

# Correspondence - G. 1925-1948

Thwaites, F. T. (Fredrik Turville), 1883-1961 [s.l.]: [s.n.], 1925-1948

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#### ST. MARY'S WELL, DES PLAINES, ILLINOIS

Hit Mazomanie at 860 Out of Mazomanie, calcareous sandstone at 945 85 foot thickness 20 foot thickness 945 - 965 Transitional beds, probably Mazomanie but may be left open 965 - 1040? Dresbach - clean white sandstone 1040? "Lime shell" 1040 - 1115 White sand 115 - 1116 Blue shale - Eau Claire 1116 - 1145 Calcareous sandstone

Estimate top of Mt. Simon at 1115 <u>300</u> 1415 to not over 1455

Well should go to 1500 or 1600 feet.

I'm gray

Fortrip to Melivaukee 2-21-25

February 27, 1925.

Mr. F. M. Gray, Jr., 290 Third Street, Milwaukee, Wisconsin.

Dear Mr. Gray:

I wish to acknowledge your very kind letter of February 18th. I appreciate very much your statements with regard to the help that the Geological Survey has been to you, and also your offer to make an appearance to help to defeat this bill. I do not know that your appearance would have much effect but if you desired to do anything, probably the most effective thing you could de would be to write the representatives of the legislature from Milwaukee.

The hearing on the Geological Survey budget will be held before the Finance Committee next Tuesday afternoon, and after this hearing any bill that is to be introduced will be introduced by that committee. There is no means of telling when any such action will be taken. They may take action to put out a bill immediately or they may delay it until toward the close of the session. Letters from constituents with regardto legislative matters have much more weight with members of the legislature than any statements which I can make because anything that I say is open to the interpretation that I am merely fighting because the plan is to abolish my job.

Thanking you for your expression of willingness to do anything to help out in this matter, I am

Very truly yours,

Director

WOH/LMV

F. M. GRAY, JR. COMPANY INCORPORATED

WELL CONTRACTORS

CHICAGO, ILL. 218 SOUTH WABASH AVE. TELEPHONE WABASH 2020

WATER > OIL > GAS 290 THIRD STREET TELEPHONE GRAND 250 MARK PIPE WELL PUMPS TOOLS AND SUPPLIES

MILWAUKEE, WIS.,

Feb. 18, '25

Prof. F. T. Thwaites, University of Wisconsin, Science Hall, Madison, Wise

My dear Professor:-

Your esteemed letter and it is with regret that I note the remarks as to certain forces endeavoring to abolish the Geological Survey, and I suppose this is nothing more than in line with what you told me merely that Blaine is playing politics and he is after Hotchkiss instead of someone else.

I shall be at your command and will do all in my power in this matter.

I returned from Wausau this morning and talked to Tony Leicht, my foreman at St. Marys Training School, Desplaines, Ill., and he informed me that he forwarded Monday noon to you samples of that well up to 1155'. It has been very hard and he told me this morning, however, it was somewhat softer and they were down 1175° this morning, he having got out 8' since midnight instead of the customary two to three feet in 12 hrs. He mentioned the fact that he was in a grayish lime formation. It is my desire to penetrate to the top of the Mount Simon and I wish you would inform me at once what we are in, and also advise if possible as to whether the Eau Claire which we think we are now in contains much alkali which would tend to soften the water. We desire a softer water, if possible, and would also like, of possible, when we finish that well to get them a water that will not leave a precipitate such as Area is doing.

Your advices in this matter will be greatly appreciated, and with kindest personal regards, I am

Yours very truly, F. M. GRAY, JR., COMPANY Andia 2 President

June 5, 1925.

Mr. F. M. Gray, Jr., 290 Third Street, Milwaukee, Wisconsin.

Dear Mr. Gray:

8

I received yours of the first and the copy of the letter. I will be glad to confirm your opinion if they should write to me.

The sample tubes are ready and packed and I will try tonbring them down early next week. Please let me know as soon as possible what day you will be in and I will come down as I am through with classes and can get away at any time although I am not able to leave for more than a day.

Yours very truly,

FTT-M

Geologist

#### F. M. GRAY, JR., COMPANY INCORPORATED

CHICAGO, ILL. WINNETT, MONT. WELL CONTRACTORS

WATER -:- OIL -:-GAS 290 THIRD STREET TELEPHONE GRAND 250

MILWAUKEE, WIS.

June 1, '25

TEST BORINGS

MARK PIPE

TOOLS & SUPPLIES WELL PUMPS

Prof. F. T. Thwaites, University of Wisconsin, Science Hall, Madison, Wis.

My dear Professor:-

Enclosed find copy of letter written this day to Mr. Cunningham who is representing Mr. Lasker for whom we are drilling 150 gal. well on Main 42-A Highway - one and a half mile west of Everett, Ill. I am sending this copy for your information so that if any of them get in touch with you that you can confirm my letter.

> Yours very truly, F. M. GRAY, JR., COMPANY nay fr.

FMG/LK

WATER SUPPLY SPECIALISTS

Mr. R. D. Cunningham, 810 Church St., Evanston, Ill.

Dear Sirt-

In re the well which we are drilling for Mr. A. D. Lasker, and in time with the writer's conversation with Mr. O'Neill and Mr. Reseman of a week ago, we made our recommendation for clutting off the culphur and petroleum deposits encountered in the drilling of this well. The writer was very much surprised indeed yesterday to receive the latter he did from you, and consider same entirely unjust and uncalled for. The writer has built this corporation up on conscientious good workmanchin, and believe that you will find our jobs speak for theselves in this regard - whether they have been shallow or deep, we have given the service which the individual cener demanded.

As per our conversation of yesterday and in order to make the matter entirely clear, we wish to confirm as follows:-

This well is located on an anticlinal structure which rune north and south, north of Glenview to somewhat north of Libertyville. Its bounds on the east, shirts the Village of Lake Forest extending from four to five siles west. By this the writer means there is a long anticlinal fold and in this fold in certain places, as experience has shown, sulphur with traces of til and gas are found. The writer believes if you will question Mr. Botsch, or Mr. Lincoln Petties, both of whom have drilled a number of shallow wells thru that district, that in lots of cases it is entirely impossible to obtain a shallow house or farm well free from these deposits above the St. Peter sandstone. The writer has personally worked on a number of wells in this district during the past twenty-five years, both in the capacity as driller for his father, and as contractor for himself. The State Geological Survey of Illinois at Urbana, the writer believes can give you great light on this subject, as also Prof. F. T. Thwaites who is more familiar than any one else with the waters of northern Illinois. Prof. F. T. Thwaites can be reached at Madison, Wis., State University.

In the drilling of Mr. Lasker's well we spudded down a 12" hole thru the top clay to the approximate 80! level where we encountered a thin sand bed Nº in thickness from which we passed into blue clay which extended all the way to bed rock at 155'. At the approximate 143' level in some shell rock we hit a strong flow of gas which made itself known on top of the derrick floor. It took 73" of pipe driving thry this shell rock to shut it off and we succeeded in landing our 10" pipe in the solid rock at 155' where the drillers report a perfect shot off and a dry hole. By this the writer means when they started to drill in this solid bed rock at 155' that they could bail all the fluid gut. From this point on they picked up traces of petroleum which was preserved in wide mouthed fruit jars at the job for your or any body else's in-spection. We have also preserved complete samples from the top of the ground on downward. We do this for our own records and for the preparation of a blue print showing the proper goology upon completion of the well that the owner may have an accurate record of what has been penetrated.

Last Friday evening the boys shut down for Memorial Day over Sunday and were at that time at a depth of 350' in the Nizgarn limestone. We expect there to be 300' or better of this Niagara lime with approximately 150' of Cincinnati shale. The bottom of this shale will lie at approximately 600' or slightly less. Your contract as submitted and signed calls for the setting of the 10" pipe in the bed rock and we put on this 10" pipe a special long Texas forged tool steel shoe so as to be able to effect with a certainty a proper shut off at the top of the first rock - this was accomplished. We are drilling a 10" hole and will carry same unless otherwise ordered thru/the bottom of the shale strata and from five to ten ft. into the second line so as to

-2-

be sure all shale has been passed thru at which time the contract contemplates the installation of sufficient 8" standard steel pipe as a liner in order to case off this shale strata for its entirety. It is our policy to always leave this 5" shale liner lap from five to ten feet below the bottom of the shale and five to ten feet lap above - when we can proceed, if so ordered, to drill an 5" hole shich is the largest inside diameter of the 5" liner into or thru the second limitone as directed or into the St. Peter sandstone, is so ordered.

It is immaterial to this corporation whether the owner cases off the top line or not. The writer was asked for a suggestion and made it. It conditions are such that sulphur water and netroleum skum on the water is not objectionable for their proper usage, then, of course, there is no use of easing off the top limestone. These are conditions which the owner, or his representatives, must best be able to know. We have not been notified with when to discuss these satters so far. We are at all times here to co-operate with each individual owner that he may have the benefit of our experience thru various sections of the country, and we are ready to proceed in accordance to any suggestions offered.

I may state finally in conclusion that this same question has arisen before, especially in two cases which has been fairly recent in which the owner percisted in knowing that he could parge and exhaust the petroleum and sulphur content by constant pumping of the well. After a year's pumping we must go back to the job and deepen it thru the shale to the St. Peter sand - this in spite of the fact that there was a well only 500 yda. west of this particular location where Mr. Chas. Morse went thru the same thing. I an speaking of Mr. Paul Llewellyn for whom we drilled a well last summer. The writer also wishes to state that there is a 400' well on Mr. Lasker's property at the farm house directly south of our new well location. This well evidently has been in use for a great number of years and is giving off a very objectionable petroleum and sulphur deposit. This also applies to Mr. Niblack's well just east and across the road from Hr. Lasker. Mr. J. O. Armour just north of Everett Station, or approximately a mile and a half north of Mr. Lasker has drilled two wells - both of them were

an San

24

worked on by the writer's family. In the second coll drilled Mr. Armour had a considerable gas production and encountered approximately a half barreld of oil per day. After considerable experimenting it was found necessary to case off the entire well to the top of the cands. However, Mr. Arthur Mosker's well just east of Mr. Armour's place encountered fresh water at 780. This is evidently due to the fact that there is a syncline or depression between the two locations.

We undoubtedly will pase thru the shale strate within the next 46 hrs. and it is imperative if you want the 8" pipe extended with the seals installed that we know immediately so we can order the proper scale and pipe delivered at the job. From as it is there will be a delay as the scale must core from Jutler, Pa. If you do not wish this pipe installed the writer would like to have somebody advice immediately so that we can install the regular shall liner which is now on the job and proceed with the writing to such a point as ofdered.

We should very much like to know at this time as to whom we are to confer with in these various matters as they come up, as it is expansive to keep a drilling crew such as we have idle avaiting decisions.

> Youre very truly, F. M. GRAY, JR., COMPANY

> > President

CC - Mr. Ceo. O'Heill

FMG/LE

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October 13, 1925.

Mr. F. M. Gray, Jr., 290 Third Street, Milwaukee, Wisconsin.

Dear Mr. Gray:

The samples for the Twin Orchard Country Club mentioned in your letter of October 8 arrived this morning. I have examined the samples from 1110 to 1230 and find the log is as follows:

1110-1130	Dolomite, gray and pink, evidently the bottom of the
	Lower Magnesian
1130-1145	Sandstone, very fine, gray and pink, very dolomitic and hard, glauconitic
1145-1170	Sandstone, fine, gray and pink, calcareous, glauconitic, some hard layers
1170-1180	Sandstone like the above, but much harder
1180-1200	Sandstone, very fine, gray, calcareous, glauconitic
1200-1005	Dolomite, gray and pink, some sandstone like the above
1205=1210	Sandstone, fine, gray, caleareous and glauconitic
1210-1230	Sandstone, medium to fine, white, calcareous, apparently

I classify the last 20 feet as the basal beds of the Mazomanie and not the true Dresbach. However I think it will be all right to land your casing on the hard shell at 1200 to 1205 if this seems suitable from other information. I believe that you will be into the true Dresbach in the next few feet as the Mazomanie is only a trifle over 100 feet thick at St. Marys.

I had a talk this morning with Mr. Thorne and he agrees with me about the fault through Des Plaines. I will be very glad to get the logs of the wells to the east of there when you have a chance to copy them out. I think we can then outline the territory which it will be desirable to avoid in the future.

Yours very truly.

Geologist

## F. M. GRAY, JR. COMPANY

INCORPORATED

TEST BORINGS PIPE WELL PUMPS TOOLS AND SUPPLIES WELL CONTRACTORS

290 THIRD STREET TELEPHONE GRAND 250 CHICAGO, ILL. 220 SOUTH STATE STREET TELEPHONE WABASH 2020

MILWAUKEE, WIS.

Oct. 8, 125

Prof. F. T. Thwaites, University of Wisconsin, Science Hall, Madison, Wis.

My dear Professor :-

Your esteemed favor of the 6th inst. and noted upon my return to the office this morning. I will be in the office the rest of the week and should indeed be glad to see you, either Friday afternoon or Saturday morning.

We are straight drilling into the top of the Dresbach at the Twin Orchard Country Club north of Bensenville and south of Desplaines. It is our intention to underream the 8" pipe from where it is now setting at the base of the St. Peter sand down thru the Magnesian lime and Mazomania formations to the top of the Dresbach. With this in mind I have instructed Mr. Sarver, the head driller, to go into the Dresbach white sand 20 to 25" and then to immediately express to you, Science Hall, Madison, samples of the well to that point. When you receive same go over the lower portions quickly and notify me as to the best point on which to set our pipe. He states that there is some red sand he is in now which appears to be particularly hard but{do not care to set pipe in sand. I am afraid of the water by-passing thru it. You, however, can tell from the samples better than I can from here say.

We have a wonderful well at St. Marys - it delivered on test better than 1400 G. P. M. Upon completion of the air lift preliminary test, the water analized 1.7#of encrusting solids and in three weeks of pumping has dropped to 1.3#. The water does not discolor bowls or toilets; in fact, it is almost too soft for boilers but is working out fine at this location as they have a large boiler horse power and do not have to crowd themselves any.

I am endeavoring to work out some kind of an iron remover for the St. Mary of the Lake Area installation where the water is soft but has a tendency to leave iron rust on bowls, etc. This is objectionable to His Emminence Cardinal Mundelin and I thought of getting

WATER SUPPLY SPECIALISTS

## F. M. GRAY, JR. COMPANY

#### WELL CONTRACTORS

TEST BORINGS PIPE WELL PUMPS. TOOLS AND SUPPLIES

WATER 7 OIL 7 GAS 290 THIRD STREET TELEPHONE GRAND 250

CHICAGO, ILL. 220 SOUTH STATE STREET TELEPHONE WABASH 2020

MILWAUKEE, WIS.

-2-

in touch with Paul Kensig at Madison who is with the Northern Water Softener Co. What do you think about it Thwaites?

Yours very truly, F. M. GRAY, JR., COMPANY President

FMG/LK

WATER SUPPLY SPECIALISTS

Page -2-

Mr. F.T. Thwaites,

March 5, 1928.

holding company to finance this franchise.

I talked this over with my banker Saturday afternoon, so I want to have your letter, stating that we will not run any chance of getting the right supply and as also convincing proof, that we will have no trouble in getting bacteria free water.

You know how these bankers are, they will take your opinion where they may not take mine, so please make your letter accordingly.

I shall figure on two units pumping direct with turbine pumps into the mains and I would figure on segregating the wells in various parts of the town.

Your prompt reply will oblige.

Very truly yours, F.M. GRAY, JR., INC.,

PRESIDENT

FMG:ER



## F. M. GRAY, JR., INC.

## WELL DRILLING CONTRACTORS

'BYRON JACKSON PUMPS WELL SCREENS & SUPPLIES

123 Wisconsin Avenue MILWAUKEE Phone Broadway 7246 Suite; 3038 Plankinton Bldg. 220 So. State Street CHICAGO Phone Wabash 2020



Milwaukee, Wis. March 5, 1928.

Mr. F.T. Thwaites, Geologist, State of Wisconsin, Madison, Wisconsin.

My dear Professor: -

I am dealing with the City of Escanaba, for a pure water supply and wish that you would keep this confidental, as I am trying to close the deal on a franchise basis.

They will require approximately one millon and a hald gallons per day and having drilled the deep well for the Northwestern in 1917, which log you tabulated and examined, we would like to hear from you as to your opinion, as to any possible contamination.

In looking over this log, I find that there is a nice bit of coarse gravel shown at the base of the drive pipe. Why not endeavor to put in a combination well with a "Cater" screen, thru this gravel to the top of the rock and then drill a good big hole thry the Dresbach.

I signed contract for the Gray Well Drilling Company, for the hole that they drilled a year ago at this time for the Escanaba Drilling Company. That well was drilled at the opposite end of town and I am very anxious to get a record of it expecially the surface formations and to get a correlation or cross section between these two wells. Will you please get me a copy in some manner or form and give me a correlation of the structure between these two wells.

I will have to form a subsidiary

GUARANTEED WATER SUPPLY Formerly President and General Manager of the Gray Well Drilling Company April 7, 1926

Mr. F.M. Gray, Jr. Gray Well Drilling Company 290 Third Street Milwaukee, Wisconsin

Dear Mr. Gray:

I have your letters of March 29, 31, and April 5. I have straightened out the samples which I have received, but I have not yet had a chance to look them over.

The package from Aledo has not yet arrived. Those from Mt. Carmel came in last night, but I am not sure that I can look at them before tomorrow. I think it is certain that you are in the Mt. Simon.

In regard to the De Peu. The analysis given by the Illinois Water Survey on the Maneral Point Zinc Company's well is 1.97 pounds encrusting solids per thousand gallons. If this well is now giving bad water, I should say that the trouble lies in leakage from strata near the surface. The Sti Bede College well is 2300' deep, lowest formation not definitely known, but probably not Dresbach. The casing is not recorded. The water is 2.37 pounds, but is high in iron and salt. It undoubtedly has a brackish taste. The well at Utica draws from the Lower Magnesian, and gives water that is 2.83 pounds, and is low in salt.

It is my conclusion that waters which are low in salt can be secured from below the St. Peter provided one does not have to go too deep. I am a little afraid to go to the Dresbach which would entail a depth of approximately 2300° to reach the top. To check the quality of the water. I looked up that which was obtained at Geness. The water there flows from the lower formations and contains over 1500 parts per million of salt; encrusting solids are 716 pounds. The **masing** in this well was not recorded. The Dresbach was reached there at only 2035°. The temperature of the water was 65° Fahrenheit which suggests that much of it comes from levels higher than the Dresbach. There is no use falling back on the glacial drift if soft water is desired. The La Salle City well is low in iron and salt, but contains 4.33 pounds encrusting solids.

#### F.M. Gray, Jr.

I am making up a sketch showing the geological conditions between the Oglesby and De Peu from such information as has been published. I think the Illinois Survey has many more records which have not been made public. We will have to visit Urbana to get these.

My recommendation is that one of the old wells be deepened. They are required to be 8' at the bottom and, I believe, an 8" hole could be carried through to the sandstones in the Lower Magnesian, and then a packer test could be made to determine the quality of the water below the bottoms of the old wells. I think, however, that the old wells could be reconditioned by proper casing. There is little doubt that the water in the Coal Measures is highly corrosive and similar water is also found in the Niagara. You will see from the sketch that in order to avoid all formations which come in contact with the Coal Measures to the east, it will be necessary to case off the lower St. Peter sandstone. This leaves the only possible formations, the sandstone in the Lower Magnesian and the Dresbach sandstone.

Inasmuch as no definite test could be made by reconditioning the old wells unless all were treated in the same way, I think the best thing is to drill a well into the Lower Magnesian, and test that first. I cannot recommend a well to the Dresbach as a certain thing, although I think there is a better chance than would appear from the data given above.

If there is anything further that I can do in this matter, please let me know. I shall probably be in the field until next week.

Yours very truly.

FTT:JL

. . . . .

Geologist.

April 8, 1926

Gray Well Drilling Company 290 Third Street Milwaukee, Wisconsin

Gentlemen:

Mr. Thwaites has referred your letter of April 6 to me.

The following quotation from a letter written by Mr. Hotchkiss formerly State Geologist to Mr. W.S. Davison, Turtle Lake, Wisconsin, will answer your question:

"In reply to your inquiry, I will say that I have never heard of Col. Noble of St. Louis and know nothing about him, so I can give you no information directly on his personal reliability. However, if he is making statements that there is a large amount of oil in your vicinity at a depth of 1200 to 1400 feet I will make the statement that he has no adequate knowledge of the geology of Wisconsin. The rocks which you will find if you will drill in your vicinity will be first, at the surface from a few feet to 150 feet or so, of glacial drift - sand, gravel, bowlders, and clay. Then your drill would penetrate sandstone of Cambrian age and would go to a depth, possibly, of 800 to 1000 feet in that formation. Below that the drill would penetrate granites and other very impetvious, hard crystalline rocks of that character. So if you were to drill to a depth of 1200 or 1400 fest, as Mr. Noble suggests, you would be in the rocks which have no pore space or openings to contain oil and it would be absolutely impossible for oil to be there because it could not get into the rocks.

In the Cambrian sandstone you would find soft, porous sandstone formations all the way but of an age geologically much older than any rocks in which oil has been found to occur in commercial quantities anywhere in the world. Furthermore, if oil had ever been present in the pore spaces of this sandstone formation it would long ago have floated to the surface and gone off into streams, as there is no bed of rocks in this sandstone which would be sufficiently impervious to prevent the oil from doing this. Such an impervious bed of rocks overlying a porous rock is absolutely necessary to hold the oil in place, so if oil ever settled in the geological ages past in the Cambrian sandstones which underlie your region it would have escaped into the surface drainage many millions of years ago and no trace of it would be left."

EFB: JL

Director.



290 THIRD ST.

F. M. GRAY JR. COMPANY

CHICAGO 220 SO. STATE ST.

SUCCESSORS TO

W. H. GRAY & BROS.

Milwaukee, Apr. 6, '26

Prof. F. T. Thwaites, University of Wisconsin, Science Hall, Madison, Wis.

Dear Sir:-

A party came in our office this morning and wanted to have a 2500' oil test made neat Turtle Lake, Wis., in Baron County. He also had a map similar to the sketch herewith enclosed defining the oil pool where same could be found - this survey was made by two geologists, Messrs. C. J. Appelman and J. C. Noble, and their idea was to drill a well southwest of the city of Turtle Lake. If you have any data on this we should be pleased to hear from you, as we told this party we would not consider the drilling of a well unless you so advised us.

Trusting we may have the pleasure of hearing from you in the very near future on the above, we are

Yours very truly, GRAY WELL DRILLING CO.

JE /LK

PROPOSAL 450 OLD COLONY BLDG. SUCTION AND WORKING TEL. HARRISON 7289 F. M. GRAY, JR. ELECTRIC LIGHT AND PA CONSULTING ENGINEER ARTESIAN AND SHALLOW WELL CONTRACTOR TEST BORINGS 305 M. & M. BANK BUILDING Cupla Zok Jour MILWAUKEE, WIS. Thurson Fairships · Dated at 191\_ 2-7 30 22 21 2 CONDITIONS OF oT CONTRACT I shall not be responsible for delays caused by strikes, lock-outs, acts of strikes, lock-outs, acts of othe elements, or No. of Wells 31 33 causes beyond my control. Should any caving formation other than herein pecified be encountered, reserve the right to re-6 4 duce the size of hole to the next largest missable. Payments on this work Roal to be madel in Apple monthly estimate amount of 85% vious work performed l balance of 19% to retained until final con 18 pletion and acceptance. Said estimates may be rendered upon the First and fillenth of each consecutive month for go pogo 9 work done through the preceding period. Payments on this work are to be made the share less otherwise Chh. mel nit over y dered I fully protected agains or injury to my employ under the so-called World pensation Acts s of Wisconsin, Michigan and Ry. Respectfully dilying 84 pool Y. Jr. a our acceptance hereon will constitute a contract between us.

Accepted this have by by by the stand

toge nable Geor



## PROPOSAL

F. M. GRAY, JR.

ARTESIAN AND SHALLOW WELL CONTRACTOR

> 305 M. & M. BANK BUILDING MILWAUKEE, WIS.

CENTRIFUGAL DEEP WELL AND SUCTION AND WORKING BARREL PUMPS CONDENSED MILK MACHINERY ELECTRIC LIGHT AND PNEUMATIC WATTER SYSTEMS

TEST BORINGS

#### CONDITIONS OF CONTRACT

I shall not be responsible for delays caused by strikes, lock-outs, acts of God or the elements, or causes beyond my control.

Should any caving formation other than herein specified be encountered, I reserve the right to reduce the size of hole to the next largest size permissable.

Payments on this work to be made in semimonthly estimates in the amount of 85% of previous work performed, the balance of 15% to be retained until final completion and acceptance.

Said estimates may be rendered upon the First and Fifteenth of each consecutive month for work done through the preceding period. Payments on this work are to be made on this basis unless otherwise specified.

I hereby aver that I am fully protected against loss or injury to my employes under the so-called Workmen's Compensation Acts in the States of Wisconsin, Illinois, Michigan and Minnesota.

		Dated a	ıt		191
To		1 2 -4	19		
No.			•		
No. of Wells	348	1.4	13	Ya.	
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1/200		Respectfu	illy submitted,	Y L	13
1-1			F. M. GRA	Ar, jr.	1-1

Your acceptance hereon will constitute a contract between us.

Accepted this

day of

By\_

19\_

3 Hancock St., New London, Wis., Ang. 17, 1927.

Mr. F. M. Gray, Jr.,

F. M. Gray Jr. Co.,

471 52nd St.,

Milwaukee, Wis.

Dear Mr. Gray: Copy of yours of the 15th has been forwarded to me together with blue print and log of the Pohlman well. The extra copies of the prints and the original tracing will be forwarded soon if we have the tracing as I think from Miss Mueller's letter that we have. I think you are right about the source of the high encrusting solids. It is reasonably certain that no good shutoff was secured if indeed there ever was one. I strongly recommend the insertion of the string of 8 inch with packer at 1280-1290. With regard to the salt I think Bob is most likely right but doubt if the quanity is enough to make much trouble if the sluphate can be reduced. I know of no way by which I could tell from the cuttings where salt is coming from because it is so easily dissolved in water that any left in the rock would have been washed away in drilling. I recall, however, that a streak of alat water was found in the Eau Claire at West Chicago and that the engineers wanted to shut down on account of it. It was so small in amount that it had no appreciable effect on the final product. On account of the question of relative quanity of yield I am doubtful if the salt content could be entirely accounted for from the Eau Claire although such is a distinct possibility. I think experimenting by filling the bottom of the hole after testing water from there by bailing id the most promising way of going after the matter. In general salt water is a phenomenon of great depth, so far as I can find out.

Miss Mueller is sending Bob a list of well logs which you have not obtained but which we can furnish blue prints of as they are public wells. I have been away from the office so long that I do not know just what has come in recently. Brownsville was a nearly dry hole at 1218 and Casco Junction reports dry at 1335. These dry holes are puzzlers as everything looks normal.

If you wish to write me direct I will be at above address for at least two weeks longer.

With best regards to both Bob and you,

Very tr ly yours,

August 15, 1927.

Mr. F. M. Gray, Jr., F. M. Gray, Jr., Company, 471 52d Street, Milwaukee, Wisconsin.

Dear Sir:

Mr. Thwaites is in the field and your letter to him under date of August 15 is being forwarded to him. You will doubtless hear from him in a day or two.

Yours very truly,

M

Clerk



## F. M. GRAY, JR., INC.

WELL DRILLING CONTRACTORS

CATER WELL SCREENS BYRON JACKSON PUMPS

471 52nd Street MILWAUKEE 220 So. State Street CHICAGO

Milwaukee, Wis., August 15th, 1927.

Prof. F. T. Thwaites, Science Hall, Madison, Wisconsin.

My dear Prof: -

We enclose herewith copy of analysis from Dearborn Chemical Company covering Pohlman Brothers well contracted by the writer before I left the Gray Well Drilling Company. This contract provided that the well was to be cased and shut off at the top of the Dresbach sand and to be drilled thru the Dresbach and to 100 ft. of penetration in the Mt. Simon Sandstone. Mr. Pohlman noticed bad water throughout his plant beginning about ten days ago and called the writer in in an advisory capacity to find out what was wrong. We have in our possession your blue print showing stratification and manner of casing. We note that the bottom of the 12" pipe with shoe was set at 1120 or part way into the St. Peter and that the bop of this 12" pipe where it interlaped in the bottom of the 15" pipe at 540 ft. level was fitted with lead seal, I find when talking to the drillers who finished this well for Meserioff after I left that a number of pieces of lead stuck to the drill at various times

#### Sheet #2.

in pulling out as they had no protecting pipe on top of the 12" seal to the top of the ground during the drilling operation Ten to one this seal is broken and is of no use. We also note that 104 ft. of 10" liner pipe was placed from the 1210 ft. level and interlaping up and into the bottom of the 12" at 1120. Blue print does not show any packer or shoe on top or bottom and according to blue print the St. Peter water can readily enter as also any contamination from the entire mazomania which is open.

The water is rotten as the analysis shows and is of no use to owner. We think we readily understand where the high sulphate of lime and the Sodium and Potassium Sulphates come from but am at a loss to understand where the high Sodium and Potassium Chlorides come from. They are 23.12 in the Pohlman well and only 3.74 in the Glen View Club well just 11 miles nor th. Bob thinks they are coming from the lower Mt. Simon. Will you look over samples carefully after analysing Dearborn report and advise your opinion in the matter. You might correspond the Glen View well with this log. I have ameeting with Mr. Pohlman bomorrow and am going to advise him to compel the Gray Company to complete their contract in accordance to its terms, namely, to shut off tightly as near as possible to the top of the Dresbach. They can do this in either one of two ways, the simplist would be to use a string of 8" with a disc wall packer on the bottom and set this 8" in the dolomit streak between 1280 and 1290 and let the 8" extend up to above the top of the 12" seal at 530 with a 8 x  $15\frac{1}{2}$  lead calking seal at this point. This would

- 3 -

give a positive tight shutoff from the top of the Dresbach to the top of the ground and this 8" could be lowered in with 8" pipe extending to the top of the ground inside the 15" and after packer was set the well could be blown and test made for better qualities before this 8" pipe on top of the 8 x 15" lead seal would be unscrewed and taken out, then the lead could be caulked. This, undoubtedly, would obitiate the Sulphates by entirely eliminating the St. Peter and Mazomania formation. Where, however, is the high Sodium and Potassium Chlorides coming from? Your well samples might enlighten. If they are coming from the bottom of the Mt. Simon we can cement undoubtedly but if they are coming from anywhere in the Eau Claire we will have to put an insert pipe with upper and lower packers thru that point of contamination.

The only other way for the Gray Company to comply with the shutoff to the top of the Dresbach would be to pull their 10 and 12" pipel ream the 10" hole to 12 to the top of the Dresbach and place back in sufficient 10" and 12" pipe screwed together with swadged nipple with proper packer on the bottom of the 10" and new lead seal on top of the 12" at 540. Pohlman needs the water bad and I doubt wery much whether he will allow them **xx** sufficient fime for this last operation.

Please send me two more copies of Pohlman blue print and when you get time please send me the original tracing as I desire to have permanent canvass back record made. If you have any other blue prints of interest of deep wells complete of late Bob and I shall be glad to have them.

With kindest personal regards, I am

Yours very truly

### UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY 300 State Highway Building Austin, Texas April 15, 1938

Dr. E. F. Bean State Geological Survey Madison, Wisconsin

Dear Dr. Bean:

Ro Freder

Your telegram of April 11 regarding the depth, capacity, and temperature of wells in the San Antonio business district has been referred to me by Dr. Sellards for further reply.

The Edwards limestone with a thickness of about 500 feet is the principal water-bearing bed under San Antonio. Water-Supply Paper 773-B, entitled "Water resources of the Edwards limestone in the San Antonio area, Texas," by Penn Livingston, A. N. Sayre, and W. N. White, gives considerable information, but does not have individual well records in the San Antonio area. The geologic map in this publication shows several faults crossing San Antonio, therefore I cannot give you the exact depth to the Edwards without knowing the exact location. An approximation might be made from the fact that the city wells in Brackenridge Park in the northeastern part of the city are about 800 feet deep. The Central Plant wells on Market Street, close to the center of the city, are 900 to 1,000 feet deep and the Mission Plant wells, in the southern part of the city, are about 1,400 feet deep. Part of this difference is accounted for by faulting and the rest by normal dip.

In the business district, the capacity of the wells varies greatly. At the Post Office, with very careful development, they have not been able to produce more than 200 gallons a minute, while two blocks away there are wells that will produce 500 to 1,000 gallons a minute. This is because the water is produced from fractures and caverns in the limestone.

Several wells in the city are used for air conditioning plants, but the city authorities frown on the practice, especially if the water is not reused by the use of cooling towers. I believe that they require that such water not be wasted into the sewers. Most of the buildings waste the water directly into the San Antonio River that runs through the city.

In certain parts of the business district, much colder water may be obtained from the Leona terrace gravels. This water is not sanitary and there is not any objection to its use for cooling and air conditioning and then wasting the water into the creeks or back into the gravels. The temperature of the water in the Leona gravels will be about 72° F. The water in the Edwards limestone ranges from 80° F. to 110° F., depending upon the depth of the well. Page 2 Dr. E. F. Bean, Madison, Wis. Apr. 15, 1938

The well records of wells in this area are in the Washington office and I have given you the above information from memory. I am sending you a copy of Water-Supply Paper 773-B under separate cover, together with lists of publications on the Texas ground-water resources. If you wish further and more definite information on the wells, I suggest that you write Mr. C. E. Meinzer, U. S. Geological Survey, Washington, D. C.

Very truly yours,

Samuel F. Turner

Associate Hydraulic Engineer

SFT/fd

Co: Dr. Sellards

AIR MAIL.

#### THE UNIVERSITY OF TEXAS

BUREAU OF ECONOMIC GEOLOGY

AUSTIN

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CONSULTING GEOLOGISTS GAYLE SCOTT HELEN JEANNE PLUMMER

April 13, 1938

Dr. E. F. Bean State Geological Survey Madison, Wisconsin

My dear Bean:

The U. S. Geological Survey and the State Board of Water Engineers recently published on the water supply at San Antonio and have made some investigations as to the use of water for air conditioning purposes. I am forwarding your telegram to Mr. S. F. Turner for reply.

Very sincerely yours,

Sellards, Director H.

EHS:MJC CC to Mr. S. F. Tunner, Austin.

STATE OF ILLINOIS DEPARTMENT OF REGISTRATION AND EDUCATION JOHN J. HALLIHAN, DIRECTOR SPRINGFIELD

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STATE OF ILLINOIS HENRY HORNER, GOVERNOR BOARD OF NATURAL RESOURCES AND CONSERVATION

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STATE WATER SURVEY DIVISION

ARTHUR M. BUSWELL, CHIEF

URBANA, ILL.

March 20, 1940

Mr. F. M. Gray, Jr. Gray Well Company 205 West Wacker Drive Chicago, Illinois

Dear Mr. Gray:

Your letter of March 19 has been referred to me.

There is no reference in your letter regarding the results of the simple test outlined in the last paragraph of the first page of Mr. Gobble's letter of March 18. If the reported gas burns, it is unnecessary and foolish to make an immediate analysis. It is then certain beyond a doubt that the gas is mostly methane gas and is present in a concentration sufficiently high to present a serious explosion hazard. matheme

In such event it is suggested that thorough ventilation be employed at all points where water containing this gas may come in contact with air such as in the pump house, showers, washrooms, lavatories, etc. until steps are taken to insure complete precaution against this hazard. Sources of ignition should be eliminated. medan

Should the pressure tank be vented at any time for cleaning or otherwise the "gas" in the cushion should be released outside the building.

The well casing should be sealed air-tight at the top and if a vent is necessary the vent should extend outside of the building and out of reach by hand.

Recommendation for dispersing and elimination of this gas and thereby eliminating a serious explosion hazard was given in paragraph one on page 2 of Mr. Gobble's letter of March 18 to you and Mr. Bennett.

> Yours very truly STATE WATER SURVEY DIVISION

Ten E. Larson, Chemist

TEL/mw

co.4 C.W. Klassen Springfield Prof. Thwaites, Madison R.G. Bennett, Highland Park

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STATE OF ILLINOIS HENRY HORNER, GOVERNOR

STATE WATER SURVEY DIVISION

ARTHUR M. BUSWELL, CHIEF

URBANA, ILL.

Naroh 20, 1940

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Another of the start of March 19 has been referred to no. The proving of the start of March 1 huger hereitly the the results of the start start out the less regarding the district of the start of the tool of the tool and the tool and the resorted gas burned it is unnecessary and foolish to the provide the start of the seal of the tool of the tool of to the resorted gas burned it is unnecessary and foolish to the provide an indedicte snal rate, it is then derive in tool to to the resorted as private, it is tool of tool of tool of tool of to the resorted an indedicte snal rate, it is tool of tool to tool to tool to the resorted as private, it is tool of to prove to tool to tool of tool the resorted author of the tool of to propent a serious to a concentre tion autitalently high to propent a serious to

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March 21st, 1940

Mr. C. W. Klassen, Chief Engineer Department of Public Health Springfield, Illinois

#### Subject: R.C.Bennett Wells Highland Perk.Ill.

My dear Mr. Klassent

Sharr

Mr. Yates left this morning for Highland Park and will take iced samples in the extra iced container we have had on hand for some time. He will also take samples of the two other bottles which you sent me and mail them tonight <u>uniced</u>.

All sample bottles will be marked OLD WHLL and NEW WELL, so please identify them correctly.

The sater cleared up nicely, and I also wish to thank you for your letter just received enclosing bulletin outlining method for the dispersing of methane gas in this well.

Will you please send a like bulletin to Mr. Bennett, as in talking to him yesterday, he mentioned your suggestion which he knew about, of course, because you sent him a copy of your letter of recent date.

I will thank you to facilitate these analysis and to warn your chemist to endeavor to distinguish any fermentation or gasses along the lines of our recent correspondence.

With kindest personal regards, I am

Yours very truly, GRAY WELL COMPANY

F. M. Gray, Jr.

CC. - Mr. R. C. Bennett, Highland Park Mr. L. E. Workman, Ass't. Geologist, Urbana, Ill. Prof; Fredericher, Madison, Misconsin Mr. J. S. Cobbie, Asst: Ingineer, Urbana, Ill. F. M. Gray - Jr. March 21, 1940

Dr. Larson adds the following comments:

"It is perhaps pertinent to advise that the analysis for methane gas is in no way indicative of the presence or absence of B. Coli or any other type of bacteria. There are many well waters which contain methane gas and are still free from the "gas formers" which are the indicators of pollution.

"The analysis for methane gas indicates only the quantity of methane present in the water. From the quantity indicated by the analysis it is possible to determine whether it is possible, or impossible for an explosive mixture to be formed in a given volume of air in contact with the water."

> Yours very truly, STATE WATER SURVEY DIVISION

Hobble

J. S. Gobble, Asst. Engineer

JSG/mw cc.-C.W. Klassen R. C. Bennett Prof. Thwaites G. B. Prindle L. E. Workman STATE OF ILLINOIS DEPARTMENT OF REGISTRATION AND EDUCATION JOHN J. HALLIHAN, DIRECTOR

SPRINGFIELD

## COPY

STATE OF ILLINOIS HENRY HORNER, GOVERNOR

STATE WATER SURVEY DIVISION

ARTHUR M. BUSWELL, CHIEF

URBANA, ILL. March 21, 1940

Mr. F. M. Gray, Jr. Gray Well Co. 205 West Wacker Drive Chicago, Illinois

#### Re: R. C. Bennett wells Highland Park, Illinois

Dear Mr. Gray:

Thanks for the copies of Prof. Thwaites' letter and your reply.

As he states there is always a question regarding shutoffs in limestone wells. Although in deepening the old well you passed through a zone of solid uncreviced limestone you do not have definite assurance that the undesirable upper water is completely eliminated. Below 226 feet you picked up more water in a creviced zone and this water must come from somewhere. It might move in horizontally from a great distance or it may come from the upper part of the lime by way of vertical crevices nearby. That this latter is possible is shown by the fact that the new well only 60 feet away did not encounter the uncreviced zone. If this uncreviced zone does not extend very far laterally and most of the lime in the vicinity is creviced it is possible to have no noticeable effect between the two wells. However, if this solid portion is quite extensive and the water goes from the upper lime to the lower by way of the new well the new well should be affected by pumping the old one. If this condition existed the new well should not have shown much, if any, increase in yield after the upper lime was penetrated.

It is a well known fact that subsurface conditions and the water-bearing characteristics of various aquifers may vary considerably in a very short distance. We have yet to find two wells which are exactly alike in every respect.

Our guess--and it must be only that--is that the old well happened to penetrate an uncreviced zone which is not very extensive.

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#### March 22nd, 1940

Mr. J. S. Gobble, Asst. Engineer State Water Survey Division Urbana, Illinois

> Subject: R.C. Bennett Wells Righland Park, Ill.

Dear Mr. Gobble:

Thank

I have your esteemed favor of the 21st, and noted.

I appreciate your question in last part of the first paragraph of your letter. I, however, explained to you that I did not think there was any connection in the upper part of this well to the new well adjacent, <u>AS</u> when we started to drill below the pipe we opened up a direct connection from the new well which came over underground to the well pit on which we were working, and we let the water run continuously into a milk bottle <u>THINGING</u> that in drilling we might cloud up the other well. <u>THE MATCH STAYED CLEAN</u> until we got down beyond 240 feet when a slight cloudiness occurred.

The other well, all this time, was pumping along supplying the estate, so I am satisfied in my mind of a positive shutoff in this old redrilled well.

Samples went in to Dr. Klassen last night and I have asked him in my letter of yesterday, of which you received a copy, to have Dr. Larson very carefully endeavor to determine characteristic of any fermentation.

I asked Mr. Bennett in a conversation on Wednesday to make the gas test as suggested in your letter of March 18th, and am sending a carbon copy of this letter to Mr. Bennett, so as to remind him if he has not done so to get it done at once.

> Yours very truly, GRAY WELL COMPANY

FMG:KH

CC.-C.W. Klassen R. C. Bennett Prof. Thwaites L. E. Worksan

F.M. Gray, Jr.

March 22, 1940

Mr. F. M. Gray, Jr. Gray Well Company 205 West Wacker Drive Chicago, Illinois

Dear Frank:

Copies of your letters and replies to them from Urbana have been coming and I have been much interested in same.

With regard to possible mistaking of methane dissolved in water for carbon dioxide generated by gas-forming bacteria, Professor Nichols states that methane is only soluble to the extent of 3 to 6 ppm. in water at ordinary temperature. Now 10 cc. of water is diluted with several times as much medium before fermentation. This would mean very little liberated methane.

Methane is very easily dissolved in oil, however. My idea is that the oil is from the Devonian which appears to overlie the Niagara under Lake Michigan

Hope you succeed in solving the problem.

The Lombard tracings will be sent as soon as they are blue printed.

Very truly yours

WISCONSIN GEOLOGICAL SURVEY By

F. T. Thwaites, Geologist Well Records

FTT/1k
March 28, 1940

Mr. C. W. Klassen, Chief Engineer Department of Public Health Springfield, Illinois

> Subject: R. C. Bennett Wells Highland Park, Ill.

My dear Mr. Klassen:

Thanks for your analysis received this morning in answer to my wire of Tuesday. I was beginning to worry, as these samples were sent in last Friday.

There is no doubt in my mind that the E. Coli were contained in the oil content and were traveling into the new well all above the 208' level, previously occasioned by the fact that the pipe in the old well was only down 157', and that the crevice rock containing oil, gas, and sulphur was wide open. As you will recollect in our previous correspondence, that in redrilling this old well, I forced an under cut on the new 42" pipe with a proper seal on the bottom through all of this crevice rock to within 2" of where the pipe was shut off on the new well; namely, 208'.

As soon as we started to pump the old redrilled well, we immediately noticed the <u>absence</u> of the sulphur odor, and the oil scum gradually disappeared. and the water cleared in a relatively short time.

I am going to ask Mr. Bennett to have his caretaker, "John" pump the old well continuously during the day time, while he is there, to the atmosphere through the two hose connections adjacent to the well pit, and I will have my man Yates on Saturday or the Monday following give the old well another does of H.T.H., having "John" again pump it until clear, when I will have Yates take samples in your iced container.

I will thank you to send to Mr. Bennett at Highland Park such a container at once, and I sincerely trust that it is not lost in transit nor taken by someone else.

Did you check up on the container you received with these samples we are speaking about, and find if it was the number of the one lost of which you have been writing? Mr. C. W. Klassen, Chief Engineer Dept. of Public Health Springfield, Ill.

3 2 10-

March 28, 1940 Re: R.C. Bennett Wells

PAGE #2

It might be a good idea Dr. Klassen if you would send Mr. Bennett also two regular containers for parcel-post, as we did the last time, so that we may take duplicate samples.

I am glad that this is now done with, and that the water from the new well is safe.

I am now going to have Professor Thwaites make up a new sketch showing the relative positions of both wells in a permanent sketch, and I will send you all copies of such prints.

I wish to thank you and all those interested for the fine cooperation, and remain

> Very truly yours, GRAY WELL COMPANY

#### FMG: DWA

## F. M. Gray, Jr.

P. S. I will thank you to send a copy of the report just received with the same notations there on to

> Professor Fred T. Thwaites, Associate Geologist, Science Hall, University of Wisconsin, Madison, Wisconsin

as he has been kind enough to cooperate in an endeavor to lick this thing.

F.M.G.

CC.-Mr. R. C. Bennett, Highland Park
Mr. L. E. Workman, Ass't. Geologist, Urbana, Ill.
Prof. Fred T. Thwaites, Madison, Wis, Science Hall
Mr. J. S. Gobble, Asst. Engineer, Urbana, Ill.
G. R. Prindle, Supt. Water Works, Highland Park, Ill.

March 28, 1940

Mr. R. C. Bennett Highland Park, Illinois

Dear Mr. Bennett:

I am pleased to inform you that this morning I received a report from Dr. Klassen, and note that he sent a carbon copy to you, and all other parties who have been kind enough to cooperate in this matter. Carbon copy to Dr. Klassen is attached herewith, as also copy of letter from Professor Thwaites of Madison, Wis.

As per my reply to Dr. Klassen, please instruct your caretaker, John, to watch out for containers from this Department of Public Health. Also have John pump the old well through the two hose connections as much as possible in a couple of days and clear it up, after which my man, Yates, will give the old well another shot and later on collect another set of samples in the containers being forwarded by Dr. Klassen.

> Very truly yours, GRAY WELL CO.

FMG:DW

F. M. Gray, Jr.

CC-Mr. C.W. Klassen, Cf. Engr. Dept of Public Health, Springfield, Ill. Mr. L. E. Workman, Ass't. Geologist, Urbana, Ill. Prof. Fred T. Thwaites, Madison, Wisconsin, Science Hall Mr. J.S. Gobble, Asst. Engineer, Urbana, Ill. Mr. Geo. B. Prindle Supt. Water Works, Highland Park, Ill.

### Mr. J.S.Gobble, Asst.Engr.

I left at 2 P.M. where hole was at 216' or approx. 8' open 4½" hole below pipe. WATER WAS BAILING DOWN with a slow recovery.Static at about 65 feet.The driller reached depth of 226 when he stopped work at 4.30 P.M. He made a pouring testbusing the garden hose and WELL FILLED UP AND OVER\*FLOWED top of casing, which was five feet above well derrick floor.

I told him last night to note static carefully this morning then to use the larger bailor and bail the well thoroughly endeavoring to bail it dry, then to watch the recovery and determine the rise. The pipe remember is shut within inches of the new well adjacent and that new well has plenty of water at same shut-off an d is ween't without any trace of oil or gas bubbles. I told him to drill to day reporting to me tonight with test before he went home.

There can be no connection as of today for any contamination to by-pass thru crevice rock as previoulsy below the bottom of the old well pipe and thru the open 8' of rock hole which before was possible to the new well.THAT OLD HOLE IS NOW POSITINELY shut off,I think.

I have in mind having driller today before he goes home to mix five gallons of water with a five pound can of H.T.H. which I obtained and which is 70% chlorine instead of 30% and to lower this to bottom of old well w are on with the bailor and dump it ON BOTT\* om then to agitate with bailor to thoroughly wash and scrub the walks and at the same time to insert into the new well which is pumping thru the AIR LINE which goes to 100 feet a dose of this same 70% H.T.H. and the pump should draw it down and scrub that wall also.THEN TO take samples monday for Dr. Klassen.

I want to apologize for this lengthy missive but know that you may have some answer that I may have over-looked. Can it be possible that two wells only 60 feet apart have adifferent rock structure and how can this old hole cased the dame depth give no water to speak off and the other plenty.I SETTLED GLASS of this out last night and it tasted sweet NO SULPHUR. So the oil and gas and affinitive sulphur is shutt-off.

I realize that I could have Mr. Bennett continue the new hole thru the shale with 6" and encase with 4½" pipe way to the top then go into the St.Peter and positively get fesh uncontaminated water but that would be a burden on him and entail some \$2,000.00 additional money.I have thot that having fesh water the Bugs if any could be eliminated .I can not understand that why the water should analysis good once then turn the next. Bannockburn had a case of this so Mr. Prindle says and it took months according to him to eliminate.

I last atlking to Mr. -eland he that by using the H.T.H. we could permeantly kill all backteria.Before using it however I went at the new pipe to encase the old well.

I am snding this to you special delivery at Urbane as also a copy to Fred Thwaites thinking that you can help me solve this problem.

Would it be possible for you to confer at the job on this, Please call if necassary? Yours truly, cc-Thwaites J.S.Gobble, Asst.Engr.

and the pipe went that foot. On sunday while there the driller made two foot and the pipe went that far.On monday Yates the releif driller made about three foot <u>WHE N</u> the pipe went that far and stopped and THE DRILL started to cut away from the pipe and they made about 4 feet per hour with nice clean white grey limestone cuttings which were clean and showed no traces of sand or black spects.A bove this there were scums of brown oil and gas bubbles in the dump box every time we ran the bailor.These got less and less as the pipe settled and finnally dissapeared.

We then drilled the well as you will see to depth of 411 feet or into the top of the Maquokets.

The static head was 48' and e chlorinated with regular grocery store Hypo-chlorinate of lime(30% chlorine) installour test cylinder and pumped and the well cleared ina couple of hours pumping about 15 G.P.M. with test cylinder in well to 125 feet.Water tasted <u>sweet</u> and showed no traces of gas or oil.

We sent sample to Highland Park(Mr. Prindle as also to Springfield. The Springifled sample came back with a slighttace of B.Coli with advise to chlorinate questioning whether we had done so or not. The Prindle sample came back with a higher count.

I pulled pump used three cans of the same stuff and sent samples again with an added one to a private Lab.In the meantime we found an old well some 60 feet away with another on adjoining "Cummings property" some added distance into which cow and other offal was running(both these old and no record)W e chlorinated both of them and the samples from both old wells were bad with some 5000 count but with the new well only some 1500 count.

I have been in touch with Dr. Klassen on this and he sent Mr. Leland up and we went into a huddle.W e then got Mr. Prindle to mix a five gallon bottle of water and to charge which he did with pure liguid chlorine.I was there and this was poured into the new well and it boiled and the WELL OVER-FLOWED and cleaned the pipe at top where you could see clean as a whistle.We ran bailor and agitated this to bottom let it stand over night and put the pump in next day.

The ater cleared and sample to Klassen came back okey from new well with sample from old well bad.

In the meantime the owner sent his own sample and it came back bad. That threw it all back again on me. I then got a string of  $4\frac{1}{2}$ " pipe with Larkin screw packer and tested the new well packing off as I had done years before at the North-Shore Club where we found pollution coming from the Mazomanie formation way down. Thwaites helped me lick that and we cased thru and eliminated that job. Anyway I found a determined a positive shut-off kaming pouring tests as I went. I put pump back in a got another bottle of charged gas chlorine from Prindle and again the water was okey changing several weeks lAtter to bad.

#### Page three

J.S.Gobble, Asst.Engr.

In the meantime we had made a sounding of the old 6" well and had supposadly found with a hand bailor and gin pope hole bottomed at 205', taking out some 11' of fine white grey sand with oil scum and gas bubbles on each bailor of water.

We chorinated that while pump was out and agitated with bailor intalling the old pump with ad added 90' of drop pipe and rod.Making cylinder at 150 ft. instead of some 60' we found it at.We did this as in testing new well.Mr. Bennett had reported old well not supplying his needs, thinking that the draw down at new well where cylinder was at 150 ft. was draw away fromold well.

The caretake"John" alternated these wells all fall and every once in awhile the butler reported dirty water with excessive air in system. We took off air volumne pump on new pump and they got along okey and still are without putting any air with the water into the storage tank.

I went back on old well with aboisting engine and pipe pole derrick, thinking to install a string of  $4\frac{1}{2}$ " pipe with packer below the bottom of the old 6" drive pipe and eliminate any leakage from same and at same effect a shut-off of this crevice rock encountered on new well where we had so much truble seating the 6" at 208'. IN RUNNING THE SMALL'3" sand pump the driller that he stopped on something at 195' he then an the 3-5/8" O.D. Larkin sand plunger pump and it stopped then whet down and when he pulled back it came hard when out it had a piece of old 4" pipe with coupling on top nothing on bottom and it had been filled with a number of rows of 1/8" small hole in the lower half.

THE HOLE FILLED WITH approx. 40' of free oil and we were unable after that to get lower than 196' with the hand bailor.

I then decided to get a drill machine on job and we did so this week monday.We want in with drill and found sand running in as fast as a could bail with the machine the level satying at 196'.Oil-gas and corruption coming all the time.

We then set the  $4\frac{1}{2}$ " pipe with forged steel drive shoe but before doing so I hauled out a load of Syb-way blue clay and put some twnety feet in the hole, along with a 50# bag of rotary aqua-jell. This to obviate and effect shut-off from above.

The weight of this pipe settled thru to 200 feet and we then whet inside of the pipe with the drill tools and agitated and the pipe followed to 205'. We then drove same. Sand kept coming and each BAILOR of slush CAME UP WITH GAS BUBBLES and brown oil scum. I stayed there for hours yesterday and while there personally drilled and rove that pipe some  $10\frac{1}{2}$ " to depth of 207-8" WHERE the oil dissapeared as also the gas bubbles and the drill cut away from the pipe. The cuttings then got clean with out specks of black which had been in it Mr. J.S.Gobble,

I had a talk yesterday with a cheimst under whom I studied at old Marquete and told him about our trouble on this job.

He have me the that <u>that possibly</u> this B.Coli count was coming with the oil and gas from pores and could identified as such and not typhoid or other germs water born.

WOULD it be psooble for Mr. Klassen's chemists to so identify with the next samples. I do not suppose they have gone inb this detail at all but then they got the tubes they looked for fermintation, thats all and when they found it, reported it as such

I am sending copies of this letter the same as the other to Mr. Klassen with request that he follow these suggestions should they be logizal.

I am without doubt now stisfied that no surface water can enter this old well as the  $4\frac{1}{2}$ " pipe with forged shoe is positively shut-off at 207 ft. and on top of that we dumped our slushings as provided for in the Wis. C de down around and between the 6" and  $4\frac{1}{2}$ " pipes so nothing could possibly enter from above.I intend culking between these two pipes permeanently. Also I will seal the drop pipe on pump.

Please take note that last time we pulled the new "COOK" pump on the new ell that Yates found a oil scum several feet thick on TOP OF THE STATIC WATER LEVEL. That could come from no-where except the rock and the pump is a PLUNGER TYPE with rods actuated from the pump head and no oil lubrication is involved.

If this was a turbine type such as is sometimes used with oil drip lubrication around the shaft there might be a question such as at Geneva and St.Charles where they that for awhile they had a oil seepage but I beleive you solved that with Roy Wells anf found it was lubrication from the pump.

This thing must and an be licked and that speedily as I can not afford to spend as I have and have vital places for this money. Your prompt attention will oblige,

Yours very truly,

Frank M. Gray

cc- Mr. C.W.Klassen, Ch.Engr. Dept Pub. Health Prof. Fred T.Thwaites, Well Geologist Madison. Mr. R.C.Bennet, Highland Park,

March 15,1940.

Mr. J.S.Gobble,Asst.Engr. State Water Survey Division, Urbana,Ill.,

Dear Mr. Gobble:

I am writing this letter and after some 40 years of well experience, I find that I am about stumped on a well condition at Highland Park. This well problem is at the R.C.Bennett residence on Praire Ave. (Old Half day road) about one mile west of Skie highway. I have drilled hundreds of wells thru that Lake Forest district but never have I had a nut like this to crack.

I entered into a contract last summer to drill a 6" well for this owner. He had another well on property but was getting sulphur water and wanted a duplicate well for an insured water supply. I knew and told him there was traces of oil and gas in his vicinity, having just before that capped and equipped a gas well for Mr. Geo. W. Rossiter at his estate on Bradley and School road. Some miles north and west of this location. I knew from the Paul Leweklyn as also from the Lasker well west and north that we had had gas and had encountered some traces of oil at the J.O. Armour estate years before that.

I figured and I think you will bear me out, that I would endeavor to seat my 6" pipe with a forged shoe thru the crevise rock to a firm seat in the solid lime AND GET a shut-off and undoubtley FRESH WATER.

I enclose herewith blue print prepared from cuttings by Prof. Thwaites with whom as you know I have w rked for years.

We drilled this new well and hit crevice rock at 157' (SHELL ROCK on print). I undercut the 6" shoe and worried the pipe by drilling and driving to a firm seat at 208'.

Now on that hole we could not get an inch ahead of the pipe from 203 ft. A fine grey-white sand kept running in and prevented the drill from chipping the lime stone. We drilled and for very inch the drill went or worried down THE PIPE FOLLOWED .I was there on a saturday, sunday and monday and bucked it personally. We made 1 foot on the MILWAUKEE OFFICE 2612 West Greve Street Phone WEst 8996 GRAY WELL CO.

F. M. Gray, Jr. Prop. WELL CONTRACTORS 205 West Wacker Drive

Phone Dearbourn 9505

WELLS ANY SIZE OR DEPTH TEST BORINGS PUMPS

CHICAGO, ILL.

Milwaukee, Wis., March 16,1940.

Prof. Fred T.Thwaites, Science Hall Madison, Wis.,

Dear Fred:

I forgot in dropping you that note this morning to ask you for print of that Paul Llewellyn well on Melody Road west of Lake Forest I drilled years ago. I need same right away so please facilitate.

> Yours truly, Trank Gray

March 16,1940.

Mr. J.S.Gobble,Asst.Engr. State Water Survey Division, Urbana,Ill.,

Dear Mr. Gobble:

With further reference to my letter to you of the 15th relative to the Bennett contamination and water condition at Highland Park,Ill.,

We were very careful today and we know we had a positive shutoff at 207'-9" in solid limestone. This within several inches of the shutoff on the other well.

THE HOLE BALED POSITVELY DRY .However when same were dumped into a large pail, they showed a brown oil scum and considerable GAS BUBBLES.These do not show when slushings are dumped in trough.

We had NO WATER at all to depth of 226'-Then we picked up some and while drilling from 226' to 240' the well overflowed twice while drilling.WHAT do you make of this ONLY GAS accumation could do this, to my idea. Anyway we have sufficient water I am sure as we endeavored to bale it down and it only lowered to 65 ft. and came right back and maintained its head.

We are installing pump Monday morning .We chlorinated with five gallons of water mixed with 5# of the H.T.H. and dumped with bailor at bottom of well, then agitated with bailor to wash the walls thoroughly.Any bugs in that manner should be thoroughly sterilized.W ell will be pumped tomorrow afternoon(monday) and when clear will take sample for Springfield in ICED container.W e will move to new well late monday and pull pump and dump and wash the walls with the H.T.H. the same way.

I noticed yesterday and have b fore that when a glass of water is drawn from faucet in house that it is effervesent like CHARGED water.COULD THIS BE THE GAS IN THE WATER and not air from the <u>tank</u>.

WOULD IT BE POSSIBLE if I sent in a gallon sample and CORKED it immediatley when drawn for the chemist to analysis and tell what this consisted of. Mr. F.M. Gray, Jr., Chicago

-2-

March 18,1940

Division.

"Complete aeration by any of several methods is the only reliable method of removal of this gas and eliminating a serious explosion hazard."

It seems likely that the oil in these wells may be from the formation and not from the pump. As you know there are numerous locations in Lake County where traces of oil are found in the water.

Since Mr. Gerber will be out of town for some time it will not be possible for me to come up there at this time. However, we will plan to make a stop at the Bennett place in the future.

> Very truly yours, STATE WATER SURVEY DIVISION

J. S. Gobble, Assistant Engineer

JBG/fb

CC. Mr. C.W. Klassen, Springfield Prof.F.T. Thwaites, Madison, Wis. Mr. R.C. Bennett, Highland Park STATE OF ILLINOIS DEPARTMENT OF REGISTRATION AND EDUCATION JOHN J. HALLIHAN, DIRECTOR

SPRINGFIELD

# COPY

STATE OF ILLINOIS HENRY HORNER, GOVERNOR BOARD OF NATURAL RESOURCES AND CONSERVATION CHEMISTRY - WILLIAM A. NOYES

CHEMISTRY - WILLIAM A. NOYES ENGINEERING - LOUIS R. HOWSON GEOLOGY - EDSON S. BASTIN FORESTRY - HENRY C. COWLES BIOLOGY - WILLIAM TRELEASE *Ex-Officio* - JOHN J. HALLIHAN *Ex-Officio* - PRES. A. C. WILLARD

STATE WATER SURVEY DIVISION

ARTHUR M. BUSWELL, CHIEF

URBANA, ILL.

March 18, 1940

Mr. F. M. Gray, Jr. Gray Well Company 205 West Wacker Drive Chicago, Illinois

Re: R.C. Bennett Wells Highland Park

Dear Sir:

Your letters of March 15 and 16 are acknowledged and we are glad to hear that you were successful in getting sufficient water after recasing and deepening the old well at the Bennett residence.

Dr. T. E. Larson, Chemist of this Division, has prepared the following discussion on methane gas in well waters:

"It is possible that methane gas is present in water from the drift in this vicinity. Since the limestone is reported to be creviced, there is no assurance that it is never present there also. Many wells several miles west and north of this location are known to contain gas.

"Nethane gas is colorless, odorless, tasteless and about half as heavy as air. It is inflammable and highly explosive when mixed (in concentrations of five to fifteen per cent) with air. The gas is soluble in water when under pressure and is released from the water when the pressure is decreased or when exposed to air. Every precaution should be taken when using water containing this gas to prevent accumulation of this gas to form a five to fifteen per cent mixture with air in a closed chamber or unventilated space. Several serious explosions and fires have resulted from lack of knowledge on this gas.

"High dangerous concentrations of this gas can be readily detected by filling a gallon bottle with water and immediately capping the bottle and permitting the gas to accumulate at the top of the water. On removal of the cap or cork and simultaneously holding a match at the mouth of the bottle, it will be noted that the gas will burn for a moment if present in very high concentration. If it does not burn it may be advisable to have a sample collected in one of our special containers by a representative of this

March 18,1940.

M.r C.W.Klassen, Ch.Engr. Dept. of Public Health, Springfield, Ill.,

My Dear Mr. Klassen:

I attach herewith copies of two letters I wrote to Mr. J.S.Gobble of the Water Survey and I was afraid I made a mistake and failed to mail you copies.

Since these were witten saturday, we installed the pump to-day and pumped well for one hour tonight before the men left and the water was clearing up fine and WITH PLENTY OF WATER élivering approx. 10 to 12 G.P.M. or better than 650 Gallons per hour.Chlorine was still coming.WE WILL PUMP this all day tomorrow(tuesday) while we are removing drill rig and caretake will continue to pump until well is clear.

On saturday we siphoned five gallons of water mixed with five pounds of H.T.H. into the new well and on sunday the owners noted return of the chaorine thru the faucets in the house.SO IT MUST HAVE BROKEN THRU the oil scum on top of the STATIC head, which we were afraid of, it not doing. Evidently the chlorine solution loosened up considerable scale etc. in the piping, tank etc. as water was rusty and discolored.Owner will pump thru faucets until clear when I will take samples on either mednesday or thursday as conditions may warrant and send iced containor with one sample each from old well and new well, as also I will send one each in the regular containers I received from you today.

Now please note my other letters carefully and you having the case legend of our troubles so far, I wish you to be careful and try and determine if the B.Coli if ANY might be bituminous and the GAS might be the natural seepage which we have noted in re-drilling this old well.WOULD A GALLON SAMPLE be of benifit to you.PLEASE ADVISE.

Your prompt attention to these samples and prompt word to me will facilitate my settlement of this job.

and the second of the second

Yours very truly,

the preservery referred and

F.M.Gray Jr.

cc-Mr. J.S.Gobble,Urbana, Mr. R.C.Bennett Highland Park Prof Fred T.Thwaites Madison

March 20th, 1940

Mr. J. S. Gobble, Asst. Engineer State Water Survey Division Urbana, Illinois

> Subject: R. C. Bennett Wells Highland Park. Ill.

Dear Sir:

Dran

I received a very interesting letter from Prof. Fred T. Thwaites this morning, and I am attaching hereto a copy of same, as also a copy of my reply to Prof. Thwaites.

I am sending carbon copies of this letter to all according to copy noted below, and I trust that you, or Dr. Larson can arrange immediately to clean this thing up.

> Yours very truly, GRAY WELL COMPANY

F. M. Gray, Jr.

FEG: KH

CC. - Mr. C. W. Klassen, Springfield Mr. E. C. Bennett, Highland Park Mr. L. E. Workman, Ass't. Geologist, Urbana, Ill. Prof. Fred T. Thwaites, Madison, Wisconsin Mr. George B. Prindle, Supt. Water Works, Highland Park.

March 19, 1940

Mr. F. M. Gray, Jr. Gray Well Company 205 West Wacker Drive Chicago, Illinois

Dear Frank:

In reply to copies of your letters to Mr. J. S. Gobble of the Illinois Water Survey, several matters come to mind.

First: The presence of oil and gas is confusing in that it undoubtedly absorbs much of the chlorine and entraps bacteria. It may also contain bacteria, at least some think so. Anyhow it may have been made by bacterial action and so may contain some still. However, these should not be confused with the gas formers which live principally at body temperatures. A very confusing type lives in decaying leaves, etc. which may easily be mistaken for the one which comes from the intestines of animals and so is taken to show sewage pollution. As the other group shows surface waters, no attention is paid in most laboratories to its recognition. It bothers only with spring waters.

Second: You say there are old wells not far away which are known to get surface drainage. These may have contaminated all the underground waters of the Niagara. No one can tell just where the different crevices go or how deep below water level such contamination may have extended.

Third: In a limestone formation any shutoff is debatable as to effectiveness. It may test tight but the bad water really comes from below via another crevice. However, it seems most likely that the surface "shell rock" has the worst water and most oil, so if it is shutoff completely water of a different source may be found below. However, as no continuous impervious bed has been passed there is no way of being certain. Even if you are below the oil level there may be unsuspected avenues for waters to travel to your new well.

I talked over the matter with Prof. Nichols at our State Laboratory. He suggested two things: First, see if pumping the new well affected adjacent old wells suspected of contamination and second, get tests for nitrates and nitrites in the water of the new well. If high, the contamination is from the surface. Third, reappearance of contamination after chlorination suggests a subsurface origin.

Log of Llewellyn well, Lake Forest, Illinois is enclosed.

Very truly yours

WISCONSIN GEOLOGICAL SURVEY

F.T. Thwaites, Geologist, Well Records

FTT/1k

March 19th, 1940

Mr. J. S. Gobble, Asst. Engineer State Water Survey Division Urbana, Illinois

> Subject: R.C.Bennett Wells Highland Park, Ill.

Dear Sirt

I have your interesting letter of the 18th, and I wish to thank you for same.

As per the letter I wrote you last night, which you will receive today, we have sufficient water; the well was clearing up nicely last night.

Your explanation from Dr. Larson relative to Methane gas confirms my suspicion. In view of this, and your suggestion in the last paragraph, first page, of your letter, I wish you would immediately have a representative take a sample in your <u>special container</u>, so as to get this matter settled at the earliest possible moment.

If Dr. Larson's findings are confirmed, I would then like to have you make the recommendations to Mr. Bennett for the dispersing and elimination of this gas, when I hope he will have a satisfactory water for his estate.

Your prompt attention in this matter will oblige.

Yours very truly, GRAY WELL COMPANY

F.M. Gray, Jr.

FMC:KH

CC. - Mr. C. W. Klassen, Springfield Prof. F. T. Thwaites, Madison, Wis. Mr. R. C. Bennett, Highland Park July 16, 1948

Layne-Northwest Co. 709 N. 11th Street Milwaukee 3, Wisconsin

Gentlemen:

## Attention: Mr. Galloway

Some time ago we received sets of samples labled No. 8 and No. 9 with no other location. Both are 150 feet deep in gravel. Could you please advise us what these are?

Very truly yours,

WISCONSIN GEOLOGICAL SURVEY

F. T. Thwaites, Geologist In Charge of Well Records

FTTbsc

## LAYNE-NORTHWEST COMPANY

PUMP & WELL FOULPMENT FOR MUNICIPALITIES INDUSTRIES RAILROADS MINES & IRRIGATION

WELL WATER SUPPLY CONTRACTORS LAYNE DEEP WELL TURBINE PUMPS

AFEILIATED WITH LAYNE & BOWLER, INCORPORATED

> MARQUETTE BUILDING 709 NORTH ELEVENTH STREET MILWAUKEE 3. WIS.

FACTORIES MEMPHIS, TENN. HOUSTON, TEXAS LOS ANGELES, CAL.

August 11,1948

Mr.F.T.Thwaites. Geologist, University of Wisconsin Madison, Wisconsin

Dear Professor Thwaites:

We wish to thank you very kindly for your letter of July 26 in reference to ours of the 23rd. The delay in replying is due to the fact that I just returned from my vacation and found your letter on my desk.

Sometime in the near future, possibly at one of the conventions, we might get together and talk about a couple of the jobs we have had to do in the last couple of years which have turned out so successful and we feel that you would be quite interested in learning of some of our findings. To say the least, one certainly gets curious in this work. We wish that at some time it might be possible for you and Mr.Bean to be at one of our meetings when the men of our organization from all parts of the U.S. and foreign countries meet to discuss problems and new methods. If ever one of these meetings is held in Chicago, Milwaukee or Minneapolis, we will certainly try to interest you men in attending.

Thanks a lot.

Yours very truly,

NORTHWES COMPANY

Ass't. to the President

ch1/1rd

Thed! Massen has carned they cardy to be held up with Lies dawn leathing definishing what about this let in Let me hem you oping in shirt few works

Mr. C. W. Klassen, Chief Sanitary Engineer Department of Public Health Springfield, Illinois

Dear Mr. Klassen:

I have yours of the 4th with reference to our telephone call of yesterday, and I see that we are still up in the air.

Whether this sewer line you are now talking about has been filled or is still in use, I am not worrying about so much as you are. It passed 20 to 25' from the well according to your information. However, I want to state a few facts for you to carefully analyse:

1 -Having drilled and completed lots of wells in Wisconsin under a very strict code, and having had some part to do in advising on that code, I necessarily have been very Careful in the way that I drill my wells,

When we start a well and are going to use 6" pipe, we start the drilling with an 8" bit, and spud the dirt down to 90 - 30" before we set in any pipe. This forms a cone on top about 10 -12" wide; and when we set the first joint of 6" in with a steel shoe on it, we start to drill inside of this with a 6" bit, and if we bring up mud cuttings, we dump them into this cone hole on the outside of the 6" pipe. We follow this procedure all the way to rock, and these cuttings follow the interstices of the pipe and between the couplings on the outside of the pipe down, <u>effectively</u> preventing any surface polution from running down on the outside of the pipe, where the shoe and couplings are bigger and cut a larger hole than the pipe.

2- On this particular job, there is a 4' deep well pit, and before we put the cement slab in this pit, we took a long handle shovel and dug the dirt away from around the 6" pipe to a depth of 4' below the bottom of the pump pit. When the pump foundation and pit floor was mored, this hole around the 6" pipe for 4' down was filled with cement., so you have a positive cement shut off down to 8' around the 6" pipe from the top of the ground, and if there is any darn sewer or not, it is only down about 4', and it is laying in impervious clay, and should it leak, it would not make much difference, as the clay in the first place is a bad absorber of moisture, and in the second place, it cannot get near Mr. C. W. Klassen, Chief Sanitary Engineer April 5, 1940 Page #2.

the well pipe on account of the mud grout and the cement seal around it. Another thing, if you would look at that blueprint of the geology above bed rock, you would see that there is over 150 ft. of impervious clays and basic soapstone shale overlying the bed rock.

Now, Dr. Klassen, if all wells under your permit system were started with a cone at the top, and the cuttings were dukped whether they put shoes on or not, you would have a whole lot less chance of contamination than is now the case.

I want you to take this criticism fairly. Both your Department and Cook County are particular about the location of the well and septic tanks, yet neither of you make a steel shoe compulsory, neither do either of you provide for mud cuttings around the pipe, which is vital, nor do you insist that the driller seal his pipe through the shell rock in a solid bedded limestone. I know of lots of wells right now that are being finished and have been finished of late, where the pipe just touches the crevice rock, and they buck their way into it, and surface water can run in right outside around the couplings. I know one in particular right now next to a well I have just finished in the middle of a sub-division where my driller reported that you could hear water running into the surface after a rain the other day. The other driller left the well without even a tin can on top of it and wide open. The Lord knows what will fall into it until the pump man sets the pump, when ter to one he wont even put an Oakum lead seal on it.

I am assisting an owner today near Clenn Ellen, for whom Brinkman and Eiten finished two wells sometime ago. One has a jet pump which is covered up with dirt, and the other has a power head pump setting on top of the easing, and you could throw a dozen rats into it if you wanted to. I have instructions to pull that pump and sound that well for correct measurements for the owner.

It might be good policy for you to investigate a certain well on 79th and 85th Sts. drilled by Eiten directly across from the Wright property, where we have just finished a hole for the Prairie State Construction Company. It is rumored that Brinkman finished that well with a measurement of 127'. When he moved away, George Marks, another well contractor, and the owner measured the hole at only 96'. The top of the hole is wide open, and no attempt has been made to protect it whatsoever.

On the well that we just finished for the Wright jcb, we encountered crevice rock at 58', and drove our pipe through it to a tight seal at 82. We had a try hole to 102, when we started to pick up water, Mr. E. W. Klassen, Chief Sanitary Engineer Springfield, Illinois April 5, 1940 Page #3.

and finished the hole at 125' with the water standing 10' static from the top. We put our fifteen gallon per minute test pump on and pumped 900 gallons an hour for eight hours, and the water only receded 5', so that the owner has a pumping level of 15', or a mighty good well. The water cleared up nicely, and we chlorinated, but your bottles were not here in time, so we put a wooden plug in the well. We left the pipe sticking above the ground one foot, and we have an order today from the owners to install a shallow well water system, and we will install 30' of 1" galvanized vertical suction pipe in the well, and will suspend it at the top with a MARK SANITARY SEAL, which effectively closes the top of the well 1' above the ground. At the top of this 1" pipe, we will connect over with galvanized 1" to the suction of the pump. We mud grouted that well, and the dry hole encountered is the proof of a positive shut-off, no matter whether there are any drains or septic tanks.

You can remember this right now, and rest assured that every well that I have anything to do with will be mud grouted and will have a MARK SANITARY SEAL on which costs \$4.75, provided that I have anything to do with the pump. But some owners and constructers have their own ideas on pumps and take it out of our hands, in which case you will readily understand that the sealing and installation of the pump equipment is strictly up to the plumber or owner and not to ms.

I hope that this lengthy letter is understood clearly by you, and that your O.K. will be forth coming, especially if the samples sent in yesterday from the Bennett well show conclusive proof of a safe well.

Now, Dr. Klassen, your paragraphs on analyses caused me to wait almost six months a year ago this winter on the F.Perry Schneider job at Roselle, and the same thing is occurring right here on the Bennett. Those types of men have money. They have made it in their own way, and they are not technical and know nothing of what you and I do, and when you qualify as you do here in the State of Illinois, you raise a question in their minds of something that they never thought of, and bing, I, the well driller, suffer and have to wait. I am the one who has to suffer, not you, whose salary is secure. I have to make my living by getting my money from these owners as fast as I can finish a job.

I do trust that you will take this letter in the spirit that it is written, and oblige

Very truly yours, GRAY WELL CO.

F. M. Gray, Jr., Prop.

FMG: DW

your description of condition can see why some might limently wany he no many drive pipes are loose in the a stunte good well. The water albared up at (aly, suc to chave give down over 10 fett amyride y not a juje and fond a hole all the way cultury anget to fill mine a hole and elemente danger Nevertelers, revers do leak, and dry dange do have craits! ad I can see the field for a rlate code in Illinois yout as it found in New York in 1932! I should that your constraint amount to the art.

I hope that this lengthy letter is understood clearly by you, and that your G.K. will be forth coulng, sapecially if the samples sent in yesterday from the Bennett well snow conclusive proof of a safe

Now, Dr. Maaren, your paragraphs on analyses caused me to wait almost aim sonths a year ago this winter on the 7.Perry Samether job at Hosolle, and the same thing is occurring right here on the Semmett. These types of man have money. They have made it in their own way, and they are not technical and know nothing of what yes and i do, and when you qualify as you do here in the State of Ellinois, you waise a question in their sinds of something that they bave to wait, thought of, and bing, I, the well driller, suffer and have to wait. I am the one who has to suffer, not you, whose salary is secure. I have to aske sy living by gatting is and you whose salary is secure. I have to aske sy living by gatting is and you, whose salary is secure. I as I can finish a job.

I do traat that you will take this letter in the spirit that it is written, and oblige

Very truly yours, GRAY WELL CO.

"Goal ""at "Koan "H "

#### Fred::::

Train

What in heck is wrong here there is something rotten in Denamark not Sweden.

Frank

April 10,1940.

Mr. C.W.Klassen, Ch.Engr. Dept. of Public Health, Springifeld, Ill.,

Dear Sir:

Please send a number of sample bottles rush to me at Chicago office.I need them for these subdivision wells and my man tried to get some today from "eland and he has none nor will have any, so he informed my foreman.

Rggarding that da--- Bennett job, what in heck is wrong, I received your teletype about five o'clock, that the old or redrilled south well was safe and now the new or 411 ft. hole is not safe. Last week that well was okey and the other was no good.

I sent samples at the same time to Wisconsin that I sent these to you that you teletyped on and for heavens sake, WISCONSIN SAYS THE WATER IN BOTH IS OKEY.

Something si wrong. Can it be the gas. Mr. Dennett informed me this morning that he has frequently of late tested both wells for METHANE gas the way you suggested in a gallon bottle and both have it and it burns. THE WATER is sweet tho in both wells whereas before it was rotten eggs and oil. It is as clear as crystal, I have in gallon bottle for a week.

I had a man checking to day and there is not a well within ten miles of there in that Bighland Park district that has fresh water, it is all rotten. So I am now satisfied that it is all coming from that top 50 feet or so of rotten limestone and that the rock below is tighter and while it still carries METH\* ane in solution the oil and sulphur is gone. IS THIS DA--- B.C coming from a vegetable decomposition from which the oil, ges and afiiliated material are derived from????????????

There is not leak that I can swear to and same samples sent and taken at same time should not come back different.

Something is rotten in <sup>D</sup>enmark and if this keeps up I can and will compel Bennett to go down into the <sup>S</sup>t.Peter and case the entire top structure off which under my contract at per foot I can do and he will have to pay the piper.Let me hear grom you fellows at once. Yours truly

copies to\*\* Workman 94%bltes

April 10, 1940

Mr. C.W. Klassen, Chief Engineer Dept. of Public Health Springfield, Illinois

Dear Mr. Klassen:

I talked with Mr. Bennett yesterday, and he informs me that he made several tests from the faucet, and the methane gas burns as you stated. The aerator sketch which you sent to me and also to Mr. Bennett shows the aerator out doors. This is bad for this climate, as you have an ice-box out there a major portion of the year.

Mr. Bennett is desirous of doing something to obviate this dangerous gas, and I should be pleased to have your suggestions. It has been my thought to place the aerator in the basement below a window in a hermetically sealed box with the aerator trays inside, then to vent the top through an open basement window with a large flue up on the outside of the house to rid the water of the gas, which would undoubtedly prevent the aerator from freezing.

Any suggestions that you may have along these lines would be appreciated. Please send carbon copy to Mr. Bennett.

Very truly yours, GRAY WELL CO.

FMG:DW

## F. M. Gray, Jr., Prop.

c.c. Mr.J.S. Gobel, Ass't. Engr.State Water Survey, Urbana, Ill. Mr. L.E. Workman, Asso. Geologist, State Geological Survey, Urbana Prof. Fred T. Thwaites, Science Hall, Madison, Wis. Mr. R.C. Bennett, 753 W. Jackson Blvd., Chicago, Ill.

April 17, 1940

Dr. C. W. Klassen Chief Engineer Dept. of Public Health Springifield, Illinois

> Subject: B. C. Bennett Well Righland Park, Ill.

My dear Dr. Elasson:

4 have just come from a long meeting with Mr. Bemnett, and he has signed up a contract with me by which we are going to deepen the new (6") 411<sup>st</sup> hole. We are going to go down with 6" through the shale strata to 600'. Then, we are going to set in 600' of 4§" cil well pipe which will extend from the bottom of the <u>impervious</u> shale strata to the top of the well. This pipe will have a shoe on the bottom at 600' and sloo be set in cement.

We will then drill a 40° drill hole through the Galena Black River limestone into the St. Peter sandstone at approximately 900' I know very well that I will get fresh water free from methane gas and also water on which there will be no question of any possible contamination ever arising, and I want you to bear in mind very carefully that this 40° pipe will be a secondary line of pipe inside of the 6°, extending clear from 600° to the top as an inner liner, as an extra precaution to shut out any possible <u>doubt</u> in your mind or any body elses that any sewer, cesspool, or drain, etc. will have any <u>possible bearing</u> on any <u>future</u> contamination br question, and if you come in after this well is done with a long and lengthy bunch of questions of same being subject to contamination again, then there is something wrong with both your and my education.

By the time Mr. Bennett figured up the cost of a possible screator to rid the well of the methane gas and to install an added chlorinator, he had as much invested with mechanical means of elimination as for going deeper in casing this top stuff off to get a natural water free from the darn gas and from the sandstone where no possible contamination could ever occur. and that is what we are going to do. MILWAUKEE OFFICE 2612 West Greve Street Phone WEst 8996

Dren

GRAY WELL CO.

WELL CONTRACTORS 205 West Wacker Drive WELLS ANY SIZE OR DEPTH

TEST BORINGS

#### Phone Dearbourn 9505

PUMPS

CHICAGO, ILL. March 20th, 1940

Prof. Fred T. Thwaites Science Hall Madison, Wisconsin

> Subject: R.C.Bennett Wells Highland Park, Illinois

Dear Fred:

I have your interesting letter of March 19th, which confirms Mr. Gobble's letter of the 18th, in which he conferred with Dr. T. E. Larson, Chemist of the Illinois Water Survey Division.

I am writing Mr. Gobble this morning quoting paragraphs from your letter.

For your information, wish to advise that we drove a  $4\frac{1}{2}$ " pipe with a forged steel shoe some 8' into solid limestone effecting a shut-off at 207' - 10", and the rock was <u>impervious</u> for some 20 feet below the shoe, as the hole baled dry to that point, after which we started to pick up some water and could not bale the hole dry from that time on to completion at 248'. Therefore, it is my contention, that while there was no impervious clay or shale strata present, still the white lime was so compact that I do not believe anything could get through it. In fact, the baling showed so. They pumped the well all day yesterday and it was clearing up nicely last evening.

For your information, please note that in drilling below the pipe on this old well we did not affect the water level on the new well adjacent. We had thought of this and there was a direct connection from the new well pump over to where we were redrilling the second well. I had the boys put a hose on it last Thursday and we let it run continually and watched it in a bottle to see if, when we got below the pipe, the water clouded in the new well. IT DID NOT DO SO.

You will note my letter to Mr. Gobble of yesterday, of which you received a copy. You will note that I suggested that we take after all their recommendation for one of their men to pick up a sample and to verify the presence of the gas.

Your first paragraph confirms my idea of late that the B. Coli was as you suggested and not dangerous. The old well we spoke about is way over near a barn on adjoining property. It must

#### **ESTABLISHED** 1864

GUARANTEED WATER SUPPLY

page 2.

Prof. Fred T. Thwaites Science Hall Madison, Wisconsin

have been drilled about the same time as the old well adjacent to Mr. Bennett's house, and undoubtedly the pipe on that well was about the same distance in the shell rock, and undoubtedly a liner, as I suspicion that the same driller put the two of them in. If this is so, the barn well bottomed at a depth higher than where we have now shut-off both of Mr. Bennett's wells at 208', and it should, from now on, be of no consequence to us. We have put a 5 lb. can of H.T.H. 70% and 5 gallons of water in that hole and found that it was impossible to cap the top of it, as it would not hold, there being a lot of old timbers around it where a man cannot get down to caulk or put a seal on it. I think we will forget that entirely from now on.

The main thing now is to determine the nature of the air or gas, as also the type of fermentation, if any, and if gas, to have a plan devised for Mr. Bennett to obviate this gas. if dangerous.

Yours very truly,

GRAY WELL COMPANY

F. M. Gray, Jr.

FMG:KH

CC. - Mr. C. W. Klassen, Springfield Mr. R. C. Bennett, Highland Park Mr. L. E. Workman, Ass't. Geologist, Urbana, Ill. Mr. J. S. Gobble, Ass't. Engineer, Urbana Mr. George B. Prindle, Supt.Water Works, Highland Park.

September 1,1938

Mr. Frank M. Gray, Jr. Gray Well Drilling Company 2612 West Greeve Street Milwaukee, Wisconsin

Dear Frank:

In reply to yours of August 29 in regard to pprospecting by earth resitivity, the Pure Oil Company used this method extensively some years ago in Michigan, but at that time there had not been enough drilling to show whether the results were reliable or not. I have seen a statement in the oil papers that none of the geophysical methods work very well in Michigan. I have never had any personal experience with this method and it would take a long time in the field for me to gain sufficient experience to see how it works. They have an instrument, or did have one, which they experimented with for shallow exploration. They found that it does not work well under all conditions. The difficulty in Michigan is/ very largely that the drift is so heavy and consists of different materials. These things near the surface are recorded much more plainly than are the deeply buried rock formations. I do not think that it would pay to experiment now because you would be just duplicating what some of the oil companies have done. The best thing in Michigan is to follow the NW SE trends of the folds ...

Very truly yours

WISCONSIN GEOLOGICAL (UNVEY By

F. T. Thwaites, Geologist

FTT LMV

MILWAUKEE OFFICE 617 North Second Street PHONE DALY 0945 161 W. WISCONSIN AVENUE SUITE 3050 2612 W. GREEVE STREET IE WEST 8998 GRAY WELL DRILLING CO.

WELL CONTRACTORS 160 N. LASALLE ST. PHONE CENTRALY474747474747 Dearborn 9505 WELLS ANY SIZE OR DEPTH

PUMPS

CHICAGO, ILL. Aug. 29, 1938

Professor T. H. Waites Science Hall University of Wisconsin Madison, Wisconsin

Dear Fred:

There is a lot of activity over in Michigan again in Michigan especially around Grand Rapids and Kalamazoo and down to Dowagia and several big wild cats have been brought in lately.

Do you know anything about this new method the large companies are using by making an electrical earth resistivity?

I understand that it is better then sizemograph surveys.

Would it be possible for you to spend a day over there making such a survey?

Yours very truly, Gray Well Company

M. Gray,

Prop.

MILWAUKEE OFFICE 2612 West Greve Street Phone WEst 8996

Gray

GRAY WELL CO.

F. M. Gray, Jr. Prop. WELL CONTRACTORS 205 West Wacker Drive

Phone Dearbourn 9505

WELLS ANY SIZE OR DEPTH TEST BORINGS PUMPS

#### CHICAGO, ILL.

March 28, 1940

Professor Fred T. Thwaites, Associate Geologist Science Hall University of Wisconsin Madison, Wisconsin

Dear Fred:

Enclosed find copy of letter to Dr. Klassen received this day, and I am asking him to send to you immediately, a copy of the report he has just forwarded, which shows water from the new well O. K. with a slight questionable count in the redrilled **dbb** well. I have contended for sometime, and still do, that owners in that district <u>do not need</u> to put up with that bad sulphur water, etc., provided the well driller knows his business, and from now on I intend to <u>under cut</u> my drive pipe through the shell rock to a firm seal in the solid bedded lime strata immediately below the "shell".

I have a like condition where I am starting a series of suburban wells on the south side, adjacent to 89 and Roberts Road, which is about one mile west of Harlem Avenue. The first well drilled, had a shut-off with pipe at 68 ft, with no shell rock nor oil or sulphur odor, and we got a good shallow well at 127 ft. 200 ft. away on the second one, we are finishing today, we encountered broken lime with oil scum extending from 68 to 89, and the pipe followed with steel shoe until it shut itself off at 89, where we finished it at 130 (fresh water). For your information, as also the Illinois survey, I am making all my drillers spud the top clay with a larger bit to 15 to 25 ft; then I am setting my 4½ pipe with a Kopperud drive shoe, and I am <u>dumping</u> the cuttings on the outside of the pipe from there on until the pipe reaches bed rock. This is helping to effect a positive shut-off and elimination of any possible future surface drainage contamination..

I want you to take the Bennett blueprint and reconstruct the old well alongside of the new one and show as follows:

6" old pipe deteriorated with holes to 157 ft., then show new 4½", 14 # per foot black steel drive pipe with steel shoe on the bottom, set at 207'10"; then a 4½" drill hole to total depth of 242, static levels the same. ESTABLISHED 1864 GUARANTEED WATER SUPPLY Prof. F.T. Thwaites, Madison, Wis. March 28, 1940 Page #2.

Please send me at least ten copies of this new blueprint, and mark "For redrilling on the old well, completed March 1940."

Your prompt attention to all of the above will be appreciated.

Very truly yours, GRAY WELL COMPANY

72 min

FMG:DW

F. M. Gray, Jr.

CC.-Mr. C.W. Klassen, Cf. Engr. Dept of Public Health, Springfield, Ill. Mr. R.C. Bennett, Highland Park Mr. L. E. Workman, Ass't. Geologist, Urbana, Ill. Mr. J. S. Gobble, Asst. Engineer, Urbana, Ill. G. R. Prindle, Supt. Water Works, Highland Park, Ill. Dr. C.W. Klassen Springfield, Ill. Re: R.C. Bennett Well April 17, 1940

## with you

I had an argument/on the F. Perry Schneider job at Roselle a year ago, where you created a doubt in a layman's mind with a lengthy explanation, which to you of course was understandable and undoubtedly according to your Department's instructions, but if you remember, I informed you that in raising this doubt on that particular job, you could turn right around and condemn 80% of the limestone wells in the State of Illinois.

Mr. Bennett does not wish nor desire to reroute that sewer, as it would be a costly proposition, and he has seen fit to proceed as outlined and spend more money to obtain a naturally satisfactory water.

I am sending carbon copies of this letter to water supply experts, as I have on other correspondence on this same matter. and I am sure that they will bear with me in this instance. If not, I shall be only too glad to have their suggestions and recommendations.

This letter is written not in any manner of criticism, but as an open question on the procedure of your Department, and it is continually costing me, as probably others, embarrassment and preventing me and others from obtaining settlements with our customers.

I have before me your analysis form and return on the 120° drill well on the Fred Eisner property near Harvard & LaMoyne North Lake subdivision. If you would only use that form and stop there, as you have on that analysis, we could both get somewhere. And, I respectfully request that in returning me analyses hereafter that you use form(SEL 10 B-60634-10M-7-38), which is clear and concise and tells the story that the water is free of pollution and safe to use.

All of the above Dr. Klassen, in view of the fact that the above 120' Eisner well is situated right in the middle of one of the most intense subdivisions that Chicago has ever seen, with septic tanks every 75', and wells drilled in a manner the Lord only knows how, and I can cite you a well just 100' from where this one was drilled, "correctly, I hope", and the top was left wide open when the driller moved off, and I know dawn well that he did not put a shoe on. Also the rock is down only 22' and you can hear water running in.

This Eisner well, I was very careful of, as I usually am, and I mud grouted it to rock and put a steel shoe on and drove it securely into the rock, KNOWING that the rock was only 20' down with an outcrop not over two miles away. Dr. C.W. Klassen Springfield, Ill. Re: R.C. Bennett Well April 17, 1940

-3-

If you can answer some of the above and justify your rulings on the Bennett matter, I shall be pleased to receive such word from you. Please do not forget that the 6" pipe on the Bennett well is down 208' with plenty of impervious materials above, and with, I know, a positive shut off at 208'.

> Very truly yours, GRAY WELL CO.

FMG:DW

F. M. Gray, Jr., Prop.

MILWAUKEE OFFICE 2612 West Greve Street Phone WEst 8996 GRAY WELL CO. F. M. Gray, Jr. Prop. WELL CONTRACTORS 205 West Wacker Drive

Phone Dearbourn 9505

WELLS ANY SIZE OR DEPTH TEST BORINGS PUMPS

CHICAGO, ILL.

### April 18th, 1940

Prof. Fred T. Thwaites Science Hall Madison, Wisconsin

Dear Fred:

Subject: R. C. Bennett Highland Park, Ill.

What do you think about that damn man Klassen at Springfield? He certainly gummed up a couple big jobs for me, and as a sample of what he does, I am enclosing herewith two different analysis sheets, one of which he sent on the Bennett job and <u>QUALIFIED</u>, and the other a lousy little 4 1/2" well where he irrevocably 0. K'd. the water. I think my letter to him of yesterday, copy of which you must have received today, will stir him up. Let me hear from you on this at once, and return these two analyses immediately with your remarks.

Yours very truly,

GRAY WELL COMPANY

F. M. Gray, Jr. Prop.

FMG:KH Enclosures (2)

## AREARAR 41 Roby Road,

## In quarantino, April 19, 1940

Gray Woll Co., 205 Wost Wacker Drive, Chicago, Illinois

Dear Frank:

In reply to yours of yesterday I am returning enclosed the reports from the Department of Health.

As to commont I can only say at present that it would appear that conditions for shallow water around Highland Park do not look very good. True, the oil floats on top being confined by the drift. Presumably most of the batteria of which a large part enter from contaminated wells also float. Water from well below the surface sooms much better but because flow is in crevices of unkowable size and direction it is more likely to be carried down than it would be in a sandstone. The tests indicate what some autheirities would call "questionable" rather than "unsafe" water. I should expect that results would not be the same in all samples particularly as the suspected contamination is slight.

Will answer other letters soon. The "cold" turned huteSghaddhudzight herbeTchalehun hazfukithotheekhtee boys

Sincoroly

May 4, 1940

Mr. F. M. Gray Jr., Prop. Gray Well Company 205 West Wacker Drive Chicago, Illinois

Doar Frank:

Fray

Having at last been released from quarantine, I could look at the Geneva, Illinois samples.

I find that the best looking streaks are 760-795 and 960-985. Second best is 860-960. However, samples taken at such long intervals cannot possibly be truly representative of the rock.

Do you want the samples returned?

Very truly yours,

WISCONSIN GEOLOGICAL SURVEY By

F. T. Thwaites, geologist, Well Records

FTT/ru

cc: C. I. Hellstrom
MILWAUKEE OFFICE 2612 West Greve Street Phone WEst 8996

GRAY WELL CO. F. M. Gray, Jr. Prop. WELL CONTRACTORS 205 West Wacker Drive

Phone Dearbourn 9505

WELLS ANY SIZE OR DEPTH TEST BORINGS PUMPS

CHICAGO, ILL. May 7, 1940

Mr. F.T. Thwaites, Geologist Well Records The University of Wisconsin Geological and Natural History Survey Madison, Wisconsin

Dear Fred:

I have yours of May 4th regarding Geneva sample, and I agree with you that it is too bad that Mr. Cater did not take samples at shorter intervals.

I note that you sent a carbon copy of this letter to Mr. Hellstrom, so he will know what I am talking about in this letter.

I agree with you, and will advise the City to shoot the 25' between depths of 985 and 960. This makes 25' there at the bottom, which can be shot with two torpedoes. That will take care of 500 lbs. Then the second best place is from 960, as you say, up to 860, or 100 ft. That should be taken care of with not less than four torpedoes, or 1000 lbs. Then come up to the 35 ft., between 795 and 760 and shoot two torpedoes there, or another 500 lbs., making a total of 2000 lbs., which should drown them out with water.

Of course when we get cleaning, we can tell best which shots have been the most effective, irrespective of the sample analysis, so that if Mr. Cater did not get his samples real accurate, we could shoot over in those spots shown by the most debris.

> Very truly yours, GRAY WELL CO.

F. M. Gray, Jr., Prop.

FMG:DW

c.c. Mr. Clarence Freeman, Geneva, Illinois Mayor Wm. Wood, Geneva, Illinois Mr.C.I. Hellstrom, Supt of Water Works, Geneva, Ill.

ESTABLISHED 1864

GUARANTEED WATER SUPPLY

Milwaukee, "is., September 11,1940.

Mr. B. Wade Denham, Archt. 1520 Washington Ave. Racine, Wis.,

Dear Sir:

Inar

Please pardon my delay in answering your letter of August 27th. but I have down in the field.

I am very well aquainted indeed with the drilling in and about Racine as father and I have drilled practically 90% of the deep wells in that locality in the past 50 years.

In drilled both deep holes at the Racine County Farm as well as a number in Racine proper, for Case, Mr. Frank Bull years ago, the old Mitchel Motor 2400 ft. well the old Ajax Rubber Co. well several old city wells, Frank ure Food Co. at Franksvilles for Mr. Bavid Eisendrath as also David Lisendraths deep 2000 ft. well at the annery. Also the B.F. Sturtevant well at Old Corliss Junction (Now Sturtevant) and the Milwaukee Road deep wells.

I have probably more well records than any one of this entire district. I talked to some man a year ago who was leasing around the Racine County farm but I have forgot his name.

I have alarge Star Drill rig in excellant shape at my warehouse here all complet with the best of heavy tools. The large 50 Horse boiler for this rig is in Chicago yard tho.

I shall be glad to lease you this rig for a price of \$3.00 per foot, you load and take to location and return it in first class shape. Also the drills, stems and rope sockets and bailors with the wrenches and circle track (No fishing tools)

You also assign to me a block of your off-set acreage near the well as part payment and as a bonus for honest work in helping you drill the well.

This money to be escrowed in my Milwaukee bank to guarantee payment as work progresses as also you shall escrow the money showing that you have the facilities for the payment of the abor , fuel and pipe bills as work progresses.

I have just finished a deep test in northern 111.under

this smae arrangement.

I shall be pleased to meet you. Yours truly, Frank M. Gray

September 10, 1940

Mr. Frank M. Gray, Jr. Gray Well Company 205 West Wacker Drive Chicago, Illinois

Dear Frank:

In reply to yours of the 27th, which arrived during my vacation, I have checked on the person mentioned. Provided you have the initials correct (there is one "A. M.") there is no record of his publishing any scientific article up to the end of 1936. No such person is a member of the American Association of Petroleum Geologists. His claims, so far as the knowledge of the facts are available here, seem improbable.

In respect to Hacine I can speak more positively. Outcrops of rock are so scarce that nobody could make out an uplift unless fooled by one of the coral reefs in the Niagara. Even granting there is an uplift, so many wells have gone down through all possible productive formations that absence of commercial amounts of oil seems positively certain. You yourself probably know as much about the small showings in the Niagara in northern Illinois as anyone. In my opinion they come from Devonian strata which occur under Lake Michigan.

I strongly advise against entering into any contract unless money to cover it is deposited in a sound bank in escrow and payments at regular intervals are assumed.

Very truly yours,

WISCONSIN GEOLOGICAL SURVEY

By:

F. T. Thwaites, Geologist Well Records

FTT/ea

Dear.9505 205 W.Wacker Drive

------

Febuary 18,1941.,

Mr. A.E.Logan, Engineering Div. M.A.& R Building Proctor & Gamble Corp. Ivorydale, Ohio.,

Dear Sirt

I have just talked with your Mr. Stiehl, of your Chicago plant.He informs me that the hardness of the water holds you back from drilling your own well right now.

I am sorry I could not have met with you while you were here, You can obtain a much softer water by segregating the water bearing DRESBACH sandstone water from those above.I segregated this on the first such well developed here at the Northwestern Hailroad large well at West Chicago.We obtained a 12 grain water as against approx. 10 grain for Chicago city water.We did not lose our gallonage either as we were afraid off.After that we drilled such a well for the Glenview country Club and the Village of Lombard and got good results in all. That proves that the Dresbach on all sides of Chicago carries the same grade of water.

I have a comparative analysis of all formations taken from the St.Mary's Academy well at Des Plaines where we shut off with wrot iron pipe.That pump was just pulled the first time in twenty years and the well HAD NO DEBRIS whatsoever.

I should like to meet with you on your next trip to Chicago and go into these matters personally. I suggest that you write Prof. Fred T.Thwaites, Ass't. Geologist, State of Wisconsin at Madison who has worked these things out with me for the past twenty years.I consider him an authority on these water matters.

Yours very truly,

Frank M. Gray Jr.

DELAFIELD, WIS. Phone 661 GRAY WELL CO. F. M. Gray, Jr. Prop.

WELL CONTRACTORS 205 West Wacker Drive

> Phones Dearbourn 9505 Randolph 7100

WELLS ANY SIZE OR DEPTH TEST BORINGS PUMPS

CHICAGO, ILL.

Middletown, Iowa.,

November 30,1941.,

Prof.Fred T.Thwaites, Well Geologist Wisc. State Geological Survey Science Hall Madison, Wis.,

Dear Fred:

I sent you some papers relative to the wonderful well we finished at Western Electric and thot you would have your girl copy and return. Lease do so as I wish to have these photostated. A 1000 G.P.M. with only 10 ft. draw down or appro-100 gal. SPECIFIC is some thing, is it not for Chicago?

Say, Fred, our No. 4 hole here is at 1690' last night still in Oneto dolomite, hard and fine grey with lots of white chert, which I suspicion is gyp. etc. I find that at Washington & Waterloo we cased off almost thru the lime in fact nearly to the top of the Jordon.

Would it not be a good plan here to shit-off all this top, to segregate the lower Jordon or even shut that off and take only the Galesville and Dresbach waters? This top water is fierce.gas odors all the way with bituminum colors all way thru. We are carrying 12" hole and could go thru with that the come back and set disc wall packer to hold the weight of pipe, using a lead seal and string of work pipe to lower in with, in that way avail ourselves of the 12" dia. in the water sand altho leaving 10" pipe for the water to come thru which is suf: icient.

I have a plunger bailor here with which I could take bottom hole samples with as we did at Des Plaines and West Chi. years ago. I am sending copy of this to Geologist Hersey at Iowa City thinking he may have some suggestions re same.

Yours ver

cc-Hersey Iowa City-

ESTABLISHED 1864 GUARANTEED WATER SUPPLY

In reply to your of Nov. 30, A we are enclosing all papere pen Frush in regard to Western Electric Co well having topied the main facts. Blueprint has been begun. specific [I doubt a These was a mislake like that at West "chings in '22') must be from The orevices. The same Thing was claimed for a well at genoa In, Wa, drilled by Thorne. I with regard to Burligin , Times; I am , not famen enough win the waters at apport levels to be able to advise as well on the and here have been and recall it they think The Mussissippio. the lower waters are the best. is oil bearing and should by all means be cared off I don't know much about the St Peler, water. this I success is any it is the this they at not its washington a .dobtol add to god and vew lis prolob munimutic driv vay and lis probe esp. porell thre. We are carrying 12" hole and could go this with that LCINSIG. Chi. years ago. I am sending copy of this to Geologist Hersey at lows dity thinking be any have out augrestions re same. S.M. Gardin. S. ac-Nersey Iowa Utty-ESTABLISHED 1864

April 18, 1941

Mr. F. M. Gray, Jr. Gray Well Company Delafield, Wisconsin

Dear Frank:

In reply to yours of the 15th, the sample is certainly part wood. I had some of the botanists examine it and they say that although there is some hemp much, if not most, is cedar.

Very truly yours

WIECONSIN GEOLOGICAL SURVEY By

F. T. Thwaites/1k

Geològist, Well Records

December 2, 1941

Mr. F. M. Gray, Jr. Gray Well Company Middleton, Iowa

Dear Frank:

Aling wearco.

In reply to your letter of November 30, we are enclosing all papers in regard to Western Electric Company well, having copied the main facts. Blueprint has been begun.

The high specific (I doubt there was a mistake like that at West Chicago in 1923) must be from the crevices. The same thing was claimed for a well at Genoa Junction, Wisconsin, drilled by Thorne.

With regard to Burlington, Iowa, I am not familiar enough with the waters at different levels to be able to advise as well as the Iowa people can. As I recall it, they think the lower waters are the best. The Mississippian is oil-bearing and should by all means be cased off. I dont know much about the St. Peter water.

Very truly yours,

WISCONSIN GEOLOGICAL SURVEY By

F. T. Thwaites, Geologist in charge of well records

FTT: fh Enclosure 2 DELAFIELD, WIS. Phone 661

MIDDLETOWN, IOWA P. O. Box 8 GRAY WELL CO.

WELL CONTRACTORS

205 WEST WACKER DRIVE

PHONES DEARBORN 9505

CHICAGO, ILL.

Middletown, Iowa.,

J an. 13,42

Fred Thwaites Science Hall-U. of Wis., Midson,Wis.,

Dear Fred:

I enclose herewith copy of analyis of water from Washington Ia well I drilled and cased in 1924-This hole is cased from some 1810 tight up to top. Please note the softness, they tell me today its an ideal boiler water, Is it so, Fred?

Well out here to the Plant, Varner's no. 1- has 16" pipe supposed by sealed with 16" from top to some 764'-dumped cement in bottom so they say. Then drilled 15" hole 45' farther where they hit a cave and set 64' of 12" liner with Varners patent lead seal (nothing but a piece of 12" pipe split with torch and flared out with lead molded on) he sets this in then a pipe of 12" about 5' long on top with a taper cone at bottom to set in the lead with a taper at top for the tools to hit, so that when tools run in and out they hit and swadge the lead out. I dont think much of it.Fred, do you?

Well he them went to some 1184' thru the St.Peter, they have had darn hard water some 32 gr. I understand but recently something broke in, the static head came up as also the pumping head 10' & at same time the water got real bad and harder.

At my No. 4, we set 864' of 16" pipe Halliburton tried to cement shoved 16" mass down 424' where it plugged, they figure the ement went up that far around the bottom and load got too heavy and it stopped his wood plug. Anyway, I drilled 424' of cement out of the pipe. Well that pipe is cemented at least at bottom that we can rest assured of. The Static head when pipe was set was 60' fom to? When plug was drilled out, they did not make any baling test for pipe tightness and when we drilled lower cement plug out and got 5' below pipe the water dropped to 160' here it has remained ever since.

We then drilled 15" hole thru St.Peter to 1224' and they made me set, some 360' of 12" pipe lapping up into the bottom of the 16" and used a Spang combination bottom hole lead and short rubber packer the rubber was only 6" long on the bottom.At the top this darn Varner patent lead seal with drilling nipple. We then went ahead thru Jordon to 1924'.Remember Fred, the Oneto dolomite is all open from 1224' to bottom at 1924' some 500' of lime and Prairie Du Chien etc. Magnesiman lime you used to call it,I beleive etc.

Weithe static level is the same 160' when we finihsed thru the Jordon, On pumping they have an enormous volumne with about 17 spec but high in hardness some '3g gr'. T beleive and high in MagnesiansuplphatesGet GARANTEED WATER SUPPLY

WELLS ANY SIZE OR DEPTH

TEST BORINGS

PUMPS

DELAFIELD, WIS. Phone 661

MIDDLETOWN, IOWA P. O. Box 8 WELLS ANY SIZE OR DEPTH

TEST BORINGS

PUMPS

# GRAY WELL CO.

WELL CONTRACTORS

PHONES DEARBORN 9505

CHICAGO, ILL.

Page two-

Fred Thwaites,

They figured they would run the water direct from the discharge into the lake they have below power house and mix then bring it back mixed to softners etc.

On No. 3 they have shut me down at 1209' just thru the St.Peter St.Peter was twice as hard on this as at No. 4 one mile west.

Static level here was and <u>is 50</u>' since we got below the 20" drive pipe at 139'-that is the head of the top Mississippi lime water and when we got thru shales to 854' they had me set 854' of 16" and Halliburton came over and put the pressure on the pipe broke it 14' down from top where you could throw a cat thru and when we wantin with 15" bit if stopped at three places.100 ft. from top. 520' and 150' from bottom we swadged for a week and finnaly succeded in driving 15" round swadge thru and after that put drill jars on trying at there orders to drill the PIPE THRU, I guess which it might have done

Anyway there is liable to be at least three spots with hole bulged in seams as the pipe was only 600# test line pipe and Halliburton had 1000# on his pumps. Dam foolishness thats all. Why ad prenue had up?

Well we drilled 15" hole after getting tools out to 1209' and the static has remained at 50'. WHAT DO YOU THINK OG IT, FRED. ???? working lower-

The top of this well I find today is ten ft/hxgher/than n0. 4 so thats accounts for 60' static in top at 4 and 50' at 3 well, does it not?

Well now they are running a pump test at No. 3 to determine if top water is coming in or not????

I have suggested to take this No. 3 where there is no question that the 16" is broke in at least 4 places and as we have 15" hole at 1209' to reduce to 12" and run that tox top of Hordon sand at about 1850'--SET 10" pipe with bottom hole Larkin packer with at least a 16" rubber then run the ten inch pipe up beyond the 15" hole put a 10" x 12" swadged nipple( forged preferred) and then 12" pipe all the way to top thru the split 16" pipe and shut off to top of Jordon sand.THEY SHOULD GET THIS SAME SOFT WATER AS AT Washington, should thy not Fred?

Say.Fred Wasn't Aledo cased top to bottom also you geologized that to I beleive, look up your record, please and see if you any water analyisi will you? What other fully cased holes are there around here also Fred, any, that you know of, please. and what is the water.

They said smething today about Mt. Pleasant having cast iron in, but is it straight cased Ntb really shut Roff. ?? Regards, Gray

January 15, 1942

Mr. F. M. Gray, Jr. Gray Well Company Middletown, Iowa

Dear Frank:

Yours of the 13th is at hand, and I have studied what information I have, which isn't much.

Our records say the Mashington well is cased to 1510 or in the Magnesian. I would not call the water soft, although the way they figure it, there is only a little calcium carbonate. They put the calcium as sulphate, which makes hard scale. The alkali content is enough to cause foaming. The statement at the bottom is certainly in error; it must be "grains per gallon."

I quite agree that lead seals are not so good. For that matter, all the waters are very corrosive and cement is the only thing which will last. The Mississippian waters run up to over 70 grains hardness.

I do not quite see why there was so much trouble with the cement job. I thought they established circulation first to see if cement will flow freely, or were they trying to cement a string which does not reach surface?

I doubt if you can get water much softer than 32 grains, but maybe there is some in the Dresbach, though I doubt it.

If you failed to change the static, I think you can be assured that no shut off was made. You can check temperatures of water pumped from different wells.

Your program for an inner liner seems about all you can do, but I would like to see it cemented for permanence, if possible. You should get water like Washington.

### #2 Mr. F. M. Gray, Jr.

I have no record of water at Aledo, but you can easily get it from the Illinois Water Survey at Urbana. The old well had hardness of 350 p.p.m. which is low. By the way, Arnold Mason, who is now in charge of water well work for the Geological Survey at Urbana, is a former student of mine.

Mt. Pleasant has very corrosive water, but I have no record of cast-iron pipe having been used. Cemented steel might work as well.

Very truly yours,

WISCONSIN GEOLOGICAL SURVEY By

F. T. Thwaites, Geologist in charge of well records

FTT:fh Enclosure

#### 

XXXXXXXXX

XXXXXXXX Delafield, Wis., Sept. 17,42.,

Mr. Chapin Roberts, Constr.Dept. Sears-Roebuck Company. 940 So.Homan Ave. Chicago, Ill.,

My Dear Mr. Roberts:

File under Some for alle

Remembering our phone conversation of last week. I took the privilige of contacting Prof. Thwaites re your well.

We had a spe cific of some 8.3 gallons at completion.

In that the pumping water table is evidently receding, according to your information. I would like you have fr. Miller, check the static as also the draw down with callonsage and obtain the present specific capa poity.

I have had the suspeicion for some years that the pores of the sandstone, jelly or clog. I have found in wells opened up, that the first removal was black mudy slime and when shot the first debris obtained was balck sandstone, finnally as the wall gave way becoming white or natural wall. At the Nat. inameling & stamping well, I had opportunity to prove this as after second third and fourth consecutive shooting of same wall, sonsiderable more specific entered the well. I found this true likewise at Western "Leotric, where after proper development, 1000 gal. was obtained with some 69 specific.Fred Thwaites that this very high and almost unbeleiveable, BUT THE ILL. Survey did the measuring and testing so it was correct. It is still holding up.However there, we found considerable more "resbach (some 150 ft.) where in your well we had to confine ourselves if you remember to some 84' of same Presbach.

Thwaites, says, depsoits of Calcium Carbonate deposition, clogs the pours a nd causes this slowage of inlet FLOW. We made a pretty large hole in that Dresbach, I know but, Fred, agrees that light shooting, properly a nd CAREFULLY done, should open up the spaicifc.

I am of the opinion, that a number of light shots, properly placed in the Dresbach wall, will knock this down and then carefully SWAB the hole to create free flowage etc. This shot hole is some 200' BELOW the bottom of the last casing installed and by using double detonators, the shots would go sidewise as BEFORE. I do not think it necassary, sir, to have to purchase new bowl assembly and small add-- itional commun. RAISE the speci fic and you will get the former or better resutls. I shall be glad to confer with you on this. Yours truly.

F.M.Gray Jr.

cc-Fred Thwaites.Madison,

September 12, 1942

F. M. Gray, Jr. Delafield, Wisconsin

Dear Frank:

In reply to yours of the 9th, sample bags were sent a few days ago as per your post card.

We all liked Mr. Roberts very much.

With regard to the Sears well, our blueprints show pipe clear down to 1249. It would therefore be impossible to shoot that hole much more. The Dresbach shots were 200 pounds so must have made as large hole where it would be difficult to shoot again.

Clogging of pores in a water well is generally ascribed to deposition of calcium carbonate because of decrease in pressure. Phooting to relieve this condition is good practice but it just seems out of the question in the Irving Road well.

Porry to hear of your troubles in Iowa. Things are quiet here with most students gone to the war and very little drilling going on.

Very truly yours,

WISCONSIN GEOLOGICAL SURVEY By

> F. T. Thwaites, Geologist In Charge of Well Records

FTT:MM

DELAFIELD, WIS. Phone 661

# GRAY WELL CO. F. M. Gray, Jr. Prop.

WELL CONTRACTORS

205 West Wacker Drive

Phones Dearbourn 9505 Randolph 7100 WELLS ANY SIZE OR DEPTH TEST BORINGS PUMPS

CHICAGONIDI. Delafield, Wis., Sept. 9,1942.

Prof. Fred T.Thwai tes, Science Hall-U.of Wis., Madison, Wis.,

Dear Fred:

I met Mr. Chapin Roberts of Sears yesterday and he said he had met you on Lake trip this summer. You found him a fine chap didnt you?

He states his Irving well is dropping slightly etc.Altho he stated they were still getting sufficient water he thot soon they might change to smaller bowls and set them down into the top of the 10" liner which is right below where the 11" bowls are now setting at approx. 300'. At time of completion, they had some 40' of water over top of bowls.

Say, Fred, at Mationa 1 Enameling five years ago, we found the first shots brought out a black sticky sandstone from the St. Peter. The first test after first shooting did not bring much more water than before. The second third and fourth consecutive shootings did the trick finnaly getting some 8 gal. specific.

I, have that and want your opinion as to whether this St. Peter closes up in the pores with solutions etc. after standing pumping for years. It seems so. An oil well you know parafins up and has to be shot and swabbed every so often. WHAT I have in mind is to save Mr. Roberts new pump parts which are hard to obta tain under priority's etc. at this time. IF a few light shots in the soft St. eter opposite where we increased before will do the trick. Let me know please your ideas in this matter , before I take it up with him.

How is everything Fred, I lost my pants on that Iowa. job, they simply would not listen to reason and insisted on casing in there own way, result being they shut off to 1200' only and open hole thru Jordon water was some 42 grains unusable etc. Then the y cut the work out and would not let me finish result being the Bank cleaned me out. I am going tho hav ng three small rigs on 6 inch defense houses with the Milw. Tool & Die job ready to start

Where are those sample bags please I sent you card a week ago, Fred.???? Regards,

ESTABLISHED 1864 F.M. Gray Jr.

GUARANTEED WATER SUPPLY

pear Front interest apply to win I I Hy go A A gue bags were WELLS ANY SIZE - a few day ago WELL CONTRACTORS BUILD as her y 105 West Washer Drive we all lend the Boberts very much your Javable Soin ti hem i with regard to The Sears well any bluepunds show hope clean down to 1249, To and the spin aponble to shoot that have my more. and tale Orenter iters were goo it's so must have made a large liste where it would be deffined to e states his Irvin well is dropping slightly stc. Altho he stated they were still getting sufficient weren holigod soon they might change to smaller bowls and set they down into the top of 13740" lover, which is right below where they do bowls are ow setting at approx. 500 . It the of college the do. they had some will an generally \* et os trale became es uplin the vores with solutions etc. after standing storgeniss to the is was not and to many letters drilling going on Hoy is everything Fred, I lost my pants on that lows. job, they simply would not listen to reason and insisted on casing in there own way, result being they shut off to 1200' only and open nole thru Jordon water was some 42 grains unusable etc. Then the y cut the work out and would not let ne finish result being the Benk cleened me out. I am going the hav ng three small rigs on 6 inch defense houses with the Milw. Fool & Die job ready to start Remardia, geve.bort .og BSTABLISHED 1864 H.M. GIQ JL. GUARANTEED WATER SUPPLY

March 20, 1944

Mr. Frank M. Gray, Jr. Midwest Drilling Company 823 South 16th Street Milwaukee 4, Wisconsin

-

Dear Frank:

In reply to yours of recent date, the only Blatz well we have a record of was drilled in 1935. We have copy of driller's log. The well is 1704 feet deep. In 1938, it was shot. In cleaning out, the tools were lost at 1253. The hole was plugged back to 1190 and redrilled. The record says they got around the tools and into old hole at 1256. The original total depth was again reached but it is not clear to me that this was in the first hole. If a new well was drilled later, we have no record of it.

Very truly yours

WISCONSIN GEOLOGICAL SURVEY By

> F. T. Thwaites, Geologist In charge of Well Records

FTT LMV

DFFICE PHONE DRCHARD 1163 EVENINGS DELAFIELD 1051 EVENINGS EDGW. 2923 WELLS ANY SIZE OR DEPTH TEST BORINGS PUMPS

# MIDWEST DRILLING CO.

INCORPORATED WELL CONTRACTORS 823 SO. 16TH STREET MILWAUKEE, 4, WISCONSIN

March, 1944.

Professor Fred C. Twaites Science Hall University of Wisconsin Madison, Wisconsin.

Dear Fred:

Will you please advise if Rogers of Lane Northwest Co has as yet turned in the samples and log of the well he drilled for the Blatz Brewing Co., on which there was a controversy several years ago.

Very truly yours,

7 hile

BROHARO 1163 BROHARO 1163 EVENINGE DELAFTELD (DS1 EVENINGE BOGW. 2923

# MIDWEST DRILLING CO

In reply to your of new to date the only Blat well we have a read of was dulled ment 1935 We have copy of dullen long. The well in 1704 feet deep In 1938 towns shot? In cleaning out tools were lost at 1253. The hole was

plugged back to 1190 adt reduilled. The record says they got aroud the book and into old hole at 1256. The organal total acpin was again reached but it is not clear to me that this was in the first hole. The neverall was dulled later we have no record of it

Ford prail source

May 10, 1944

Mr. Frank M. Gray, Jr. Midwest Drilling Company 823 South 16th Street Milwaukee, Wisconsin

Dear Frank:

In reply to yours of the 9th, I could look over the samples from the Blatz tests. After next week, I will have no classes in afternoons or on both Friday and Saturday, so should be able to finish quickly.

Very truly yours

WISCONSIN GEOLOGICAL SURVEY By

> F. T. Thwaites, Geologist In charge of Well Records

FTT LMV

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	-0140	/

ALABAMA Birmingham MAIN AND EAST MILWAUKEE ARKANSAS Fort Smith JANESVILLE, WISCONSIN ARIZONA Phoenix CALIFORNIA San Diego Fred. San Francisco Stockton COLORADO The are about thru at Blat Big 6 Denver CONNECTICUT Hartford New Haven FLORIDA with Those Lest Holes (7) -Jacksonville GEORGIA Macon ILLINOIS hig are all about 50 deip Aurora Chicago Danville Elgin OHIO Peoria Akron stly Infectr and I 40-45' Quincy Rockford Canton Cincinnati INDIANA Cleveland Evonsville Columbus Ft. Wayne Dayton Hardpan Denetration h Indianapolis Lancaster Michigan City Lima then South Bend Middletown Terre Haute Portsmouth IDAHO Sandusky Boise Toledo \* completed J- F 10 TOWA OKLAHOMA Cedar Rapids Cushing Des Moines Muskogee Ottumwa Sioux City They woh me I furnish a Oklahoma City Tulsa KANSAS OREGON Coffeyville Portland KENTUCKY PENNSYLVANIA Bowling Green Allentown umary 1000 - Sector iti Lexington Altoona Louisville Erie MARYLAND Harrisburg Baltimore Lancaster Norristown Fring you the samples hi MASSACHUSETTS Philadelphia Boston A.V Pottsville Springfield Reading MICHIGAN Scranton Ann Arbor Sunbury Battle Creek Can yn & some me un fer Wilkes-Barre Detroit York Flint Grand Rapids RHODE ISLAND Jackson Providence Kalamazoo TENNESSEE Juckley Hun Fran me a dragram MINNESOTA Chattanooga Knoxville Memphis Duluth Minneapolis MISSISSIPPI TEXAS Amarillo Hattiesburg - Imag return Lamples, Fr Blag Vicksburg Brownsville Mar Dallas MISSOURI El Paso Kansas City Fort Worth Sedalia Galveston Springfield mennal Houston Bulles - h St. Louis San Angelo N. CAROLINA Waco Asheville UTAH NEBRASKA Salt Lake City Lincoln Engineers there Ogden Omaha VIRGINIA NEW JERSEY Norfolk Camden Petersburg Trenton Roanoke NEW MEXICO Frank WASHINGTON Albuquerque Spokane NEW YORK WEST VIRGINIA Amsterdam Wheeling Buffalo New York WISCONSIN Niagara Falls Green Bay Rochester Janesville Syracuse \$1.00 DAY \$1.50-GUEST LAUNDRY DONE FREE La Crosse

Invyly to yours of the 9th I could live over The samples from the Bentz Tenter. after next week will have no classer in afternoons or on both Friday and Saturday as should be able to front grilly. and the set of the set of the in an and when the second of the part a firestilled floor hears and a hears " Hat wind of hears & any hear is horas Mi The second for eliter of the second that and

# Gray-Milaeger Drilling Co.

## WELL DRILLING CONTRACTORS

DRY CORE FOUNDATION SOUNDINGS TURBINE PUMPS

Phone Broadway 7246

220 So. State Street CHICAGO Phone Wabash 2020

123 Wisconsin Ave.

MILWAUKEE

F. M. GRAY, Pres. Formerly President and General Manager of the Gray Well Drilling Company

December 12, 1929

Prof. F. T. Thwaites, Geologist Science Hall, University of Wisconsin Madison, Wisconsin

Subject: A. O. Smith

My dear Fred:

Mr. Carroll of the above company called me again today, and it is evident that some of my competitors, undoubtedly Rogers of the Layne crew, is using bad tactics. It is now the second time that Mr. Carroll has mentioned a well drilled by either myself or my father, some twenty to thirty years ago, citing it as a well giving very hadr water, viz. today he called and asked if it was I who drilled the Wm. O. Goodrich Co. well, at 30 and Hopkins, which is just north of their plant adjoining; he said, "if so, you will have to drill a better well for us, as the water is so hard it couldn't be used for anything, and on top of it, the water is milky and full of sand." I explained to him that I worked on this job for father, twenty-five years ago, as a helper, and that in those days no thought was given to casing off only those formations which caved, and I further stated, that the well was drilled according to their engineer's instructions and that in those days no thought was given to a possible softening of the supply. A well was a hole in the ground, and that well was cased with 10" pipe to rock, with a 6" steel liner in the shale strata. The rest of the hole was left open. They used it for twenty-three years without trouble, until two years ago at the time that Thorne was working with Prof. Bagg at Greenebaum Tannery, Mr. Schmidt, Chief Engineer of the Goodrich plant called me and wanted a price per day for re-pipeing their well, which was filled up with sand. I quoted my regular price of \$50.00 per day for a drilling machine and crew of two men. Bob Lentz was with me at the time I solicited the job. Thorne got it at \$35.00 a day, and if the well is still giving off sand, it is his improper and poor workmanship which is doing it. I told Mr. Carroll this much, but did not mention any names, and if they are still getting sand it is because Thorne did not put a proper packer on his pipe, or seat it securely.

#### GRAY-MILAEGER DRILLING CO.

Prof. F. T. Thwaites

I told Carroll frankly that it is only in the last six or eight years that soft waters were thought of, and that we had since this time benefitted everybody concerned by keeping accurate records, and that with your cooperation, we had succeeded in getting better results.

Evidently Rogers has told them about the Journal trouble, Shorewood and Sturtevant, Goodrich, and Harvester.

You know about all of them, and I further explained to Carroll that while the Dresbach was present at Sturtevant, actual tests showed that the Mt. Simon carried a high percentage of solids, whereas in Chicago, it was entirely different. You know we cased back the 1210 at Sturtevant and only took the St. Peter 📥 water when we got an 18 grain hardness, but you further know that the Dresbach pinches out up here. I further told Mr. Carroll that Wauwautosa had endeavored on the M. T. Peterson well to case off. They had a hazy idea that it was being done, but neither Hebbring nor Peterson knew exactly what it was all about. The same thing happened on No. 4 Wauwautosa well, and if you will notice Layne-Bowler blue print, you will find that they haven't even got all of the shale strata cased off and that the shale pipe simply laps up into the bottom of the 24" drive pipe without even a lead seal. What kind of a shut-off do you call this, and how can you expect soft water. I don't know how they cased off the last No. 5 well that Misseroff drilled jointly, but I don't believe they got any 20 grain water from the Mt. Simon sand, which Rogers claims. I don't like this kind of fighting but I guess we have got to put up with it; they are having a man see you, I guess it is their chemist, so please try and straighten them out on these various points, and you might, if you so wish and see the opportunity, explain my part as an individual with your cooperation in developing better accord, so that knowledge could be obtained which finally gave us soft water results.

In thinking it over further, I wish you could personally get an expression from Andrew Hebbring, Supt. of the Water Works at Wauwautosa as to the analysis of his various wells. If you can get this from him and we then find that Roger's statements donot check, we can best be able to fight this rotton propaganda. Thanking you for your personal attention to this matter, and assistance, I am,

Yours very truly.

Musin

GRAY-MILAEGER DRILLING COMPANY

November 24, 1937

Mr. F. M. Gray, Jr. Gray Well Drilling Company 161 W. Wisconsin Avenue Milwaukee, Wisconsin

Dear Frank:

In reply to yours of the 23rd, I am enclosing a copy of a letter which I have written to Graham, Anderson, Probst & White. You will note that I am assuring them that a production of water is entirely feasible within the Loop; in fact the maps by Anderson show much less drawdown there than in the western part of the City, but possibly this situation is now changed. I am not sending a pencil sketch showing the correlation of the Burke & James and Wilson Company wells because I do not have a map of Chicago. However, there will be no trouble in their drawing up such a sketch.

If we could be sure that the water would not be used for sprays or otherwise exposed to the air, it might be feasible to run it underground without much danger, but the matter of chemical changes is one which I know nothing about, and for that same reason no one has ever tried it. I am also reluctant to pass upon the advisability of such a well for the reason that they have been outlawed in Wisconsin largely because of our recommendations in respect to sewage drainage wells. For that reason I do not care to be quoted as advising a drainage well, although there is a distinct possibility that from the engineering standpoint it would be a success.

Very truly yours

WISCONSIN GEOLOGICAL SURVEY By

> F. T. Thwaites, Geologist Well Records

FTT LMV

F.M.G ray Jr.

MILWAUKEE OFFICE 161 W. WISCONSIN AVE. SUITE 3050 PHONE DALY 0945 SUCCESSORS TO W. H. GRAY & BRO., F. M. GRAY, JR.

GRAY WELL DRILLING COMPANY

WELL CONTRACTORS

160 NORTH LASALLE STREET PHONE CENTRAL 4747

Dear.9505

WELLS ANY SIZE OR DEPTH PUMPS TEST BORINGS

CHICAGO, ILL.,

Nov.23,1937.

Prof.Fred T.Thwaites, Science Hall-U.of Wis., Madison,Wis.,

Dear Fred:

The firm of Graham-Anderson-Probst and White, Archt's. in the railway Exchange Building, have givin me a lot of work in past years.

There Chief Engr.Mr. Geo. W.Hubbard and I have had several meeting, in regard to the possiblities of obtaining large supplies in the loop.

There is a discrepancy between what I tell him and what my competitor Geoger is telling him. Agitation is also spread around by bhe refrigeration people that the loop is dry.

J.P.Miller Co. years ago started a 10" well for McVickers Theatre, they got to 900 ft. and got tools stuck in St.Peter which was customary in those days.After fishing for months they got fired off the job. This is one reason for the loop being dry(They never got down to the big water in the Dresbach)

Now I have showed Mr. Hubbard the log of the Burke and James well at 240 East Ontario St. which is just north of the outer loop bridge also the log of Wilson big well that I drilled. These two we know are authentic.I also showed him your correlation east to west R.J.13 thru Chicag from Clinton Ia. and north to south from East hi. to Two Hivers.

I want you to send him a copy of these prints at once also give him a pencil sketch with correlation from Burke and James south to Wilson. This should prove the relative amount of sands in there proper sequence under the loop.

Burke well had 120 feet of St.Peter and 180 ft. of Bresbach and I would drill a 19" hole thru the St.Peter and case that lower cave with 16" pipe after shooting the dev-- out of it then proceed and drill 15" hole thru Dresbach and develop.The "isson well pumped 1840 G.P.M. after I finished without shooting and with 15 Gal. per ft. Dr. down.The Burke well well was only a 8" hole at bottom of Dresbach and equipped for 200 G.P.M. with pump set at 250 ft.It has since been abandoned as Eastman took plant over and closed same.

#### ESTABLISHED 1864 GUARANTEED WATER SUPPLY

Page two.

Fred Thwaites:

Wislon well shows 130 ft. St.Peter and slightly less Dresbach as 150 feet. as against 180 at B.and J.

Geiger has got every owner balled up on Geology calling strata's first and second Potsdam or the old old story.

There are a number of jobs awaiting some one to start and get a successful well here in the loop and 1 am ready to do so and GUARANTEE.

The water disposal problem is also important with all this condensor water going into the sewers.

Hubbard wants a 2000 G.P.M. water cooling well. The St.Peter well at Oak Park which <sup>1</sup> just finsihed tested 52 degr. the composit temperature at the discharge at "ilson well which is 50ft. above and slightly away from pump base is 54 degr. We should evelop not greater than 54 to 55 at most here in the loop.

Now Geiger has turned in I understand a log of a hole at Chi. Heights, that has no bearing on hicago loop that I can see neither is one he has on North Branch River.

Another thing, I have advised that for disposal, we drill the same hole as above descrbed with 15" thru Dresbach---THEN CASE THRU DRESBACH WITH 12" steel pipe and HALIBURTON CEMENY this 12" in place to 1600 ft. This will effectively shut out all top waters and prevent and disposal water from contaminating the Dresbach and upper formations. THEN DRILL A 12" HOLE BELOW INTO THE LOWER MT.SIMON SANDS TO SAY 2400 ft. and get that big resorvoir capacity which is no good and to warm.

Shoot the dev--- out of these sands and develop them just as if we were going to pump them THEN DUMP OUR WASTE CONDENSOR WATER INTO THIS WELL, and I really think we can lick it <sup>F</sup>red.

Please let me hear from you at Milwaukee and what you really think of my plan. Yours has been sound advise before and I can still listen to it.

Also send Hubbard prints No. to So. and East to West and copies of Wissen and B.& J. wells with a correlation between the two.

Please send me a copy of what ever you do to hime.

Yours

December 1, 1937

Mr. F. M. Gray, Jr. Gray Well Drilling Company 161 W. Wisconsin Avenue Milwaukee, Wisconsin

Dear Frank:

Am enclosing a copy of another letter to Graham, Anderson, Probst and White in regard to drainage wells in Chicago. With/regard to cementing the pipe, I think it would be most desirable to use guides to center the pipe in the hole, but I am not convinced that it is mecahnically feasible to get an impervious cement wall throughout the entire 1600 feet. However, this is a matter which I do not want to pass upon, as it is outside the field of geology.

Am glad to know that you are getting such good results from shooting.

Very truly yours

WISCONSIN GEOLOGICAL SURVEY By

> F. T. Thwaites, Geologist Well Records

FTTLMV

enc.

# GRAY WELL DRILLING CO.

MILWAUKEE OFFICE 617 North Second Street PHONE DALY 0945 161 W. WISCONSIN AVENUE

617 N. SECOND 375, ROOM 804 Phone BRoadway 9790 Milwaukee, Wis. WELL CONTRACTORS 160 N. LA SALLE ST. PHONE CENTRAL 4747-4749 Dear. 9505 WELLS ANY SIZE OR DEPTH

PUMPS

CHICAGO, ILL. Milwaukee, Wis., Nov. 29-37

Prof. Fred T.Thwites, Science Hall-U.of Wis., Madison, Wis.,

"ear "red:

I have your letter of Nov. 24th. enclosing copy of letter to Mr. Geo. W.Hubbard of Graham's office Chicago.

This water disposal proposition in both Chi. and Milw is serious.

Right now there is over 3000 Gal. per minute goin ginto the sewers here at Milw. in the downtown district alone. There has been talk of stopping this as the Sewerage treating plant do not want to have to teart clear water.

There is no reason why water that only goes thru SPRAYS can not be put back intot he ground.

In reagrd to the Chicago proposal. If you will note my letter carefully you will see that I have probided to CEMENT, with the Haliburton method the 1600 ft. of 12" pipe in place, this obviates any danger that when the pipe should rust out that there wouldber a vulcanite wall remaining to protect all formations above the 1600 ft. level.

We know that the lower Mt.Simon sands in Chicago district are full of water, but are unsatisfactory on account of the high salt content.

There is no well nearer than the stock yards that I know of that is used for drinking water, the Burke and James well is not being used and there are no other deep wells in the or near the loop that I know off. Even tho there were, they would not be affected as we intend to case everything above the and to base of "resbach. Then I intend to dril to 2400 or even slightly deeper to get that porous white sand then to shoot and purge it good.

I am glad to note that from a engineering point of view you think it feasable. I have contwcted the U.S.Board of Health when this matter came up on another job a year ago and they could see no objections. The state off ill thot I was nuts to try it, but I am used to ther theories at "rbana. I shot them to glory at "ilsons with that big capacity also at Elgin State Hospital where they said I could not obtain onl y 4 to 5 G.P.ft. of Dr. down. we got 13.

I thank you for this information, and remain,

Yours truly,

ETT.C

ESTABLISHED 1864

cc-Hubhard-Chicago

GUARANTEED WATER SUPPLY

April 5,1938

Mr. F. M. Gray, Jr. Gray Well Company 617 North Second Street Milwaukes, Wisconsin

Dear Frank:

In reply to yours of April 4, I read up about San Antonio, Texas. If you will write your congressman, you can obtain a copy of Water Supply Paper 773-B, which gives the latest information. Most of the deep wells draw on the Edwards limestone, which is from a few hundred to possibly 2000 feet below the surface. The whole area is so cut up by faults that it is impossible to make any general statement. You will find, however, that in this area the use of underground water for cooling may not be approved for the reason that it wastes water which would otherwise be used for irrigation. Texas laws require that flowing wells be not allowed to run to waste, and whether they consider air conditioning a waste, I do not know. However, it is possible to obtain water at moderate cost.

In regard to the Gary samples, I have never seen the last ones, so there must have been some slip somewhere. There was one batch but not the second one. I suspect that they were sent to Illinois.

In regard to oil possibilities in central Illinois, I will be glad to go down there if it is considered desirable. I will have to make a charge per day and expenses for this work out of the State. I think the last time I went down I charged \$35 per day. However, there is very little that can be seen at the surface. Most of the new discoveries have been made by use of the seismograph, which determines the structure of the deeply buried rocks. Production also depends upon the porosity of the limestone as much as upon structure. This is something which cannot be told without test drilling. If you care to send me a list of the acreage you have acquired, I will try to check it over with existing available information and see what I can learn. The field is in such an early stage of development that very little has been published about it. I understand the Pure Oil Company has about 80 per cent of the acreage under lease. It is not likely that you will be able to pick up very much which is favorably located.

Very truly yours

WISCONSIN GEOLOGICAL SURVEY

By

F. T. Thwaites, Geologist Well Records

## GRAY WELL DRILLING CO.

MILWAUKEE OFFICE 617 NORTH SECOND STREET PHONE DALY 0945 161 W. WISCONSIN AVENUE SUITE 3050

Educide line 500

WELL CONTRACTORS 160 N. LA SALLE ST. PHONE CENTRAL 4747-4749 WELLS ANY SIZE OR DEPTH

PUMPS

CHICAGO, ILL.

April 4,1938

Prof.F<sup>F</sup>red T.Thwaites, Madison, Wis.,

Dear Fred:

I am getting started on Sears job here in Chicago and in talking to there Chief engr. this momning he asked again about my dope on San Antonia Tex.

I wrote Meissner at Washington, I think that is his name about dope on Baltimore, they want to do something there at once.

Will you please get me information as soon as possible on both of these places as the contracts are waiting for me if I can get them water.

I probably will have a job for you, in the Central Ill. field.<sup>A</sup> bunch of influential men here formed a syndicate saturday and are putting the money in escrow, I expect to go with them last of week and see what we can pick up around Centralia, Clay City or Flora. I told them I would want you to check up on whatever acreage was aquired before drilling was started.Let me knpw. what you would want per day etc.

George says he sent you rest of samples on Gary first well at the Inidana Theatre.Did I give you the casing log, if not, here it is.

12" pipe with shoe thru top sand to clay at45 ft. 10" drive pipe with shoe inside of this and down to rock at120ft.

10" hole to 210 thru devonian(cased with 8")OD.inserted joint liner from 210 ft. up into bottom of 10" pipe to 88'then 8" drill hole to bottom.

Pumping 240 G.P.M. Approx. 2 Gal. specific.

Please let me hear from you on the geology on above locacations for Sears.

> Yours truly, 7.M. Dray Jr. H. ESTABLISHED 1864 F.M. Gray Jr. H.

GUARANTEED WATER SUPPLY

### United States Department Of The Interior

Geological Survey Washington

#### Mr. Frank M. Gray, Jr. 160 N. LaSalle Street, Chicago, Illinois.

Dear Mr. Gray:

In reply to your letter of March 30, addressed to Mr. O.E. Meinzer, regarding prospects of ground-water supplies in Baltimore, Maryland, and San Antonio, Texas.

The ground-water conditions of Baltimore are described in Bulletin 138, "Artesian well prospects in the Atlantic Coastal Plain region," and Maryland Geological Survey Special Publication vol. 10, Part 11, " The surface and under-ground water resources of Maryland, including Delaware and the District of Columbia." The Geological Surve Bulletin is out of print, but copies may be consulted in the public and John Crerar libraries, and the libraries of the Field Museum of Chicago, in Chicago.

Information taken from these report indicates that it is unlikely that one well will yield 500 gallons a minute of water. The Patuxent formation of sand, gravel, and clay, immediately overlying the crystalline rocks, contains three and possible four water-bearing horizons, the most important of which lie in the lower fifty feet of the formation. In the area underlain by crystalline rocks, many wells have been successful with yields of generally less than 100 gallons a minute. No information on temperature. is included in the two reports.

The geology and ground-water resources of San Antonio, Texas, are described in Water-Supply Faper 773-B, "Water resources of the Edwards limestone in the San Antonio area, Texas." A copy of this report is being sent to you under separate cover.

Additional information may be found in the following references:

Muir, A.H., "The geology of the artesian water supply of the San Antonio area, Texas": St.Louis, 1911. Sellards, E.H., "The geology and mineral resources of Bexar County": Texas Univ. Bulletin 1932, 1919. Taylor,T.U., "Underground waters of the Coastal Plain of Texas": Geol. Survey Water-Supply Paper 190, 1907. (Out of Print).

These reports may be consulted in the libraries listed above.

industrial use in the United States.".

Very truly yours, W.C. Mendenhall Director. P.S. There is also being sent to you under separate cove, a copy of Water-Supply Paper 520-f, "Temperature of water available for