7½' Keota Quad
076-10W-25 ACDA
1980 field located by D. Karsten

location change by PJH

IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey
RECORD OF WELL

#11764

Location: IN WILSON PARK SOUTH PART OF TOWN

Town: KEOTA (NE) (SW) County KEOKUK

NE SE SW NE C-SW-NE sec. 25 T. 76 N., R. 10 (E) (W) Twp.

Well name and number

Owner KEOTA TOWN WELL (1960) Address KEOTA, IOWA

Tenant Address

Contractor THORPE WELL CO. Address DES MOINES, IOWA

Drillers YARBOROUGH

Drilling dates OCT. 28, 1959 - FEB. 20, 1960

Well data:
Altitudes: Drilling curb feet; Land surface feet ~~783'~~ 788' Topo

Determined by

Topographic position UPLAND

Total depth: Reported 1557½' feet; Measured feet

Drilling method ROTARY

Hole and casing data 450' OF 12" CASING 0-450' - CEMENTED TO TOP
1225' OF 8" CASING 0-1225'

Original depth to water 163 ft. above below Date

Source of data

1225'-1556'

Sources of water: Principal Root Valley - Oneota

Others Willow River?

PRODUCTION DATA

Date

Static water level 163

Pumping water level 194

Yield (g.p.m.) 480

Measuring point

Duration of pumping

Specific capacity

TL1-27 0-750
TL1-28 750'-1350'
TL1-29 1350'-1555'

LABORATORY DATA

Well No. W11764 Sample range 0-1555 No. of samples 247

No. of dupls. and cond. 228 good Washed range 55-1555

Samples prepared by Koch Date Jan. 20 - Feb. 19, 1960

Logged by Northup Date Fall 1959 - Winter 1960

Correlations by Date

KEOTA TOWN WELL

450' OF 12" FROM SURFACE CEMENTED TO TOP.
STARTED OCT. 28TH 1959

TO SET 8" CSG. IN 11" HOLE THRU ST. PETER

ELEV = 783

MERCURY 6-3864
BOB YARBOROUGH
KEOTA

0-2	SURFACE
2-16	WHITE CLAY
16-45	YELLOW CLAY
45-55	BLUE CLAY
55-75	ROCK LAYERS OF GRAY SHALE
75-90	HARD BRN. SS., CHT. AND SHALE
90-120	GRAY LS. AND CHT.
120-165	BRN. LS. AND SHALE BREAKS
165-298	HARD BLUE SHALE AND LAYERS OF LS
298-396	LIGHT BLUE SHALE AND LAYERS OF ROCK
396-430	" " " " " LIMESTONE
430-448	GRAY LS. AND LIGHT BLUE AND BLACK SHALE
448-475	HARD LS. AND IRON PYRITE
475-485	GRAY LIMESTONE
485-495	" " AND DARK GRAY SHALE
495-530	DARK GRAY SHALE AND LAYERS OF LIME
530-545	LIGHT BRN. LIMESTONE AND SHALE BREAKS
545-585	GRAY LIMESTONE
585-600	GRAY LIMESTONE AND CHERT
600-629	DOLOMITE AND SOME CHERT - LOST CIRC. - NO SPLS. FOR 30'
629-650	CREVICES - 92' STATIC
650-695	LIMESTONE
MAG. - 695-705	RED SHALE
705-723	DOLOMITE AND SHALE
723-729	CREVICES - NO SAMPLE
729-820	SHALE AND DOLOMITE
820-886	DOLOMITE AND LIMESTONE
886-920	CREVICES (NO SAMPLES)
920-935	GRAY LIMESTONE
935-953	DOLOMITE
953-990	LIMESTONE AND SOME DOLOMITE
990-1075	LIMESTONE AND DOLOMITE NO TRACE OF SHALE
1075-1109	LIMESTONE AND CHERT
1109-1124	LIMESTONE
1124-1130	GRAY SHALE AND SAND
1130-1146	WHITE SAND (ST PETER)
1146-1155	DOLOMITE, LIMESTONE, CHERT, SAND

1035 N. ENGLISH
806
-229

825
783
-42

1045
772
-273

Thorpe Well Co.

TRUCK REPORT

Nº 1776

Truck No..... Date.....

Lv..... M. Ar..... M.

Load & Weight.....

Lv..... M. Ar..... M.

Load & Weight.....

Lv..... M. Ar..... M.

Load & Weight.....

Lv..... M. Ar..... M.

Load & Weight.....

Lv..... M. Ar..... M.

Load & Weight.....

Riding..... from..... to.....

CHARGE RECORD

Item		Where Purchased
Gas.....	gal.	
Oil.....	qts.	
Trans. & Diff.....	lbs.	

Mileage

Finish.....

Start.....

Total.....

Items Paid Cash	Amount	Items Charged	Amount

Get Receipt or Charge Slip for all Purchases, Service and Necessary Repairs and Turn in with Truck Report.

Check any Faulty Item below:

.....Brakes	.....Wheels & Bearings
.....Lights	.....Glass
.....Tires	.....Steering
.....Body & Fenders	.....Wench
.....Cooling System (Anti-freeze)	.....Windshield Wiper
.....Engine	.....Horn
.....Gen. & Batt.	.....Fuel Tank & Lines
.....Trans. & Diff.	.....Paint Job
.....Other	

Remarks:.....

.....

.....

.....

Driver:.....

Checked by:.....

Time

Stop.....

Start.....

Stop.....

Start.....

Stop.....

Start.....

Stop.....

Start.....

Stop.....

Start.....

Stop.....

Start.....

Stop.....

Start.....

Thorpe
Mercury 0-63864

Dec. 22, 1959 — 4:40 pm.

Wes Thorpe →

Eldon - lower Devonian

73' no cuttings - lots of water but no good

Keota - Same formation 624

11" hole rotary —

~~Devonian~~

~~650-730~~ Niagaran —

Top Devon OK 624

Trouble at 624 - ~~&~~ 628

Cased to 660 & cement

Charles — Wes. Thorpe is having loss of circulation trouble at Keota as he had at Eldon. He phone as shown by the above notes and asked if we had any suggestions. They have tried hay, rope, and about everything to plug without avail.

He wants to know if we think he will have trouble down to the top of the Maquoketa. He is now at 624. Our forcast was good on the top of the Devonian.

He asks that we phone him collect ~~when~~ tomorrow ie Dec 23. HJN

3

GROUND-WATER CONDITIONS IN THE JORDAN-ST. LAWRENCE RESERVOIR AT KEOTA, IOWA

The following statements represent an interpretation of the available data in the files of the investigations of the Iowa and U. S. Geological Surveys.

The town of Keota is located on the rolling Kansan drift surface in parts of sections 24 and 25, T. 76 N., R. 10 W., Keokuk County. The ground level in this locality should range between 780 and 790 feet above sea level. Based on an assumed starting elevation of 787 feet, the following is a generalized log of the anticipated underlying rocks down through the St. Lawrence dolomite:

Formation	Thickness(ft)	Depth Range(ft)
Quaternary system		
Pleistocene series (glacial drift)	90	0-90
Mississippian system		
Keokuk-Burlington formations (cherty limestone and dolomite, minor sand or silt)	45	90-135
Wassonville dolomite, some chert	30	135-165
North Hill limestone	15	165-180
Prospect Hill siltstone	7	180-187
McCraney limestone	8	187-195
English River siltstone	18	195-213
Maple Mill shale	247	213-460
Devonian system		
Lime Creek formation (Limestone and shale)	110	460-570
Cedar Valley formation (limestone and dolomite, may contain minor chert)	90	570-660
Wapsipinicon formation (dolomite)	30	660-690
Silurian system		
Niagaran dolomite	40	690-730

Keota, Iowa -- 2

Formation	Thickness(ft)	Depth Range(ft)
Ordovician system		
Maquoketa formation (shale and dolomite)	245	730-975
Galena formation (limestone and dolomite, cherty in lower half	220	975-1195
Decorah-Platteville formations (limestone and shale)	80	1195-1275
St. Peter sandstone	30	1275-1305
Prairie du Chien formation (sandy and cherty dolomite, Root Valley sandstone member near middle)	395	1305-1700
Cambrian system		
Jordan sandstone	75	1700-1775
St. Lawrence dolomite	150+	1775-1925+

These depth and thickness figures may have to be adjusted to some extent owing to local variations in the structure and thickness of the formations. A higher or lower starting elevation will also modify these depths proportionate to the difference between the assumed and actual starting elevation.

An abundant supply of potable water generally is found in the Jordan-St. Lawrence formations in this part of Iowa. Municipal wells at the surrounding communities of North English, Wellman, Washington, and Richland obtain their water from this source. Successful wells have also been completed in the Jordan-St. Lawrence reservoir at several other places in southeastern Iowa including Albia, Ottumwa, Keosauqua, Fairfield, Wayland, and Mount Pleasant. All these wells are capable of producing several hundred gallons a minute each. For example, during a 15½ hour pumping test the Wellman town well produced 300 g.p.m. with only 14½ feet of drawdown to a pumping water level of 79½ feet below the surface. Richland produced 200 g.p.m. at 20 feet of drawdown. Washington City Well No. 6 (1956) produced 882 g.p.m. at 105 feet of drawdown. Mineral analyses indicate that the water from these deep formations will be of acceptable quality for drinking although moderately high in sulfate. The

quality of water developed at the existing Keota wells and at a few Jordan wells in the surrounding region are given on a separate sheet included with this letter. Highly mineralized water occurs in the strata below the Mississippian limestones down through the St. Peter sandstone. Therefore, in most of the deep wells drilled in southeastern Iowa in recent years, the casing has been extended from the surface into the upper part of the Prairie du Chien dolomite to shut out the mineralized water from the upper beds.

In a well penetrating the Jordan sandstone at Keota, the original static water level is estimated to lie at about 650 feet above sea level or about 130 feet or so below the upland surface.

On the basis of these data, it appears that large quantities of water of acceptable quality for drinking probably can be obtained in a well penetrating the Jordan-St. Lawrence formations at Keota. This well should be cased and cemented in from the surface for about 75-100 feet into the upper part of the Prairie du Chien dolomite to adequately seal off all overlying water zones.

PJH 9/59

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

Town - Well No Owner	Date of coll.	Depth (ft.)	Geol. source	DF	Diss. solids	Fe	Mn	Ca	Mg	K	Na	CO_3	HCO_3	SO_4	Cl	F	NO_3	Hardness cal. as $CaCO_3$ tot	carb	non-carb	pH	Micro-mohs at 25°C Cond
Keota town well (West - 1949)	6/57	159	Miss.	-	922	.96	.05	138	64	6.0	67	0	512	313	6.0	0.3	9.3	607	420	187	7.1	1190
Keota town well (~~X~~ South)	6/57	169	Miss.		537	1.1	.05	108	42	4.6	33	0	510	93	5.0	0.3	2.2	442	418	24	7.1	850
Richland town well (1952)	3/58	1830	Jordan		1054	.18	.05	98	47	21	176	0	278	512	52	1.2	1.8	438	228	210	7.9	1570
Wellman town well No. 3 (1954)	11/57	1715	Jordan		1180	3.6	.05	93	43	19	210	0	288	560	54	1.4	1.3	409	236	173	7.4	1590
Washington City well No. 6 (1956)	3/57	1901	Jordan St. Law.		1180	.22	.05	98	47	25	205	0	283	564	64	1.4	.44	438	232	206	7.5	1530

NOTES: < = less than

Although no temperature measurements were obtained at the time these water samples were collected, the water from the Mississippian rocks should have a temperature of about 52oF and that from the Jordan-St. Lawrence aquifer about 72oF.

GW
Kentucky

7

TO: H. G. Hershey
FROM: Richard C. Northup
RE: Keota well

Following up my memorandum of yesterday regarding the Keota well, Thorpe's driller brought in samples from 1115'-1155' this morning (Friday). A check shows the last sample from 1150'-1155' to be partly St. Peter and Prairie du Chien lithology, top of the Prairie du Chien being about 1152' or 1153; or so. I recommended that they go to 1200' anyway, and preferably to around 1225' before setting casing. We should get the samples down to there by Monday or Tuesday. Wesley Thorpe phoned to ask about Keota, and also to get the casing record and formation tops from the Hendrick town well. They have been having trouble there for some time and at present there are so many chips and flakes of iron being pumped as to render the well virtually useless. Apparently the casing is completely shot and Thorpe is considering having a Schlumberger Gamma Ray-Neutron log run. If the trouble can't be found and remedied there will probably have to be a new well. Wes said he was going to attend a council meeting at Hendrick tonight, so we may be called on for a forecast soon.

RCN

CW
Keotahle

TO: H. G. Hershey
FROM: Richard C. Northup
RE: Keota Town Well
DATE: January 21, 1960

At the request of Mr. Robert Yarborough, driller for Thorpe Well Co., the writer made a trip to Keota on Thursday morning to pick up the samples at the new well there. 1115' of samples were brought in, and a quick check was made of the last 100' which shows that drilling has almost reached the top of the St. Peter. Brown sandy dolomite and what is probably a feather edge of the "Re-Peter" sandstone was drilled the last 10 feet from 1105' to 1115' (very similar lithology to the Richland well). They have probably hit the glenwood shale and the St. Peter sometime late today. As soon as I had checked the samples, I phoned Tom Thorpe as they plan to go about 50' into the Prairie du Chien and set casing there. Tom says that the driller will being in the samples below 1115' tomorrow morning and by that time they should be into the Prairie du Chien, which they should reach around 1150'. A tentative casing point should be around 1200' or perhaps a bit deeper. Drilling is being done by a small portable rotary rig with 11 inch diameter hole at present. This well is surprisingly high, and is 155' higher on the Galena than our forecast. However this variance can probably be accounted for by a greater thinning in the Maple Mill-Lime Creek section and also in the Maquoketa than we had anticipated. Structure may also be playing a part.

RCN

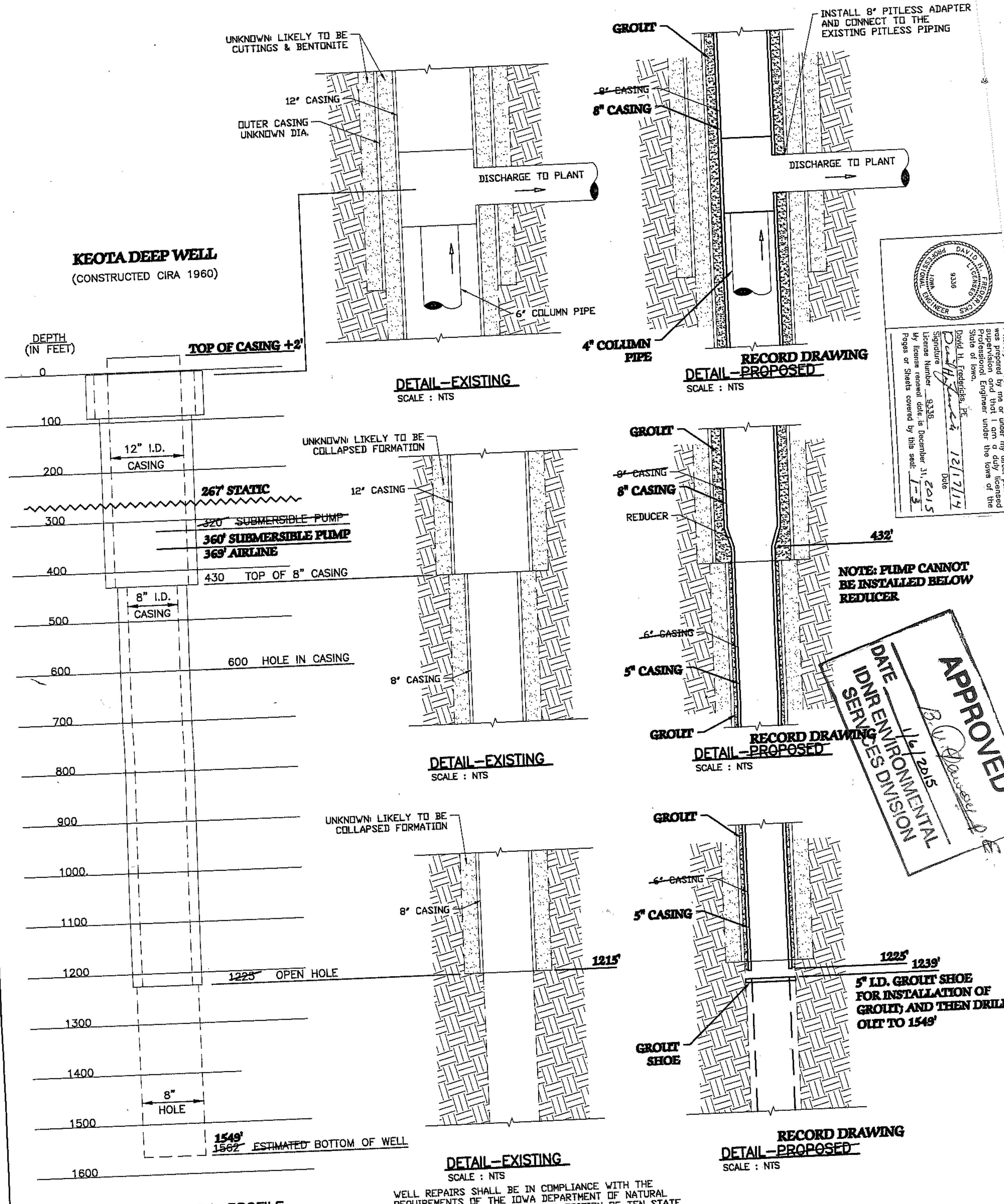
February 8, 1960

TO: H. G. Hershey
FROM: R. C. Northup
RE: Keota and Central Fibre Products Wells
DATE: January 29, 1960

Mr. Bob Yarborough, the day driller on the Keota town well, brought in the samples from 1160' to 1225'. The entire section is Prairie du Chien dolomite, and they now plan on setting and cementing 8" casing at 1225'. This will put them 70' into the Prairie du Chien and will, of course, case out everything from the surface to that point. Our log is now complete to the casing point, although the samples were far from being of the best quality. There were several gaps where circulation had been lost in the Galena, and also what is probably a gypsiferous section in the Wapsipinicon. Mr. Yarborough will advise us when drilling is resumed. I now estimate the top of the Jordan at about 1630 feet, and the St. Lawrence around 1675 feet. Total depth should probably be about 1725 feet, unless plans change.

MARK	REVISION DESCRIPTION	DATE	BY

FILE PATH\NAME: G:13-129KEO/DRAWINGS/JORDAN WELL/WELL PROFILE.DWGNS\RECORD\Sheet11.DWG
PLOTTED: 7-7-2014 ET



WELL REPAIRS SHALL BE IN COMPLIANCE WITH THE REQUIREMENTS OF THE IOWA DEPARTMENT OF NATURAL RESOURCES (IDNR) AND THE 2012 EDITION OF TEN STATE STANDARDS.

PUMP SETTING: 360'; AIRLINE 369'
MOTOR: 40 HP, 460V HITACHI, 3450 RPM.
PUMP: DISCHARGE HEAD; MONITOR 10 x 8 x 4, TY
AMERICAN, MODEL S6-300, 10 STAGE, 6", IN
COLUMN PIPE: 4" CERTALOK
PERFORMANCE: 280 GPM AT 295'; 267' STATIC

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.
David H. Fredericks, PE
Signature [signature] Date 12/17/14
License Number 9336
My license renewal date is December 31, 2015
Pages or Sheets covered by this seal: 1-3

DAVID H. FREDERICKS LICENSED PROFESSIONAL ENGINEER 9336 IOWA

APPROVED
DATE 1/6/2015 [signature]
IDNR ENVIRONMENTAL SERVICES DIVISION

NOTE:
DUE TO THE FAILURE OF THE EXISTING CASING; THE WELL WAS REHABILITATED BY INSTALLING THE FOLLOWING (TOP TO BOTTOM):
- **A NEW PITLESS ADAPTER (12' LENGTH).**
- **429' OF 8" CASING (A53B, 0.322" STEEL WALL CASING AT 28.55 LBS./FT & BEVEL "V" ENDS) FROM THE TOP DOWN TO THE REDUCER DEPTH OF 432'.**
- **809' OF 5" CASING (A53B, 0.258" STEEL WALL CASING AT 14.62 LBS./FT & BEVEL "V" ENDS) FROM THE REDUCER DOWN TO A POINT 10' BELOW THE END OF THE EXISTING 8" CASING.**
- **1/4"x24" FLAT STEEL CASING GUIDES WELDED AT THE TOP AND BOTTOM WITH CENTER MEASURING 1" FROM THE CASING O.D.; 4 PER EACH SET (1 EA. QUADRANT); 10 SETS WERE INSTALLED ON THE 5.563" CASING, AND 7 SETS ON THE UPPER 8.625" CASING.**
- **A GROUT SHOE WAS INSTALLED AT THE BOTTOM END OF THE NEW CASING AND THE VOID BETWEEN THE NEW CASING AND THE EXISTING WELL BORE O.D. WAS FILLED WITH GROUT. 450 SACKS OF GROUT USED (155 MORE THAN THEORETICAL).**
- **THE GROUT SHOE WAS THEN DRILLED OUT AND THE WELL BORE HOLE WAS CLEANED OUT BELOW THE END OF THE NEW CASING TO 1549'**
- **WELL PERFORMANCE TESTS WERE PERFORMED BOTH BEFORE AND AFTER THE WELL WAS ACIDIZED.**
- **INSTALLED 4" CERTALOK COLUMN PIPE WITH (2) CHECK VALVES; ONE INSTALLED AT 200'; ONE INSTALLED AT 340'.**

EMERGENCY WELL #2 REPAIRS - RECORD DRAWINGS 12-12-2014 ET

SHEET	PROJECT		
1	PROPOSED WATER WORKS IMPROVEMENTS 2014	*PROPOSED DEEP WELL REPAIRS*	FRENCH-RENEKER-ASSOCIATES, INC. Fairfield, Iowa Engineers &

3