W8478

Pumping Test at Marion, Iowa
February 7, 1958
Well No. 3

A pumping test was made on the new Marion, Iowa well on February 7, 1958 by Hoeg and Ames. The Geological Survey cooperated by making water level measurements in the pumping well and obtaining rate of discharge data.

The well was pumped at various rates on February 5, 1958 for a total of about 5 hours.

February 7, 1958. The well was pumped at a constant discharge of 507 gpm for 5 hours. The static water level was 197.29' and the pumping level after 5 hours was 221.81'; this is a specific capacity of about 20 gallons per minute per foot, under the above conditions. The well was then pumped for a little over 5 hours with an average discharge of 725 gpm. The drawdown was 46 feet; which is a specific capacity of about 16 gpm/ft., under these conditions.

The data obtained was plotted and projected. For the 500 gpm rate, the projection indicates a drawdown of less than 40' over two years time. A similar projection for the 700 gpm rate indicates a drawdown of less than 60' over two years time. These figures are based on assumed continuous pumping at the rates shown, and the absence of boundary conditions.

The static water level may be lowered after a number of years of heavy pumping. Thus, it would be advisable to provide for periodic measurements of the water level and keep records of these readings, as well as the quantity pumped per day.

TABLE 1
Pumping Test at Marion, Iowa; Feb. 7, 1958
Well No. 3

Location: SW NE sec. 6, T. 83N., R. 6W.

Total Depth: 1663 feet

Elevation of land surface datum: Approx. 850'

Contractor: Hoeg & Ames

Driller: Leroy Ames

Date drilled: July 1957 to Jan. 1958

Hole size:

Casing data:	Am't.	Depth to Bot. Pipe	Depth to Top Pipe
20" od	73'	73'	
12" Id	110'	110'	
11" Id	100'	400'	300'
8" Id	835'	1150'	318'
10" Id	318'	318'	gnd. level

Water level: Static water level was 197.29' below the top of the casing which was approx. 2 ft. above land surface.

Test pump: Turbine powered by two gas engines with belt drive

Aquifer: Prairie du Chien, Jordan, and St. Lawrence

Measurements: Water level measured with electric line. Discharge determined from weir.

Observers: H. M. Jensen and R. E. Hansen

TABLE 2
Pumping Test at Marion, Iowa; Feb. 7, 1958
Well No. 3

Time (minutes)	Depth to Water (ft)	Drawdown (ft)	GPM	Remarks
0				Static = 197.29
1	213.30	16.01		
2	214.58	17.29		
3	214.55	17.26		
4	214.55	17.26		
5				
6	214.90	17.61		pump rate steady
7	215.20	17.91		
8	215.05	17.76	507	
9				
10	215.18	17.89		
12	216.61	19.32		
14	216.92	19.63		
16	217.46	20.17		
18	217.07	19.78	507	
20	217.77	20.48		water clear-T=61°F
22	217.23	19.94		
24	217.23	19.94	507	
26	217.24	19.95		
30	218.14	20.85		
34	218.49	21.20		water level up & down in well
38	218.47	21.18		
42	218.82	21.53		
46	219.22	21.93		
50	219.07	21.78		
55	218.65	21.36		
60	219.42	22.13		
65	219.55	22.26		
70	219.59	22.30		
75	219.59	22.30		
80	219.49	22.20		
90	219.65	22.36		
105	219.92	22.63		
120	220.45	23.16	510	
135	220.66	23.37		
150	220.84	23.55		
165	220.80	23.51		
190	221.20	23.91		
206	221.06	23.77		

Time (minutes)	Depth to Water (ft)	Drawdown (ft)	GPM	Remarks
210	221.17	23.88		
240	221.52	24.23		
270	221.61	24.32		
300	221.81	24.52		pump. rate increased
301	236.40	39.11		
302	236.92	39.63		wide open
303	237.32	40.03		
304	237.28	39.99		
305	237.55	40.26		
306	237.65	40.36		
307	237.49	40.20		
308	237.71	40.42		
310	237.88	40.59		
312	239.46	42.17	750	
315	240.00	42.71		
320	240.49	43.20		
325	240.52	43.23	717	
335	240.61	43.32		
350	240.78	43.49		
360	241.11	43.82		
390	241.49	44.20	720+	
420	241.78	44.49		
450	241.95	44.66		
480	242.01	44.72		
510	242.25	44.96		
540	242.43	45.14		
570	242.62	45.33		
600	242.85	45.56		
630	242.93	45.64		
660	243.03	45.74		
690	243.25	45.96	700+	
720	243.30	46.01		

Pumping Test
Marion City Well #3
7 Feb-58

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Obs. Jensen, Hansen

File No. { Washington ..... / District .....

W8478

Time in Minutes	Elec Line Hold	+ or −	Water Level	Drawdown	Discharge				Remarks.			
9:50AM 0	2					Static Water Level - 197.29						
1	210	+3.30	213.30	16.01								
2	210	4.58	214.58	17.29								
3	210	4.55	214.55	17.26								
4	210	4.55	214.55	17.26								
5	210											
6	210	4.90	214.90	17.61								
7	21.0	5.20	215.20	17.91								
8	220	-4.95	215.05	17.76	507							
9												
10	220	4.82	215.18	17.89								
12	220	3.29	216.61	19.32								
14	220	3.08	216.92	19.63								
16	220	2.54	217.46	20.17								
18	220	2.93	217.07	19.78	507							
19	220	2.45	217.55	20.26								
20	220	2.23	217.77	20.48								
22	220	2.77	217.23	19.94								
23	220	2.37	217.63	20.34								
24	220	2.77	217.23	19.94	507							
26	220	2.76	217.24	19.95					Water Temp 61° Outside Temp 10°			
30	220	1.86	218.14	20.85					Water Clear - Slight Odor - No taste			
34	220	1.51	218.49	21.20					There appears to be about a 4'			
38	220	1.53	218.47	21.18					rise & fall in pumping water levels -			
42	220	1.18	218.82	21.53					@ 500 gpm. - Possible turbulence			
46	220	-0.78	219.22	21.93					in pump column.			
50	220	-0.93	219.07	21.78	507							
55	220	1.35	218.65	21.36								
60	220	0.58	219.42	22.13								
65	220	0.45	219.55	22.26								
70	220	0.41	219.59	22.30								

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9-330

Obs. Jensen - Hansen.

UNITED STATES
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GEOLOGICAL SURVEY

File No. { Washington ..... / District .....

Marion City Well #3
7/2/58
1 Feb 58

SHEET II.

W8478

Time	Hold	+ or −	Water level	Drawdown	Discharge gpm. ft			Remarks.				
75	220	-0.41	219.59	22.30								
80	220	0.51	219.49	22.20								
90	220	0.35	219.65	22.36								
105	220	0.08	219.97	22.63								
120	220	+0.45	220.45	23.16	507							
135	220	+0.66	220.66	23.37								
150	220	0.84	220.84	23.55								
165	220	0.80	220.80	23.51								
190	220	1.20	221.20	23.91								
206	220	1.06	221.06	23.77								
210	220	1.17	221.17	23.86								
240	220	1.52	221.52	24.23								
270	220	1.61	221.61	24.32								
300	220	1.81	221.81	24.52				Increased pumping rate.				
301	240	-3.60	236.40	38.11								
302	240	3.08	236.92	38.63	717							
303	240	2.68	237.32	40.03								
304	240	2.72	237.28	39.99								
305	240	2.45	237.55	40.26								
306	240	2.35	237.65	40.36								
307	240	2.51	237.49	40.20								
308	240	2.29	237.71	40.42								
309	240											
310	240	2.12	237.88	40.59								
312	240	0.54	239.46	42.17	750							
315	240	0.0	240.00	42.71								
320	240	+0.49	240.49	43.20								
325	240	0.52	240.52	43.23	717							
335	240	0.61	240.61	43.32								
350	240	0.78	240.78	43.49								

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W8478

9-330

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Sheet II

File No. { Washington ..... / District .....

Time in Minutes	Hold	+ or −	Water Level	Drawdown	Discharge gpm.			Remarks.				
75	220.0	-0.41	219.59	22.30								
80	220.0	-0.51	219.49	22.20								
90	220.0	-0.35	219.65	22.36								
105	220.0	-0.08	219.92	22.63								
120	220.0	+0.45	220.45	23.16	510							
135	220.0	+0.66	220.66	23.37								
150	220.0	+0.84	220.84	23.55								
165	220.0	+0.80	220.80	23.51								
190	220.0	+1.20	221.20	23.91								
206	220.0	+1.06	221.06	23.77								
210	220.0	+1.17	221.17	23.88								
240	220.0	+1.52	221.52	24.23								
270	220.0	+1.61	221.61	24.32								
300	220.0	+1.81	221.81	24.52				Increased pumping rate				
301.0	240.0	-3.60	236.40	38.11								
302.0	240.0	3.08	236.92	38.63	717							
303	240.0	2.68	237.32	40.03								
304	240.0	2.72	237.28	39.99								
305	240.0	2.45	237.55	40.26								
306	240.0	2.35	237.65	40.36								
307	240.0	2.51	237.49	40.20								
308	240.0	2.29	237.71	40.42								
309	240.0											
310	240.0	2.12	237.88	40.59								
312	240.0	0.54	239.46	42.17	750							
315	240.0	0.0	240.00	42.71								
320	240.0	+0.49	240.49	43.20								
325	240.0	0.52	240.52	43.23	717							
335	240.0	0.61	240.61	43.32								
350	240.0	0.78	240.78	43.49								

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W8478

9-230

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington _____ / District _____

Sheet III

Time in Minutes	Yield	+ or −	Water level	Drawdown	Discharge		Remarks.
360	240.0	+1.11	241.11	43.87			
390	240.0	1.49	241.49	44.20	720+		Water level fluctuating in measuring column.
420	240.0	1.78	241.78	44.49			
450	240.0	1.95	241.95	44.66			
480	240.0	2.01	242.01	44.72			
510	240.0	2.25	242.25	44.96			
540	240.0	2.43	242.43	45.14			Measuring column foaming over
570	240.0	2.62	242.62	45.33			very hard to measure -
600	240.0	2.85	242.85	45.56			
630	240.0	2.93	242.93	45.64			
660	240.0	3.03	243.03	45.74			
690	240.0	3.25	243.25	45.96	700+		
720	240.0	3.30	243.30	46.01			Shut down.

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W8478

9-330

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ____ District ____

Time	Hold	+ or −	Water level	Drawdown	Discharge			Remarks.				
360	240	+1.11	241.11	43.87								
390	240	1.49	241.49	44.20								
420	240	1.78	241.78	44.49								
450	240	1.95	241.95	44.66								
480	240	2.01	242.01	44.72								
510	240	2.25	242.25	44.96								
540	240	2.43	242.43	45.14								
570	240	2.62	242.62	45.33								
600	240	2.85	242.85	45.56								
630	240	2.93	242.93	45.64								
660	240	3.03	243.03	45.74								
690	240	3.25	243.25	45.96								
720	240	3.30	243.30	46.01								

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9-220 W8478

Marion Well #3

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington .... District 1

July 31 - 1957 Copy of Hoeg & Ames Report.

Time	Drawdown	Pumping Level	G.P.M.	Remarks	S.L. - 65'
					Air Line - 300
1.00 PM	00	65.0			Top Bowls - 305'
1:10	67	132	225.	Water Very dirty	Bottom " - 310'
1:35	72	137		" clearing	
1:45	75	140		tightened Belt	
2:05	75	140		speeded up pump	
2:30	155	220	392	Water very dirty	
2:55	167	232	420	water dirty	
3:15	167	232		Do	
3:45	168	233		Do	
4:00	169	234		slowed pump down.	
4:30	89	154	280	water almost clear	
4:45	90	155		water clear	
5:00	90	155	290	caught water sample	
				shut down pump.	

Initially when we were present they said they had put 200' airline and test shows it must have been 300'

H. M. Jensen R E Hanson

W8478

MARION WATER DEPT. 2

July 31 - 1957 Well #3 - Report

time	DD	PL	PPM	Remarks
1:00 p.m.	00	65	started pump	65' water level before pumping
1:10	67	132	225	water dirty
1:35	72	137		water clearing
1:45	75	140		tightened belt
2:05	75	140		speeded up pump
2:30	155	220	392	water very dirty
2:55	167	232	420	water dirty
3:15	167	232		water dirty
3;45	168	233		water dirty
4:00	169	234		slowed pump down
4:30	89	154	280	water almost clear
4:45	90	155		water clear
5:00	90	155	280	caught water sample
5:00				stopped pump

SWL - 65'
Airline - 300'
Top of Bowls - 305'
Bottom " " - 310.

Test

S-330

W8478

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ____ / District ____

Feb 7, 58 - Marion Well

T_{hr}	t min	AIR LINE GAGE	D/W	Q'	gpm	T°				Remarks	
9.45	0	98								Static = 197.29 e.l.	
	1	90 87		8						= 199.0 air line	
	2	86½		11 11.5							
	3	86½		11.5							
	4	"		11.5	507						
	5	86		12							
	6	86	211	12							
	7	85½		12.5							
	8	85½		12.5							
	9	85½		12.5							
	10	85	212	13	507						
	12	84	213	14							
	14	83½		14.5							
	16	83	214	15							
	18	83½			507						
	20	83½									
	25	83½		14.5							
	30	83	214	15							
	40	82		16	507						
	50	82									
	60	82									
	90	80	217	18							
	120	80									
	150	73		25	532						
	210										

303
6
297
98
199

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9-330

Feb 5, 58

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

W8478

File No. { Washington ..... / District ..... }

1st try

303' AIR LINE

TIME	t MIN	O. Air LINE	Air line reading	D/W	e(ft)	Weir GPM	T		HOLD			
905	0	303'	-103	200'				State	200	-341=196.59		el. line
	1							" 303	3-103=200	D/W - Air line		
	2		77	226	26							
	1/2 3		71 70	232	33							
	4		69	234	34							
	5		69	234	34	609			wide open			
	6		67	236	36							
	7		65	238	38							
	8		64	239	39	609						
	9		63	240	40							
	10		62	241	41							
	11		62	241	41							
	12		61	242	42							
	13		61	242	42							
	14		60	243	43					239.8' el. line @ 15		
	16		60	243	"							
	18		60	243	"					240.2' el. line @ 19		
	20		60	243	"							
	22		60	"	"					240.8' el. @ 22		44.21'
	25		60	"	"							
	26		59	244	44							
	28		59	"	"	661.7				242.05 el. @ 29		
	30		59	"	"							
	35		58	245	45					242.5		
	40		58	"		661.7						
	45		57 1/2	245.5	45.5							
	50		57 1/2	"	"	717.8			Tank may have settled			
	60						60°		Shut Down			
	70											
	80											
	90											

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9-230

W8478

Feb 5, 58

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ____ District ____

2nd try

Re START

Time	t in MIN	D air line	air line reading	D/w	Q (GPM)	gpm						
10.40	0	303	102						STATIC 201'			
	1		65 62		34							
	2		60		42				wide open			
	3		59.5									
	4		59									
	5		59									
	6		58.5									
	7		58									
	8		58	245	44'							
	9		52									
	10		49	254	53'				Jars pulling el. up when stuck			
	12		27	276	75'	717.2						
	14		12									
	+615		46									
	+8 16 17		59 64									
	20		64	239	38'							
	25		63½	239.5	38.5							
	30		63½		"	717.2						
	40		63		39'							
	50		62½		39.5'		61° W	29° A				
	60		62		40'	717.2						
121°	90		62									
12 40	120		61									
1 10	150 135		59 56½	246	45' 45.5	717.2			Prob. 1st good reading			
1 40	180		56		46'							
210	210		55½		46'½							
240	240								shut off at 212			
212												
½			72	2½	99	5½	100					
1			96	3½	99+	6½	100					
1½			101	4½	100	10½	100					
2			98									

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W 8478

9-230 — 3rd try — Feb 5, 58

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington .... / District ....

	t	D / Gen line	air gage	D/w	s	gpm						
2 27		303					Static		203			
	1		78									
	2		69									
	3		68			5582						
	4		68	235	32'							
	5		68									
	6		68									
	7		67½		32½'							
	8		"									
	9		67	236	33							
	10		67		"							
	15		67	"	"							
	20		66	237	34							
	30		66						320	shut off		
3 27	60											
4 27	120											

9-330

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

File No. { Washington ..... / District ..... }

W8478

#3 East Injection

Time		hold	wet	W/L								
		47.0	8.29	38.71								

NO. 3215. 20 DIVISIONS PER INCH (120 DIVISIONS) BY 3 3-INCH CYCLES RATIO RULING. CODEX BOOK COMPANY, INC. NORWOOD, MASSACHUSETTS

Hansen
Jensen

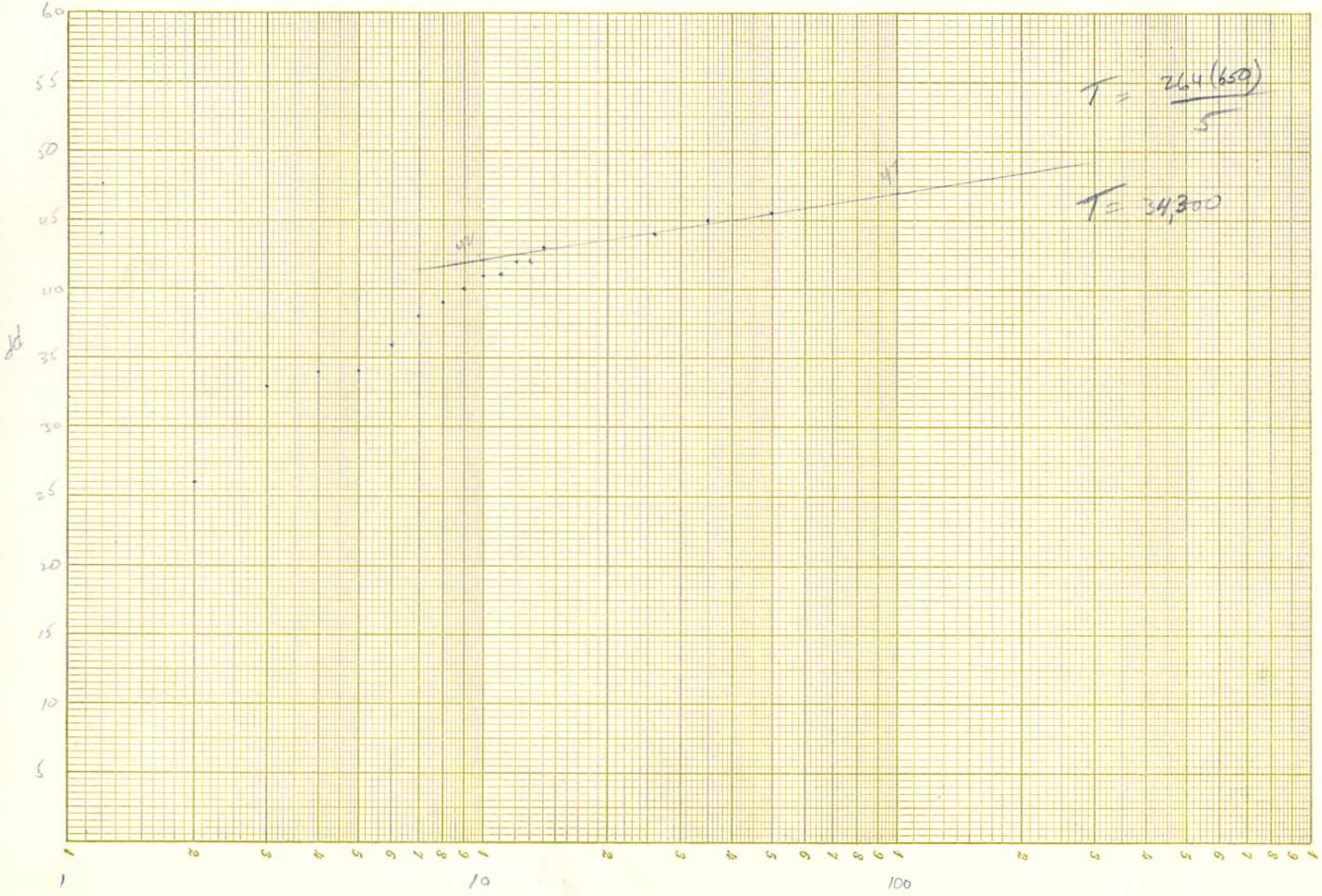
1140 m/day
575,600 m/yr

s vs. t curve: Marion Pumping test
7 Feb 58 Well #3

W8478

5 Feb 56

1st try



W 8478