WRD Exp. (GW)
Aug. 1964

U. S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

Record by D MARONSON Source of data FILE Date 7/20/65 Map OAKLAND, IOWA 1:24,000

State IOWA [16] County (or town) POTTAWATTAMIE [78]

Latitude: [41 18 36 N] Longitude: [095 29 00] Sequential number: [1]

Lat-long accuracy: [2] T 75 N, R 40 W Sec 12, NE ¼, NW ¼, SW ¼ 5

Local well number: [075 40W 12 c b a] Other number: B & M W-0213

Local use: [002 13 18 CITY] Owner or name: OAKLAND DEEP CITY WELL

Owner or name: [OAKLAND IOWA] Address: OAKLAND, IOWA

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [M]

Use of water: (A) Air cond, (C) Comm, (D) Dewatering, (F) Fire, (H) Dom, (I) Irr, (N) Ind, (P) PS, (S) Stock, (Insti:), (U) Unused [P]

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

DATA AVAILABLE: Well data [1] Freq. W/L meas.: INTERMITTENT [I] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: COMPLETE [C]

Freq. sampling: INTERMITTENT [I] Pumpage inventory: yes / no; period: [ ]

Aperture cards: [ ] yes

Log data: DRILLER'S LOG [D]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 1936 ft [1936] Meas. rept [ ]

Depth cased; (first perf.) 1936 ft [1936] Casing type: STEEL; Diam. 16 in [16] accuracy [ ]

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

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [ ]

Date Drilled: 1918 [9 1 8] Pump intake setting: 230 ft [2 3 0]

Driller: THORPE BROS. name, DES MOINES, IOWA address

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

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

Descrip. MP LSD ft above/below lsd, Alt. MP 1077

Alt. LSD: 1077 [1 M 7] Accuracy: (source) ALTIMETER [7]

Water Level 92 ft above/below MP; Ft above/below lsd [92] Accuracy: REPORTED [3]

Date meas: 1918 [1 8] Yield: 150 gpm [150] Method determined [ ]

Drawdown: 66 ft [66] Accuracy: REPT. [6] Pumping period [ ] hrs

QUALITY OF WATER DATA: Iron 27.0 ppm [9] Sulfate 682 ppm [3] Chloride 242 ppm [3] Hard. 282 ppm [6]

Sp. Conduct 2840 K x 10^6 [6] Temp. 68 °F [68] Date sampled FEB, 1962 [2 6]

Taste, color, etc. TYPED WITH YELLOW-GRAY COLOR AND WITH FINNY DARK SPHERULES PARTICLES IN RECEIPT IN LAB.

075-40W-12 cba

Well Number 41 18 36 (N/S) 095 24 00
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: CENTRAL LOWLAND [I2] | Section: DISSECTED TILL PLAIN [E] | Drainage Basin: NISHNABOTNA [35D] | Subbasin: [ ]

Topo of well site: (D) (F) (H) (S) (T) (V) local depression, flat surface, hilltop, hillside, terrace, valley flat, [V]

MAJOR AQUIFER: DEVONIAN, system; MIDDLE, series; [D2] VAPSIPINICON, aquifer, formation, group [MW]

Lithology: DOLOMITE [D] Origin: MARINE [6] Aquifer Thickness: 85 ft

Length of well open to: [85] ft Depth to top of: 1840 ft [AE]

MINOR AQUIFER: [ ] system, [ ] series, [ ] aquifer, formation, group [ ]

Lithology: [ ] Origin: [ ] Aquifer Thickness: [ ] ft

Length of well open to: [ ] ft Depth to top of: [ ] ft [ ]

Intervals Screened: [ ]

Depth to consolidated rock: 62 ft [62] Source of data: DRILLER'S LOG [D]

Depth to basement: [ ] ft [ ] Source of data: [ ]

Surficial material: SANDY TILL [RT] Infiltration characteristics: POOR [4]

Coefficient Trans: [ ] gpd/ft [ ] Coefficient Storage: [ ]

Coefficient Perm: [ ] gpd/ft²; Spec cap: 2.2 gpm/ft; Number of geologic cards: [ ]

CASING:

65' OF 16" PIPE 0-65'

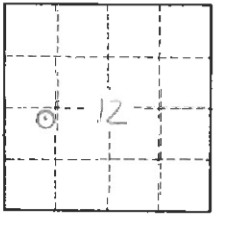
12" TO 460'

10" TO 960'

8" TO 1090'

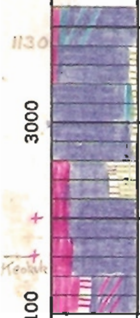
7" TO 1608'

5" TO BOTTOM



Oakland City Well W-0213

2900



Dolo, crm, dnse, calc; dolo, brn, fn gran; cht, ltgr, op
lt brn, v. fn, gran; Cht, ltgr, mot, subtransl

XX

3000

Dolo drb, fn xtln-gran

Cht ltgr, subtransl, conch

mot brn, fn gran-xtln

Cht, brn mot wh

Dolo, dk brn fn xtln

Cht, brn mot wh, much grease, bnded

3100

3200

3300

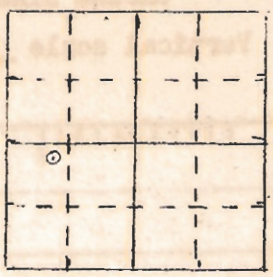
3400

3500

Oakland (Pottawattamie)
Oakland City

IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey

W-0213



RECORD OF WELL

Location:

Town: Oakland (N E / S W); County Pottawattamie

NE¼ NW¼ SW¼ sec. 12 T. 75 N., R. 40 W. Belknap Twp.

Well name and number Oakland deep city well

Owner City of Oakland Address

Tenant Address

Contractor Thorpe Bros. Well Co. Address Des Moines

Drillers

Drilling dates 1917-1918

Well data:

Elevations: Drilling curb 1077 feet; Land surface feet

Determined by

Topographic position small valley

Total depth: Reported 1936 feet; Measured feet

Drilling method

Hole and casing data 65' of 16-inch casing to 65', 12" casing to 460', 10-inch casing to 960', 8-inch casing to 1090, 7-inch casing to 1608' and 5-inch casing to 1936'

(Give amount, size, kind, and depth of all casing; type and position of seals and packers; cementing; how finished--perforated pipe, screen, gravel pack, open hole, etc.)

Original depth to water 92 ft. above below Land Surface Date 1918

Original elevation of water level 985 ft.; Source of data Vol 33 I.G.S.

Sources of water: Principal 1840-1925; Others only seeps found above

Production data: Date _____

Static depth to water 92 ; Measuring point Land Surface?

Pumping level 158 at 150 g.p.m.

_____ _____

_____ _____

_____ _____

Specific capacity 2.3 g.p.m. per ft. drawdown; Temperature _____ °F.

Pump data: Type pump _____ ; 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 _____

WATER ANALYSES (in parts per million)

Date sampled				
Sampled by				
Total solids				
Insoluble matter				
Alkalinity (Meo)				
Alkalinity (Phn)				
pH				
$Fe_2O_3+Mn_2O_3+Al_2O_3$				
Alkali as sodium				
Calcium				
Magnesium				
Iron (unfiltered)				
Manganese				
Nitrate				
Fluoride				
Chloride				
Sulphate				
Bicarbonate				
Hardness (ppm)				
Hardness (gpg)				

Remarks _____

Laboratory data: Sample storage location _____

Sample range 1150-1932 No. spls. 75 No. dupls & cond. _____

Spls. prepared by _____ Washed range _____ by _____

Driller's log and cond. _____

Insoluble residues: Prepared by _____ Studied by _____ Strip log _____

Microscopic study Clins strip log _____

Gen. log _____ Correl. by _____

Casing record at Oakland City well

T.D. 1936. drilled 1917-18.

65' of 16-inch pipe 0-65'
12-inch to 460 feet
10-inch to 960 feet
8-inch to 1090 feet
7-inch to 1608 feet
6 inch to bottom

No water except seep until 1840 where for 30' cuttings washed away.

Water 1840 to 1925' Equiv. 2070 to 2155

SWL 92 ft

Pumping test 150 g.p.m with 66 ft dd. with cylinder at 2301'

STATE OF IOWA
IOWA GEOLOGICAL SURVEY
GEOLOGY ANNEX
IOWA CITY

OAKLAND, POTTAWATTAMIE COUNTY

Well curb - 1077

The city well, drilled by the Thorpe Brothers Well Company of Des Moines, is 1936 feet in depth and its diameters are from 16 to 7 inches. The well is cased with 16 inch pipe to 65 feet, 12 inch to 460 feet, 10 inch to 960 feet, 8 inch to 1090 feet, 7 inch to 1608, and 5 inch to the bottom. The well was drilled in 1917-18.

"No water except seep was found until the depth of 1840 feet was reached where for 30 feet cuttings were washed away. Water was found in this bed of creviced dolomite from 1840 to 1925 feet. The static level is 92 feet from the surface and at the final test pumping at the rate of 150 gallons per minute produced a draw down of 66 feet with the cylinder at 230 feet." The cost of the well was $16,875

Driller's log and Record of strata

	Depth in feet
Pleistocene and Recent (62 feet thick; top 1077 feet above sea level):	
"Sandy clay"	0-10
"Sand"	10-35
"Sandy clay"	35-62
Pennsylvanian:	
Missouri series (393 feet thick)--	
"Lime rock and shale"	62-455
Des Moines series (635 feet thick)--	
"Shale with streaks of sandstone"	445-1090
Mississippian and other formations (top 12 feet above sea level):	
"Limestone"	1090-1486
Limestone, light yellow-gray and light blue-gray, rapid effervescence in cold dilute HCl; flakes and poorly rounded grains of limpid quartz; whitish cryptocrystalline silica; cuttings in sand and powder	1130
Limestone, gray, rapid effervescence	1140
Limestone, gray, fine grained, rapid effervescence, buff, moderately rapid; a little blue shale in minute chips, siliceous with irregular grains and minute particles of clear quartz and cryptocrystalline silica	1150
Limestone, blue-gray, effervescence moderately rapid; white, crystalline, rapid reaction, fine-grained, a little shale	1160

	Depth in feet
Shale, greenish, calcareous; limestone, effervescence rapid, blue-gray; chalcedony and clear quartz; a little brown shale	1170
Limestone as above; silica as above; a little shale	1180
Limestone, blue and brownish gray, effervescence moderately rapid, argillaceous; dark flint, chalcedony; 3 samples	1190-1210
Limestone, light brown, hard, siliceous, response slow; some rapid; silica as above	1220
Limestone, as above; some green shale; pyrite	1230
Shale, greenish, calcareous, in chips	1240
Limestone, light gray, response rapid; shale in minute chips; whitish silica; pyrite	1250
Limestone, gray, rapid reaction; white silica; black fissile shale at 1260 and 1280; 3 samples	1260-1280
Shale, drab; white chalcedonic silica; limestone, gray	1290
Shale, dark drab, fissile	1300
Shale, as above; limestone	1310
Limestone, response rapid; chert; chalcedonic silica; shale; pyrite	1320
Shale, blue	1330
Limestone, buff, in sand; chips of shale	1340
Shale and limestone, light buff, in fine sand; limpid quartz and cryptocrystalline silica	1350, 1360
Shale, blue, in powder; some limestone and cryptocrystalline silica; 3 samples	1370-1400
Limestone, buff, moderately rapid reaction; much cryptocrystalline silica in minute flakes and crystalline quartz in microscopic particles	1410
Sandstone, fine, grains imperfectly rounded	1420
Shale, blue, in chips	1430
Limestone, effervescence rapid, buff; cryptocrystalline silica and quartz	1440-1450

	Depth in feet
Limestone, light yellow-gray, rapid response, a little silica as above	1460
Shale, blue, in fine sand	1463-1467
Limestone, light buff, effervescence rapid; sandstone, some shale	1470
Limestone, light buff, slow effervescence	1480
Driller's log; "shale (Kinderhook?)"	1486-1583
Limestone, light buff, some slow, some rapid reaction; chalcedony and quartz sand; shale in powder and chips	1500
Shale, light blue, calcareous; 2d sample at	1500
Shale, blue, calcareous; 4 samples	1510-1540
Limestone, light yellow-gray, effervescence rapid; some chips of shale	1550
Limestone, as above; shale, blue, some bright green	1560
Limestone, as above, in flaky chips, earthy	1570
Limestone, as above, in small chips	1580
Limestone, gray, some whitish, rapid effervescence	1590, 1600
Dolomite, light blue-gray, crystalline	1610
Limestone, light buff and whitish, effervescence rapid, called "hard" by driller	1620
Limestone, buff, in fine sand, some rapid effervescence, some darker and rather slow, considerable residue of quartzose microscopic particles and some grains of limpid quartz; blue shale, pyrite	1630
Limestone, gray, reaction moderately rapid, "hard"	1640
Limestone, blue-gray, moderately slow reaction, argillaceous	1650
Limestone and shale, limestone brown, moderately slow reaction	1660
Shale and limestone, blue-gray, reaction slow; at 1680 also white and gray cryptocrystalline silica and microscopic quartz particles	1670, 1680
Dolomite, light blue and gray, cuttings in fine sand and flour, much chalcedonic silica and some fine quartz sand; 3 samples	1690, 1710

	Depth in feet
Shale, blue-gray, with dolomite and silica as above	1720
Silica, white, chalcedonic; whitish limestone of rapid effervescence; fine quartz sand; all in powder and sand	1730
Shale, light blue-gray, siliceous as above, calcareous	1740
Dolomite, in powder and fine meal; shale, light blue-gray, in powder, quartzose	1750
Dolomite, gray, in fine crystalline sand; cuttings blue-gray in mass from argillaceous powder	1760
Dolomite, buff and gray, in fine crystalline sand; 6 samples	1770-1820
Dolomite, light yellow-gray; some flakes of blackish fossiliferous shale, inflammable, similar in appearance to that at 1280	1830, 1840
No samples, "drillings washed away"	1840-1870
Dolomite, subcrystalline, light yellowish and light brownish gray, in chipsl some shale as above	1870
Dolomite, and some magnesian limestone of rather slow effervescence; light yellow-gray; considerable calcite	1927
Dolomite, light buff, in clean fine meal	1932

Griley (Son)
Ci. Com., Shenandoah

Oakland, Pottawattamie County
(~~Altitude 1102 feet~~)

Copied from I.G.S. Vol 33, pp. 296-298

The city well, drilled by the Thorpe Brothers Well Company of Des Moines, is 1936 feet in depth and its diameters are from 16 to 7 inches. The well is cased with 16 inch pipe to 65 feet, 12 inch to 460 feet, 10 inch to 960 feet, 8 inch to 1090 feet, 7 inch to 1608, and 5 inch to the bottom.

No water except seep was found until the depth of 1840 feet was reached where for 30 feet cuttings were washed away. Water was found in this bed of creviced dolomite from 1840 to 1925 feet. The static level is 92 feet from the surface and at the final test pumping at the rate of 150 gallons per minute produced a drawdown of 66 feet with the cylinder at 230 feet. The cost of the well was $16,875.

Driller's log and Record of strata

	Depth in Feet
PLEISTOCENE AND RECENT (62 ft. thick; top 1102 ft. above sea level);	
"Sandy clay"	0-10
"Sand"	10-35
"Sandy clay"	35-62
PENNSYLVANIAN:	
Missouri series (393 feet thick)	
"Lime rock and shale"	62-455
Des Moines series (635 feet thick)	
"Shale with streaks of sandstone"	455-1090
MISSISSIPPIAN AND OTHER FORMATIONS (top 12 ft. above sea level)	
"Limestone"	1090-1486
Limestone, light yellow-gray and light blue-gray, rapid effervescence in cold dilute HCl; flakes and poorly rounded grains of limpid quartz; whitish cryptocrystalline silica; cuttings in sand and powder	1130
Limestone, gray, rapid effervescence	1140
Limestone, gray, fine grained, rapid effervescence, buff, moderately rapid; a little blue shale in minute chips, siliceous with irregular grains and minute particles of clear quartz and cryptocrystalline silica	1150
Limestone, blue-gray, effervescence moderately rapid; white, crystalline, rapid reaction, fine-grained; a little shale	1160
Shale, greenish, calcareous; limestone, effervescence rapid, blue-gray; chalcedony and clear quartz; a little brown shale	1170
Limestone as above; silica as above; a little shale	1180

	Depth in Feet
Limestone, blue and brownish gray, effervescence moderately rapid, argillaceous; dark flint, chalcedony; 3 samples	1190-1210
Limestone, light brown, hard, siliceous, response slow; some rapid; silica as above	1220
Limestone, as above; some green shale; pyrite	1230
Shale, greenish, calcareous, in chips	1240
Limestone, light gray, response rapid; shale in minute chips; whitish silica; pyrite	1250
Limestone, gray, rapid reaction; white silica; black fissile shale at 1260 and 1280; 3 samples	1260-1280
Shale, drab; white chalcedonic silica; limestone, gray	1290
Shale, dark drab, fissile	1300
Shale, as above; limestone	1310
Limestone, response rapid; chert; chalcedonic silica; shale; pyrite	1320
Shale, blue	1330
Limestone, buff, in sand; chips of shale	1340
Shale and limestone, light buff, in fine sand; limpid quartz and cryptocrystalline silica	1350,1360
Shale, blue, in powder; some limestone and cryptocrystalline silica; 3 samples	1370-1400
Limestone, buff, moderately rapid reaction; much cryptocrystalline silica in minute flakes and crystalline quartz in microscopic particles	1410
Sandstone, fine, grains imperfectly rounded	1420
Shale, blue, in chips	1430
Limestone, effervescence rapid, buff; cryptocrystalline silica and quartz	1440-1450
Limestone, light yellow-gray, rapid response; a little silica as above	1460
Shale, blue, in fine sand	1463-1467
Limestone, light buff, effervescence rapid; sandstone; some shale	1470
Limestone, light buff, slow effervescence	1480
Driller's log; "shale (Kinderhook?)"	1486-1583
Limestone, light buff, some slow, some rapid reaction; chalcedony and quartz sand; shale in powder and chips	1500
Shale, light blue, calcareous; 2d sample at	1500
Shale, blue, calcareous; 4 samples	1510-1540
Limestone, light yellow-gray, effervescence rapid; some chips of shale	1550
Limestone, as above; shale, blue, some bright green	1560
Limestone, as above, in flaky chips, earthy	1570
Limestone, as above, in small chips	1580
Limestone, gray, some whitish, rapid effervescence	1590,1600

	Depth in Feet
Dolomite, light blue-gray, crystalline	1610
Limestone, light buff and whitish, effervescence rapid, called "hard" by driller	1620
Limestone, buff, in fine sand, some rapid effervescence, some darker and rather slow, considerable residue of quartzose microscopic particles and some grains of limpid quartz; blue shale, pyrite	1630
Limestone, gray, reaction moderately rapid; "hard"	1640
Limestone, blue-gray, moderately slow reaction, argillaceous	1650
Limestone and shale, limestone brown, moderately slow reaction	1660
Shale and limestone, blue-gray, reaction slow; at 1680 also white and gray cryptocrystalline silica and microscopic quartz particles	1670,1680
Dolomite, light blue and gray, cuttings in fine sand and flour, much chalcedonic silica and some fine quartz sand; 3 samples	1690-1710
Shale, blue-gray, with dolomite and silica as above	1720
Silica, white, chalcedony; whitish limestone of rapid effervescence; fine quartz sand; all in powder and sand	1730
Shale, light blue-gray, siliceous as above calcareous	1740
Dolomite, in powder and fine meal; shale, light blue-gray, in powder, quartzose	1750
Dolomite, gray, in fine crystalline sand; cuttings blue-gray in mass from argillaceous powder	1760
Dolomite, buff and gray, in fine crystalline sand; 6 samples	1770-1820
Dolomite, light yellow-gray, some flakes of blackish fossiliferous shale, inflammable, similar in appearance to that at 1280	1830,1840
No samples, "drillings washed away"	1840-1870
Dolomite, subcrystalline, light yellowish and light brownish gray, in chips; some shale as above	1870
Dolomite, and some magnesian limestone of rather slow effervescence; light yellow-gray; considerable calcite	1927
Dolomite, light buff, in clean fine meal	1932

Notes.-- The floor of the Coal Measures, placed by the above interpretation of the driller's log at 12 feet above sea level, is in accord with the elevation of this floor at points north, east and south where it has been reached. About 25 miles to the west in the Council Bluffs-Omaha area the altitude at the floor as defined by the summit of heavy limestones referred to the Mississippian stands 550 feet above sea level, indicating a rather sharp upwarp toward the west, if not faulting.

The Oakland well reaches a depth of 730 feet below sea level. No evidence of the Saint Peter sandstone or of its superincumbent shales is found in the cuttings and the sandstone probably lies 200 or 300 feet below the bottom of the well. The dolomites in which the well foots may be referred to the Galena with some probability.

Sheet No. 1 Name of Well Oakland Survey No. W-0213

Location Pottawattamie C[illegible] Date Drilled Analyst M. Elias

100

10

20

30 — 1130
Dolomite, slightly [illegible] [illegible]ownish drab, v. fn [illegible] [illegible]ert, lt. gray, opaque to transl.

40 — 1140
Dolo. [illegible] med. some dk. drab to brownish drab, v. fn. to fn.

50
[illegible] calc., med. drab [illegible] [illegible]sh drab, [illegible] fn. to fn.

60 — 1160
Dolo. slightly calc., med. drab + brownish drab, v. fn.; 5% chert, lt. gray, opaque to transl.
20% sh. lt. green some brown, cave?

70 — 1170
Dolo. calc., med. to dk. drab, v. fn. to fn.; 8% chert, lt. gray transl., little opaque

80 — 1180
Dolo. [illegible] med. to dk. drab, v. fn. to fn.; 35% chert, dolomitic, dk. drab little lt. bluish gray semi-transl. mottling

90 — 1190
Dolo [illegible] 1180-90'; 50% chert, slightly dolo [illegible] drab and (opaque) lt. gray transl. to semi-transl.

00 — 1200

Sheet No.................. Name of Well Oakland Survey No. W-0213

Location Pottawattomie Date Drilled.................. Analyst M. Elias

00 — 1200

Dolo. calc. med. drab, v.fn.; 60% chert, slightly dolo., dk. drab opaque mottled with lt. gray transl. little opaque
2% pyrite

10 — 1210

Sample as in 1200-10' 65% chert

20 — 1220

Ls., v. slightly argillaceous, lt. gray, slightly brownish, v.fn., clastic? (sample consists of only one small piece)

30 —

...arc., lt gray green, micac., streaks of ls. lt. gray, v. fn., sh. with v. fn. pyrite xls
10% chert, lt. gray, transl., few small dk. gray spots. Shale all cav

40 — 1240

45% sh. as in 1230-40'; Ls. lt. drab gray, dk. spots, fn. to coarse, crinoid frags.
10% chert, pale gray, little drab + dk. gray spots, opaque to chalcedonic

50 — 1250

Ls. lt. buff gray, ; fn. to coarse, <1% glauconite; 20% chert, lt. gray transl., little opaque
40% dolo. med. drab fn. sach.

60 — 1260

Dolo. med. gray to drab, fn. sach.; 25% chert lt. gray, few small dk. spots, opaque, little chalcedony

70 — 1270

Dolo. to med. gray to drabish gray, fn. sach.; 45% chert, lt. to med. gray, slightly drabish in part, transl. to opaque, sponge(?) spicules

80 — 1280

Dolo. lt. gray to drab, fn. sach.; 40% chert as in 1270-80, mostly transl. and chalcedonic
25% sh. dolomitic, med. gray - cave?

90 — 1290

Sh. dolomitic, med. to dk. gray, non-lam., few blk. well lam. pieces look like Penn.

00

Sheet No. Name of Well Oakland Survey No. W-0213

Location Pottawattomie Date Drilled Analyst M. Elias

00 — 1300
Limestone, argillaceous, lt. slightly brownish gray, floury with clastic fragments of med. drab gray ls.; 5% chalcedony, lt. gray; 3% sh. dk. gray to blk. lam.

10 — 1310
Dolo. v. calc. [illegible] to med. drabish gray; 25% chert lt. gray and chalcedony

20 — 1320
Sh. [illegible] dolomitic [illegible] lt. gray

30 — 1330
Ls., lt. buff, v. fn. with coarsely [illegible] + numerous other foss. - brachs. ostracodes
2% chalcedony

40
lt. gray to lt. buff, v. fn. with coarsely xlln. crinoid frags., many ostracodes
40% sh. lt. greenish gray to med. gray, slightly dolo. in part.

1350 — 1350
Sh. calc. lt. gray, non-lam., micac.; 20% ls. as in 1340-50; 5% chert lt. gray and chalcedony

60 — 1360

70 — 1370
Ls. as in 1340-50; 2% chalcedony; 10% sh., partly lt. gray to lt. green gray

80 — 1380
Ls. v. arg., lt. gray, reduced to flour

90 — 1390
Dolo. slightly calc., lt. to med. drab, fn. sach.; 10% chert, lt. drabish gray, opaque, little chalc.

00 — 1400

Sheet No. ..... Name of Well Oakland ..... Survey No. WL-0213

Location Pottawatomie ..... Date Drilled ..... Analyst M. Ellison

Sheet No. 5 Name of Well Oakland Survey No. W-0213

Location Pottawattomie Date Drilled Analyst M. Elias

Depth	Marked depth	Description
00	[illegible]	Sh. calc., lt. gray, non-lam.
10	[illegible]	Sh. dolomitic, lt. greenish gray, poor lam.
20	1520	Sh. [illegible], lt. gray, non-lam.
30	1530	S[illegible] [illegible] gray, non-lam.
40	1540	ls. dolomitic, lt. to med. gray to drab, v. fn. to fn.
50	1550	[illegible]ght brownish gray, [illegible] % sh. as in 1530-40's cave?
60	1560	L[illegible] brownish gray to brown, few med. gray pieces, v. fn. to fn.
70	[illegible]	lt. brownish gray to brown, little med., v. fn. to fn.
80	1580	Ls. [illegible]mitic, lt. brownish gray, little med., fn., scattered large clear Xls.
90	1590	Ls. v. slightly dolomitic, lt. gray, v. slightly brownish in part, fl[illegible] to fn., scattered large clear Xls.
00		

Sheet No. Name of Well Oakland Survey No. W-0213

Location Pottawattamie Co. Date Drilled Analyst M. Elias

Depth	Description
00 (1600)	Dolo. lt. gray, to med., few drabish pieces
10 (1610)	Ls. lt. to med., gray drab to drab, v. fn. to fn., scattered large clear calc. xls.
20 (1620)	Dolo. lt. gray to brown, fn.; 40% dolo. flour, lt. gray, v. slightly arg.
30 (1630)	Dolo. calc., lt. to med. gray to drab, v. fn. to semi transl.
40 (1640)	Dolo. med. gray to drab, v. fn. to fn.
1650 50 (1650)	Dolo. med. drab,
60 (1660)	Dolo. slightly calc., v. slightly med. drab, much reduced to flour
70	med. drab; 40% slightly arg. dolo. reduced to flour
80 (1680)	Dolo. lt. to med. drab; 10% chert (?) pale gray, opaque to transl.
90 (1690)	Dolo. gray to drab, v. fn. to fn., reduced to a silt; 5% chert as above
00 (1700)	

Sheet No. 7 Name of Well Oakland Survey No. W-0213

Location Pottawattamie Co. Date Drilled Analyst M. Elias

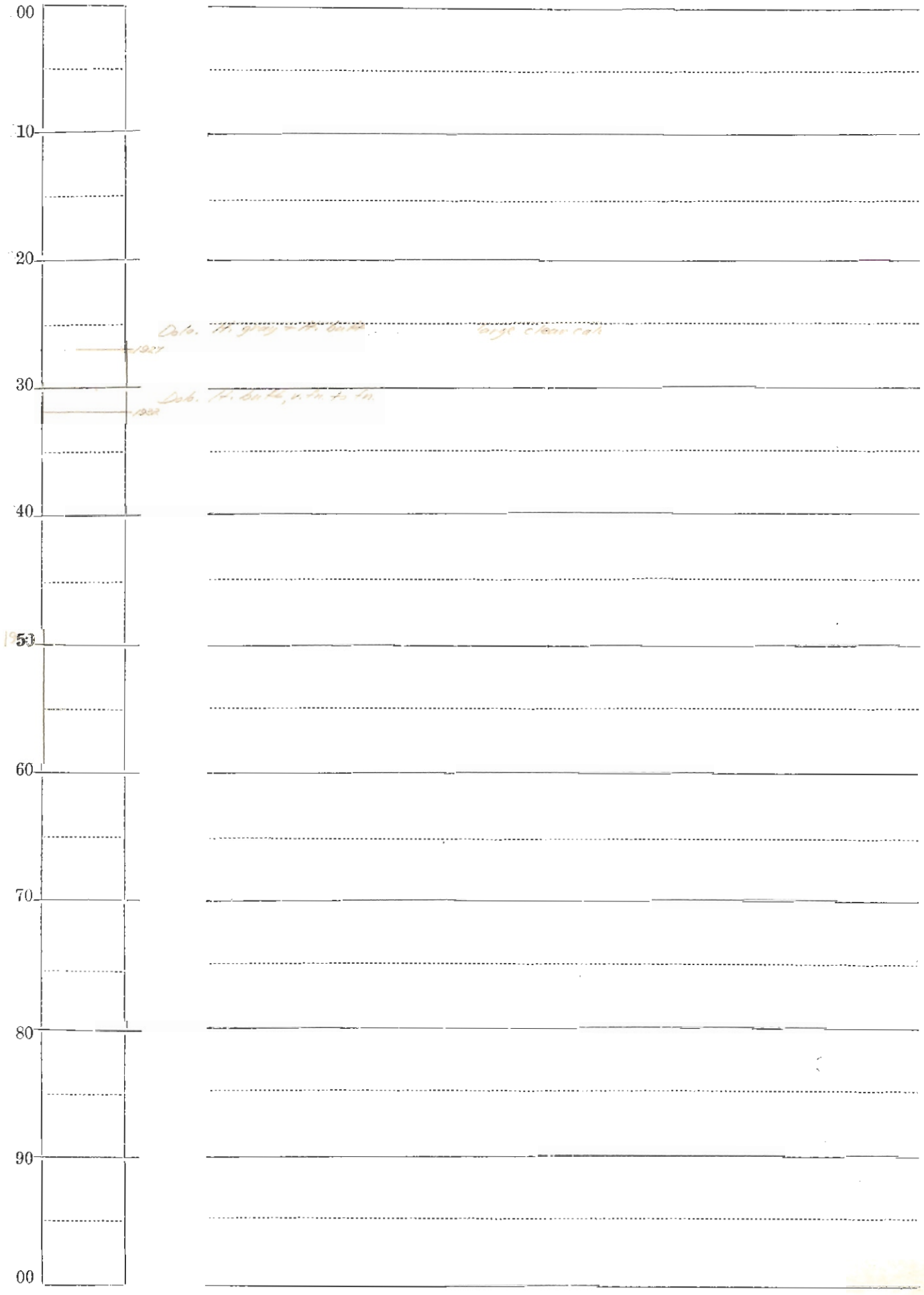
Sheet No. .... Name of Well Oakland .... Survey No. W-0213

Location Pottawattomie Co. .... Date Drilled .... Analyst M. Elias

Depth	Description
00 (1800)	Dolo., lt. gray, little med., fn. (slightly cherty in part); reduced to fn sand.
10 (1810)	Dolo. lt. to med. gray to drab, v. fn. to fn., few frags. large clear calc. xls.; 1% chert, lt. gray, opaque
20 (1820)	Dolo. lt. to med. drab gray, v. fn. to fn.; 10% sh. brown black; 3% chert, lt. gray, opaque to transl.
30 (1830)	Dolo. lt. buff to med. drab, v. fn. to fn., occasional large clear calc. xls.; 5% sh. dk. gray to brown blk., partly dolo
40 (1840)	
50	N S
60 (1860)	Dolo. .. to med. buff to drab, v. fn. to med., few large clear calc. xls.
70 (1870)	
80	N S
90	
1900	

Sheet No. 2 Name of Well Oakland Survey No. W-0312

Location Pottawattamie Co Date Drilled Analyst M. Elias



UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 075-40W-12CBA
Aquifer Code(s) DZMW
Owner's Name OAKLAND CITY WELL (1918)
W Number 00213

Card Q

State: IOWA (19) County: POTTAWATTAMIE (78) Town: OAKLAND, IOWA

Well No. Latitude 411836N (5–11) Longitude 095240 00 (12–18) Seq. No. 1 (19) Date M D Y 10 23 34 (20–25)

Sampling Depth 1936 (26–29) Type 1 (30) Kx10^6 (31–35) pH 7.4 (36–38) Temp. °F (39–41)

SiO_2 (42–44) Ca 81 (45–49) Mg 38 (50–53) Na +K 346 (54–58) K .C (59–61)

HCO_3 317 (62–65) CO_3 (66–67) SO_4 666 (68–72) Cl 138 (73–78) Source No. 3 (79) Q (80)

Card R

Duplicate Columns 1-25 from Card Q

F .40 (26–28) NO_3 0. (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe 1.6 (42–45)

Mn 0. (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 1530 (58–63) Calc. (64–69) Ca,Mg 359 (70–73) Hardness Non-Carb. 99 (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 $CaCO_3$ 260 (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: _____ Date: _____

Published: _____

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 075-40W-12 CBA
Aquifer Code(s) D2MW
Owner's Name OAKLAND CITY WELL (1918)
W Number 00213

Card Q

State: IOWA (1 9) (1 2) County: POTTAWATTAMIE (7 8) (3 4) Town: OAKLAND, IOWA

Well No. Latitude (4 1 1 8 3 6 N) (5 – 11) Longitude (0 9 5 2 4 0 0) (12 – 18) Seq. No. (1) (19) Date M D Y (0 3 1 4 3 5) (20 – 25)

Sampling Depth (1 9 3 6) (26 – 29) Type (1) (30) Kx10^6 ( ) (31 – 35) pH (7 5) (36 – 38) Temp. °F ( ) (39 – 41)

SiO_2 ( ) (42 – 44) Ca (8 0) (45 – 49) Mg (3 8) (50 – 53) Na +K (3 8 5) (54 – 58) K (C) (59 – 61)

HCO_3 (3 3 2) (62 – 65) CO_3 ( ) (66 – 67) SO_4 (6 8 6) (68 – 72) Cl (1 3 9) (73 – 78) Source No. (3) (79) (Q) (80)

Card R

Duplicate Columns 1-25 from Card Q

F (3 7) (26 – 28) NO_3 (0) (29 – 32) PO_4 ( ) (33 – 35) B ( ) (36 – 38) Al ( ) (39 – 41) Fe (4) (42 – 45)

Mn (0) (46 – 49) Cu ( ) (50 – 52) Pb ( ) (53 – 54) Zn ( ) (55 – 57)

Determined Solids (1 5 0 0) (58 – 63) Calc. ( ) (64 – 69) Ca,Mg (3 5 6) (70 – 73) Hardness Non-Carb. (8 4) (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 $CaCO_3$ (2 7 2) (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:

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

075-40W-12 CBA
DMW

IA-0213

Water Quality
(ppm)

Card Q

State: IOWA [16] (1–2) County: POTTAWATTAMIE [78] (3–4) Town: OAKLAND

Well No. Latitude [41 18 N] (5–11) Longitude [095 24 00] (12–18) Seq. No. [1] (19) Date M D Y [02 12 62] (20–25)

Sampling Depth [193] (26–29) Type [1] (30) Kx10⁶ [2840] (31–35) pH [7.3] (36–38) Temp. °F [61] (39–41)

SiO_2 [19.] (42–44) Ca [50.] (45–49) Mg [38.] (50–53) Na [512.] (54–58) K [19.] (59–61)

HCO_3 [508] (62–65) CO_3 [0] (66–67) SO_4 [62.] (68–72) Cl [242.] (73–78) Source [3] (79) No. [Q] (80)

Card R

Duplicate Columns 1-25 from Card Q

F [52] (26–28) NO_3 [.4] (29–32) PO_4 [.] (33–35) B [.] (36–38) Al [.] (39–41) Fe [27.] (42–45)

Mn [.05] (46–49) Cu [.] (50–52) Pb [.] (53–54) Zn [.] (55–57)

Solids Determined [1860] (58–63) Calc. [] (64–69) Hardness Ca,Mg [292] (70–73) Non-Carb. [4] (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 $CaCO_3$ [416] (32–35) Free CO_2 [] (36–38) SAR [] (39–41)

RSC [] (42–44) ABS [.] (45–47) [.] (48–50) [] (51–54)

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

No. [S] (80)

Verified PMJ

Recorded by: D. AARONSON

Punched by: Punched PGH Date:

Published:

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 075-40W-12 CBA
Aquifer Code(s) D2MW
Owner's Name OAKLAND CITY WELL (1918)
W Number 00213

Card Q

State: IOWA (19) (1–2) County: POTTAWATTAMIE (78) (3–4) Town: OAKLAND, IOWA

Well No. Latitude 41 18 36 N (5–11) Longitude 095 24 00 (12–18) Seq. No. 1 (19) Date M 07 D 08 Y 65 (20–25)

Sampling Depth 1936 (26–29) Type 1 (30) Kx10^6 2340 (31–35) pH 7.9 (36–38) Temp. °F 72 (39–41)

SiO_2 10. (42–44) Ca 76. (45–49) Mg 34. (50–53) Na 404. (54–58) K 21. (59–61)

HCO_3 356 (62–65) CO_3 0 (66–67) SO_4 676. (68–72) Cl 155. (73–78) Source No. 3 (79) Q (80)

Card R

Duplicate Columns 1-25 from Card Q

F .40 (26–28) NO_3 .5 (29–32) PO_4 . (33–35) B . (36–38) Al . (39–41) Fe .69 (42–45)

Mn .05 (46–49) Cu . (50–52) Pb . (53–54) Zn . (55–57)

Solids Determined 1580 (58–63) Calc. (64–69) Hardness Ca,Mg 330 (70–73) Non-Carb. 38 (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 $CaCO_3$ 292 (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:

THORPE WELL COMPANY

CONTRACTORS

LATEST ROTARY AND CABLE TOOL EQUIPMENT
THORPE PATENT GRAVEL PACKED WELLS

2340 SIXTH AVENUE
TELEPHONE 3-6107

DES MOINES, IOWA

PLEASE ADDRESS ALL REPLIES
DIRECT TO THE COMPANY
LOCK BOX 1376

Aug. 13th 1943

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

Dear Sir:

Referring to your letter in regard to log of the deep well drilled for the City of Oakland we wish to advise that we donot have a log of this well, evidently this was among some of the records which were destroyed.

Very tfuly yours,
Thorpe Well Company
By