February 2, 1938

Mr. L. J. Klise
Box 143
Forest City, Iowa

Dear Mr. Klise:

Enclosed is a preliminary mineral analysis on the new city well at Grafton, as shown by the sample which I collected at the end of the pumping test on January 29. The final analysis will be completed in a few days and the results sent to you at that time. This analysis, as you know, does not show the sanitary condition of the well because the bacteriological count cannot be made on a sample collected in this manner.

The analysis is very similar to that of water from the Cooperative Creamery well at Grafton, which we looked at during the pumping test. Major change is in the iron content of the water from the town well. The creamery well, deriving most of its water from the same source, shows 0.4 parts per million, while the iron in the city well amounts to 1.4 parts per million. We often find that a high iron content in a newly drilled well decreases with use, and in this case I feel confident that we can expect a large reduction after the well has been pumped for some days. In other respects, the water as shown by the preliminary analysis is quite suitable for town use.

If the Geological Survey can be of service at any time, please do not hesitate to call on us.

Very truly yours,

H. G. Hershey

HGH:A
Enc. 1

CC: Mr. T. W. Thorpe
Mr. Ralph Gearhart
Mr. Otto H. Buechele

IOWA GEOLOGICAL SURVEY
Water Analysis Report
PRELIMINARY

SEE Water Anal. Folder.

4

County Worth — Date Sampled January 29, 1938

Town Grafton — Sampled by H. G. Hershey

Location of Well SW¼ SE¼ SW ¼, SE ¼, Sec. 3, T. 98 N., R 19 W. E

Owner Town of Grafton — Well No. ____ : T.D. 172½ ft.

Type of Well Drilled — Static Level 41'7½ ft. — Curb Elevation 1225 ft.

Producing Formation(s) Cedar Valley limestone — Depth range ____

Remarks on Condition of Well, Casing or Formations 12" casing from 0 to 70' 8" casing from 2'5" above curb to 90'. 12" hole from 70' to 90' filled with concrete. Annular space between 12" and 8" casings filled with concrete.

Constituents	Parts Per Million	Constituents	Parts Per Million
Total Solids	346.0	Magnesium (Mg)	22.5
Dissolved Solids	____	Iron (Fe) (unfiltered)	1.4
Insoluble Matter	13.6	Manganese (Mn)	0.15
pH	7.0	Aluminum (Al)	____
Alkalinity (MeO)	256.0	Fluorine (F)	____
Alkalinity (Phn)	0.0	Chlorine (Cl)	11.0
R_2O_3	____	Sulphate (SO_4)	16.4
Nitrogen as Ammonia (NH_4)	____	Bicarbonate (HCO_3)	312.3
Nitrogen as Nitrite (NO_2)	0.002	Phosphate (PO_4)	____
Nitrogen as Nitrate (NO_3)	0.15	Borate (BO_3)	0.0
Alkalies as Sodium (Na)	____	Calculated Hardness	287.0
Calcium (Ca)	76.6	Hardness Grains per U. S. Gallon	16.8

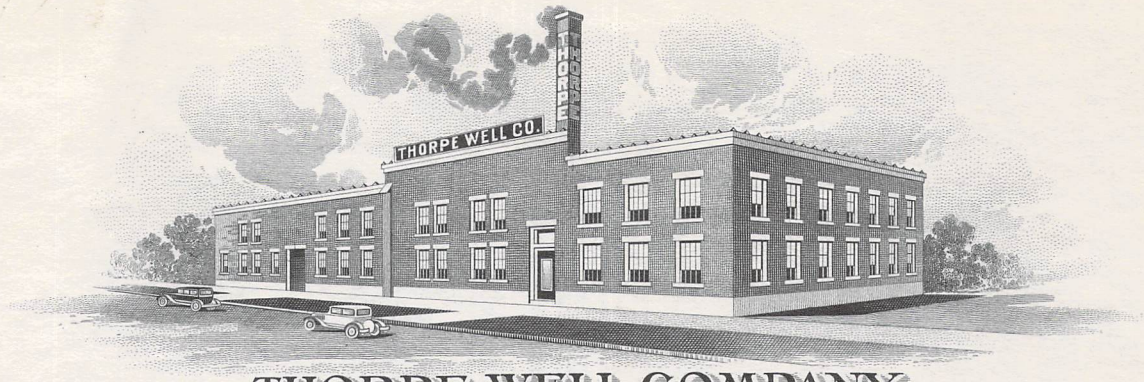
Temperature: Water 47 °F, Air 19' °F, Measured at 27' from well in 4" pipe

Remarks:

Analysis by State Water Analysis Laboratory, Prof. J. J. Hinman, Jr., Director, Iowa City, Iowa. Lab.No. 119,957, Date Feb. 2, 1938

Sent to:

Date:



THORPE WELL COMPANY

CONTRACTORS

LATEST ROTARY AND CABLE TOOL EQUIPMENT
THORPE PATENT GRAVEL PACKED WELLS

2340 SIXTH AVENUE
TELEPHONE 3-6107

DES MOINES, IOWA

PLEASE ADDRESS ALL REPLIES
DIRECT TO THE COMPANY

Jan. 5th 1938

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

Dear Sir:

We are enclosing herewith a log of the new well at Grafton showing theformation to date.

The City Council have asked for a test of the water as to mineral analysis and have asked us to test for quantity at this time.

We are having our driller ship you a sample of the water by express prepaid and will appreciate your having this analysis made for us.

Wishing you a prosperous and Happy New Year, we are,

Sincerely yours,
Thorpe Well Company
By Pittman

September 27, 1937

MEMORANDUM

TO: H. G. Hershey, Hotel Hanford, Mason City

FROM: A. C. Tester

SUBJECT: Grafton, Worth County, water supply project

This will acknowledge receipt of your memorandum of September 23 enclosing your report to Mr. Gearhart in compliance with his request for information on that locality. I have read your report and do not have any suggestions or criticism, other than the material should meet the full requirements and serve as a basis for proper specifications of a satisfactory well. It is possible that your expectation of a high static level and low drawdown for 100 g.p.m. is controlled by the situation demonstrated at Kensett. I hope that your prediction will be accomplished, although the character of the formations is such that it is hazardous to expect such close similarity in wells separated as much as the nine or ten miles between Kensett and Grafton.

Dictated September 25.

Hotel Hanford
Mason City, Iowa
September 23, 1937

Dear Dr. Tester:

Enclosed is my letter to Mr. Gearhart concerning the new water supply at Grafton, Worth County. The english could have been improved by rewriting, but the time involved did not seem justified since, as you know, I am not very adept with the typewriter. I will be very glad to have any criticism which you may have.

I was unable to talk to the council at Grafton as a group, but explained my purpose and recommendations to the mayor and two of the council members individually.

All of yesterday was spent on the Grafton project.

Very truly yours,

H. G. Hershey

H. G. Hershey

Hotel Hanford
Mason City, Iowa
September 23, 1937

Mr. Ralph W. Gearhart
Consulting Engineer
329 Twenty-first Street, S.E.
Cedar Rapids, Iowa.

Dear Mr. Gearhart:

Your request to the Iowa Geological Survey for information regarding a new well at Grafton, Worth County has been referred to me. I have visited Grafton an made a study of the geology and water possibilities of the area.

Mr. Bruesewitz, the Mayor, informed me that you were present at the time that a member of the State Board of Health approved a location for the well between the railroad and Third Avenue, in line with the extension of Second Street.

Geologically, there are no objections to that location. At that point I believe that a properly constructed well, to a depth of 150 feet, will produce an adequate supply of water for the town of Grafton. Unfortunately, accurate samples of well cuttings have not been saved from wells drilled in the vicinity of Grafton and an accurate forcast cannot be made of the materials which will be passed through in drilling. The following general section, however, may be expected at the proposed location.

	Feet
Glacial drift and unconsolidated material, including some sand at approximately at 17 feet and possibly at 43 feet.....	0-45
Limestone or dolomite, gray and buff, granular, with hard cherty streaks.....	45-65

	Feet
Shale or very soft limestone, gray	65-70
Limestone or dolomite, gray and buff, with crevices and hard cherty streaks.....	70-150

Any water found in the glacial material will be objectionable and inadequate for a town supply. The limestone or dolomite between 45 and 65 feet is reported to be a poor producer, as is the material from 65 to 70 feet. Numerous wells have been developed in the limestone or dolomite below 70 feet in the vicinity of Grafton, and an adequate supply of water for the town may be expected from the crevices and more porous beds. It should not be necessary to go below 150 feet for the water needed, and it is possible that it may be obtained before that depth is reached. Water from this source will have a static level of approximately 35 feet and the drawdown, at 100 gallons per minute, may be as little as 6 feet, that is, to a depth of 41 feet, although this figure is highly questionable.

The bedrock immediately below the glacial drift is a part of the Shellrock formation, which is in turn underlain by the Cedar Valley formation. Both formations are Devonian in age. The lack of well cutting samples prevents an accurate determination of the depth of the contact between the two, but it appears possible that the contact occurs at 70 feet.

It is important that the glacial material be completely cased out and a perfect seal obtained between it and the underlying bedrock. Trouble has been encountered in other wells in the vicinity because this was not done and under heavy pumping sand entered the well, and put the pump out of commission. You may be interested in knowing the construction of the town well at Kensett, Worth County, which was done under P.W.A. and apparently meets requirements similar to those expected at Grafton. At Kensett 76 feet of 12-inch wrought iron casing was placed from the surface to 76 feet and a 12-inch hole continued to 105 feet. The top of bedrock there, occurs at 76 feet. An 8-inch pipe was placed from 60 to 105 feet and the space betweem the 8-inch pipe and the

walls of the 12-inch hole, and between the 8-inch and 12-inch pipes was filled with concrete, which was allowed to set before drilling was continued in an 8-inch hole to a total depth of 235 feet.

I hope sincerely that your specifications will include a section providing for samples to be saved from each 5-foot interval of drilling and that the samples will be sent to the Iowa Geological Survey at Iowa City. They will be most helpful to us. If you will notify the Survey a few days before drilling is expected to start we will have adequate containers for the samples sent to Grafton.

If we can be of any further service please do not hesitate to call on us.

Very truly yours,

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

Hotel Hanford
Mason City, Iowa
September 17, 1937

MEMORANDUM

TO: Dr. A. C. Tester

FROM H. G. Hershey

SUBJECT: Proposed water supply at Grafton, Worth County.

Your memorandum of September 16 on the above subject reached me today. I plan to do the field work at Grafton on Tuesday, September 21. If it is imperative that it be done before that time I could work it in on September 19, but it would be less convenient at that time.

Before making a report to Mr. Gearhart I will visit the Kensett well and obtain all available information there and from Mr. Sharff. I will send you a copy of my communication to Mr. Gearhart. At your suggestion I will meet the council at Grafton after the field work has been done, for the purposes that you outline.

September 16, 1937

MEMORANDUM
TO: H. G. Hershey, Hotel Hanford, Mason City.
FROM: A. C. Tester

SUBJECT: Proposed water supply at Grafton, Worth County.

A request has just been received from Ralph W. Gearhart, Consulting Engineer of Cedar Rapids, for information on the location of a new well at Grafton, Worth County. It appears that the town has received a P.W.A. grant for a water works, and the city council has employed Mr. Gearhart as their consulting engineer. Mr. Gearhart wishes to obtain the proper location for a well, in order that he may draw his plans for pumphouse, reservoir tank, and distributing system according to the best location.

Mr. Gearhart's request for information came during my absence, and since there has already been some delay, I believe it will be desirable for you to do this work at the earliest possible moment. It is obvious that it must be worked in conveniently with your commitments at Mason City, but if a day can be taken out conveniently, I suggest that this plan be followed.

After having made your survey and reached proper conclusions, I suggest that you consult with the city council at Grafton, explain to them your decision and recommendations for the location of the well, and also explain that your location should be approved by the State Department of Health. In addition, please prepare a written statement and send it to Mr. Gearhart at Cedar Rapids. His address is as follows: Mr. Ralph W. Gearhart, Consulting Engineer, 329 Twenty-first Street, S.E., Cedar Rapids. Send me a copy of your communication to Gearhart.

It is possible that the best water supply may be obtained from the Cedar Valley formation and that a well similar to that developed as a P.W.A. project at Kensett will meet the requirements of the town of Grafton. We do not have a record of the Kensett well

other than that it is 235 feet deep and finished in limestone "probably Cedar Valley." McCutcheon received the contract for this well, but sublet it to Scharff, and as a result there was considerable misunderstanding concerning the samples. McCutcheon promised to supply the samples and I believe made every attempt to do so, but Scharff neglected to save the material in properly labelled boxes and as a result the cuttings were so badly mixed and improperly handled that it was not worthwhile to salvage any of the material. The matter of construction and pumping tests, however, can be obtained from the P.W.A. office in Des Moines, but I suggest that you call at Kensett and get as much information as is possible from the council at that point.

September 16, 1937

Mr. Ralph W. Gearhart
Consulting Engineer
329 Twenty-first Street S.E.
Cedar Rapids, Iowa

Dear Mr. Gearhart:

Your letter of September 8 came to my attention on my return to the office on the 15th. I am sorry that there has been some delay in handling this matter and hope that the lack of prompt handling has not caused you an inconvenience. I am referring your request for information to Dr. H. G. Hershey, who is now doing field work at Mason City. Dr. Hershey should be able to visit the town of Grafton within the next few days and discuss the matter directly with the council. Also, I have asked Dr. Hershey to make a report so that a written statement can be sent to you at your Cedar Rapids address.

Yours very truly,

A. C. Tester

ACT:A