WRD Exp. (GW)
April 1966

Well No. 080-16W-16BC

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD

Record by D. AARONSON Source of data FILE Date 1/27/67 Map 1:63,360 COUNTY HWY.

State IOWA [16] County (or town) POWESHIEK [79]

Latitude: 41 43 0 N Longitude: 092 43 30 Sequential number: 1

Lat-long accuracy: 3 T 80 N S, R 16 E Sec 16, ___ ¼, SW ¼, NW ¼ 5

Local well number: 080 16W 16BC Other number: B & M W-6931

Local use: 06931 55CITY Owner or name: GRINNELL CITY WELL #7

Owner or name: GRINNELL IOWA Address: GRINNELL, IA.

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, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Mod, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (W) Repressure, (X) Recharge, (Y) Desal-P S, (Z) Desal-other, Other ___ [P]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. [W]

DATA AVAILABLE: Well data [3] Freq. W/L meas.: INVENTORY [0] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: COMPLETE [C]

Freq. sampling: INTERMITTENT (8/30/55) [I] Pumpage inventory: yes / no, period: [ ]

Aperture cards: yes [ ]

Log data: GEOLOGIST LOG [G]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 2550 ft [2550] Meas. rept accuracy DRILLER'S LOG [3]

Depth cased; (first perf.) 2190 ft [2190] Casing type: STEEL; Diam. 19 in [19]

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

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: OCT 1955 [955] Pump intake setting: ___ ft [ ]

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

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

Power (type): diesel, (elec) nat gas, gasoline, hand, LP gas, wind; H.P. ___ [5] Trans. or meter no. ___

Descrip. MP LSD ft above / below LSD, Alt. MP 1011

Alt. LSD: 1011 [1011] Accuracy: (source) ALTIMETER [7]

Water Level 298 ft above / (below) MP; Ft (above) / below LSD [298] Accuracy: DRILLER'S LOG [D]

Date meas: JAN. 1960 [1960] Yield: 875 gpm [875] Method determined [ ]

Drawdown: 174 ft [174] Accuracy: ___ [3] Pumping period ___ hrs [ ]

QUALITY OF WATER DATA: Iron 0.58 ppm [4] Sulfate 258 ppm [7] Chloride 21 ppm [1] Hard. 362 ppm [7]

Sp. Conduct 990 K x 10^6 [8] Temp. 75 °F [75] Date sampled 1/22/60 [160]

Taste, color, etc. ___

Punched ERC

Verified FCH

Well No. 080-16W-16BC

Well No. 080-16W-16BC

Latitude-longitude 41 , 44, 30 (N) (S) 092, 43, 30.1
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD [1] Physiographic Province: CENTRAL LOWLAND [20-21: 12] Section: DISSECTED

TILL PLAIN [22: E] Drainage Basin: IOWA [23-25: 2SD] Subbasin: [26]

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (Φ) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat — FLAT [27: F]

MAJOR AQUIFER: CAMBRIAN (system), UPPER (series) [28-29: C3] JORDAN SS. (aquifer, formation, group) [30-31: SJ]

Lithology: COARSE SANDSTONE [32-33: 4V] Origin: MARINE [34: 6] Aquifer Thickness: 54 ft

[35-37: 54] Length of well open to: 54 ft [38-40: 54] Depth to top of: 2192 ft [41-43: B19]

MINOR AQUIFER: CAMBRIAN (system), UPPER (series) [44-45: C3] ST. LAWRENCE (aquifer, formation, group) [46-47: SS]

Lithology: FINE DOLOMITE [48-49: 2D] Origin: MARINE [50: 6] Aquifer Thickness: 262 ft

[51-53: 262] Length of well open to: 262 ft [54-56: 262] Depth to top of: 2246 ft [57-59: B25]

Intervals Screened: NONE

Depth to consolidated rock: 233 ft [60-63: 233] Source of data: WELL CUTTINGS [64: C]

Depth to basement: 2955 ft [65-68: 2955] Source of data: DRILLER'S LOG [69: D]

Surficial material: [70-71] Infiltration characteristics: POOR [72: 4]

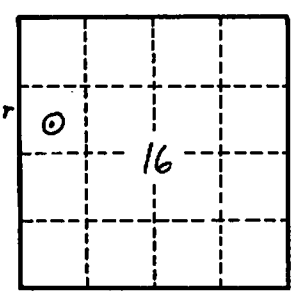
Coefficient Trans: gpd/ft [73-75] Coefficient Storage: [76-78]

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards: [79]

CASING:

700' OF 13" CASING (CEMENTED) 0-700 FT
1325' OF 12" LINER (CEMENTED) 675'-2000 FT
710' OF 10" LINER 1975'-2685'

WELL WAS 2970 FT DEEP — PLUGGED BACK TO 2550 FT.

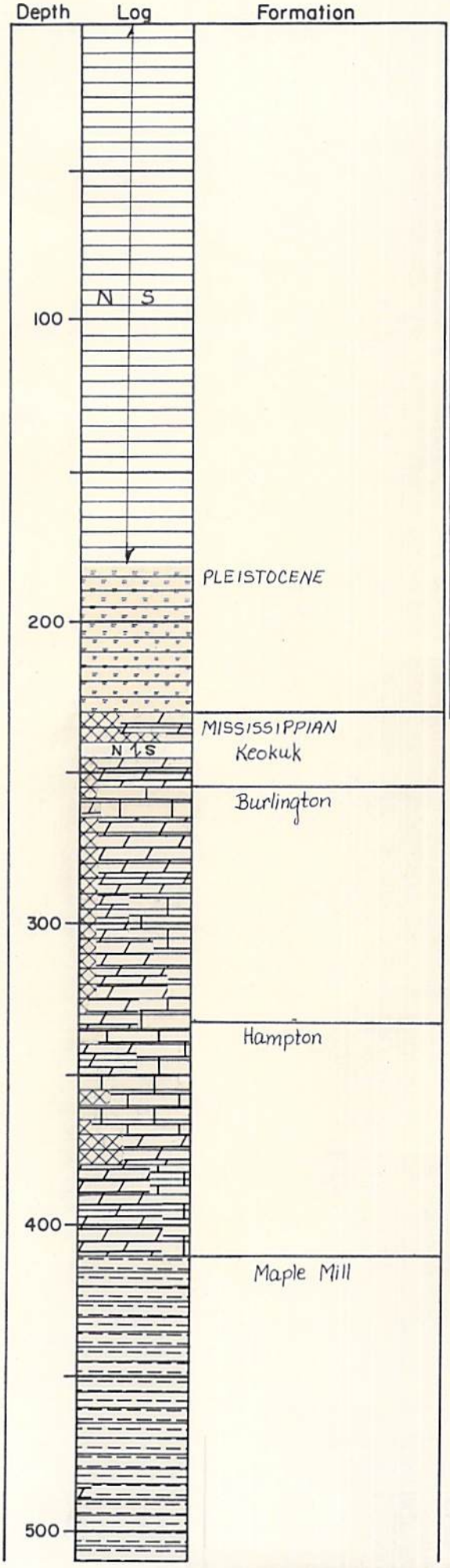


SWL @ 825' DEPTH WAS 425 FT
SWL @ 880' DEPTH WAS 370 FT
SWL @ 950' DEPTH WAS 429 FT.
SWL @ 2970' DEPTH WAS 304.7 FT.

Well No. 080-16W-16BC

GPO 857-700

GEN. DATA

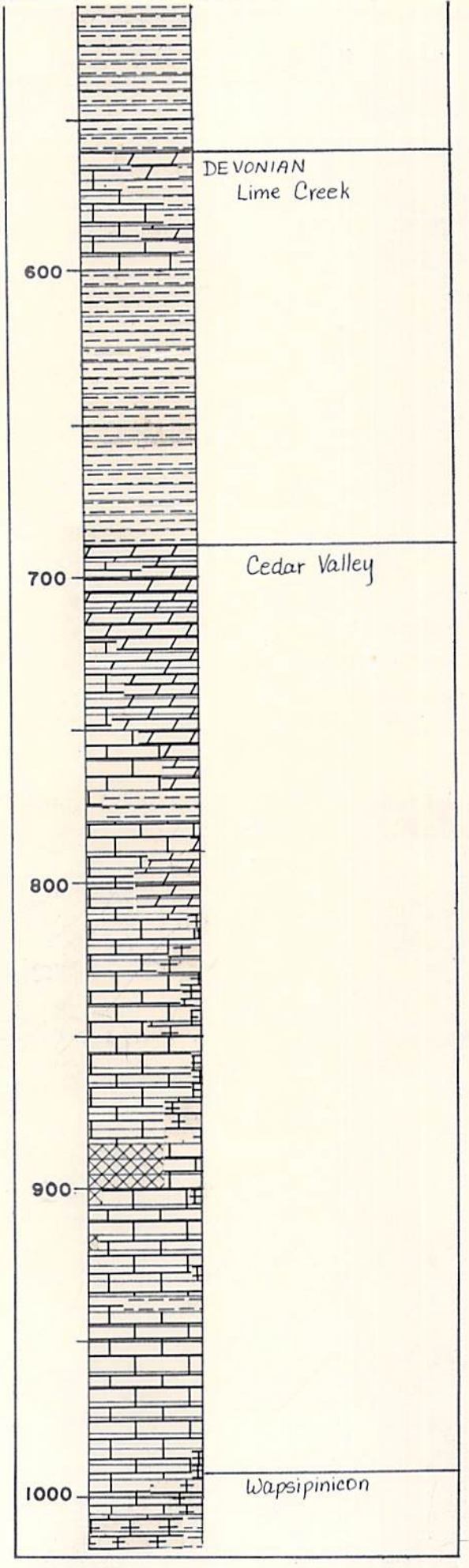


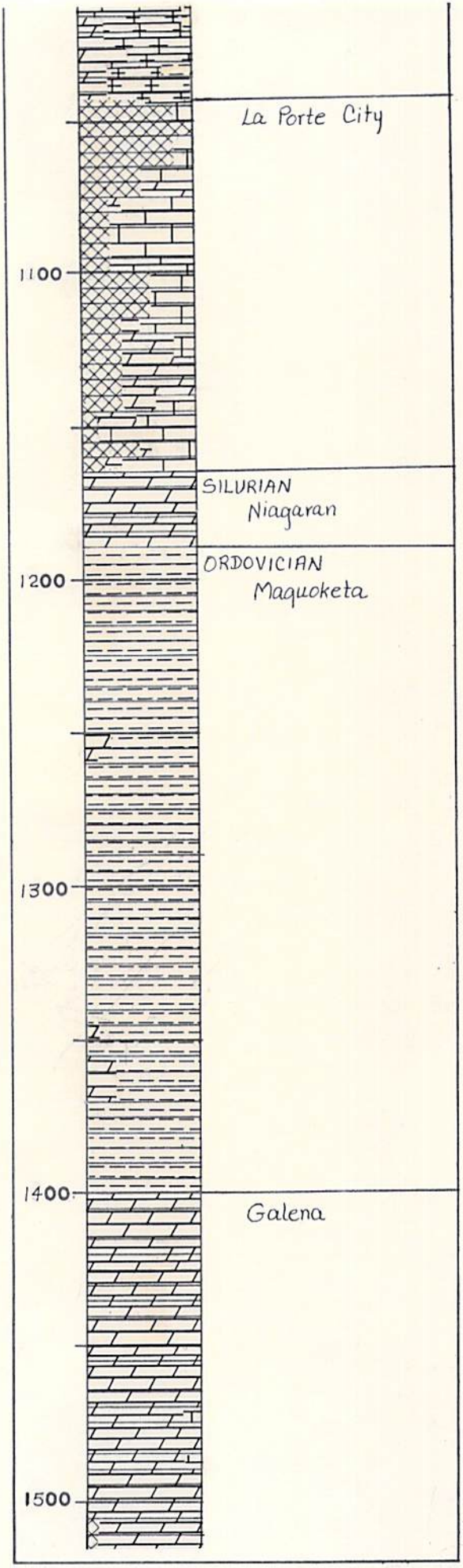
IOWA GEOLOGICAL SURVEY
In Cooperation with
U. S. GEOLOGICAL SURVEY
Iowa City, Iowa

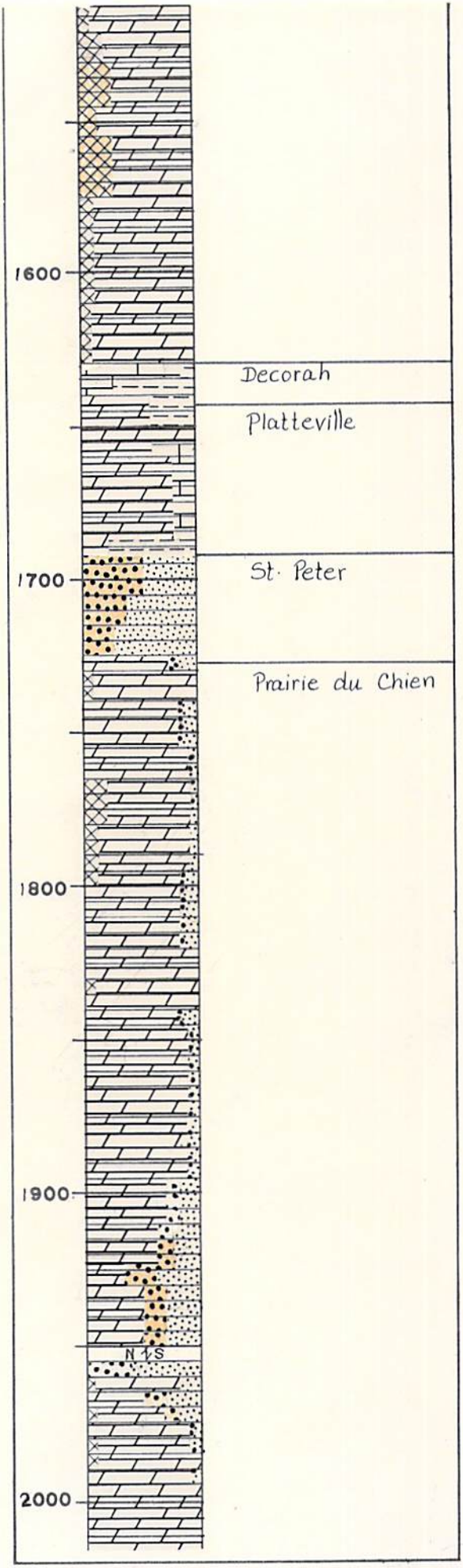
Name *Grinnell City Well #7*	State *Iowa*
Town *Grinnell* County *Poweshiek*	Loc. *SW NW*
Contractor *Thorpe Well Co.* Driller	Sec. *16*
Drilling Dates *Sept. 1954 - Nov. 1955*	T. *80* N., R. *16* W.
Casing Record *700' of 13" casing 0-700' (cemented in)*	
1325' of 12" liner 675-2000' (cemented in)	
710' of 10" liner 1975-2685'	
well plugged back to 2550' and perforated opposite Jordan and St. Lawrence	
S.W.L. G.P.M. D.D.	
Remarks	Elev. *1011'*
	T.D. *2970'*
Logged By *Northup Dec. 1954 - Nov. 1955*	I.G.S. No. *W-6931*

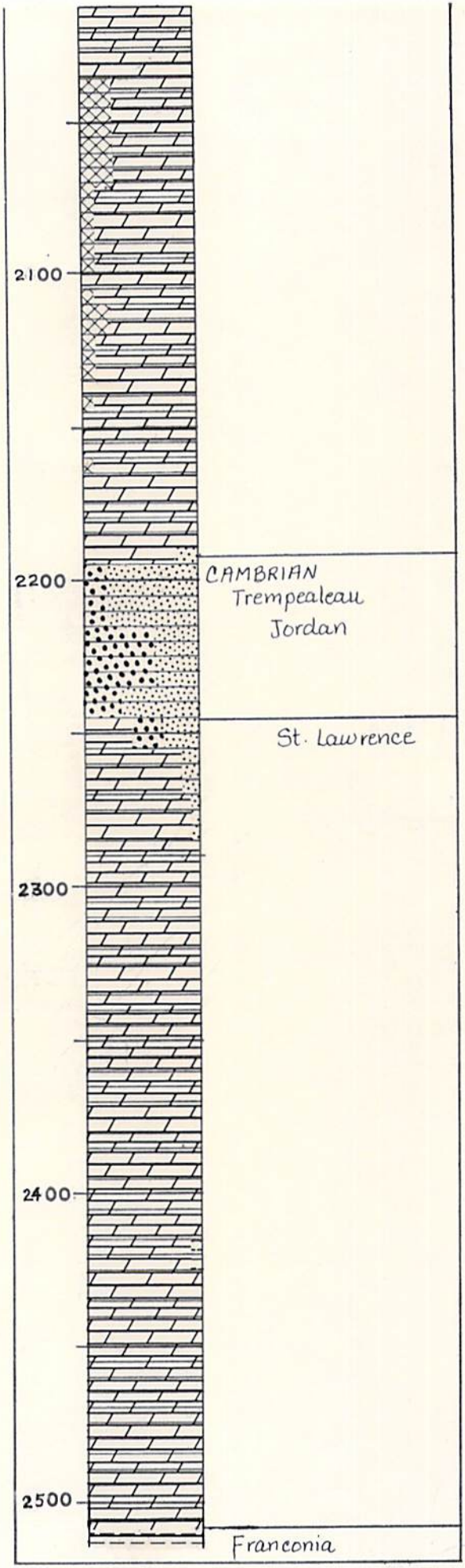
Explanation of Colors

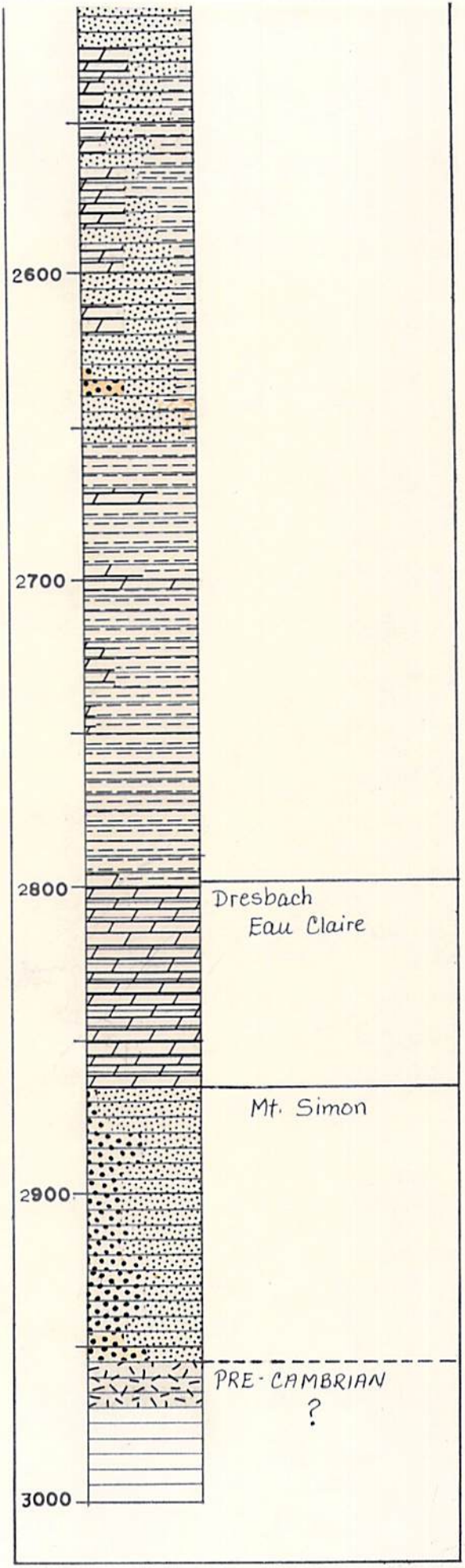
- Soil
- Loess, Silt on Siltstone
- Drift
- Sand & Gravel
- Shale
- Sandstone
- Limestone
- Dolomite
- Chert
- Gypsum or Anhydrite
- N & S No Samples


DEVONIAN
Lime Creek
600
Cedar Valley
700
800
900
1000
Wapsipinicon

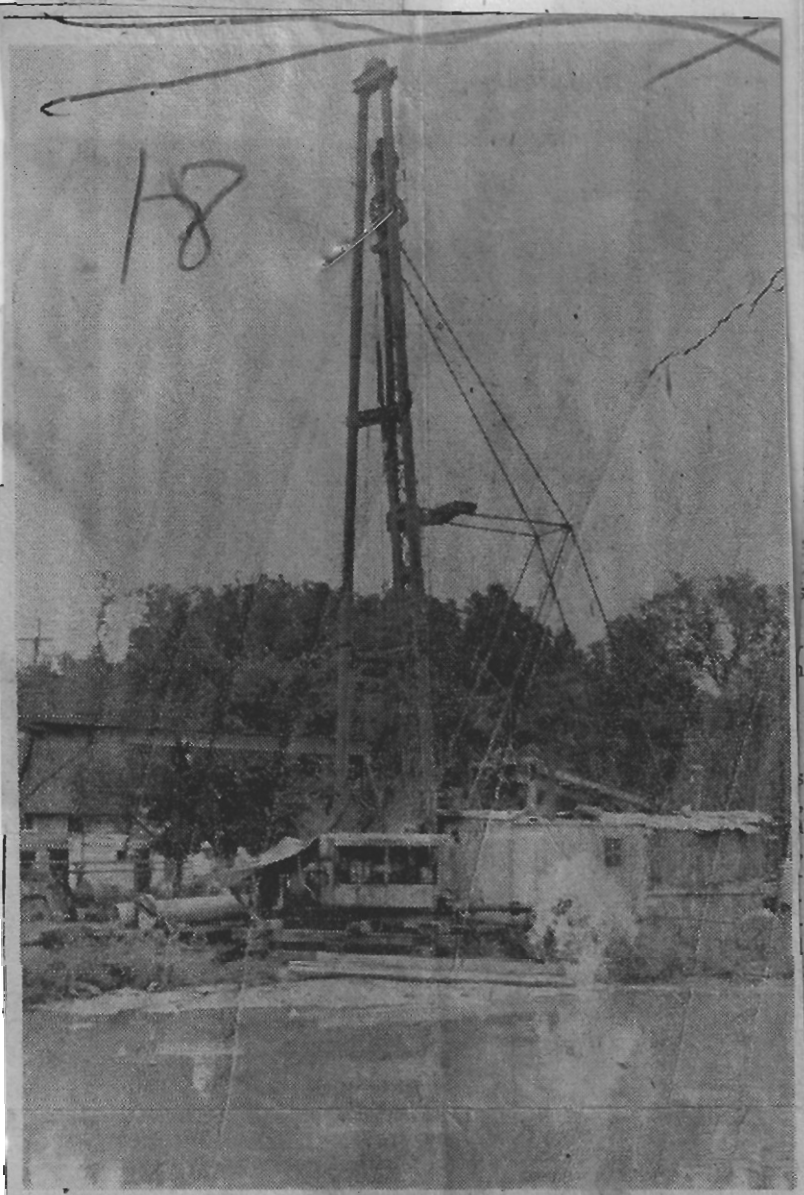

La Porte City
1100
SILURIAN
Niagaran
ORDOVICIAN
Maquoketa
1200
1300
1400
Galena
1500


1600
1700
1800
1900
2000
Decorah
Platteville
St. Peter
Prairie du Chien
N
S


2100
2200
2300
2400
2500
CAMBRIAN
Trempealeau
Jordan
St. Lawrence
Franconia


2600
2700
2800
2900
3000
Dresbach
Eau Claire
Mt. Simon
PRE-CAMBRIAN
?

18



GRINNELL'S NEW DEEP WELL is nearing completion with indications that it will meet the city's water needs for generations to come. Drilling has been finished to the contract depth of 2700 feet with a 12-inch hole. Output in test pumping (shown above) has reached 925 gallons per minute. The city has decided to drill down from 75 to 150 feet deeper with the aim of further production and less draw-down by reaching a new vein. Putting a 10-inch hole on down will not damage the well and is expected to increase capacity. Thorpe Well Co. of Des Moines is the contractor.

Council To Investigate New Deep Well Here; Consider No. 5 Well Conversion

Tom and Phil Thorpe, representatives of Thorpe Well Company, Des Moines, strongly urged council members to convert the city's No. 5 well from an oil lubricated shaft to a water lubricated shaft.

Repair and maintenance, both from the cost and time angles, were given as the reason for the suggestion by the well men.

Cite Sales, Service

The Thorpes cited sales of 100 "water" lubricated units for every "oil" lubricated pump sold. Since spare parts are stocked in similar ratios, there is often a long waiting period for repair parts for "oil" lubricated shafts, as evidenced by the long wait here in conjunction with the No. 5 well repair this summer.

Estimated cost of converting the No. 5 well, including an extension of 20 feet to get further down into the well supply, was placed at $5000. Use of stainless steel shafting would up the cost by $1800, although this move was recommended by the Thorpes.

Lose Oil

Another point mentioned by the well company representives was that "oil" lubricated pumps often lose their oil, which drops down into the well. This process could get into the filtering sand, causing heavy costs for sand replacement.

Councilmen decided to hold a special meeting the latter part of this week to take action on the conversion proposal.

Councilmen moved unamiously to initiate investigating action with regard to securing a new city water well.

The motion approved by the council was to have city engineer, Don Ferguson and George Clifton, head of the water committee, draw up plans and specifications for a new deep well.

George Clifton, mayor protem, presided at the meeting in the absence of Mayor Tom Godfrey.

Estimated Cost

Tom and Phil Thorpe of the Thorpe Well Company, Des Moines, estimated the cost of the new well and pump at approximately $100,000. They said that the new well would produce from 800 to 1000 gallons per minute and would require about one year to complete.

In discussions on the new well, the Thorpes stated that the static water level in the city's present wells has dropped some 23 feet since 1941, in a steady drop of some two feet per year.

Financing the well construction would probaly be thru the issuance of revenue bonds and paid from earnings of the water department.

Approval

It was pointed out that the state board of health must give their okay to both plans and proposed sites.

The Thorpes told of well drilling jobs held by the company and cited several possible types of wells to be drilled.

SEP 8 1955

group.

Continued Drilling Is Authorized

City Expects To Go Additional 150 Feet To Hit New Water Level

Thorpe Well Company has been authorized to renew drilling at the Grinnell No. 7 well at least through the Dolemite strata, when the issue will again be reviewed by city officials.

By all indications, the city will authorize drilling up to 150 feet on the supposition that a much larger water vein will be hit in that distance.

10-Inch Hole

Mayor Tom Godfrey said that drilling will resume with a 10-inch hole to be drilled through the present strata. If necessary additional soils tests will be taken to determine whether deeper drilling will be beneficial.

An earlier test indicated that Grinnell could hit a large water strata within another 75 to 150 feet. Water at that level, the report said, should be abundant and much softer than that hit at the 2500 foot level.

Supply Sufficient

Even so, the present supply is sufficient and meets requirements expected of the new well. Tests produced more than 1,000 gallons per minute from the new well.

But while the new well is producing 1000 gallons a minute, water Superintendent Bernie Matherly has noticed a slight drop in production from other city wells connected to the same vein.

Drillers ran into some trouble this past week when a unit became lodged in the 12-inch pipe, but have been successful in removing the piece of equipment.

November 24, 1953

Mr. C. W. Durham
Henningson, Durham & Richardson, Inc.
2962 Harney Street
Omaha 2, Nebraska

Dear Mr. Durham:

We are replying to your letter of November 17 requesting information on the city water supply at Grinnell, Iowa, and pertinent comments relative to the construction of an additional deep well. The available data from the files of the cooperative investigations of the Iowa and U. S. Geological Surveys are summarized as follows:

The Grinnell city water supply is derived from two deep wells No. 5 and No. 6, 2260 and 2498 feet deep respectively, located at the city water pumping station at Second and Main Streets. Wells 1, 2, 3, and 4 have all been abandoned. Well 4, a 2000-foot hole, was plugged up about three years ago to decrease the possibility of contamination of the deep aquifers. The following geologic section was encountered in the drilling of Well 6. All depth figures are referred to the altitude of the well curb 1020 feet above sea level.

Formation and description	Thickness (ft.)	Depth (ft.) From	Depth (ft.) To
Pleistocene			
No samples (pebbly clay with sand at base	200	0	200
Mississippian system			
St. Louis limestone (sandy limestone)	30	200	230
Keokuk formation (cherty dolomite)	68	230	298
Burlington limestone	42	298	340
Hampton formation (cherty dolomite and limestone)	50	340	390
English River siltstone	30	390	420
Maple Mill shale	130	420	550

Devonian system			
Lime Creek formation			
Shaly dolomite	40	550	590
Shale	90	590	680
Cedar Valley formation			
Limestone	80	680	760
Dolomite with gypsum	170	760	930
Dolomite	50	930	980
Wapsipinicon formation			
Dolomite and gypsum	50	980	1030
Cherty limestone	120	1030	1150
Silurian system			
Undifferentiated cherty dolomite	40	1150	1190
Ordovician system			
Maquoketa shale (shale with dolomite in lower part)	240	1190	1430
Galena dolomite (cherty in lower part)	190	1430	1620
Decorah-Platteville formations (shale and limestone)	80	1620	1700
St. Peter sandstone	30	1700	1730
Prairie du Chien formation (dolomite with sand zone 1870-1970 feet)	460	1730	2190
Cambrian system			
Jordan sandstone	60	2190	2250
St. Lawrence dolomite	100	2250	2350
Franconia formation (siltstone and silty dolomite)		2350	2500 T.D.

The casing records of these wells indicate that City Well 5 is cased from surface into the top of the Prairie du Chien formation, whereas, in Well 6 the St. Peter sandstone is left uncased. The Jordan sandstone is the main aquifer in these wells. Well 6 has been tested at 650 and 375 gallons a minute with drawdowns of 90 and 35 feet respectively, and Well 5 at 357 gallons a minute with a drawdown of 46 feet. These tests, however, probably represent only short periods of pumping. The water level in the deep city wells was initially about 250 feet below the surface, but was 270 feet below in 1942 indicating that the constant pumping of these wells has reduced the local pressure head of the Jordan aquifer. To prevent excessive interference a new deep well should be located a considerable distance from Wells 5 and 6.

Mineral analyses of water samples from City Wells 5 and 6 are given on a separate sheet. Note that Well 5 seems to be less mineralized than Well 6. The reason for the increase in mineralization in Well 6 for the sample collected in 1952 is not known, but it may represent a mixture of shallow and deep waters.

The shallower aquifers in this general area contain rather highly mineralized waters. Therefore, a new deep well at Grinnell should be cased at least as far as the top of the St. Peter sandstone and seemingly the quality would be improved by casing a considerable distance into the Prairie du Chien dolomite or as far as the top of the Jordan sandstone.

We hope this report will assist you in your work. If we can supply further data in this regard, please let me know.

Very truly yours,

Not advised during drilling of well No. 8

H. G. Hershey

HGH:PJH:t
Enclosure

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

TOWN - Well No. / Use - Location	Date of coll.	Depth (ft.)	Geol. source	°F.	Diss. solids	Fe	Mn	Ca	Mg	K/Na Na+K (as Na)	HCO_3	SO_4	Cl	F	NO_3	Hardness (calc. as $CaCO_3$) Tot.	Carb.	Non-carb.	pH	Cond.
Grinnell City Well No. 5	6/16/34	2006	Jordan Pr. du ch.		794	2	.0	74	39	117	356	277	22	1.0	.89	345	292	53	7.7	
" "	8/30/40	"	"	71	714	.3	.0	84	37	89	359	261	19	1.9	.0	362	294	68	7.7	
" "	6/16/42	"	"	75	774	.4	.0	133	40	32	356	256	17	1.0	.4	497	292	205	7.3	
" "	8/20/52	"	"		787	.2	0	100	39	21/110	347	325	22	1.6	.62	410	284	126	6.9	
Grinnell City Well No. 6	8/2734	2498	"		908	1.4	.06	92	42	137	354	365	24	1.5	.0	404	290	114	7.5	
" "	3/13/37	"	"	74	814	1.2	.02	107	34	117	344	328	26	1.0	1.3	407	282	125	7.4	
" "	8/30/40	"	"	75	829	.3	.0	92	36	122	356	344	25	2	.0	378	292	86	7.2	
" "	8/20/52	"	"		1659	1.0	0	171	50	23/269	322	892	55	1.6	0	633	264	369	6.9	

NOTES:

REGISTERED ENGINEERS

C. W. DURHAM
W. A. RICHARDSON
W. L. BREDAR
W. S. HANSEN
V. L. HILL
J. Z. JIZBA
A. E. LAWSON
E. F. MANGIAMELI
F. J. MATTHIES
G. E. MILLER
R. L. REINS
V. V. SEARS
D. R. STUART
F. A. TOWL
W. R. WARNE

TELEPHONE
JACKSON 2164

HENNINGSON, DURHAM & RICHARDSON, INC.

CONSULTING ENGINEERS

FORMERLY HENNINGSON ENGINEERING CO.

2962 HARNEY STREET

OMAHA 2, NEBR.

ASSISTANT ENGINEERS

B. F. BANDUR
W. H. CAVNER
B. J. CHRISTENSEN
B. E. DANIELS
G. R. EICHENBERGER
J. J. FORMAN
P. R. OMBRUNI
B. H. PLOWGIAN
R. A. ROHLING
D. G. SCHOLER
R. V. SOUTHWORTH
W. V. TIETSORT
J. T. TAMAI
J. T. WHITESIDE, JR.
K. H. WICKERSHAM

J. J. FORMAN, ATTY.

November 17, 1953

Dr. H. G. Hershey
State Geologist
Iowa City, Iowa

Re: Water Supply - Grinnell, Iowa

Dear Dr. Hershey:

Our firm has been requested by the Grinnell City Council to assemble some preliminary information relative to the construction of another deep well.

We would appreciate it if you would send us information which you have relative to the Grinnell water supply and any thoughts you might have in connection with this matter.

We would appreciate your prompt attention to this matter inasmuch as we have promised them an early report.

Very truly yours,

HENNINGSON, DURHAM & RICHARDSON

By C. W. Durham

CWDurham/ER

Grinnell (Poweshiek)

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Herald Register
Grinnell, Iowa

JAN 18 1954

Council Eyes Water Rate Change To Finance Deep Well Construction

Possible revamping of the city water department financial structure to make way for construction of a new deep well was given preliminary consideration at Monday night's city council meeting.

Figures in the annual municipal financial report disclosed that the department under the present rates is not making sufficient profit to finance revenue bonds and interest for the well project.

Increase Offset

Continuing increases in costs of upkeep materials were cited as more than offsetting additional revenue gained from the last re-adjustment in water rates. Another change in fees may be in the offing.

Mayor Tom Godfrey requested Councilman George Clifton, chairman of the water committee, to confer with City Engineer Don Ferguson and Bernie Matherly, water superintendent, and prepare specific recommendations for presentation at the next council session.

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Herald Register
Grinnell, Iowa

MAY 13 1954

Bids Sought For Drilling Deep Well

To Be Opened June 14; Specifications Call For Depth of 2700 Ft.

Bids for drilling of the new deep well will be opened June 14 at 7:30 p. m., according to action taken at a special meeting of the Grinnell city council Monday night.

Specifications call for a well 2700 feet deep to be located at the northeast corner of the old reservoir site on West street between First and Second avenues. Work is to be started within 30 days after the contract is let and the project is to be completed by Dec. 31, 1955.

Diameters Given

According to City Engineer Don Ferguson, who prepared the plans and "specs", the well will have a 26-inch diameter opening at the top, a 12-inch diameter from 700 to 2000 feet in depth and a 10 to 12-inch hole to the bottom.

The legal notice on the well, appearing elsewhere in this issue, outlines the work to be done and gives all requirements.

Councilmen also entered into a contract with the Carleton D. Beh Co. of Des Moines for financing and bond service in connection with the proposed waterworks improvement (deep well.)

Other City Business

Ferguson was directed by the council to draw up a contract with the Robison Brothers for demolishing and leveling the old concrete reservoir. The Robison bid was for $975.

A new half-ton Ford pickup was purchased from Pulis-Johnson Motor Co. for the sewage disposal department. The Ford bid was $1095 plus the old truck. Four other Grinnell automotive agencies submitted bids.

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Herald Register
Grinnell, Iowa

MAY 17 1954

Grinnell (Poweshiek)

COUNCIL PROCEEDINGS

NOTICE TO BIDDERS

Notice of Public Hearing on Proposed Plans and Specifications and proposed Form of Contract for the construction of Improvements and Extensions to the Municipal Waterworks of the City of Grinnell, Iowa, and of taking of bids for such improvements and extensions.

Notice is Hereby Given that the City Council of the City of Grinnell, Poweshiek County, Iowa, will meet at the City Hall, in the Council Chamber, Grinnell, Iowa, on the 14 day of June, 1954, at 7:30 o'clock P. M., at which time and place or at such later time and place as the Council may then fix, said Council proposes to adopt plans and specifications and form of contract and to receive bids for the construction of improvements and extensions to the municipal waterworks of said City and to enter into a contract for the construction of said improvements and extensions. Said proposed improvements and extensions are in general as follows:

... Drilled Well. Construct a deep well, drilled, approximately twenty-seven hundred (2,700) feet in depth including necessary drilling, casing, cement grouting, developing and testing.

Section B. Deep Well Turbine Pump. Furnish and install a deep well turbine pump including the necessary electrical and control equipment.

Section C. Electrical and Watermain Connections. Make necessary electrical and watermain connections.

All work, material and equipment is to be in accordance with the plans and specifications and proposed form of contract now on file in the office of the City Clerk of Grinnell, Iowa, by this reference made a part hereof as though fully set out and incorporated herein. Bids must include payment by the contractor of any use or sales tax upon the materials furnished.

At the said time and place said Council will also consider bids for the furnishing of water for the use of said City and it is estimated that the needs of the City will require approximately 250,000,000 gallons per year.

All proposals and bids in connection therewith shall be submitted to the City Clerk of said City on or before the time herein set for said hearing. All proposals shall be made on official bidding blanks furnished by the City and any alterations in the official form of proposal will entitle the Council, at its option, to reject the proposals involved from consideration. Each proposal shall be sealed and plainly identified.

Each proposal shall be accompanied in a separate envelope by a certified check in an amount equal to ten per cent (10%) of the total amount of the bid, drawn on and certified by a bank in Iowa, payable to the Treasurer of the City of Grinnell, Iowa, as security that if awarded the contract by resolution of the City Council, the bidder will enter into a contract at the prices bid and will furnish the required corporate surety bond. This certified check may be cashed and the proceeds retained by the City of Grinnell, Iowa, as agreed liquidated damages if the bidder fails to execute a contract or file an acceptable bond for the faithful performance thereof, within ten (10) days after the acceptance of his proposal by resolution of the City Council.

At said hearing the City Council will consider the plans and specifications and proposed form of contract for the project, the same now being on file in the office of the city Clerk, reference to which is made for a more detailed and complete description of the proposed improvements, and at said time and place the said Council will also receive and consider any objections to said plans, specifications and form of contract made by any interested party.

Payment for said improvements and extensions will be made in cash or in revenue obligations which said revenue obligations will be payable solely and only out of the net earnings of said municipal waterworks. The City shall not incur any general obligations for said improvements and neither the contract for the construction of said improvements and extensions nor said revenue obligations shall constitute a general obligation of the City or be payable in any manner by taxation and under no circumstances shall the City be in any manner liable by reason of the failure of said net earnings to be sufficient for the payment of said revenue obligations and the interest thereon.

Payment to the contractor will be based on monthly estimates equivalent to eighty-five per cent (85%) of the contract value of the work completed during the preceding calender month. Estimates will be prepared on the first day of each month by the contractor, subject to the approval of the Engineer, who will certify to the City for payment, each approved estimate on or before the tenth (10th) day of the month in question. Final payment of the remaining fifteen per cent (15%) will be made thirty (30) days after completion and acceptance by resolution of the City Council of the completed contract, assuming that no unpaid claims then remain on file in accordance with the provisions and conditions of Chapter 573, of the Code of Iowa, 1950, as amended. No such partial or final payment will be due until the Contractor has certified to the City Clerk that the materials, labor and service, involved in each estimate have been paid for in accordance with the requirements stated in the specifications.

The successful bidder shall furnish a performance bond in an amount equal to 100% of the contract price, which bond shall also guarantee the completed work against defects of workmanship or materials for a period of one (1) year from and after completion and acceptance by the City Council.

The work shall be commenced within 20 days after the award of contract and shall be completed on or before the 31 day of Dec. 1955, subject to any extensions of time which may be granted by the City Council.

The City reserves the right to award contract at the time of said meeting or at such later time as may then be fixed and to reject any or all bids, and to enter into such contract or contracts it shall deem to be for the best interest of said City.

These improvements are being constructed pursuant to authority granted the municipality under the provisions of Chapter 397 of the Code of Iowa, 1950.

By virtue of statutory authority preference will be given to products and provisions grown and coal produced within the State of Iowa, and to Iowa domestic labor.

Proposed plans and specifications and form of contract are now on file in the office of the City Clerk of Grinnell, Iowa. Copies may be obtained from D. W. Ferguson, City Engineer, of Grinnell, Iowa, upon a deposit of $25.00 for one set, all of which will be refunded to bona fide bidders who bid in their own name provided plans and specifications are returned in good condition within fifteen days after the award of contract. The full amount of the deposit will be returned to all other parties provided plans and specifications are returned in good condition within five days after date of hearing. No refund will be made for plans and specifications not returned within these periods. Additional sets or partial sets of plans and specifications will be furnished by the Engineer when requested at cost of reproduction which will not be refunded.

This Notice is given by order of the Council of the City of Grinnell, Iowa.

Tom Godfrey Mayor

Attest: Elmer B. Lowrey
City Clerk

May 13-20

Section A. Drilled Well. Construct a deep well, drilled, approximately twenty-seven hundred (2,700) feet in depth including necessary drilling, casing, cement grouting, developing and testing.

Section B. Deep Well Turbine Pump. Furnish and install a deep well turbine pump including the necessary electrical and control equipment.

Section C. Electrical and Watermain Connections. Make necessary electrical and watermain connections.

All work, material and equipment is to be in accordance with the plans and specifications and proposed form of contract now on file in the office of the City Clerk of Grinnell, Iowa, by this reference made a part hereof as though fully set out and incorporated herein. Bids must include payment by the contractor of any use or sales tax upon the materials furnished.

At the said time and place said Council will also consider bids for the furnishing of water for the use of said City and it is estimated that the needs of the City will require approximately 250,000,000 gallons per year.

All proposals and bids in connection therewith shall be submitted to the City Clerk of said City on or before the time herein set for said hearing. All proposals shall be made on official bidding blanks furnished by the City and any alterations in the official form of proposal will entitle the Council, at its option, to reject the proposals involved from consideration. Each proposal shall be sealed and plainly identified.

Each proposal shall be accompanied in a separate envelope by a certified check in an amount equal to ten per cent (10%) of the total amount of the bid, drawn on and certified to by a bank in Iowa, payable to the Treasurer of the City of Grinnell, Iowa, as security that if awarded the contract by resolution of the City Council, the bidder will enter into a contract at the prices bid and will furnish the required corporate surety bond. This certified check may be cashed and the proceeds retained by the City of Grinnell, Iowa, as agreed liquidated damages if the bidder fails to execute a contract or file an acceptable bond for the faithful performance thereof within ten (10) days after the acceptance of his proposal by resolution of the City Council.

At said hearing the City Council will consider the plans and specifications and proposed form of contract for the project, the same now being on file in the office of the city Clerk, reference to which is made for a more detailed and complete description of the proposed improvements, and at said time and place the said Council will also receive and consider any objections to said plans, specifications and form of contract made by any interested party.

City Council to Decide on 'Liner' For No. 5 Well at Meeting Tonight

6/14/54
Grinnell
(Poweshiek)

Contracts for Grinnell's new 2,700-foot No. 7 well will be let at the meeting of the city council tonight (Monday), and a decision is expected at the same meeting concerning the future of the "on-again-off-again" No. 5 well.

Trouble with the city's 2,260-foot No. 5 well started some weeks ago when production slacked off from a normal output of 620 gallons a minute to about 200 gallons within the space of 24 hours.

Output Drops

"Bailing out" of the well at that time restored the output to near normal, but the water yield dropped again sharply last week to about half of normal.

It was then that the city council voted to conduct an extensive test of the well to determine what if anything was wrong with it, and what if anything could be done to restore the water yield permanently to its normal flow.

Consequently, the Schlumberger Well Surveying company of Houston, Texas, was contacted and sent a crew of specialists to Grinnell to examine the faulty well Friday.

Engineer Reports

At a council meeting Friday evening, Bill Beazley, the electrical engineer in charge of the testing crew, gave the council the following report:

The crew ran three separate tests on the well. First test consisted of a continuous record of temperature changes of the water in the well by lowering a "thermometer" to the bottom.

Second check consisted of an "electrical log" of the various strata of rock through which the well passed. This was accomplished by means of a device which sent out electrical impulses, and recording the amount of resistance encountered as the instrument gradually was lowered to the bottom. Generally speaking, high resistance indicates solid material, while low resistance would show softer strata.

Record Width

Thirdly, the crew lowered a "calibration" instrument which recorded the exact width of the well from top to bottom.

Results of the tests, which cost $981.28, showed conclusively that the metal lining of the well, which reaches down to the 1,741-foot level, is not broken or cracked, and that the "open" hole below the metal lining has not been seriously clogged.

A LONG WAY DOWN—A technician for the Schlumberger Well Surveying company guides an electronic instrument on the first few feet of its 2,260-foot journey down to the bottom of Grinnell's No. 5 well. The instrument determined the type of rock through which the well was drilled.

No Obstruction

It is possible, according to the engineer, that a minor obstruction might have been removed by the lowering of the instruments without being recorded, but no major obstructions were encountered.

At Monday's meeting, the council will decide whether or not to install a further metal liner all the way to the bottom of the well.

Since this part of the liner would go through the water-bearing strata, it would have to be perforated to permit water to enter the well. However, it would probably prevent any further clogging of the well.

Grinnell (Poweshiek)

Herald Register
Grinnell, Iowa

JUN 17 1954

Contract Let, Work to Be Started Soon

To Be 2700 Feet Deep; Financed Solely with Revenue Bonds

Thorpe Well company of Des Moines was awarded the contract for drilling Grinnell's new deep well at a special meeting of the city council Monday night.

Low bid submitted by the Thorpe Co. was for $113,686 but the cost may vary somewhat from that figure depending on what size pump is installed and other alternates in construction which will be decided as work progresses.

Layne Western of Ames, another leading well-drilling firm, also submitted a complete bid, for $118,234 or $4,548 more than the Thorpe estimate. Varner Well and Pump Co. of Dubuque submitted bids on the pump and water main hookup but not on the drilling.

Within Three Weeks

Work on the new well, first to be drilled here since 1926, will begin within three weeks. Completion date is Dec. 31, 1955.

Financing of the project will be by revenue bonds handled by the Carleton D. Beh Co. of Des Moines under extension of a previous contract on waterworks improvements including the reservoir.

Revenue bonds can be paid off only by future net earnings of the waterworks and there can be no tax levy against property to liquidate the bonds, even in case of default.

Plans for the new well, to be located on the north side of the old reservoir site (Second avenue and West street), call for a depth of 2700 feet below the surface.

Dimensions

A 20-inch steel pipe casing will be installed to a depth of 675 feet to be followed by a 12-inch steel pipe casing to a depth of 2000 feet. A 12-inch diameter uncased hole will be drilled the remaining 700 feet to the bottom of the well.

There is to be cement grouting in the space back of the casings to a depth of 2000 feet.

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Des Moines, Iowa

Herald-Register
Grinnell, Iowa

JUL 8 1954

Expect Deep Well Work to Start Soon

Work on drilling of Grinnell's new deep well is expected to start in the near future.

Men from the Thorpe Well Co. of Des Moines, contractor for the job, are expected here later this week to inspect the site preparatory to setting up the drilling rig. The Thorpe company was delayed in its operations elsewhere by the recent floods.

Herald-Register
Grinnell, Iowa
SEP 6 1955

Start Drilling On New 2,700-Foot City Well

Police Report Minor Area Accidents Over Labor Day Weekend

Police reported two minor area accidents over the Labor Day weekend.

An accident occurred at the Rock Island crossing on the old detour about 3½ miles east of town Monday evening at 5 o'clock. Earl Warren Carmer of Grinnell rolled his 1937 Chevrolet at the crossing.

Highway patrolman Gerald Kahler, the investigating officer, filed charges against Carmer for operating a vehicle without a driver's license.

Sunday Morning Mishap

Police also reported memorandum information on an accident that occurred about 7 a. m. Sunday on the Highway 6 detour east of town. James Buddy Daniels of Omaha left the road in his 1952 Mercury sports coupe.

Daniels car rolled 1½ times according to reports. Damages to the car were estimated at $450. The driver was unhurt.

CIVIC MILESTONE — Councilman George Clifton, chairman of the water committee, shovels the first dirt Friday in ground-breaking for the city's new deep well as other council members and the mayor await their turns. In the group, left to right: Bernie Matherly, waterworks superintendent; Councilman Bob Breiting; Don Kunkel, driller for Thorpe Well Co.; Clifton; City Engineer Don Ferguson; Councilmen Howard Sage, Carl Speth, John Hotchkin and Ed Speth; and Mayor Tom Godfrey.

Target Date For Operation Is Dec. 31, '55

Thorpe Well Company Starts Work on Site of Former City Reservoir

Drilling started late last week on Grinnell's first new deep well in nearly 30 years.

Located on the site of the old reservoir on West street, "Number Seven" is scheduled to be in operation by Dec. 31, 1955, according to Don Ferguson, city engineer.

Mayor Tom Godfrey and members of the city council participated in the ground-breaking ceremonies Friday morning which formally launched beginning of work on the 2,700-foot shaft by the Thorpe Well company of Des Moines.

City officials hope for an output of at least 800 gallons a minute, and possibly as high as 1,000 gallons, once the new well goes into operation. The city's No. 5 and 6 wells are now producing about 1,400 gallons a minute between them.

Cost of the entire operation, including drilling, pump and connections, will come to about $114,000, Ferguson said. The well will be financed by sale of revenue bonds.

Powerhouse

June 18, 1954

Thorpe Well Company
2340 Sixth Avenue
Des Moines, Iowa

Attention Mr. Phil Thorpe

Gentlemen:

We are glad to supply the following information in regard to the possibilities of obtaining a ground-water supply of 35-40 gpm from a well drilled to a depth of approximately 300 feet at a site in the City of Grinnell. All data were obtained from the files of the Iowa and U. S. Geological Surveys.

Glacial Drift is expected to be approximately 200 to 225 feet thick at this site, underlain by rocks of Mississippian age. In Grinnell City Well No. 5, 181 feet of Mississippian limestone was encountered from 209 to 390 feet.

Records of wells in and around Grinnell indicate that a layer of sand up to 15 feet in thickness occurs at the base of the unconsolidated materials and that this sand layer contains rather large quantities of water. However, this sand in most cases is quite fine and commonly difficult to exclude from a well without decreasing the water yield.

If a well cannot be developed satisfactorily in the sand at the base of the Glacial Drift, there is some possibility that the desired amount of water can be obtained by deeper drilling into the consolidated rocks. The Mississippian rocks in this area are not known to yield large quantities of water to wells. However, records of farm wells in the area indicate yields of from 5 to 30 gpm have been obtained from wells drilled into or through the limestones of Mississippian age.

To summarize: It is believed that rather large quantities of water are present in a layer of fine sand at the base of the Glacial Drift. It may or may not be possible to satisfactorily construct a well in this sand layer. A well drilled into the consolidated rocks could be expected to

yield moderate quantities of water. There is some possibility that the desired amount could be obtained from these rocks.

If this office can provide you any further information, please do not hesitate to call on us.

Very truly yours,

H. G. Hershey
By J. B. Cooper

HGH:JBC:t

Grinnell (Powershick)

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Herald-Register
Grinnell, Iowa

DEC 9 1954

Water Well Is Ahead of Schedule Council Advised

Grinnell's new water well may be in operation well in advance of the anticipated completion date, according to a progress report presented to the city council Monday night.

Water chairman George Clifton reported that steel casings have been put in and that the well is down to 705 feet. Thorpe Well Drilling official said they expect to reach 1,000 feet by the first of the year and will be "all through" by May 1.

The officials told Mayor Tom Godfrey that "you'll be drinking water from this well by May 1."

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Des Moines, Iowa

Herald-Register
Grinnell, Iowa

JAN 3 1955

New Well May Have Pump Under Ground

Administrators Will Tour Plant And View Units in Operation

A submerged pump may be used in operation of the new city water well at Grinnell.

Mayor Tom Godfrey, impressed with preliminary sketches of the submerged pump, said today that he along with City Clerk Homer Lowrey and two or three city councilmen expect to inspect operation of similar installations within the next week or two.

Down 1265 Feet

The new city well had reached 1,265 feet prior to the new year and the time is drawing close for officials to make a decision if the submerged pumps are to be used.

The city administrators will be guests of the company on January 16 when they will tour the Freeport, Ill., plant where the pumps are made. They will also tour several communities where the pumps are in operation, Godfrey said.

See Before Deciding

Though impressed with the submerged set up, Godfrey explained that he and councilmen would have to see the pumps in operation before making a decision.

Said to be more economical, the submerged pump is located at the bottom of the well shaft and instead of pulling water up, would push it from below. Godfrey said the main economical feature is elimination of big and expensive well pipes.

Jasper
Poweshiek

MEMORANDUM

December 14, 1954

To: H. G. Hershey
From: R. Gale McMurtrey
Subject: Well at Grinnell

On the return trip from checking the water levels and water-level recorders at Rock Creek (Jasper county), I stopped at Grinnell to check on the progress of the well being drilled for the town by Thorpe Well Company.

Twenty-inch casing with $\frac{1}{2}$" wall was cemented in from 0-700 feet the 7th of December. The Haliburton method was used to cement the casing in, and 944 sacks of cement were used in the process.

As of today (12/14/54) at 11:00 a.m. the hole was down to 950 feet. A 19" bit has been used from 700' to the present depth.

At 825' the w/l was 425'; at 880 feet the the w/l was 370'; and the present w/l is back down to 429'.

Samples from 182' to 900' were picked up. Samples from 0-182' are on the rotary drill rig which was used in the upper material.

Gale

IOWA PRESS
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Des Moines, Iowa

Herald-Register
Grinnell, Iowa

JUL 25 1955

Use 604,000 Gallonc Of Water Daily

Grinnell Daily Water Consumption Up 3,000 Gallons Over Last July

The recent heat wave has seen city water consmption figures rise steadily during the past several days according to information released by city water superintendent, Bernie Matherly.

Average Climbs

Grinnellians consumed water at a daily average of 604,000 gallons throughout the first 21 days of July while the average daily consumption for all of July in 1954 was lower by 3,000 gallons per day. Even though there are many more water-type air conditioners in use throughout Grinnell now than there were at this time last year, the record 875,000 gallons used on July 12th, 1954, has not yet been equaled. However, average daily figures are over those for last year. Peak day for this year was July 7th when over 800,000 gallons of water were consumed.

Daily Output

With the rising water output climbing at its present rate, Grinnellians can plan on using almost 20,000,000 gallons of water during July alone. Figures for the seven day period July 15 through 21 show an average daily pumping output of 647,000 gallons:

Date	Daily Output
July 15	629,000
July 16	576,000
July 17	534,000
July 18	667,000
July 19	689,000
July 20	734,000
July 21	702,000

As indicated by the above figures, the 700,000 gallon daily mark has twice been exceeded during the most recent hot spell

Nine Week Salvage Attempt Success

Drill Pulled To Surface Wednesday

Crew Sought Bit Since It Broke Early In May

A long-lost steel drill, buried 2200 feet below the surface in Grinnell's new $113,000 city water well, has been pulled to the surface.

It ended a nine week search for the drill which was lost in early May as the Thorpe Well company began drilling on the last five hundred feet of the well.

The drill was pulled to the surface early Wednesday morning without the slightest trouble, after the crew succeeded in lowering a steel friction cylinder over the heavy steel bit.

During the nine week period, in which the company had reached the point of considering abandoning the project, several different approaches were used in an attempt to free the drill which had lodged against the side of the well hole 2200 feet under ground.

Drill Along Side

Late Tuesday the crew succeeded in freeing the bit from the side of the hole after drilling along the side with a smaller six inch drill. When the bit moved over into the hole, the cylindrical friction unit slipped over the top and grasped the bit.

Carl Allen, trouble shooter for the company, along with Guy Elam, crew superintendent, directed the rescue operations. Allen then cut the cylinder free to remove the bit.

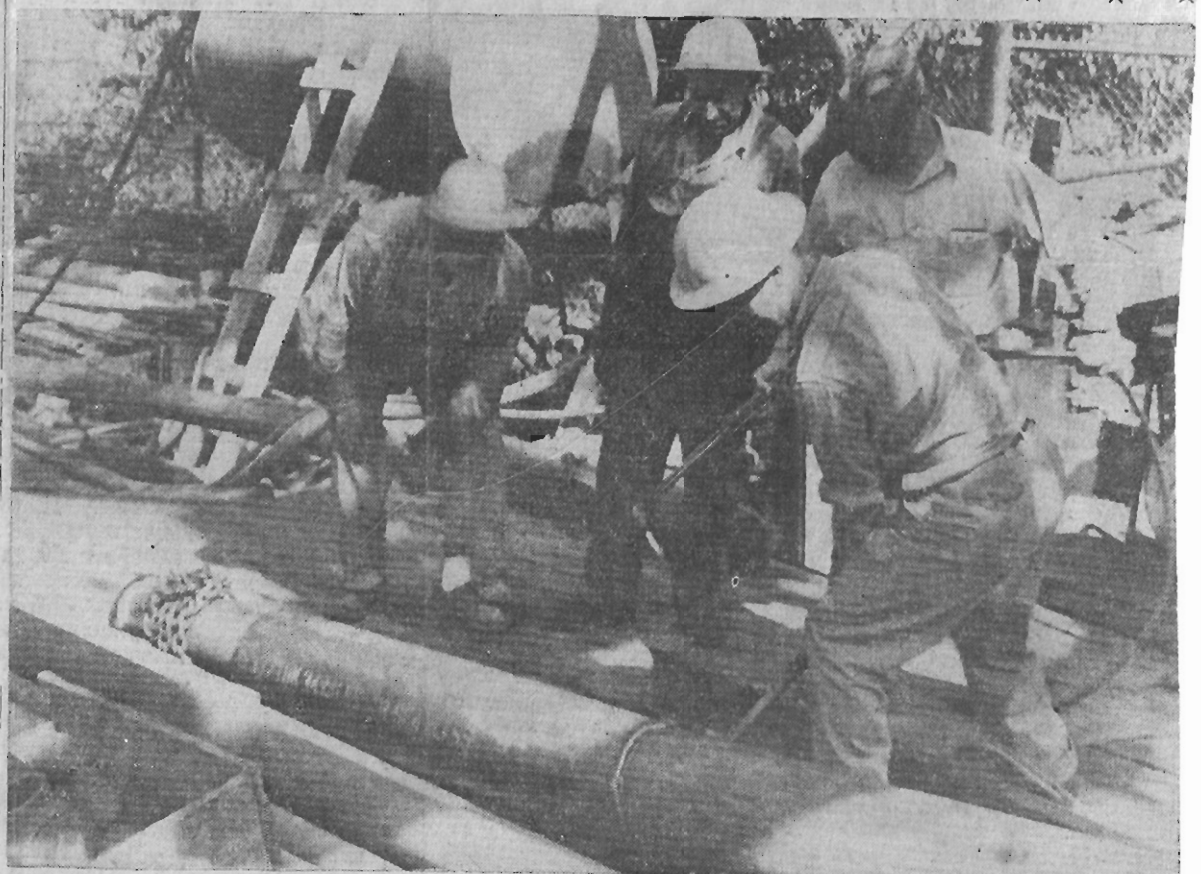
Stem Broken

On inspection, the crew learned that the bit had sustained a heavy pounding after breaking loose nine weeks ago this Friday. A portion of the broken stem had been milled off to enable the friction casing to slip over the neck and grasp the bit.

At the well site are a variety of special tools designed specifically to free the bit in Grinnell's new well. Allen estimated that $1,000 worth of tools were ruined or partially wrecked in the salvage operation. That along with the nine weeks of searching proved costly to the company.

It is estimated that a month to six weeks will be required to complete the drilling. The company is drilling a 12 inch hole the final 500 feet.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



FREEING A DRILL—Carl Allen, right, directs crewmen in freeing a drill, pulled from a 2200 foot level at the new city water well, from a cylindrical friction pipe used in freeing the bit. Pictured are Guy Elam, O. A. Dandven and Bob Baker.

Grinnell (Powershiek

AUG 11 1955

New Well to Go Below 2,700 Feet

Seek Water Bearing Strata Below Shale

At Special Session, Council Votes Approval; Wait Geological Analysis

Meeting in special session Tuesday noon the Grinnell city council authorized City Manager M. B. Starr to order resumption of drilling beyond the 2,700 foot mark if geological tests indicate that water bearing strata will be reached within another 100 feet.

The move was taken by the council with the possibility that the water supply could be greatly increased if another water bearing strata would be reached.

Soil samples were sent to the geological survey repartment at Iowa University at Iowa City Tuesday afternoon for analysis and recommendation by the geologists. Decision to continue drilling depends upon the geological findings.

Thorpe Well Company reached the prescribed 2,700 mark Tuesday morning and ceased drilling .The company was in a shale (non water bearing) formation at that level. It was believed that another water bearing strata would be reached within another 100 feet.

En route to the depth, two water bearing formations were encountered the principal one being in the Jordan strata. Another smaller formation was reached below the Jordan level.

Cost of the additional drilling to the city will be $15 a foot or an estimated $1,500 for the 100 feet. The go-ahead was voted by all six members of the council.

Carl Allen, representative of the drilling firm, pointed out that the shale formation is not water bearing. He told councilmen that the 200-foot shale formation would tend to crumble and that a 10-inch casing should be inserted to maintain the present hole, whether drilling continues or ceases.

It was decided also that before drilling is continued, that a test of the current water supply be conducted.

Allen told councilmen that the drillers are certain that they have gone through or are near the eod of the shale fomation. He said the shale has caved in during drilling and will again unless a casing is inserted.

Starr called for the special council meeting pointing out that the city is not getting the results it wanted. If further drilling or testing is to be done, now is the time, he pointed out.

Councilmen recalled that the 2,700 foot level was orginally determined as a possibility of hitting softer water. Other city wells are to a maximum depth of 2,500 feet.

Continued Drilling Is Authorized

Geological Check Indicates Water Is 75 to 150 Feet Deeper

Lining of No. 7 well started this morning as plans are being completed for drilling another 100 feet or so to hit a new water bearing strata.

The action was authorized by City Manager M. B. Starr after learning results of a geological check of the well.

In authorizing the additional drilling, Starr had this to say:

"The new No. 7 well is now down to 2700 feet, according to the original plan. Although tests have not been completed we feel sure it will furnish adequate water for present day needs.

"However, after studying available data and consulting with Engineers of the Iowa Geological Survey, and with other well experts, it is my opinion that we can increase the capacity of the well considerably by drilling some farther; probably between 75 and 150 feet, and at only a 2% or 3% increase in cost.

"It would seem logical that by increasing the available supply we may delay the time when another well may be needed. Also, there is data that indicates that water from the next lower water bearing stratum contains less hardness, which would somewhat reduce the cost of softening.

"Water usage has increased greatly, and will continue to increase with the further development of our city. We should not overlook an opportunity to anticipate the need for an additional supply."

Grinnell (Poweshiek)

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Des Moines, Iowa

Herald-Register
Grinnell, Iowa

SEP 16 1954

Drillers Near 200 Foot Mark At New Well

Drillers expect to hit the 200 foot mark this week en route to a 2,700 foot depth on the city's new water well.

Tuesday, after a week of drilling, the company had passed the 152 foot mark. Later this week the company's largest drilling machine will be set up on the site on south West street to continue the task.

Working around the clock drillers have averaged nearly 30 feet a day, sometimes more and sometimes considerably less. On one shift early this week, the crew gained only two feet when rocks jammed the exhaust pipe.

Thorpe Well Company of Des Moines has contract for the $113,000 project, which is expected to be completed by December 1955.

DRILL POUNDS DEEPER—Dick Kunkle and Guy Lemar, both of Stewart, Ia., were drill operators when this picture was taken at the site of the new city water well. Drillers have been averaging about 30-feet per day with 2,700 depth foot as the goal.

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Herald-Register
Grinnell, Iowa

OCT 28 1954

Drilling Resumes On New Water Well at Grinnell

Drilling has been resumed on the new water well for Grinnell.

Bernie Matherly, water superintendent, said the company's large drilling rig has been set up and drilling is again underway. The crew had passed the 200 foot mark Wednesday.

Drilling had been halted for nearly a month, when the company stopped operations with a smaller drill unit intending to put the larger drill into operation.

Matherly disclosed too that there has been no word from the crew that is to paint the inside of the Grinnell water tower. The project, according to contract let three weeks ago, calls for a Nov. 1 completion date.

MEMORANDUM

To: H. G. Hershey
From: J. B. Cooper
August 11, 1955

Re: Developments at Grinnell City Well

N. B. Starr, City Manager, called 8/9/55 to report well now being drilled for Grinnell down to contract depth of 2700.' Bottom formation shale. Starr was undecisive about stopping at 2700' or drilling deeper and wanted our advice. I suggested samples be brought to us before we could tell him much. Samples were brought to Iowa City about 4:30 p. m.

Starr called 8/10/55. Samples not studied yet. Starr had talked to Thorpe and Thorpe had recommed deeper drilling. Decision was made by them to case out shale and drill deeper.

I called Thorpe Well Company about another matter and was informed by Carl Allen (Field foreman) that plans were to set 200' of 10" liner from 2702½' to 2502½'. to case out shale. Then a pump test would be conducted. Then the well would be drilled deeper (to Basement rocks) and another pump test run. This procedure sounds alright to me. Thorpe will notify us when first pump test is made.

When samples are studied I will call Starr and give him our best estimate of section below 2700'

August 12, 1955

Mr. N. B. Starr
City Manager
Grinnell, Iowa

Dear Mr. Starr:

We have examined the samples to a depth of 2700 feet, from the deep well now being drilled for the city of Grinnell.

As you know wells of this depth are rare in Iowa. It is difficult to predict the character, thickness, or water-bearing properties of the formations which will be encountered by drilling below a depth of 2700 feet at Grinnell.

We have compared the log of your well with the log of the deep well at Nevada. If geologic conditions at Grinnell are similar to those at Nevada, which may not be, the following geologic section may be anticipated.

Formation and Character	Thickness (ft.)	Depth Range (ft.)
Cambrian system		
Dresbach formation		
Eau Claire member (Dolomite, silty, may contain some shale)	115	2700-2815
Mt. Simon member (Sandstone)	105	2815-2920
Pre-Cambrian system		
Red Clastics (Sandstone, mica, feldspar; may be redder in color than sandstone above)		2920-

November 24, 1953

Mr. C. W. Durham
Henningson, Durham & Richardson, Inc.
2962 Harney Street
Omaha 2, Nebraska

Dear Mr. Durham:

We are replying to your letter of November 17 requesting information on the city water supply at Grinnell, Iowa, and pertinent comments relative to the construction of an additional deep well. The available data from the files of the cooperative investigations of the Iowa and U. S. Geological Surveys are summarized as follows:

The Grinnell city water supply is derived from two deep wells No. 5 and No. 6, 2260 and 2498 feet deep respectively, located at the city water pumping station at Second and Main Streets. Wells 1, 2, 3, and 4 have all been abandoned. Well 4, a 2000-foot hole, was plugged up about three years ago to decrease the possibility of contamination of the deep aquifers. The following geologic section was encountered in the drilling of Well 6. All depth figures are referred to the altitude of the well curb 1020 feet above sea level.

Formation and description	Thickness (ft.)	Depth (ft.) From	Depth (ft.) To
Pleistocene			
No samples (pebbly clay with sand at base	200	0	200
Mississippian system			
St. Louis limestone (sandy limestone)	30	200	230
Keokuk formation (cherty dolomite)	68	230	298
Burlington limestone	42	298	340
Hampton formation (cherty dolomite and limestone)	50	340	390
English River siltstone	30	390	420
Maple Mill shale	130	420	550

The well at Nevada penetrated the Red Clastics for a distance of 235 feet.

We are very much interested in this well and will be glad to aid you in any way we can.

Very truly yours,

H. G. Hershey

HGH:JBC:L

Pomeschuck

September 27, 1955

Mr. Bernard Matherly
Water Superintendent
Grinnell, Iowa

Dear Mr. Matherly:

Enclosed is a report on the mineral analysis of water from your 2702-foot well as shown by a sample collected by you August 30, 1955.

If you have any questions concerning this report, please do not hesitate to let me hear from you.

Very truly yours,

H. G. Hershey
by C. N. Brown

HGH:L
Enc.

Bowschief

September 27, 1955

Mr. M. B. Starr
City Manager
Grinnell, Iowa

Dear Mr. Starr:

Enclosed is a report on the mineral analysis of water from your 2702-foot well as shown by a sample collected by Mr. B. Matherly August 30, 1955.

If you have any questions concerning this report, please do not hesitate to let me hear from you.

Very truly yours,

H. G. Hershey
by C. N. Brown

HGH:L
Enc.

check through these and let me know the range of samples included.

After getting a cut for Dick keep the rest handy until I find out for sure whether or not the city wants a set of the samples

Hale

missing
240 - 245

230 - 233

233 - 236

236 - 240

182 - 185

355 - 360 - 2

430 - 435 - 2

435 - 440 - 2

440 - 495 - 2

695 - 700 - 2

830 - 835 - 2

885 - 890 - 2

Powershield

MEMORANDUM

October 6, 1955

To: H. G. Hershey
From: J. B. Cooper
Re: Grinnell City Well

Bernard Matherly called to report Grinnell City well now at depth of 2968'. Sandstone from 2865 to 2968'. Extremely hard formations at 2968' -- driller unable to penetrate more than a few inches and no sample recovery.

Hard formation probably is top of Precambrian quartzite or granite.

Dick Northup went to Grinnell about 1:00 p. m. to pick up samples and attempt to identify bottom formation (if any sample had been obtained).

SWL dropped 32' at depth of 2875' Driller reports water sand from 2865 - 2968'

Jim

Poweshiek

MEMORANDUM   October 7, 1955

To: H. G. Hershey
From: Richard C. Northup
Subject: Grinnell City Well

A trip was made to Grinnell on October 6 at request of the city officals to check on the New City Well. Apparently the Mt. Simon sandstone had been reached at 2865 feet with a drop in the water head of 32 feet, At 2968 fine-grained, very hard sandstone was reached. This may be quartzite, although the last sample from 2968-2970 feet shows both rounded and sharp angular grains. A better check can be made here with a clean dried sample. At any rate Messrs. Godfrey and Starr, Mayor and city manager respectively have decided to stop drilling. A pumping test will be run sometime next week, perhaps Tuesday or Wednesday, and they will notify us in time for someone to be there. You will recall that a pumping test was run earlier to include water from the Prairie du Chien, Jordan, and St. Lawrence formations, and which yielded 1015 gallons per minute.

Geronbology -
Harris. at Noon
Install reservoir.
Horvath.
Howard Hill
2817
Merv. Meade, V.P.
Long Range.
Webster 7600

MEMORANDUM October 7, 1955

To: H. G. Hershey
From: Richard C. Northup
Subject: Grinnell City Well

A trip was made to Grinnell on October 6 at request of the city officals to check on the New City Well. Apparently the Mt. Simon sandstone had been reached at 2865 feet with a drop in the water head of 32 feet, (at 2968') fine-grained, very hard sandstone was reached. This may be quartzite, although the last sample from 2968-2970 feet shows both rounded and sharp angular grains. A better check can be made here with a clean dried sample. At any rate Messrs. Godfrey and Starr, Mayor and city manager respectively have decided to stop drilling. A pumping test will be run sometime next week, perhaps Tuesday or Wednesday, and they will notify us in time for someone to be there. You will recall that a pumping test was run earlier to include water from the Prairie du Chien, Jordan, and St. Lawrence formations, and which yielded 1015 gallons per minute.

MEMORANDUM October 7, 1955

To: Dr. H. G. Hershey
From: R. C. Northup
Re: Bottom hole samples from Grinnell City Well

2968-2970'

The samples from ~~3968'-3970'~~ at Grinnell were studied and the well has apparently reached a hard quartzite or quartzitic sandstone with little or no porosity. While the cuttings are very pulverized, they are for the most part very sharp and angular, probably not true grains, but pieces that have broken across the grain. The overall color is a light pink, and the surfaces are very vitreous. If the underlying formations are similar, there would probably be little or no more water RECOVERED. Inasmuch as an increased supply of water has already been indicated from the sandstone above the quartzitic material, and as shale from the Franconia-Eau Claire section has caused some trouble from caving, the city manager and mayor feel it adviseable to set liner through the remaining open shale section from about 2785' to 2803' and complete with pumping test next week.

Bruneck

October 14, 1955

Mr. T. W. Thorpe
Thorpe Well Company
2340 Sixth Avenue
Des Moines, Iowa

Dear Mr. Thorpe:

Enclosed please find a copy of the report mailed to you September 27, 1955 of Well No. 7 which you drilled for the city of Grinnell.

If you have any questions concerning this report, please do not hesitate to let me hear from you.

Very truly yours,

H. G. Hershey

HGH:L

Enc.

Bwashick

September 27, 1955

Thorpe Well Company
2340 Sixth Avenue
Des Moines, Iowa

Gentlemen:

Enclosed is a report on the mineral analysis of water from the 2702-foot well you drilled for the city of Grinnell as shown by a sample collected by Mr. Matherly August 30, 1955.

If you have any questions concerning this report, please do not hesitate to let me hear from you.

Very truly yours,

H. G. Hershey
by C. N. Brown

HGH:L
Enc.

NOV 17 1955

Plug New Well At 2,550 Feet; Production Tests Commenced

At a special meeting Monday afternoon, Grinnell city officials authorized the Thorpe Well Company to plug the new city well at 2,550 feet and prepare it for another production test.

The drilling had reached a depth of 2,970 feet when further drilling was halted.

At the 2,550 level, the well will be sealed off, drilling equipment removed and perforated pipe inserted. Water developing chemicals will be added to the water veins and pumping tests will be commenced.

It is estimated that the production tests will yield 1,200 gallons of water per minute.

Should the tests prove satisfactory, the new well will be put into use thus enlarging the water supply of Grinnell.

support of the work of the Pre

G-6 Grinnell Gen Data
Powershiek Co.

March 25, 1963

Mr. Arthur J. Bader
Stanley Engineering Company
Stanley Building
Muscatine, Iowa

Dear Mr. Bader:

We are replying to your letter of March 20 concerning the geologic log of Grinnell city well No. 7 (1955) and additional information on the groundwater conditions there as an aid in developing a water supply of approximately 1000 gpm for industrial use.

A generalized log of the formations encountered in this well and pertinent information on the construction and production of the well are summarized on separate sheets appended to this letter. Currently the city has one other deep well in operation in the near vicinity of well No. 7 and may have a third well for standby use.

According to your letter an industrial site has been chosen that is approximately three-quarters of a mile south of the Grinnell city wells. This places it at the south edge of town in the NW¼ NW¼ sec. 21, T. 80N., R. 16W. just off Highway 146 and probably near the Minneapolis and St. Louis railway. A new deep well at this location is expected to penetrate practically the same sequence of formations as found in city well No. 7 with some slight modifications owing to local variations in the structure and thickness of the strata.

Only small to moderate quantities of water are expected from the upper and intermediate formations in this area. Moreover, the water from the Devonian and Silurian rocks probably will be highly mineralized in sulfate because of the associated gypsum.

The Prairie du Chien - Jordan - St. Lawrence Formations at a depth range of approximately 2000 to 2500 feet are the chief sources of supply in the Grinnell city wells. Tests indicate these wells to be capable of producing between 650 and 875 gpm or more with specific capacities ranging between 7 and 10 gallons per foot drawdown. All three wells are cased from the surface at least into the upper part of the Prairie du Chien Dolomite to shut out highly mineralized water in the overlying beds. The static water level of the Jordan aquifer is estimated to be about

285 feet below the surface at the contemplated drilling site south of Grinnell.

The quality of the water from the Grinnell city wells is shown on the attached mineral analysis sheet. These analyses indicate the water to be acceptable for drinking and general industrial use. The water temperature should be about 75 to 76° F.

On this basis we conclude that the Jordan Sandstone and associated dolomite strata between 2000 and 2500 feet are the most promising sources for a large capacity well yielding at least 1000 gpm of potable water at Grinnell. It would seem advisable to have the new well cased from the surface for about 50 feet into the Prairie du Chien Dolomite and the casing grouted in place for its full length with neat cement to assure a good seal and to protect the pipe from corrosion. Acidizing and developing the well for a considerable period may appreciably increase the original output.

We hope this is the information you wished and that it will assist you with your study of industrial water supply at Grinnell. If there are any questions remaining or if we can provide you further information on this matter, please let us know.

Very truly yours,

H. G. Hershey

HGH/PJH
b|m
Enclosures

GEOLOGIC LOG GRINNELL CITY WELL NO. 7 (1955)

Formation	Thickness(ft.)	Depth Range(ft.)
Quaternary System		
Pleistocene Series (glacial drift, locally some sand and gravel)	230	0-230
Mississippian System		
Keokuk-Burlington Formations (limestone and dolomite, considerable chert)	102	230-332
Hampton Formation (limestone and dolomite, chert zone in lower part)	48	332-380
North Hill Formation (limestone and dolomite)	30	380-410
Prospect Hill Siltstone and shale	5±	410-415
Maple Mill Shale	145	415-560
Devonian System		
Lime Creek Formation (upper part limestone and dolomite, lower 2/3's calcareous shale, some dolomite)	130	560-690
Cedar Valley Formation (mostly limestone in upper 1/3, dolomite in lower 2/3's; considerable gypsum - anhydrite in middle; some chert at base of middle; trace shale)	300	690-990
Wapsipinicon Formation (upper 50±' mostly gypsum-anhydrite, some dolomite; chert, limestone and dolomite in lower 120±')	175	990-1165
Silurian System		
Undifferentiated dolomite	25	1165-1190
Ordovician System		
Maquoketa Formation (shale, dolomitic)	210	1190-1400
Galena Formation (dolomite, lower part contains 5-30% chert)	230	1400-1630
Decorah-Platteville Formations (limestone and shale at top, underlain by dolomite; Glenwood Shale at base)	63	1630-1693
St. Peter Sandstone	34	1693-1727
Prairie du Chien Formation		
Willow River Member (dolomite, sandy)	168	1727-1895
Root Valley Member (sandy dolomite and sandstone, about 50-50%)	80	1895-1975
Oneota Member (dolomite, some chert)	217	1975-2192

Geologic Log Grinnell City Well No. 7 (1955) (continued)

Formation	Thickness(ft.)	Depth Range(ft.)
Cambrian System		
Jordan Sandstone	55	2192-2247
St. Lawrence Formation (dolomite, slightly silty, glauconitic in lower half)	261	2247-2508
Franconia Formation (upper half mostly fine sandstone with considerable shale and dolomite, very glauconitic; lower half mostly shale, some dolomite)	290	2508-2798
Dresbach Formation (upper part dolomite with glauconite; lower part sandstone; basal 15 feet may be metamorphosed Precambrian sediments?)	172	2798-2970

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
Grinnell city No. 5 (1915)	7/24/60	2260	Ft du Ch. Jordan	76	763	.66	<.05	81	40	20	103	0	368	285	18	1.5	<0.1	364	302	62	7.3	1020
" " No. 6 (1926)	"	2500	Ft. du Ch. Jordan St. Lawr.	76	933	.54	<.05	95	43	20	133	0	368	391	24	1.5	1.0	415	302	113	7.4	1340
" " No. 7 (1955)	1/22/60	2550	"	75	728	.58	<.05	79	40	20	99	0	371	258	21	1.4	<.44	362	304	58	7.7	990

NOTES:

Name:	Grinnell city well No. 7 (1955)
Location:	SW¼ NW¼ sec. 16, T. 80N., R. 16W. Poweshiek County, Iowa
Elevation:	1011' above sea level
Contractor:	Thorpe Well Company, Des Moines
Drilling dates:	September 1954–November 1955
Depth	Original 2970'; plugged back to 2550', November 1955
Casing record:	700' of 19" casingfrom 0–700' cemented in; 1325' of 12" linergfrom 675–2000' cemented in; 710' of 10" liner from 1975–2685'; well plugged back to 2550' and casing perforated opposite Jordan and St. Lawrence Formations.
Production data:	On January 22, 1960 a pumping test of 30 minutes duration produced 875 gpm with 86 feet of drawdown from a static water level of 298 feet. Specific capacity is 10 gallons/ foot drawdown. Pump setting reported to be at 500'.

STANLEY ENGINEERING COMPANY

CONSULTING ENGINEERS

STANLEY BUILDING
MUSCATINE, IOWA

March 20, 1963

Iowa State Geological Survey
Iowa City, Iowa

Gentlemen:

We have been retained by the City of Grinnell, Iowa, to make a study concerning the development of an industrial ground water supply of approximately 1,000 gallons per minute. The new well will be approximately three-quarters of a mile south of a 1,000 gallon per minute, 3,000 ft. deep well constructed by the city in 1955. We were not, however, able to obtain copies of the boring logs or pumping tests for this existing well.

estimate
NW NW sec. 21 - 80N - 16W.

If possible, we would like to obtain any information your office would have concerning the above-mentioned well, plus any additional information or recommendations concerning ground water supplies in this area.

We would appreciate your early reply.

Yours very truly,

STANLEY ENGINEERING COMPANY

Arthur J. Bader

Arthur J. Bader

AJB:rjc:3468

Telephone
AMherst
3-9494

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North Hill Formation (limestone and dolomite)	30	380-410
Prospect Hill Siltstone and shale	5±	410-415
Maple Mill Shale	145	415-560
Devonian System		
Lime Creek Formation (upper part limestone and dolomite, lower 2/3's calcareous shale, some dolomite)	130	560-690
Cedar Valley Formation (mostly limestone in upper 1/3, dolomite in lower 2/3's; considerable gypsum - anhydrite in middle; some chert at base of middle; trace shale)	300	690-990
Wapsipinicon Formation (upper 50±' mostly gypsum-anhydrite, some dolomite; chert, limestone and dolomite in lower 120±')	175	990-1165
Silurian System		
Undifferentiated dolomite	25	1165-1190
Ordovician System		
Maquoketa Formation (shale, dolomitic)	210	1190-1400
Galena Formation (dolomite, lower part contains 5-30% chert)	230	1400-1630
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IOWA GEOLOGICAL SURVEY
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(Dissolved constituents in parts per million)

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" " No. 7 (1955)	7/22/60	2550	"	75	728	.58	<.05	79	40	20	99	0	371	258	21	1.4	<.44	367	304	58	7.7	1

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Production data:	On January 22, 1960 a pumping test of 30 minutes duration produced 875 gpm with 86 feet of drawdown from a static water level of 298 feet. Specific capacity is 10 gallons/ foot drawdown. Pump setting reported to be at 500'.

IOWA GEOLOGICAL SURVEY
Water Analysis Report
Iowa City, Iowa

County Polk Date Sampled

Town Grinnell Sampled by

Location of well sec. , T. N., R. Twp

Owner Well No. Depth Ft.

Type of well Static level Ft. Altitude Ft.

Producing Formation(s) Depth Range

Notes on condition of well, casing, or formations.

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

	J & M.S. Jordan				
Silica (SiO_2)			Dissolved solids	1230	885
Iron (Fe)	<0.02	1.3	Hardness (calc. as $CaCO_3$) Total	454	382
Manganese (Mn)	0.04	<0.05	(as grains per gallon)		
Calcium (Ca)	111	87	Carbonate	286	286
Magnesium (Mg)	43	40	Noncarbonate	168	96
Potassium (K)	32	19	Alkalinity (as $CaCO_3$)	286	286
Sodium (Na)	255	115	pH	7.7	7.8
Carbonate (CO_3)	None		Specific Conductance (micromhos at 25°C.)	1930	1245
Bicarbonate (HCO_3)	349	349	Temperature (°F.)	75°	75°
Sulfate (SO_4)	372	306	******* *******		
Chloride (Cl)	245	47	Analysis No.		
Fluoride (F)	1.4	1.5	Date analyzed	10-27-55	8-30-55
Nitrate (NO_3)	0	0	I.G.S. Well No.		

Remarks:

Resume of Grinnell Pump Test Well No. 7

August 27, 1955

Well pumped total of 6 hours 25 minutes at rates varying from 480 to 692 g.p.m. — Drawdown was about 80 feet to a pumping level of 381 feet.

August 29, 1955

Well pumped total of 12 hours at rate varying from 680 to 930 g.p.m. Drawdown was about 143 feet to a pumping level of 444 feet.

August 30, 1955

Well pumped total of 5 hours 48 minutes at rates varying from 500 to 1015 g.p.m. — Drawdown was about 175 feet to a pumping level of 475 feet.

In all tests the well was not pumped long enough at each rate of discharge to establish definately the pumping level for that discharge rate.

Well No. 7 is 745 feet distant from City Water plant, the site of Wells 5 and 6. During test of Well 7 Wells 5 and 6 were pumped at different times. Well 6 reported to pump at 685 g.p.m. and Well 5 at 300 g.p.m. The pumping level in Well 6 during pumping of Well 7 was about 394 feet. The water level in Well 6 with Wells 5 and 7 pumping was about 319 feet. The water level in Well 6 with Well 6 and 5 pumping, but well 7 off was about 399 feet. The drawdown in No. 7 with Wells No. 5 and 6 pumping was 10 feet.

EHL
013

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August 30, 1955

Well pumped total of 5 hours 48 minutes at rates varying from 500 to 1015 g.p.m. — Drawdown was about 175 feet to a pumping level of 475 feet.

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Well No. 7 is 745 feet distant from City Water plant, the site of Wells 5 and 6. During test of Well 7 Wells 5 and 6 were pumped at different times. Well 6 reported to pump at 685 g.p.m. and Well 5 at 300 g.p.m. The pumping level in Well 6 during pumping of Well 7 was about 394 feet. The water level in Well 6 with Wells 5 and 7 pumping was about 319 feet. The water level in Well 6 with Well 6 and 5 pumping, but well 7 off was about 399 feet. The drawdown in No. 7 with Wells No. 5 and 6 pumping was 10 feet.

Results of Pumping Test
Grinnell City Well No. 7
August 27 to 30, 1955

Name: Grinnell City Well No. 7

Location: SW NW sec. 16, T. 80 N., 12. 16 W. Poweshiek County

Elevation: 1011 feet ~~along~~ above sea level datum

Contractor: Thorpe Well Company Des Moines, Iowa

Present Depth: 2702 feet

Casing Record: 19" casing cemented in hole from surface to about 2200 feet. 202' of 10" liner from 2500 to 2702' (present depth)

Test pump: Turbine. 490' of 12" column and 6-stage bowls with 18' of suction pipe on bottom. Powered with 2 large diesel motors.

Discharge Measurements: 6" Sparling meter set in discharge line. Discharge line was 10' of 10" pipe ~~and~~ with 15' of 6" pipe from pump. Majority of discharge measurements made by M. B. Starr, City Manager.

Temperature Measurements: Temperature measured at end of discharge line. Thermometer used by city registered 1° lower than the thermometer of the Geological Survey.

Depth-to-water measurements: Majority of depth-to-water measurements made by Bernard Matherly, Water Superintendent.

Remarks: City wells No's. 5 and 6 (745 feet distant) were pumped intermittently at rates of 300 g.p.m. and 685 respectively during pumping of well no. 7.

City Well No. 7 is to be drilled deeper to explore water possibilities of lower Cambrian sand stone.

Data collected during pumping test by J. B. Cooper, Geological Survey, Iowa City.

Note: It was impracticable to obtain precise and continuous d/w and gpm measurements inasmuch as inadequate provision was made for entrance of measuring device into casing. The measuring lines used periodically stuck between pump column and casing. Pumping rates were changed often and motor speeds varied.

Results of Pumping Test
Grinnell City Well No. 7
August 27 to 30, 1955

Name: Grinnell City Well No. 7

Location: SW NW sec. 16, T. 80 N., 12. 16 W. Poweshiek County

Elevation: 1011 feet ~~along~~ above sea level datum

Contractor: Thorpe Well Company Des Moines, Iowa

Present Depth: 2702 feet

Casing Record: 19" casing cemented in hole from surface to about 2200 feet. 202' of 10" liner from 2500 to 2702' (present depth)

Test pump: Turbine. 490' of 12" column and 6-stage bowls with 18' of suction pipe on bottom. Powered with 2 large diesel motors.

Discharge Measurements: 6" Sparling meter set in discharge line. Discharge line was 10' of 10" pipe ~~and~~ with 15' of 6" pipe from pump. Majority of discharge measurements made by M. B. Starr, City Manager.

Temperature Measurements: Temperature measured at end of discharge line. Thermometer used by city registered 1° lower than the thermometer of the Geological Survey.

Depth-to-water measurements: Majority of depth-to-water measurements made by Bernard Matherly, Water Superintendent.

Remarks: City wells No's. 5 and 6 (745 feet distant) were pumped intermittently at rates of 300 g.p.m. and 685 respectively during pumping of well no. 7.

City Well No. 7 is to be drilled deeper to explore water possibilities of lower Cambrian sand stone.

Data collected during pumping test by J. B. Cooper, Geological Survey, Iowa City.

Note: It was impracticable to obtain precise and continuous d/w and gpm measurements inasmuch as inadequate provision was made for entrance of measuring device into casing. The measuring lines used periodically stuck between pump column and casing. Pumping rates were changed often and motor speeds varied.

Results of Pumping Test
Grinnell City Well No. 7
October 12-13, 1955

Name: Grinnell City Well No. 7

Location: SW NW sec. 16, T. 80 N., R. 16 W. Poweshiek County

Elevation: 1011 feet above sea level

Contractor: Thorpe Well Company, Des Moines

Depth: ~~2920'~~ 2970'

Casing record: 19" casing cemented in hole from surface to about 2000'. see final casing record on pump test results of 11/11/55.

Test Pump: Turbine. 490' of 12" column and 6-stage bowls with 10' of suction pipe. Powered by 2 large diesel engines.

Discharge measurements: 6" Sparling meter set in discharge line. Discharge line was 10" with upturned 45° elbow at discharge end. Majority of measurements made by M. B. Starr, City Manager.

Temperature measurements: Made at end of discharge line.

Depth to water measurements: Majority made by Bernard Matherly, Water Superintendent.

Aquifer tested: Jordan and Mt. Simon sandstone.

Remarks: City well No. 5 was pumped at 300 g. p. m. continuously during pumping test.

Results: Drawdown was greater at comparable discharge rates than the drawdown of water from Jordan sandstone alone. (See pump test results of August 27-30, 1955).

Future plans: Liner will be set opposite the Jordan sandstone and pumping test conducted on water from the Mt. Simon sandstone.

Data collected: during pumping test by W. L. Steinhilber.

Results of Pumping Test
Grinnell City Well No. 7
October 12-13, 1955

Name: Grinnell City Well No. 7

Location: SW NW sec. 16, T. 80 N., R. 16 W. Poweshiek County

Elevation: 1011 feet above sea level

Contractor: Thorpe Well Company, Des Moines

Depth: 2920'

Casing record: 19" casing cemented in hole from surface to about 2200'.

Test Pump: Turbine. 490' of 12" column and 6-stage bowls with 10' of suction pipe. Powered by 2 large diesel engines.

Discharge measurements: 6" Sparling meter set in discharge line. Discharge line was 10" with upturned 45° elbow at discharge end. Majority of measurements made by M. B. Starr, City Manager.

Temperature measurements: Made at end of discharge line.

Depth to water measurements: Majority made by Bernard Metherly, Water Superintendent.

Aquifer tested: Jordan and Mt. Simon sandstone.

Remarks: City well No. 5 was pumped at 300 g.p.m. continuously during pumping test.

Results: Drawdown was greater at comparable discharge rates than the drawdown of water from Jordan sandstone along. (See pump test results of August 27-30, 1955).

Future plans: Liner will be set opposite the Jordan sandstone and pumping test conducted on water from the Mt. Simon sandstone.

Data collected: during pumping test by W. L. Steinhilber.

obs. - W.L.S.

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ..... / District .....

Grinnell City Well #7 10/12/55

Time	R.P.M. Engine	R.P.M. Pump	Pumping level	gpm		Temp.			Remarks			
10:10a	725	1325	304.75	SWL					start pumping			
10:30	"	"	371-0"	402								
11:00	"	"	369	418		74°F			water muddy			
11:30	"	"	367	429					do			
12:00	"	"	367	433					water cloudy & sand			
12:30	"	"	365-5	435					do			
1:00	"	"	365-8	440		75°F			do			
1:30	750	1400	386-8	530					do			
2:00	"	"	386-11	525		75°F			do			
2:30	"	"	385-2	530					do			
3:00	800	1500	412-0	632					do	water sample		
3:30	"	"	411-10	634					do	taken for		
4:00	"	"	412-7	637					do	chem. anal.		
4:30	850	1550	444-9	720					do			
5:00	"	"	445-2	720					do			
5:30	"	"	445-2	710					do			
6:30	"	"	445-6	710					do			
7:00	900	1600	472-10	762					do			
7:30	"	"	474-10	754		75°F			do			
8:00	"	"	475-1	755					water clear			
8:30	"	"	475-0	756					do			
9:00	"	"	475-0	756					do			
9:30	"	"	474-9	750					do			
10:00	"	"	475-4	756					do			
10:30	"	1625	482-6	777					do			
11:00	"	"	482-6	780					do			
11:30	910	1640	487-0	789					do			
12:00	"	"	486-10	775					do			
12:30	"	"	486-8	780					do			
1:00	"	"	484-2	780					do			
1:30	"	"	483-9	780					do			
2:00	"	"	483-5	775					do			

obs. WLS

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ..... District .....

Grinnell City Well #7 (cont.)

2:20	910	1640	483-2	775					water clear			
3:00	"	"	483-11	760					do			
3:30	"	"	488-6	760					do			
3:45						pump off - breakdown						
5:30									pump on 5:30; 10/13/55			
6:00	910	1640	490-0	850								
6:30	900	1650	489-6	870								
7:00	"	"	488-5	866								
7:30	"	"	488-6	875								
8:00	"	"	488-4	860								
8:30	"	"	487-5	850								
9:00	"	"	486-10	854								
9:31	"	"	486-3	856								
10:00	"	"	486-0	854								
10:30	"	"	484-11	854								
11:00	"	"	483-8	850								
11:30	"	"	483-7	850								
12:00	"	"	483-6	850		75°F			water clear			
12:30	"	"	481-9	840					do			
1:00	"	"	482-0	840					do			
1:30	"	"	482-5	840					do			
2:00	"	"	482-6	843					do			
2:30	"	"	482-8	850					do			
3:00	"	"	481-11	840					do.			
3:08									pump off.			
3:13			313-6									
3:18			311-1									
3:38			308-8		SWL = 304.75							
3:53			308-0									
4:38			306-7									
5:08			305-11						pump on again after measurement.			

Obs. WLS

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IOWA GEOLOGICAL SURVEY
ROUTING SLIP

Staffs

IGS

- ☐ HGH
- ☐ MDA
- ☐ RPC
- ☐ GJD
- ☐ AJF
- ☐ CMF
- ☐ PJH
- ☐ LFJ
- ☐ RCN
- ☐ RVR
- ☐ GES

USGS

- ☐ JBC
- ☐ EMH
- ☐ RMJ
- ☐ CWL
- ☐ CRM

☐ Sample Room

Disposition

- ☐ File
- ☐ Prepare reply
- ☐ Comment
- ☐ Your attention
- ☐ See me
- ☐ Return
- ☐ Initial

Remarks:

For. Files
Nothing to be
Sent out.

From: Jim

9-230

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ____ / District ____

Grinnell Pump Test 8-27-55

Time		Engine RPM	Pump RPM		D/W	GPM		Temp °F		Remarks		
									SWL	301-4"		
7:12A									Started Pumping			
8:00		700	1250		330-8"	358						
8:30		"	"			362						
9:00		"	"			356						
9:30		"	"			354		74				
10:00		"	"			358						
10:30		"	"			360						
11:00		750	1320		353-2"	500						
11:30		"	"		353-0	480						
	Hooking up Record Motor						—					
									SWL	303-8"		
1:25									Started Pumping			
2:00		750	1350		351-7"	513						
2:30		"	"		351-4	503		74				
3:00		800	1400		367-0	605						
3:30		825	1450		381-7"	692		75				
8-28-55												
10:00A					303-7"					SWL		

U. S. GOVERNMENT PRINTING OFFICE 16—45721-1

Well No. 6 pumping 68 G.p.m.

" " 5 " 200± "

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

9-230

File No. Washington .... District ....

Grinnell Pump Test 8-29-55

Time	Engine RPM	Pump RPM	P/W	Gpm	Temp °F	Remarks
10:00A						Started Pumping
11:00	800	1450	378-6	680		
12:00P	800	1500	411-0	752		
12:30	800	"	411-0	750	75	
1:00	"	"	411-0	734		
						Speeded motor
1:30	900	1550	422-6	795		
1:45	"	"	"	"	76	
2:00	"	"	422-5	800		
2:30	"	"	422-0	800	76	
300	"	"	422-0	800	76	Water Gauge.
3:30	"		"	790		
4:00	"		"	786		
5:00	925	1590		840		Line Stuck
5:30	"	"		"		In hole - no
6:00	"	"		"		P/W now.
7:00	"	1600	439.6	930		Lowered bowls
7:30	"	"	445.0	"		2 turns.
8:00	"	"	444.0	925		
9:00	"	"	438.0	"		
9:30	"	"	444-6	880		
10:00	"	"	"	880		Pulley broke on
						motor —
						Shut down.
						Pump off
						to lower Column
						Between 6 & 7:00

— Electric line stuck in hole. —

10' of 10" pipe & 15' of 6" pipe from pump.
meter on 6" line.

6 stages
490' of 12" pump to top of bowls.

508 to suction.

Considerable trouble with electric line dragging on flanges of pump column.

All d/w meas. made by Bernard Matherly, Water Supt., or driller. -

Majority of GPM figures from M.B. Starr, City Engineer → Average of 15 min check with stop watch on meter -

---

Distance from City wells 5 & 6 at water plant to new well reported as 745 feet by Water Supt.

Well No. 6 pumping 685 gpm

9-230

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington .... District ....

City well No. 7

Grinnell Pump Test 8-30-55

Time		Engine RPM	Pump RPM		D/w	GPM		Temp °F	Remarks
									Pulleys changed so
									as to revolve pump
									at higher speed
12:20 Pm					301.12				SWL
1:08					301.28				Using City electric line
1:45					301.22				MP - base of pump rim
									.70' above top csg. ±
									City uses top csg.
									Top csg. 2'± above L.S.
2:10									Pump on.
2:18					341	500±			
2:20									Stopped pump
2:30									Pump on
2:36					350	580			
2:44					352.7	"			
2:55		700	1350		352.75	584			
3:00		700	1350		350	569			Driller meas.
3:09									Speeded pump
3:12					370	760			
3:30		750	1350		375	760			
4:00		750	1450		379-6	735			
4:30		800	1550		414-6	875			
5:00		825	1600		424	900			
5:30		"	"		425-10	890			
6:00		"	"		426-8	"			
6:30		850	1650		455	970			
7:00		"	"		456	975			
7:30		875	1700		473-2	1017			
8:00		"	"		475	1015			Water Sample

No. 5 pumping at 300 gpm

9-250

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington .... District .... (2)

Grinnell Pump test 8-30-55

Recovery From	To	Minutes										
475	308	15							Recovery meas.			
308	305-9	15										
305-9	302-4	30										
302-4	302-1	60										
302-1	301-6	120										
301-6	299-4	540										

Temperature before testing 64°
" after " 75°

9-330

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ..... District .....

Check in #6 well when testing #7 Grinnell-

1955 8-29	Time		water level ft	in.								
	Switch at		10:00 am			303'-4"						
	#6 pump started at					10:30 am						
	11:00 Am		386-8									
	11:55		390									
	1:00 pm		391	9½								
	2:00		393	1								
	3:00		393	9								
	4:00		394	1								
	4:30		394	6								
	5:00		394	8								
	6:00		394	16								
	7:00		393	9								
	7:30		394	16								
	8:00		395	1								
	8:55		393	9								
	9:30		394	1								
	10:04		394	1								
	11:00		392									
midnite	12:00		391	2								
8-30-55	1:00		390	9								
7 am	8:00		390	1								
	8:05				#6 pump O K							
	11:00				45 Started							
	11:50		307	1								
	2:35 pm		308	11								
	3:00		310	6								
	3:30		312									
	4:00		313									
	4:30		314	4½								
	6:05		316	5								

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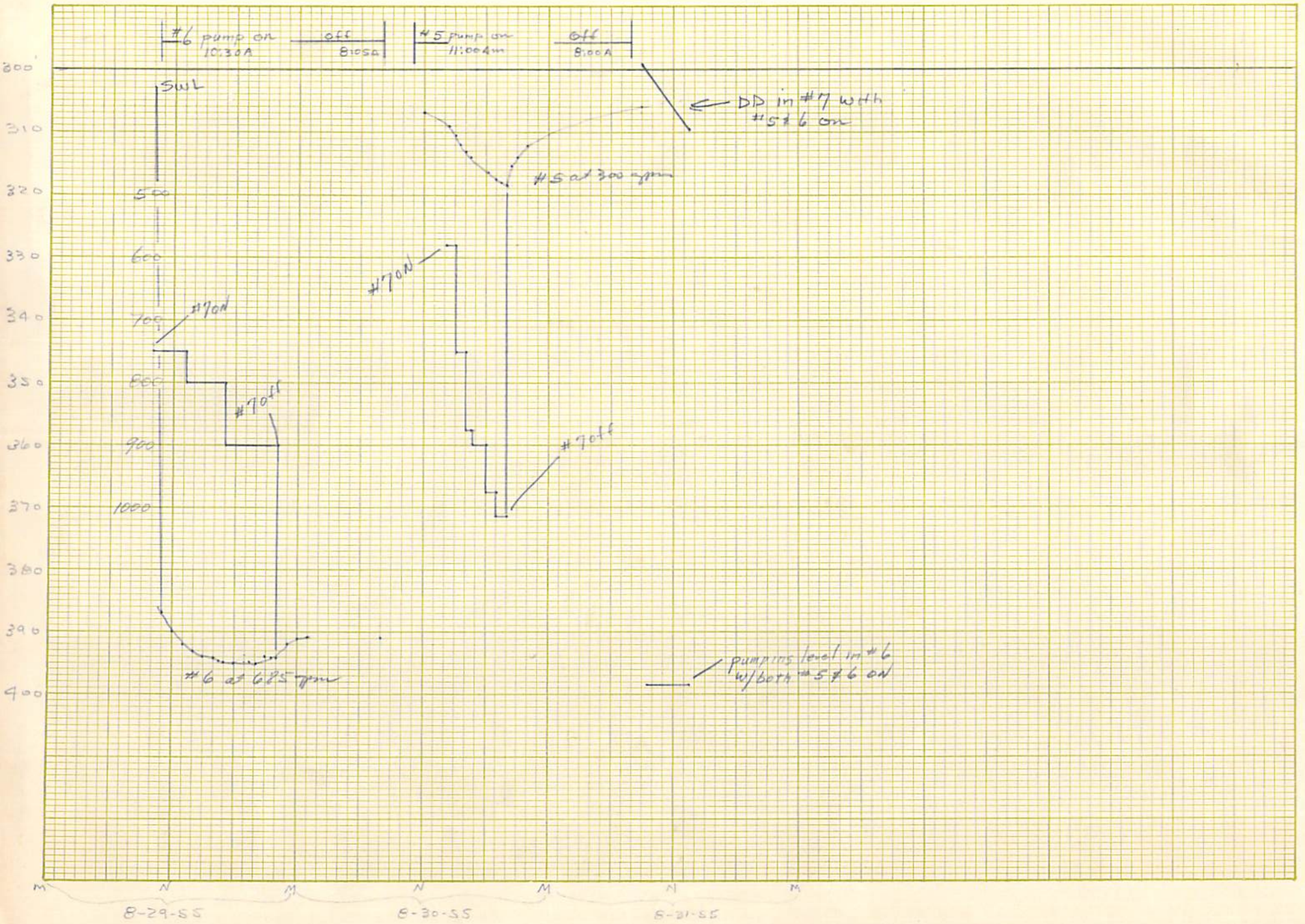
9-280

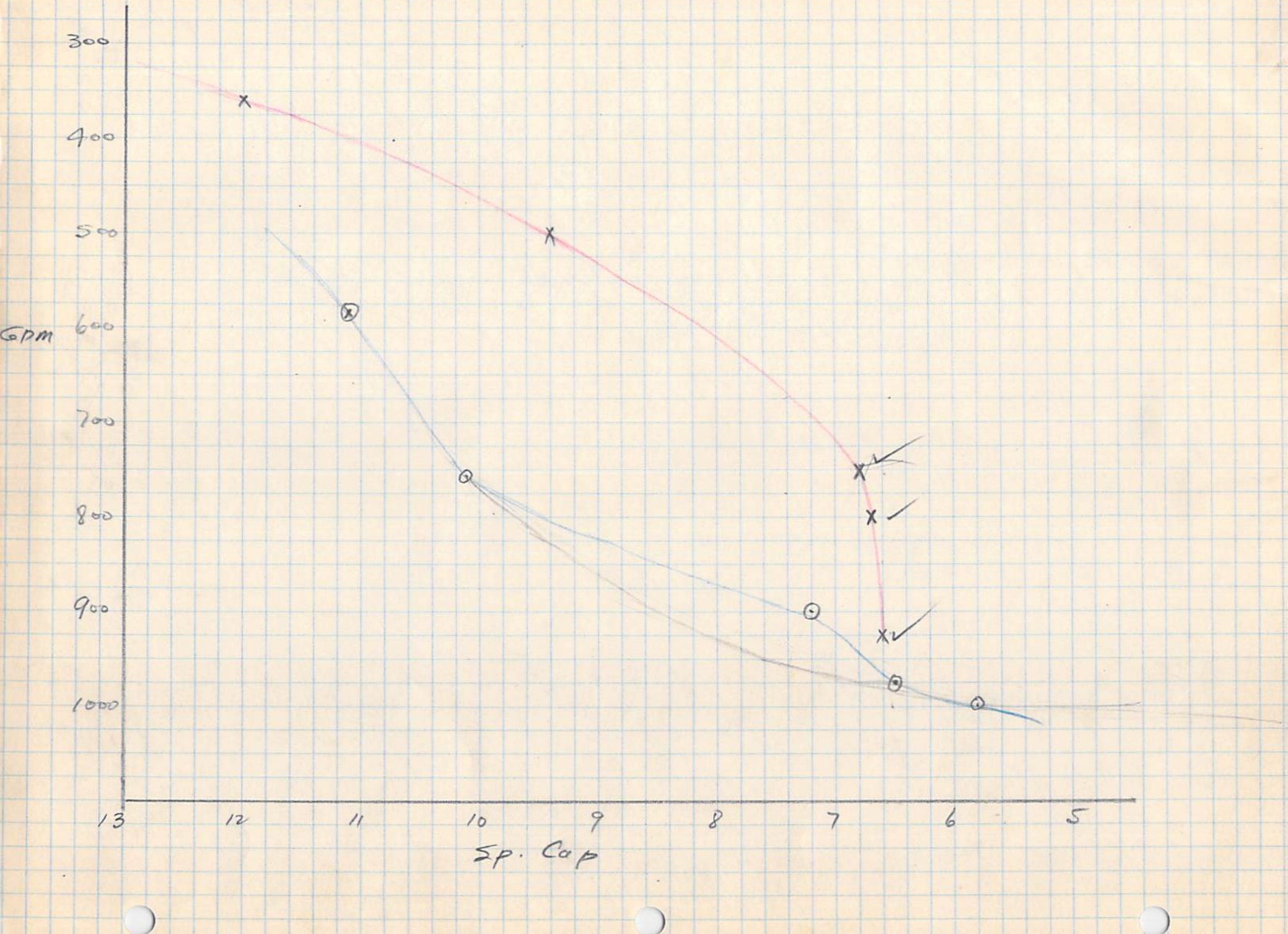
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington .... District ....

6:30		316	10									
7:00		317	7									
7:30		318	1									
8:00		318	6									
8:30		315	5									
9:00		313	9									
10:00		312	3									
8-31-55					#5	off		at 8:00 AM				
9:50		305	11									
			#7	went	[illegible]							
9:00		299	4									
1:30		309	4		Both	5 &	6 running	[illegible]				

Water level measured in #6 with Both #5 & #6 pumping was 398'-6".




300
400
500
600
700
800
900
1000
GPM
13
12
11
10
9
8
7
6
5
Sp. Cap

8/30/55

Grinnell City well
Log copied from Drillers Notebook
could not locate upper section

JBC

742 - 770	limestone
770 - 785	Shale, Grey
785 - 915	limestone
915 - 950	" Shale Streaks
950 - 965	Brown Lime
965 - 980	limestone
980 - 985	" Grey Shaley
985 - 995	" " hard
995 - 1000	" " Shaley
1000 - 1025	" "
1025 - 1042	Brown Ls.
1042 - 1043	Shale, Blue
1043 - 1085	Limestone, grey (Sharp)
1085 - 1120	" Brown
1120 - 1150	" Sharp
1150 - 1193	"
1193 - 1240	Shale
1240 - 1270	" Brown
1270 - 1330	" light

w/Lat 830' Was 425'
" " 880' " 370'
" " 925' " 429

1330 - 1375	Shale, Brown
1375 - 1398	" Hard
1398 - 1560	Brown Lime
1560 - 1585	Gray "
1585 - 1635	Brown "
1635 - 1640	Shale - Blue-Green
1640 - 1655	Ls. Gray
1655 - 1688	Brown Ls.
1688 - 1693	Sh. - Blue-Green
1693 - 1727	Sh. Pebble SS
1727 - 1760	Gray Lime
1760 - 1770	Brown "
1770 - 1795	Limestone
1795 - 1922	Ls. - Grey
1922 - 1925	Sand
1925 - 1980	N.R. Sandstone
1980 - 1985	" Some Dolomite
1985 - 2085	Sandy Dolomite
2085 - 2197	Dolomite

Cement at 2022'

w/Lat 1900' Was 338'-9"
1990' 323-9"
2030 325'
2055 317

2197 - 2250	Sand
2250 - 2265	Dolomite
2265 - 2315	Limerock
2315 - 2390	Dolomite
2390 - 2420	" w/shale Streaks
2420 - 2495	Dolomite
2495 - 2508	" w/shale Streaks
2508 - 2513	Shale
2513 - 2555	Dolomite w/shale Streaks
2555 - 2575	Dolomite
2575 - 2595	Sdy. Lime - Brownish
2595 - 2610	Sand - Brownish
2610 - 2620	Sand
2620 - 2625	Sand w/streaks of red
2625 - 2635	Shale
2635 - 2647	Brownish Sand
2647 - 2700	Green Shale
	Dolomite

SWL at 2180' was 306'

2021' of 10" liner
Set at 2702 - 2500

MEMORANDUM November 21, 1955

To: H. G. Hershey
From: W. L. Steinhilber
Subject: Pumping test - Grinnell City Well No. 7

I was notified that pump test had started on November 11 and was to run thru 11/12/55. When I arrived on morning of the 12th, I found the test had been concluded the evening before. The drawdown was excessive and poor water quality was observed.

I located B. Matherly and received the data and a water sample. The data and results are being tabulated and summarized for the files.

Walt

Results of Pumping Test
Grinnell City Well No. 7
November 11 and 12, 1955

Name: Grinnell City Well No. 7

Location: SWNW sec. 16, T. 80 N., R. 16 W. (Poweshiek County)

Elevation: 1011 feet above sea level

Contractor: Thorpe Well Company, Des Moines, Iowa

Depth: 2970'

Casing Record: 19" from 0-700' (cemented); 12" from 675 - 2000' (cemented); 10" from 1975 - 2685, swedged in top and bottom (this column was added last to shut-off the Jordan St. Lawrence aquifer -- will be perforated after test); 10" from 2685 to 2700; 8" from 2660 to 2815'; 6" from 2768' to 2970', bottom 110 ft. perforated.

Test Pump: Turbine, powered by two large diesels. Set at 560'

Discharge measurements and depth to water measurements same as previous tests, made by B. Matherly, Water Superintendent.

Temperature Measurements: made at end of discharge line.

Aquifer Tested. Mt. Simon sandstone

Results: drawdown was extreme - 259' dd. pumping at only 425 g.p.m. after 8 hours. (See results of previous tests on 8/27-30 & 10/12-13/55)

Future plans: Plug to be set at ft. and casing opposite Jordan sandstone to be perforated from ft. to ft.

Data collected by W. L. Steinhilber

Remarks: Matherly made preliminary chloride analysis. Very high, over 2600 p.p.m.

Results of Pumping Test
Grinnell City Well No. 7
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9-230

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ..... / District .....

Grinnell City Well # 7 Pumping Test 11/11 - 11/12/55

DATE	HOUR	RPM Engine	RPM Pump	W/L	D/W		Q (gpm)	Temp.		Remarks		
11/11	12 N.							63°7	START PUMP			
	12:30			391.2	90.2				S.W.L. = 301'			
	1:00	750	1700	425.5	124.5		250					
	1:30	800	1490	448.7	147.7		290		Muddy & SAND			
	2:00	800	1490	448.2	147.2		290		Muddy			
	2:30	850	1560	463.3	162.3		350	77°7	clearing			
	3:00	"	"	462.8	161.8		345					
	3:30	"	"	462.7	161.7		345	77°7				
	4:00	"	"	462.7	161.7		350					
	4:30	"	"	—			405					
	5:00	"	"	—			405					
	5:30	900	1600	548.3	247.3		405					
	6:00	"	"	548.3	247.3		405					
	6:30	"	"	—			405					
	7:00	"	"	544.6	243.6		405					
	7:30	"	"	544.6	243.6		405			water sample		
	8:00	910	1650	560(?)	259.		425	[illegible]7.		little cloudy		
	8:00								Pump off			
	8:10			303	257				Recovery			
11/12	9:30a			295					W/L after 13 hrs higher than original STATIC W/L.			

obs: B. Matheny - Town Water Supt.
Data collected by W.L. Steinkilber
SWL = 301'

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