WRD Exp. (GW)
Aug. 1964

Verified ERC Punched FCH

U. S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

Record by D. AARONSON Source of data FILE Date 11/24/65 Map COUNTY HWY 1:63,360

State IOWA [16] County (or town) HUMBOLDT [46]

Latitude: 42 52 08 N Longitude: 094 17 14 Sequential number: 1

Lat-long accuracy: 2 T 93 N, R 29 W Sec 17, SE ¼, NE ¼, SE ¼ 5

Local well number: 093 29W 17DAD Other number: B & M W-3375

Local use: 03375 48CITY Owner or name: BODE TOWN WELL

Owner or name: BØDE IØWA Address: BODE, IA

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) S, (S) Stock, (T) Instit, (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.: INVENTORY [Ø] 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: GEOLOGIST LOG [G]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 259 ft [259] Meas. [6]

Depth cased (first perf.): 235 ft [235] Casing type: STEEL; Diam. 10 in [10] accuracy

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

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

Date Drilled: AUG 1948 [948] Pump intake setting: ft

Driller: name, 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, LPG, wind; H.P. Trans. or meter no.

Descrip. MP CURB 1.5 ft above / below lsd, Alt. MP 1156

Alt. LSD: 1155 [1155] Accuracy (source): ALTIMETER [7]

Water Level 40 ft above / below MP; Ft above / below lsd [40] Accuracy: DRILLER'S LOG [3]

Date meas: AUG. 1948 [848] Yield: 190 gpm [190] Method determined

Drawdown: 54 ft [54] Accuracy: Pumping period [3] hrs

QUALITY OF WATER DATA: Iron 0.08 ppm [1] Sulfate 137 ppm [4] Chloride 34 ppm [2] Hard. 505 ppm [8]

Sp. Conduct 949 K x 10^6 [4] Temp. °F Date sampled NOV. 23, 1962 [N62]

Taste, color, etc.

093-29W-17 DAD

Well Number 42 52 08 N 094 17 14 W (d m s d m s)

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD Physiographic Province: CENTRAL LOWLAND [12] Section: WESTERN

LAKE [B] Drainage Basin: DES MOINES [258] Subbasin:

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

MAJOR AQUIFER: DEVONIAN system, UPPER series [D3] LIME CREEK aquifer, formation, group [UL]

Lithology: FINE LIMESTONE [2L] Origin: MARINE [6] Aquifer Thickness: ft

Length of well open to: 9 ft [9] Depth to top of: 250 ft [250]

MINOR AQUIFER: DEV. OR MISSISSIPPIAN system, LOWER series [L] APPLINGTON FM ? aquifer, formation, group [X]

Lithology: FINE DOLOMITE [2D] Origin: MARINE [6] Aquifer Thickness: 30 ft

Length of well open to: 15 ft [15] Depth to top of: 220 ft [220]

Intervals Screened: NONE

Depth to consolidated rock: 100 ft [100] Source of data: WELL CUTTINGS [C]

Depth to basement: ft Source of data:

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

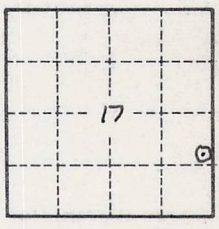
Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft²; Spec cap: 3.3 gpm/ft; Number of geologic cards:

CASING:

10" CASING IN 16" HOLE TO -125' (CEMENTED)
8" PIPE FROM 155' TO 255' BOTTOM
20' PERFORATED.

30' OPEN INTERVAL FROM 125'-155' IS IN HAMPTON FM.



GPO 844-225

RESULTS OF PRODUCTION TEST MADE ON BODE TOWN WELL

Bode, Iowa

August 11, 1948

NAME: Bode Town Well (1948).

LOCATION: SE¼ NE¼ SE¼ Sec. 16, T. 93 N., R. 29 W.

OWNER: Town of Bode.

CONTRACTOR: Hoeg and Ames, Lincoln, Iowa.

ELEVATION: Drilling curb, top of 16-inch pipe 1.5 feet above land-surface and 1156 feet above sea level.

DRILLERS: Homer Rhodes and Kennith Kroeger.

DRILLING DATES: July 16 to August 11, 1948.

TOTAL DEPTH: 259 feet.

CASING AND HOLE DATA: 10-inch casing to depth of 125 feet cemented with 138 sacks cement in 16-inch hole. 100 feet of 8-inch pipe from 155 feet to 255 feet with bottom 20 feet perforated.

TEST PUMP: Turbine, powered with belt drive from gasoline motor. 3½-inch column with 5 feet of bowls set at 155 feet with no suction pipe.

DISCHARGE MEASUREMENTS: Discharge rate obtained by timing and measuring amount of water discharged into a metal tank.

TEMPERATURE MEASUREMENTS: Water temperature measurements made at end of 16 feet of 4-inch discharge pipe.

WATER-LEVEL MEASUREMENTS: Depth to water measurements were referred to top of 10-inch pipe 1.5 feet above land surface.

REMARKS: The static water level and all measurements made through 11:30 A.M. were made by the driller. Observations and measurements following the 11:30 measurement were made by J. B. Cooper, Iowa Geological Survey. Well samples and drillers log record are on file in the office of the Iowa Geological Survey, Iowa City, Iowa.

RESULTS OF PRODUCTION TEST MADE ON BODE TOWN WELL AUGUST 11, 1948

TIME	DEPTH TO WATER (FEET)	G.P.M.	TEMP. °F.	REMARKS
Aug. 11				
9:00 AM	40.0			Static water level.
9:45				Pump turned on.
9:55	94-	189		
10:00	94			
10:15	94.5	190		Water dirty.
10:25	94.5	190		
10:45	93.0	190		Water clearing.
11:00	93.0	190		
11:15	93.0			
11:30	93.0	190		
1:00 PM	94.0	190	51	Water fairly clear.
1:40	93.3			
1:45		190	51	
2:15	93.8			
2:30	94	190		
3:00	94.2	190		
3:30	93.0			
4:00	93.9	190		Water slightly turbid.
4:45	94.1	190		
5:00			51	Water sample for analysis.
5:30	94.0	190		
5:45				Pump turned off.
5:51	41.0			Recovery measurements.
6:00	41.0			
6:10	40.8			
Aug. 12				
9:00 AM	39.0			

Humboldt

June 4, 1948

Mr. X. P. Boyles,
Public Health Engineer
Fort Dodge, Iowa

Dear Mr. Boyles:

Re: Proposed well to be drilled for town of Bode, Iowa

Your letter of June 1 to Dr. Hershey in regard to Bode has been referred to me for attention as he will be away from the office for the next few days. The following discussion of the general geology and ground-water conditions at Bode has been prepared from data in the open files of the Geological Survey.

The elevation at the railroad station in Bode is approximately 1150 feet above sea level. This figure has been used as a starting elevation upon which to have the anticipated geologic section to the top of the St. Peter sandstone which is given below:

Formation and Description	Thickness (feet)	From (feet)	To (feet)
Pleistocene system (clay and sand)	50	0	50
Cretaceous system (red clay and sand or sandstone)	110	50	160
Mississippian system			
Gilmore City formation (limestone)	10	160	170
Hampton formation (limestone and dolomite)	15	170	185
Maynes Creek formation (dolomite and chert)	30	185	215
Devonian system			
Sheffield formation (dolomite and shale)	80	215	295
Lime Creek formation (dolomite with occasional thin shale beds)	90	295	385
Cedar Valley formation (dolomite)	190	385	575
Independence formation (shale and dolomite)	20	575	595
Wapsipinicon formation (limestone and dolomite)	100	595	695
Ordovician system			
Maquoketa formation (cherty dolomite, trace of shale)	55	695	750
Galena formation (dolomite, some chert)	195	750	945
Decorah-Platteville formations (shale and limestone)	105	945	1050
St. Peter formation (sandstone)		1050	

The above forecast of formation expected at Bode is based upon information of existing wells in the area. The thickness of the glacial drift and Cretaceous formations are not well known. The figures presented represent our best estimate. The lower formations should be encountered about as forecast.

A well at the town of West Bend in Palo Alto County northwest of Bode produced 50 gallons per minute with a reasonable drawdown when the well was drilled through the Cedar Valley formation. This well was drilled deeper and finished in the St. Peter sandstone from which 160 gallons per minute were obtained with a small amount of drawdown.

The city well at Ottosen which was drilled in 1939 to a depth of 293 feet finishing in the Mississippian dolomite was reported to have produced 40 gallons per minute with 100 feet of drawdown from a static water level of 40 feet.

Some water can be expected to occur in the Mississippian rocks and the Sheffield, Lime Creek and Cedar Valley formations. It is probable that a well producing 50 gallons per minute can be developed from these formations. It is not expected that the shale in these rocks will require casing.

If sufficient water is not found in these formations, it will be necessary to drill deeper into the Maquoketa and Galena formations. Again it is not expected that the shales which occur in the upper part of these rocks will require casing.

The St. Peter sandstone should furnish approximately 150 gallons per minute with a high pumping level. The Decorah-Platteville shales above the St. Peter would have to be cased out.

The proposed site, approximately 15 feet from the active well, is satisfactory only if the town is to consider one well as a standby unit or if the new well is to be drilled to a deeper aquifer with the aquifer tapped by the 217-foot well cased out. If both wells are finished at the same depth and are pumped at the same time, excessive interference may be expected. A spacing of at least 300 feet would be desirable.

We shall be glad to give you any further assistance in this matter that we can and will welcome the opportunity to attend any pumping tests which may be conducted.

Very truly yours,

James B. Cooper

JBC:AEH

Humboldt

JUN 3 1948

Iowa
State Department of Health
DISTRICT HEALTH SERVICE
NO. 5
Fort Dodge, Iowa

IN REPLYING ADDRESS
X. P. Boyles
Public Health Engineer

WALTER L. BIERRING, M. D.
COMMISSIONER
DES MOINES, IOWA

June 1, 1948

H. Garland Hershey,
Dir. & State Geologist
Iowa Geological Survey
Geology Annex,
Iowa City, Iowa

Dear Mr. Hershey:

Regarding letter of May 3, 1948 referring to well development at Bode, Iowa.

Mayor Thompson of Bode was in the office Thursday, May 27th, stating that well drilling operations would begin in the near future. The town council has decided on the location approximately 15 ft. from the present active well.

I realize these well forecasts entail considerable work and study and do appreciate all the assistance you have given on locations such as the one proposed at Bode. The main question at present is whether or not a new well should be developed within the approximately 15 ft. of the present active well, and if this question can be answered at this point in the study, would appreciate hearing from you as I would like this information before the well driller starts work.

The main reason for location near the present active well is because of apparent probability of some type of treatment being installed for the municipal supply.

Thanks for your help in this matter.

Very truly yours,

X. P. Boyles
Public Health Engineer

XPB:DES

Iowa
State Department of Health
DISTRICT HEALTH SERVICE
NO. 5
Fort Dodge, Iowa

WALTER L. BIERRING, M. D.
COMMISSIONER
DES MOINES, IOWA

IN REPLYING
ADDRESS
X. P. Boyles
Public Health Engineer

MAY 5 1948

MAY 5 1948

May 3, 1948

H. Garland Hershey,
Dir. & State Geologist
Iowa Geological Survey
Iowa City, Iowa

Dear Mr. Hershey:

The town of Bode, located in Humboldt county, is contemplating the development of a new deep well. We would appreciate a forecast on possibilities in this area. It is believed that Hoag and Ames, well drillers, have been retained to develop a supply. Just when they will start is not known, however it is believed sometime about the first of June.

The present active deep well, located just south of the elevated storage tower, is, I believe, 217 ft. deep. General information on the construction of this well is very limited, however it is understood that static level stands at 60 ft. with a pumping level of 120 ft. The only records in this office indicate rock to have been encountered at 217 ft, however this depth is questionable. The town also has a standby well located approximately 110 ft. northeast of the active well and the records on this well are also very sketchy.

One of the proposed sites being considered for the new development is at a point approximately 14 to 20 ft. from the present active well. This active well is reported to be decreasing in yield which might be corrected by acidizing, however in making this forecast would appreciate your thoughts of locating this close to the active well.

Very truly yours,

X. P. Boyles
Public Health Engineer

XPB:DES
cc: Mr. A. H. Wieters

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 093-29W-17DAD
Aquifer Code(s) D3UL LX
Owner's Name BODE TOWN (1948)
W Number 03375

Card Q

State: IOWA (19) County: HUMBOLDT (46) Town: BODE, IOWA

Well No. Latitude 42 52 08 N (5–11) Longitude 094 17 14 (12–18) Seq. No. 1 (19) Date M D Y 07 10 68 (20–25)

Sampling Depth 259 (26–29) Type 1 (30) Kx10⁶ 800 (31–35) pH 7.0 (36–38) Temp. °F (39–41)

SiO_2 26. (42–44) Ca 110. (45–49) Mg 42. (50–53) Na 42. (54–58) K 1.9 (59–61)

HCO_3 390 (62–65) CO_3 0 (66–67) SO_4 79. (68–72) Cl 42. (73–78) Source No. 3 (79) Q (80)

Card R

Duplicate Columns 1-25 from Card Q

F .2 (26–28) NO_3 10. (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe .06 (42–45)

Mn .07 (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 517 (58–63) Calc. (64–69) Ca,Mg 445 (70–73) Hardness Non-Carb. 125 (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 $CaCO_3$ 320 (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

Water Quality
(ppm)

Local Well No. 093-29W-17DAD
Aquifer Code(s) D3 UL LX
Owner's Name Bode Town (1948)
W Number 03375

Card Q

State: IOWA (19) (1 2) County: HUMBOLDT (46) (3 4) Town: BODE, IOWA

Well No. Latitude 42 52 08 N (5–11) Longitude 094 17 14 (12–18) Seq. No. 1 (19) Date M D Y 06 09 58 (20–25)

Sampling Depth 259 (26–29) Type 1 (30) Kx10⁶ 840 (31–35) pH 7.3 (36–38) Temp. °F (39–41)

SiO_2 20. (42–44) Ca 118. (45–49) Mg 45. (50–53) Na 7.8 (54–58) K 2.9 (59–61)

HCO_3 376 (62–65) CO_3 0 (66 67) SO_4 124. (68–72) Cl 35. (73–78) Source No. 3 (79) Q (80)

Card R

Duplicate Columns 1-25 from Card Q

F .2 (26–28) NO_3 13. (29–32) PO_4 . (33–35) B . (36–38) Al . (39–41) Fe .16 (42–45)

Mn .07 (46–49) Cu . (50–52) Pb . (53 54) Zn . (55–57)

Solids Determined 679 (58–63) Calc. (64–69) Ca,Mg 480 (70–73) Hardness Non-Carb. 172 (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 $CaCO_3$ 308 (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

Local Well No. 093-29W-17DAD
Aquifer Code(s) D3UL LX
Owner's Name BODE TOWN (1948)
W Number 03375

Water Quality
(ppm)

Card Q

State: IOWA (1 2: 19) County: HUMBOLDT (3 4: 46) Town: BODE, IOWA

Well No. Latitude 42 52 08 N (5–11) Longitude 094 17 14 (12–18) Seq. No. 1 (19) Date M D Y 08 11 48 (20–25)

Sampling Depth 259 (26–29) Type 1 (30) Kx10⁸ (31–35) pH 7.3 (36–38) Temp. °F 51 (39–41)

SiO_2 (42–44) Ca 126 (45–49) Mg 45 (50–53) Na +K 17 (54–58) K .C (59–61)

HCO_3 366 (62–65) CO_3 0 (66 67) SO_4 139 (68–72) Cl 49 (73–78) Source No. 3 Q (79 80)

Card R

Duplicate Columns 1-25 from Card Q

F .2 (26–28) NO_3 8.7 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe .13 (42–45)

Mn .7 (46–49) Cu (50–52) Pb (53 54) Zn (55–57)

Solids Determined 760 (58–63) Calc. (64–69) Ca,Mg 506 (70–73) Hardness Non-Carb. 206 (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 $CaCO_3$ 300 (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: KW

Published:

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

W-3375

RECORD OF WELL

Location:

Town: BODE (N E / S W): County HUMBOLDT

SE NE SE sec. 16 T 93 N., R. 29 W. 5th P.M. Twp.

Well name and number Town of BODE (1948)

Owner — Address

Tenant — Address

Contractor Hoeg & Ames Address Lincoln

Drillers Homer Rhodes

Drilling dates 22 July to 11 August.

Well data:

Elevations: Drilling curb 1156 feet; land surface 1155 feet

Averaged from Bode RR. Sta. — JBC. Aug 11, 1948

Determined by

Topographic position Upland.

Total depth: Reported 259 feet, Measured feet

Drilling method Cable Tool

Hole and casing date 16" hole to 125'

10" casing set at 125' - cemented in with 138 sacks cement

8" pipe from 155' to 255' - bottom 20' perf.

Original depth to water 40 ft. above / below Curb Date

Original elevation of water level ft.; Source of data

Sources of water: Principal Near 170'; Others

Production data: Date

Static depth to water 40 Measuring point Curb
Pumping level 94 at 190 g.p.m.

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

Pump data: Type pump Turbine Column Dia. 3½" Length 150
Cylinder or bowls: Dia. 7" Length 5' Suction pipe 120
Power Belt Drive Airline No
Estimated rate of production: 190 g.p.m. for 7½ hrs. a day
Use of water Public Supply.

Test 8-11-1948

WATER ALALYSES (in parts per million)

Date samples	8/11/48			
Sampled by	JB-Cooper			
Total solids	760.			
Insoluble matter	80.5			
Alkalinity (Meo)	300			
Alkalinity (Phn)	None			
pH				
Fe_2O_3- Mn_2O_3-Al_2O_3	21.			
Alkali as sodium	16.9			
Calcium	126.5			
Magnesium	45.3			
Iron (unfiltered)	1.3			
Manganese	0.7			
Nitrate	39.0			
Fluoride	0.2			
Chlordie	49.			
Sulfate	138.7			
Bicarbonate	366.			
Hardness (ppm)	506.			
Hardness (gpg)	30.2			

Remarks

Laboratory data: Sample storage location CD9-9

Sample range 0-259 No. spls. 43 No. dupls. & cond. 43-Good
Spls. prepared by EMR Washed range 100-259 by EMR
Driller's log and cond.

Insoluble residues: Prepared by Studied by Strip log
Microscopic study 0-259 strip log 9-2-48
Gen. log Correl. by R.W.