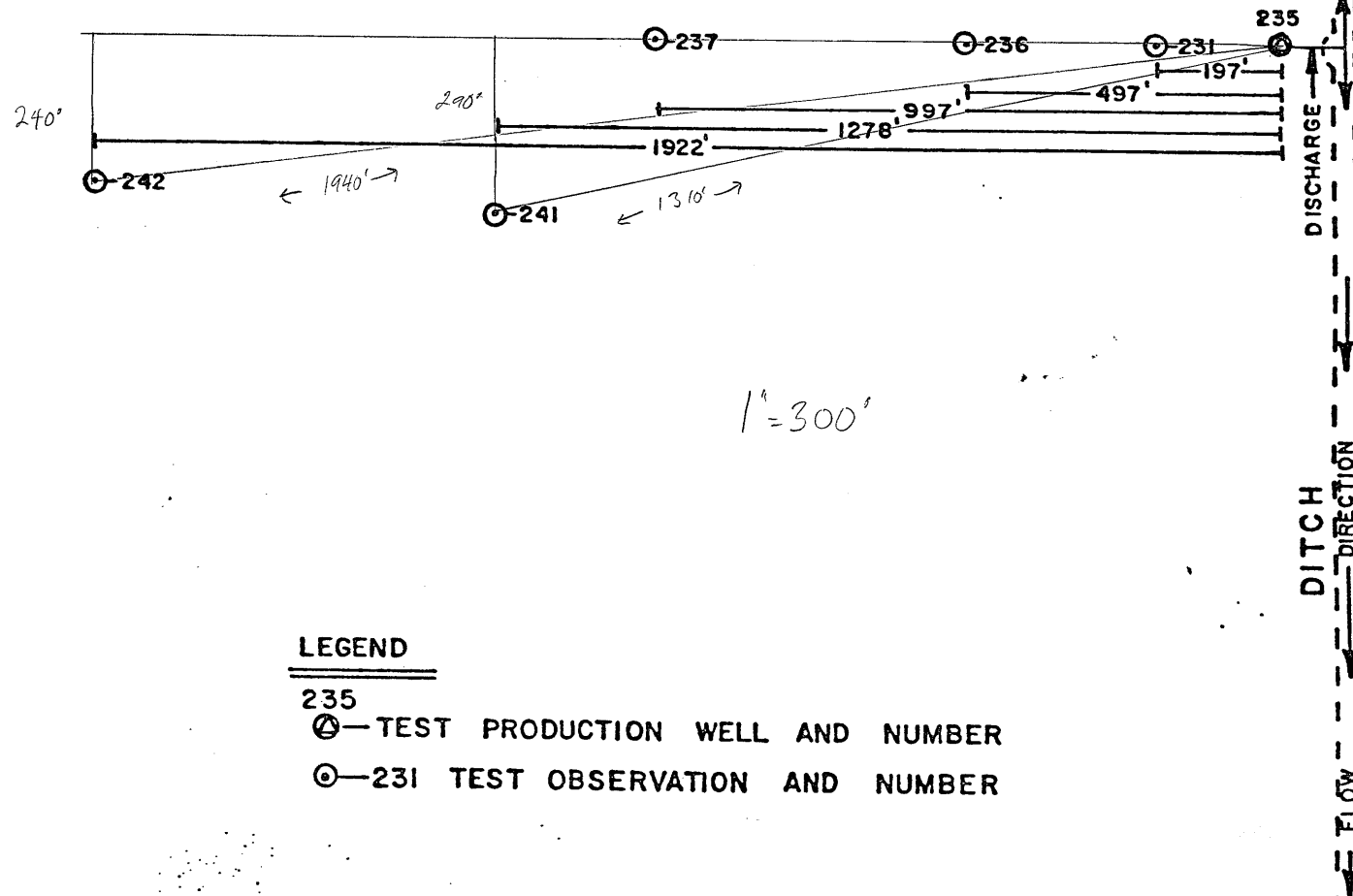


LOCATION OF USSC, SOUTHERN DIVISION RANCH AQUIFER TEST  
SITES, 4-87

# PHASE I AQUIFER TEST SITE SECTION 5

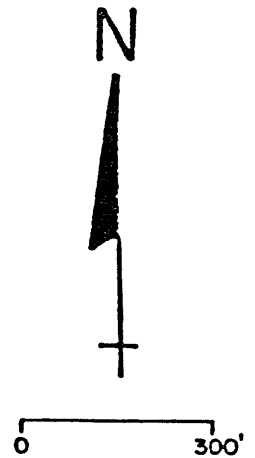


## LEGEND

235

⊙—TEST PRODUCTION WELL AND NUMBER

⊙—231 TEST OBSERVATION AND NUMBER



MISSIMER & ASSOC., INC.

A-0306623-1

1987

SCHEMATIC DIAGRAM SHOWING PHASE I AQUIFER TEST SET UP.

# CONSTRUCTION DETAILS OF MONITOR AND TEST PRODUCTION WELLS

Well Number	Total Depth (feet)	Drilled Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Casing Type	Finish
OB1 H-M-231	129	200	4	67	PVC	Open Hole
H-M-232	177	180	4	49	PVC	Open Hole
H-M-233	177	180	4	49	PVC	Open Hole
H-M-234	188	190	4	42	PVC	Open Hole
PW H-M-235	125	125	12	65	PVC	Open Hole
OB2 H-M-236	130	131	4	65	PVC	Open Hole
OB3 H-M-237	126	193	4	65	PVC	Open Hole
OB4 H-M-241	112	--	6	--	Steel	Open Hole
OB5 H-M-242	--	--	6	--	Steel	Open Hole
H-M-301	124	180	10	76	PVC	Open Hole
H-M-302	140	140	4	77	PVC	Open Hole
H-M-303	140	140	4	77	PVC	Open Hole
H-M-304	15	15	4	5	PVC	10' PVC
H-M-305	10	10	4	5	PVC	Slot Screen 5' PVC
H-M-306	28	28	4	23	PVC	Slot Screen 5' PVC
H-M-309	120	120	8	77	PVC	Slot Screen Open Hole

GEOLOGIST LOG OF WELL H-M-231

<u>Depth(feet)</u>	<u>Lithology</u>
0-10	Sand, light olive gray (5Y 6/1), quartz, trace iron staining, upper 3 feet organic rich, unlithified, fine to coarse, subangular to subrounded, coarser grained to fine gravel and occasional pebbles with depth.
10-20	Sand, light olive gray (5Y 6/1), quartz, as above, unlithified, better sorting than above, medium to coarse grain size, sub to well rounded, occasional pebbles, trace clay.
20-33	Sand, light olive gray (5Y 6/1), quartz, unlithified, poorly sorted, fine to coarse sand as the 0-10 foot interval, minor yellowish-brown clay from 23 feet.
33-35	Clay, dark yellowish brown (10 YR 4/2), sandy, unlithified, and interbedded thin lenses of limestone, same, and dark gray, hard to medium.
35-40	Sand, light olive gray (5Y 6/1), quartz, unlithified, poorly sorted, very coarse to medium sized granules and occasional small to medium sized pebbles, minor clay as above from 35 feet.
40-50	Clay, dark yellowish brown (10 YR 4/2), as above, white and light gray shell fragment lense from 45 feet, minor phosphate sand with depth.
50-52	Clay, olive gray (5Y 4/2), dense, calcareous, unlithified, silty.
52-60	Clay, light olive gray (5Y 5/2), looser than above, unlithified, highly silty, phosphatic minor dolomitic, thin sandstone lense, same, from 52 feet.
60-66	Lime mud, yellowish gray (5Y 8/1) and limestone, soft, highly fossiliferous, sandy, trace phosphatic.
66-73	Limestone, yellowish gray (5Y 8/1), medium to hard, sandy, trace phosphatic, fossil molds and casts common, fine moldic porosity.

GEOLOGIST LOG OF WELL H-M-231 - Continued:

<u>Depth(feet)</u>	<u>Lithology</u>
73-105	Limestone, medium gray (N5) and yellowish gray, as above, biomicrite, hard to medium, quartz sand minor to common, trace phosphatic, abundant partially and entirely solutioned fossil molds and casts, well developed secondary moldic porosity.
105-129	Limestone, medium light gray (N6) to yellowish gray (5Y 8/1), biomicrite, medium hard, abundant quartz fine to medium grain size sand, trace phosphatic as above; very well developed secondary moldic porosity.
129-152	Sand, very light gray (N8), quartz, fine to medium sized grains, well sorted, subrounded to subangular, occasional coarser grains with depth, trace fine phosphate sand.
152-160	Limestone, yellowish gray (5Y 7/2), medium hard, abundant quartz, minor phosphate; fine to medium sand, calcareous, commonly sparitic matrix, nearly complete solutioning of fossil fragments yielding good moldic porosity.
160-170	Limestone, yellowish gray, as above, soft to medium, fossil fragments common, fair moldic porosity.
170-178	Sand and shell fragments, similar to above, but very poorly consolidated by a similar calcareous matrix, minor secondary solutioning evident.
178-185	Clay, light olive gray (5Y 5/2), unlithified, abundant quartz, minor phosphate, fine to medium, sand, minor shell fragments.
185-200	Clay, grayish olive green (5GY 2/2), unlithified, stiff, sandy, dolomitic minor phosphate.

FIELD LOG OF TEST HOLE 74-I2-29  
Map #52 Missimer & Associates  
# H-M-301

<u>Depth(feet)</u>	<u>Lithology</u>
0-17	Sand, light olive gray, unconsolidated, medium to coarse, sand sized quartz grains.
17-20	Clay, yellowish gray and greenish gray, sandy, unconsolidated, and sand, as above.
20-27	Sand and interbedded sandy clay, yellowish gray, unconsolidated, quartz grains fine to coarse size.
27-35	Limestone marl, yellowish gray, hard and softer to unlithified with depth, sandy, white and gray shell fragments common, good moldic porosity.
35-38	Clay, tan, sandy, and marl, as above.
38-45	Limestone, gray and yellowish gray, shelly hard to medium, common marly, good moldic porosity.
45-61	Limestone, gray, hard, micrite, abundant fossil molds and casts, excellent moldic porosity.
61-73	Limestone, light gray, soft, poorly consolidated, abundant quartz fine sand and shell fragments, fine moldic to intergranular porosity.
73-95	Limestone, gray, hard, micrite, minor quartz sand, large fossil casts, excellent moldic porosity.
95-117	Limestone, gray and yellowish gray, hard to medium, quartz sand common, well indurated, good moldic porosity.
117-129	Limestone, as above, medium soft, still good induration, quartz sand abundant, good moldic porosity.
129-140	Sandstone, yellowish gray, soft to loosely consolidated, very friable, similar composition to above.
140-147	Limestone, light yellowish gray, hard to medium, very sandy, good induration, good moldic porosity.
147-156	Sandstone and sand, yellowish gray, very soft to unconsolidated, echinoid and barnicle fragments common, quartz sand fine grain size.

Sec 29

FIELD LOG OF TEST HOLE 74-12-29

<u>Depth(feet)</u>	<u>Lithology</u>
156-176	Sand and shell fragments, unconsolidated, olive gray clay matrix, sand is fine grain quartz and phosphate.
176-180	Clay, olive gray, unlithified, stiff textured, fine sandy.

TABLE 2. COMPUTED AQUIFER HYDRAULIC COEFFICIENTS

## PHASE I TEST: SECTION 5

<u>Well No.</u>	<u>Method</u>	<u>Transmissivity (gpd/ft)</u>	<u>Storage Coefficient</u>	<u>Leakance Coefficient (gpd/ft<sup>3</sup>)</u>
H-M-231	Straight Line	106,000	---	---
	Curve Matching	105,000	$3.7 \times 10^{-4}$	$1.1 \times 10^{-3}$
H-M-236	Straight Line	114,000	---	---
	Curve Matching	96,000	$3.9 \times 10^{-4}$	$2.5 \times 10^{-3}$
H-M-237	Straight Line	125,000	---	---
	Curve Matching	105,000	$5.0 \times 10^{-4}$	$1.1 \times 10^{-3}$
H-M-241	Straight Line	139,000	---	---
	Curve Matching	123,000	$6.0 \times 10^{-4}$	$1.1 \times 10^{-3}$
H-M-242	Curve Matching	123,000	$5.6 \times 10^{-4}$	$1.3 \times 10^{-3}$
--	Distance Drawdown (Straight Line)	100,000	---	---
--	Computer Fit:			
	Equilibrium	105,000	--	$1.0 \times 10^{-3}$
	Non-Steady State	105,000	$5 \times 10^{-4}$	$1.2 \times 10^{-3}$

## PHASE II TEST: SECTION 29

<u>Well No.</u>	<u>Method</u>	<u>Transmissivity (gpd/ft)</u>	<u>Storage Coefficient</u>	<u>Leakance Coefficient (gpd/ft<sup>3</sup>)</u>
H-M-302	Straight Line	330,000	---	---
	Curve Matching	320,000	$3.4 \times 10^{-4}$	$1.3 \times 10^{-4}$



**APPENDIX B**

**TIME AND DRAWDOWN OR RECOVERY  
MEASUREMENTS OF PHASE I AQUIFER TEST MONITOR WELLS**

TIME VERSUS DRAWDOWN IN WELL H-M-235 (PRODUCTION)  
DURING AQUIFER PERFORMANCE TEST

<u>Time(minutes)</u>	<u>Drawdown(feet)</u>
.45	5.74
1.5	6.22
2	6.60
3	6.94
4	7.01
5	7.19
6	7.22
7	7.35
8	7.44
9	7.50
10	7.65
12.5	7.93
15	7.93
21	8.26
26	8.44
31	8.53
41	8.80
51	8.96
63	9.24
77	9.43
96	9.59
107	9.67
123	9.76
183	10.08
240	10.25
318	10.51
360	10.59
420	10.73
480	10.85
540	10.94
720	11.08
906	11.24
1140	11.26
1260	11.29
1455	11.34
1500	11.34
1590	11.38
1667	11.51
1800	11.44
1920	11.44
2040	11.24
2160	11.23
2280	11.14
2400	11.16
2520	11.16
2640	11.13

TIME VERSUS DRAWDOWN IN WELL H-M-235 (PRODUCTION)  
DURING AQUIFER PERFORMANCE TEST - Continued:

<u>Time(minutes)</u>	<u>Drawdown(feet)</u>
2760	11.05
2880	11.24
3000	11.25
3120	11.18
3240	11.29
3360	11.24
3487	11.33
3596	10.84
3709	11.10
3844	11.19
4328	11.12

TIME VERSUS DRAWDOWN IN WELL H-M-231 DURING  
AQUIFER PERFORMANCE TEST

<u>Time(minutes)</u>	<u>Drawdown(feet)</u>
.083	.07
.17	.21
.33	.39
.50	.52
.67	.61
.83	.71
1	.80
1.5	1.13
2.5	1.26
3	1.36
4	1.54
5	1.68
6	1.81
7	1.91
8	2.02
9	2.09
10	2.18
12.5	2.33
15	2.45
20	2.75
25	2.94
30	3.10
40	3.33
50	3.53
60	3.70
75	3.90
90	4.05
105	4.18
120	4.28
150	4.45
180	4.61
243	4.84
300	5.01
367	5.16
422	5.23
489	5.36
548	5.45
602	5.51
729	5.61
911	5.71
1147	5.78
1401	5.87
1647	5.87
1800	5.89
1920	5.86

TIME VERSUS DRAWDOWN IN WELL H-M-231 DURING  
AQUIFER PERFORMANCE TEST - Continued:

<u>Time(minutes)</u>	<u>Drawdown(feet)</u>
2040	5.78
2160	5.76
2285	5.71
2415	5.68
2525	5.67
2644	5.67
2760	5.65
2882	5.68
3002	5.66
3123	5.64
3240	5.69
3356	5.70
3490	5.73
3701	5.61
3836	5.67
4199	5.72

TIME VERSUS DRAWDOWN IN WELL H-M-236 DURING  
AQUIFER PERFORMANCE TEST

<u>Time(minutes)</u>	<u>Drawdown(feet)</u>
.5	.02
.75	.04
1	.07
1.5	.12
2	.18
2.5	.23
3	.28
4	.38
5	.47
6	.56
7	.64
8	.71
9	.77
10	.84
12.5	.98
15	1.1
20	1.32
25	1.5
30	1.65
40	1.89
50	2.08
60	2.24
75	2.44
90	2.60
105	2.74
120	2.85
150	3.02
180	3.16
245	3.41
306	3.58
370	3.73
425	3.83
490	3.93
551	4.02
604	4.08
732	4.18
914	4.28
1150	4.36
1265	4.41
1403	4.45
1505	4.45
1660	4.46
1803	4.46
1923	4.44
2043	4.40
2163	4.47

TIME VERSUS DRAWDOWN IN WELL H-M-236 DURING  
AQUIFER PERFORMANCE TEST - Continued:

<u>Time(minutes)</u>	<u>Drawdown(feet)</u>
2288	4.32
2418	4.29
2528	4.28
2647	4.28
2763	4.28
2885	4.29
3004	4.27
3125	4.25
3243	4.27
3354	4.29
3494	4.32
3554	3.39
3627	4.09
3670	4.17
3834	4.24
4315.	4.32

TIME VERSUS DRAWDOWN IN WELL H-M-237 DURING  
AQUIFER PERFORMANCE TEST

<u>Time(minutes)</u>	<u>Drawdown(feet)</u>
.5	0
1	0
1.5	.005
2	.01
2.5	.01
3	.02
4	.02
5	.04
6	.05
7	.07
8	.09
9	.11
10	.13
12.5	.19
15	.24
20	.35
25	.45
30	.54
40	.70
50	.84
60	.96
75	1.11
93	1.25
105	1.34
120	1.44
152	1.61
182	1.74
247	1.95
309	2.10
374	2.24
427	2.34
493	2.44
554	2.52
606	2.58
735	2.70
920	2.79
1155	2.89
1220	2.94
1507	2.96
1662	2.98
1801	2.98
1921	2.97
2049	2.95
2169	2.92
2289	2.88
2409	2.86



TIME VERSUS DRAWDOWN IN WELL H-M-237 DURING  
AQUIFER PERFORMANCE TEST - Continued:

<u>Time(minutes)</u>	<u>Drawdown(feet)</u>
2528	2.84
2648	2.84
2768	2.82
2888	2.82
3007	2.79
3129	2.77
3245	2.77
3340	2.79
3497	2.82
3565	2.37
3603	2.60
3801	2.74
4309	2.85

TIME VERSUS DRAWDOWN IN WELL H-M-241 DURING  
AQUIFER PERFORMANCE TEST

<u>Time(minutes)</u>	<u>Drawdown(feet)</u>
18	.12
33	.28
63	.56
124	.95
250	1.39
312	1.53
430	1.77
558	1.93
739	2.08
923	2.17
1159	2.29
1274	2.33
1408	2.38
1510	2.38
1610	2.39
1810	2.38
1934	2.39
2065	2.36
2175	2.34
2298	2.28
2428	2.25
2534	2.24
2650	2.24
2777	2.24
2891	2.23
3009	2.23
3134	2.18
3248	2.18
3368	2.20
3501	2.23
3611	2.04
3806	2.16

TIME VERSUS DRAWDOWN IN WELL H-M-242 DURING  
AQUIFER PERFORMANCE TEST

<u>Time(minutes)</u>	<u>Drawdown(feet)</u>
67	.27
129	.54
254	.91
326	1.06
435	1.23
562	1.39
744	1.54
928	1.65
1163	1.76
1278	1.81
1413	1.87
1514	1.86
1613	1.87
1814	1.86
1937	1.85
2070	1.85
2179	1.82
2302	1.78
2431	1.75
2538	1.73
2654	1.72
2779	1.72
2894	1.70
3012	1.65
3139	1.65
3249	1.67
3509	1.69
3618	1.58
3812	1.64

# TIME VERSUS RECOVERY IN WELL H-M-231

<u>Time(minutes)</u>	<u>Recovery(feet)</u>
.167	.22
.25	.27
.33	.36
.50	.49
.75	.64
1	.75
1.25	.86
1.5	.93
1.75	1.01
2	1.08
2.5	1.20
3	1.30
3.5	1.39
4	1.46
5	1.59
6	1.70
7	1.79
8	1.87
9	1.95
10	2.02
12.5	2.18
15	2.32
20	2.535
25	2.70
30	2.83
35	2.945
40	3.05
50	3.24
60	3.395
75	3.59
96	3.79
125	4.02
135	4.09

# TIME VERSUS RECOVERY IN WELL H-M-236

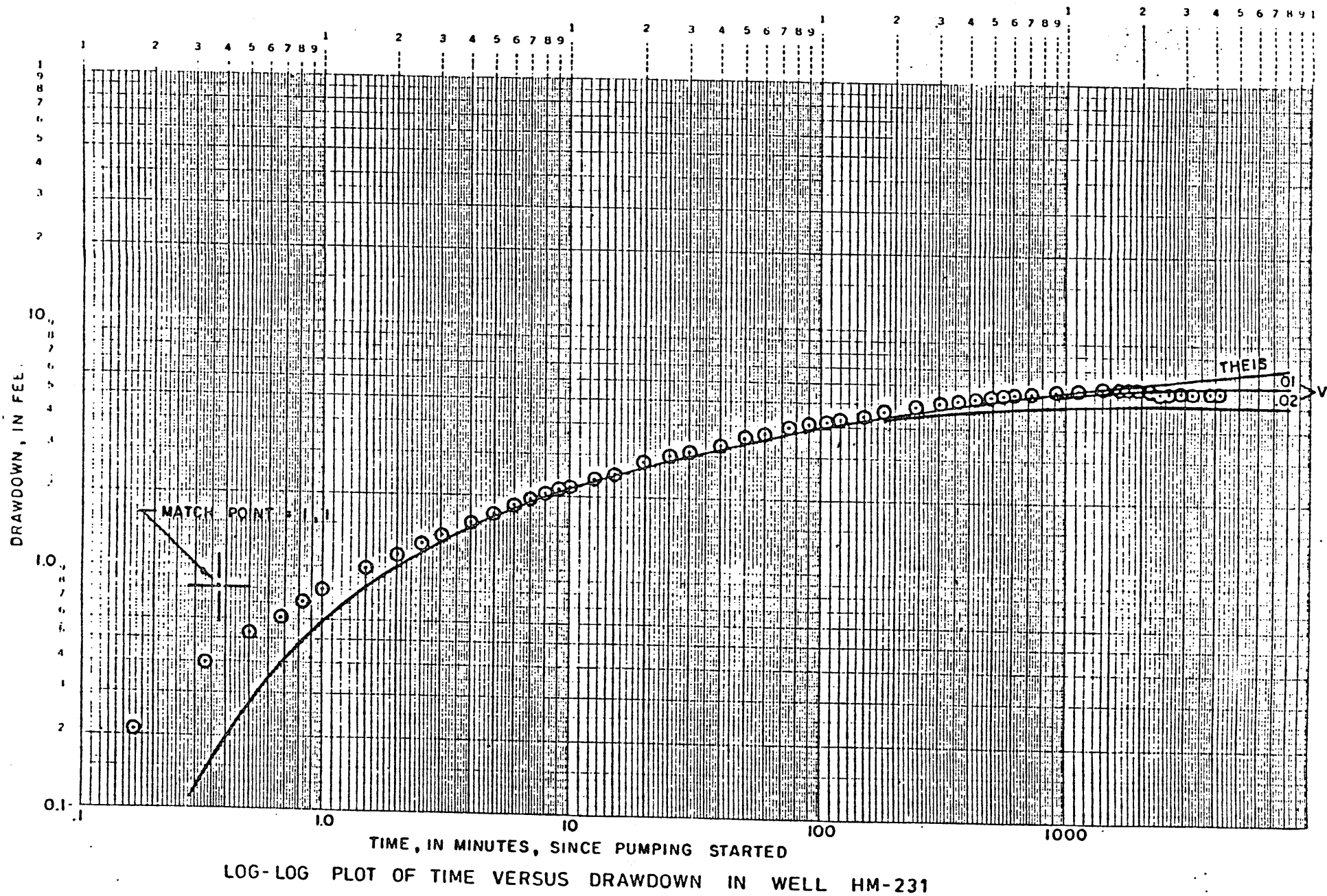
<u>Time(minutes)</u>	<u>Recovery(feet)</u>
.25	.015
.50	.03
.75	.05
1	.07
1.16	.09
1.5	.12
1.75	.15
2	.175
2.25	.20
2.5	.23
2.75	.25
3	.28
3.5	.33
4	.37
4.5	.415
5	.46
5.5	.50
6	.54
7	.61
8	.68
10	.79
13	.94
14	.99
15	1.03
17.5	1.13
20	1.22
22.5	1.30
25	1.37
30	1.51
35	1.625
40	1.73
45	1.82
50	1.90
60	2.05
76	2.25
97	2.455
120	2.67
133	2.69
164	2.87
220	3.13
280	3.32
340	3.47
380	3.54

# TIME VERSUS RECOVERY IN WELL H-M-237

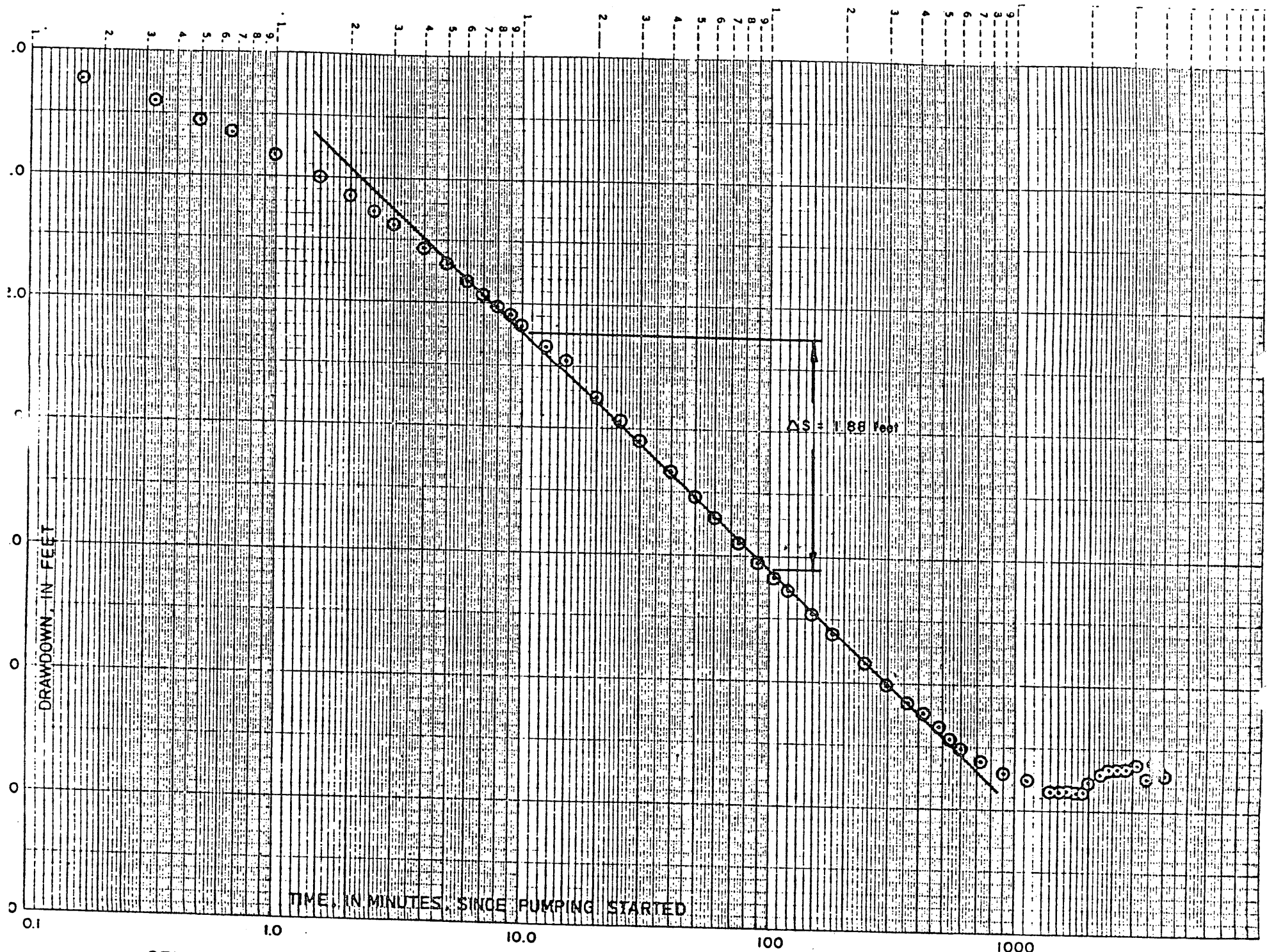
<u>Time(minutes)</u>	<u>Recovery(feet)</u>
3	.01
4	.02
5	.03
6	.045
7	.065
8	.09
9	.105
10	.125
12.5	.175
15	.225
20	.32
25	.41
30	.49
40	.63
50	.76
61	.87
77	1.02
98	1.18
123	1.34
161	1.54
180	1.63
240	1.82
300	2.00
360	2.11
420	2.20
480	2.28
540	2.34
600	2.39
660	2.44
720	2.48
780	2.52
840	2.56
900	2.59
960	2.62
1020	2.645
1080	2.655
1140	2.665
1200	2.67
1260	2.675
1320	2.68
1380	2.69
1440	2.70
1500	2.72
1560	2.73
1680	2.745
1800	2.76

**APPENDIX D**

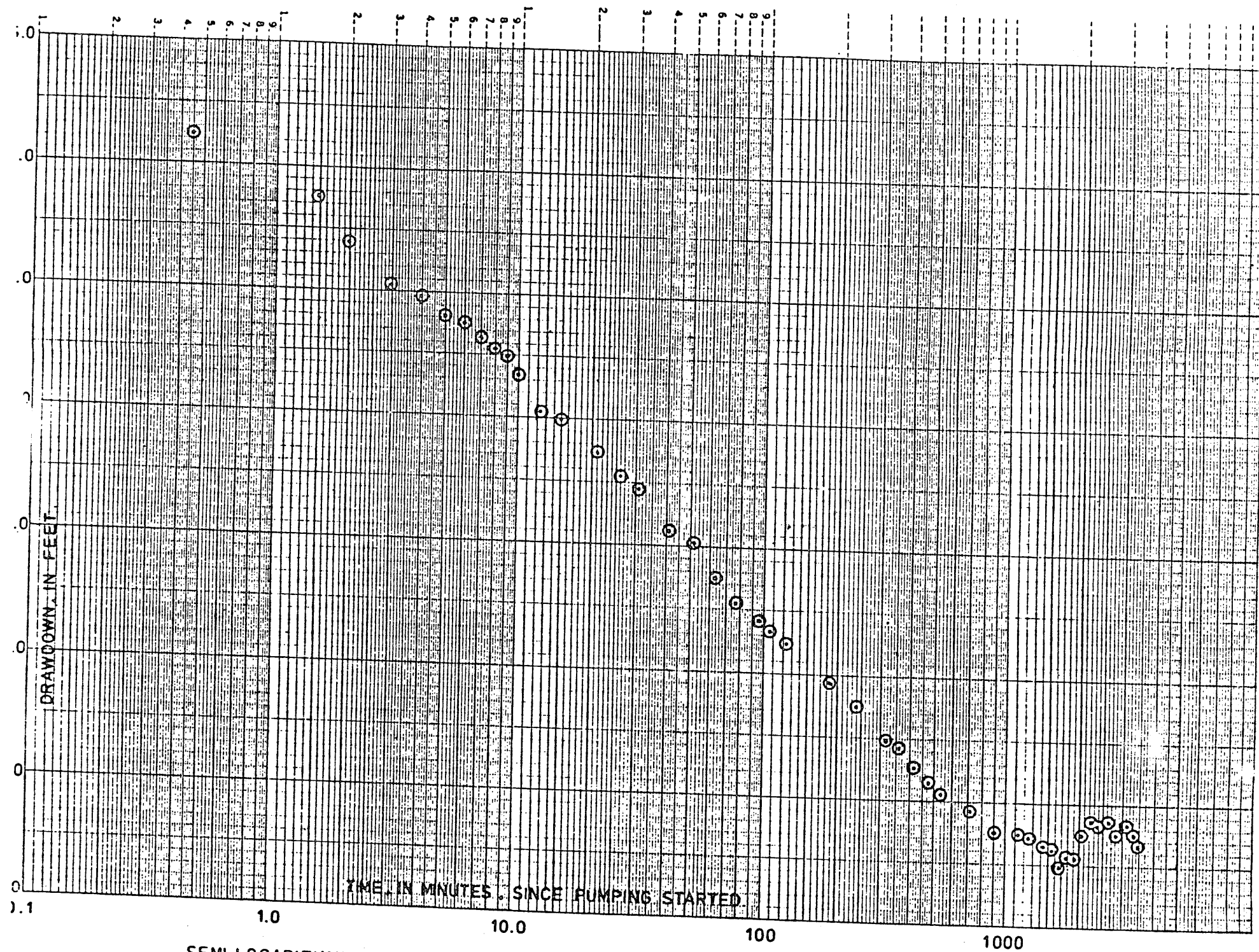
**GRAPHS OF TIME VERSUS DRAWDOWN  
IN MONITOR WELLS FOR PHASE I AQUIFER TEST**



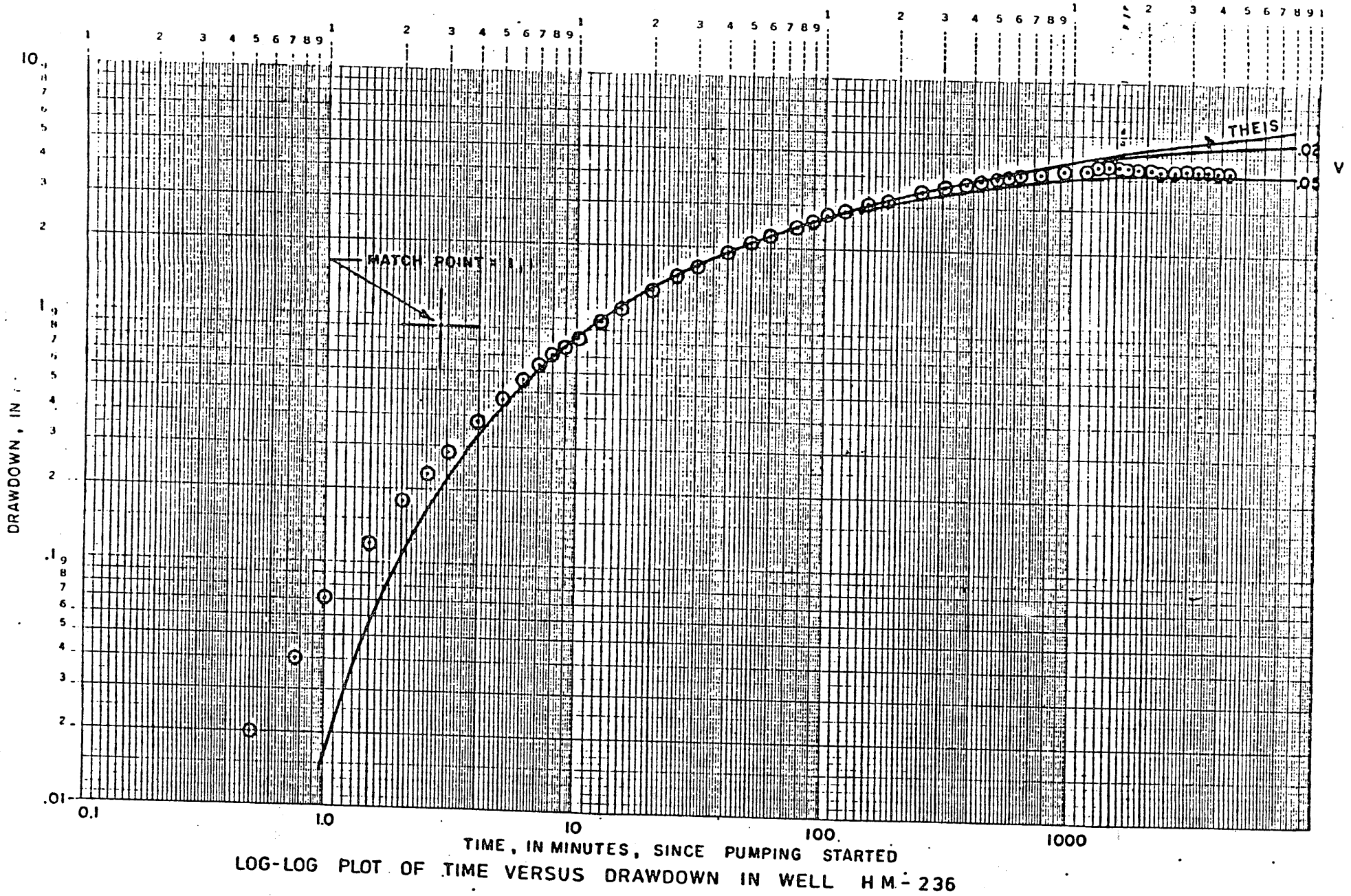




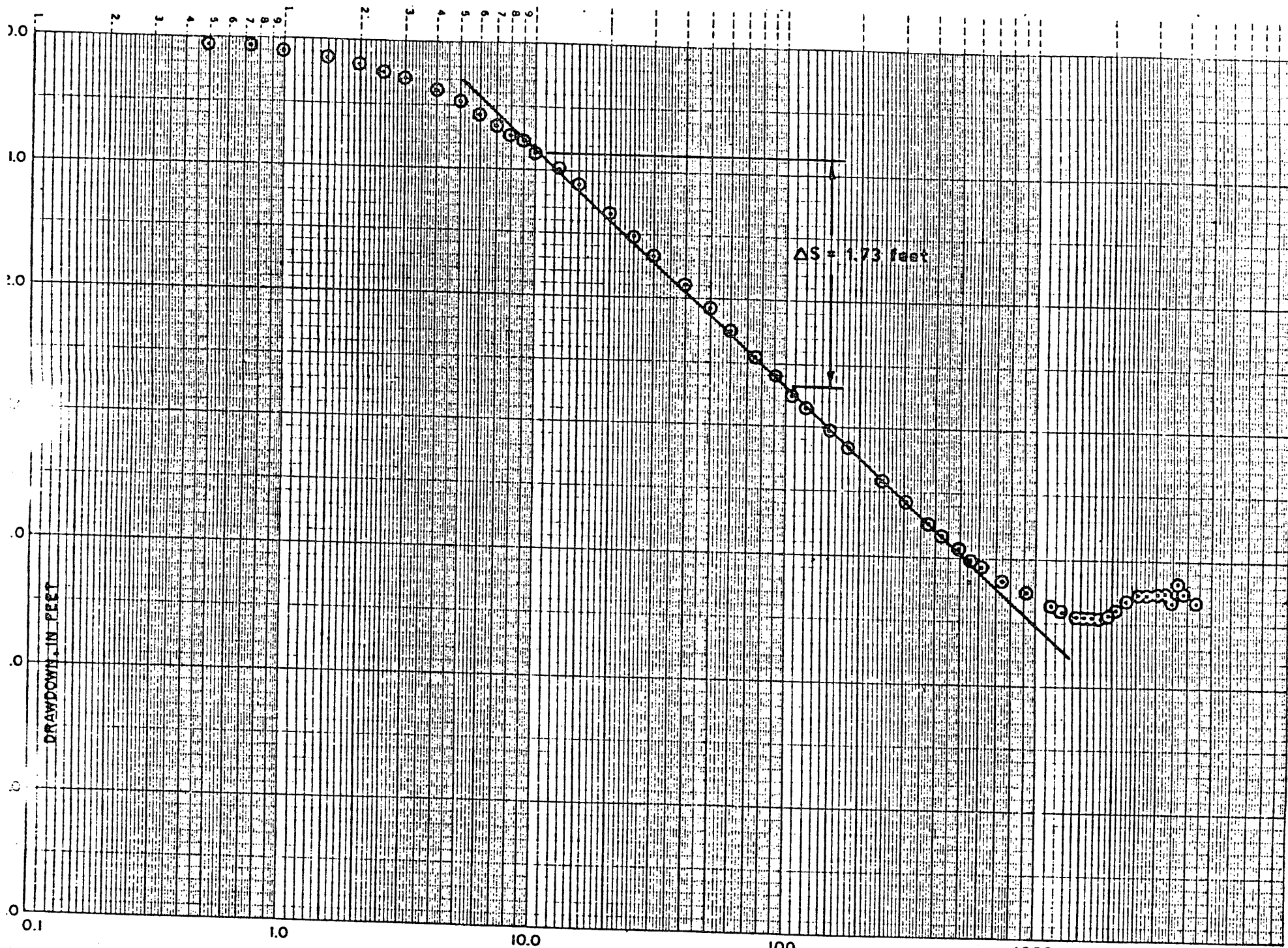
SEMI-LOGARITHMIC PLOT OF TIME VERSUS DRAWDOWN IN WELL HM-231.



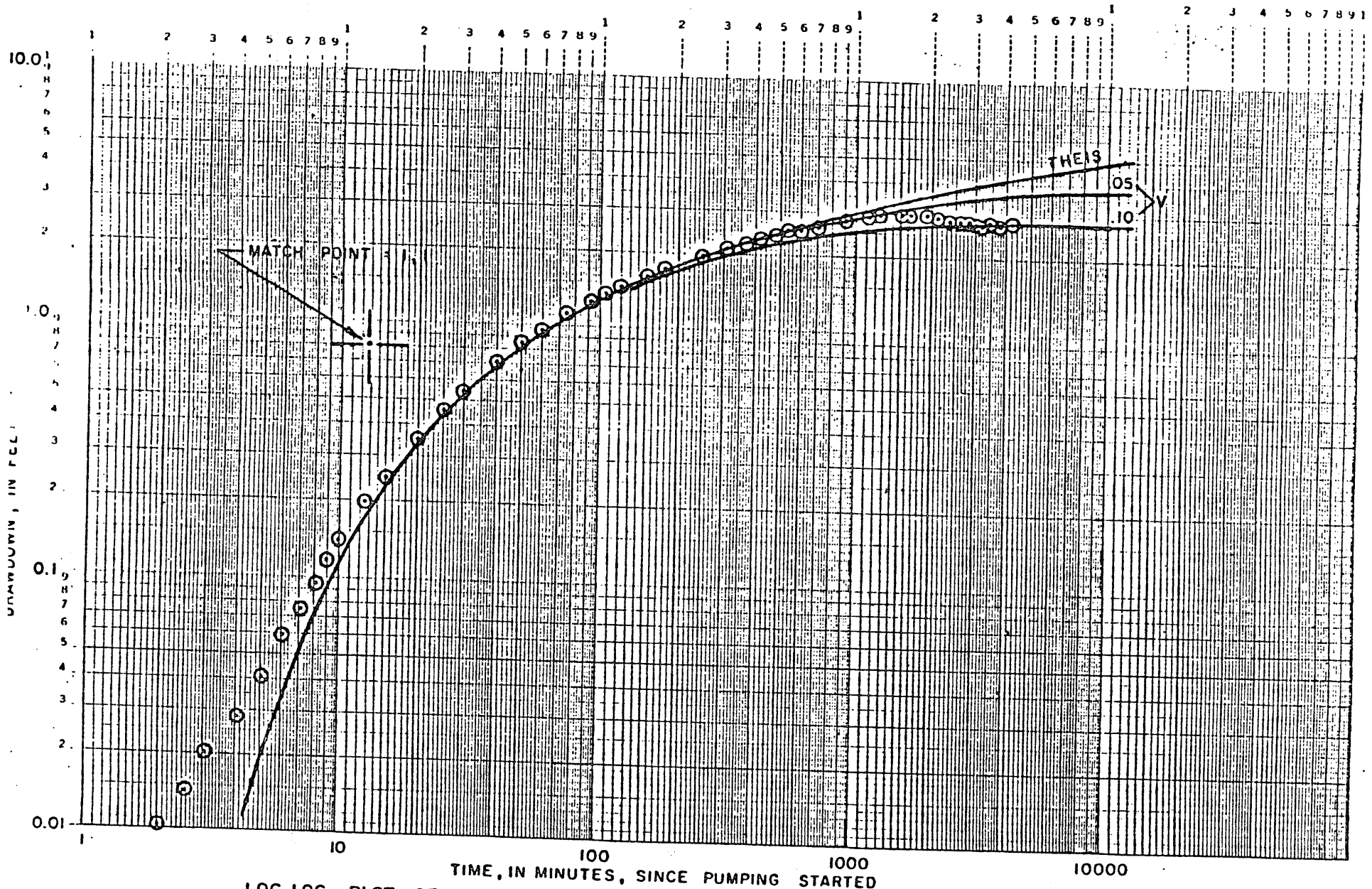
SEMI-LOGARITHMIC PLOT OF TIME VERSUS DRAWDOWN IN WELL H-M-235.



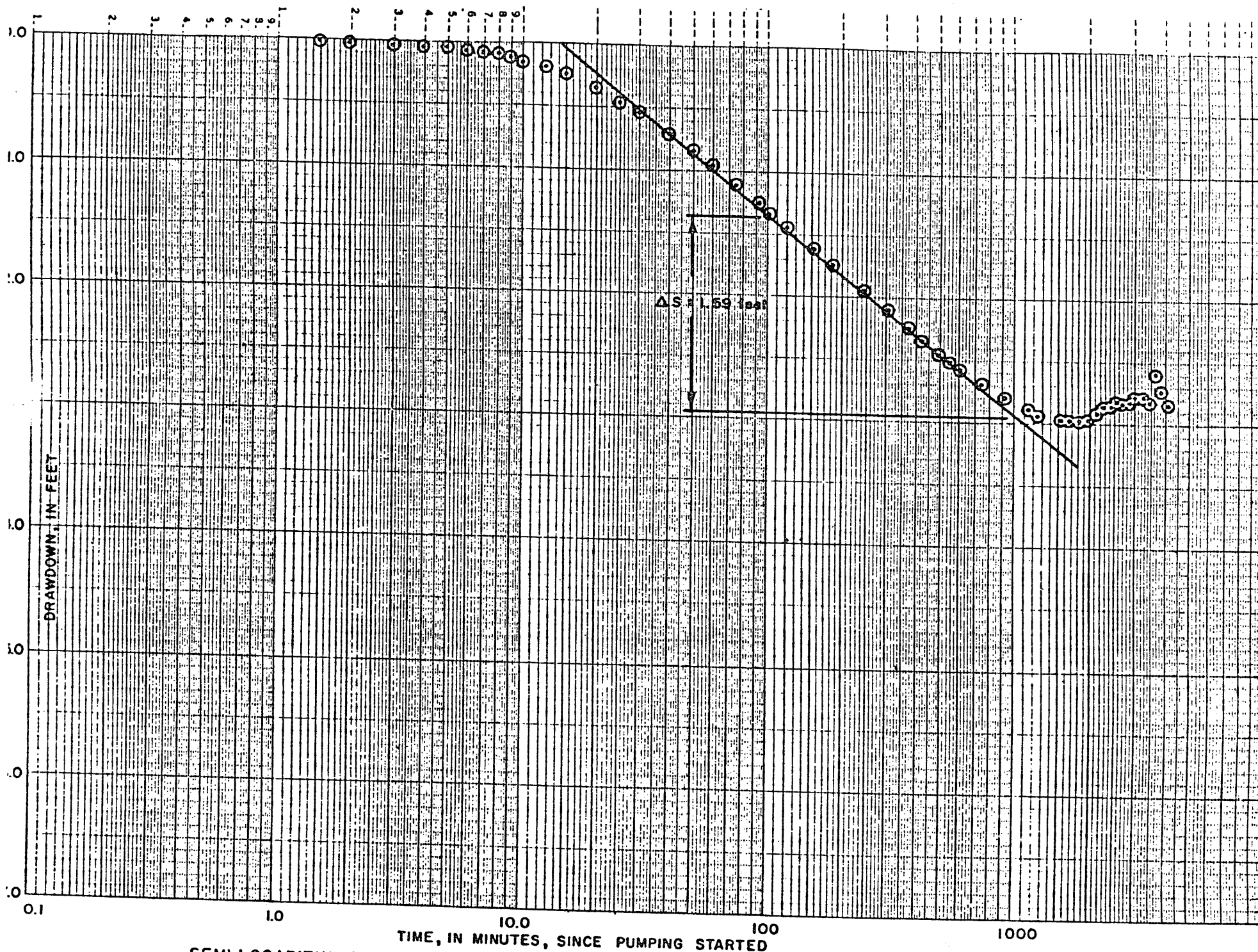




SEMI-LOGARITHMIC PLOT OF TIME VERSUS DRAWDOWN IN WELL H-M-236.

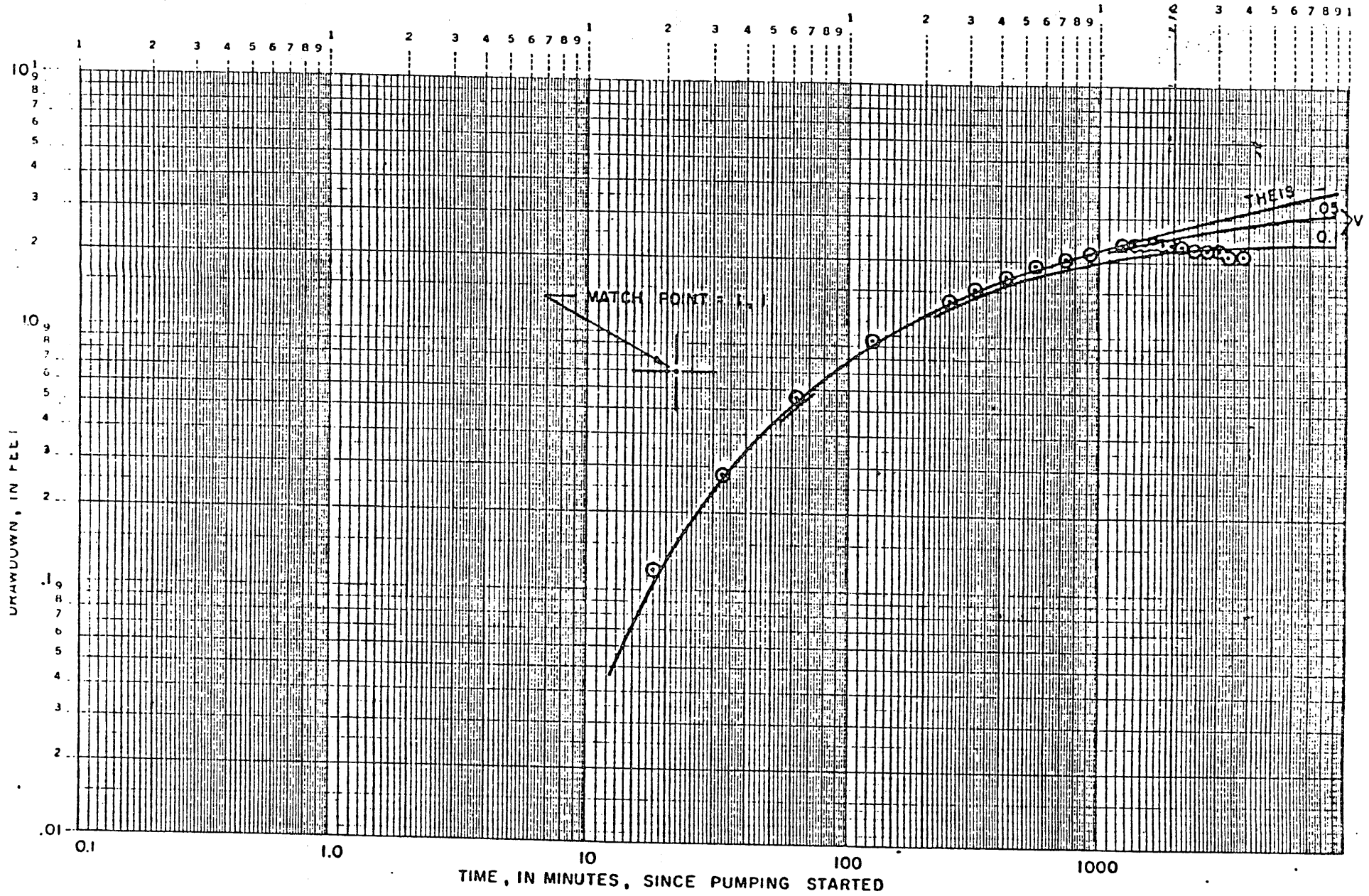


LOG-LOG PLOT OF TIME VERSUS DRAWDOWN IN WELL HM-237

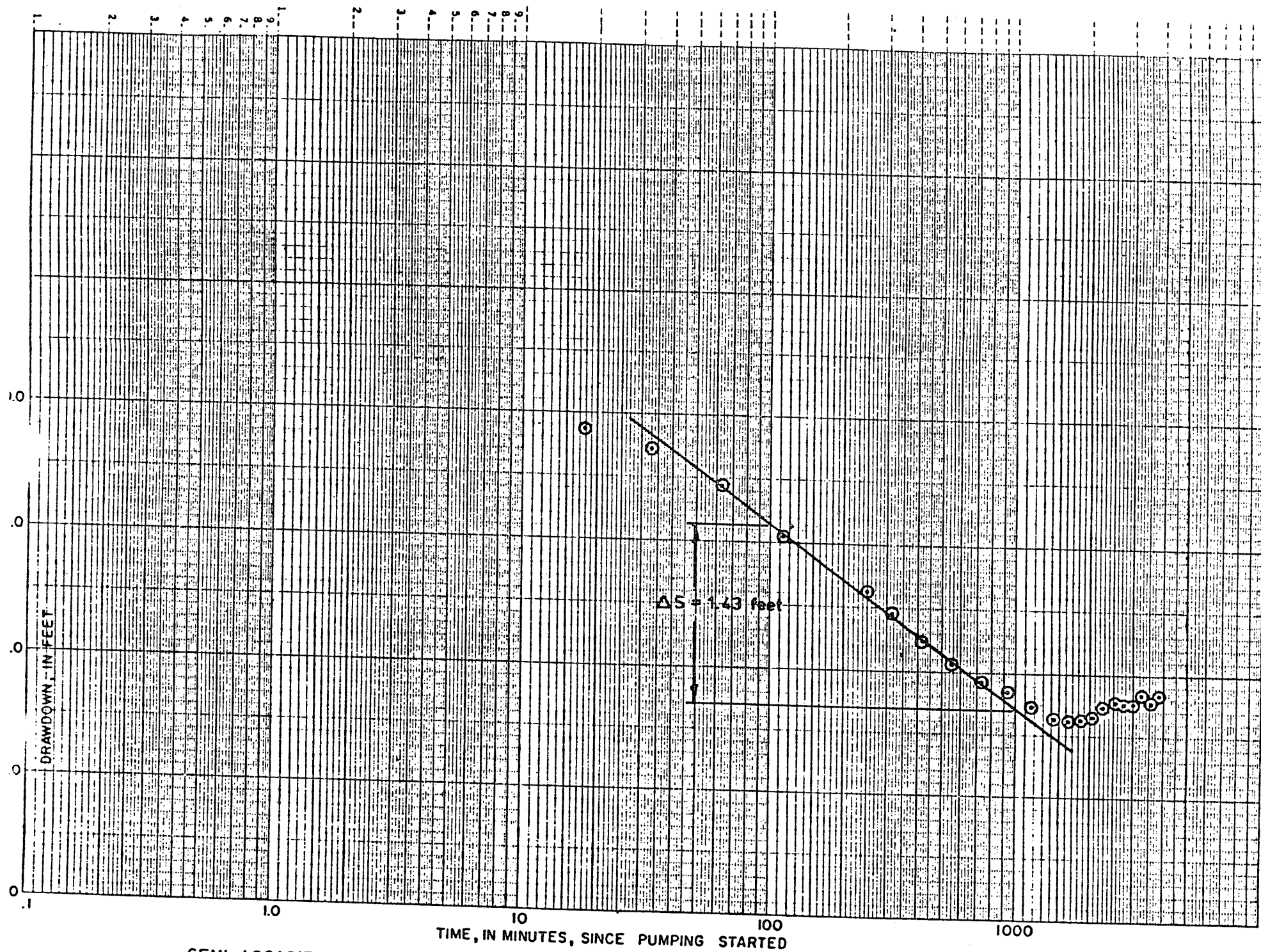


SEMI-LOGARITHMIC PLOT OF TIME VERSUS DRAWDOWN IN WELL H-M-237.

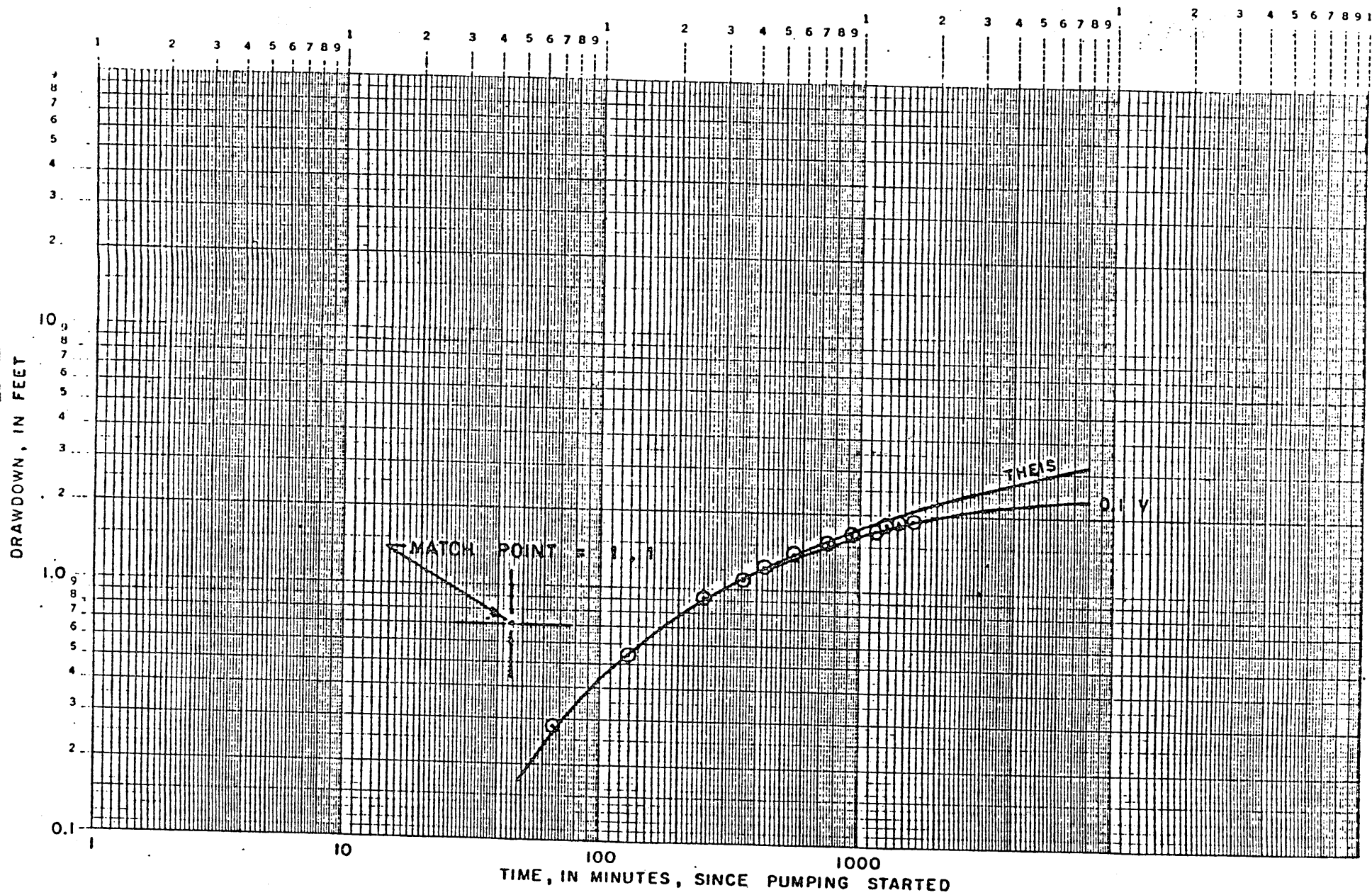




LOG-LOG PLOT OF TIME VERSUS DRAWDOWN IN WELL H M-241.







LOG-LOG PLOT OF TIME VERSUS DRAWDOWN IN WELL H M-242.