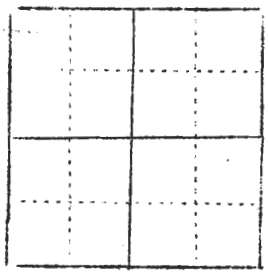
IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey

W 6045

RECORD OF WELL



Location:

Town: Sutherland (N E / S W) :County O'Brien

NW NE SW sec. 7 T 94 N.,R. 39 ~~E.~~ W. _____ Twp.

Well name and number _____

Owner City of Sutherland Address Sutherland Iowa

Tenant _____ Address _____

_____

Contractor T. W. Thorpe Well Co. Address Des Moines

Drillers Wm. Hogan

Drilling dates 3/5/53 To 6/12/53

Well data:
Elevations: Drilling curb 1467 ?? feet; Land surface probably wrong feet

_____

_____

Determined by Elevation on Well #1 & 2

Topographic position Upland

Total depth: Reported 450' feet, Measured _____ feet

_____

Drilling method Cable Tool

Hole and casing data _____

419' 11" OF 12" PIPE

_____

_____

_____

Original depth to water 243.6 ft. above / below _____ Date 6/12/1953

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

_____

Sources of water: Principal Pleist ~~Cret.~~ ; Others _____

_____

Production data: Date _____

Static depth to water _____ Measuring point _____
Pumping level _____ at _____ g.p.m.
_____ _____
_____ _____
_____ _____

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				
$Fe_2O_3+Mn_2O_3+Al_2O_3$				
Alkali as sodium				
Calcium				
Magnesium				
Iron (unfiltered)				
Manganese				
Nitrate				
Fluoride				
Chloride				
Sulfate				
Bicarbonate				
Hardness (ppm)				
Hardness (gpg)				

Remarks _____

Laboratory data: Sample storage location EB5-2,3
Sample range 2-450 No. spls. 91 No. dupls. & Cond. 79 Fair
Spls. prepared by DeRoma Washed range 326-450 by DeRoma
Driller's log and cond. _____
Insoluble residues: Prepared by _____ Studied by _____ Strip log _____
Microscopic study _____ strip log 7/8/53
Gen. log _____ Correl. by NORTHUP

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 094-39W-07CAB
Aquifer Code(s) KIDI
Owner's Name SUTHERLAND CITY #3 (1933)
W Number 6045

Card Q

State: IOWA [19] (1 2) County: O'BRIEN [71] (3 4) Town: SUTHERLAND, IOWA

Well No. Latitude [42 58 24 N] (5–11) Longitude [095 30 09] (12–18) Seq. No. [1] (19) Date M D Y [09 06 67] (20–25)

Sampling Depth [471] (26–29) Type [1] (30) Kx10^6 [2200] (31–35) pH [6.9] (36–38) Temp. °F [ ] (39–41)

SiO_2 [23.] (42–44) Ca [296.] (45–49) Mg [68.] (50–53) Na [130.] (54–58) K [9.2] (59–61)

HCO_3 [366] (62–65) CO_3 [0] (66 67) SO_4 [970.] (68–72) Cl [6.5] (73–78) Source No. [3] (79) [Q] (80)

Card R

Duplicate Columns 1-25 from Card Q

F [.5] (26–28) NO_3 [.1] (29–32) PO_4 [ ] (33–35) B [ ] (36–38) Al [ ] (39–41) Fe [2.7] (42–45)

Mn [.66] (46–49) Cu [ ] (50–52) Pb [ ] (53 54) Zn [ ] (55–57)

Solids Determined [1870] (58–63) Calc. [ ] (64–69) Hardness Ca,Mg [1020] (70–73) Non-Carb. [720] (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:

Published:

094-39W-07 CAB
KDD

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Sutherland town (1953)
W-6045

Water Quality
(ppm)

Card Q

State: Iowa (16) County: O'Brien (71) Town: Sutherland

Well No. 42 58 24 N (Latitude, 5–11) 095 30 09 (Longitude, 12–18) Seq. No. 1 (19) Date M 06 D 12 Y 53 (20–25)

Sampling Depth 471 (26–29) Type 1 (30) Kx10⁶ 1670 (31–35) pH 7.3 (36–38) Temp. °F 52 (39–41)

SiO_2 (42–44) Ca 304 (45–49) Mg 85 (50–53) Na 118 (54–58) K 1.1 (59–61)

HCO_3 344 (62–65) CO_3 0 (66–67) SO_4 1010 (68–72) Cl 11 (73–78) Source No. 3 (79) Q (80)

Card R

Duplicate Columns 1-25 from Card Q

F 0.8 (26–28) NO_3 4.1 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe X30 (42–45)

Mn 030 (46–49) Cu (50–52) Pb (53–54) Zn (55–57)

Solids Determined 1830 (58–63) Calc. (64–69) Hardness Ca,Mg 1110 (70–73) Non-Carb. 825 (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 $CaCO_3$ 282 (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: P. J. Horick

Punched by: Punched FCR Date:

Published: Verified ERC

094-39W-07 CAB
KDD

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Sutherland Town (1953)
W-6045

Water Quality
(ppm)

Card Q

State: Iowa [16] (1 2) County: O'Brien [71] (3 4) Town: Sutherland

Well No. Latitude 42 58 24 N (5–11) Longitude 095 30 09 (12–18) Seq. No. 1 (19) Date M 04 D 17 Y 62 (20–25)

Sampling Depth 471 (26–29) Type 1 (30) Kx10^6 2150 (31–35) pH 7.2 (36–38) Temp. °F (39–41)

SiO_2 24 (42–44) Ca 288 (45–49) Mg 88 (50–53) Na 123 (54–58) K 9.4 (59–61)

HCO_3 368 (62–65) CO_3 0 (66 67) SO_4 956 (68–72) Cl 910 (73–78) Source No. 3 (79) 9 (80)

Card R

Duplicate Columns 1-25 from Card Q

F .08 (26–28) NO_3 .04 (29–32) PO_4 (33–35) B (36–38) Al (39–41) Fe .35 (42–45)

Mn .068 (46–49) Cu (50–52) Pb (53 54) Zn (55–57)

Solids Determined (58–63) Calc. (64–69) Ca,Mg 1080 (70–73) Hardness Non-Carb. 778 (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 $CaCO_3$ 302 (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. 5 (80)

Recorded by: P. J. Horick

Punched FCH
Punched by: _____ Date: _____

Published: Verified ERC

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

Water Quality
(ppm)

Local Well No. 094-39W-07 CAB
Aquifer Code(s) KIDI
Owner's Name SUTHERLAND CITY #3 (1953)
W Number 6045

Card Q

State: IOWA [19] (1-2) County: O'BRIEN [71] (3-4) Town: SUTHERLAND, IA.

Well No. Latitude [425824N] (5-11) Longitude [0953009] (12-18) Seq. No. [1] (19) Date M D Y [092958] (20-25)

Sampling Depth [471] (26-29) Type [1] (30) Kx10^6 [2000] (31-35) pH [7.4] (36-38) Temp. °F [ ] (39-41)

SiO_2 [22.] (42-44) Ca [289.] (45-49) Mg [82.] (50-53) Na [132.] (54-58) K [12.] (59-61) Source No. [3] [Q]

HCO_3 [354] (62-65) CO_3 [0] (66-67) SO_4 [1000.] (68-72) Cl [90.] (73-78)

Card R

Duplicate Columns 1-25 from Card Q

F [7] (26-28) NO_3 [4] (29-32) PO_4 [ ] (33-35) B [ ] (36-38) Al [ ] (39-41) Fe [27] (42-45)

Mn [59] (46-49) Cu [ ] (50-52) Pb [ ] (53-54) Zn [ ] (55-57)

Solids Determined [1860] (58-63) Calc. [ ] (64-69) Hardness Ca,Mg [1060] (70-73) Non-Carb. [769] (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 $CaCO_3$ [290] (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:

WRD Exp. (CM)
Aug. 1964

Punched FCH

Verified ERC

U. S. DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

Record by P.J. Horick Source of data Files Date 6/4/65 Map H 6

State Iowa [16] County (or town) O'Brien [711]

Latitude: [42 58 24 N] Longitude: [095309] Sequential number: [1]

Lat-long accuracy: [2] T. 94 N S, R 39 W E Sec 7, NW ¼, NE ¼, SW ¼ 5PM B & M

Local well number: [943907C8b] Other number: W-6045

Local use: [060945] Owner or name: SUTHERLAND CITY

Owner or name: SUTHERLAND CITY Address: Sutherland, Iowa

Ownership: (C) County, Fed Gov't, (M) City, Corp or Co, (N) Private, (P) State Agency, (S) 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, (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 [0] 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: 471 ft [471] Meas. / rep [6]

Depth cased; (first perf.) 430 ft [430] Casing type: STEEL; Diam. 12 in accuracy [12]

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

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

Date Drilled: JUNE 1953 [953] Pump intake setting: ft

Driller: Thorpe Well Co. (name), Des Moines, Iowa (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple, cent., (M) multiple, turb., (N) rope, (P) piston, (R) rod, (S) submerg, (T) turb, (Z) other [T] Deep / Shallow [D]

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

Descrip. MP LSD ft above / below lsd, Alt. MP 1467

Alt. LSD: 1467 [1467] Accuracy (source) ALTIMETER [7]

Water Level 243.6 ft above / below MP; Ft above / below lsd [2434] Accuracy: DRILLER'S LOG [D]

Date meas: JUNE 1953 [653] Yield: 170 gpm [170] Method determined [ ]

Drawdown: 21.7 ft [22] Accuracy: [3] Pumping period 6 hrs [ ]

QUALITY OF WATER DATA: Iron 3.5 ppm [6] Sulfate 956 ppm [ ] Chloride 9.0 ppm [0] Hard. 1080 ppm [ ]

Sp. Conduct 2150 K x 10^6 [6] Temp. °F Date sampled [46]

Taste, color, etc.

094-39W-07cab

Well Number 42 58 24 N 095 30 09.1
d m s S d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD (1–19) Physiographic Province: CENTRAL LOWLAND [12] (20–21) Section: WESTERN

LAKE [B] (22) Drainage Basin: LITTLE SIOUX [36C] (23–25) Subbasin: _____ (26)

Topo of well site: local depression, (D) flat surface, (F) hilltop, (H) hillside, (S) terrace, (T) valley flat, (V) _____ (27)

MAJOR AQUIFER: Cretaceous system, LOWER series [K1] (28–29) Dakota Sandstone aquifer, formation, group [D1] (30–31)

Lithology: FINE SANDSTONE [2V] (32–33) Origin: MARINE [6] (34) Aquifer Thickness: _____ ft

[ ] (35–37) Length of well open to: 20 ft [20] (38–40) Depth to top of: 326 ft [326] (41–43)

MINOR AQUIFER: _____ system, _____ series [ ] (44–45) _____ aquifer, formation, group [ ] (46–47)

Lithology: _____ [ ] (48–49) Origin: _____ [ ] (50) Aquifer Thickness: _____ ft

[ ] (51–53) Length of well open to: _____ ft [ ] (54–56) Depth to top of: _____ ft [ ] (57–59)

Intervals Screened: _____

Depth to consolidated rock: 326 ft [326] (60–63) Source of data: WELL CUTTINGS [C] (64)

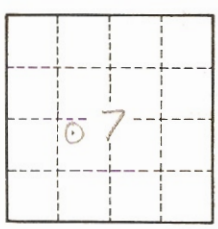
Depth to basement: _____ ft [ ] (65–68) Source of data: _____ [ ] (69)

Surficial material: SANDY TILL [8T] (70–71) Infiltration characteristics: POOR [4] (72)

Coefficient Trans: _____ gpd/ft [ ] (73–75) Coefficient Storage: _____ [ ] (76–78)

Coefficient Perm: _____ gpd/ft^2; Spec cap: 7.8 gpm/ft; Number of geologic cards: _____ [ ] (79)

Casing:
404' of 12" pipe
60' of 5" pipe with 20' length of 5" screen on bottom at 450', gravel packed on outside with 17-18 tons of gravel



GPO 844-225