Punched FCH

WRD Exp. (CW)
Aug. 1964

Verified PMJ

U. S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

COUNTY NUM

Record by D. AARONSON Source of data FILE Date 7/2/65 Map 1:63,360

State IOWA 16 County (or town) CALHOUN 13

Latitude: 42 31 45 N Longitude: 094 32 03 Sequencial number: 1

Lat-long accuracy: 2 T 89 N R 31 W Sec 17 NW¼ NE¼ NW¼ 5

Local well number: CE 93 W 17 b 1 a b Other number: W-0201

Local use: 0 0 2 0 1 28 C I T Y 2 Owner or name: MANSON CITY WELL 2

Owner or name: M A N S O N I O W A Address: MANSON, IOWA

Ownership: (C) Country, (F) Fed Gov't, (M) Mncp, (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) P-S, (S) Stock, (U) Unused P

Use of well: (A) Anode, (D) Drain, (G) Geomic, (O) Obs, (O) 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 0 Field aquifer char.

Hyd. lab. data:

Qual. water data: type: COMPLETE C

Freq. sampling: INTERMITTENT I Pumpage inventory: yes, period:

Aperture cards: yes

Log data: GEOLOGIST LOG G

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 1211 ft 1211 Meas. (est) 6

Depth cased (first perf.) 1105 ft 1105 Casing type: STEEL ; Diam. 16 in Accuracy 6

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

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

Date Drilled: MAY 1928 5 2 8 Pump intake setting: 170 ft 170

Driller: THORPE WELL CO. DES MOINES, IOWA

Lift (type): (A) air, (B) bucket, cent, jet, (C) multiple, cent.) name, (L) multiple, (surb.) address, (N) nose, piston, rot, (P) submerg, (R) turb, (S) other I Deep Shallow D

Power (type): diesel, elec, (G) nat gas, gasoline, hand, LPG gas, wind; H.P. 5 Trans. or meter no.

Descrip. MP CURB 8 ft above below lsd, Alt. MP 1237

Alt. LSD: 1245 1245 Accuracy: (source) ALTIMETER 7

Water Level 127 ft above below MP; ft above below lsd 1135 Accuracy: REPORTED 6

Date meas: MAY 1928 5 2 8 Yield: 400 gpm 400 Method determined

Drawdown: 8 ft F Accuracy: REPT 6 Pumping period hrs

QUALITY OF WATER DATA: Iron 0.18 ppm 2 Sulfate 110 ppm 4 Chloride 330 ppm 4 Hard. 98 ppm 2

Sp. Conduct 1470 K x 10⁶ Temp. 61.5 °F 62 Date sampled 1/27/61 1961

Taste, color, etc.

C 8 93IW17 ba b

Well Number 42, 31, 45 (W) 094, 32, 03
d m s d m s

HYDROGEOLOGIC CARD

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

LAKE | 8 | Drainage Basin: RACCOON | 2 5 A | Subbasin:

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

MAJOR AQUIFER: PRE-CAMBRIAN | system | | series | 7 | | aquifer, formation, group | X

Lithology: IGNEOUS | H | Origin: IGNEOUS | 7 | Aquifer Thickness: ft

Length of well open to: 106 ft | 1 0 6 | Depth to top of: 1001 ft | A 0 0

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: NINE

Depth to consolidated rock: 200 ft | 2 0 0 | Source of data: WELL CUTTINGS | C

Depth to basement: ft | Source of data:

Surficial material: CALCAREOUS TILL | C T | Infiltration characteristics: POOR | 4

Coefficient Trans: gpd/ft | Coefficient Storage:

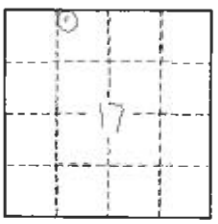
Coefficient Perm: gpd/ft^2; Spec cap: 50 gpm/ft; Number of geologic cards:

CASING:

0 - 400' 16" PIPE

350' - 966' 12" PIPE

909' - 1105' 10" PIPE

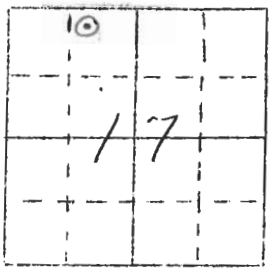


IPD 864-923

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

W-020

RECORD OF WELL



Location:

Town: Manson (N E S W); County Calhoun

C NW-NE ¼ sec. __ T. 89 N., R. 31 E. W. Lincoln Twp.

Well name and number City Well #2 (South)

Owner _____ Address _____

Tenant _____ Address _____

Contractor Thorpe Well Co Address Des Moines

Drillers _____

Drilling dates May 1, 1928

Well data:

Elevations: Drilling curb 1237 feet; Land surface 1245 feet

well in basement

Determined by _____

Topographic position Upland

Total depth: Reported 1211 feet, Measured 1211' feet

Drilling method cable

Hole and casing data 16" to 10"
(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.)
400' of 16" pipe from 0 to 400'
616' of 12" pipe from 350 to 966'
191' of 10" pipe from 904 to 1105'

Original depth to water 127 ft. above/below _____ Date _____

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

Sources of water: Principal _____; Others _____

See Vol. XXXIII

Production data: Date _____

Static depth to water 127 Measuring point _____

Pumping level 135 at 400 g.p.m.

Specific capacity 50 g.p.m. per ft. drawdown; Temperature 61½ °F.

Pump data; Type pump Turbine Column Dia. _____ Length 170

Cylinder or bowls: Dia. _____ Length _____ Suction pipe _____

Power Electric Airline _____

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

Use of water city supply

WATER ANALYSES (in parts per million)

Date sampled	Aug. 12, 1942			
Sampled by	K.E. Anderson			
Total solids	730			
Insoluble matter	17.0			
Alkalinity (Meo)	92.0			
Alkalinity (Phn)	0.0			
pH	8.2			
Fe_2O_3+ Mn_2O_3+Al_2O_3	0.5			
Alkali as sodium	283.5			
Calcium	14.0			
Magnesium	2.0			
Iron (unfiltered)	0.1			
Manganese	0.0			
Nitrate	0.44			
Fluoride	3.5			
Chloride	327.0			
Sulfate	112.4			
Bicarbonate	112.2			
Hardness (ppm)	43.4			
Hardness (gpg)	2.53			

Remarks _____

Laboratory data: Sample storage location _____

Sample range 35-1211 No. spls. 100 No. dupls. & cond. 29 prog.

Spls. prepared by _____ Washed range _____ by _____

Driller's log and cond. _____

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

Microscopic study _____ Hershey strip log Consolman

Gen. log _____ Correl. by _____

W # 201 C0400

STATE HYGIENIC LABORATORY, IOWA CITY, IOWA
WATER LABORATORY DIVISION
MINERAL ANALYSIS

LAB. NO. 904
MINERAL NO. 5295
7-23-57 19

TOWN Henson COUNTY Calhoun
OWNER OF SUPPLY Town of Henson
COLLECTOR'S NAME Ellis R. Williams
DATE COLLECTED 7-5-57 DATE RECEIVED 7-10-57
REPORT TO: NAME State Dept. Health
ADDRESS Des Moines, Iowa

FIELD DATA

SOURCE: WELL NAME, NUMBER, POINT OF COLLECTION, DEPTH, CONSTRUCTION DATE, ETC., North well, pumping station, 1220 ft. 3/6/33 reseed

WELL PUMPED 1 HRS. AT 250 GPM. DATE OF PREVIOUS SAMPLE
WAS SAMPLE FREE OF TURBIDITY WHEN COLLECTED yes
TEMPERATURE °C F 56 ALKALINITY (ppm $CaCO_3$) P T pH
IS A POLYPHOSPHATE BEING USED? no

LABORATORY ANALYSIS
(PARTS PER MILLION)

SPECIFIC CONDUCTANCE K AT 25°C 131 x 10^{-5}. TURBIDITY
DISSOLVED SOLIDS 767 SOLUBLE IRON (Fe) 0.10
TOTAL SOLIDS 767 SILICA (SiO_2) 9.6 TOTAL IRON (Fe) 0.10
ALKALINITY (ppm $CaCO_3$) P 4.0 T 87.0 pH 8.4 DATE 7-10-57

POSITIVE IONS		NEGATIVE IONS	
K^+	4.2	NO_3 – asN	<0.1
Na^+	265	F^-	4.0
Ca^{++}	15.0	Cl^-	292
Mg^{++}	1.6	SO_4^{--}	127
Mn^{++}	<0.05	HCO_3^-	96.4
Al^{+++}		CO_3^{--}	4.8

HARDNESS AS $CaCO_3$ 44.2 ppm 2.6 gpg
Clear when received.

ANALYST Dougherty
dt

R. L. MORRIS
PRINCIPAL CHEMIST

Code 1 W 201

STATE HYGIENIC LABORATORY, DES MOINES BRANCH
WATER LABORATORY DIVISION
MINERAL ANALYSIS

LAB. NO. 1751
MINERAL NO. 2766
Feb. 27 19 61

IOWA GEOLOGICAL SURVEY

TOWN Manson COUNTY Calhoun
OWNER OF SUPPLY Municipal
COLLECTOR'S NAME V. P. Boyles
DATE COLLECTED Jan. 27, 1961 DATE RECEIVED Jan. 30, 1961
REPORT TO: NAME Division of Public Health Engineering
ADDRESS State Department of Health

FIELD DATA

SOURCE: WELL NAME, NUMBER, POINT OF COLLECTION, DEPTH, CONSTRUCTION DATE, ETC., South or #2 well. 1224 ft deep. Drilled in 1928. Tap on pump discharge.

WELL PUMPED 1/2 HRS. AT 400 to 450 GPM. DATE OF PREVIOUS SAMPLE July 8, 1957
WAS SAMPLE FREE OF TURBIDITY WHEN COLLECTED yes
TEMPERATURE °C 59 F ALKALINITY (ppm $CaCO_3$) P 0 T 90 pH 8.0
IS A POLYPHOSPHATE BEING USED? none

New submersible pump 450 gpm G.M., setting at 300 ft. deep having a 6" column. Installed in August and September 1960. Recased to 1105' depth in June 1960.

LABORATORY ANALYSIS
(PARTS PER MILLION)

SPECIFIC CONDUCTANCE K AT 25°C 147 x 10^{-5}. TURBIDITY
DISSOLVED SOLIDS 803 SOLUBLE IRON (Fe) 0.18
TOTAL SOLIDS 803 SILICA (SiO_2) 10.4 TOTAL IRON (Fe) 0.18
ALKALINITY (ppm $CaCO_3$) P 6.0 T 76.0 pH 8.3 DATE Jan. 30, 1961

POSITIVE IONS		NEGATIVE IONS	
K^+	1.9	NO_3 – asN	<0.1
Na^+	278	F^-	4.0
Ca^{++}	16.0	Cl^-	330
Mg^{++}	1.9	SO_4^{--}	116
Mn^{++}	<0.05	HCO_3^-	76.1
Al^{+++}		CO_3^{--}	7.2

HARDNESS AS $CaCO_3$ 48.0 ppm 2.8 gpg
Calculated $pH_{(s)}$ = 8.5

ANALYST Ryan, Schwabbauer

bw

R. L. MORRIS
PRINCIPAL CHEMIST

carbon W#201

STATE HYGIENIC LABORATORY, DES MOINES BRANCH
WATER LABORATORY DIVISION
MINERAL ANALYSIS

LAB. NO. 726
MINERAL NO. 7442
25 Sep 19 69 bj

TOWN Manson COUNTY Calhoun
OWNER OF SUPPLY Municipal
COLLECTOR'S NAME J L Rattenborg
DATE COLLECTED 6 Aug 69 DATE RECEIVED 8 Aug 69
REPORT TO: NAME EES
ADDRESS SDH

FIELD DATA

SOURCE: WELL NAME, NUMBER, POINT OF COLLECTION, DEPTH, CONSTRUCTION DATE, ETC.,
Well #2 (South Well) Pump discharge tap 1211'

WELL PUMPED ____ HRS. AT 450 GPM. DATE OF PREVIOUS SAMPLE Feb '61
WAS SAMPLE FREE OF TURBIDITY WHEN COLLECTED Yes
TEMPERATURE °C ____ ALKALINITY (ppm $CaCO_3$) P ____ T ____ pH 8.8
IS A POLYPHOSPHATE BEING USED? No

LABORATORY ANALYSIS
(PARTS PER MILLION)

SPECIFIC CONDUCTANCE K AT 25°C 160 x 10^{-5}. TURBIDITY ____
DISSOLVED SOLIDS 863 SOLUBLE IRON (Fe) 0.08
TOTAL SOLIDS 863 SILICA (SiO_2) 10 TOTAL IRON (Fe) 0.08
ALKALINITY (ppm $CaCO_3$) P None T 74.0 pH 8.1 DATE 8 Aug 69

POSITIVE IONS		NEGATIVE IONS	
K^+	0.9	NO_3^-	0.8
Na^+	300	F^-	4.0
Ca^{++}	19.2	Cl^-	380
Mg^{++}	1.0	SO_4^{--}	110
Mn^{++}	< 0.05	HCO_3^-	90.3
Al^{+++}		CO_3^{--}	None

HARDNESS AS $CaCO_3$ 52.0 ppm 3.0 gpg

ANALYST Ryan

R. L. MORRIS
JHG PRINCIPAL CHEMIST

Calcd W#201

STATE HYGIENIC LABORATORY, DES MOINES BRANCH
WATER LABORATORY DIVISION
MINERAL ANALYSIS

LAB. NO. 725
MINERAL NO. 7441
25 Sep 19 69 bj

TOWN Manson COUNTY Calhoun
OWNER OF SUPPLY Municipal
COLLECTOR'S NAME J L Rattenborg
DATE COLLECTED 6 Aug 69 DATE RECEIVED 8 Aug 69
REPORT TO: NAME EES
ADDRESS SDH

FIELD DATA

SOURCE: WELL NAME, NUMBER, POINT OF COLLECTION, DEPTH, CONSTRUCTION DATE, ETC.,
Well #1 (North Well) Pump discharge tap 1228'
constructed 1905

WELL PUMPED ____ HRS. AT 350 GPM. DATE OF PREVIOUS SAMPLE Feb '61
WAS SAMPLE FREE OF TURBIDITY WHEN COLLECTED Yes
TEMPERATURE °C ____ ALKALINITY (ppm $CaCO_3$) P ____ T ____ pH 8.8
IS A POLYPHOSPHATE BEING USED? No

LABORATORY ANALYSIS
(PARTS PER MILLION)

SPECIFIC CONDUCTANCE K AT 25°C 160 x 10^{-5}. TURBIDITY ____
DISSOLVED SOLIDS 856 SOLUBLE IRON (Fe) 0.18
TOTAL SOLIDS 856 SILICA (SiO_2) 11 TOTAL IRON (Fe) 0.18
ALKALINITY (ppm $CaCO_3$) P None T 78.0 pH 8.0 DATE 8 Aug 69

POSITIVE IONS		NEGATIVE IONS	
K^+	0.9	NO_3^- [redacted]	0.6
Na^+	300	F^-	4.4
Ca^{++}	19.2	Cl^-	340
Mg^{++}	< 0.1	SO_4^{--}	130
Mn^{++}	< 0.05	HCO_3^-	95.2
Al^{+++}		CO_3^{--}	None

HARDNESS AS $CaCO_3$ 48.0 ppm 2.8 gpg ____

ANALYST Ryan, Morlan

R. L. MORRIS
JHG PRINCIPAL CHEMIST

STATE HYGIENIC LABORATORY
The University of Iowa
Medical Laboratory Building
Iowa City, Iowa 52242
319-353-5990

W#201

Lab No. 4994

COMPLETE MINERAL ANALYSIS

Mineral No. 11510

TOWN Manson COUNTY Calhoun

Reported JUL 09 1975

OWNER OF SUPPLY Town

Sampled 22 Apr 1975

COLLECTOR'S NAME John LeFebvre

Received 25 Apr 1975

REPORT TO: Department of Environmental Quality
3920 Delaware
Des Moines, Iowa 50316

FIELD DATA

SOURCE Well #2

SAMPLING POINT Tap -- South

Record to 1105' June 1960

WELL DATA

NAME OR NUMBER

CONSTRUCTION DATE

DEPTH 1211'

PUMPED 1 HRS AT 450 GPM

WAS SAMPLE FREE OF TURBIDITY WHEN COLLECTED Yes

TEMPERATURE °C ALKALINITY (mg/1 $CaCO_3$) P T pH

IS A POLYPHOSPHATE BEING USED? No DATE OF PREVIOUS SAMPLES 1969

LABORATORY ANALYSIS (Milligrams per Liter)

Specific Conductance at 25°F 1500 Micromhos Silica (SiO_2) 7.6

Total Residue 918 Soluble Iron (Fe) <0.01

Filtrable Residue 918 Total Iron (Fe) <0.01

Alkalinity as $CaCO_3$ P 4.0 T 80.0 pH 8.3 pHs 8.44

Hardness as $CaCO_3$ 58.0 mg/l 3.4 gpg Stability Index 8.58

CATIONS		ANIONS		TRACE METALS		RADIOACTIVITY (picocuries/L)	
(K+)	4.5	(NO_3^-)	1.4	As	<0.01	Gross Alpha	4.0
(Na+)	290	(F^-)	5.2	Ba	<0.1	226 Radium	0.5
(Ca++)	17	(Cl^-)	340	Cd	<0.01	Gross Beta	12
(Mg++)	2.0	($SO_4^=$)	120	Cr	<0.01	90 Strontium	<0.4
(Mn++)	<0.01	(HCO_3^-)	87.8	Cu	<0.01	Other	
		($CO_3^=$)	4.8	Pb	<0.01		
		(CN^-)		Hg	<1 ug/L	Organics	
		($PO_4^=$)		Se		CCE_m	
				Ag	<0.01	CAE_m	
				Zn	0.02	MBAS	

PESTICIDES (mg/L)

Chlorinated Hydrocarbons	Organophosphate & Carbamates	Herbicides

R L Morris Principal Chemist

W J Hausler Jr, PhD, Director

Calcium W #201

Central Laboratory:
Medical Laboratories Building
Iowa City, Iowa 52242
319/353-5990

STATE HYGIENIC LABORATORY
The University of Iowa

Branch Laboratory:
Room 405
East 7th and Court Streets
Des Moines, Iowa 50309
515/281-5371
Send Samples Here.

COMPLETE MINERAL ANALYSIS

GENERAL INFORMATION

TOWN Manson COUNTY Calhoun

REPORT TO: DEQ
3920 Delaware
Des Moines, IA (Zip)

DATE RECEIVED: 4/27/77

Laboratory Number 4277 Mineral Number 13262

WELL DATA

Well Number
Depth ft.
Date of Construction
Hours Pumped
Rate Pumped gpm.

FIELD DATA

Collector's Name Petersen Date of Collection 4/26/77 Date of Previous Sample
Source of Sample Manson Public Water Supply Sampling Point: Raw water tap, well #2

Was sample free of Turbidity when collected? ☒ Yes ☐ No
Was Polyphosphate used? ☐ Yes ☒ No
pH Specific Conductance @ 25°C (77° F) micromhos.
Alkalinity mg/liter as $CaCO_3$ P T

LABORATORY ANALYSIS

Specific Conductance @ 25°C (77°F) 1600 micromhos. Stability Index 8.97 pH(s) 8.51
Soluble Iron 1.1 mg/L Total Iron 1.1 mg/L Silica (SiO_2) 8.8 mg/L pH 8.05
Filterable Residue 854 mg/L Total Residue 854 mg/L Hardness as $CaCO_3$ 48.5 mg/L
Alkalinity as $CaCO_3$ P none mg/L T 74.0 mg/L 2.8 gpg

CATIONS: (mg/liter)

Potassium	16
Sodium	280
Calcium	16
Magnesium	1.6
Manganese	0.01

ANIONS: (mg/liter)

Nitrate	<0.1
Fluoride	4.4
Chloride	360
Sulfate	100
Bicarbonate	90.3
Carbonate	none

TRACE METALS: (mg/liter)

Arsenic	<0.01	Silver	<0.01
Barium	<0.1	Strontium	
Cadmium	<0.01	Aluminum	
Chromium	<0.01	Zinc	0.01
Copper	0.01	Nickel	
Lead	<0.01		
Mercury	<0.001		
Selenium	<0.01		

RADIOACTIVITY: (picocuries/liter)

Gross Alpha	1.2
^{226}Radium	-
Gross Beta	1
^{90}Strontium	-

PESTICIDES: (mg/liter)
Chlorinated Hydrocarbons:

Organophosphates and Carbamates:

HERBICIDES:

ORGANICS:

COMMENTS: Small amount of sediment in sample on receipt in lab

Date of Preliminary Report JUN 14 1977 Date of Final Report OCT - 4 1977

W. J. Hausler, Jr., Ph.D.
Director

2670

STATE HYGIENIC LABORATORY
The University of Iowa

Central Laboratory:
Medical Laboratories Building
Iowa City, Iowa 52242
319/353-5990

W#201 7-31-79
Branch Laboratory:
Room 405
East 7th and Court Streets
Des Moines, Iowa 50309
515/281-5371
Send Samples Here.

COMPLETE MINERAL ANALYSIS

GENERAL INFORMATION

TOWN Manson COUNTY Calhoun

REPORT TO: DEQ
3920 Delaware
Des Moines, IA (Zip)

DATE RECEIVED: 4/27/77

Laboratory Number 4276 Mineral Number 13261

WELL DATA

Well Number
Depth ft.
Date of Construction
Hours Pumped
Rate Pumped gpm.

FIELD DATA

Collector's Name Petersen Date of Collection 4/26/77 Date of Previous Sample
Source of Sample Manson Water Supply Sampling Point: Raw water, well #1

Was sample free of Turbidity when collected? ☒ Yes ☐ No
Was Polyphosphate used? ☐ Yes ☒ No
pH Specific Conductance @ 25°C (77° F) micromhos.
Alkalinity mg/liter as $CaCO_3$ P T

LABORATORY ANALYSIS

Specific Conductance @ 25°C (77°F) 1500 micromhos. Stability Index 8.86 pH(s) 8.48
Soluble Iron 0.24 mg/L Total Iron 0.24 mg/L Silica (SiO_2) 8.8 mg/L pH 8.1
Filterable Residue 824 mg/L Total Residue 824 mg/L Hardness as $CaCO_3$ 47.0 mg/L
Alkalinity as $CaCO_3$ P none mg/L T 80.0 mg/L 2.7 gpg

CATIONS: (mg/liter)
Potassium 10
Sodium 270
Calcium 16
Magnesium 1.6
Manganese 0.01

ANIONS: (mg/liter)
Nitrate <0.1
Fluoride 4.4
Chloride 320
Sulfate 120
Bicarbonate 97.6
Carbonate none

TRACE METALS: (mg/liter)

Arsenic	<0.01	Silver	<0.01
Barium	<0.1	Strontium	
Cadmium	<0.01	Aluminum	
Chromium	<0.01	Zinc	0.01
Copper	<0.01	Nickel	
Lead	<0.01		
Mercury	<0.001		
Selenium	<0.01		

RADIOACTIVITY: (picocuries/liter)
Gross Alpha 1.1
^{226}Radium –
Gross Beta NIL
^{90}Strontium –

PESTICIDES: (mg/liter)
Chlorinated Hydrocarbons:

Organophosphates and Carbamates:

HERBICIDES:

ORGANICS:

COMMENTS:

Date of Preliminary Report JUN 14 1977 Date of Final Report OCT - 4 1977

W. J. Hausler, Jr., Ph.D.
Director

2670

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 089-31W-17BAB
Aquifer Code(s) Z X
Owner's Name MANSON CITY #2 (1928)
W Number 00201

Card Q

State: IOWA [19] (1 2) County: CALHOUN [13] (3 4) Town: MANSON, IOWA

Well No. Latitude [42 31 45 N] (5–11) Longitude [094 32 03] (12–18) Seq. No. [1] (19) Date M D Y [08 06 69] (20–25)

Sampling Depth [1211] (26–29) Type [1] (30) Kx10^6 [1600] (31–35) pH [8.8] (36–38) Temp. °F [ ] (39–41)

SiO_2 [10.] (42–44) Ca [19.] (45–49) Mg [10.] (50–53) Na [300.] (54–58) K [.9] (59–61)

HCO_3 [90] (62–65) CO_3 [0] (66 67) SO_4 [110.] (68–72) Cl [380.] (73–78) Source No. [3] [Q] (79 80)

Card R

Duplicate Columns 1-25 from Card Q

F [.40] (26–28) NO_3 [.8] (29–32) PO_4 [ ] (33–35) B [ ] (36–38) Al [ ] (39–41) Fe [.08] (42–45)

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

Determined Solids [863] (58–63) Calc. [ ] (64–69) Ca,Mg Hardness [52] (70–73) Non-Carb. [0] (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 $CaCO_3$ [74] (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. 089-31W-17BAB
Aquifer Code(s) ZX
Owner's Name MANSON CITY #2 (1928)
W Number 00201

Card Q

State: IOWA [1 2: 19] County: CALHOUN [3 4: 13] Town: MANSON, IOWA

Field	Columns	Value
Well No. Latitude	5–11	423145N
Longitude	12–18	0943203
Seq. No.	19	1
Date (M D Y)	20–25	070857
Sampling Depth	26–29	1211
Type	30	1
$K \times 10^6$	31–35	1290
pH	36–38	8.4
Temp. °F	39–41	56
SiO_2	42–44	11.
Ca	45–49	14.
Mg	50–53	2.1
Na	54–58	274.
K	59–61	4.0
HCO_3	62–65	93
CO_3	66–67	5
SO_4	68–72	112.
Cl	73–78	301.
Source	79	3
No.	80	Q

Card R

Duplicate Columns 1-25 from Card Q

Field	Columns	Value
F	26–28	4.5
NO_3	29–32	.4
PO_4	33–35	
B	36–38	
Al	39–41	
Fe	42–45	.07
Mn	46–49	.05
Cu	50–52	
Pb	53–54	
Zn	55–57	
Solids Determined	58–63	784
Solids Calc.	64–69	
Hardness Ca,Mg	70–73	44
Hardness Non-Carb.	74–77	0
Color	78–79	
No.	80	R

Card S

Duplicate Columns 1-25 from Card Q

Field	Columns	Value
Br	26–28	
I	29–31	
Alk. as $CaCO_3$	32–35	84
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.	80	S

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. 089-31W-17BAB
Aquifer Code(s) ZX
Owner's Name MANSON CITY #2 (1928)
W Number 00201

Card Q

State: IOWA (19) County: CALHOUN (13) Town: MANSON, IOWA

Well No. Latitude 42 31 45 N (5–11) Longitude 094 32 03 (12–18) Seq. No. 1 (19) Date M D Y 08 10 42 (20–25)

Sampling Depth 1211 (26–29) Type 1 (30) $Kx10^6$ (31–35) pH 8.2 (36–38) Temp. °F 62 (39–41)

SiO_2 (42–44) Ca 14 (45–49) Mg 20 (50–53) Na 284 (54–58) K .C (59–61)

Source No. 3 Q

HCO_3 112 (62–65) CO_3 (66–67) SO_4 112 (68–72) Cl 327 (73–78)

Card R

Duplicate Columns 1-25 from Card Q

F 35 (26–28) NO_3 .1 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe .1 (42–45)

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

Solids Determined 730 (58–63) Calc. (64–69) Hardness Ca,Mg 43 (70–73) Non-Carb. 0 (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 $CaCO_3$ 92 (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:

089-31W-17BAB

2X

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

W-020:

Water Quality
(ppm)

Card Q

State: IOWA (1 2: 16) County: CALHOUN (3 4: 13) Town: MANSON

Well No. (5–11: Latitude 42 31 45 N) (12–18: Longitude 094 32 03) Seq. No. (19: 1) Date (20–25: M 01, D 27, Y 76)

Sampling Depth (26–29: 121) Type (30: 1) Kx10⁶ (31–35: 470) pH (36–38: 8.8) Temp. °F (39–41: 59)

SiO_2 (42–44: 10.) Ca (45–49: 16.) Mg (50–53: 1.9) Na (54–58: 27.4) K (59–61: 1.9)

HCO_3 (62–65: 78) CO_3 (66 67: 7) SO_4 (68–72: 110.) Cl (73–78: 330.) Source No. (79–80: 3 Q)

Card R

Duplicate Columns 1-25 from Card Q

F (26–28: .40) NO_3 (29–32: .4) PO_4 (33–35: .) B (36–38: .) Al (39–41: .) Fe (42–45: .18)

Mn (46–49: .40) Cu (50–52: .) Pb (53 54: .) Zn (55–57: .)

Determined Solids (58–63: 883) Calc. (64–69:) Ca,Mg Hardness (70–73: 48) Non-Carb. (74–77: 0)

Color (78 79:) No. (80: R)

Card S

Duplicate Columns 1-25 from Card Q

Br (26–28: .) I (29–31: .) Alk. as $CaCO_3$ (32–35: 76) 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. (80: S)

Verified PMJ

Punched FCH

Recorded by: D. AARONSON

Punched by: _____ Date: _____

Published:

Sheet No. 1 Name of Well Survey No. W-0201

Location Manson, Calhoun Co. Date Drilled Analyst Hershey

00
10
20
30

Interval 90-174 one sample

40 Clay, Sand, Gravel - yellow, highly calc.

Unleached & oxidized drift

50
60
70

-174

Interval 174-200 one sample

80 Clay & silt - yellow, highly calc, very few sand grains

Drift

90

Sheet No. ..... Name of Well ..... Survey No. W-0201

Location Manson, Calhoun Co. Date Drilled ..... Analyst .....

00 — 200

Interval 200 - 230 - one sample.

Clay - light gray, highly calc, silty.
Sample contains some sand and little fine gravel.

10

20

30

40

50

60

70 — 270

80 — 280

90 — 290

00

Sheet No. ..... Name of Well ..... Survey No. W-0201

Location Manson, Calhoun Co. ..... Date Drilled ..... Analyst Harshey

00

May be included in glacial clay

Shale - dark gray, non-calc., compact, slightly gritty when ground between teeth, shows shaly structure in several fragments. Material ground up in drilling becomes highly calc., silty & sandy (possibly mixed with cave glacial material

10 — 510

Clay - gray, calc. with 35% sand & gravel mixed.
Sd - maj. gr 1-½ mm., prin. subs. ½-¼, 2-1 mm., max. 6 mm.; ang. to curv qtz., ls., dolom., qtzite., dark & light igneous material, little pyrite?. See under, green min. in ls. Some greenish gray, non-calc., unctuous shale?
(Rusty coals from surface)

20 — 520

Clay - gray, with much silt & sand mixed, highly calc., micac.
Sd - maj) gr. 1-½ mm., max. 10 mm., ang to curv. qtz, ls., dolom, qtzite., dark & rotten light igneous material. Small amt. of carbonaceous material very soft. Small amt. of greenish gray, non-calc., unctuous, soft, shale?. chert.
Some ironstain (Unleached & unoxid drift)

30 — 530

Clay - gray, silty & sandy, calcareous, micaceous, with some gravel
Sd mixed with clay - maj. gr. 1-½ mm, gravel up to 17 mm., ang. to curv. qtz, ls, dolom., dark igneous material, rotten granitic frags.; small amt. black carbonaceous material. Small amount of yellow-brown & red iron staining. Qtzite?
(Unleached & unoxidized drift).

40 — 540

Sand - drab gray; maj. gr. ½-¼ mm., prin. subs. ½-¼, ¼-⅛ mm., max. 5 mm. ang. to curv. qtz, ls., dolom., light & dark igneous material, gray shale showing shaly structure & non-calc., feld., chert, etc. (ss? frags. with calc. cement). Aragonite (columnar)
(Typical glacial sand except possibly for shale & ss?)

50 — 550

Sand - drab gray, maj. gr ½-¼ mm., prin. subs ¼-⅛, 1-½ mm. max 11 mm. Similar to 540-550

Shale 15% - med. dark gray to light greenish gray, non-calc., very slightly gritty when ground between teeth, micaceous, flecked with black soft carbonaceous material.

60 — 560

Shale - med. gray, non-calc., gritty between teeth, micaceous, shows shaly structure.

Sample contains 50% sand similar to 540-550 (probably cave) bonded by ground-up shale & calc. material.
Siltstone? < 2% - White

70 — 570

Sand - glacial, very dirty, some shale

80 — 580

Sand - glacial, very dirty, little shale.

90 — 590

Shale - gray, somewhat calc., silty in part, micac., slightly pyritic.
One fragment of

00 — 600

80% of sample composed of glacial? sand (cave)

Sheet No. ..... Name of Well ..... Survey No. W-0201

Location Manson Calhoun Co. Date Drilled ..... Analyst Hershey

600

Shale - red & gray, highly calc., silty. Gray material hard compact micac.
Red apparently softer and its structure completely destroyed by drilling, may be non-calc. Siltstone ??
Sample contains 30% glacial sand.

10 — 610

Shale - deep brick red & gray

20 — 620

30

40

50

60

70

80

90

Siltstone - deep brick red, little gray, non-calc, micac.

Shale dark greenish gray, non-calc, micac.
Calcite
Gypo ??

700

Sheet No. 1 Name of Well Manson City well Survey No. 0201

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

00

10

20

35 clay mx drkish gry. calc sdy dr. ft

30

40

50

60

70

80

90 glacial
sdy gravel — 60% sd - m.g. 1-1/2 gravel 40%

00

Sheet No. 2 Name of Well. Manson City Well #2 Survey No. 020

Location ..... Date Drilled..... Analyst. D.M.S. 2-25-42

00

10

20

30

40

50

60

70

74 clay, yell-bf, gray in part, sdy & gravelly Calc

80

90

clay, tan, silty slt sdy, calc

200

Sheet No. 3 Name of Well. Manson city #2 Survey No. 020.1

Location ..... Date Drilled..... Analyst Davis 2-25-42

00

10

20

clay, gry, sl. sdy w. qtz, ig. & ls pebs
2 Traces of red.

30 30

40

50 50 clay drbsh gry, sl sdy, slty, calc

K(?) 2

60

70 70 clay, m gry, calc. w. limonite pellets 10% ls, dolom
Tr. coal ls. m-fitho, glauc in part

clay, m gry, calc. w. red. sl rk cd spots - limonite (?)
80 80 10% dol, lt gry, m xl d se, 10% wh & grnsh silic clay like calc. (?)

clay, m drbsh gry, calc few w red spots 10% dol gry sublith
to m dse, in pebbles. Clay sdy - some C some A
Tr. wh. material aa (?)

90 90 clay, m gry, calc, few red spots, 15% dol frag - wh. m -
10% sd & granules - silic & ig.

100 100

Sheet No. 4 Name of Well. Manson city #2 Survey No. 020

Location ..... Date Drilled ..... Analyst. Davis-Bates

300 First good sh.

sh. — gry, hard compact, rough shly struct noncalc.

60% clay — lumpy, — drb sh gry, calc., 10% dolo, pebbles & qtz sd. Tr. weathered igneous

10

Clay sh. — drb. lumpy calc. 90% sd & granules polished (K?)
10% dol frag & pebbles

20 20

clay, — drb gry, lumpy, calc. 2% sd
5% dol. frag.

30 30

clay, — gry. lumpy calc. 10% sh, drk drb, uncl.
60% dol frag - yell, gry, white

40 40

clay aa. 5% dol frag. 5% qtz sd
Tr. ig. frag. (?)
weathered

3 50 50

clay or sh. drk drb to drb sh brn 3% dol.
frag

60 60

clay or. sh. — gry & sh tough rough lam
5% dolo frag & qtz sd

70 70

clay or sh — gry. lumpy calc.
5% dolo frag

80 80

clay or sh aa 5% dol 3% sd - some polished.

90 90

clay aa & sh. — drk gry. 2 lumps of ss of chT & chalced, grains cemented by clay & iron oxide

400

Sheet No. 5 Name of Well Monsoon City #2 Survey No. 0201

Location ..... Date Drilled ..... Analyst Davis 2-26-42

400

clay or sh., lt.-m. drbsh gry, calc
tr. dol. frag

10 410

clay a.a. 2% dol. frag. Tr. sd polished.

20 420

clay a.a. 10% dol. frag. Tr. altered ig. frag.
5% Polished sd & peb.

30 430

clay a.a. & dk. grey unctuous w. slight lum
Tr. ig. frag. Red fragments.

40 440

clay, a.a. 9% wht ig(?) silic. frag
2% sd

450 450

460

a.a.

60 460

70 470

sh, dk. drbsh gry, w. fish scales
60% clay pale brn, silty Tr qyp

80 480

sh or clay m gry calc 5% sd. & sh dk drbsh gry a.a.

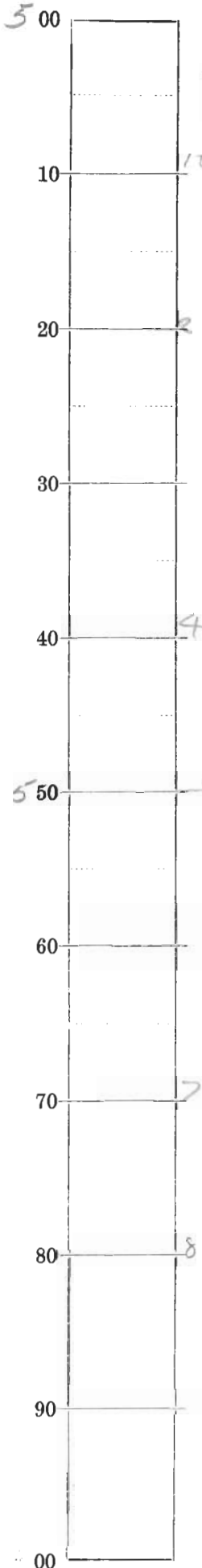
90 490

sh or clay a.a.

500

Sheet No. 6 Name of Well. Mason City #2 Survey No. 020.1

Location ..... Date Drilled ..... Analyst. Davis 2-26-42



Clay, m gry, wh & pink. 25% sd. & granules
tr. clr. white

clay, m gry sdy 10% sd

clay, m. gry 15% sd & granules
tr. siderite conc. small

sd & granules poorly sorted. larger
grains polished — rounded clr grains

sd & granules aa & 40% clay m gry

sd & granules aa 40% clay m drb sh gry
much limonite stain

sd & gravel aa % clay aa

50% clay m drb shgry

Sheet No. 7 Name of Well Manson City Survey No. 0201

Location ..... Date Drilled ..... Analyst Davis 2-26-42

500

Sh. red, micac. silty 80% 25% ash in drk sh. gry. silty
35% sd. glacial ? Tr sid. pellet

10 — 510

Sh. red micac silty w few streaks of gry.
15% sh. gry aa 30% sd glacial (?)
Tr. sid. pellets

20 — 520

Sh. red. micac. ~~sil~~ silty micac 20% sh. gry. aa
40% sd. f granules glacial (?)
Tr. sid pellets.

30 — 530

Sh. red. micac silty. c 5% sh., gry a
25% sd f glacial (?)

40 — 540

Sh. red. aa 55% sd.

550

Sh. red. silty micac w wh. streaks

60 — 560

Sh. red. silty micac. w. wh streaks

70 — 570

Sh. red. silty micac 5% sh, m-drk drksh gry
cave (?)

80 — 580

Sh. red silty micac 2% sh - m - drk drksh gry. cave ?
2% dol. frag. 2% sd. cave (?)

90 — 590

NS

600

Sheet No. 8 Name of Well Manson city #2 Survey No. 020

Location ..... Date Drilled ..... Analyst Davis 2-22-42

700

sh, red silty, micac. w. White streaks
25% sd caved (?)
Tr pyr.

10 — 10

sh red silty micac w. streaks silty stone
wh. v. micac.

20 — 20

sh, red silty micac s/s a.a
Tr. sh, drk drb grn 10% sd caved (?)

30 — 30

sh, red silty micac w/ streaks & spots

40 — 40

sh, red silty micac 60% sd caved (?)

750 — 50

sh, red sl. silty micac 80% sd. & granules caved?

60 — 60

sh, red & wh grn ⅓ sl silty micac

70 — 70

aa tr v. altered ig

80 — 80

sh, red s/s silty micac 60% sd caved (?)
Fossil frag (?)

90 — 90

sh, red, st silty micac 80% sd (caved?-kdf)
& granules

800 — 00

Sheet No. 9 Name of Well. Monsen city #2 Survey No. 020.1.

Location ..... Date Drilled ..... Analyst Davis 2:27-92

800

sh, red & gry i/l sl silty & micac. 20% sd & granules caves

10 — 10

sh. red & gry, slty micac Same calc. material 2% sd cave(?)

20 — 20

sh, red, slty, & micac, some gry 75% sd & granules cave(?)

30 — 30

sh, red slty micac. w. wh. streaks p.s. in part

40 — 40

sh. reddish brn & gry, micac silty 30% white chalk 30% sd & granules cave(?)

850 — 50

Tr. weathered ig. frag.

sh or clay, m. dk brn & gry 2-5% sd cave(?) 2% silic calc material - weathered ig. (?)

60 — 60

sh or clay a.a. Tr. dol. m gry, cr. vf dse 5% sd & granules (cave(?)) 2% l/s, wh, f-crse weathered (?)

70 — 70

Dol. pale gry, m xl dse to m gry f. xl, dse 15% cht. wh. op. 40% sd & granules cave 15% sh or clay m gry.

80 — 80

clay or sh. m gry. 2% wht. chalky calc. material 5% sd & granules cave(?) Tr. dol. & cht, w.

90 — 90

a.a.

900

Sheet No. 10 Name of Well... Manson City #2 Survey No.. 0201

Location ..... Date Drilled..... Analyst.. Davis 2-28-42

7 00

clay or sh m-dk drbsh gry 70% sd. cave (?)
2% dol. m-dse 1% cht. w ls.

10 10

sh. red-pink, slty calc in part (?)
Tr sd cave (?)

20 20

sh. gry-sh pink, Tr sd. Bad sple

30 30

sh and/or clay, lt. red to gry 5.0% + sd (cave)
Tr. dol. frag Bad sple

40 40

Ground up mixture of sd. red to gry sh, cht, dol
Bad Sple

7 50 50

clay, pink sh gry, sl. y sd % sd grains
dolo frag.

60 60

clay, m gry calc. Tr. sd + cht.

70 70

sh or clay, m gry. somewhat calc
2% sd + cht.

80 80

sh, dk drbsh gry 60% sd. cave (?)
2% cht frag

90 90

Ss. 70% sd

10 00

Sheet No. 11 Name of Well Manson # 2 Survey No. 0201

Location Date Drilled Analyst Davis 2-2004

1000 00

clay, gry, 60% wsd, 10% weathered ig. frag + silic material (may include cht.) Tr. 940(?)

10 — 10

clay, gry, 10% sd + siliceous material

20 — 20

30

40

0 50

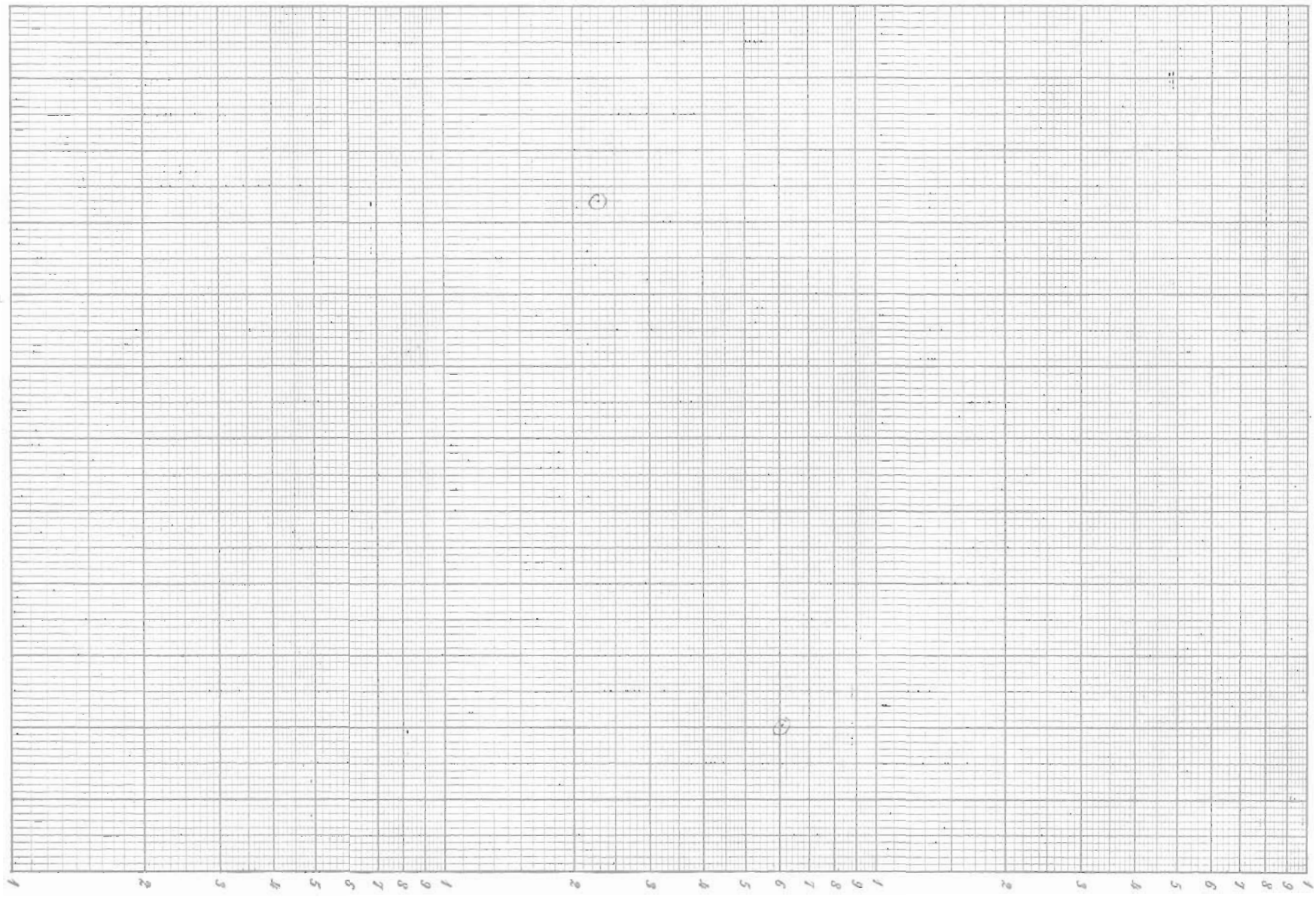
60

70

80

90

11 00



Otto Engineering Company, p.c.

CONSULTING ENGINEERS & LAND SURVEYORS

1405 WEST MAIN STREET
P.O. BOX 431
SAC CITY, IOWA 50583
PHONE 712-662-7165

320 E. SIXTH STREET
STORM LAKE, IOWA 50588
PHONE 712-732-6001

HOWARD E. WATTS P.E.
RICHARD H. VREELAND L.S.
CHARLES A. TAPLEY L.S.
FRANK H. FLORES P.E.
JACK W. HEUTON P.E.
KENNETH L. BERGESON, P.E.
NEAL R. KUEHL, P.E.

March 29, 1974

Mr. Paul Horick
Iowa Geological Survey
16 West Jefferson Street
Iowa City, Iowa 52240

Dear Paul,

The city of Manson, Calhoun County, Iowa, is giving consideration to drilling a new well. As you know, this is in the Manson "disturbed section".

We would appreciate a forecast, and any suggestions you may have.

Very truly yours,

OTTO ENGINEERING COMPANY, P.C.
SAC CITY, IOWA

Frank H. Flores, P.E.

FHF:nmo

GW Manson Gen Data
Calhoun Co.

April 3, 1974

Mr. Frank H. Flores, P.E.
Otto Engineering Company, P.C.
1405 West Main Street
P. O. Box 431
Sac City, Iowa 50583

Dear Frank:

Enclosed are some pertinent construction and hydrologic data on the two existing municipal wells at Manson, Iowa. Water analyses and a generalized log of the abnormal stratigraphic section in well No. 2 are also enclosed.

The rocks underlying this area are so unpredictable I hesitate to make definite forecasts of what you could expect here. However, based on the existing town wells, the outlook appears faitly good for developing another well that will perform as good as the present wells.

The main water zone in these wells apparently is the arkosic-like sandstone between 1100 and 1200 feet. Deeper drilling must be considered as speculative exploration. We will be very interested in the new well at Manson in all respects and trust you will save a complete set of drill cuttings and hydrologic data for us.

If I can be of further assistance, please feel free to contact me.

Very truly yours,

Paul J. Horick
Chf. Groundwater Geol.

PJH:mph
Enclosures

Manson city well No. 2 (1928)

Formation	Depth range (ft)
Pleistocene Series (glacial drift)	-0-175
Cretaceous System (undifferentiated shale, minor limestone beds)	175-550
Dakota (?) Sandstone	550-610
Red shale	610-810
Mixture of gray shale, red shale, siltstone, and thin limestone and dolomite	810-1010
Undifferentiated igneous rocks, tuffaceous, feldspars, chlorites, arhosic	1010--1211

IOWA PRESS
CLIPPING BUREAU
Des Moines, Iowa

Journal
Manson, Iowa
Calhoun
MAR 10 1942

The Water Level of Manson Well Same as That a Year Ago

The water level of the Manson City well is the same as a year ago, as revealed by tests conducted recently by Ellis Williams, water superintendent.

When the state geological survey released figures recently, telling how the water level of shallow wells over the state had risen, people here became curious to know if Manson's deep well was affected.

Tests show the water level to be 127 feet, the same as when the tests were taken about a year ago. Previous to that time each test showed that the level had gone down somewhat, from the original level of approximately 96 feet when the well was first measured, better than 40 years ago.

During the late 20's the water level dropped rather rapidly, causing considerable worry as to whether the supply might eventually be insufficient for the town. Then it was surprising that the drouth years showed little effect on it.

There has always been a strong pressure in the well, so that, while constant pumping would lower the water a little, it came back immediately to its own level as soon as pumping stopped.