesman pointed out that it would be wonderful if the project would develop into a No. 1 oil well.

Odebolt (Sac)

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Chronicle
Odebolt, Iowa

Shortage of 6-Inch Steel Pipe Delays Drilling Operation

Drilling of Odebolt's new town well has been halted temporarily because of a shortage of 6-inch steel pipe, a council spokesman said today.

Equipment of the Thorpe Well company, Des Moines, has been left at the site until work can be resumed. The 2-man crew who had been conducting the work have been transferred to another job until pipe for the Odebolt well is received.

A supply of the pipe is expected about April 1, it was reported.

"The delay is not the fault of Thorpe and company or the town," the councilman said.

The well now is down about 1,725 feet in the St. Peter's sand strata.

"The drilling has been going along smoothly and there are only a few hundred feet more to go to reach the Jordan where there is an abundant supply of water," the councilman asserted.

As the well is drilled, steel pipe or concrete is used to line the opening. Near the surface 10-inch steel pipe is being used; further down 8-inch pipe is being installed. The well has reached the depth now where 6-inch pipe is needed.

The Thorpe company is being paid by the foot, not by the job. The town is not obligated to the company for any re-drilling that has to be done.

"The only loss the town has incurred has been a loss of time in reaching water," the council spokesman said.

The cost of the operation is being paid for from profits from the municipal water system. When the job was started, there was a fund of some $12,000 available from the water department.

No additional taxes will be levied to pay for the well. The cost will be paid in a few years by net profits from operation of the water system, the councilman said.

Revenue bonds will be sold to pay the Thorpe company when the job is completed. These bonds will be retired by revenue from the water system.

"Present income is sufficient to retire the bonds in about four or five years," the councilman said.

Odebolt (Sac)

AUG 30 1951

Well Diggers Reach Depth of 300 Feet

Diggers for the town well had reached a depth of 300 feet Wednesday morning. They said that they expect to strike a sand area at approximately 320 feet. In this area they hope to hit a good supply of water.

With their present equipment, the diggers can go down about 20 feet per day.

IOWA PRESS CLIPPING BUREAU
Des Moines, Iowa

Chronicle
Odebolt, Iowa

SEP 27 1951

Well Drillers Reach Depth of 530 Feet Wednesday Morning

Workmen on the new town well reported Wednesday morning that they have reached a depth of approximately 530 feet. So far no good source of water has been discovered.

One of the men said that his company went to a depth of 3,000 feet at Nevada before a suitable water supply was struck.

When working in the area where the present digging is taking place a number of years ago, a strata of water was reached at about 600 feet.

IOWA PRESS CLIPPING BUREAU
Des Moines, Iowa

Chronicle
Odebolt, Iowa

OCT 11 1951

Well Drillers Hit Snag

Workmen on the new town well report that they are laboring with unexpected complications at present.

A six inch pipe is stuck and is holding up work temporarily. A 50 foot sandstone area was struck recently and this is a good indication that the well drillers are near a good water supply.

A depth of about 550 feet has been reached in operations thus far.

IOWA PRESS CLIPPING BUREAU
Des Moines, Iowa

Chronicle
Odebolt, Iowa

NOV 1 1951

Well Drilling Continues

Workers on the new town well have been forced to drill deeper. The vein of water they struck recently was not good enough to afford a good supply. Only about 35 gallons a minute could have been taken from it. The drillers reached a depth of about 590 feet the forepart of this week.

IOWA PRESS CLIPPING BUREAU
Des Moines, Iowa

Chronicle
Odebolt, Iowa

DEC 13 1951

Well Drilled to 1,315 Feet

Odebolt's new city well Wednesday had been drilled to a depth of 1,315 feet, still without reaching an abundant supply of water.

Operations were slowed up somewhat the past week when the crew from Thrope Well company, Des Moines, which is digging the well, had trouble with a bit.

Work on the well was begun last Aug. 15.

(Odebolt) Sac County

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Chronicle
Odebolt, Iowa

FEB 22 1951

Water Supply Low In Town at Present

The water supply in Odebolt is low, according to Leo Beck, water commissioner. He asks in a notice in this issue that residents be as conservative as possible in their use of water.

The old south well was pressed into use last week in order to keep the town supplied. Only as much water as is absolutely needed is being taken from the south well. All water is thoroughly chlorinated before being used, Beck said.

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Chronicle
Odebolt, Iowa

MAR 1 1951

Good News-- Ample Water Supply Here

Discovery of Leaks and Day-long Rain Helped Alleviate the Shortage

The water supply in Odebolt is more plentiful. There are reasons for the end of the shortage which hit the town last week.

An inch and one-quarter of rain which fell Sunday helped, as did the discovery of two leaks in the town water system. It was estimated that about 20,000 gallons of water were escaping from the leaks daily.

When that much is added to the 90,000 which is used on an average day in Odebolt, it can be understood why there was some shortage.

Fell At Right Time

The rain Sunday came at a good time. The frost was out of the ground enough to allow the water to sink in. The town tank was full Monday, the water committee reported.

One of the leaks discovered Saturday morning was in the Einspahr building where the water meter had frozen and burst. The other was in the connection leading into the Schmieding building.

Helping find the leaks were members of the Fort Dodge water department. These men had special instruments which could detect where the leaks were.

May Dig Well

A representative of the Thorpe Well company of Des Moines was also here Saturday to discuss Odebolt's lack of water. He will be back soon to test holes dug by his company about three years ago. If the tests prove favorable, it is believed that one or more wells will be dug this spring or summer.

The south wells are not being used anymore. To alleviate the shortage water was taken from them twice last week. All water from them was heavily chlorinated before being used.

AUG 16 1951

Drilling for New Well Begins Here

Believe Good Strata of Water Can Be Struck At About 300 Feet

Work began yesterday (Wednesday) on the digging of a town well on the lot on which the town water tower is located on Hanson boulevard.

According to findings made by the State Engineer, a good strata of water should be struck at a depth of about 300 feet. It is believed that the water will be soft enough for general use. In the event, however, that it should be too hard, the water could be used at least in emergency cases. It will take about a month to complete the work.

Sufficient Supply

The present town surface wells are a source of a sufficient supply of water except in extreme dry spells.

A number of years ago a well was dug in the locality where the present digging is going on. At that time a rich area of water was discovered at a depth of about 580 feet. The State Engineer thinks that a better source of water was bypassed at that time and an attempt is being made to strike it this time. As mentioned above, it is believed that they will hit this strata of water at 300 feeet.

The Thorpe Well company of Des Moines is in charge of the drilling operation. For the past several days, employees of the company have been getting their equipment lined up preparatory to beginning the actual digging operations.

WRD Exp. (CW)
Aug. 1964

U. S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

Record by D. AARONSON Source of data FILE Date 6/29/65 Map 1:63,360

State IOWA 16 County (or town) SAC

Latitude: 42 18 18 N Longitude: 095 15 13 Sequential number:

Lat-long accuracy: 2 T. 87 N S. R. 38 W Sec. 34, SW ¼, SW ¼, NE ¼ 5

Local well number: OB 73 W 34 a C C C Other number: W-5749 B&M

Local use: 05745 SCITY Owner or name: TOWN OF ODEBOLT

Owner or name: ODEBOLT IOWA Address: ODEBOLT, IOWA

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist M

Use of water: (A) Air cond, (C) Comm, (D) Dewatering, (F) Fire, (H) Dom, (I) Irr, (N) Ind, (P) P-S, (S) Stock, (T) Instit, (U) Unused P

Use of well: (A) Anode, (D) Drain, (G) Seismic, (O) Obs, (P) Oil-gas, (R) Recharge, (S) Spring, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed

DATA AVAILABLE: Well data 1 Freq. W/L meas.: INVENTORY C Field aquifer char.

Hyd. lab. data:

Qual. water data; type: COMPLETE

Freq. sampling: IRREGULAR I Pumpage inventory: yes / no, period:

Aperture cards: yes

Log data: GEOLOGIST LOG - DRILLER'S LOG G D

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 2200 ft 2200 Meas. (rept) accuracy

Depth cased: (first perf.) 1721 ft 1712 Casing type: STEEL ; Diam. 10 in 10

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. open gallery, (O) open end, (P) perf., screen, sd. pt., (S) shored, (T) grav. pack, (W) open hole, (X) other, (Z) other X

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other C

Date Drilled: JUNE 1952 952 Pump intake setting: ft

Driller: THORPE WELL CO. (name) DES MOINES, IOWA (address)

Lift (type): (A) air, bucket, cent, jet, (B) (C) (J) (L) multiple (cent.), (M) multiple, turb., (N) none, (P) piston, (R) rot., (S) submerg, turb, (T) (Z) other D Deep Shallow

Power (type): diesel, elec, gas, gasoline, hand, gas, wind; nat LPG H.P. Trans. or meter no.

Descrip. MP CURB 1 ft above below lsd, Alt. MP 1405

Alt. LSD: 1404 4 0 4 Accuracy: (source) ALT

Water Level 342 ft above below MP; Ft above below lsd 3 4 1 Accuracy: REPT. 6

Date meas: 7/10/52 7 5 2 Yield: 228 gpm 2 2 8 Method determined

Drawdown: 20 ft 2 0 Accuracy: REPT 6 Pumping period 24 hrs 2 4

QUALITY OF WATER DATA: Iron 9.4 ppm 6 Sulfate 704.3 ppm 8 Chloride 35 ppm 2 Hard. 710 ppm 6

Sp. Conduct K x 10⁵ Temp. 61.7 F 6 2 Date sampled 5/24/52 5 2

Taste, color, etc.

9-189
(Oct. 1939)

NOTEBOOK SHEET

Name Odebolt Date 7/10/52

1060 - 1145	Gray shaly limestone
1145 - 1240	Brown limestone
1240 - 1315	Dark greenish, some limy streaks
1315 - 1351	Limest., white
1351 - 1400	" , Lt. gray
1400 - 1600	" , " brown
1600 - 1650	" , gray
1650 - 1662	Dark green shale (Decorah - Platteville)
1662 - 1670	Lt. Brown lime
1670 - 1697	Dk. Green Shale
1697 - 1755	Sandstone - St. Peter
1755 - 1858	Brown limest. - Willow River
1858 - 1872	Wh. Sand st. - Root Valley
1872 - 1895	Brown limest. - Oneota
1895 - 1952	Gray ls.
1952 - 2025	Sandstone - Jordan
2025	Brown Lime

To,	from	
16"	16 - 17	1' Temp.
13"	62	62 - 0 Temp
10"	468'	467 +1 perm.
8"	Liner	1721 462 (Not perfed)

U. S. GOVERNMENT PRINTING OFFICE 16—12465-1

Odeboldt, Iowa

Cleaning out old well - acidizing + surging

Oct. 23 - WL. 13.05' below top casing

Much fn od in well

Well in Park - 30' to blue clay - yellow sandy clay
Oct. 22 - 13' to water

2 drls. May 8 -
West side -

H.G. Iverson - Mayor
J. Kahl -
Chris. Sonksen - councilman
Don Mullen - Attny
Martin - Bankie
Bryant - Dentist
McAllister - Dr.

Well Number 42 18 18 N 095 15 13
d m s S d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: CENTRAL LOWLAND 12 Section: WESTERN LAKES B

Drainage Basin: LITTLE SIOUX 316C Subbasin:

Topo of well site: (D) local depression, (F) flat surface, (H) hilltop, (S) hillside, (T) terrace, (V) valley flat,

MAJOR AQUIFER: CAMBRIAN system, UPPER series, C3, JORDAN SANDST. aquifer, formation, group, SJ

Lithology: COARSE SS. 4V Origin: MARINE 6 Aquifer Thickness: 75 ft

175 Length of well open to: 75 ft 175 Depth to top of: ft A95

MINOR AQUIFER: ORDOVICIAN system, MIDDLE series, 02, ST. PETER SS, aquifer, formation, group, MP

Lithology: MEDIUM SANDST 3V Origin: MARINE 6 Aquifer Thickness: 58 ft

158 Length of well open to: 34 ft 334 Depth to top of: 1697 ft A70

Intervals Screened: NONE

Depth to consolidated rock: 390 ft 390 Source of data: WELL CUTTINGS C

Depth to basement: ft Source of data:

Surficial material: SANDY TILL BT Infiltration characteristics: POOR 4

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft²; Spec cap: 11.4 gpm/ft; Number of geologic cards:

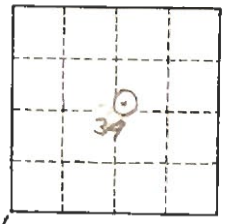
CASING:

16' OF 16" TEMP. PIPE 1' TO 17'

62' OF 13" PIPE 0-62'

468' OF 10" PERM. PIPE +1 TO 467'

8" LINER - NOT PERF. 462'-172'



GPO 844 225

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves Patented. FORM 422057

WE. Hole

Test holes at Odebolt, Iowa

Thorpe Well Company – Mr. Walker, driller
October, 1941

Test hole #1 Location:
SWL -7'

0-8' - clay, brown cdy hard
8-20 - S&G. brown RUNNING
20-28 - clay + sand
28-35 - clay, blue

Test hole #2 Location:
SWL -7'

0-3 diet blk
3-5 clay, brn
5-9 sand, fine
9-16 gravel
16-30 clay blue
30-55 clay, blue

Test hole #3 Location:
No water

0-4 soil, blk
4-15 clay yell
15-24 clay blue + sand brown
24-25 sand, fine
25-35 clay, blue
35-36 clay - oil shows in mud

Test hole #4 Location:
No water

0-3 soil dark brown
3-12 clay yell + boulders
12-30 clay blue
30-37 shale dark (clay)

Test hole 5 along road
Test hole 4 along road 3' below bridge floor
" " 3 " " 3' above bridge floor
" " 2 " " 5' " " "
" " 1 " " 10' " " "

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves Patented. FORM 422057

John C. Moore Corporation. Rochester, N. Y. Binder and holes in leaves Patented. FORM 42[illegible]57

MOORE'S MODERN METHODS

Test holes at Odebolt. (5)

Thorpe Well Company - Mr. Walker, dlr. W. E. Hale

October 1947

Test hole #5 Location:

No water

0'-2' soil, brn

2'-16' clay, yellow & rocks

16'-35' clay, blue

35-30' clay dk shaley

Test hole #6 Location:

SWL 6'

0'-10' clay & top soil

10'-12' sd fine running

12'-13' gravel cemented

13-25 clay, blue

No. 4 -

No. 5 - 9' yellow clay

9-18' blue clay