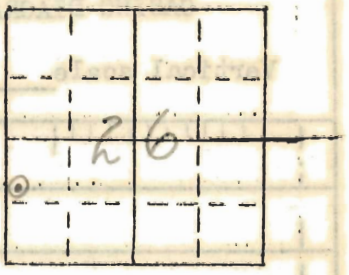
IOWA GEOLOGICAL SURVEY W-0957

In Cooperation with U. S. Geological Survey

RECORD OF WELL



Location:

Town: Hull (N E / S W): County Sioux E.

SW-NW-SW sec. 26 T 97 N., R. 45 W. Lincoln Twp.

Well name and number Town Well #2 Never completed for use

Owner _____ Address _____

Tenant _____ Address _____

Contractor Layne-Western Address Omaha, Nebr.

Drillers R.E. Peters

Drilling dates Nov. 12, 1938 - May 29, 1939

Well data:

Elevations: Drilling curb 1127 feet; Land surface _____ feet

Determined by U.S.H.

Topographic position Upland

Total depth: Reported 768 feet, Measured _____ feet

Drilling method cable tool

Hole and casing data 172' of 16-inch steel casing from 0 to 172'
340' of 12-inch W.I. casing from 0 - 340'
328' of 10" steel casing from +2' to 326'; 351' of 10" W.I. casing from 326 - 677'
644' of 8-inch steel casing from 14' to 658'
49'9" of 8-inch W.I. casing and screen from 657'3" to 698'
* During pumping test 8" casing slipped downward

Original depth to water 243.5 ft. below curb Date _____

Original elevation of water level 1183.5 ft.; Source of data _____

Sources of water: Principal _____; Others _____

Production data: Date May 29-31, 1939

Static depth to water 241.4 Measuring point

Pumping level 255.5 at 70 g.p.m.

258.9 104

Specific capacity g.p.m. per ft. drawdown; Temperature 52 °F.

Pump data: Type pump Turbine Column Dia. Length

Cylinder or bowls: Dia. Length Suction pipe

Power Airline

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

Use of water city supply

WATER ANALYSES (in parts per million)

Date samples	Jan. 25, 1939	May 31, 1939	July 11, 1939	
Sampled by	H.G. Hershey	H.G. Hershey	H.G. Hershey	
Total solids	3414	2550	2750	
Insoluble matter		14.0	23.0	
Alkalinity (Meo)	310	332.0	334.0	
Alkalinity (Phn)	0.0	0.0	0.0	
pH	7.3	7.0	7.1	
Fe_2O_3+ Mn_2O_3+Al_2O_3		4.0	8.0	
Alkali as sodium		211.3	153.8	
Calcium	476.6	330.9	394.5	
Magnesium	149.2	137.8	133.0	
Iron (unfiltered)	0.2	1.0	1.7	
Manganese	0.2	0.18	0.20	
Nitrate		0.00	0.00	
Fluoride	trace	trace	1.0	
Chloride	32	28.0	26.0	
Sulfate	1925.4	1417.7	1468.3	
Bicarbonate	378.2	405.0	407.5	
Hardness (ppm)	1805	1395	1536	
Hardness (gpg)	105.5	81.6	89.82	

Remarks drlg depth 560' drlg depth 707' T.D. 768'

Laboratory data: Sample storage location

Sample range 0-768 No. spls. 156 No. dupls. & cond. 156 good

Spls. prepared by Washed range by

Driller's log and cond.

Insoluble residues: Prepared by Studied by Strip log

Microscopic study 0-770 WCS. Gulf strip log 11/14/39 WCS. Gulf

Gen. log WCS Correl. by Schuldt Carmody

IOWA GEOLOGICAL SURVEY
Generalized Log Based on Detailed
Description of Drill Cuttings

Name of Well: Hull City Well #2 Survey No. W- 0957

Drilled by: Layne-Western Co., Omaha, Nebr. Date ~~Nov. 12, 1938~~ May 29, 1939, 193__

Total Depth: ~~707~~ 710 ft; Curb Elevation: 1427 ft; Static Level: 243 ft.

Casing Data: _____

Pump and Screen Data: _____

Location: SW¼ NW¼ SW¼ Sec. 26 T 97N. R 45W, Sioux County

Pumping Test: ~~19~~ Hours ~~10~~ Min; Gal. Per Min. ~~114~~; Drawdown ~~9~~ ft. in ~~10~~ min.

Description of Formations

No.	Rock Unit	Thick.	From (Feet)	To
	PLEISTOCENE SYSTEM			
	Kansan Drift			
1.	Drift, buff, oxidized, sandy to fine pebbly, silty, calcareous, and red drift, sandy to pebbly, calcareous	25'	0	25'
2.	Drift, yellow buff, predominantly silt, moderately sandy, calcareous	30'	25'	55'
3.	Silt, buff, with considerable fine sand, well sorted, slightly calcareous	5'	55'	60'
4.	Drift, medium gray to yellow gray, silty to sandy to fine pebbly, calcareous	20'	60'	80'
5.	Drift, light buff, silty, medium to coarse sandy, strongly calcareous	10'	80'	90'
6.	Drift, brick red, silty to sandy to pebbly, calcareous	5'	90'	95'
7.	Drift, light buff to slightly buff gray, silty to sandy to fine pebbly, calcareous	25'	95'	120'
8.	Silt, light buff, with some sand and granules, calcareous	20'	120'	140'
9.	Silt, light buff, and drift, gray, with drift for most part subordinate, both sandy to fine gravelly, calcareous	30'	140'	170'
10.	Drift, gray to buff, very silty, sandy to fine gravelly, calcareous	10'	170'	180'
11.	Silt, buff, slightly sandy to fine gravelly, highly calcareous	15'	180'	195'
12.	Silt, white to very light gray, no sand or pebbles, calcareous	5'	195'	200'

Notes:

Description	Thick.	From	To
13. Drift, buff, very silty, moderately sandy to very fine gravelly, limestone and igneous fragments common, strongly calcareous	5'	200'	205'
14. Drift, light to medium gray, slightly fissile in parts, sandy, no coarse sand or granules, slightly calcareous	10'	205'	215'
15. Drift, buff, very silty, moderately sandy to granules, slightly calcareous	35'	215'	250'
16. Drift, medium gray, very silty, moderately sandy to granules (quartz, limestone, and igneous material)	45'	250'	295'
CRETACEOUS SYSTEM			
Carlile Formation (shale)			
17. Shale, medium to dark gray, very silty to fine sandy, no coarse sand or granules, micaceous, slightly calcareous	55'	295'	350'
18. Sandstone, light gray to light brown gray, fine to medium grained, angular to sub-angular, well sorted, 50% very strongly dolomite cemented	7'	350'	357'
19. Shale, medium gray, structureless, compact, micaceous, firm, non-calcareous	8'	357'	365'
Greenhorn Formation (~~limestone~~)			
20. Dolomite, brown, fine crystalline, saccaroidal, transluscent, grading to gray in parts, very hard, considerable pyrite	10'	365'	375'
21. Shale, very dark brown, bituminous, with some fragments of coalified wood, slightly silty to fine sandy	5'	375'	380'
22. Shale, light to medium gray, micaceous, poor to fair shaly structure, with considerable associated silt to fine sand, very slightly calcareous	20'	380'	400'
23. Dolomite, brown, fine crystalline, transluscent, hard, with occasional coalified fragments in dolomite, 60%, sandstone, white to light buff, strongly calcite cemented 40%	5'	400'	405'
Graneros Formation (~~shale~~)			
24. Shale, medium gray, micaceous, poor to fair shaly structure occasional flattened plates of coalified plant material, non-calcareous, with 20% brown, fine crystalline hard dolomite between 420-425'	25'	405'	430'

Description	Thick.	From	To
25. Shale, light pink, silty, non-calcareous, micaceous	2'	430'	432'
26. Shale, light gray, micaceous, silty, non-calcareous, with occasional coalified plant fragments in parts	28'	432'	460'
27. Shale, light to medium gray, micaceous, silty to fine sandy, non-calcareous, with occasional hard yellow buff fine textured dolomite fragments between 475-480', occasional coalified plant fragments in parts	40'	460'	500'
28. Lignite, composed of coalified wood fragments with considerable pyrite	5'	500'	505'
29. Shale, light gray, silty to fine sandy, micaceous, very slightly calcareous	7'	505'	512'
Dakota Formation			
30. Sandstone, very light buff, medium grained, very well sorted, angular, very slightly frosted, slightly pyritic, unit becomes more fine in upper 5', unit somewhat silty	48'	512'	560'
31. Shale, light gray, silty, wholly as drilling mud, non-calcareous	5'	560'	565'
32. Sandstone, very light buff, fine to very coarse grained, very poorly sorted, clean	15'	565'	580'
33. Shale, light gray, silty, non-calcareous	5'	580'	585'
34. Sandstone, white, medium to very coarse to granules, very poorly sorted, angular to subangular, slightly frosted, clean	50'	585'	635'
35. Sandstone, light gray, medium to fine grained, angular, silty	5'	635'	640'
36. Sandstone, light buff, fine and coarse grained, angular	5'	640'	645'
37. Sandstone, light gray, medium to fine grained, angular, silty, micaceous	5'	645'	650'
38. Shale, light gray, soft, wholly as well mud, non-calcareous, micaceous	20'	650'	670'

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Description	Thick.	From	To
39. Sandstone, very light buff, medium to very coarse grained to granules and fine gravel in parts, numerous small pebbles pink quartzite and olive brown chert	20'	670'	690'
40. Sandstone, light gray, medium to coarse grained, rather well sorted, angular to subangular, clean	20'	690'	710'
41. Sandstone, coarse to granules, angular to subangular, fair sorting	10'	710'	720'
42. Sandstone, white, fine to coarse grained, fair sorting, angular to subangular	10'	720'	730'
PRE CRETACEOUS			
43. Siltstone, white to light buff, homogeneous, extremely fine sugary texture, medium to coarse sandy with small percentage anhydrite	20'	730'	750'
44. Siltstone, as in unit 43, with 35% deep red very fine textured ~~rhyolitic porphyry, siltstone is medium to coarse sandy~~ medium to coarse sandy as pebbles.	10'	750'	760'
PRE CAMBRIAN			
45. ~~Rhyolite porphyry~~ Rhyolite porphyry deep red to grayish, medium to coarse sandy, hard, fresh	10'	760'	770'

Generalized Log

Hull City, Wyo.

NW¼, SW¼, Sec. 20 T. 57 N., R. 91 W.

Surface Elev. 1427

#	Description	Thick	From	To
	Sandstone, gray, medium grained, subangular - well sorted, micaceous, very hard	10'+	550'	560'
	Shale, gray, non-calcareous, silty, micaceous	5'	560'	565'
	Sandstone, light gray to light buff, medium to coarse grained, pyritic, with occasional granules.	15'	565'	580'
	Shale, gray, noncalcareous, silty, micaceous, sandy	5'	580'	585'
	Sandstone, light buff, medium grained, ~~to~~ with 10 - 25% coarse grains pink and yellow quartz grains common, some coated.	30'	585'	615'
	Sandstone coarse, subangular, fairly well sorted, pyritic, pink & yellow quartz common	20'	615'	635'
	Sandstone, light buff, fine to medium grained. angular slightly silty, micaceous	10'	635'	645'
	Shale, gray, silty, micaceous, noncalcareous, slightly ~~micaceous~~	25'	645'	670'
	Sandstone, light buff, medium to coarse grained subangular, slightly silty	10'	670 - 680'	
	Sandstone, very coarse sand to small pebbles, no medium - fine sand, poorly sorted, composed of 50% clear to milky quartz, 20% yellow tinted quartz, 20% pink tinted quartz 10% pyrite cemented sandstone & brown chert	5'	680'	685'
	Sandstone, coarse to very coarse, subangular to ~~subangular~~ rounded, pink and yellow quartz	5'	685' - 690	

Shale; gray, 8' 5'05" – 5'13"

Sandstone; gray, fine grained, Major Grade ¼-⅛ mm, well sorted; silty or 17' 5'30" – 5'47"

Sandstone; gray, medium grained, well sorted, silty or shaley, 5'47" – 5'50"

Shale; gray, silty, slightly micaceous, calcareous (may be cave). 5'50" – 5'65"

Sandstone; light gray, medium to coarse grained, angular. Pink, yellow and milky quartz common 5'65" – 5'80"

Shale; gray, sandy, silty, slightly micaceous, non calcareous 5'80" – 5'83"

Sandstone; light pink, medium to very coarse grained, to granule Poorly sorted, pink and yellow quartz common. 33' 5'33" – 6'15"

Sandstone; light pink, coarse grained, fairly well sorted, pyritic, angular, Pink and yellow quartz grains common 21' 6'15" – 6'35"

L, ... 9
W.C.S.

Preliminary

Generalized Log
of Hull City Well
Sioux Co., Ia

Previous to petrographic Study

	Thick	From	To
Pleistocene			
	290	0	290
Cretaceous			
Shale, ~~dark~~ medium to dark gray, sandstone with Dolomite Sands, dolomite brown, fine xline, translucent ss poorly sorted, pyritic	60'	290	- 350
	5'	350	355
Shale, dark gray,	10'	355	- 365
Dolomite, brown, fine xline	10'	365	- 375
Shale, , dark brown, much organic matter	5'	375	- 380'
Shale, gray.	20'	380	- 400'
LS, drab, fine to med. xline, & dolomite brown, fine crystalline. limestone predominant	5'	400	- 405'
Shale, gray.	25'	405'	- 430'
Shale, Pink to red	2' ±	430	- 432
Shale ~~Gray~~, medium to light gray	~~28~~	432	460
Shale, dark gray	5'	460	- 465
Shale, medium gray	35'	465	- 500
~~In~~ Wood charcoal, pyritized, in gray shale (?)	5'	500	- 505

Sheet No. ..... Name of Well ..... Survey No. .....

Location ..... Date Drilled ..... Analyst Schuldt

00

10

20

30

40

50

SS, gray, med. gr., Ang., well sorted, m.c. silty or micaceous shale flour

SS, " " " " " " micac " " " " " " "

60

Sh, gray, calc., silty text., micac.

SS, lt. gray, med. to crse, pyritic, with calcs, qz granules, some pink qz & some clear

70

S. - buff, " " fair sorting (US 70 V. fine sd.), Ang., granules pink & yel. qz co.

SS, " " " " " (10% " ") " " " "

80

Sh, gray, sandy, silty text., non-calc.

SS, lt. buff, med. gr. with 2-3% V. crse to granules, pink & yellow qz common

90

SS, " " " to V. crse, some granules, poorly sorted, pink, yel. qz common some milky qz

SS, " " " " " " " " " " " " " " " " " " Pink & yel. qz common Pyrite, some milky qz

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Sheet No. ..... Name of Well ..... Survey No. .....

Location ..... Date Drilled ..... Analyst .....

00

10

20

30

40

50

60

70

80

90

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IOWA GEOLOGICAL SURVEY

Generalized Log Based on Detailed Description of Drill Cuttings

Name of Well: Hull City Well #2. Survey No. W- 0957

Drilled by: Layne-Western Co., Omaha Nebr. Date Nov. 12, 1938-May 29, 1939, ~~193~~

Total Depth: 707' ft; Curb Elevation: 1427 ft; Static Level: 243' ft.

Casing Data:

Pump and Screen Data:

Pumping Test: 19 Hours 10 Min; Gal. Per Min. 114 ; Drawdown 9 ft. in 19hrs 10 min.

Description of Formations

No.	Rock Unit	Thick.	From (Feet)	To
	PLEISTOCENE SYSTEM Kansan Drift			
1.	Drift, buff, oxidized, sandy to fine pebbly, silty, calcareous, and red drift, sandy to pebbly, calcareous	25'	0	25'
2.	Drift, yellow buff, predominantly silt, moderately sandy, calcareous	30'	25'	55'
3.	Silt, buff, with considerable fine sand, well sorted, slightly calcareous	5'	55'	60'
4.	Drift, medium gray to yellow gray, silty to sandy to fine pebbly, calcareous	20'	60'	80'
5.	Drift, light buff, silty, medium to coarse sandy, strongly calcareous	10'	80'	90'
6.	Drift, brick red, silty to sandy to pebbly, calcareous	5'	90'	95'
7.	Drift, light buff to slightly buff gray, silty to sandy to fine pebbly, calcareous	25'	95'	120'
8.	Silt, light buff, with some sand and granules, calcareous	20'	120'	140'
9.	Silt, light buff, and drift, gray, with drift for most part subordinate, both sandy to fine gravelly, calcareous	30'	140'	170'
10.	Drift, gray to buff, very silty, sandy to fine gravelly, calcareous	10'	170'	180'
11.	Silt, buff, slightly sandy to fine gravelly, highly calcareous	15'	180'	195'
12.	Silt, white to very light ~~buff~~ gray, no sand or pebbles, calcareous	5'	195'	200'
13.	Drift, buff, very silty, moderately sandy to very fine gravelly, limestone and igneous fragments common, strongly calcareous	5'	200'	205'

Notes:

	Thick	From	To
14. Drift, light to medium gray, slightly fissil in parts, sandy, no coarse sand or granules, slightly calcareous	10'	205'	215'
15. Drift, buff, very silty, moderately sandy to granules, slightly calcareous	35'	215'	250'
16. Drift, medium gray, very silty, moderately sandy to granules (quartz, limestone, and igneous material)	45'	250'	295'
~~17.~~			
CRETACEOUS SYSTEM			
Carlile Formation (Shale)			
17. Shale, medium to dark gray, very silty to fine sandy, no coarse sand or granules, micaceous, slightly calcareous	55'	295'	350'
18. Sandstone, light gray to light brown gray, fine to medium grained, angular to subanglular, well sorted, 50% very strongly dolomite cemented	7'	350'	357'
19. Shale, medium gray, structureless, compact, micaceous, firm, non-calcareous	8'	357'	365'
Greenhorn Formation (Limestone)			
20. Dolomite, brown, fine crystalline, saccaroidal, transluscent, grading to gray in parts, very hard, considerable pyrite	10'	365'	375'
21. Shale, very dark brown, bituminous, with some fragments of coalified wood, slightly silty to fine sandy	5'	375'	380'
22. Shale, light to medium gray, micaceous, poor to fair shaly structure, with considerable associated silt to fine sand, very slightly calcareous	20'	380'	400'
23. Dolomite, brown, fine crystalline, transluscent, hard, with occasional coalified fragments in dolomite, 60%, Sandstone, white to light buff, strongly calcite cemented 40%	5'	400'	405'
Graneros Formation (Shale)			
24. Shale, medium gray, micaceous, poor to fair shaly structure occasional flattened plates of coalified plant material, non-calcareous, with 20% brown, fine crystalline hard dolomite between 420-425'	25'	405'	430'
25. Shale, light pink, silty, non-calcareous, micaceous	2'	430'	432'
26. Shale, light gray, micaceous, silty, non-calcareous, with occasional coalified plant fragments in parts	28'	432'	460'
27. Shale, light to medium gray, micaceous, silty to fine sandy, non-calcareous, with occasional hard yellow buff fine textured dolomite fragments between ~~479-480~~ 475-480', occasional coalified plant fragments in parts	40'	460'	500'
28. Lignite, composed of coalified wood fragments with considerable pyrite	5'	500'	505'
29.			

29. Shale, light gray, silty to fine sandy, micaceous, very slightly ~~fine-sandy~~ calcareous	7'	505'	512'
30. Sandstone, very light buff, medium grained, very well sorted, angular, very slightly frosted, slightly pyritic, unit becomes more fine in upper 5', unit somewhat silty	48'	512'	560'
31. Shale, light gray, silty, wholly as drilling mud, non-calcareous	5'	560'	565'
32. Sandstone, very light buff, fine to very coarse grained, very poorly sorted, clean	15'	565'	580'
33. Shale, light gray, silty, non-calcareous,	5'	580'	585'
34. Sandstone, white, medium to very coarse to granules, very poorly sorted, angular to subangular, slightly frosted, clean	50'	585'	635'
35. Sandstone, light gray, medium to fine grained, angular, silty	5'	635'	640'
36. Sandstone, light buff, fine & and coarse grained, angular	5'	640'	645'
37. Sandstone, light gray, medium to fine grained, angular, silty, micaceous	5'	645'	650'
38. Shale, light gray, soft, wholly as well mud, non-calcareous, micaceous	20'	650'	670'
39. Sandstone, very light buff, medium to very coarse grained to granules and fine gravel in parts, numerous small pebbles pink quartzite and olive brown chert	20'	670'	690'
40. Sandstone, light gray, medium to coarse grained, rather well sorted, angular to subangular, clean	30'	690'	710'
41. Sandstone, coarse to granules, angular to subangular, fair sorting,	10'	710'	720'
42. Sandstone, white, fine to coarse grained, fair sorting, angular to subangular	10'	720'	730'

Pre Cretaceous (Solid Capitan)

to light buff, 43. Siltstone, white, homogeneous, ~~fine-to-coarse-sandy w, very~~ extremely fine sugary texture, medium to coarse sandy with small percentage ~~gyp~~ anhydrite	20'	730'	750'
44. Siltstone, as in unit 43, with 35% deep red very fine to sub-crystalline quartz, ~~possibly recrystallized chert,~~ both siltstone and ~~chert~~ Quartzite are medium to coarse sandy.	10'	750'	760'
Pre-Cambrian ~~(?)~~ 45. ~~Chert~~ Quartzite, deep red to grayish, medium to coarse sandy, hard, fresh	10'	760'	770'

Salt Cafe

IOWA GEOLOGICAL SURVEY
Generalized Log Based on Notable Description of Drill Cuttings

Name of Well Hull City Well #2 Survey No. W-0957

Location SW¼ NW¼ SW¼ Sec. 26, T.97 N., R.45 W., Sioux County

Drilled by Layne-Western Co., Omaha, Nebr. Date Nov. 1, 1938 to May 29, 1939

Total Depth 797 ft, Curb Elevation 1427 ft, Static Level 243 ft.

Pumping Test ____ Hours ____ Min, ____ Gal. per Min. ____, Drawdown ____ ft. in ____ min.

Casing Data _____

Description of Formations

No.	Rock Unit	Thick.	From (feet)	To
	PLEISTOCENE SYSTEM Kansan Drift			
1.	Drift, buff, oxidized, sandy to fine pebbly, silty, calcareous, and red drift, sandy to pebbly, calcareous	25'	0	25'
2.	Drift, yellow buff, predominantly silt, moderately sandy, calcareous	30'	25'	55'
3.	Silt, buff, with considerable fine sand, well sorted, slightly calcareous	5'	55'	60'
4.	Drift, medium gray to yellow gray, silty to sandy to fine pebbly, calcareous	20'	60'	80'
5.	Drift, light buff, silty, medium to coarse sandy, strongly calcareous	10'	80'	90'
6.	Drift, brick red, silty to sandy to pebbly, calcareous	5'	90'	95'
7.	Drift, light buff to slightly buff gray, silty to sandy to fine pebbly, calcareous	25'	95'	120'
8.	Silt, light buff, with some sand and granules, calcareous	20'	120'	140'
9.	Silt, light buff, and drift, gray, with drift for most part subordinate, both sandy to fine gravelly, calcareous	30'	140'	170'

Notes:

W-0957

Description	Thick.	From	To
10. Drift, gray to buff, very silty, sandy to fine gravelly calcareous	10'	170'	180'
11. Silt, buff, slightly sandy to fine gravelly, highly calcareous	15'	180'	195'
12. Silt, white to very light gray, no sand or pebbles, calcareous	5'	195'	200'
13. Drift, buff, very silty, moderately sandy to very fine gravelly, limestone and igneous fragments common, strongly calcareous	5'	200'	205'
14. Drift, light to medium gray, slightly fissile in parts, sandy, no coarse sand or granules, slightly calcareous	10'	205'	215'
15. Drift, buff, very silty, moderately sandy to granules, slightly calcareous	35'	215'	250'
16. Drift, medium gray, very silty, moderately sandy to granules (quartz, limestone, and igneous material)	45'	250'	295'
CRETACEOUS SYSTEM			
Carlile Formation			
17. Shale, medium to dark gray, very silty to fine sandy, no coarse sand or granules, micaceous slightly calcareous	55'	295'	350'
18. Sandstone, light gray to light brown gray, fine to medium grained, angular to sub-angular, well sorted, 50% very strongly dolomite cemented	7'	350'	357'
19. Shale, medium gray, structureless, compact, micaceous, firm, non-calcareous	8'	357'	365'
Greenhorn Formation			
20. Dolomite, brown, fine crystalline, saccharoidal, translucent, grading to gray in parts, very hard, considerable pyrite	10'	365'	375'
21. Shale, very dark brown, bituminous, with some fragments of coalified wood, slightly silty to fine sandy	5'	375'	380'
22. Shale, light to medium gray, micaceous, poor to fair shaly structure, with considerable associated silt to fine sand, very slightly calcareous	20'	380'	400'

Description	Thick.	From	To
23. Dolomite, brown, fine crystalline, translucent, hard, with occasional coalified fragments in dolomite, 60%, sandstone, white to light buff, strongly calcite cemented 40%	5'	400'	405'
Graneros Formation			
24. Shale, medium gray, micaceous, poor to fair shaly structure occasional flattened plates of coalified plant material, non-calcareous, with 20% brown, fine crystalline hard dolomite between 420-425'	25'	405'	430'
25. Shale, light pink, silty, non-calcareous, micaceous	2'	430'	432'
26. Shale, light gray, micaceous, silty, non-calcareous, with occasional coalified plant fragments in parts	28'	432'	460'
27. Shale, light to medium gray, micaceous, silty to fine sandy, non-calcareous, with occasional hard yellow buff fine textured dolomite fragments between 475-480', occasional coalified plant fragments in parts	40'	460'	500'
28. Lignite, composed of coalified wood fragments with considerable pyrite	5'	500'	505'
29. Shale, light gray, silty to fine sandy, micaceous, very slightly calcareous	7'	505'	512'
Dakota Formation			
30. Sandstone, very light buff, medium grained, very well sorted, angular, very slightly frosted, slightly pyritic, unit becomes more fine in upper 5', unit somewhat silty	48'	512'	560'
31. Shale, light gray, silty, wholly as drilling mud, non-calcareous	5'	560'	565'
32. Sandstone, very light buff, fine to very coarse grained, very poorly sorted, clean	15'	565'	580'
33. Shale, light gray, silty, non-calcareous	5'	580'	585'
34. Sandstone, white, medium to very coarse to granules, very poorly sorted, angular to subangular, slightly frosted, clean	50'	585'	635'
35. Sandstone, light gray, medium to fine grained, angular, silty	5'	635'	640'

Description	Thick.	From	To
36. Sandstone, light buff, fine and coarse grained, angular	5'	640'	645'
37. Sandstone, light gray, medium to fine grained, angular, silty, micaceous	5'	645'	650'
38. Shale, light gray, soft, wholly as well mud, non-calcareous, micaceous	20'	650'	670'
39. Sandstone, very light buff, medium to very coarse grained to granules and fine gravel in parts, numerous small pebbles pink quartzite and olive brown chert	20'	670'	690'
40. Sandstone, light gray, medium to coarse grained, rather well sorted, angular to subangular, clean	20'	690'	710'
41. Sandstone, coarse to granules, angular to sub-angular, fair sorting	10'	710'	720'
42. Sandstone, white, fine to coarse grained, fair sorting, angular to subangular	10'	720'	730'
PRE CRETACEOUS			
43. Siltstone, white to light buff, homogeneous, extremely fine sugary texture, medium to coarse sandy with small percentage anhydrite	20'	730'	750'
44. Siltstone, as in unit 43, medium to coarse sandy with 35% deep red very fine textured rhyolite porphyry as pebbles	10'	750'	760'
PRE CAMBRIAN			
45. Rhyolite porphyry deep red to grayish, medium to coarse sandy, hard, fresh	10'	760'	770'

Sheet No. ..... Name of Well. ..... Survey No. .....

Location ..... Date Drilled Nov. 12, 1929 – Nov. 29, 1929 Analyst .....

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Sheet No. ..... Name of Well. ..... Survey No. .....

Location ..... Date Drilled ..... Analyst Schuldt

100

Drift, [illegible]

Drift, sim. to soil, loc-like, fr. pit.

10

Drift, lt. bf, sdy, to f. pebbles, strongly calc.

Drift, gray, bf, otherwise sim. to above, 110-115'

20

Fr. bf w. some gr. & granules, calc.,

Fr. bf [illegible]

30

Silt, bf, [illegible] 5% fine gr, calc. nodules, 1 lg. pt. fr. gr.

Silt, bf, [illegible] 1 lg. pt. fr. gr.

40

Silt, m. bf to grayish, containing clayey, organic, sdy to f. gravel

Silt, lt. bf to grayish, organic, [illegible] = organic silt

50

Drift, gray bf, v. silty to sdy to f. gravelly, calc,

Drift, gray & silt, bf (clean) bf silt predom., both sdy to f. gravelly, calc.

60

Drift, gray, calc & silt, bf, strongly calc, sim. to above @ 155-160'

Drift, [illegible], silt, mica predom.

70

Drift, gr., v. bf, v. silty, sdy to f. gravelly, calc.

Drift, [illegible]

80

Silt, bf, sl. sdy to f. gravelly, calc

Silt, gray, bf, [illegible]

90

Silt, [illegible]

Silt, wh - v. lt. gray, fr. sd. or pebbles, calc.

200

Sheet No. ..... Name of Well ..... Survey No. .....

Location ..... Date Drilled ..... Analyst Schlicht

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300

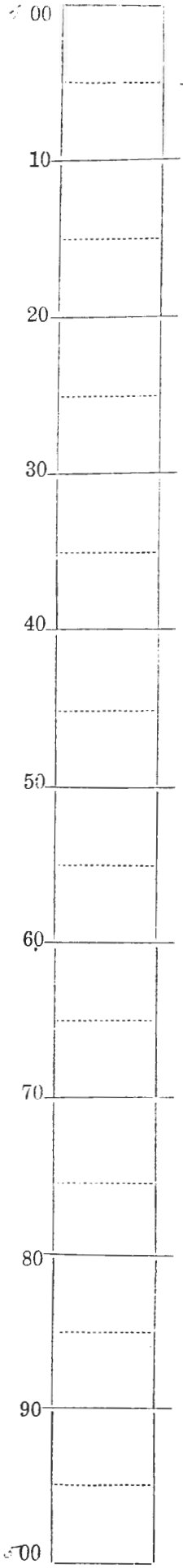
Sheet No. Name of Well Survey No. [illegible]

Location Date Drilled Analyst Schuldt

Depth	Description
300	Shale [illegible] gray [illegible], with consid. assoc. [illegible] to f. sd, sl. calc., micac.
	Shale, " " " " " " " " " "
10	Shale " " " " " " " " " " ", [illegible] to rare [illegible] green. gls (cave.
	Shale " " " " " " " [illegible] "; [illegible] frags. somewhat unct.
20	Shale, med. [illegible] gray, fershay struct., micac., with some assoc. crse slt. to f. sd, non-calc., [illegible] as overlying [illegible]
	Shale " " " " " " " " " "
30	Shale " " " " no " " " " ", " [illegible] frags. [illegible] Qz
	Shale, " " " " " " " " " " " " " ", occas. [illegible] dol frags (cave?)
40	Shale " " " " " " " " [illegible] Qz sd, occas. [illegible] (ca
	Shale " " " " " " " " " " " " ", occas. [illegible] Qz, Ls, & Ig. met. (cav
50	SS, lt. gray to lt. brn. gray, f.-m. gr., Ang. to subang., [illegible] sort., with 50% of fragments of brn. v. strongly dol. cem. ss to v. sdy. dol., hrd., sd. f. gr., ang.; [illegible] frags. [illegible] micac. sh., SS is micac., consid. pyrite
57	[illegible] lt. gray, sim. to unit 350-355', 40%; Sh., med. gray, structureless, non-calc., micac., 60%, 4 or 5 granules pink Qtzt.
60	Sh. med. gray, structureless, compact, micac., non-calc., firm
	Dol. or [illegible], sug. text, transl., [illegible], grading to gray [illegible], mod to strongly pyritic, [illegible] Qz & Ig. met.
70	[illegible] sim. to same 365-370', 15% Ig. & met. & Qz
	Sh., v. dk. brn., bituminous, with some frags. coalified wood, [illegible] silty, non-calc.
80	Sh., lt. gray, micac., with consid. assoc. slt. to f. sd, v. sl. calc.
	Sh., " " " " " " " " " " " " ".
90	Sh., " " " " " " " " " " " ".
	Sh., " " " " " " " " " " " ".
400	

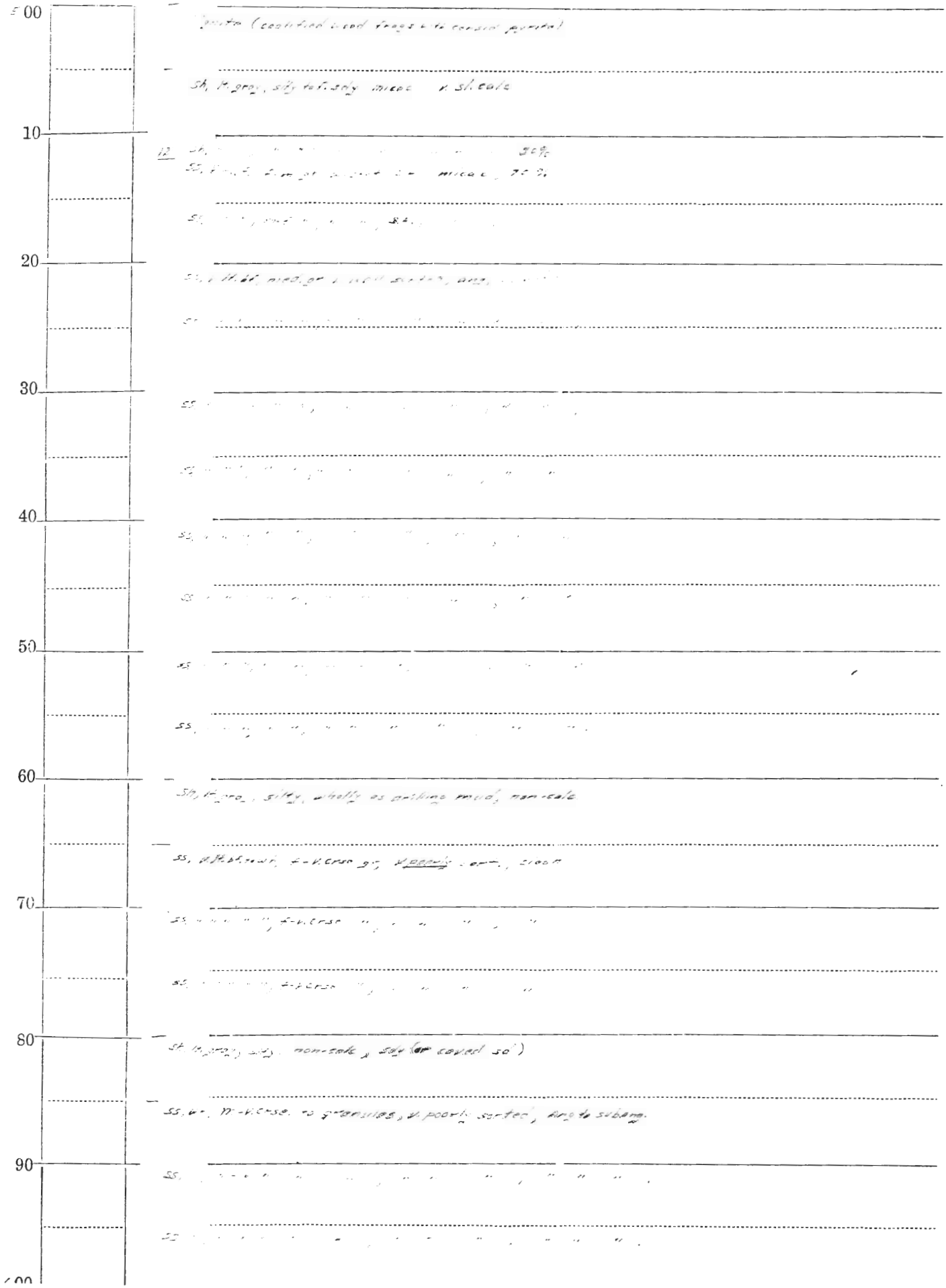
Sheet No. ..... Name of Well. Kentucky ..... Survey No. KY-085-

Location ..... Date Drilled ..... Analyst Schultz



Sheet No. ..... Name of Well Hull City #... ..... Survey No. ...

Location ..... Date Drilled ..... Analyst Schuldt



Sheet No. ..... Name of Well ..... Survey No. .....

Location ..... Date Drilled ..... Analyst Schaldt

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700

Sheet No. ..... Name of Well ..... Survey No. .....

Location ..... Date Drilled ..... Analyst Schaller

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Sheet No. ..... Name of Well ..... Survey No. .....

Location ..... Date Drilled ..... Analyst .....

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Sandstone - gray-buff, mic gr 1-2 mm, prin sub 1-½ mm (slightly coarser than above), angular to curvi. Some polis. Chiefly qtz. with ss. to ls. cem. Some pyrite cem. & mud.

765

Dolomite - few grains, grayish brown, compact, dense, fine-grained.

10

770

Conglomerate and sandstone - buff, variable, grains from ¼ mm to 6 mm, angular to curvi. Poorly well sevel, on some of larger curvi. faces. Chiefly qtz. with chalcedony, etc. Th pyrite cemented.

Dolomite - light, drab, compact - dense, fine grained, few fragments show enclosed sand grains. Hard.

775

Dolomite - as above, but free ...

Conglomerate - light colored, mic gr 1-2 mm, prin subs. ½-2 - 4 mm, max. 20 mm.

20

780

Sandstone - buff pink ang to sub ang qtz.

785

30

790 calc-oz

Quartzite - v light gray

Silt - quartz, probably sandstone.

795

Quartzite - light gray

40

800

Quartzite - light gray

Dolomite - very fine gr.

Shale - trace, light gray

805

Quartzite - very light gray, & small amt. of buff & red very grains of qtz.

50

810 815

Quartzite - very gray and red to pink

820

60

70

80

90

00

IOWA GEOLOGICAL SURVEY
Well or Water Sample Data Bottle No. 6-101

TOWN: _____ COUNTY: _____

LOCATION: _____ Sec. _____ T. _____ N., R. _____ E. W. _____ Twp.

OWNER OF WELL: Town of Hull Well No. 2

USE OF WATER: City Supply (X); Private-Domestic ( ); Public Drinking ( ); Livestock ( ); Industrial ( ); School Supply ( ); Air Conditioning ( ); Cooling ( ); Pumping test (X).

CONSTRUCTION OF WELL: Drilled ( ); Gravel-Pack type ( ); Driven ( ); Dug ( ); Bored ( ); _____ ( ).

CONTRACTOR: _____ DATE DRILLED: _____ 1935 - May 29, 1939

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the kind, length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.) See sketch

WELL DATA:
Curb Elevation _____ Ft. Present Depth _____ Ft. Final Depth _____ Ft.

Topographic Position of Well: _____

Static Level (Depth to Water (Above) (Below) Curb) _____ Ft. Pumping Level _____ Ft.

Amount of Drawdown _____ Ft. pumping at _____ g.p.m. in _____ hours _____ minutes.

Calculated gals. per ft. drawdown _____ g.p.m.

Capacity of Well _____ g.p.m. at _____ ft. drawdown.

Type of Pump Turbine. Power Electricity.

Depth of Bottom of Pump 376 ft. with _____ ft. of suction pipe, 4 screen

TEMPERATURE: Air 52 °F.; Water 52 °F., measured after well had pumped _____ hrs. 0 mins. at 500 g.p.m.; 11 ft. from pump after water had passed through the following pipe 11" Time 10:50 (A.M.) (P.M.)

SOURCE OF WATER: Recent (Type and Depth) _____

Glacial Formations (Type) _____ at _____ ft. to _____ ft.

Limestone or Dolomite (Age) _____ at _____ ft. to _____ ft.

Sandstone (Age) Cretaceous at 370 ft. to 607 ft.

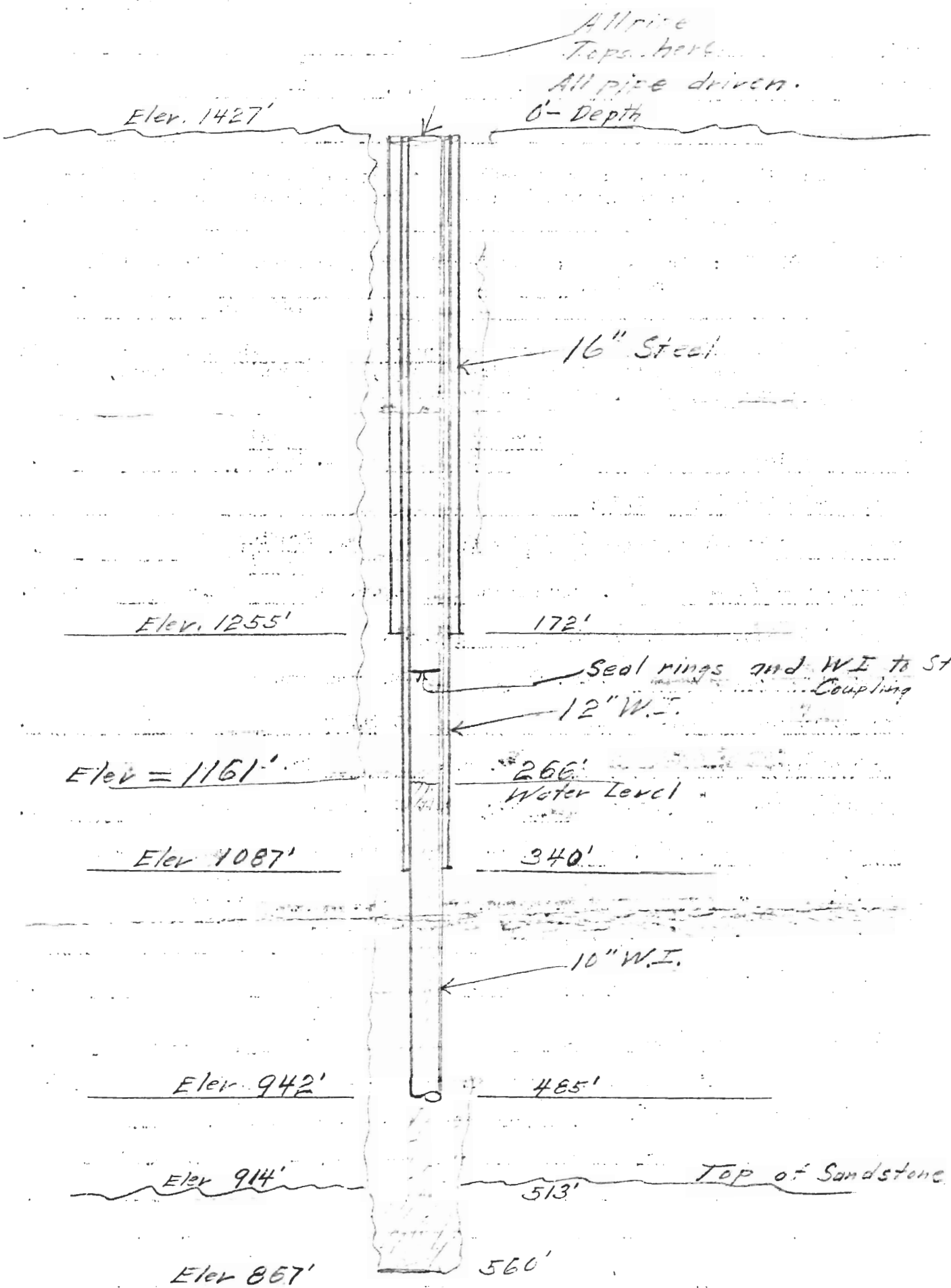
Principal Producing Formation Lower Dakota sandstone [Inferred]

REMARKS: [See report on sample taken May 30, 1939, on this same pumping test]

Sample taken for: Mineral Analysis ( ); Sanitary Analysis ( ).
Data Collected by H. E. Herson; Date May 29, 1939.
Report Analysis to H. G. Hershey, Iowa Geological Survey, Iowa City.

Description of Formations

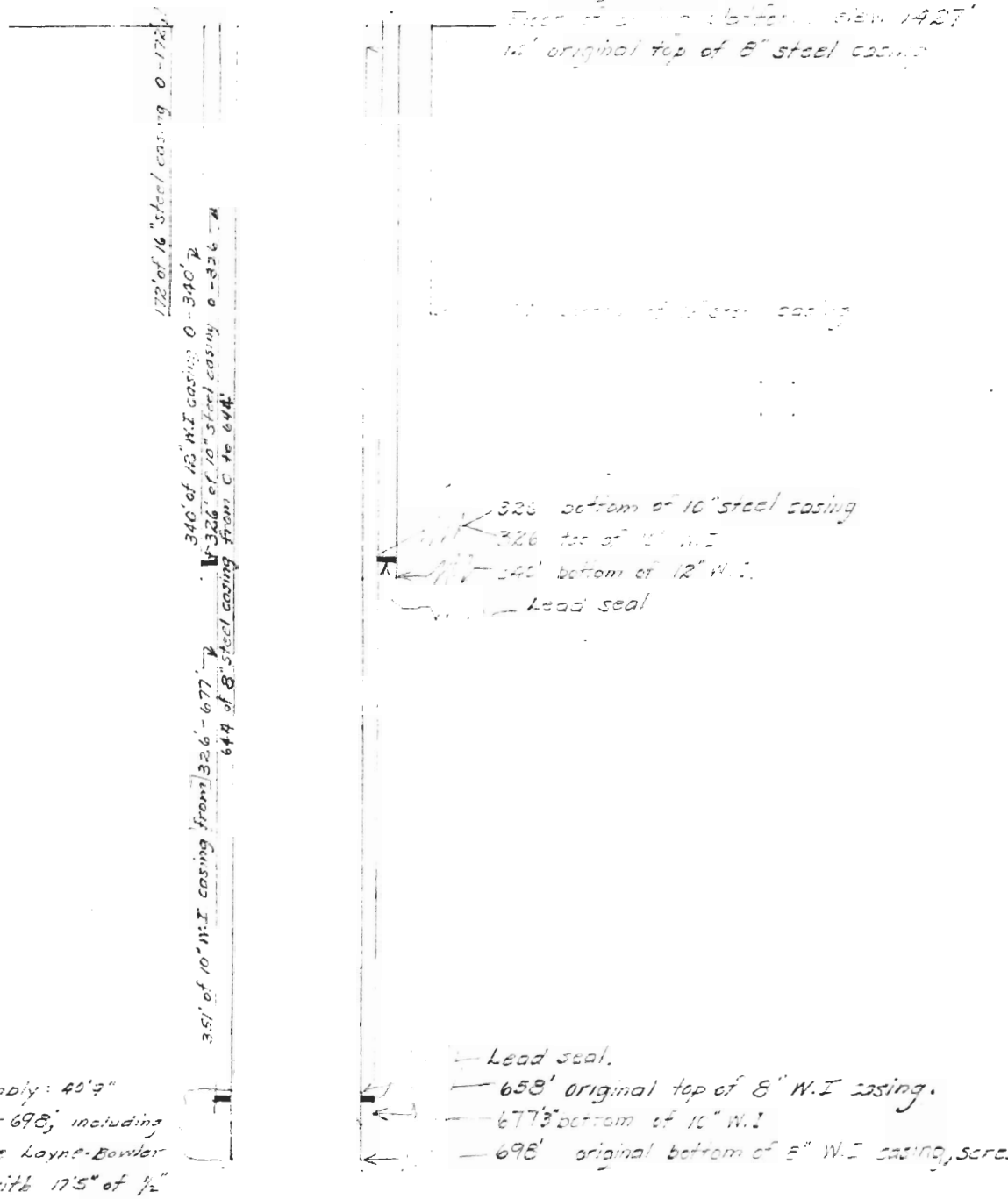
Rock Unit		Thick.	From	To
Shale:	gray	6'	505'	513'
Sandstone:	gray, fine grained, major grade ¼-1/8 mm., well sorted: silty or shaly	17'	513'	530'
Sandstone:	gray, medium grained, well sorted, silty or shaly.	30'	530'	560'
Shale:	gray, silty textured, non calcareous (may be cave).	5'	560'	565'
Sandstone:	light buff, medium to coarse, angular. Pink, yellow and milky quartz common	15'	565'	580'
Shale:	gray, sandy, silty textured, non-calcareous	5'	580'	585'
Sandstone:	light buff, medium to very coarsed grained, poorly sorted, pink and yellow. Quartz common	30'	585'	615'
Sandstone:	light buff, coarse grained, fairly well sorted, pyritic, angular. Pink and yellow quartz grains common	20'	615'	635'


All pipe Tops here
All pipe driven.
Elev. 1427'
0'- Depth
16" Steel
Elev. 1255'
172'
Seal rings and W.I. to Steel Coupling
12" W.I.
Elev = 1161'
266'
Water Level
Elev 1087'
340'
10" W.I.
Elev. 942'
485'
Elev 914'
513'
Top of Sandstone
Elev 867'
560'

WELLS CAL SURVEY

Rough Sketch

Showing: Construction of Hull town well No. 2 at the time of the pumping test of May 29-30, 1939. Casing record received from Mr. E. K. Peters, driller for Layne-Western Co.



Screen assembly: 40'7" originally 657'3"-698', including 20'3" of Keystone Layne-Bowler 8" W.I. screen with 17'5" of ½" openings spaced 1½" centers both ways, and remainder 8" W.I. pipe with lead seal at top. Screen openings 0.020

Note: During pumping test of May 29-30 all casings but 8" reached surfac
[illegible] originally 12' [illegible] sank to 22' [illegible] Only 16" steel & 12" W.I. [illegible]

Town of Hull, Iowa Well #2 Contractor Layne Western Co.

Drillers log to date Feb.28,1939

0-- 70	70	Yellow Clay
70-75	5	Gray Shale very soft
75-120	45	Yellow & Black
120-132	12	Light Brown Shale
132-150	18	Brown & Blue Shale
150-215	65	Blue Shale Muck
215-348	63	Blowing at 220ft top of blue shale, blew out over 80ft head of water.
348-351	3	lime shell
351-365	14	Blue shale
365-403	38	Broken Lime soft
403-415	12	Gray lime
415-~~470~~ -513	98	Brown shale
513-560		Present depth Sand stone Soft.

Water levels
18'
72'
122'
164'
403' Water rose to 256 ft below curb
513' Statis level 243ft below curb

Present Feb.28,1939
Case shut-off
16" steel to 172 ft
12" W.I. to 340ft
10" W.L. to 485 ft ~~10"x~~

Note. There is not tight seal between the 16" and 12" other than seal formed by drillings.

Static head time of sample(With case to 485') 266 ft below curb.

Sample was taken after bailing about 11 bailers and the twelth bailer was allowed to hang, out of the well during the noon hour.

Note: Static ~~head~~ level water in old well at this time was 244 ft below curb. (last fall the static level in the old well was 158 ft.)

10" case extends to the surface and is composed of W.L. pipe with seal rings in place but not set up, This pipe is intenden to be driven lower as drilling progresses. (Drill used to 560ft is 12" size.) Hole recently filled up to about 360ft and was bailed and all materials removed to 560ft.

IOWA GEOLOGICAL SURVEY
Generalized Log Based on Detailed
Description of Drill Cuttings

Name of Well Hull City Well #2 Survey No. W-0957

Location SW¼ NW¼ SW¼ Sec. 26, T.97 N., R.45 W., Sioux County

Drilled by Layne-Western Co., Omaha, Nebr. Date Nov. 12, 1938 to May 29, 1939

Total Depth 707 ft, Curb Elevation 1427 ft, Static Level 243 ft.

Pumping Test ____ Hours ____ Min, Gal. per Min. ____, Drawdown ____ ft. in ____ min.

Casing Data ____

Description of Formations

No.	Rock Unit	Thick.	From (feet)	To
	PLEISTOCENE SYSTEM			
	Kansan Drift			
1.	Drift, buff, oxidized, sandy to fine pebbly, silty, calcareous, and red drift, sandy to pebbly, calcareous	25'	0	25'
2.	Drift, yellow buff, predominantly silt, moderately sandy, calcareous	30'	25'	55'
3.	Silt, buff, with considerable fine sand, well sorted, slightly calcareous	5'	55'	60'
4.	Drift, medium gray to yellow gray, silty to sandy to fine pebbly, calcareous	20'	60'	80'
5.	Drift, light buff, silty, medium to coarse sandy, strongly calcareous	10'	80'	90'
6.	Drift, brick red, silty to sandy to pebbly, calcareous	5'	90'	95'
7.	Drift, light buff to slightly buff gray, silty to sandy to fine pebbly, calcareous	25'	95'	120'
8.	Silt, light buff, with some sand and granules, calcareous	20'	120'	140'
9.	Silt, light buff, and drift, gray, with drift for most part subordinate, both sandy to fine gravelly, calcareous	30'	140'	170'

Notes:

Description	Thick.	From	To
10. Drift, gray to buff, very silty, sandy to fine gravelly, calcareous	10'	170'	180'
11. Silt, buff, slightly sandy to fine gravelly, highly calcareous	15'	180'	195'
12. Silt, white to very light gray, no sand or pebbles, calcareous	5'	195'	200'
13. Drift, buff, very silty, moderately sandy to very fine gravelly, limestone and igneous fragments common, strongly calcareous	5'	200'	205'
14. Drift, light to medium gray, slightly fissile in parts, sandy, no coarse sand or granules, slightly calcareous	10'	205'	215'
15. Drift, buff, very silty, moderately sandy to granules, slightly calcareous	35'	215'	250'
16. Drift, medium gray, very silty, moderately sandy to granules (quartz, limestone, and igneous material)	45'	250'	295'
CRETACEOUS SYSTEM			
Carlile Formation			
17. Shale, medium to dark gray, very silty to fine sandy, no coarse sand or granules, micaceous slightly calcareous	55'	295'	350'
18. Sandstone, light gray to light brown gray, fine to medium grained, angular to sub-angular, well sorted, 50% very strongly dolomite cemented	7'	350'	357'
19. Shale, medium gray, structureless, compact, micaceous, firm, non-calcareous	8'	357'	365'
Greenhorn Formation			
20. Dolomite, brown, fine crystalline, saccharoidal, transluscent, grading to gray in parts, very hard, considerable pyrite	10'	365'	375'
21. Shale, very dark brown, bituminous, with some fragments of coalified wood, slightly silty to fine sandy	5'	375'	380'
22. Shale, light to medium gray, micaceous, poor to fair shaly structure, with considerable associated silt to fine sand, very slightly calcareous	20'	380'	400'

W-0957

Description	Thick.	From	To
23. Dolomite, brown, fine crystalline, translucent, hard, with occasional coalified fragments in dolomite, 60%, sandstone, white to light buff, strongly calcite cemented 40%	5'	400'	405'
Graneros Formation			
24. Shale, medium gray, micaceous, poor to fair shaly structure occasional flattened plates of coalified plant material, non-calcareous, with 20% brown, fine crystalline hard dolomite between 420-425'	25'	405'	430'
25. Shale, light pink, silty, non-calcareous, micaceous	2'	430'	432'
26. Shale, light gray, micaceous, silty, non-calcareous, with occasional coalified plant fragments in parts	28'	432'	460'
27. Shale, light to medium gray, micaceous, silty to fine sandy, non-calcareous, with occasional hard yellow buff fine textured dolomite fragments between 475-480', occasional coalified plant fragments in parts	40'	460'	500'
28. Lignite, composed of coalified wood fragments with considerable pyrite	5'	500'	505'
29. Shale, light gray, silty to fine sandy, micaceous, very slightly calcareous	7'	505'	512'
Dakota Formation			
30. Sandstone, very light buff, medium grained, very well sorted, angular, very slightly frosted, slightly pyritic, unit becomes more fine in upper 5', unit somewhat silty	48'	512'	560'
31. Shale, light gray, silty, wholly as drilling mud, non-calcareous	5'	560'	565'
32. Sandstone, very light buff, fine to very coarse grained, very poorly sorted, clean	15'	565'	580'
33. Shale, light gray, silty, non-calcareous	5'	580'	585'
34. Sandstone, white, medium to very coarse to granules, very poorly sorted, angular to subangular, slightly frosted, clean	50'	585'	635'
35. Sandstone, light gray, medium to fine grained, angular, silty	5'	635'	640'

Description	Thick.	From	To
36. Sandstone, light buff, fine and coarse grained, angular	5'	640'	645'
37. Sandstone, light gray, medium to fine grained, angular, silty, micaceous	5'	645'	650'
38. Shale, light gray, soft, wholly as well mud, non-calcareous, micaceous	20'	650'	670'
39. Sandstone, very light buff, medium to very coarse grained to granules and fine gravel in parts, numerous small pebbles pink quartzite and olive brown chert	20'	670'	690'
40. Sandstone, light gray, medium to coarse grained, rather well sorted, angular to subangular, clean	20'	690'	710'
41. Sandstone, coarse to granules, angular to sub-angular, fair sorting	10'	710'	720'
42. Sandstone, white, fine to coarse grained, fair sorting, angular to subangular	10'	720'	730'
PRE CRETACEOUS			
43. Siltstone, white to light buff, homogeneous, extremely fine sugary texture, medium to coarse sandy with small percentage anhydrite	20'	730'	750'
44. Siltstone, as in unit 43, medium to coarse sandy with 35% deep red very fine textured rhyolite porphyry as pebbles	10'	750'	760'
PRE CAMBRIAN			
45. Rhyolite porphyry deep red to grayish, medium to coarse sandy, hard, fresh	10'	760'	770'

MASTER CARD – A 9-26-69

STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	N. or S.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.
1 2	3 4	5 6	7 8	9 10	11	12 13 14	15 16	17 18	19
19	84	43	11	25	N	096	08	13	1

WELL SCHEDULE

US GEOLOGICAL SURVEY

IOWA DISTRICT WRD

WELL NO. 097-45W-26CBC CO. Sioux

OWNER HULL CITY WELL #2 (1939) ADDRESS HULL, IOWA

DRILLER LAYNE WESTERN DATE DRLD. MAY 1939

MAP 1:63,360 COUNTY HWY.

SOURCE OF DATA FILE

DESCRIPTION M. P. LSD FEET (ABOVE) (BELOW) LSD 1427

CONTINUED FROM ABOVE	ACCURACY	LOCAL WELL NUMBER T.	R.	E/W	SEC.	QUARTERS	LOCAL USE W-NUMBER	OPTIONAL	OWNER OR NAME	OWNERSHIP	WATER USE	WELL USE	WELL DATA	FREQ. W/L	FIELD CHAR.	HYD. LAB.	QW-DATA	QW-FREQ.	PUMPAGE	APERTURE	LOG DATA	CARD DESIG.
	20	21 22 23	24 25	26	27 28	29 30 31 32 33 34	35 36 37 38 39	40 41 42 43 44 45 46 47 48 49 50 51	52 53 54 55 56 57 58 59 60 61 62 63 64 65 66	67	68	69	70	71	72	73	74	75	76	77	78 79	80
	2	097	45	W	26	CBC	00957	//39CITY 2	HULL IOWA	M	U	U	1	Ø			C	Ø			GD	A

WELL-DESCRIPTION CARD – B

DUPLICATE CARD A CC 1-19	DEPTH OF WELL	ACCURACY	DEPTH CASED OR FIRST PERF.	DIAM. INCHES	WELL FINISH	METH. DRILLED	YEAR DRILLED	PUMP SETTING	METH. LIFT	DEEP SHALLOW	POWER	ALTITUDE OF LSD (FEET)	ACCURACY	WATER LEVEL (FEET)	ACCURACY	DATE MONTH	DATE YEAR	YIELD OF WELL (GPM)	METH. DET.	DRAW-DOWN (FEET)	ACCURACY	PUMPING PERIOD (HOURS)	QUALITY OF WATER IRON	SULF.	CHLOR.	HARD	S.P. COND.	TEMP.	DATE SAMPLED	CARD DESIG.
	20 21 22 23	24	25 26 27 28	29 30	31	32	33 34 35	36 37 38	39	40	41	42 43 44 45 46	47	48 49 50 51	52	53 54	55	56 57 58 59 60	61	62 63 64	65	66 67 68	69	70	71	72	73	74 75 76	77 78 79	80
	77	0	3	702		8	XC	939				1427	7	241	D	53	9	104		183			59	29				58	739	B

HYDROGEOLOGIC CARD – C

DUPLICATE CARD A CC 1-19	PHYS-IOG-RAPHY PROV.	SEC.	DRAINAGE BASIN	SUBBASIN	TOPO SETTING	MAJOR AQUIFER SYSTEM	SERIES USGS	SERIES IGS	UNIT	LITH-OLOGY	ORIG.	THICK-NESS	LENGTH WELL OPEN TO	DEPTH TO TOP OF	MINOR AQUIFER SYSTEM	SERIES USGS	SERIES IGS	UNIT	LITH-OLOGY	ORIG.	THICK-NESS	LENGTH WELL OPEN TO	DEPTH TO TOP OF	DEPTH TO CONSOLI-DATED ROCK	SOURCE	DEPTH TO BASEMENT	SOURCE	SURF. MAT. LITH-OLOGY	SURF. MAT. INFIL.	COEF. TRAN. SIG. FIG.	COEF. TRAN. XIO	COEF. STOR. SIG. FIG.	COEF. STOR. XIO–	GEOL. CARDS	CARD DESIG.
	20 21	22	23 24 25	26	27	28	29	30	31	32 33	34	35 36 37	38 39 40	41 42 43	44	45	46	47	48 49	50	51 52 53	54 55 56	57 58 59	60 61 62 63	64	65 66 67 68	69	70 71	72	73 74	75	76 77	78	79	80
	12	B	36	B	F	K	1	D	2	4	V	6			226	70								295	C	724	C	8T	4						C

CASING AND SCREEN (SIZE, TYPE, INTERVALS):

10" CASING TO 677'3"

8" +2.86' TO 701'8"

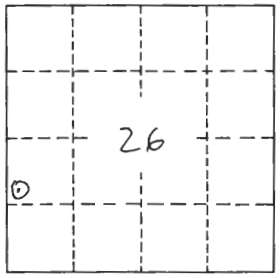
SCREEN 704'4" TO 721'9"

CODED BY D. AARONSON DATE 20 MARCH 1970

PUNCHED BY T DATE

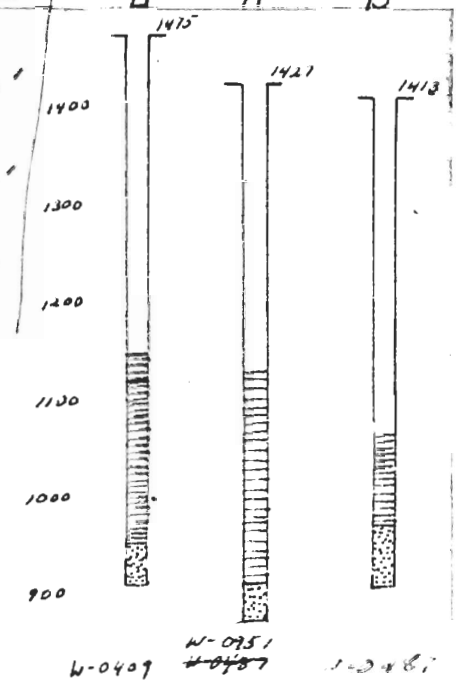
VERIFIED BY DATE

SKETCH ON REVERSE: YES NO ✓



WELL NO. 097-45W-26CBC

	CE	Shale Top	Shale Thick	SS Top	SS Thick
rchwood	1415	1154	109	954	42'
ill	1427	1137	222	915	38'
den	1413	1063	80'	913	60'



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

Town - Well No Owner	Date of coll.	Depth (ft.)	Geol. source	°F	Diss. solids	Fe	Mn	Ca	Mg	K	Na	CO_3	HCO_3	SO_4	Cl	F	NO_3	Hardness cal. as $CaCO_3$ tot.	carb.	non carb.	pH	Cond
Hull Town well No. 2	7/39	770	Cret.	58	2750	1.7	0.2	395	133		154		408	1468	26	1.0	0.0	1534	334	12007.1		

NOTES:

MOORE'S MODERN METHODS

[illegible] Co.

Town Well No. 2

[illegible]

Sheet 1 of 4

May 29 1930

[illegible] 2.2' ft above drillers curb of 1427' mill floor

Time	Feet	Corrs	DD	Elaps. Time	Man. Tube	Prod	Temp A	Temp W	Remarks
May 29									
1:00 A	230	247.6*	241.7						Static level
	250	260.6	257.2						Production sta.
	[illegible]	[illegible]	268.3						
	5:50	266.2	263.0						
	5:55	266.2	263.1						Production increased *
	5:57	268.2	265.1						
	5:59	268.3	265.1						
	6:00	268.4	265.2			48 #			
	6:05	268.4	265.20			44 #			Production * increased
	6:08								
	6:09	270.2	267.0						
	6:10	270.5	267.25						
	6:12	270.7	267.2						Production * decreased Much sand with water
	6:15	269.4	266.2			46 #			
	6:20	267.9	264.7			42 #			
	6:25	267.4	264.2						
	6:30	266.5	263.3			38" = 30 bbl. barrell			Clearing
	6:35	265.4	262.4						
	6:40	264.5	261.3						
	6:50	262.6	259.4			36" = 28 [illegible]			Sand & wa
	7:00	261.6	258.2			40" = 32 [illegible]		54°	
	7:10	260.3	257.1						
	7:20	258.9	255.7			42" = 34			
	7:30	258.0	254.8						
	7:40	257.1	253.9			46" = 38 bbl barrell			
	7:50	256.4	253.2						
	8:00	255.8	252.6			46" = 38 [illegible]			Sand reducing
	8:10	255.4	252.2						
	8:20	255.1	251.9						
	8:30	254.8	251.7			48" = 40 [illegible]			
pm.	8:45	254.5	251.8						
	8:50	254.3	251.1						

* By [illegible] valve on discharge line.

11" CP & discharge 2.2' [illegible] above curb, [illegible] tube.
Point of ref. 2½' above drilling floor.
Bottom of 8 bowls 378 and 1' tailpiece & screen.

Town Well No. 2

Time	Press	Corr.	D.I	Time	Mano Tube	Pitot	Temp A	Remarks
	253.5	250.3					66.82	
9:50	253.6	250.4						Production increased
10:00								
10:01	255.2	252.0			4" = 24			
10:02	255.2	252.0			4" = 24			
10:05	255.3	252.1			5" = 40 R.C.			
10:10	255.2	252.1			5" = 40 M			
10:25	255.2	252.0						
10:45	254.5	251.3						
10:50	254.6	251.4			5" = 40 M		67.52	Water temp G-101
11:00								Prod. inc.*
11:03	255.9	252.7						
11:05	256.	252.9				55.		
11:10	256.1	252.9			4.1" 55	58.5		Water carry very small am of Sand.
11:20	256.2"	252.8						
11:30								Prod. inc.*
11:31	257.8	254.6						
11:33	259.3	256.1			5" 72			
11:35	258.7	255.5			7½" 70	60		
11:40	258.-	255.2						
11:41								Prod. inc.*
11:43	260.9	257.7			7½" 69			
11:44								Prod. inc.*
11:45	263.1	259.9						
11:47	263.2	260.0				57		
11:50	263.2	260.0			7½" 70	56		
pm 11:55	262.7	259.5						
12:00	262.3	259.1						
May 30								
am 12:05	260.1	256.9						Water - Dirty Pump speed changed Gen. off line
12:10	260.4	257.2				57		Water
12:15	259.2	256.1			5" 72	65		Clearer
12:25	258.5	255.3			5" 76	58		
am 12:42	258.6	255.3			5" 76	64		

	Read	Corr	Time	Man Tube	Press	Temp	Remarks
							Production inc*
	259.-	256.2		10-80			
	254.-	256.2		9"-78			Little cond
	259.	256.1		9"-78			
	259.2	256.3		9"-78			
	257.-	256.3					Production * Increased
	260.3	257.0					
	262.2	257.2					
	260.1	256.3		12-80			
	260.3	256.3		1"-82			
	259.3	256.1		11"-78			
	259.1	256.3		11-82			Panel Dome 3" Pauses Elevation
		256.1					Prod. inc *
	260.2	257.2					
	260.3	257.1					
	260.3	259.1					
4:00	260.1	257.9					
4:15	260.1	256.9					
4:18							Prod. inc *
4:19	262.2	259.0		15 97			
4:20	261.9	255.7		15"			
4:25	261.9	255.7		15			
4:45	259.2	256.2		15" 97			
5:00	261.4	258.2		15" 97			
5:15	261.4	258.2		15" 97			
5:30	261.4	258.2		15" 98			
5:35							Proj. inc.
5:36	262.6	259.4		17 104			
5:38	262.1	259.-		104			
5:40	262.5	259.3		17 104			
5:45	262.3	259.1		17 104			

Time	Recd	Sorted	Time	Tube	Prod	Temp	Remarks
7:30							
[illegible]	262.1	258.?					
[illegible]	261.9	258.7					Inc. 1 in. Gravity
[illegible]	262.0	258.5					Producther increase
[illegible]							
6:37	262.5	259.6					
[illegible]	[illegible]	259.7					
[illegible]	[illegible]	257.7					
7:00	262.6	259.4					
7:30	262.4	259.2					
8:00	262.6	259.4					Discharge val opened to full capacity of pu
8:03							
8:04	265.5	262.3					
8:25							Production dec
[illegible]							" inc.
[illegible]							Slug of air increased. Pumped very slow
[illegible]							
			Water		recording inst. out of order.		
8:27	262.7	259.5			2"		
9:03	254.3	251.1					
9:15	252.9	249.7			Air = 3" water		
9:30	252.6	249.4					
9:45	252.6	249.4					
9:50	252.6	249.4					
10:00							Prod. Inc
10:01	253.7	250.5					
10:05	254.3	251.1					
10:10	254.3	251.1					
10:15	254.4	251.2					
10:30	253.7	250.5					
10:45	253.4	250.2			Air 87½-54½		Water c
11:00	253.4	250.2					
11:15	253.3	250.1					
11:30	253.3	250.1					Trace of
am. 11:45	253.3	250.1					
12:00	253.3	250.1					
1:00	253.3	250.1			Air 92-54½ water		G - 20
1:30	253.3	250.1			End.		

Hull, Sioux Co
Town Well No. 2

Construction of well at time of pumping test of May 29-30, 1939, as received from Mr E.K. Peters, driller for the Layne Western Co.

172' of 16" steel casing	from	Surface	to	172'
340' of 12" W.I. "	"	"	"	340'
328' of 10' steel "	"	+2'	"	326'
351' of 10" WI "	"	326'	"	677'
644' of 8" steel "	"	14	"	658'
40'9" of 8" WI, spring screen	"	657'3"		698' *

* During the pumping test the 8" casing slipped downward and at 1:00 pm May 30 the top was 9' lower than it was at the beginning of the test. Several slips appeared to be followed by a high content of clay silt and sand in the water pumped from the well.

Lead seals are reported between 8" and 10" originally at 657'; and between 10" and 12" at 326'.

Will Sioux Co
Town Well

Jan. 25, 1939

R. R. Peters - in charge for Layne Western

Log by driller

Yellow clay	70	0	70	
Gray Sh. very soft		70	75	
Yellow & black		75	120	
Light brown Sh		120	132	
Brown & blue Sh		132	150	
Blue Sh		150	215	
" " Gas @ 220'		215	345	< Water not enough to c with 40'
Gas blowing strong - not burnable				
Lime Shell		348	351	
Blue Shale		351	365	
Broken lime soft		365	403	
Gray lime		403	415	Water 256 SWL.
Cronerost Brown shale		415	513	
Sandstone, soft.		513		SWL. 243
4" coal & iron pyrite				
(see following page.				

Corrected May 29, 193

178' of 16" size 1/2" wall - seals out 4 waters
340' 12" WI from surface (
WI 8" = 46'9" from 656'3 - 697' below seal (seal included) - 12' lap
very bouldery to 220 then 12" put in driven below 2

18' water - dry below to 72
72' "
127
160-170 in sdy. Sh

S.W.L. = 243'6"

10" WI 351' from 326 677 bottom (seal at 328,
10" now + surface but will come out above 32

20'3" of Keystone Layne Bowler 8" WI screen from
no. 676'9" to 698 (17'5" actual screen openings
1/2" holes spaced 1 1/2 centers both ways.
Lead seals

Hull, Sioux Co
City Well No 2

Mo, Da, 1939

Drillers log
Hole sizes
Casing record
Water level record

C. C. Sawyer, Sioux Co. Ino

Drillers log (cont.

Sandstone, muddy, soft	51	570		
" coarse, soft	84	654	SWL 25	
Shale, water head 2nd	16	670		
Sandstone, very fine, soft	10	680		
" coarse, very soft	5	685		
" fine " "	20	705		

Sand report to M. E Harding
Box. 614, Rock Rapids

July 11, 1939.

Sandstone, medium coarse	5	710	SWL 26	
" very "	13	723	" 24	
" fine hard	25	748		
Brown quartz	17	765	768 FD	" 25

See water level at time of pump te

IOWA GEOLOGICAL SURVEY

Constructional features of well No. 2, Hull, Iowa, at the time of the pumping test on May 29-30, 1939, as received from R. R. Peters, driller for the Layne Western Company

172' of 16" steel casing from surface to 172'
340' of 12" W. I. casing from surface to 340'
328' of 10" steel casing from +2' to 326'
351' of 10" W. I. casing from 326' to 677'
644' of 8" steel casing from 14' to 658'
40' 9" of 8" W. I. casing and screen from 657' 3" to 698' *

*During the pumping test the 8" casing slipped downward and at 1:00 P. M. May 30, the top was 9' lower than it was at the beginning of the test. Several slips appeared to be followed by a high content of clay silt and sand in the water pumped from the well.

Lead seals are reported between 8" and 10" originally at 657'; and between 10" and 12" at 326'.

IOWA GEOLOGICAL SURVEY

Results of Pumping Test on Town Well No. 2, Hull, Iowa

May 29-30, 1939

Date and Time	Corrected+ Water Level Reading	Production in G. P. M.	Remarks
May 29 P. M.			
4:30	241.4		Satic level
5:50	257.4		Production started
5:52	263.3		
5:53	263.0		
5:55	263.0		Production increased*
5:57	265.1		
5:59	285.1		
6:00	285.2	45±	
6:05	285.2	44±	
6:08			Production increased*
6:09	273.0		
6:10	271.5		Production decreased*
6:12	267.5		Much sand and silt with water
6:15	265.2	46±	
6:20	264.7	42±	
6:25	264.2		
6:30	263.3	38±	Clearing
6:35	262.4		
6:40	261.3		
6:50	259.4	36±	Sand in water
7:00	258.4	40±	Water 54°. Sand in water
7:10	257.1		
7:20	255.7	42±	
7:30	254.8		
7:40	253.9	46±	
7:50	253.2		
8:00	252.6	46±	Sand reducing
8:10	251.2		
8:20	251.9		
8:30	251.7	48±	
8:40	251.3		
8:50	251.1		
9:20	250.3		Air 60°; Water 52°
9:50	250.4		
10:00			Production increased*

+All measurements corrected to conform to driller's curb which was drilling platform, elevation 1427'.
Productions by monometer tube on 4" pipe, 2½" orifice.

*By valve on discharge line.

Date and Time	Corrected + Water Level Reading	Production in G. P. M.	Remarks
10:01	252.0	56	
10:02	252.0	56	
10:05	252.1	56±	
10:10	252.0	55±	
10:20	252.0		
10:40	251.6		
10:50	251.4	56±	Temp. air 59°; Water 52°
11:00			Production increased*
11:03	252.7		
11:05	252.9	53.5	
11:10	252.9	58	Water carrying very small amount of sand
11:20	252.8		
11:30			Production increased*
11:31	254.6		
11:33	256.1	72	
11:35	255.5	70	
11:40	255.2		
11:41			Production increased*
11:43	257.7	69	
11:44			Production increased*
11:45	259.9		
11:47	260.0		
11:50	260.0	76	
11:55	259.5		
12.00	259.1		
May 30 A. M.			
12:05	256.9		Water dirty, pump speed changed several times
12:10	257.2		
12:15	256.0	72	Water clearer
12:30	255.3	76	
12:45	255.3	76	
1:00	255.3	76	
1:15	255.1		
1:17			Production increased*
1:18	256.2	80	
1:20	256.2	78	Very little sand
1:30	255.9	78	
1:45	256.0	78	
2:00	255.9		
2:02			Production increased*
2:03	257.0		
2:04	257.0		
2:05	256.9	85	
2:10	256.8	83	
2:20	256.6	83	

Date and Time	Corrected + Water Level Reading	Production in G. P. M.	Remarks
2:35	256.5	82	
3:43	256.1		No sand. Some air causes cloudiness
3:45			Production increased *
3:46	257.1	88	
3:48	257.1		
3:50	257.1	92	
4:00	256.9	90	
4:15	256.9		
4:18			Production increased *
4:19	259.0	97	
4:20	258.7		
4:25	258.7	98	
4:45	256.4	97	
5:00	258.2	97	
5:15	258.2	97	
5:30	258.2	98	
5:35			Production increased*
5:36	259.4	104	
5:38	259.4	104	
5:40	259.3	104	
5:45	259.1	104	
6:00	258.9	104	
6:15	258.7	102	No. 1 well started
6:30	258.8	103	
6:37			Production increased *
6:38	259.6	107	
6:40	259.7	107	
6:45	259.7	107	
7:00	259.4	107	
7:30	259.2	106	
8:00	259.4	106	
8:03			Discharge valve opened to full capacity of pump
8:04	262.3	144	
8:05			Production decreased*
8:07			Production increased*
8:15			Slug of dirty material. Pumped very slowly
8:27	299.5	20±	Water level recording instrument out of order
9:03	251.1	94	
9:15	249.7	94	Air 81°; Water 54½°
9:30	249.4	94	
9:45	249.4	94	
10:00	249.4		
10:00			Production increased *
10:01	250.7	111	
10:05	251.1	112	
10:10	251.1	110	
10:15	251.2	114	

Date and Time	Corrected + Water Level Reading	Production in G. P. M.	Remarks
10:30	250.5	113	
10:45	250.2	114	Air 87°; Water 54½°. Water clear
11:00	250.2	114	
11:15	250.1	114	
11:30	250.1	115	Trace of sand
11:45	250.1	114	Trace of sand
12:00	250.1	114	
P.M. 1:00	250.1	114	Air 92°; Water 54½°
1:30	250.1	115	

IOWA GEOLOGICAL SURVEY
Well or Water Sample Data Bottle No. G-20

TOWN: Hull COUNTY: Sioux

LOCATION: NW¼ SW¼ Sec. 26 T. 97 N., R. 45 E. W. Lincoln Twp.

OWNER OF WELL: Town of Hull Well No. 2

USE OF WATER: City Supply (X); Private-Domestic ( ); Public Drinking ( ); Livestock ( ); Industrial ( ); School Supply ( ); Air Conditioning ( ); Cooling ( ); _____ ( ).

CONSTRUCTION OF WELL: Drilled (X); Gravel-Pack type ( ); Driven ( ); Dug ( ); Bored ( ); _____ ( ).

CONTRACTOR: Layne-Western Co, Omaha, Neb. DATE DRILLED: Start Nov. 12, 1938

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the kind, length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.)

WELL DATA:
Curb Elevation 1427 Ft. Present Depth 560* Ft. Final Depth — Ft.

Topographic Position of Well: Upland

Static Level (Depth to Water ~~(Above)~~ (Below) Curb) 266 Ft. Pumping Level _____ Ft.

Amount of Drawdown _____ Ft. pumping at _____ g.p.m. in _____ hours _____ minutes.

Calculated gals. per ft. drawdown _____ g.p.m.

Capacity of Well _____ g.p.m. at _____ ft. drawdown.

Type of Pump Sampled from bailer* . Power — .

Depth of Bottom of Pump — ft. with — ft. of suction pipe.

TEMPERATURE: Air _____ °F.; Water _____ °F., measured after well had pumped _____ hrs. _____ mins. at _____ g.p.m.; _____ ft. from pump after water had passed through the following pipe _____ Time _____ (A.M.) (P.M.)

SOURCE OF WATER: Recent (Type and Depth) _____

Glacial Formations (Type) _____ at _____ ft. to _____ ft.

Limestone or Dolomite (Age) _____ at _____ ft. to _____ ft.

Sandstone (Age) Cretaceous at _____ ft. to _____ ft.

Principal Producing Formation Upper Dakota sandstone

REMARKS: [*Information from Mr. E. C. Reimann]

Sample taken for: Mineral Analysis (X); Sanitary Analysis ( ).
Data Collected by E.C. Reimann for H.G. Hershey ; Date Feb. 23, 1939.
Report Analysis to H. G. Hershey, Iowa Geological Survey, Iowa City.

IOWA GEOLOGICAL SURVEY
Water Analysis Comparison

Town: _____ County: SIOUX & LYON Location: _____ Sec. ____ T. ____ N., R. ____ E. W.

Owner: _____ Contractor: _____ Date Started: _____

Well Number or Location	1 Farmers Co-op Creamery Hull--	2 Boyden-City	3 Hull--City	4 Larchwood-City	5	6
Depth of Sample	317 ft.	500 ft.	1263 ft.	560 ft.		
Formation Source	Kans.&Nebr.	Upper Dak.	Pleistocene			
Water Level Below Curb	241½ ft.	235 ft.		187.7 ft.		
How Sampled	Pumped	Pumped	Pumped	Pumped		
Sampled by	A.C. Tester	H.G.Hershey	Mr. Mark	A.C.Tester		
Date Sampled	Aug.3,1936	Jan.21,1937	Sept.13,'34	Aug.2,1936		
Total Solids	3752.0	2385.0	2667.0	828.0		
Dissolved Solids	----	----	----	----		
Insoluble Matter	58.0	80.0	29.4	43.2		
Alkalinity (MeO)	384.0	304.0	----	256.0		
Nitrite (NO_2)	0.004	0.000	Tr.	0.000		
Nitrate (NO_3)	0.30	0.00	0.0	0.20		
Sodium(Na) & Potassium(K)*	248.30	186.4	233.7	103.08		
Calcium (Ca)	481.60	285.8	264.1	115.76		
Magnesium (Mg)	198.70	91.8	171.0	29.16		
Iron (Fe)	---	---	---	---		
Iron (Unfiltered)**	1.8	2.0	2.0	0.9		
Manganese (Mn)	5.50	0.08	0.1	0.00		
Aluminum (Al)	---	---	2.2	---		
Fluorine (F)	0.0	1.0	Tr.	0.5		
Chlorine (Cl)	15.0	50.0	24.0	64.0		
Sulphates (SO_4)	2021.60	1171.6	1446.0	279.60		
Bicarbonates (HCO_3)	468.48	370.8	419.7	312.32		
Phosphates (PO_4)	0.00	0.00	0.07	0.00		
Borates (BO_3)	2.0	1.0	8.0	2.0		
Calculated Hardness***	2033.0	1095.0	1368.0	411.0		
Water Lab. Number	106,195	110,026	88,437	106,194		

*Na & K not separated, calculated as Sodium(Na): **Includes iron precipitated or flocculated after sample collected: ***Calculated as $CaCO_3$.

ompleted Depth _____ ft.; Final Static Water Level _____ ft.; Production _____ GPM; Draw-down _____ ft., at _____ GPM; Gallons per foot draw-down _____. Date Completed _____ 193_.

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 097-45W-26CBC
Aquifer Code(s) KIDZ
Owner's Name HULL CITY #2 (1939)
W Number 0957

Card Q

State: IOWA (19) (1 2) County: SIOUX (84) (3 4) Town: HULL, IOWA

Well No. Latitude 43 11 25 N (5–11) Longitude 096 08 13 (12–18) Seq. No. 1 (19) Date M D Y 07 11 39 (20–25)

Sampling Depth 770 (26–29) Type 1 (30) Kx10⁶ (31–35) pH 7.1 (36–38) Temp. °F 58 (39–41)

SiO_2 (42–44) Ca 394 (45–49) Mg 133 (50–53) Na +K 1540 (54–58) K .C (59–61) Source No. 3 (79) Q (80)

HCO_3 408 (62–65) CO_3 (66 67) SO_4 1470 (68–72) Cl 26 (73–78)

Card R

Duplicate Columns 1-25 from Card Q

F .10 (26–28) NO_3 0. (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe .17 (42–45)

Mn .20 (46–49) Cu (50–52) Pb (53 54) Zn (55–57)

Solids Determined 2750 (58–63) Calc. (64–69) Hardness Ca,Mg 1540 (70–73) Non-Carb. 1210 (74–77)

Color (78 79) No. R (80)

Card S

Duplicate Columns 1-25 from Card Q

Br (26–28) I (29–31) Alk. as $CaCO_3$ 334 (32–35) Free CO_2 (36–38) SAR (39–41)

RSC (42–44) ABS (45–47) (48–50)

Alpha (pc/l) (55–57) Beta (pc/l) (58–60) Ra (pc/l) (61–63) U (ug/l) (64–66)

No. S (80)

Recorded by: D. AARONSON

Punched by: T Date:

Published:

April 2, 1938

Mr. W. E. Buell
Buell & Winter Engineering Co.
Sioux City, Iowa

Dear Mr. Buell:

Following is a discussion of the possibilities of developing a new water supply for the town of Hull, Sioux County, which has been prepared in response to your request of March 22.

Formations which are encountered at Boyden may be expected at Hull with certain reservations. A generalized log of the Boyden well is as follows:

	Thickness	From (Feet)	To
PLEISTOCENE SYSTEM			
Glacial clay--yellow and light to dark gray, calcareous, with sand and small gravel pebbles	305	0	305
Sand--gray, medium grained, angular	32	305	337
Gravel and sand	13	337	350
CRETACEOUS SYSTEM			
Upper Dakota formation			
Shale--gray, fine textured, non-calcareous	5	350	355
Sandstone--fine to medium grained, angular, well sorted, micaceous	10	355	365
Siltstone--medium gray, coarse textured, non-calcareous ..	15	365	380
Sandstone, medium gray, very fine grained, angular, well sorted, micaceous, silty ..	5	380	385
Siltstone--medium gray, coarse textured	10	385	3[illegible]

Shale--medium gray, homogeneous, non-calcareous	15	395	410
Siltstone--medium gray, coarse textured	30	410	440
Sandstone--light gray, fine grained, well sorted, angular, micaceous	30	440	470
Sandstone--buff, medium grained, angular, well-sorted	10	470	480
Sandstone--buff, fine grained, well sorted angular, slightly micaceous	20	480	500 T.D.

Starting at an elevation of 1433 feet above sea level, which is the approximate elevation of the present town well at Hull, the base of the glacial drift should occur at a depth of 315 feet, and the top of the producing sandstone in the Boyden well should occur at a depth of 458 feet. The bottom of the Boyden well should correspond to a depth of approximately 518 feet in the proposed Hull well, and the sequence of formations should be very similar to those at Boyden except as noted above.

Below a depth of 518 feet at Hull, I would expect a sequence of shales, sandstones and siltstones similar to those above. Accurate information is lacking on these deeper formations, so that a precise forecast cannot be made, but I would expect the Lower Dakota sandstone to begin at a depth of approximately 675-700 feet and continue to about 755 feet. These figures are rough, but if samples of the cuttings are submitted we may be able to give more definite information as drilling progresses below 500 feet. I would suggest that the full thickness of the Dakota sandstone be drilled before the well is finally completed.

The important aquifers are the sand and gravel at the base of the glacial drift at 295-300 feet which is utilized by the Farmers' Cooperative Creamery well at Hull, the Upper Dakota sandstone which is utilized at Boyden, and the Lower Dakota sandstone which I believe can be developed at Hull at an approximate total depth of 750 feet.

For your convenience the analyses of waters from the Farmers' Cooperative Creamery well at Hull, the Boyden city well, the present Hull city well, and the Larchwood city well are assembled on a separate sheet. It will be of utmost importance in the proposed new

well at Hull to case out the upper aquifers, that is, the glacial sand and gravel and the Upper Dakota sandstone. This will probably mean casing throughout and adequate seals or packers at any casing reductions.

Regarding the hardness of water at Hull, several points should be mentioned. We cannot be absolutely sure that the water in the Lower Dakota sandstone is as soft as that from the Larchwood well. However, I believe that it will be considerably softer than that from the present Boyden well. Under ordinary conditions we could safely say that the Lower Dakota sandstone would produce much softer water than that from the present Hull well. However, normal conditions do not exist at Hull because of the old well drilled in 1892. I feel confident that the casing in that well has corroded through in numerous places, and it appears entirely possible that the Lower Dakota sandstone may be taking highly mineralized waters from the upper horizons. This process may have been going on for a number of years, and if that is true the Lower Dakota will produce highly mineralized water for some time, but the hardness should become lower with continued pumping, provided the old well is properly plugged.

The static level of water from the glacial sand and gravel will be 241 feet and that of the Upper Dakota sandstone should be 253 feet. I estimate that the static level of the Lower Dakota sandstone will be 250 feet or slightly higher.

I hope that the above information will be helpful to you. If you have any questions on it or if there is additional data which I can supply, please do not hesitate to call on me.

I trust that a complete set of samples will be saved and suggest that a careful record be kept throughout drilling operations of the water levels and changes in water levels. Water level will be very important in our interpretations, especially in the lower formations.

Very truly yours,

H. G. Hershey

HGH:A
Enc.
CC. E.G. Fiala - July 8, 1938.

BUELL & WINTER ENGINEERING CO.

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ESTIMATES SUPERVISION
APPRAISALS

MUNICIPAL ENGINEERS
INSURANCE EXCHANGE BUILDING
SIOUX CITY, IOWA

SEWERAGE PAVEMENTS
WATERWORKS SEWAGE DISPOSAL
POWER PLANTS

March 22, 1938

Dr. H. G. Horshey
Iowa Geological Survey
Iowa City, Iowa.

Dear Doctor:

The town of Hull, Iowa have retained us to handle the engineering in connection with a municipal well. They desire a well, if possible to get about the same water as we got at Larchwood.

As we understand it the town of Boyden did not go to the second rock formation to get the same water as Larchwood.

Will you kindly give us all information possible as to logs, etc., which you have for the proposed well at Hull.

Thanking you very much for your consideration in this matter, we are

Yours very truly,

BUELL & WINTER ENGINEERING CO.

WEB:EH

By_____

February 20, 1939

Mr. E. C. Reimann
Town of Hull
Hull, Iowa

Dear Mr. Reimann:

Your letter of February 2 has been before me for some time and I am sorry that it has been impossible to reply before now.

Attached you will find copies of the logs of the Larchwood and Boyden wells, together with water analyses on each well.

No analysis was made of waters from the Larchwood well after the consolidated rock was encountered until the present producing formation was reached. However, we have an analysis of water from the Graneros formation as shown by the sample collected from the John Hancock Mutual Life Insurance Company farm well, 3½ miles southeast of Larchwood. A report on this analysis is included here for your convenience, as well as a report on the lower Pleistocene water from the Larchwood well.

Like you, I feel confident that the sandstone which was being drilled when I was last at Hull, is the same as that which furnishes water for the town of Boyden. It does not compare with the first layer of rock at Larchwood, but I am not at all sure that it is the same sandstone as the producing formation in the Larchwood well. To be definitely sure where your sandstone fits into the section of Larchwood, it will be necessary to examine the deeper well cuttings.

If the section in the Hull well is normal I would expect only sandstone and shale below the present bottom of the well, but at the present time I do not

feel well enough informed to say definitely where the next lower water-producing sandstone will occur.

I have heard indirectly that you have had trouble with the well. I hope sincerely that you are out of difficulty by this time.

Very truly yours,

H. G. Hershey

HGH:RV

Memorandum: Dr. H. G. Hershey

Subject: Information regarding the Dakota Sandstone at Hull Iowa

A rather superficial examination of the Dakota as in the Farnwood, Hull, and Boyden wells shows the Hull as to be slightly more coarse and better sorted than in either the Farnwood or the Boyden well, these latter two being both slightly finer in grain and containing more iron material. The initial range per 3 wells is however greater, 4 and 18 mm and cannot be used as a criterion, nor existing mixing between the two wells. The Boyden samples are clean and white whereas the Farnwood and Hull samples are brownish gray. All three are micaceous and pyritic.

The appended card shows depth and surface elevation relationships.

In regard to the request for an analysis of the "soft water" at Farnwood, there appears to have been no test made upon the sandstone was received. This analysis was then requested

2/15/1939 S.

TOWN OF HULL

HULL, IOWA

Feb. 2,1939.

Iowa Geological Survey
Iowa City, Iowa.

Mr? H. G. Hershey

Dear Sir:

Recieved your report and letter relative to well and water.

Would it be possible for us to get a copy of the log on the wells at Larchwood and Boyden, to gether with a water analysis on each, and also an analysis on the first rock water that was tested at Larchwood. Would like to have these for a comparison.

It appears to the writer that this sandstone that we have here at Hull at the present time does not compare with that of Larchwood, but does compare with that of Boyden. Does it compare with the first layer of rock at Larchwood? If so and withthe thickness and deepth of the various kinds of stone and shale between the two sandstones we aught to get some idea as to where we might expect to find the second sandstone here.

The driller has tried without success to drive the 12" caseing down to the 403 foot level. He is going to set 10" case now and then will bail the well . When this is done we will forward the sample of water taken according to your directions. The container is here and trust that it will be in your hands in a few days.

Yours very truly,

E C Reimann.

ECR/G

CC: Layne-Western Co., Omaha, Nebr.; Buell & Winter, Sioux City, Ia.; H. H. Peters, G. E. Demott, and E. C. Heimann, Hull, Iowa

February 1, 1939

Mr. E. C. Heimann
Hull, Iowa

Dear Mr. Heimann:

Your letter of January 24 to the director of the Iowa Geological Survey was referred to me by Mr. A. C. Trowbridge when I returned to the office.

We have studied the samples from the lower portion of the new Hull well and find that the sandstone beginning at 514 feet is the same as that from which the Boyden water supply is obtained. The sandstone in the Hull well is somewhat dirtier than that from the Boyden well, but the two are so nearly alike that the difference may have been caused by the method in which the samples were obtained. A more complete report on the full set of samples will be sent to you in the near future.

A preliminary analysis of the water from the Hull well as shown by the sample which I collected from the bailer at the time of my visit to Hull was sent to you yesterday. You will notice that the mineral content of this water is higher than that shown by the analysis of water from the Boyden well. I believe that the greater hardness was caused by the fact that waters from horizons above the bottom sandstone were entering the well at the time the sample was taken.

A water sample jug and container were sent to you and I trust that you have received them. It will be interesting to know the differences in the composition of the water caused by driving the pipe and possibly shutting off some of the higher, more mineralized waters.

We will not use all of the material in the sample sacks which have been sent to our office and will be glad to save the unused portions so that they may be mounted in a glass tube for your office in Hull.

Please do not hesitate to call on us if we can be of service.

Very truly yours,

HGH:LM

H. G. Hershey

TOWN OF HULL

HULL, IOWA

Jan.24,1939

Director of Iowa Geological Survey
Iowa City, Iowa.

Dear Sir:

We are shipping the samples from surface level to depth of 550 feet of our new well now under construction. Samples are being shipped by express today.

We wish to call your attention to the samples of gray sand that was struck at 514 feet and in which they are still drilling. If possible we would like your report of this sand first. It is the writers impression that this is the aand that they have at Boyden, Iowa. Water from this aand we understand is not very good.

Our water superintendent has sent in for container for water samples but as yet has not recieved same. Would it be possible to have a few of these containers sent to us so we will have them on hand when we reach water which looks pormising?

In the event that all of the material in the sample sacks are not required by your office, we would like to have the remainderb to mount in a glass tube for our office here in Hull.

Thank you for your prompt reply.

Yours very truly,

E C Reimann
Member Water Comm.

ECR/G

CC Mr. G. S. De Mots Clerk.

TOWN OF HULL

HULL, IOWA

March 9,1939

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

Dear Mr. Hershey:

Am sending you today samplew of drillings from 550 ft to 635 feet. Express prepaid.

My we ask that you kindly analyze the sample for 600 feet and also one at about 550 feet as soon as possible and determine if they are from the same kind of rock. It appears to the writer that two different kinds of sandstone may run together here at Hull. From 513 feet to about 570 seems to be one kind of drillings and from 570 to 635(the present depth) seems to be a courser grained sand-stone. It might be well to state that the water stood 271 feet below the curb today after four bailers were taken out.

We have as yet not received the analysis of the water sent in after the casing was driven down.

My we have your prompt reply and also you opinion of the sand stone and the expected water bearing qualities?

Yours very truly,

E C Reimann

ECR/G

TOWN OF HULL

HULL, IOWA

Feb. 24, 1939

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

Dear Sir:

Last evening we shipped you a gallon jug of water and sand which was taken from the bailer off the bottom at 560 feet. Sample was drawn from bailer after it had hung for 1½ hours but it didnot settle much .

Container was sent express prepaid. We hope that this will give a sample of the water coming from the rock between 513feet and 560 ft.

Yours very truly,

E C Reimann.

P.S. Perhaps we had better have another bottle on hand for a sample of the next rock we ~~strick~~ if any below the present drilling.

ECR

TOWN OF HULL

HULL, IOWA

Feb.28,1939

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

Dear Mr. Hershey: Re. Your letter of Feb.25th

Enclosed herewith the repot blank together with a drillers log to date and some other information as to the depth of various waters, casing depths etc.

You will note that the static level of the water in the old well is shown. This was discovered when it became necessary for us to pull the pump casing of the old well for repairs. This differance in water level of the old well looks like it might have something to do with the new one. As it stands now the old well level is 22 ft higher than the water in the new one.

According to the casing levels, and the differance in the static level of the water before the 10" casing was driven , (243 ft) and after the 10" was driven to approx 485 ft (266') (Perhaps had better explain that the 10" casing was driven in the filled hole beforethe bailing took place) looks like our previous assumption was incorrect, as the level is lower now, and we had assumed from the previous rise in level at 513 ft to a 243 ft water level , that the bottom water was forcing its way up and would tend to keep the 403 ft water out of the hole.

Trust that all this mess of words will give you a little light on just what is taking place. If I can gather an further information that will assist you, kindly call on me and will endeavour to get the dope for you.

Yours very truly,

E C Reimann.

ECR/G

March 13, 1939

Mr. E. C. Reimann
Hull, Iowa

Dear Mr. Reimann:

The samples between 550 feet and 635 feet from the new Hull well have been received and studied.

A partial generalized log of the well based on our detailed examination of the cuttings is attached. All of the material is Dakota.

There appears to be a good possibility that the sandstone below 585 feet will produce sufficient water for a town supply. The chief question is in regard to the quality and hardness of the water, and this will depend upon the shale between 580-585 feet as shown by our samples.

Two conditions must be met to make water produced from the sandstone between 585 feet and 635 feet of different composition from that above:

1. The shale 580-585 feet must extend over a wide area around Hull. A shale 5 feet thick is often sufficient to effectively separate two waters, although a thicker separating stratum is more effective and more desirable. There is no way of knowing whether the shale under consideration becomes too thin to separate the upper water and that between 585 and 635 feet in the vicinity of Hull.

2. The well must be constructed in such a way as to prevent water above 580 feet from entering the well. The particular danger here is that the shale will not form a seal around the casing and water from above will leak down between the walls of the hole and the casing. The driller will know if the upper water can be effectively shut off.

If this is possible I suggest that a temporary shut off be made and a pumping test be run on water from the sandstone at 585-635 feet, and after the well has been completely pumped out a water sample be taken for mineral analysis.

Before this is done I think it would be advisable to drill the complete thickness of the sandstone. That is, to continue drilling below 635 feet until the next lower shale formation is encountered.

You will undoubtedly want to discuss this whole matter with the engineers and with the driller before final decision is made.

If any of the above points are not clear or if additional considerations present themselves, please do not hesitate to let me hear from you.

If a pumping test is decided on, I will appreciate it if you will let me know as far in advance of the test as possible. I will then make every effort to get away from Iowa City to be present for the full duration of the test and to collect the water sample.

Very truly yours,

(signed)

H. G. Hershey

HGH:RV
Enc.

C.C. sent to Mr. Walter E. Buell, Buell & Winter Engineering Co., Insurance Exchange Building, Sioux City, Iowa.

March 31, 1939

Mr. E. C. Reimann
Hull, Iowa

Dear Mr. Reimann:

Your telegram "Test abandoned sand too fine rises in casing" was received late last night when I returned to the office.

I am extremely sorry to hear of this difficulty and hope that it will not prove serious in the development of the best water available at Hull. I shall be glad to have the details of the attempted pumping test if you can conveniently write me concerning them. The casing and other constructional features of the well at that time will be of much interest.

Your courtesy in getting word to me so promptly is much appreciated, particularly because I was putting forth considerable effort to complete other pressing work here at Iowa City in anticipation of the trip to Hull.

Sincerely yours,

HGH:LM

H. G. Hershey

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SYMBOLS

DL = Day Letter
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Received at 110 East Washington St., Iowa City, Iowa. Dial 3141

MRF40 8 XC=HULL IOWA 30 1052A

1939 MAR 30 AM 11 26

H G HERSHEY=

IOWA GEOLOGICAL SURVEY IOWACITY IOWA=

TEST ABANDONED SAND TOO FINE RISES IN CASING=

E C REIMANN.

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

TOWN OF HULL

HULL, IOWA

April 5,1939

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

Dear Mr. Hershey:

Am sending you a sample of sand form 680-685 which looks to the driller as if we are is something which aught to proove good.

At the presnt time the well is cased to the top with 10" pipe to a depth of 659 feet , bottom of the pipe in the shale.

~~xxxx~~ Shale extends down to 670 feet and then this sand starts from 670 to the 685 feet the present bottom. Will not be able to tell you the static head until to morrow.

The driller is wondering if it would be a good idea to drive the 10" casing into the shale a little deeper than it is now. What would be your opinion on this matter?

Will you kindly analyze the sand and let us hear from you. More details later. Thank you in advance.

Yours very truly,

E C Reimann

14

24 Shale Hard

TOWN OF HULL

HULL, IOWA

March 27m1939

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

Dear Mr. Hershey:

We have ordered a test run on the well at about 600 feet. The present casing depth is 584 feet and the static head this morning was 283 feet below the curb.

We do not know at this time just when the pump will be set and ready for the test but presumablly the latter part of this week. We would appreciate it very much if you can arrange to be present and lend us what assistance you can in obtaining accurate information regarding the water supply.

We will wire you upon word from the Layne Western Co as to the exact time of the test.

Thank you for your cooperation.

Yours very truly,

E C Reimann

ECR/G

Subject: Report on detailed study of sample from 680'-685' in Hull city well #2, sent in by Mr. Reimann, April 5, 1939

Analyst: W. C. Schuldt

Date: 4/10/39

Following is a detailed description of the sample:

> Sandstone, consisting of very coarse sand to small pebbles, with no medium or fine sand, and very poorly sorted in the coarse range, angular, subangular, and curvilinear, composed of 50% clear to somewhat milky quartz, 20% yellow tinted quartz, 20% pink tinted (and in some cases pink coated) quartz, and 10% miscellaneous, among which are brown chert, traces of slightly porous greenish chert, pyrite cemented coarse sandstone, hard vitreous pink quartzite, and pink quartzite with grains coarse and definitely distinguishable.

The general position of this sand in the section indicates Lower Dakota Sandstone (see strip log), and the general coarseness of the material indicates the lower conglomeratic phase of this unit. However, the relatively small percentage of chert and the comparative angularity of the individual grains do not coincide with this conclusion unless the conglomerate in this area is altered in character by proximity to the outcrop area of the Sioux Quartzite.

There is also the possibility that material is Sioux Quartzite, derived from a somewhat less metamorphosed phase of that unit. Beyer in his report on the Sioux Quartzite and associated rocks of Iowa states that such phases exist.

A study of the accompanying sheet containing a resumè of the information regarding the Pre-Cambrian in Lyon and Sioux Counties as obtained from well records, will indicate a third possibility; namely, that of strata of possible equivalence to the Red Clastics of eastern Iowa, as indicated by the record of an old city well at Hull.

However, under any one of the three possibilities outlined above, the base of the Dakota sandstone has been reached or is very near, and beyond the fact that it might be advisable to drill through this material into the underlying strata, further drilling is not recommended.

TOWN OF HULL

HULL, IOWA

May 19,1939

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

Dear Mr. Hershey:

For your information the well drillers started setting the screen and pipe in the well yesterday and at noon today they had a little over 400 feet set.

The driller told me that he expected to have all the casing set, the well cleaned out and the pump set ready to run the test by Thursday of next week and that they expected to run the test starting Friday May 26th.

As the work progresses and when the pump is about half set I will wire you to that effect.

Trust that you will be able to arrange to be here on the ground when the test is run.

Yours very truly,

E C Reimann

ECR/G

June 17, 1939

Mr. R. W. Brooks
Layne-Western Company
807 World-Herald Building
Omaha, Nebraska

Dear Mr. Brooks:

Thank you very much for your letter of June 16 in regard to the most recent developments at Hull.

The samples in the lower portion of this hole will be extremely valuable to the Iowa Geological Survey and I trust that Mr. Peters will continue to save samples with extreme care.

It may be possible for me to be in Hull when the next pumping test is run. I will appreciate it, therefore, if you will let me know as far in advance of the pumping test as possible. If I cannot be present, I will do what I can to have the analysis rushed through the State Water Laboratory and will report to Mr. Reimann by telephone just as soon as I receive this report.

The matter of static level in the Hull well is rather disconcerting. After the last test and upon my return to Iowa City, I checked my measuring line with a steel tape and feel confident that my measurements were not off as much as ten feet. However, that is possible and I will check the line again in an attempt to find out where the discrepancy in measurements occurred. I will be very glad to know what your measurement is after the present drilling is completed.

Very truly yours,

HGH:LM

H. G. Hershey

Phone JAckson 6544

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THROUGHOUT THE COUNTRY

June 16, 1939

Dr. H. G. Hershey
102 Geology Building
Iowa City, Iowa

Dear Dr. Hershey: Subject: Hull, Iowa

At a meeting with the town council at Hull on Wednesday of this week it was decided that we would drill on down to the quartzite, which is expected at about 775' as we understand it. Our instructions were to go not more than 800' and to stop as soon as hard rock was encountered.

We will no doubt be sending you another test of this well the latter part of next week and we would certainly appreciate anything that you can do to hurry this analysis along. The delays in waiting for these analysis are quite costly to us and if there is anything that we can do to hurry them through, of course we will be more than glad to cooperate. If after the next alanysis is run you would call Mr. Reiman on a reverse call at Hull and give him the results of the analysis, I believe it would save us a couple of days time.

For your information, the remainder of the test was run at 120 GPM with a drawdown of 9'. Apparently there has been an error some place in measuring the static water level in the well. Our driller, Mr. Peters, measured it both before and after the test and insists that it is 253'. In view of this fact I asked Mr. McGowan, our pump installer, to measure the static level and he also reported 253'. We will check this again when we finish drilling this time.

Yours very truly,

LAYNE-WESTERN COMPANY

R. W. Brooks

RWB:AI

TOWN OF HULL

HULL, IOWA

June 10,1939

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

Dear Mr. Hershey:

Learned from Mr. Brooks this A.M. that you had not run the last sample of water which was sent in by express, but that you are putting it thru now. Perhaps I assumed to much in figuering that the Water Data sheet would not be necessary as you had all the information as to the casing , depth etc. Never the less am enclosing one now if its is or can be of any use to you.

In answer to the question as to the static head after pumping, will say that it was 253 feet below the curb. This is exactly the same as it was before the pumping test was run.

It was my understanding that you made the statment that the last sample of water taken was the one that you would go by in the determination as to the quality of the water. We have been waiting for the results of the test as a whole with your opinion on the well amd the courese that you would recommend be followed.

From what Mr. Brooks said it would be the middle of this comming week before we could expect the results from the last water sample. If it is possible we would like to have them by that time as we are waiting to read your report beforen we make any discission as to the drilling deeper etc. Will you kindly advise just what we can expect to find by going deeper and what portion of this well compares with Larchwood sand, also advisability of attempting to finish the well at some other depth. When I last talked with you, I understood you to favor going down to the 775 foot depth, and set the casing on the rock with about 5' of drilled hole in the rock.

Will await your reply and thanks for your cooperation.

Yours very truly,

ECR/G

ECReimann

June 12, 1939

Mr. E. C. Reimann
Hull, Iowa

Dear Mr. Reimann:

I have just received your letter of June 10 after having mailed a letter to you in regard to the 16-inch casing in the Hull well and water level and pumping data at the time the last water sample was collected. I am very sorry that there was a misunderstanding in regard to the sample which you collected on May 31 and sent in. The analysis of that sample should be completed later today and I will either include it with this letter or sent it under separate cover.

I am somewhat surprised to learn that the static water level of Hull Well No. 2 is 253 feet below the curb. I measured the static water level before the pumping test began as 241.4 feet. This is the corrected reading. The last reading that I took at 1:30 P. M. on May 30 while the well was producing 115 gallons showed a water level of 250.1 feet. Could it be possible that there is a 10-foot error in the static level of 253 feet?

We have just received the partial analysis of the sample which you collected on May 31. It varies only a little from the analysis of water which I collected at about twenty-three hours previously. The calcium is exactly the same, the magnesium and calculated hardness are higher and the iron is somewhat lower than the earlier analysis. However, these changes may be considered negligible.

By going deeper I would expect the Dakota sandstone to continue until a depth of approximately 775 feet is reached. At that depth the Sioux quartzite should be encountered. We find very often that the lower portion of the sandstone becomes coarser, and by drilling deeper in Hull Well No. 2, it is my opinion that a coarse-grained sandstone will be encountered immediately above the Sioux quartzite which will do away with the possibility of the well pumping fine sand in the future.

Mr. H. C. Reimann:

Naturally it is impossible to say definitely that the sandstone will become coarser.

If the fine sandstone should continue to the top of the Sioux quartzite it may be worth while to continue drilling a short distance into the quartzite in an attempt to locate a crevice which would allow water to pass and yet keep out the sand. Quartzite, of course, is extremely hard and it would not pay to go any appreciable distance into it. The distance to which it would be practicable to drill will depend in part upon the hardness of the quartzite at Hull.

In reply to your question regarding the position of the Larchwood aquifer in the Hull well, it is my opinion that the Larchwood well obtains water from a horizon at approximately 585 feet in the Hull well. However, I have talked with Mr. Brooks about the possibility of finishing the well above the present bottom and it was his opinion that the sandstone was too fine to screen. Apparently the only possibility of making a well is at the present depth or in some deeper horizon.

If you have any questions or if I can be of further assistance in helping you come to a final decision, please do not hesitate to call on me.

Very truly yours,

HGH:LM
Enc.

H. C. Hershey

DC: Mayor K. C. Sheldon
R. T. Brooks
M. E. Harding
W. L. Buell

TOWN OF HULL

HULL, IOWA

June 30,1939

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

Dear Mr. Hershey:

Ysterday I expressed the samples of drillings to you range from 585 to 750 feet.

Herewith is a special sample, which we would like to know what it is, right a way. The water bailed put was brown .
This sample is from about 751 to the present depth of 756 and is axxording to Mr. Peters HARD ROCK.

The water level is about 257 below curb now, It has varied a little at one time coming up to 247 and then down to 259.

Let us hear from you soon as you get the dope on the sample, and if possible look over the other samples sent by express. particularlly the course one and the white one.

Will write more details later.

Thank you for your cooperation.

Yours very truly,

E C Reimann,

225'

July 8, 1939

Mayor K. C. Sheldon
Hull, Iowa

Dear Mayor Sheldon:

Your telegram of July 7, "Will start pump test at Hull Monday Come if possible" has been received, and I replied by telegram as follows: "Impossible for me but Robinson will reach Hull Tuesday morning".

I am very sorry that it is impossible for me to attend the pumping test, but Mr. T. W. Robinson, Engineer in Charge of Ground Water Investigations in Iowa, has kindly consented to make these measurements for us.

Mr. Robinson plans on leaving Iowa City on Monday and should arrive in Hull early Tuesday morning. It will not be necessary to hold the pumping test until his arrival. In fact, it would be our suggestion that the pumping test be started after an accurate water level measurement has been taken, and when Mr. Robinson arrives he can make several pumping level measurements before the well is shut off. He will also wish to observe the recovery of the water level after the well has stopped pumping.

It may be necessary for Mr. Robinson to return to Des Moines by Wednesday, July 12, and in that case it would be most satisfactory to him if the end of the pumping test would come on Tuesday morning, soon after his arrival. Of course, it may not be possible to arrange the test in this manner.

Mr. Robinson will take a water sample for us and the report will be made to you just as soon as possible.

Very truly yours,

HGH:m

H. G. Hershey

Phone JAckson 6544

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THROUGHOUT THE COUNTRY

September 22, 1939

Dr. H. G. Hershey
103 Geology Building
Iowa City, Iowa

Dear Dr. Hershey:

Thanks for your letter of September 19 and the water analysis results on Hull, Iowa.

We tested the well again last week but were unable to clear up the sand. The well had a .018 screen and still continued to pump a very large quantity of sand during the 66-hour test. It is quite apparent that during this test the shale above the sand caved down thus sealing off a large part of the screen.

They are going to try once more to get back around 600'.

Yours very truly,

LAYNE-WESTERN COMPANY

R. W. Brooks

R. W. Brooks

RWB:AI

September 26, 1939

Mr. R. W. Brooks
Layne-Western Company
807 World-Herald Building
Omaha, Nebraska

Dear Mr. Brooks:

Thank you for your letter of September 22 concerning the results of the latest pumping test at Hull.

I am very sorry to hear that the test was not satisfactory and that it will be necessary to do more work before another test is held.

I will appreciate it if you will keep me informed as to the progress of the project.

Very truly yours,

H. G. Hershey

HGH:KN

To: H.G. Hershey

From: D.A. Davis

Subject: Sample of sand pumped from Hull City well No. 3

Date: April 10, 1942

Two samples of sand were received from E.J. Marzec, one marked "Sand being pumped from well" and the other marked "Sandstone from above concrete seal".

"Sand being pumped from well" - Sand, mainly quartz grains, about 3% mica flakes. Quartz grains are angular to curvilinear, some polished, some slightly frosted. Some casing scale in sample.

Size grades:

1/2-1/4 mm.	-	20%
1/4-1/8 mm.	-	35%
1/8-1/16mm.	-	35%
1/16-1/32mm.	-	10%

"Sand from above concrete seal" - Sand, mainly quartz, trace of pyrite. Grains angular to curvilinear, mostly polished.

Size grades:

1-1/2 mm.	-	74%
1/2-1/4 mm.	-	25%
1/4-1/8 mm.	-	1%

August 18, 1958

Mr. L. A. Peter
Buell and Winter
Insurance Exchange Building
Sioux City 1, Iowa

Dear Mr. Peter:

This is in response to your request for information about Hull Town Well No. 2, Sioux County, Iowa.

A well 75 feet away from this well would be expected to encounter practically the same conditions. Hull City Well No. 2 was drilled to a total depth of 770 feet and encountered what is tentatively called pre-Cretacious material at 730 feet and the Precambrian at 760 feet below land surface. Little is to be gained by drilling deeper into the Precambrian except that a crevice may be encountered that will yield some water to the well. Such an occurrence cannot be predicted.

The well was cased with 8-inch pipe from the surface to 702 feet and screen was set opposite the lower and coarser Dakota sandstone. The static water level was 242 feet and pumping at 114 gallons per minute caused a drawdown of 15 feet.

There may be some interference between the old well and the proposed well if they are pumped simultaneously. However, as the old well had a rather high specific capacity this should not be a serious matter.

Enclosed is a copy of the log of Hull Town Well No. 2 and a mineral analysis of water from that well. I hope this brief discussion will aid you; and if there are any other questions, please call on me.

Very truly yours,

H. G. Hershey

OVE:t
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CONSULTING ENGINEERS
L. A. Winter
L. A. Peter

Insurance Exchange Building SIOUX CITY 1, IOWA

August 12, 1958

Iowa Geological Survey
State University of Iowa
Iowa City, Iowa

Re: Deep Water Well: Hull, Iowa

Gentlemen:

We are presently preparing specifications for a new water well for the Town of Hull, Iowa.

The present well was constructed in 1940, however, we have been unable to find any records or copy of log in our file.

We will greatly appreciate receiving from you a copy of the log of this well and any recommendations which you may care to make in regard to the water bearing stratas at this location. Tentatively, the new well will be approximately seventy five feet east of the existing well.

Very truly yours,

BUELL & WINTER, ENGINEERS

By L. A. Peter
L. A. Peter

LAP:djd