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U. S. DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

FT. DODGE, QUAD.

Record by **D. AARONSON** Source of data **FILE** Date **2/3/66** Map **1:62,500**

State **IOWA** County **WEBSTER** Subbasin **94**

Latitude: **42° 36' 54" N** Longitude: **094° 08' 45" W** Sequential number: **1**

Local well number: **09028W15BBB** Other number: **W-3303**

Local use: **013303** City: **CITY** Owner or name: **CITY OF DODGE #2**

Owner or name: **BADGER** Address: **BADGER, IA.**

Ownership: County, Fed Gov't, City, Corp or Co, Private, State Agency, Water Dist. **M**

Use of water: Air cond, Comm, Dewatering, Fire, Dom, Irr, Ind, P S, Stock, Instit, Unused. **P**

Use of well: Anode, Drain, Seismic, Obs, Oil-gas, Recharge, Spring, Test, Unused, Withdraw, Waste, Destroyed. **W**

DATA AVAILABLE: Well data **1** Freq. W/L meas.: **INVENTORY** Field aquifer char. **72**

Hyd. lab. data: **73**

Qual. water data; type: **COMPLETE** **74**

Freq. sampling: **INTERMITTENT (7/19/48)** Pumpage inventory: **yes** **75**

Aperture cards: **yes** **77**

Log data: **GEOLOGIST LOG** **78**

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: **530** ft Meas. **530**

Depth cased: **220** ft Casing type: **STEEL** ; Diam. **8** in

Finish: porous gravel w. gravel v. horiz. open perf., screen, sd. pt., shored, open concrete, (perf.), (screen), gallery, end, other **X**

Method: air bored, cable, dug, hyd jetted, air reverse trenching, driven, drive rot., rot., percussion, rotary, other **C**

Date Drilled: **FEB. 1948** Pump intake setting: **948** ft

Driller: **THORPE WELL CO.** Address: **DES MOINES, IA.**

Lift (type): air, bucket, cent, jet, (cent.) (turb.), none, piston, rot, submerg, turb, other **D**

Power: nat LPG Trans. or meter no. **41**

(type): diesel, elec, gas, gasoline, hand, gas, wind; H.P. **41**

Descrip. MP **LSD** above ft below lsd, Alt. MP **1155**

Alt. LSD: **1155** Accuracy: **ALTIMETER**

Water Level: **85** ft above MP; Ft below lsd **85** Accuracy: **DRILLER'S LOG**

Date meas: **FEB. 1948** Yield: **55** gpm Method determined **55**

Drawdown: **102** ft Accuracy: **3** Pumping period **55** hrs

QUALITY OF WATER DATA: Iron **0.08** Sulfate **144** Chloride **7** Hard. **438**

Sp. Conduct **945** K x 10⁶ Temp. **4** Date sampled **11/23/62**

Taste, color, etc.

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD Physiographic Province: **CENTRAL LOUPLAND** Section: **WESTERN**

LAKE **B** Drainage Basin: **DES MOINES** Subbasin: **25B**

Topo of well site: local depression, fiat surface, hilltop, hillside, terrace, valley flat, **UPLAND**

MAJOR AQUIFER: **MISSISSIPPIAN** LOWER **M1** HAMPTON FM. **KH**

Lithology: **CHERTY DOLOMITE** Origin: **MARINE**

Length of well open to: **130** ft Depth to top of: **400** ft

MINOR AQUIFER: system series aquifer, formation, group

Lithology: Origin: Thickness: ft

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

Intervals Screened: **NONE**

Depth to consolidated rock: **140** ft Source of data: **WELL CUTTINGS**

Depth to basement: ft Source of data:

Surficial material: **SANDY TILL** Infiltration characteristics: **POOR**

Coefficient Trans: gpd/ft Coefficient Storage: **53**

Perm: gpd/ft²; Spec cap: **53** gpm/ft; Number of geologic cards:

CASING:

8" FROM +2' TO 145' } CEMENTED
6" FROM 142' TO 220' }





Badger, Iowa

Dec. 31, 1947

New Town Well Drilling

Location: NW¹/₄ NW¹/₄ NW¹/₄ Sec. 15, T 90 N., R. 28 W.

Elevation: 1155 above sea level

Contract. Thorpe Well Co.

Dr. Wesley & Tom Thorpe Jr.

Drilling depth: 215 ft.

Com. log Drift 0-120

sh. g. r. 120-140

broken ls. 140-150

ss. 150-165 ±

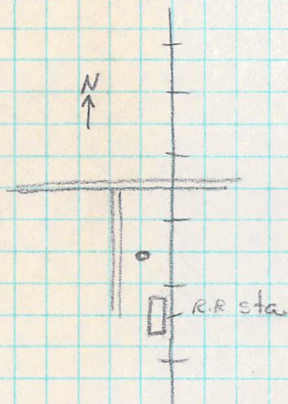
sh. g. r. = 208-215-

Production test. 30 gpm with pump setting at 150'

SWL 55' ±

Will drill deeper.

Samples being saved.





Feb. 4. 1948

-Badger-

SWI 85'

TD 530'

50 \pm gpm

35 @ 134'

100' gpm at 180'

8"	to 145'	} cemented.
6"	142' - 220'	

Will take samples all Moines -
 Did not have complete log at Badger

Plan to set pump 290'

Wes Thorpe & Guy Elam plan start H. Dodge
 within four days.

MAY 31 1956

DEPARTMENT OF REVENUE

NOTICE OF HEARING AND LETTING

Sealed proposals will be received by the Town Clerk of the Town of Badger, Iowa, at her office in said Town until 8:00 o'clock p.m. on _____, for the construction of an elevated Water Storage Tank as described in the plans and specifications now on file in the office of the Town Clerk. Proposals will be acted upon by the Town Council of said Town at a meeting to be held on the day and hour above specified or at such later time as may be filed. At said time and place a hearing will be held on the proposed plans and specifications and proposed form of contract for said improvements, and at said hearing any interested person may appear and file objections thereto or to the cost of said improvements.

The extent of the work to be done includes the furnishing, erecting and painting of a 30,000 gallon capacity elevated water tank on a 100' tower with concrete footings.

All work is to be done in strict compliance with plans and specifications prepared by Rowat-Murray, Engineers of Belmond, Iowa, unless notified of change by the Engineer in

charge. The above mentioned plans and specifications have heretofore been approved by the Town Council, and are now on file for public examination in the office of the Town Clerk and may be examined by bidders.

Each proposal shall be made on a form furnished by the Town or Rowat-Murray, Engineers and must be accompanied by a check, certified by an Iowa bank in an amount equal to or greater than ten per cent (10%) of the amount of the proposal made payable to the Town Treasurer of the above Town and filed in a sealed envelope. This check may be retained by the Town Treasurer as liquidated damages in the event the successful bidder fails to enter into a contract within ten (10) days and post bond satisfactory to the Town insuring the faithful fulfillment of the contract as required by law.

Payment to the contractor for said improvements will be made on monthly estimates in cash derived from the sale of revenue bonds to be issued in accordance with Chapter 397 of the Code of Iowa.

By virtue of statutory authority, a preference will be given to products and provisions grown or produced within the State of Iowa, and to Iowa domestic labor.

The successful bidder will be required to furnish a bond in an amount equal to one hundred per cent (100%) of the contract price, said bond to be issued by a responsible surety approved by the Town Council and shall guarantee the faithful performance of the contract and the terms and conditions therein contained and shall guarantee the prompt payment for all material and labor and protect and save harmless the Town from claims and damages of any kind caused by the operation of the contractor.

Plans and specifications for private use may be obtained from the Engineers or the Town Clerk upon a deposit of \$15.00 which will be refunded if such plans and specifications are returned in good order within two weeks after the date of receiving bids.

The Town reserves the right to reject any or all proposals, and to waive informalities or irregularities in any bid.

The work under the proposed contract except for finish painting shall be completed no later than November 1, 1956. Finish painting shall be completed no later than May 1, 1957.

Published on order of the Town Council of Badger, Iowa.

By CORA H. HILL, Town Clerk

Webster
Badger

April 30, 1947

Mr. K. P. Boyles
Public Health Engineer
District Health Service No. 5
Fort Dodge, Iowa

Dear Mr. Boyles:

Re: Ground-water and geologic conditions in vicinity of Badger, Iowa.

In response to your request for information on developing a new water supply for the town of Badger, we have prepared the following discussion from data in the open files of the Geological Survey.

The town of Badger is located in northern Webster County in parts of sections 9, 10, 15 and 16, T. 90 N., R. 28 W. In 1940, the town had a population of 250. It is assumed that a water supply of 50 gallons per minute will meet the requirements of the town.

The present town well is about 280 feet deep. The well is cased with 5-inch casing to a depth of 149 feet, and with 4-inch casing from 150 to 206 feet. Water enters the well at a depth of 150 feet and below a depth of 206 feet. The aquifer at a depth of 150 feet is probably in the St. Louis formation and those below 206 feet are probably in the Gilmore City formation. The non-pumping water level was reported to be about 40 feet below land surface. The well produced about 23 gallons per minute with an unknown pumping level. The water pumped from this well apparently has an iron content of 3 parts per million.

The following forecast of the anticipated geologic section at Badger to the top of the Maquoketa formation is based on a starting elevation of 1152 feet.

<u>Formation and Description</u>	<u>Thickness (feet)</u>	<u>From (feet)</u>	<u>To (feet)</u>
Pleistocene (clay with some sand and gravel)	149	0	149+
Mississippian St. Louis (sandstone)	11	149	160
Warsaw, Keokuk, Burlington (dolomite with shale beds)	45	160	205
Gilmore City (limestone)	100	205	305
Hampton (limestone, cherty dolomite and siltstone)	195	305	500
Maple Mill (shale)	20	500	520
Devonian (dolomite)	355	520	875
(shale)	20	875	895

H. G. Chesney

Very truly yours,

We will appreciate learning about any definite plans for the construction of a new well at Badger. If we can be of further service to you in this regard please let us know.

In summary, there is a good chance that an adequate supply of water for the town of Badger can be developed from aquifers above the top of the Maple Mill shale. Since it may be necessary to drill into the Wapiniton formation to obtain sufficient water a fairly large hole should be started in order to provide for reducing in hole size for liners through the Maple Mill and Devonian shales.

In the event that sufficient water is not obtained after reaching the Maple Mill shale, the next lower promising aquifer is near the base of the Wapiniton formation at an approximate depth of about 1000 feet. At Humboldt, a well finished in the upper part of the Wapiniton formation developed a supply of 245 gallons per minute with the drawdown of 114 feet. Much of the water may have been encountered in the Wapiniton formation. At Duncombe, a supply of only 37 gallons per minute was obtained with a drawdown of 48 feet from a well finished at an equivalent depth of 875 feet at Badger.

Although the present town well did not develop a supply of 50 gallons per minute after penetrating the Mississippian strata through a greater part of the Gilmore City formation, there is a good chance that a well drilled in another location to the same depth would encounter an adequate supply of water. The lower part of the Gilmore City formation and the Hampton formation contain good aquifers in places, so that it appears that there is a good chance of developing a satisfactory water supply above the top of the Maple Mill shale.

The shales in the Warsaw, Keokuk-Burlington formations, the Maple Mill shale and the shales in the Devonian section may all require lining to prevent caving.

Formation and Description			
Thickness (feet)	From (feet)	To (feet)	
Devonian (continued) (dolomite and shale)	155	895	1050
Ordovician Maquoketa			1050

April 30, 1947

J. X. P. Boyles

Webster
Baker
Fidelity Union Bank
MADE IN U.S.A.
December 29, 1947

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

Dear Mr. Boyles:

Thank you very much for your letter of December 23 to Dr. Hershey in regard to developments at the towns of Badger and Dows. The town well at Dows is being tested on Tuesday, December 30, and I plan to get there for the production test. The present depth of the well is 651'.

On Wednesday I plan to visit the well drilling at Badger and hope to see you either at Dows, Badger or at your office.

Very truly yours,

William E. Hale

WEH:DH

Iofna

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

DEC 26 1947

December 23, 1947

H. G. Hershey,
Associate Geologist
Geology Annex
Iowa City, Iowa

Dear Mr. Hershey:

Re: New well development at Badger

The Thorpe Well Company moved in on the site and have started operations for the drilling of a new deep well for the Badger water supply. This location is to the right of the highway leading into Badger and just west of the railroad tracks.

I would be glad to have you or one of your men stop in at this site in the near future.

On my last visit to Dows, December 11, drilling was at a depth of 465 ft. and it is very possible that this well should be completed about the first of the year. Hoag and Ames are the drilling contractors.

With best regards for a Merry Christmas and Happy New Year.

Very truly yours,



X. P. Boyles
Public Health Engineer

XPB:DES

3303

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

RECORD OF WELL

Location:

Town: Badger (N E)
(S W): County Webster

NW1/4NW1/4NW1/4 sec. 15 T 90 N., R. 28 W. Twp.

Well name and number Badger Town Well (1948)

Owner Town of Badger

Address

Tenant

Address

Contractor Thorpe Well Co.

Address Des Moines

Drillers Wesley Thorpe - Tom Thorpe - Jr

Drilling dates Feb. 4, 1948

Well data:

Elevations: Drilling curb 1155 feet; Land surface _____ feet

Determined by Hand level from RR sta - W.E.H.

Topographic position Upland

Total depth: Reported 530 feet, Measured _____ feet

Drilling method Cable Tool

Hole and casing data 8" from 42' to 145'
6" from 142' to 220' } cemented in

Original depth to water 85 ^{above} ft. below L.S. Date Feb. 1948

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

Sources of water: Principal _____; Others _____

Production data:

Date _____

Static depth to water 85 Measuring point L.S.
 Pumping level 134 at 35 g.p.m.
180 100?
 final 187 55 after pipe cemented

Specific capacity _____ 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 samples	_____	_____	_____	_____
Sampled by	_____	_____	_____	_____
Total solids	_____	_____	_____	_____
Insoluble matter	_____	_____	_____	_____
Alkalinity (Meo)	_____	_____	_____	_____
Alkalinity (Phn)	_____	_____	_____	_____
pH	_____	_____	_____	_____
Fe ₂ O ₃ + Mn ₂ O ₃ + Al ₂ O ₃	_____	_____	_____	_____
Alkali as sodium	_____	_____	_____	_____
Calcium	_____	_____	_____	_____
Magnesium	_____	_____	_____	_____
Iron (unfiltered)	_____	_____	_____	_____
Manganese	_____	_____	_____	_____
Nitrate	_____	_____	_____	_____
Fluoride	_____	_____	_____	_____
Chloride	_____	_____	_____	_____
Sulfate	_____	_____	_____	_____
Bicarbonate	_____	_____	_____	_____
Hardness (ppm)	_____	_____	_____	_____
Hardness (gpg)	_____	_____	_____	_____
Remarks	_____	_____	_____	_____

Laboratory data:

Sample storage location CD5-4.5

Sample range 0-525 No. spls. 106 No. dupls. & cond. 106 - Fair - Good
 Spls. prepared by RKS Washed range 140-525 by EMR
 Driller's log and cond. None
 Insoluble residues: Prepared by _____ Studied by _____ Strip log _____
 Microscopic study _____ strip log Run 0-525'
 Gen. log _____ Correl. by _____

WATER LEVEL DATA

Measuring point _____

Date	Depth to water	Altitude	Remarks

REMARKS

Notes: Dated Dec 31, 1947

Production test at drilling depth of 215 feet

SWL - 55'

30 gpm with pump setting at 150' - To drill deeper

Notes: Feb 4, 1948

SWL 85'

35 gpm at 134' purl

100 gpm at 100' purl ?

see production data on inside page