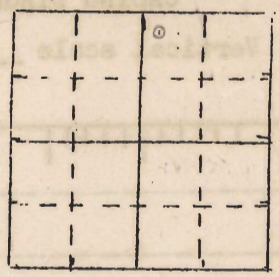
IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey

W-1141

RECORD OF WELL



Location:

Town: Adair (N E S W); County Adair

NW¼NW¼NE¼ sec. 4 T. 77 N., R. 33 E. W. Summit Twp.

Well name and number Adair Town Well

Owner Town of Adair Address

Tenant Address

Contractor Thorpe Bros. Well Company Address Des Moines, Iowa

Drillers Harry West

Drilling dates Jan. 24, 1940 Completed: 7/22/40

Well data:

Elevations: Drilling curb 1391 feet; Land surface feet

Determined by

Topographic position valley of small stream

Total depth: Reported 1733' 10" feet; Measured feet

Drilling method

Hole and casing data 695' of 10" casing from 0' to 695'; 274' of 8" casing from 529' to 803'; 602' of 6" casing from 758' to 1360'.
(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 434 ft. above below Date

Original elevation of water level ft.; Source of data

Sources of water: Principal C.V. Wapsipinicon for 1625-1635; Others clear water to 1715' after pumping test

Production data: Date _____

Static depth to water 434'; Measuring point _____

Pumping level 56 dd at 72 g.p.m. after acidizing

_____ _____

_____ _____

Static 444' 267 44 before acidizing

Specific capacity _____ g.p.m. per ft. drawdown; Temperature 66 °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			Aug 8, 1940	
Sampled by			HG Hudson	
Total solids			4082	
Insoluble matter			22.0	
Alkalinity (Meo)			2.64	
Alkalinity (Phn)			0.0	
pH			7.2	
$Fe_2O_3+Mn_2O_3+Al_2O_3$			14.0	
Alkali as sodium			296.6	
Calcium			687.4	
Magnesium			158.8	
Iron (unfiltered)			24.0	
Manganese			.18	
Nitrate			0.00	
Fluoride			3.2	
Chloride			555	
Sulphate			1797.4	
Bicarbonate			322.1	
Hardness (ppm)			2413	
Hardness (gpg)			141.1	

Remarks _____

Laboratory data: Sample storage location _____

Sample range 0-1725 No. spls. 342 No. dupls & cond. 342 fair-good

Spls. prepared by Summerford - Unklesby Washed range 1260-1555 by Unklesby

Driller's log and cond. Yes

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

Microscopic study 260-1725 {Carrier Carmedy Schuldt} strip log March 1940 Schuldt; Carmedy Copied by Harris

Gen. log yes Correl. by Schuldt

WATER LEVEL DATA

Measuring point _____

Date	Depth to water	Altitude	Remarks
about June 10-44	465'		Drilling depth at 1260'
July 17-1944	444		Drilling depth at 1580'

REMARKS

This well was treated with acid before final pumping test. Prior to acidizing the static level was 444' below L.S. would produce 41 gpm with drawdown of 267'. Treated with 65 cartrigs of muriatic acid.

Pumping test conducted on July 12, 1944 at depth of 1580' - static 444' feet deawdown 267' pumping at 27 gpm. Prod. Horizon 1360-1580' Dolomite

Pumping test at depth of 1260' - 18 gpm ± with 200' D.D. (Gilmore City - Hampton)

R-1-B

THORPE BROTHERS WELL COMPANY

2340 Sixth Avenue

DES MOINES, IOWA

Drilled for Town of Adair *at* Adair, Iowa

Drilling started _____ *19* ____ *Completed* 7/22/40 *19* ____

Well No. _____ *Kind of Well* _____ *Depth* 1738'10" *Size hole started* 10" *in.*

Finish 6" *G. P. M.* 72 *Static head* 435' *Drawdown* 65'

Water was first encountered at _____ *in* _____ *Approximate Amount* _____

Remarks Top water cased out

RECORD OF PERMANENT PIPE					TEMPORARY PIPE	
SIZE PIPE	AMOUNT OF PIPE	DEPTH TO BOTTOM OF PIPE	DEPTH TO TOP OF PIPE	MAKE OF PIPE	SIZE PIPE	AMOUNT
10"	695'	695'	Surface			
8"	274'	803'	529'			
6"	602'	1360	758'			

Driller _____ *From Surface to* _____ *feet*

Driller _____ *From* _____ *feet to* _____ *feet*

Driller _____ *From* _____ *feet to* _____ *feet*

AMOUNT IN FEET	KIND OF SOIL OR FORMATION	TOTAL DEPTH FEET
0 - 280	Mixed clay	280
4	Limestone	284
516	Mixed shale	800
5	Sandstone	805
90	Limestone	895
40	Shale- green	935
35	Limestone	970
8	Shale- dark	978
182	Limestone- hard	1160
90	Limestone- not so hard	1250
60	Shale- some lime ledges	1310
160	Limestone	1470
2	Shale	1472
266'10"	Limestone	1738'10"

IOWA GEOLOGICAL SURVEY
Water Well Data Sheet

Survey Number W-1141

Town Adair County Adair T. 77 N., R. 33 W. E.

Name City Well Location NW¼ NW¼ ¼ NE ¼, Sec. 4

Contractor Thorpe Well Co Driller Harry West Use Town supply

Construction Drilled Drilling Dates Jan. 24, 1940 Drilling Depth 1725

Topog. Valley of small stream. Curb Elev. 1391 (?) Ref. C.R.I.&P.RR(AH) Total Depth 1738' 10"

Final Static Level ____ above / below curb Pumping Level ____ Draw down ____ gpm ____ Time pumped ____ Date ____

Depth to bot. pump ____ ft. with ____ ft. suction pipe. Calc. g/ft. drawdown ____ Prin. Prod. ____

Producing Horizons ____

Water levels and pumping tests on various horizons during drilling:

Depth Range	Stat. Level	Pump Level	Draw down	gpm.	Temp.	Producing horizons	Producing formations	Formations cased out

Additional information Samples above 600' contaminated because cuttings dumped back into hole to keep mud thick.

Laboratory Data

Sample range (0-745)-(780-1725) Number samples 342 Number Duplicates 342 Cond. Four to Good

Log Yes / No, Cond. ____ Boxed Summerford 0-595 March 12, 1940

Summerford 595-745 March 25, 1940

780-1260+ June 8, 1940

Unklesbay 1260-1440 July 1, 1940

" 1430-1555 " 3, 1940

" 1555-1725 " 31, 1940

Remarks Cut made for Gulf (99) Unklesbay (1260-1260+) (19 spls) March 12, 1940

(1260-1430) (1415-1440) 23 spls July 1 1940

(1430-1555) 26 " " 3 1940

(1555-1725) 31 " " 31 1940

Microscopic Study Range ____ Strip Log ____ Gen. Log ____ Blue Print ____ Samples Washed 1260-1555'

Insol. Res. Study Range ____ Strip Log ____ Gen. Log ____ Insol. Res. Prepared ____ Well Corel. ____

Adair

Firestone

COMBINATION FALL AND WINTER RETAIL CATALOG AND CHRISTMAS FLIER

ORDER BLANK

Date

Charge To Started Drilling 1-24-40

Street Address Completed" 7-22-40 Town State

Ship To 6" Finish 72 gpm 5wk 435 ft. ~ 500

Street Address Water first encountered at 1163 in Ls. Town about 275 gpm State

Ship Via Terr. No.

TERMS

Payment: Net 10th Proximo.

Delivery: F.O.B. Point of Shipment. Freight allowed or prepaid on 100 lbs. or more.

Prices: All invoices will be rendered at prices in effect on date of shipment.

Mixed Clay	0 – 280	Temporary Riser
Ls.	280 – 284	41" @ 20" (pulled
Mixed Shale	284 – 800	80' @ 16"
Ss.	800 – 805	280' @ 13 3/8)
Ls.	805 – 895	
Corn. Shale	935	695' @ 10" from 0' to 685'
Ls.	970	274' @ 8" " 529 to 803'
Lob. Ls.	978	602' @ 6" 758 to 1360'
Ls. Hd.	1160	
Ls. not so hard	1250	Cleaned out Ls
Sh. - Some Ls. Mixed	1310	Layne-Western
Ls.	1470	Nels Howe Jim
Shale	1472	Started 1-22-50
Ls.	1633	end 2-12-50
Ls - H2o	1655	
Ls. - Hard	1738-10"	

Signature

Penny record on Mach.

Fill in above, send original to your source of supply, duplicate to your district office, retain triplicate for dealer or store file.

IOWA GEOLOGICAL SURVEY
Generalized Log Based on Detailed
Description of Drill Cuttings

Name of Well Adair City Well Survey No. W- 1141

Location Adair Co., Iowa

Drilled by Date

Total Depth 595' ft, Curb Elevation ' ft, Static Level ft.

Pumping Test Hours Min, Gal. per Mn. , Drawdown ft. in min.

Casing Data 41' of 20" pipe; 80' of 16" pipe; 280' of 12½" pipe

Description of Formations

No.	Rock Unit	Thick.	From (feet)	To
	PLEISTOCENE SYSTEM			
1.	Drift and topsoil, dark brown silt, non-calcareous, rare sand grains	10'	0	10'
2.	Drift, yellow buff, silt, medium to coarse sandy with occasional granules, non-calcareous	20'	10'	30'
3.	Drift, medium gray, silt to clay, ~~sand~~ calcareous, quartz sand and fine pebbles common	110'	30'	140'
4.	Drift, light gray to white, calcareous, sandy, occasional pebbles	5'	140'	145'
5.	Drift, gray and buff mixed, sandy to fine pebbly	20'	145'	165'
6.	Drift, buff, silty, sandy, fine pebbly, strongly calcareous	10'	165'	175'
7.	Drift, Medium to dark gray, occasional pebbles and sand grains	5'	175'	180'
8.	Drift, buff, silty, calcareous, sandy to very pebbly	20	180'	200'
9.	Drift, buff and gray, silty, sandy, fine pebbly, moderately calcareous	15'	200'	215'
10.	Drift, drab gray, with some buff, sandy to fine pebbly, slightly to moderately calcareous	35'	215'	250'
11.	Drift, medium to dark gray, very sandy to fine pebbly, slightly calcareous, starchy fracture	10'	250'	260'
12.	Drift, light to medium gray, sandy to fine pebbly, slightly calcareous	8'	260'	268'

Notes:

	Thick	From	To
PENNSYLVANIAN SYSTEM			
13. Shale, light gray, soft, slightly silty, wholly as mud	7'	268'	275'
14. Limestone, light gray-buff, fine textured, moderately hard	4'	275'	279'
15. Shale, light green gray, soft, very silty, non-calcareous, micaceous	6'	279'	285'
16. Shale, olive gray, medium hard, structureless, calcareous	10'	285'	295'
17. Shale, light gray, soft, slightly unctuous, calcareous, wholly as mud	5'	295'	300'
18. Shale, black, bituminous, crumbly fracture, supports flame	5'	300'	305'
19. Shale, light gray, soft, non-calcareous, silty, slightly micaceous, entirely as mud	20'	305'	320'
20. Shale, very light gray to white, calcareous, soft, wholly as mud, with thin band light gray dolomite between 335' and 340' and a few bands red shale between 340' and 345'	40'	320'	360'
21.			

OFFICE COPY

STATE OF IOWA
IOWA GEOLOGICAL SURVEY
GEOLOGY ANNEX
IOWA CITY

Generalized Log of Adair City Well

	Thickness	From	To
Top of Mississippian System			802
Iowa series			
Meramec group			
Ste. Genevieve and St. Louis sandy limestone and shale	58	802	860
Warsaw dolomite and shale	75	860	935
Osage group			
Keokuk cherty dolomite	95	935	1030
Burlington cherty limestone and dolomite	65	1030	1095
Gilmore City oolitic limestone	50	1095	1145
Kinderhook group			
Hampton formation			
Iowa Falls-Eagle City limestone	20	1145	1165
Maynes Creek cherty dolomite	73	1165	1238
Chapin-North Hill oolitic limestone	22	1238	1260
Maple Mill silty shale	40	1260	1300
Devonian System			
Cedar Valley and Wapsipinicon limestone and dolomite	425	1300	1725

Total depth, 1725 feet.

cc to F. E. Hunt, Adair, October 29, 1943
cc to F E Hunt Aug 1946

OFFICERS
R. T. ROWLAND, MAYOR
M. M. GARNES, CLERK
W. C. LYLE, TREASURER
DR. M. R. ANDERSON, PHYSICIAN
HARRY D. BYERS, ATTORNEY
ED. SPARLING, MARSHAL

TOWN OF ADAIR

ADAIR, IOWA

COUNCILMEN
J. W. CROW
W. E. NICHOLS
S. W. CARNEY
H. W. WAHE
P. S. KELLOWAY

aug. 9. 1940.

Dr H. H. Hershey

Dear. sir.

Readings are of the adair well of raise of water for one hour.

1.10 oclock AM	490FT 7"	Reading when pump was stopped
1.21 " " "	468FT 8"	
1.31 " " "	465FT	
1.41 " " "	463FT 1"	
1.51 " " "	461FT 1"	
2.01 " " "	460FT	
2.11 " " "	459FT	
2.21 " " "	458FT 1"	

Reading at 9 oclock AM 446FT 1 inch.

this is the readings that was taken after you went home.

Yours Respt.
E A Sparling.

5

PT

IOWA GEOLOGICAL SURVEY
Iowa City, Iowa

Result of Pumping Test of Adair Deep Well on
August 7 - 9, 1940

T. D. 1725'
Water levels measured with Thorpe's elect. equip.

Time	Water level	Production in g.p.m.	Temperature Air	Temperature Water	Remarks
Aug. 7					
1:50	434'				Static water level.
3:55	471'		82	64.5	
4:45	475'			65	
4:55					Break down.
5:25	454'1"				
5:42	451'10"				
Aug. 8					
5:15 p.m.	435'6"				Bot. pump 553'8" + 17'
5:30	435'6"				Start pump.
5:31	442'				
5:32	444'				
5:35	448'				
5:40	451'3"	55			
5:45	453'8"				
5:50	455'3"				
5:55	456'8"				
6:00	457'11"		78	59.8	Water from bottom.
6:10	459'10"				
7:07	465'9"		71	64	
7:30	467'8"	55			
8:00	470'0"		69	64.7	
8:30	472'0"		69	65	
9:00	473'5"		68	65	
9:30	475'0"	57	67.5	65.1	
10:00	476'2"		68	65.4	
10:30	477'7"		68	65.5	
11:00	478'4"		68	65.6	Sample.
11:30	479'4"	57	68	65.7	
11:50	480'3"				Sample.
11:52					Shut off.
11:57	467'9"				
Aug. 9					
12:02 a.m.	465'0"				
12:07	463'3"				

All temperatures 2½' above curb 3' from centerline of well.

12:10		70			Start pump.
12:15	477'3"				
12:20	480'2"				
12:25	481'9"	70			
12:30	482'5"	72			

Time	Water level	Production in g.p.m.	Temperature Air	Temperature Water	Remarks
12:40	487'1"		68	65.8	
12:50	488'1"				
1:00	490'0"	72	68	66	
1:10	490'7"				
1:11					Shut down.
1:16	472'2"				
1:21	468'3"				
1:31	465'0"				
1:41	463'1"				
1:51	460'0"				
2:11	459'0"				
2:21	458'1"				
9:00 a.m.	446'0"				

Readings after 1:16 a.m. on August 9 taken by E. V. Sparling.

When the Adair well had reached a depth of 1725 feet and before the pumping test of August 7-9, the well was treated with 65 carboys of muriatic acid which was left in the well for 40 hours. No change in water level was noted by the driller while the acid was being placed in the well. Following acidization the well was pumped for 24½ hours at 55 g.p.m. and 2 hours at 80 g.p.m. During this test the bottom of the pump was at 624 feet and at no time during the test did the water level fall to that point.

Prior to the acid treatment the static water level was 444 feet. Pumping at more than 44 g.p.m. the water level fell to 711 feet, the bottom of the pump, but would produce 44 g.p.m. at that depth.

The above statements are the report of Mr. Harry West who was the Thorpe driller on the job at the time of acidization and testing.

IOWA GEOLOGICAL SURVEY
Water Analysis Report

FINAL

County Adair Date Sampled August 6, 1940 193

Town Adair Sampled by H. G. Hershey

Location of Well NW¼ NW ¼, NE ¼, Sec. 4, T. 77 N., R 33 E W.

Summit Twp.

Owner Town of Adair Well No. Drlg. : T.D. 1725 ft.

Type of Well Drilled Static Level 434 ft. Curb Elevation 1393 ft.

Producing Formation(s) Devonian Depth range

Remarks on Condition of Well, Casing or Formations 41' of 20" pipe from 0 to 41'; 80' of 16" pipe from 0 to 80'; 280' of 13 3/8 and 12½" pipe from 0 to 280'; 695'9" of 10" pipe from 0 to 695'9"; 271' of 8" pipe from 529' to 800'; 603' of 6" liner from 752 to 1355'; 370' of 6" open hole from 1355' to 1725'.

Constituents	Parts Per Million	Constituents	Parts Per Million
Total Solids	4082.	Magnesium (Mg)	158.6
Dissolved Solids	.	Iron(Fe) (unfiltered) (filtered)	24.0
Insoluble Matter	22.0	Manganese (Mn)	0.18
pH	7.2	Aluminum (Al)	.
Alkalinity (MeO)	264.0	Fluorine (F)	3.2
Alkalinity (Phn)	0.0	Chlorine (Cl)	555.0
R_2O_3	14.0	Sulphate (SO_4)	1797.4
Nitrogen as Ammonia(NH_4)	.	Bicarbonate (HCO_3)	322.1
Nitrogen as Nitrite(NO_2)	.	Phosphate (PO_4)	.
Nitrogen as Nitrate(NO_3)	0.00	Borate (BO_3)	.
Alkalies as Sodium(Na)	296.6	Calculated Hardness	2413.
Calcium (Ca)	687.4	Hardness Grains per U. S. Gallon	141.1

Temperature: Water °F. Air °F. Measured at

Remarks: Sampled at 11:00 p.m. after well had pumped 5½ hrs at 55-57 g.p.m. Sample filtered immediately after collection.

Analysis by State Water Analysis Laboratory, Prof. J. J. Hinman, Jr., Director,
Iowa City, Iowa. Lab. No. 250690, Date August 22, 1940, 193.
Sent to: M. M. Garnes, Adair: Thorpe Well Co., Des Moines: W. E. Littler, Adair, Iowa
Date: Aug. 27, 1940 Aug. 27, 1940. Jan. 22, 1941

H. M. Crow

IOWA GEOLOGICAL SURVEY
Well or Water Sample Data Bottle No. G-20

TOWN Adair COUNTY Adair

LOCATION _____ Sec. __ T. __ N. R. __ E. W. _____ Tw.

OWNER OF WELL: Town Well Well No. Deep

USE OF WATER: City Supply ( ); Private-Domestic ( ); Public Drinking ( ); Livestock ( ); Industrial ( ); School Supply ( ); Air Conditioning ( ); Cooling ( ); _____ ( ).

CONSTRUCTION OF WELL: Drilled ( ); Gravel-Pack type ( ); Driven ( ); Dug ( ); Bored ( ); Jetted ( ) _____ ( ).

CONTRACTOR _____ DATE DRILLED _____

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the kind, length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.)

Note: See data sheet of this date accompanying another sample — Bottle No G-63.

WELL DATA

Curb Elevation _____ Ft. Present Depth _____ Ft. Final Depth _____ Ft.

Ground Elevation _____ Ft. Topographic Position _____

Static Level (Depth to Water (Above) (Below) Curb) _____ Ft. Pumping Level _____ Ft.

Amount of Drawdown ____ Ft. pumping at ____ g.p.m. in ___ hours ___ minutes.

Calculated gals. per ft. drawdown ____ g.p.m.

Type of Pump _____ . Power _____ .

Depth of Bottom of Pump _____ ft. with _____ ft. of suction pipe.

TEMPERATURE: Air ____ °F.; Water ____ °F., measured after well had pumped _____ hrs. ____ mins. at ____ g.p.m.; _____ ft. from pump after water had passed through the following pipe _____ Time _____ (A.M.) (P.M.)

SOURCE OF WATER: Recent (Type and Depth) _____

Glacial Formations (Type) _____ at ____ ft. to _____ ft.

Limestone or Dolomite (Age) _____ at ____ ft. to _____ ft.

Sandstone (Age) _____ at ____ ft. to _____ ft.

Principal Producing Formation _____

REMARKS Sampled at 11:00 pm after well had pumped 5½ hrs at 55-57 gpm. Sample filtered immediately after collection. See other data sheet of this date and data sheet of July 25, 1940

Sample taken for: Mineral Analysis (X); Sanitary Analysis ( ).

Data Collected by H.G. Hershey ; Date Aug. 8, 1940

Report Analysis to H. G. Hershey, Iowa Geological Survey, Iowa City

2

IOWA GEOLOGICAL SURVEY
Well or Water Sample Data Bottle No. _____

TOWN Adair COUNTY Adair

LOCATION NW¼ NW¼ NE¼ Sec. 4 T. 77 N. R. 33 W. Summit Twp.

OWNER OF WELL: Town of Adair Well No. _____

USE OF WATER: City Supply ( ); Private-Domestic ( ); Public Drinking ( ); Livestock ( ); Industrial ( ); School Supply ( ); Air Conditioning ( ); Cooling ( ); Testing at present ( ).

CONSTRUCTION OF WELL: Drilled (×); Gravel-Pack type ( ); Driven ( ); Dug ( ); Bored ( ); Jetted ( ) _____ ( ).

CONTRACTOR Thorpe Well Co., Des Moines DATE DRILLED 1939 1940

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the kind, length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.) 41' of 20" pipe from 0' to 41'; 80' of 16" pipe from surface to 80'; 280' of 12½ and 13⅜" pipe from surface to 280'; 695'9" of 10" pipe from surface to 695'9"; 800' of 8" pipe from surface to 800'; 603' of 6" liner from 752' to 1355'. 370' of 6" open hole from 1355' to 1725'.

WELL DATA

Curb Elevation 1392 Ft. Present Depth 1725 Ft. Final Depth _____ Ft.

Ground Elevation _____ Ft. Topographic Position _____

Static Level (Depth to Water (Above) (Below) Curb) 444 Ft. Pumping Level — Ft.

Amount of Drawdown — Ft. pumping at 44 g.p.m. in 5 hours — minutes.

Calculated gals. per ft. drawdown _____ g.p.m.

Type of Pump Cylinder (?) . Power Drilling rig .

Depth of Bottom of Pump 711 ft. with _____ ft. of suction pipe.

TEMPERATURE: Air ____ °F.; Water ____ °F., measured after well had pumped _____ hrs. ____ mins. at ____ g.p.m.; ____ ft. from pump after water had passed through the following pipe _____ Time _____ (A.M.) (P.M.)

SOURCE OF WATER: Recent (Type and Depth) _____

Glacial Formations (Type) _____ at ____ ft. to ____ ft.

Limestone or Dolomite (Age) Devonian at ____ ft. to ____ ft.

Sandstone (Age) _____ at ____ ft. to ____ ft.

Principal Producing Formation Wapsipinicon

REMARKS [Driller Harry West reports principal supply at 1625 to 1635 and that a post-pumping bailing test showed clear water to 1715']

Sample taken for: Mineral Analysis (×); Sanitary Analysis ( ).
Data Collected by Town officials ; Date July 25, 40
Report Analysis to H. G. Hershey, Iowa Geological Survey, Iowa City

3

IOWA GEOLOGICAL SURVEY
Water Analysis Report

County Adair Date Sampled June 10, 1940 193

Town Adair Sampled by Town official for H.G.Hershey

Location of Well NW¼ NW¼ NE¼ ¼, ¼, Sec. 4, T. 77 N., R 33 W.

Summit Twp.

Owner Town of Adair Well No. Drlg. : 1260 ft.

Type of Well Drilled Static Level 465 ft. Curb Elevation 1394 ft.

Producing Formation(s) Gilmore City - Hampton Depth range

Remarks on Condition of Well, Casing or Formations 41' of 20" pipe from 0 to 41'; 80' of 16" pipe from 0 to 80'; 280' of 12½" and 13 3/8" pipe from 0 to 280' and 695'9" of 10" pipe from 0 to 695'9".

Constituents	Parts Per Million	Constituents	Parts Per Million
Total Solids	2119.	Magnesium (Mg)	59.4
Dissolved Solids	.	Iron(Fe) (unfiltered) (filtered)	trace *
Insoluble Matter	7.0	Manganese (Mn)	0.10
pH	7.3	Aluminum (Al)	.
Alkalinity (MeO)	248.0	Fluorine (F)	2.8
Alkalinity (Phn)	0.0	Chlorine (Cl)	125.0
R_2O_3	2.0	Sulphate (SO_4)	1081.6
Nitrogen as Ammonia(NH_4)	.	Bicarbonate (HCO_3)	302.6
Nitrogen as Nitrite(NO_2)	.	Phosphate (PO_4)	.
Nitrogen as Nitrate(NO_3)	0.00	Borate (BO_3)	.
Alkalies as Sodium(Na)	310.4	Calculated Hardness	862.0
Calcium (Ca)	247.3	Hardness Grains per U. S. Gallon	50.4

Temperature: Water °F. Air °F. Measured at

Remarks: * Sample decanted, iron may be low.

Analysis by State Water Analysis Laboratory, Iowa City, Iowa. Lab. No. 148,256, Prof. J. J. Hinman, Jr., Director, Date July 6, 1940, 193.

Sent to: R. T. Rowland, Mayor, Adair; T. W. Thorpe, Des Moines, Iowa

Date: July 6, 1940 July 6, 1940

Sent to: W. E. Littler, Adair, Ia.; H. M. Crow

IOWA GEOLOGICAL SURVEY
Well or Water Sample Data Bottle No. _____

TOWN Adair COUNTY Adair

LOCATION NW¼, NW¼, NE¼ Sec. 4 T. 77 N. R. 33 W. Summit Twp.

OWNER OF WELL Town of Adair Well No. _____

USE OF WATER: City Supply ( ); Private-Domestic ( ): Public Drinking ( ); Livestock ( ); Industrial ( ); School Supply ( ); Air Conditioning ( ); Cooling ( ); Drilling at present (×).

CONSTRUCTION OF WELL: Drilled (×); Gravel-Pack type ( ); Driven ( ); Dug ( ); Bored ( ); Jetted ( ) ( ).

DATE STARTED Jan. 24, 1940

CONTRACTOR Thorpe Well Co., Des Moines DATE FINISHED _____

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the kind, length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.) 41' of 20" pipe from 0 to 41'; 80' of 16" pipe from 0 to 80'; 280' of 12½" and 13⅜" pipe from 0 to 280'. and 695'9" of 10" pipe from 0 to 695'9".

WELL DATA

Curb Elevation 1394 Ft. Present Depth 1260 Ft. Final Depth _____ Ft.

Ground Elevation 1391 Ft. Topographic Position Small valley

Static Level (Depth to Water (~~Above~~) (Below) Curb) 465 Ft. Pumping Level 665 ± Ft.

Amount of Drawdown 200 Ft. pumping at 18 ± g.p.m. in 3 hours — minutes.

Calculated gals. per ft. drawdown ____ g.p.m.

Type of Pump Bailer. Power Drilling rig.

Depth of Bottom of Pump _____ ft. with ____ ft. of suction pipe.

TEMPERATURE: Air ____ °F.; Water ____ °F., measured after well had pumped _____ hrs. ____ mins. at ____ g.p.m.; ____ ft. from pump after waterhhad passed through the following pipe _____ Time _____ (A.M.) (P.M.)

SOURCE OF WATER: Recent (Type and Depth) _____

Glacial Formations (Type) _____ at ____ ft. to ____ ft.

Limestone or Dolomite (Age) Mississippian at ____ ft. to 1163 ft.

Sandstone (Age) _____ at ____ ft. to ____ ft.

Principal Producing Formation Gilmore City - Hampton

REMARKS _____

Sample taken for: Mineral Analysis ( ); Sanitary Analysis ( ).

Data Collected by Town official for H. G. Hershey; Date [About] June 10, 1940

Report Analysis to H. G. Hershey, Iowa Geological Survey, Iowa City

2

IOWA GEOLOGICAL SURVEY
Well or Water Sample Data Bottle No. _____

TOWN Adair COUNTY Adair

LOCATION _____ Sec. __ T. __ N. R. __ E. W. _____ Twp.

OWNER OF WELL: Town of Adair Well No. (2 deep)

USE OF WATER: City Supply (X); Private-Domestic ( ); Public Drinking ( ); Livestock ( ); Industrial ( ); School Supply ( ); Air Conditioning ( ); Cooling ( ); _____ ( ).

CONSTRUCTION OF WELL: Drilled (X); Gravel-Pack type ( ); Driven ( ); Dug ( ); Bored ( ); Jetted ( ) _____ ( ).

CONTRACTOR Thorpe Bros DATE DRILLED July 1940

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the kind, length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.)

Casing record not complete

WELL DATA

Curb Elevation _____ Ft. Present Depth 1580 Ft. Final Depth _____ Ft.

Ground Elevation _____ Ft. Topographic Position _____

Static Level (Depth to Water (~~Above~~) (Below) Curb) 444 Ft. Pumping Level 711 Ft.

Amount of Drawdown 267 Ft. pumping at 27 g.p.m. in 5 hours 0 minutes.

Calculated gals. per ft. drawdown ____ g.p.m.

Type of Pump Working Barrel on rig. Power Gas engine.

Depth of Bottom of Pump 693 ft. with 18 ft. of suction pipe.

TEMPERATURE: Air 90 °F.; Water 62 °F., measured after well had pumped 3 hrs. ____ mins. at 27 g.p.m.; 8" ~~ft.~~ from pump after water had passed through the following pipe 8" Time 6:00 (~~A.M.~~) (P.M.)

SOURCE OF WATER: Recent (Type and Depth) _____

Glacial Formations (Type) _____ at ____ ft. to ____ ft.

Limestone or Dolomite (Age) _____ at ____ ft. to ____ ft.

Sandstone (Age) _____ at ____ ft. to ____ ft.

Principal Producing Formation _____

REMARKS Well to be sunk an additional 100'

Sample taken for: Mineral Analysis (X); Sanitary Analysis ( ).
Data Collected by Fiala E.G.; Date July 12 1940
Report Analysis to H. G. Hershey, Iowa Geological Survey, Iowa City

5

ADDITIONAL WELL SAMPLE DATA

Adair Town Well

Depth of well at time test was made: 1580 ft

Test by bailer ( ) or by pump ( )? by Pump

What was the static water level before pumping started? 444 ft. from Top

How long was the test run? 5 hrs

How many gallons per minute were bailed or pumped from the well? 27 per min

What was the drawdown? 711 from Top

If pump was used, what was depth to bottom? 711 ft 6"

Did water level recover to original level and how long did it take for complete recovery? Did not get this time

IOWA GEOLOGICAL SURVEY
Well or Water Sample Data Bottle No. No number

TOWN Adair COUNTY Adair

LOCATION NW¼ NW¼ NE¼ Sec. 4 T. 77 N. R. 33 W. Summit Twp.

OWNER OF WELL Town of Adair Well No.

USE OF WATER: City Supply ( ); Private-Domestic ( ): Public Drinking ( ); Livestock ( ); Industrial ( ); School Supply ( ); Air Conditioning ( ); Cooling ( ); Testing at present ( ).

CONSTRUCTION OF WELL: Drilled (X); Gravel-Pack type ( ); Driven ( ); Dug ( ); Bored ( ); Jetted ( ) ( ).

CONTRACTOR Thorpe Well Co., Des Moines DATE STARTED DATE FINISHED

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the kind, length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.)

WELL DATA

Curb Elevation 1394 Ft. Present Depth Ft. Final Depth 1580 ± Ft.

Ground Elevation 1391 Ft. Topographic Position Small valley

Static Level (Depth to Water ~~(Above)~~ (Below) Curb) 4±4 Ft. Pumping Level Ft.

Amount of Drawdown 267 Ft. pumping at 27 g.p.m. in 5 hours 0 minutes.

Calculated gals. per ft. drawdown g.p.m.

Type of Pump . Power .

Depth of Bottom of Pump ft. with ft. of suction pipe.

TEMPERATURE: Air °F.; Water °F., measured after well had pumped hrs.

 mins. at g.p.m.; ft. from pump after waterhhad passed through the following pipe Time (A.M.) (P.M.)

SOURCE OF WATER: Recent (Type and Depth)

Glacial Formations (Type) at ft. to ft.

Limestone or Dolomite (Age) at ft. to ft.

Sandstone (Age) at ft. to ft.

Principal Producing Formation

REMARKS Additional data to be furnished

Sample taken for: Mineral Analysis (X); Sanitary Analysis ( ).

Data Collected by town officials for H.G.Hershey; Date July 10, 1940

Report Analysis to H. G. Hershey, Iowa Geological Survey, Iowa City

2

IOWA GEOLOGICAL SURVEY
Water Analysis Report

County Adair Date Sampled July 10, 1940 193

Town Adair Sampled by Town official for H.G.Hershey

Location of Well NW¼ NW¼, NE¼, Sec. 4, T. 77 N., R 33 W. E

Summit Twp.

Owner Town of Adair Well No. Bridge : T.D. 1580± ft.

Type of Well Drilled Static Level 444 ft. Curb Elevation 1394 ft.

Producing Formation(s) Depth range

Remarks on Condition of Well, Casing or Formations

Constituents	Parts Per Million	Constituents	Parts Per Million
Total Solids	2475.	Magnesium (Mg)	79.5
Dissolved Solids	.	Iron(Fe) (unfiltered) (~~filtered~~)	7.2
Insoluble Matter	9.0	Manganese (Mn)	0.10
pH	7.2	Aluminum (Al)	.
Alkalinity (MeO)	206.0	Fluorine (F)	2.6
Alkalinity (Phn)	0.0	Chlorine (Cl)	147.0
R_2O_3	4.0	Sulphate (SO_4)	1328.8
Nitrogen as Ammonia(NH_4)	.	Bicarbonate (HCO_3)	253.8
Nitrogen as Nitrite(NO_2)	.	Phosphate (PO_4)	.
Nitrogen as Nitrate(NO_3)	0.00	Borate (BO_3)	.
Alkalies as Sodium(Na)	326.5	Calculated Hardness	1127.
Calcium (Ca)	315.1	Hardness Grains per U. S. Gallon	65.9

Temperature: Water °F. Air °F. Measured at

Remarks:

Analysis by State Water Analysis Laboratory, Prof. J. J. Hinman, Jr., Director,
Iowa City, Iowa. Lab. No. 14944, Date July 17, 1940, 193.
Sent to: M. M. Garnes, Adair ; T. W. Thorpe, Des Moines, Ia. ; W. E. Littler, Adair, Ia.
Date: July 18, 1940. July 18, 1940. Jan. 22, 1941.
H. M. Crow

IOWA GEOLOGICAL SURVEY
Well or Water Sample Data

Bottle No. G-63

TOWN Adair COUNTY: Adair

LOCATION: NW¼ NW¼ NE¼ Sec. 4 T. 77 N., R. 33 W. Summit Twp.

OWNER OF WELL: Town of Adair Well No. Deep

USE OF WATER: City Supply ( ); Private-Domestic ( ); Public Drinking ( ); Livestock ( ); Industrial ( ); School Supply ( ); Air Conditioning ( ); Cooling ( ); Testing at present ( ).

CONSTRUCTION OF WELL: Drilled (X); Gravel-Pack type ( ); Driven ( ); Dug ( ); Bored ( ); Jetted ( ) ( ).

CONTRACTOR: Thorpe Well Co. Des Moines DATE DRILLED: Date Started Jan. 24, 1940 July 22, 1940

CASING OR CURBING DATA: (Show by diagram on opposite side of sheet the kind, length and depth of top and bottom of each size of pipe, the amount of overlaps, position of seals or packers, pipe perforation and screens, etc.) 41' of 20" pipe from 0 to ~~40~~ 41'
80' of 16" pipe from 0 to 80'; 280' of 13⅜ and 12½" pipe from 0 to 280'
695'9" of 10" pipe from 0 to 695'9"; 271' of 8" pipe from 529' to 800'
603' of 6" liner from 752 to 1355'; 370 of 6" open hole from 1355' to 1725'

WELL DATA:
Curb Elevation 1394 1393 Ft. Present Depth — Ft. Final Depth 1725 Ft.

Topographic Position of Well: Small valley

Static Level (Depth to Water (~~Above~~) (Below) Curb) 434 Ft. Pumping Level 480.2 Ft. [*]

Amount of Drawdown 46 Ft. pumping at 55-57 g.p.m. in 6 hours 20 minutes.

Calculated gals. per ft. drawdown _____ g.p.m.

Type of Pump Cylinder (4½" dia) • Power Drilling rig •

Depth of Bottom of Pump 570'5" ft. with 17 ft. of suction pipe.

TEMPERATURE: Air 68 °F.; Water 66 °F., measured after well had pumped 7 hrs. [*]
____ mins. at 55-72 g.p.m.; 3 ft. from pump after water had passed through the following pipe 3' of 6" pipe 2½' above curb Time 1:00 (A.M.) (~~P.M.~~)

SOURCE OF WATER: Recent (Type and Depth) _____

Glacial Formations (Type) _____ at ____ ft. to ____ ft.

Limestone or Dolomite (Age) _____ at ____ ft. to ____ ft.

Sandstone (Age) _____ at ____ ft. to ____ ft.

Principal Producing Formation Wapsipinicon

REMARKS: [*] Sample was taken at 11:45 [*] See pumping test sheet in file.
See remarks of July 25, 1940 data sheet

Sample taken for: Mineral Analysis (X); Sanitary Analysis ( ).
Data Collected by H G Hershey; Date Aug 8, 1940.
Report Analysis to H. G. Hershey, Iowa Geological Survey, Iowa City.

3

IOWA GEOLOGICAL SURVEY
Water Analysis Report

FINAL

County Adair Date Sampled August 8, 1940 193

Town Adair Sampled by H. G. Hershey

Location of Well NW¼ NW ¼, NE ¼, Sec. 4, T. 77N., R 33 W.

Summit Twp.

Owner Town of Adair Well No. Deep Drlg. T.D. 1725 ft.

Type of Well Drilled Static Level 434 ft. Curb Elevation 1393 ft.

Producing Formation(s) Devonian Depth range

Remarks on Condition of Well, Casing or Formations 41' of 20" pipe from 0 to 41'. 80' of 16" pipe from 0 to 80'; 280' of 13 3/8 and 12½" pipe from 0 to 280'; 695'9" of 10" pipe from 0 to 695'9"; 271' of 8" pipe from 529' to 800'; 603' of 6" liner from 752 to 1355'; 370' of 6" open hole from 1355' to 1725'.

Constituents	Parts Per Million	Constituents	Parts Per Million
Total Solids	4325.	Magnesium (Mg)	160.5
Dissolved Solids	.	Iron(Fe) (unfiltered) (filtered)	25.0
Insoluble Matter	28.0	Manganese (Mn)	0.20
pH	7.2	Aluminum (Al)	.
Alkalinity (MeO)	264.0	Fluorine (F)	3.2
Alkalinity (Phn)	0.0	Chlorine (Cl)	555.0
R_2O_3	16.0	Sulphate (SO_4)	1808.9
Nitrogen as Ammonia(NH_4)	.	Bicarbonate (HCO_3)	322.1
Nitrogen as Nitrite(NO_2)	.	Phosphate (PO_4)	.
Nitrogen as Nitrate(NO_3)	0.00	Borate (BO_3)	.
Alkalies as Sodium(Na)	301.3	Calculated Hardness	2445.
Calcium (Ca)	696.7	Hardness Grains per U. S. Gallon	142.9

Temperature: Water 66 °F. Air 68 °F. Measured at after well had pumped 7 hours at 55-72 g.p.m.; 3 ft. from pump after water had passed through 3' of 6" pipe 2½' above curb at 1:00 a.m.

Remarks:

Analysis by State Water Analysis Laboratory, Prof. J. J. Hinman, Jr., Director, Iowa City, Iowa. Lab. No. 150629, Date August 22, 1940 193.

Sent to:

Date:

PHONE 4-8224

HOWARD C. MAFFITT

CONSULTING CHEMIST

OFFICE AND LABORATORIES
522-526 ELEVENTH STREET

DES MOINES, IOWA

June 15, 1940

To: Town of Adair, Iowa
Attention: Mayor R. T. Rowland

Subject: Results of partial mineral analysis of filtered portion of sample of well water, submitted June 8, 1940. (completed report)

	Parts per Million By Weight
Total Residue on Evaporation (Dried at 103°C.)	2243.
Organic and Volatile Matter	260.
Total Fixed Residue (Dried at 103°C.)	1983.
Total Iron (Fe)	0.2
Fluoride (F)	7.0
Total Hardness, by Soap Method expressed as Calcium Carbonate ($CaCO_3$)	760.

The above Total Hardness is equivalent to 44. grains per U. S. gallon.

Howard C. Maffitt

HOWARD C. MAFFITT
Consulting Chemist

HCM:ME
cc: Thorpe Well Co.

9

077-33W-04ABB

DMC

UNITED STATES DEPARTMENT OF THE INTERIOR
Geological Survey
Water Resources Division

W-1141

Water Quality
(ppm)

Card Q

State: IOWA [16] (1 2) County: ADAIR [1] (3 4) Town: ADAIR

Well No. [4130151N] (5–11) Latitude

[094391 3] (12–18) Longitude

Seq. No. [1] (19)

Date [01 09 65 8] (20–25) M D Y

Sampling Depth [1725] (26–29)

Type [1] (30)

Kx10^6 [3090] (31–35)

pH [7.6] (36–38)

Temp. °F [ ] (39–41)

SiO_2 [9.6] (42–44)

Ca [240.] (45–49)

Mg [73.] (50–53)

Na [360.] (54–58)

K [19.] (59–61)

HCO_3 [235] (62–65)

CO_3 [0] (66 67)

SO_4 [1300.] (68–72)

Cl [23.] (73–78)

Source No. [3] [Q] (79 80)

Card R

Duplicate Columns 1-25 from Card Q

F [3.2] (26–28)

NO_3 [Ø.4] (29–32)

PO_4 [.] (33–35)

B [.] (36–38)

Al [.] (39–41)

Fe [4.4] (42–45)

Mn [.05] (46–49)

Cu [.] (50–52)

Pb [ ] (53 54)

Zn [.] (55–57)

Solids Determined [2460] (58–63)

Calc. [ ] (64–69)

Ca,Mg [900] (70–73)

Hardness Non-Carb. [707] (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 $CaCO_3$ [193] (32–35)

Free CO_2 [ ] (36–38)

SAR [ ] (39–41)

RSC [ ] (42–44)

ABS [.] (45–47)

[.] (48–50)

[ ] (unlabeled)

Alpha (pc/l) [ ] (55–57)

Beta (pc/l) [ ] (58–60)

Ra (pc/l) [.] (61–63)

U (ug/l) [.] (64–66)

No. [5] (80)

Verified PMJ

Recorded by: D. AARONSON

Punched by: Punched FCH Date:

Published:

July 18, 1940

Charles Carter

Mr. T. W. Thorpe
Thorpe Well Company
2340 Sixth Avenue
Des Moines, Iowa

Dear Mr. Thorpe:

Inclosed is a report on the mineralogical analysis of a water sample from the new Adair well which was collected on July 10.

The fluorine content of the water is the same as that reported for the sample of June 10. Other constituents and the total calculated hardness are somewhat higher for the most recent sample. The most disturbing feature of this increase in mineralogical content is the reported presence of 7.2 parts per million iron. This value, of course, is extremely high. It is not characteristic of the deeper waters in western and southwestern Iowa and it is possible that a piece of bit steel or a fragment of casing was included in the sample, which might explain the high iron content.

Thank you very much for your record of the Arcadia well which has just been received.

Very truly yours,

H. G. Hershey

HGH:N

April 16, 1939

Mr. T. W. Thorpe
Thorpe Well Co.
Des Moines, Iowa

Dear Mr. Thorpe:

Enclosed are the water analyses that we have available for wells bearing on the situation around Adair. Two copies of each report are included; one for you and one for the Town of Adair if they wish to keep such information on file.

We do not have state laboratory analyses of water from the Audubon or Atlantic Wells but analyses of water from the Audubon Well has been published in Iowa Geological Survey volume XXXIII page 115.

If I can be of further service on this project I trust that you will call one me.

Very truly yours,

HGH:E

H. G. Hershey

1190
200
9 25

Telephone Conversation With Mr. Tom. Thorpe Dec. 5, 1938.

Adair, Adair County

Suggested that the upland 4½ mi. NW of Adair might be favorable for developing well in the Dakota ss. at 200-300 feet

Samples to be saved.

Large diameter test hole suggested by Mr Thorpe in order give full working freedom.

Well to stop when Penna is reached.

Note: Atlantic has well in fine sand to depth of < 100'. This should be checked.

Curb of Stuart #7 Test = 1170 (200 / 9 / 25) Bedrock 245

" " " Deep =

" " Greenfield = 1370 Bedrock 200

Adair

6

January 8, 1951

Mr. Frank H. Flores
Layne Western Company
Box 662
Ames, Iowa

Dear Mr. Flores:

In response to your letter of January 5 regarding the deep well at Adair, Iowa, we are sending under separate cover a generalized copy of our geologic log.

Studies in October 1949 with the Geological Survey logging equipment indicated the possibility that sand may be entering this well through several breaks in the casing. The equipment, however, could not be lowered below 1,141 feet. A sample of the sand suggested that the sand was entering between the water level and a depth of about 815 feet.

If we may be of further service, do not hesitate to write.

Very truly yours,

C. Richard Murray

CRM:RMJ:emh

JAN 8 1951

LAYNE WESTERN COMPANY

WATER SUPPLY CONTRACTORS

WELL WATER SUPPLIES AND
PUMP EQUIPMENT FOR
MUNICIPALITIES
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RAILROADS
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FACTORIES
MEMPHIS, TENN.
HOUSTON, TEXAS
LOS ANGELES, CALIF.
BRANCHES - REPRESENTATIVES
THROUGHOUT THE COUNTRY

AMES, IOWA

January 5, 1951

Dr. H. G. Hershey
Iowa Geological Survey
Geology Annex Bldg.
Iowa City, Iowa

Dear Dr. Hershey:

We write to inquire if you have in your files any information regarding the 1700 ft. well at Adair, Iowa. It is our understanding that this well was completed in 1940. If you have a log and casing record on this well we would appreciate receiving a copy of it as the town is now experiencing some difficulty with this well and has asked for our assistance.

If we could have this at an early date we certainly would appreciate it.

Yours very truly,

LAYNE-WESTERN COMPANY

Frank H. Flores

FHF:le

September 3, 1940

Mr. M. M. Garnes
Clerk
Adair, Iowa

Dear Mr. Garnes:

Recently I had an opportunity to talk with Professor J. J. Hinman, Jr. Assistant Director of the Water Laboratories here in Iowa City regarding the most recent analyses of water from the Adair city well. Professor Hinman pointed out that the chlorine content was abnormally high, possibly caused by some acid having remained in the well from the acid treatment. It was his thought that other constituents, particularly iron, may have been increased by the acid treatment and that the well had not been sufficiently pumped to obtain a sample which was characteristic of the producing formation. He suggested that the well be pumped for an extended period of time and another sample taken for mineral analysis.

If additional pumping is done at Adair I should like to be present if possible to observe the changes in water level and to collect a sample. I will appreciate it if you will give me as much advance notice as possible.

Very truly yours,

H. G. Hershey

HGH:N

Redfield Oil & Gas Group

F. E. HUNT, MANAGER

ADAIR, IOWA

AUG 13 1946

Sunday

Dear Doctor Hershey:-

On way to church;therefore this note;thanking you for your recent letter:

I realize too much time and work for the entire log of the Adair, water well and all I care for is where different divisions were encountered -such as top Miss.Top of Warsaw-top od Devonian age and if Silorian was reached-IF there was any show of eather oil or gas in well at anytime;ALSO where Bartlesville was encountered in the Penn.

I surmise the Banker's Daughtor and Son-in law-shall call you by phone or person sometime next week in regard to house or a room.They the people I refered to while in your city.I am sure he is worthy of help,if possable,and they would greatly appreciate your effort whether successful or not.

Sincerely,

F. E. HUNT

Adair

August 12, 1946

Mr. Fletcher E. Hunt
Redfield Oil & Gas Group
Adair, Iowa

Dear Mr. Hunt:

In further response to your letter of August 7 I am enclosing a copy of the generalized log of the Adair City water well drilled by the Thorpe Well Company to a depth of 1725 feet. If you need more detail we could furnish it.

We have a record of pumping tests run at three different depths during the drilling of the well:

1) At 1260 feet 18 gpm with a 200-foot drawdown
2) At 1580 feet 27 gpm with a 267-foot drawdown producing horizon reported to be 1360-1580 feet.
3) At 1725 feet 72 gpm with a 56-foot drawdown (after acidizing) producing horizon reported to be 1625 to 1635 feet although the water was clear to the bottom.

On Thorpe's log there are no horizons reported to be water-bearing.

I hope that this meets your needs. If not please let me hear from you.

Very truly yours,

H. G. Hershey

HGH:LIH
enclosure

2

Adair

October 20, 1949

Town of Adair
Adair, Iowa

Attention: Mr. Lynn Killcoin

Gentlemen:

We have completed our review of the data obtained at the time of our surveys in your deep well last week.

These surveys indicate the strong possibility that there are several breaks in the well casing which could permit sandstone to enter the well. The record of formations penetrated during drilling, and the sample of sand submitted to us as representative of the material entering the well, indicate that this sand must be entering the well someplace above a depth of about 815 feet and probably below the present water level in the well.

None of our instruments could be lowered below a depth of 1141 feet in the well. Although this depth may represent the present bottom of the well, with sand filling the hole from that point to the original depth of 1738 ft. 10 in., it is also entirely possible that there is some other obstruction in the hole at that point which prevents the instruments from going deeper.

In the event that this well is to be reconditioned and placed into service, we would suggest that the well be bailed to determine the nature of the obstruction at 1141 feet, and if it is sand it should be removed and the hole cleaned out to its original depth. The well would then probably have to be entirely recased from the top of the 6-inch pipe to a point above the water level. It would be wise to consider cementing this pipe into place if the well is to be used for any long period of time in order to cut down the damage due to corrosion. The cement, if used, should be pumped in so as to form a continuous sheath around the new pipe.

These measures should serve to place the well back into operation at something like its original rate of production. The quality of the water, however, will still be as poor as it was originally.

If we can be of further service, do not hesitate to write.

Very truly yours,

Keith E. Anderson

KEA:LFS

Note: See attached data sheet for source of main water supply.
JLH

July 29, 1940

Town of Adair,
Adair,
Iowa.

Gentlemen:

Our report of the partial examination of water sample No. 149619, received July 27th, in a bottle locally prepared, shows the following results:

Sample collected July 25 when well was 1725' deep

Iron	- 7.5
Fluorides	-2.8
Sulfates	- 2500 plus or minus 100

The determination of sulfate was made by the use of the turbidimeter. This does not give a highly accurate determination but it permits an estimation which we believe is sufficiently close in this analysis. You will note that we consider it accurate within plus or minus 100 parts per million. That is, the value lies somewhere in the range between 2400 and 2600 parts.

Yours very truly,

Jack J. Hinman, Jr.

JJH:ME

Jack J. Hinman, Jr.,
Assistant Director (Water Division)

Copy to Mr. Wieters &
Dr. Hershey.

COPY

August 27, 1940

Mr. T. W. Thorpe
Thorpe Well Company
2340 Sixth Avenue
Des Moines, Iowa

Dear Mr. Thorpe:

Inclosed are the final complete copies of the report on the analyses of the water from the Adair well as shown by the samples which I collected on August 8. You will note that there is very little change from the preliminary analysis which was sent to you some time ago.

Regarding the analyses, I have talked with Professor J. J. Hinman, Jr., Assistant Director of the State Water Laboratories who has just returned to his office. He pointed out that the chlorine content was abnormally high, possibly caused by some acid having remained in the well from the acid treatment. He believed further that other constituents, particularly iron may have been increased by the acid treatment and that the well had not been sufficiently pumped to obtain a sample which was characteristic of the producing formation. It was his suggestion that the well be pumped for an extended period of time and another sample taken for analysis.

These were essentially the conclusions which you and I reached during our telephone conversation.

If additional pumping is done at Adair I should like to be present to observe the changes in water level and to collect the sample. I will appreciate it if you will give me as much advance notice as possible.

Very truly yours,

H. G. Hershey

HGH:N
Inc.
CC to Prof. J. J. Hinman, Jr.

6

July 12, 1940

Charles Carter

Mr. M. M. Garnes, Clerk
Adair, Iowa

Dear Mr. Garnes:

The sample of water from the Adair well has just been received. It was sent immediately to the State Water Laboratory and they have informed us that the analysis should be completed about July 17.

There are several facts regarding the pumping test in which I am greatly interested and I will appreciate it if you will answer the questions on the attached sheet and return it to me at your convenience.

I am extremely sorry that it was impossible for me to attend the pumping test on July 10.

Very truly yours,

H. G. Hershey

HGH:N

Inc.

August 14, 1940

Mr. M. M. Garnes, Clerk
Adair, Iowa

Dear Mr. Garnes:

We have just received from the water laboratory preliminary reports on the samples which I collected on August 8 during the pumping test of the deep Adair well.

These analyses show that the water is of extremely poor quality. It is high in total solids, calcium, magnesium, chlorine, sulphate, and calculated hardness, and is exceptionally high in iron and fluorine. The fluorine content had not been definitely established at the time the report was made to me but the analyst is of the opinion that it will be between 4 and 5 parts per million.

I believe that you will find this water entirely unsatisfactory for domestic use.

Two possibilities appear to be open regarding the well. It can be deepened in the hope of obtaining a more satisfactory water or it could be plugged back and an attempt made to develop less mineralized waters higher in the well.

If you have any questions regarding the analysis or if I can be of service in helping you come to a decision on a solution to the problem, please do not hesitate to call on me.

Very truly yours,

H. G. Hershey

HGH:N

Inc.
cc. A. H. Wieters.

June 19, 1939

Mr. R. W. Brooks
Layne-Western Company
807 World-Herald Building
Omaha, Nebraska

Dear Mr. Brooks:

Subject: Adair, Iowa

Although I have done some work on the water possibilities at Adair, Iowa, there is very little of a definite nature that I can tell you regarding the formations that might be encountered in drilling.

Between 500 and 1,000 feet, however, I believe that the strata will consist primarily of shales with possibly some sandstone and a few thin limestones. The limestones, if present, should occur between 500 and 600 feet.

According to my interpretations, the top of the Mississippian lime should be reached at a depth of approximately 1060 feet. Using other deep wells in the vicinity as a guide, there appears to be little possibility of obtaining an adequate supply of water above the top of the Mississippian limestone, although as you undoubtedly know, it sometimes happens that thick water-bearing sandstones occur at the base of the Pennsylvanian.

When I was in Adair I recommended that a deep well be carried to the top of and into the Mississippian limestone and pointed out the possibility that it may be necessary to drill several hundred feet into the limestone before an adequate water supply would be obtained.

If water-bearing sandstone is encountered above the limestone and within the Pennsylvanian, it should, of course, be tested for quantity and quality.

Mr. R. W. Brooks:

The above figures are based on a starting point at the top of the upland at Adair. If the well is started in the valley or on the slopes, correction will have to be made for the differences in starting elevation.

A well at Adair will be highly important to us, and I trust that you will find it possible to save a complete set of samples along with information regarding water level and possible water production from the various formations drilled.

If I can furnish additional information on this project, please let me hear from you.

Very sincerely yours,

HGH:LM

H. G. Hershey

Phone JAckson 6544

LAYNE-WESTERN COMPANY

WATER SUPPLY CONTRACTORS

WELL WATER SYSTEMS AND
PUMP EQUIPMENT FOR
MUNICIPALITIES
INDUSTRIES
RAILROADS
MINES AND IRRIGATION

Affiliated with
LAYNE & BOWLER INC.
LAYNE SCREEN AND LAYNE PUMPS
807 World-Herald Building
OMAHA, NEBR.

FACTORIES:
MEMPHIS, TENN.
HOUSTON, TEXAS
LOS ANGELES, CALIF.
BRANCHES AND REPRESENTATIVES
THROUGHOUT THE COUNTRY

June 16, 1939

Dr. H. G. Hershey
102 Geology Building
Iowa City, Iowa

Dear Dr. Hershey:

Subject: Adair, Iowa

While in Adair last week I was informed that they are seriously considering drilling a well approximately 1000' deep. I believe you have been in Adair and gone over the location and studied the possibility of water supply in this area, so presume you may have some idea as to the formations that would be encountered between 500' and 1000'.

1061

We would appreciate any information that you can give us in regard to Adair.

Yours very truly,

LAYNE-WESTERN COMPANY

R. W. Brooks

RWB:AI

R. W. Brooks

May 25, 1939

Hon. Mayor and Town Council
Adair, Iowa

Attention: Mr. Samuel Carney
Chairman, Water Dept.

Gentlemen:

I have been requested to write to you in regard to the underground water possibilities in the vicinity of Adair. After a study of existing conditions at Adair two courses appear to be open. Further testing can be done in the deepest valley west of town or a deep well can be drilled.

There is a chance that a gravel body can be found in the deepest valley west of town which would yield a sufficient quantity of water for town supply. However, according to the report on test holes already put down in that area, this possibility does not appear to hold much promise. This, or any other shallow source of supply will be effected by drought and may have to be chlorinated at least during part of the year.

In the event that a deep well is drilled no appreciable amount of water can be expected until the rocks underlying the Pennsylvanian coal measures are penetrated for some distance. According to information at our disposal the base of the coal measures should be encountered at a depth of 1060 feet. Mr. T. W. Thorpe has reported that enough water for the Adair supply was encountered in the Mississippian and Silurian rocks in the Stuart well. We have no reason to expect radical changes in conditions between Stuart and Adair. The difference in elevation would have to be taken into consideration as explained when I met with you in Adair.

10

Production from a deep well would not be affected by periods of drought. If the well is properly constructed chlorination would not be necessary. Water from a deep well at Adair will be moderately to highly mineralized and may contain enough fluorine to be deleterious to the teeth of growing children.

Since conditions are such that there is no ideal solution to the water problem at Adair and after careful consideration of all available data and factors, it would be my suggestion that the town attempt to develop a deep water supply.

If I can be of further service, I trust that you will not hesitate to call on me.

Very truly yours,

HGH:LM

H. G. Hershey

July 6, 1940 Charles Carter

Mr. R. T. Rowland, Mayor
Adair, Iowa

Dear Mr. Rowland:

Inclosed is the analysis of water from your new well.

The first and most important item is the fluorine which as you see is 2.8 parts per million as compared with 7 parts per million as reported by Mr. Maffitt. Although the value as reported by the State Water Laboratory is considerably lower than Mr. Maffitt's figure, it is still rather high and would probably be considered dangerous to the teeth of growing children. However, it may be well for you to get the opinion of Mr. A. H. Wieters of the State Department of Health on this matter.

Another point on which the State analysis does not agree exactly with Mr. Maffitt is in the total calculated hardness. Mr. Maffitt reports 44 grains per U. S. gallon, the State Laboratory reports 50.4 grains per U. S. gallon.

The water is relatively high in alkalies, calcium, and sulphate, and although the water would be rather hard to soften I believe that it would be usable.

If you have any questions regarding the analysis please do not hesitate to let me hear from you regarding them.

Very truly yours,

H. G. Hershey

HGH:N

Inc.

8

July 18, 1940 Charles Carter

Mr. M. M. Garnes
Clerk
Adair, Iowa

Dear Mr. Garnes:

Thank you very much for the additional data on the Adair city well at the time of the last pumping test.

I have just received the report on the analysis of water as shown by the sample collected during the test of July 10. A copy of this report is inclosed. The fluorine is exactly the same as it was in the sample collected on June 10. The other constituents, however, are somewhat higher and as a consequence the calculated hardness is higher in the last sample collected.

The most important feature of the sample collected on July 10 is the fact that the iron content of the water increased to 7.2 parts per million. It is difficult for me to believe that the true iron content of the water as it comes from the formation is as high as that reported. It seems possible that a small fragment of casing or of the bit was included in the sample which might account for the extremely high value obtained.

If you have any questions regarding the analysis please let me hear from you.

Very truly yours,

H. G. Hershey

HGH:N

7

July 27, 1940

Mr. M. R. Gaines,
Town Clerk,
Adair, Iowa.

Dear Sir:

We are in receipt of your letter of July 25th, advising us that the sample of water which you sent us for examination in a one gallon jug is from your new deep well. There is a considerable amount of earthy-appearing sludge in this bottle probably mixed with more or less iron precipitate. Consequently we do not think that the iron determination will be useful or that it will be representative. However, we will shake the bottle as well as we can and determine the iron. We will also determine the fluoride.

As the sample was apparently not collected by a representative of the State Department of Health or of the Iowa State Geological Survey, it is not eligible for examination in the special laboratory operated with W.P.A. funds. If you wish such a mineral analysis made to supplement other information, it is suggested that you arrange with Mr. A. H. Wieters, Director, Division of Public Health Engineering, State Department of Health, Des Moines, or Doctor H. G. Hershey, Assistant State Geologist, Geology Building, State University of Iowa, Iowa City, to have the sample collected by one of their representatives so that it may be eligible for such examination. This will probably result in a more representative specimen being secured.

Yours very truly,

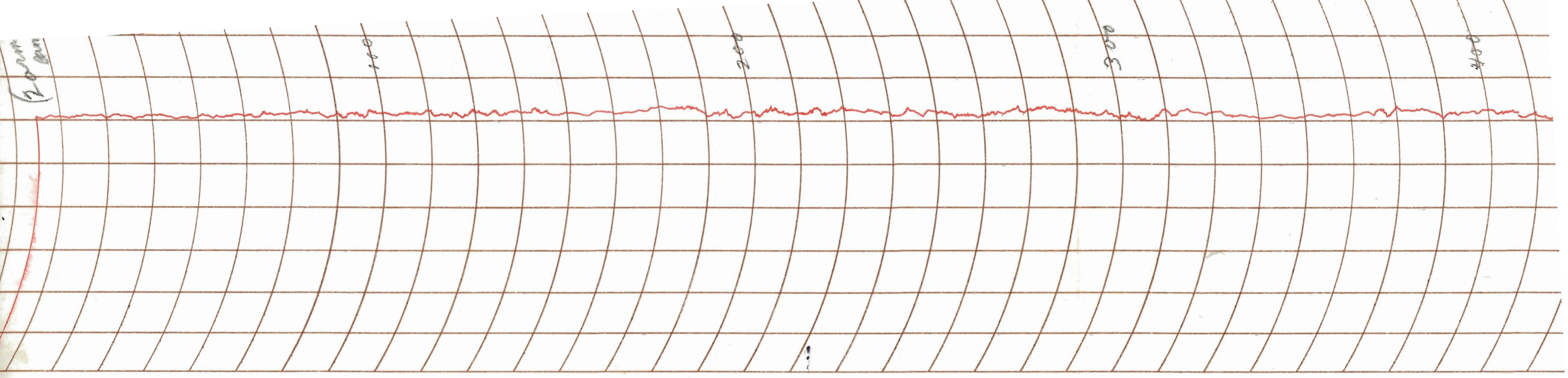
Jack J. Hinman, Jr.

JJH:EE

Jack J. Hinman, Jr.,
Assistant Director (Water Division)

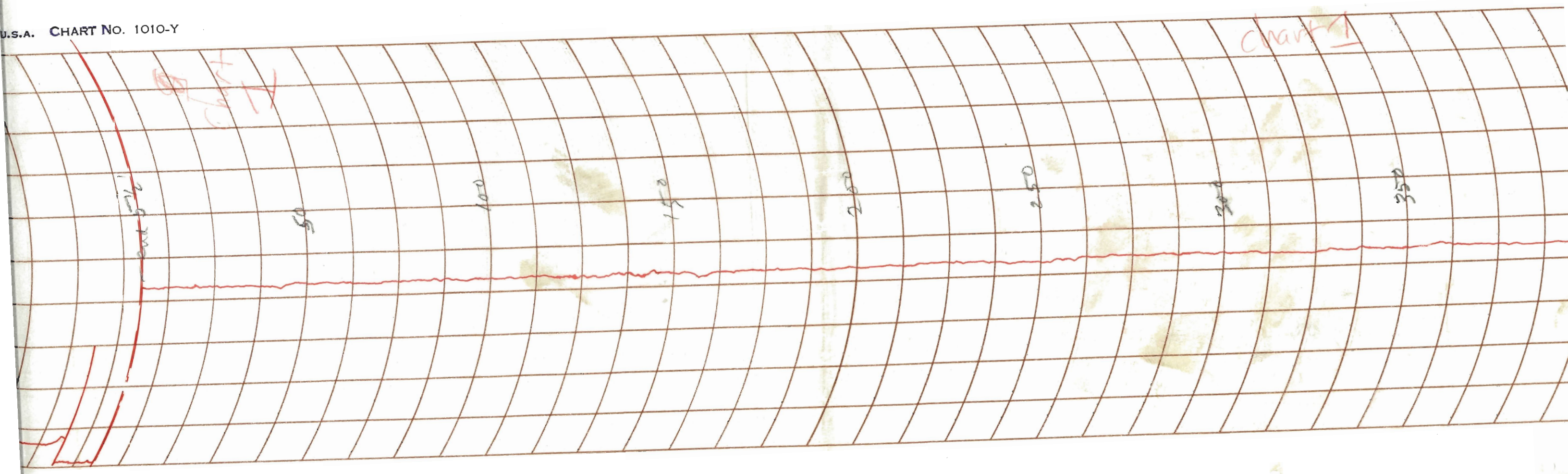
COPY

6



MADE IN U.S.A. THE ESTERLINE-ANGUS

U.S.A. CHART NO. 1010-Y



ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A.

ES

400

450

500

532'

550

600

650

700

725

CHART 1

758' Log out
2000 MV 3 MA
(Trip at 744')

Caliper Datum 44'
(5000 MV 4 MA)

THE ESTERL

500

529

600

700

750

800

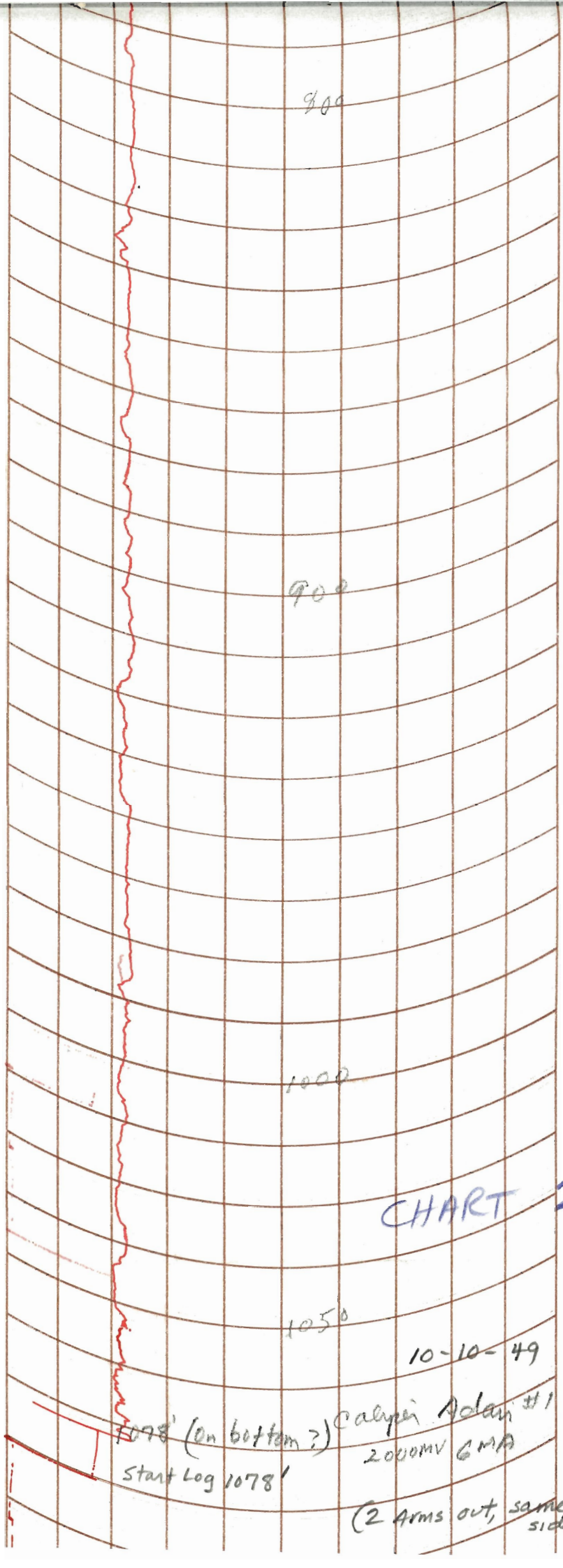

900
950
1000
1050
CHART 2
10-10-49
1078' (on bottom?)
Start Log 1078'
Calyper Polar #1
2000MV 6MA
(2 Arms out, same side)

CHART 3

4 arms out

3½"

← 10" casing

50

100

150

200

250

300

350

400

MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES

0

437' w/l

450

CHART 4

500

520

550

555

588

600

622

650

660

690

700

Power off, switch to MG

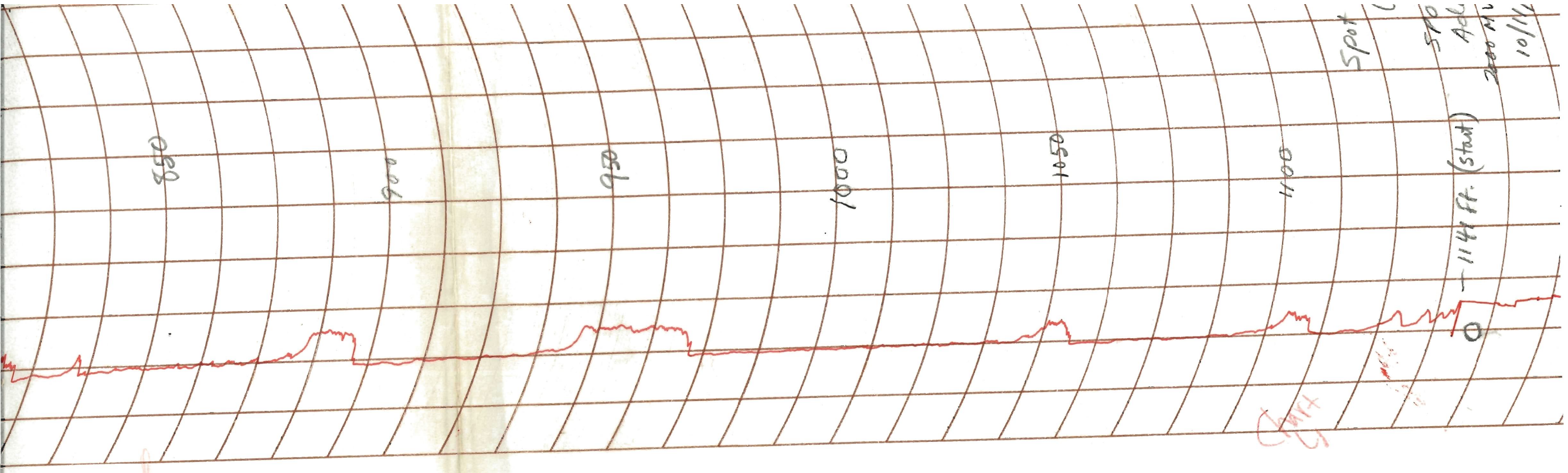
718

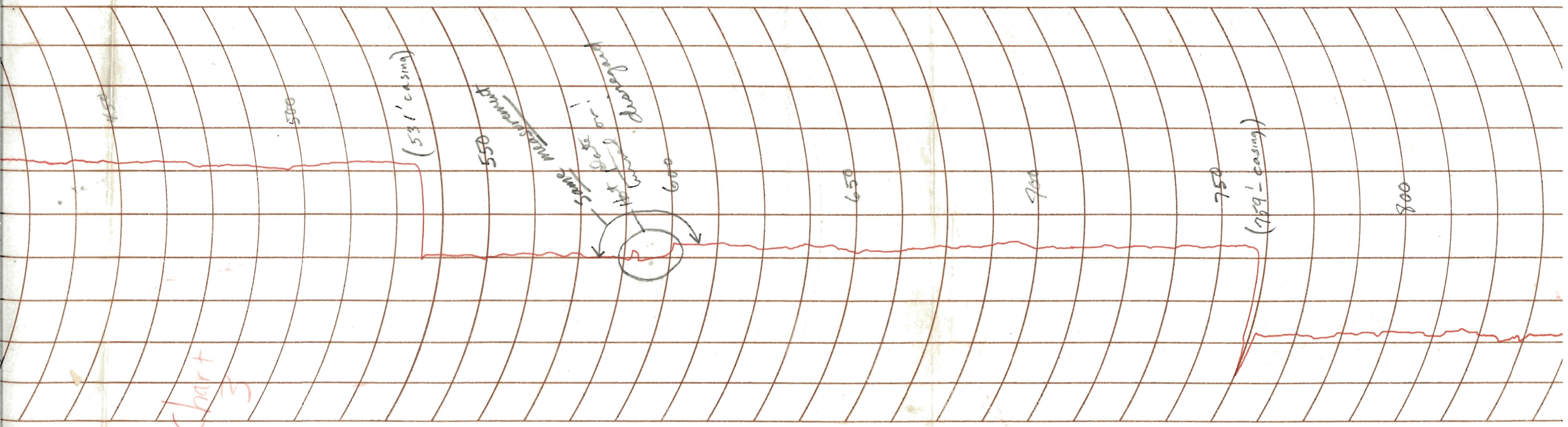
743

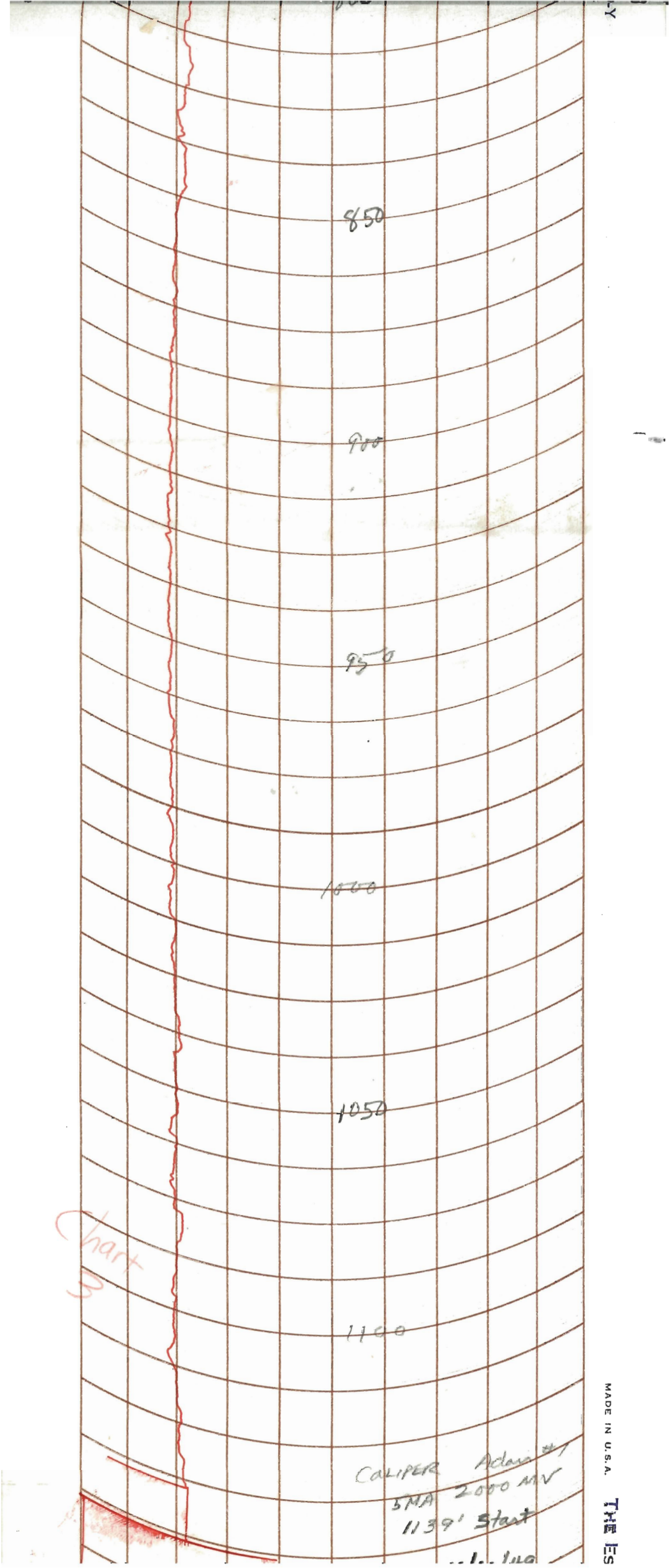
Chart 4

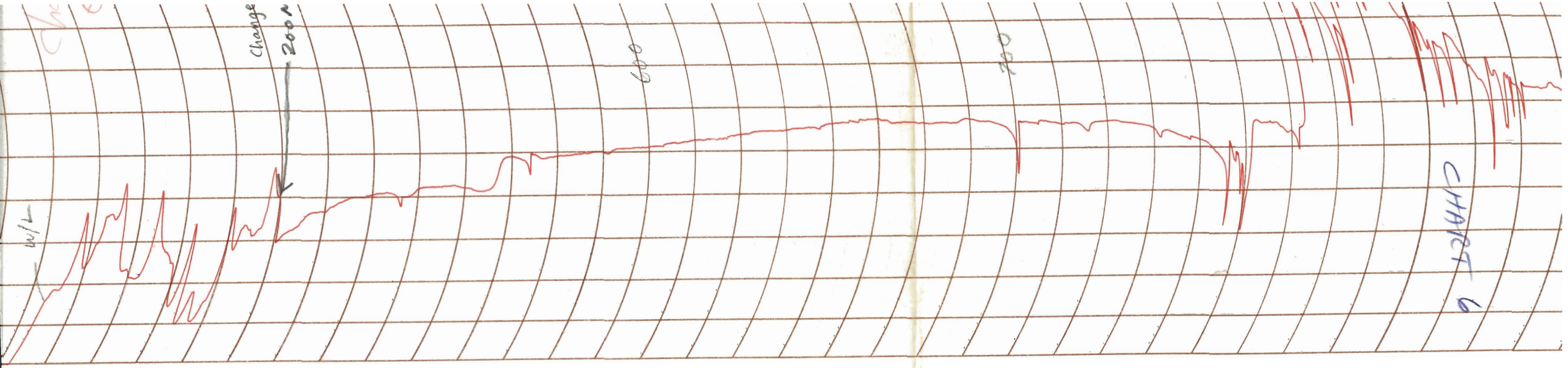
750

800

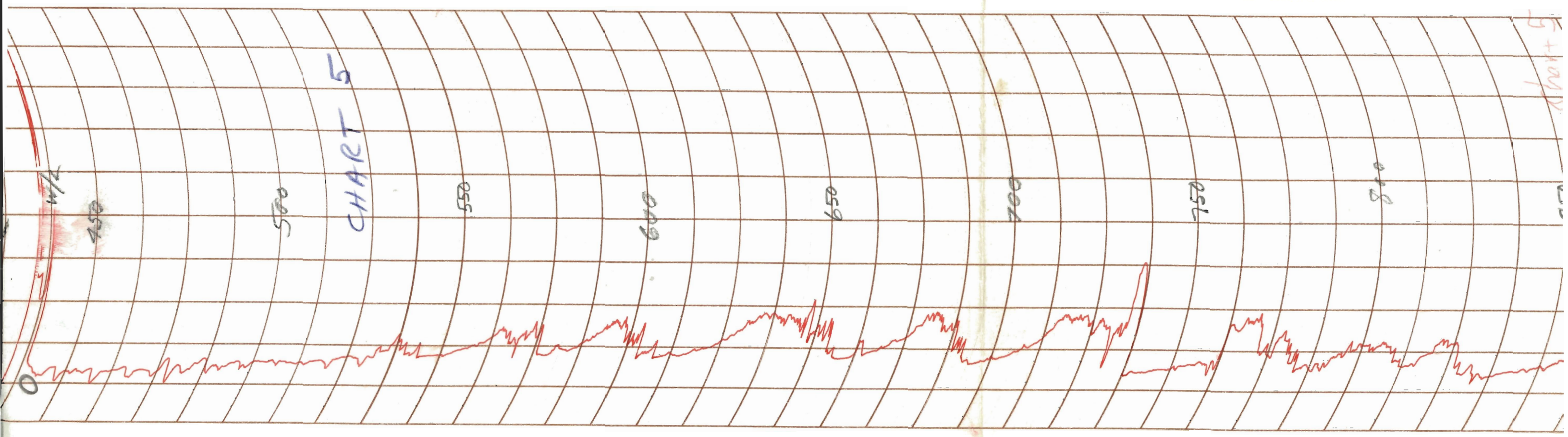

850
900
950
1000
1050
1100
Spot (
Stop
Add
200 M
10/14
1144 ft. (stud)

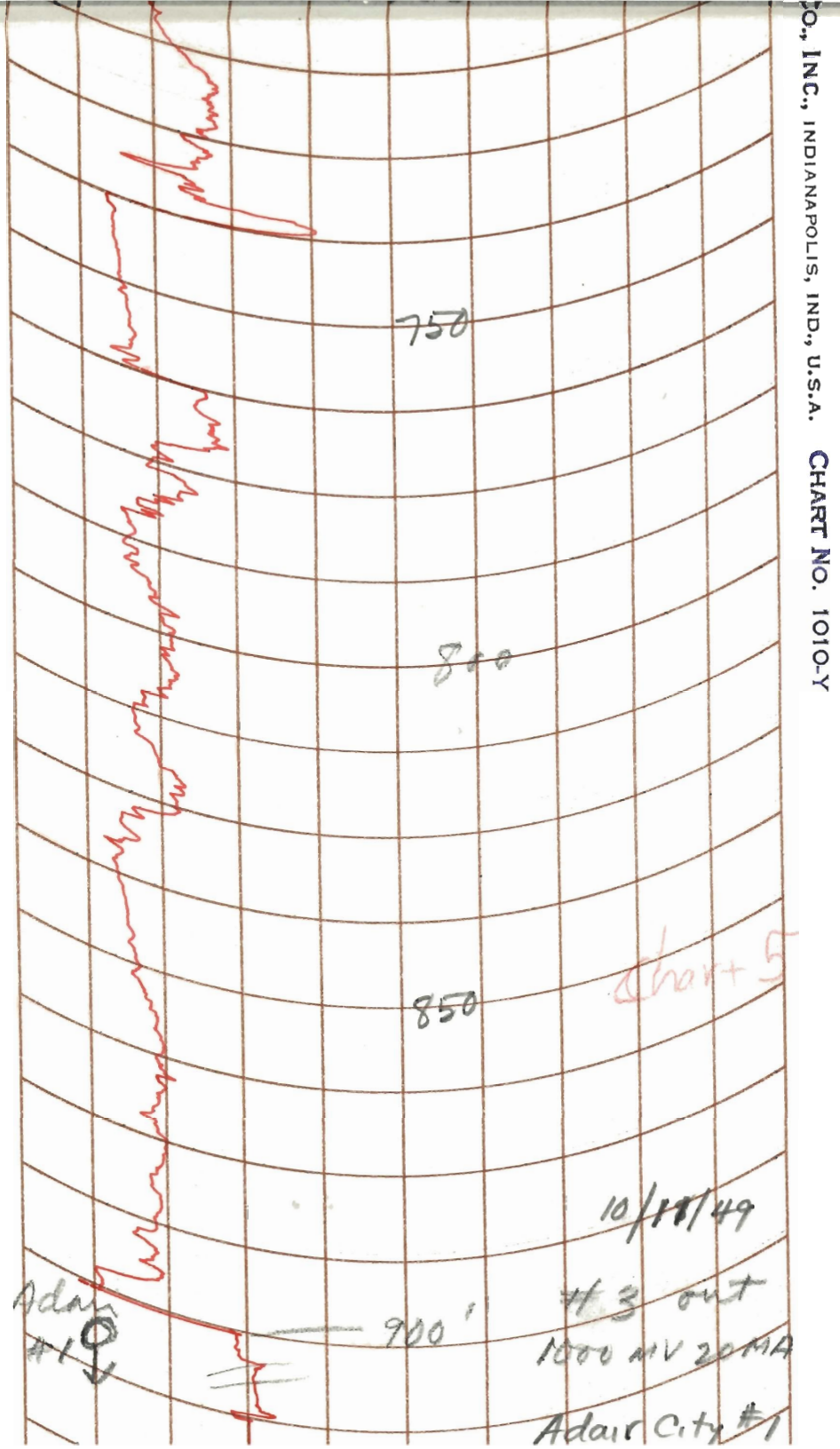

500
(531' casing)
550
Start pumping
Start
Stop pumping
Start pumping
600
650
700
750
(759' casing)
800
Chart 2


850
900
950
1000
1050
1100
Chart 3
CALIPER Adara #1
SMA 2000 MV
1139' Start

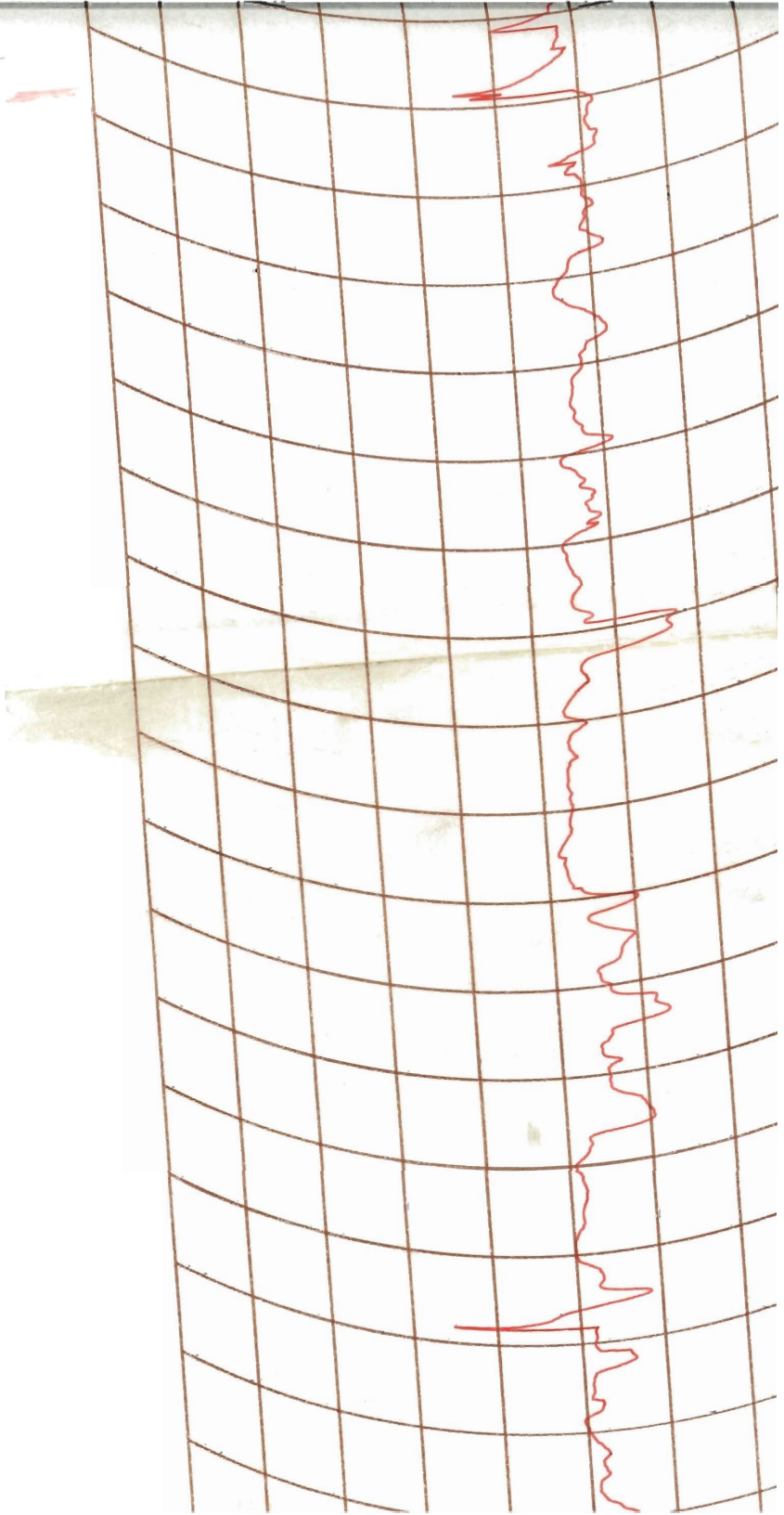


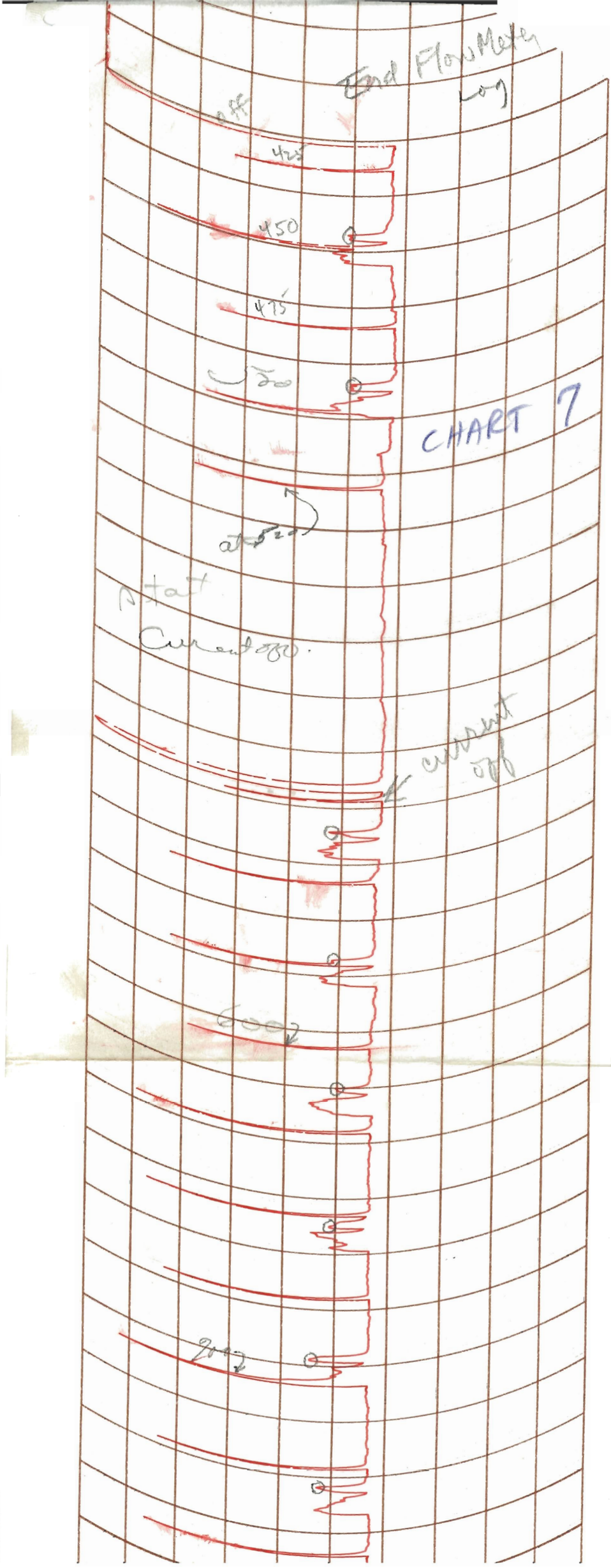
THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 1010-Y



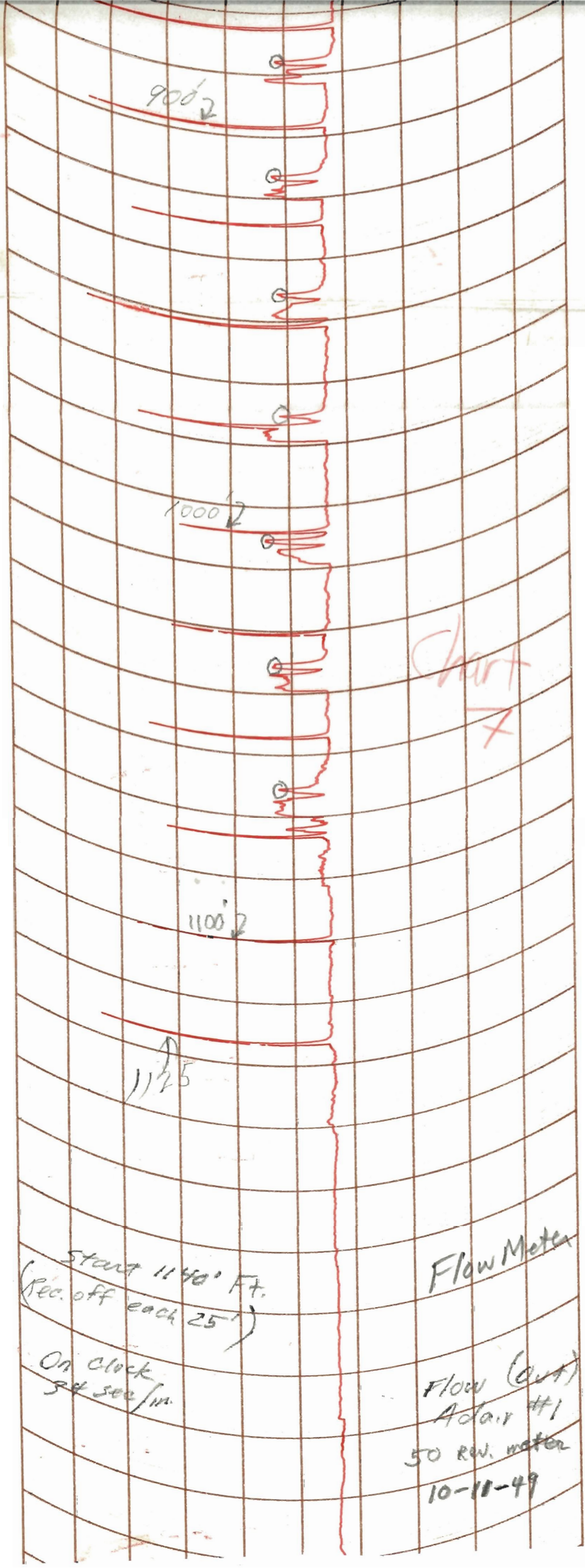


CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 1010-Y





MADE IN U.S.A. THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. ES



THE ESTERLINE-ANGUS CO., INC., INDIANAPOLIS, IND., U.S.A. CHART NO. 1010-Y

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves, each Patented 1906.

Punched FCH

WRD Exp. (GW)
Aug. 1964

Verified PMJ

Adair, Adair Co.
Pumping test - T.D. 1725

Aug. 7, 1940

Water levels measured with Thorpe's elect. equip.

Time	Water level	Production GPM	Temperature Air	Temperature Water	Remarks
Aug. 7.					
1:50	4.34'				Static water level
3:55	4.71				
4:45	4.75				
4:55					Break down
5:25	4.54'1"				
5:42	4.51'10"				
Aug 8					
5:15	4.35'6"				B-t. pump 55'5"11"
5:30	4.35'6"				Start pump
5:31	4.42				
5:32	4.44				
5:35	4.48				
5:40	4.51'8"				
5:45	4.53'8"				
5:50	4.55'3"				
5:55	4.56'8"				
6:00	4.57'11"				
6:10	4.59'10"				
7:07	4.65'9"				
7:30	4.67'8"				
8:00	4.70'0"				
8:30	4.72'0"				
9:00	4.73'5"				
9:30	4.75'6"				
10:00	4.76'2"				
10:30	4.77'7"				
11:00	4.78'4"				
11:30	4.79'4"				Sample filtered
11:50	4.80'3"				
11:52					Sample shut off
11:57	4.67'9"				
12:02 am	4.65'0"				
12:07	4.63'3"				

78	59.8			Water from bottom
77	64			
69	64.7			
69	65			
68	65			
67.5	65.1			
65	65.4			
68	65.5			
65	65.6			
68	65.7			

Kennedy: Glob thermometers. All temperatures 2½' above curb 3' from centerline of well

3

COUNTY HWY

U. S. DEPARTMENT OF THE INTERIOR — GEOLOGICAL SURVEY

Water Resources Division Well Schedule Form

MASTER CARD

Record by: D. ARRONSON | Source of data: FILE | Date: 7/22/65 | Map: 1:63,360

State: IOWA (16) | County (or town): ADAIR (001)

Latitude: 41°30'15"N | Longitude: 094°39'13" | Sequential number: 1

Lat-long accuracy: 2 | T. 77 N, R. 33 W, Sec. 4, NW ¼, NW ¼, NE ¼ 5

Local well number: 077N33W04adD | Other number: B & M WN-1141

Local use: CITY | Owner or name: ADAIR CITY WELL

Owner or name: ADAIR | Address: ADAIR, 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) P.S., (S) Stock, (T) Inatit, (U) Unused — P

Use of well: (A) Anode, (D) Drain, (G) Seismic, (O) Obs, (O) Oil-gas, (P) Recharge, (R) Spring, (S) 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: INTERMITENT (I) | Pumpage inventory: yes / no, period:

Aperture cards: yes

Log data: GEOLOGIST LOG — G

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD | Depth well: 1725 ft | 1725 Meas. (rept) accuracy — 6

Depth cased: (first perf.) 1360 ft | 1360 Casing type: STEEL ; Diam. 10 in — 10

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, (X) other, (Z) other — X

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: JULY 1940 | 940 | Pump intake setting: ft

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, LPG gas, wind; H.P. | Trans. or meter no.

Descrip. MP: LSD ft above/below lsd, Alt. MP: 1391

Alt. LSD: 1391 | Accuracy: (source) ALTIMETER — 7

Water Level: 434 ft above/below MP; Ft above/below lsd: 434 | Accuracy: REPORTED — 2

Date meas: JULY 1940 | 740 | Yield: 72 gpm | 72 | Method determined

Drawdown: 56 ft | 56 | Accuracy: REPORTED | 6 | Pumping period: hrs

QUALITY OF WATER DATA: Iron 4.40 ppm | 6 | Sulfate 1301 ppm | 9 | Chloride 123 ppm | 3 | Hard. 900 ppm | 6

Sp. Conduct: 3090 K x 10^6 | Temp. °F | Date sampled JAN 1938 | 1 5 8

Taste, color, etc.: BROWN COLOR, VERY TURBID

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves, each Patented 1906. 400887

077-33W-04abb

(4)

Adair

65 carboys acid, left in well 48 hours

No change in water level while acid was being put in.

Pumping test 24½ hrs @ 55 gpm – 424' of pump last 2 hours @ 50 gpm – did not reach bottom of pump. Before acid treatment SWL = 44 ft.
PWL = 711 ft. of 44 gpm. in 1 hour but would produce 44 gpm at that level.

E. V. Sparling - Water Supt.

2

Well Number 41 30 15 N 09439 13 W
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD (1–19) | Physiographic Province: CENTRAL LOWLAND (20–21) 12 | Section: DISSECTED TILL PLAIN E (22) | Drainage Basin: NISHNABOTNA (23–25) 3 5 D | Subbasin: (26)

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

MAJOR AQUIFER: DEVONIAN (system), MIDDLE (series) (28–29) D 2, CEDAR VALLEY aquifer, formation, group (30–31) M C

Lithology: DOLOMITE (32–33) D | Origin: MARINE (34) 6 | Aquifer Thickness: 10 ft (35–37) 1 0

Length of well open to: 10 ft (38–40) 1 0 | Depth to top of: 1625 ft (41–43) 1 6 2 5

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: NONE

Depth to consolidated rock: ____ ft (60–63) | Source of data: ____ (64)

Depth to basement: ____ ft (65–68) | Source of data: ____ (69)

Surficial material: ____ (70–71) | Infiltration characteristics: ____ (72)

Coefficient Trans: ____ gpd/ft (73–75) | Coefficient Storage: ____ (76–78)

Coefficient Perm: ____ gpd/ft²; Spec cap: 12 gpm/ft; Number of geologic cards: ____ (79)

CASING;

0-695' 695' OF 10" CASING

529' 803' 274' OF 8" CASING

758'-1360' 602' OF 6" CASING

SEE GEOPHYSICAL FILE



GPO 844-225

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves, each Patented 1906. 400687

Adair,
Deep well

July 26, 1940

Water 1625'-1635'
SWL. = 444'

T.D. 1725'

Mr. West checked clear water to 1715'

444 gpm for 5 hrs. then 60 gpm for 30 min when pump broke in two.

Pump at 711

Water cleared quickly

1725
1355
370

John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves, each Patented 1906. 400687

Adair

12:m				Start pump
12:15	4 77' 3"			
12:20	4 84' 2"			
12:25	4 81' 9"			
12:30	4 87' 5"			
12:44	4 87' 1"		68	65.5
12:50	4 88' 1"			
1:me	4 90' 0"	72	68	66
1:10	4 90' 7"			
1:11				Shut down
1:14	4 72' 2"			
1:21	4 68' 3"			
1:31	4 65' 0"			
1:41	4 63' 1"			
1:51	4 60' 0"			
2:11	4 59' 0"			
2:21	4 58' 1"			
9:00 am.	4 46' 0"			

Readings after 12:16 p.m. on Aug 9 taken by E.S. Sperling.



John C. Moore Corporation, Rochester, N. Y. Binder and holes in leaves, each Patented 1906. 400687

Adair, Adair County
City Well (Deep)

June 5, 1940

Mixed clay	280	0	280
Limestone	4	280	284
Mixed sh - very few rock beds	516	284	800
Sandstone	5		805
Limestone (Broken with sh for 20'	90		895
Shale green in color	40		935
Limestone	35		970
Shale dark in color	8		978
Limestone Water 1163			SWL 465

	Amt
20"	41'
16	80
12½ 13⅜	280
10	695'9"
8"	top to 800' to be cut at 500' ±
8"	Finally cut at 529'

July 1-2, 1940

Bottom of streaked shale 1310 more hard streaks near bottom

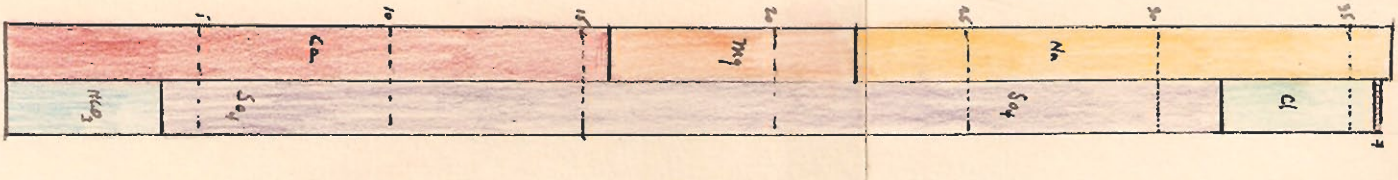
Shale streak 72 - 74

603' of 6" liner bottom at 1355 — 1355 / 603 / 752 Top

Water level dropped 35' then recovered at (1400 ± West) (1500 ± Quinn)

Quinn measured SWL 455 at 1560 depth

Adair - Adair Co. Drilled Well 7/10/40 Depth 1580 ± Prod. Horizon Between 1360-1580 Devonian



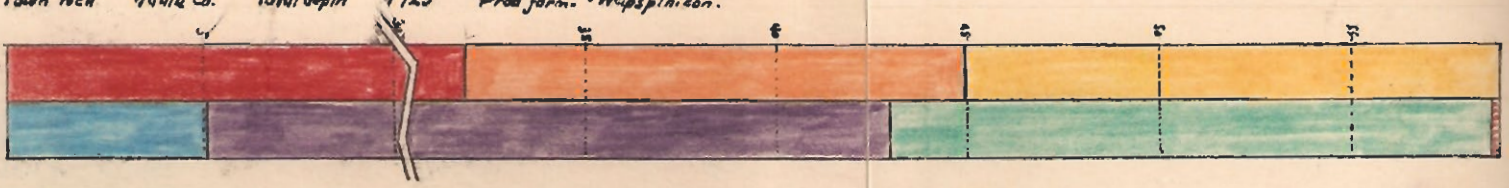
#149144

Adair City Well Adair Co. Depth 1725 Prod Hor Devonian Sample Aug. 8 Bottle No. G-20



150630

Adair Town Well Adair Co. Total depth 1725 Prod form. Wapsipinicon.



#150629

Adair Town Well Adair Co Total depth 1580



#149144

Adair Town Well Adair Co TD 1260 Prod Hor Gilmore C. Hampton 1163

