IOWA GEOLOGICAL SURVEY W-0462

In Cooperation with U. S. Geological Survey

RECORD OF WELL

Location:

Town: WAUKEE (N E / S W): County DALLAS E.

SE/c - NW - NW sec. 33 T 79 N., R. 26 W. Walnut Twp.

Well name and number Waukee Town Well #1 (1936) Old - church property

Owner _____ Address _____

Tenant _____ Address _____

Contractor McCutcheon Well Co. Address _____

Drillers _____

Drilling dates Oct. 1936 - March 1937

Well data:

Elevations: Drilling curb 1040 feet; Land surface _____ feet

Determined by _____

Topographic position plain

Total depth: Reported 808 feet, Measured _____ feet

Drilling method _____

Hole and casing data 8" casing from +2' to 91'

6" casing from 44' to 399' (perforated ½" holes 335 - 355')

5 3/16" casing from 380 to 585'

4" casing from 570 to 808' (perforated ½" holes 770-800')

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

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

Sources of water: Principal Mississippian 580-790; Others Pennsylvanian 335-55

Production data: Date Dec. 24, 1936

Static depth to water 151'2" Measuring point

Pumping level 369 at 18 g.p.m.

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

Pump data: Type pump Column Dia. Length

Cylinder or bowls: Dia. Length Suction pipe

Power Airline

Estimated rate of production: 18 g.p.m. for 10 hrs. a day

Use of water city supply

WATER ANALYSES (in parts per million)

Date samples	Dec 24, 1936	Jan. 12, 1937	Jan. 22, 1940	
Sampled by	A.C. Tester	E.G. Fiala	E.G. Fiala	
Total solids	2298.0	2746.0	2159	
Insoluble matter	55.0	42.0	12.0	
Alkalinity (Meo)	448.0	470.0	390.0	
Alkalinity (Phn)	0.0	0.0	0.0	
pH	7.3	7.7	7.5	
$Fe_2O_3 + Mn_2O_3 + Al_2O_3$	97.0	10.0	7.0	
Alkali as sodium	620.8	540.9	528.7	
Calcium	65.7	55.0	117.9	
Magnesium	17.7	21.6	33.6	
Iron (unfiltered)	50.0	10.0	1.5	
Manganese	0.20	0.06	trace	
Nitrate	0.89	0.00	0.00	
Fluoride	3.5	3.3	4.0	
Chloride	120.0	110.0	108.0	
Sulfate	977.9	816.0	1039.2	
Bicarbonate	546.6	573.4	475.8	
Hardness (ppm)	327.0	244.0	435	
Hardness (gpg)	19.1	14.9	25.5	

Remarks

Laboratory data: Sample storage location

Sample range 30 - 795 No. spls. 152 No. dupls. & cond. 99 p.to f.

Spls. prepared by Washed range by

Driller's log and cond. Yes

Insoluble residues: Prepared by Studied by Strip log

Microscopic study 30-795 Gulf & Carrier strip log Gulf & Carrier

Gen. log Correl. by " " "

IOWA EMERGENCY RELIEF ADMINISTRATION
Geological Division S-E6-1085

Geological Outline Report on Water Resources at Waukee, Iowa

I Introduction

Location - Section 33, Walnut Township (T79N, R26W), Dallas County.

Population - 400

Roads & Railroads - U. S. paved highway 6, graveled county roads; C. M. St. P. & P. RR, M. & St. L. RR.

Important water consumers - no large consumers.

Industries - no large enterprizes within town limits; Shuler Coal Company mine 2 miles east and ½ mile north of town.

Town officials - Mayor: Mr. E. Davis; Health Official: Dr. T. E. Jones.

II Present Water Supply -- no municipal system; nearly all families have private wells which average 50 feet in depth.

Local Wells

(1) Well at Skelly filling station.

Depth - 50 feet

Curb elevation - 1040 feet A.T., reference point rail at Milwaukee depot 1043.

Static level - 25 feet below curb normal, but falls notably in dry weather.

Casing - 12-inch tile, bored well with concrete top.

Log - no accurate data. Approximately as follows: soil 0 to 3 feet, sandy, oxidized till 3 to 12 feet, calcareous till 12 to 48 feet, sand containing water 48 feet plus.

(2) Town well in triangular area center of business district. All characteristics similar to well No. 1.

(3) Well at Waukee Consolidated School near southeast corner of town. Student enrollment 400.

Depth - 136 feet (approximate). Original depth reported to be 460 feet. It was drilled in 1921 by Thorpe Well Co., who left no log record with school officials.

Curb elevation - 1040 feet A.T. in pit; elevation of school grounds 1045 feet.

Static level - 60 feet below curb, reported by janitor.

Log - no exact log available locally. Water is reported to come from a sand and gravel formation beneath till at 120 to 130 feet.

Pump - single-action, 4-inch cylinder, driven by 7 hp. electric motor; bottom at 110 feet. Normal pumping rate 25 gpm.

Casing - 8-inch .

Tank - pressure type, 1500 gallons capacity which is piped to showers, lavatories, and toilets in two buildings.

Water samples - last submitted to State Water Laboratory in spring term 1935.

School officials - Pres. of Board Dr. T. E. Jones, Supt. Mr. Hartman.

3

(4) Test well for town water supply, drilled in northwest corner of town in 1934 by Myron Hayes of Dallas Center.

Near NE cor Sec. 32 T79N R26W (Walnut Twp) 50ft. South of South edge of right of way US. No 6 ← 50 yards west of railroad junction

Lithology	From (feet)	To
1. Soil	0	2
2. Yellow drift (oxidized till)	2	12
3. Gray drift (gray till)	12	32
4. Black mud (dark silt)	32	35
5. White drift (calcareous till)	35	57
6. Yellow drift (oxidized zone)	57	80
7. Brown drift (oxidized zone)	80	97
8. Gray drift	97	100
9. Black drift	100	112
——bedrock surface——		
10. Brown limestone	112	113
11. White shale	113	116
12. Gray & light shale with limestone bands	116	156
13. Sandstone with water	156	160
14. Sandstone, gray, dry	160	170
15. Shale	170	171

At this point drilling was discontinued and the water from sandstone stratum 13 tested by pumping. With 3¼ inch casing in the well it produced 5 gpm. Testing was discontinued, and the well is now in private use.

Curb elevation - 1042 feet A.T. Static Level 25' (?)

III Deep wells in the region but beyond town limits.

(1) Well at Thompson farm 4 miles east and 1½ miles north of Waukee. SW¼, Sec 19, Webster Township (T79N, R25W), Polk County.

Curb elevation - 895 feet A.T.

Lithology	From (feet)	To
1. Soil	0	4
2. Yellow drift (oxidized till)	4	14
3. Gray drift (calcareous till)	14	33
4. Sand, little water	33	44
5. Gray drift (calcareous till)	44	68
6. Muddy sand, wood	68	76
7. Gravel & sand with much water	76	84
8. Shale, light gray	84	85

4

Casing - 3¼ inch steel from 0 to 80 feet; Johnson screen from 80 to 84 feet (2-inch diameter).

Static level & drawdown - static level 30 feet below curb; drawdown 30 to 60 feet below curb at 15 gpm.

Driller - Myron Hayes of Dallas Center.

(2) Well at Hollywood Club, 5 miles east and 1½ miles south of Waukee, SW¼, SW¼, Sec 6, T78N, R25W, Polk County.

Lithology	From (feet)	To
1. Soil	0	2
2. Yellow drift (oxidized till)	2	18
3. Blue drift (calcareous till)	18	36
4. Gray drift (" ")	36	52
5. Gravel	52	52'6"
6. Yellow drift (oxidized till)	52'6"	90
7. Gray drift (calcareous till)	90	112
——————bedrock surface——————		
8. Gray shale (top of Pennsylvanian)	112	168
9. Sandy shale with hard bands	168	275
10. White, sandy shale	275	292
11. Sandstone, some water	292	299
12. Black shale (possible coal zone)	299	310
13. Sandy shale	310	316
14. Sandstone	316	318
15. Shale (some limestone & sandstone).	318	363
16. Sandy shale with sandstone bands	363	370
17. Black & gray shale	370	384
18. White shale	384	390
19. Gray shale	390	416
20. Sandstone	416	419
21. Shale, with hard sandstone bands	419	473
22. Limestone	473	482
23. Sandstone & shale interbedded	482	492
24. Sandy limestone, some water	492	526
25. Shale, sandstone beds	526	531
26. Sandstone	531	537
27. Shale & sandstone bands	537	542
28. Sandstone, brown, water	542	555
29. Shale, gray	555	560.

Curb elevation - 885 feet A.T. (approximate). Well is in concrete pit 7 feet below surface. Electric motor with 2-inch cylinder pump supplies pressure tank.

Static level - reported 10 feet below curb; no appreciable drawdown, water always ample. Many farmers hauled water

from here last summer.

IV Water Resources at Shuler Coal Mine, 2 miles E of Waukee, in SW¼ Sec 23, Walnut Township (T79N, R26W), Dallas County.

Producing stratum - a 5-foot bed of coal 387 feet below the surface. Active mining continuing at present.- Curb Elev. 1002'

Roof stratum over coal - black, slaty shale.

Drift thickness - approximately 75 feet.

Water in workings - very little, not enough to interfere with operations. About 1000 gallons per day accumulate in sump at bottom of the shaft according to Mr. Johnson, engineer.

Log of formations - not available at the mine. An extensive test drilling program has been carried out in an area of about 20 square miles around the mine. Logs, charts, and elevation data are available at the Des Moines office of the Company, 706 Surety Building.

V Geological Statement

The region surrounding Waukee is a relatively level surface of the Wisconsin till plain. The nearest definite drainage lines are the valley of Little Walnut Creek 1 miles north, and that of Sugar Creek 1 mile south of town. Drainage from the area flows generally southeastward to join the Raccoon and Des Moines system. The maximum relief in section 33 around Waukee is approximately 25 feet.

The present topography is that of the almost uneroded surface of the Wisconsin drift. The soil zone is from 2 to 4 feet thick; the underlying oxidized zone extends to a depth of about 15 feet, and grades into unaltered till. In some

localities bodies of sand and gravel may occur on the surface or at any depth within the till. The total drift thickness at and near Waukee may be 75 feet, minimum, or up to 120 feet maximum. Some evidence for the existence of an older drift formation beneath the Wisconsin is suggested by strata 5 to 8 in the log of the test well at the northwest corner of town. Without examination of samples this suggestion cannot be confirmed.

In most localities, in and near the town, sufficient water for domestic use can be obtained within 50 feet from the surface in sand and gravel. The present data indicates the sub-till sand and gravel zone to be unreliable. It supplies adequate water in the school well, but was missing entirely in the test well.

Beneath the till formations occurs the Des Moines Series which is predominantly shale. It contains interbedded sandstones, limestones, and coals which are worked extensively in eastern Dallas County and in Polk County. Aquifers within it are few and unreliable, but some water can be obtained from several of the sandstone strata, especially near the bottom of the Des Moines Series. The quality of water at any certain spot is unpredictable, and is apt to be characterized by very high sulfate and carbonate content. In exploring further for a municipal water supply, test holes to the sub-till sand and gravel should be drilled in various parts of town. Deeper aquifers of sufficient quantity should not be expected at less than 500 feet below surface.

VI Special Problems

The predominance of shallow bored wells in the closely settled community suggest the possibility of surface contamination in nearly any well. At least 3 wells in town, of this type, have been condemned because of such contamination. A municipal water supply and properly constructed water system to be used by practically all residences would undoubtedly contribute greatly to the health of the community.

Respectfully submitted

V. H. Jones

V. H. Jones, Field Geologist
Adel, Iowa, June 8, 1935

Dallas

July 6, 1953

Mr. F. S. McCutcheon
McCutcheon Well Company
8303 Douglas Avenue
Des Moines 13, Iowa

Dear Frank:

In reply to your letter of July 1, 1953, in regard to construction details, pumping records, and mineral analysis of the Waukee Town Well the following data have been obtained from our files:

Construction Record:
8" steel casing from +2 ft. to 91 ft.
6" from 44 ft. to 399 ft, perforated with $\frac{1}{2}$" holes from 335 to 355 ft.
5 3/16" from 380 to 585 ft.
4" from 570 to 808 ft., perforated with $\frac{1}{2}$" holes from 770 to 800 ft.

The information on pumping tests is very meager. There is a partial record, as follows:

March 3, 1937
8:35 - 25 gpm
10:00 - 20 gpm
12:00 - 18 gpm

March 4, 1937
8:40 - 20 gpm
9:30 - 20 gpm
12:00 - 18.3 gpm
3:00 - 18.2 gpm

Apparently no water levels were measured during this test, or at least we do not have a record of any that may have been made.

The only static water level measurement we have is one which was obtained December 24, 1936. This measurement is 151'2" below top of casing.

There is a record on the log of a discharge rate of 18 gpm with a drawdown of 213 ft. I do not know the source of this informationbut assume it was obtained at the time of the test.

On a separate sheet is the water analysis report. This is the latest analysis of which we have a record. As you will see the water quality is not too good. Objectionable amounts of sulphate, flouride, and total solids are present in the water.

I hope this information will be of value to you. If we can be of further service to you, please let us know.

Very truly yours,

C. Richard Murray

CRM:JBC:t
Enclosure

September 17, 1934

Memorandum to: E. S. Boudinot

Re: Waukee Water Resources

The Town of Waukee lies on a nearly level plain made by Wisconsin glacial drift. This drift rests upon the eroded surface of the Kansan drift. Together the drift sheets are 100 to 150 feet thick. Below the glacial drift occurs the indurated rock of Pennsylvanian age, which includes some water-bearing sandstones.

Water is now being produced from three zones at Waukee or in the near vicinity.

1. The common supply for the private small well in Waukee is obtained from a fine silty clay zone in the Wisconsin drift at depths ranging from 50 to 65 feet. This water is being exhausted by the present drought conditions and usually has considerable iron in mechanical suspension. It is reported by citizens that wells of slightly different depths of this range show different water properties. However, this water source should not be considered for development as a town source as the quantity would not stand heavy withdrawal and the quality will be unsatisfactory to most users.

2. Several wells in the immediate vicinity of Waukee produce water from a zone which lies approximately 130 to 140 feet below the 1035 feet elevation of Waukee. As the elevation increases, the depth to this water zone increases and vice versa. It appears that this sand (called locally a 'black sand') is lenticular in character and lies at or near the base of the Kansan glacial drift. It may be an old valley fill. The Lux, Mullen and consolidated school wells all produce water from this zone and their positions suggest very strongly that the old channel passes under the Town of Waukee.

3. The third water source occurs in the Pennsylvanian sands which may be found by deep drilling as shown at Redfield, and southeast of Waukee, and in Waukee at the Consolidated school. The school well was cleaned four months ago and found to be more or less clogged below 140 feet in the hole; it was stated by Mr. Hartman (Supt. of school) that the casing is perforated at 130 to 135 feet and that most of the water is being obtained from that level.

   The Pennsylvanian water can be expected at depths from 200 feet to 600 feet depending on the stratigraphic position of the sand found to have the most water. However, such water may be mineralized and contain high quantities of iron and sulphates.

   Samples of water for complete chemical analysis were taken from the following wells: (1) the consolidated school well (487 feet deep but said to be producing from 135 feet) (2) the Christian Church well, a dug well producing from 50 feet, the shallow zone, (3) the city well in triangular park, 55 feet deep and also from shallow zone, (4) the Lux well, 135 feet deep, located ¾ mile west of town and producing from the basal drift zone.

   Samples for bacteriological analysis were taken from the Christian

Church and town wells as described above.

Recommendations

For development of water final recommendations should not be made until the results of the chemical analysis are available for study and comparison. However, provided the quality of the water is satisfactory, there is little question but that an ample supply of water is available at Waukee at the 130 - 135 foot depth. The proposed location on the Jones lot will be favorable for this well. There is little need to drill a test well before developing the final 12 inch well, but of course, no change would be taken if the information is obtained from a 4 inch test well before the larger well is drilled. A more complete statement will be made concerning the type of well to be constructed when the analysis have been studied.

A. C. TESTER
Assistant State Geologist