

AQUIFER TEST - CARPENTER WELL - 11N, 21E, 35F

LOWER YAKIMA VALLEY

by E. A. Nemecek

March 21, 1978

Open-File Technical Report 78-01

The opinions, findings, conclusions, or recommendations expressed in this report are those of the authors' and do not necessarily reflect the views of the Water Resources Program, Department of Ecology, nor does mention of trade names or recommendation for use by the State of Washington. This report is intended as a working document and may be circulated to other Agencies and the Public, but it is not a formal Ecology Publication.

MEMORANDUM

CHECK  
INFORMATION \_\_\_\_\_  
FOR ACTION \_\_\_\_\_  
PERMIT \_\_\_\_\_  
OTHER \_\_\_\_\_

TO: Bill Myers  
FROM: E. A. Nemecek  
SUBJECT: Aquifer Test - Carpenter Well - 11N, 21E, 35F  
Results and Projections. Lower Yakima Valley  
DATE: March 21, 1978

State of  
Washington  
Department  
of Ecology



On December 20-21, 1977 a drawdown-recovery test was performed on the subject well using two observation wells to monitor the results. No response was noted in one observation well. The most likely cause is that the well is too shallow. A definite response was noted in the second well located approximately 5000 feet away (10N, 21E, 3A).

The data obtained were analyzed by use of the Jacob Modified Non-Equilibrium Formula. Only the observation well data were used for final computations. Results indicate an average transmissivity (T) of 28,000 gal/day/ft. and a storage coefficient (S) of  $1.5 \times 10^{-4}$ . The pumped well analysis was not used because of pumping interference, airline measurement inaccuracy, variation in discharge and anomalous results.

The data obtained from analysis, T and S, were used to make projected drawdown vs. time curves for radii of 0.5, 1.0, and 1.5 miles.

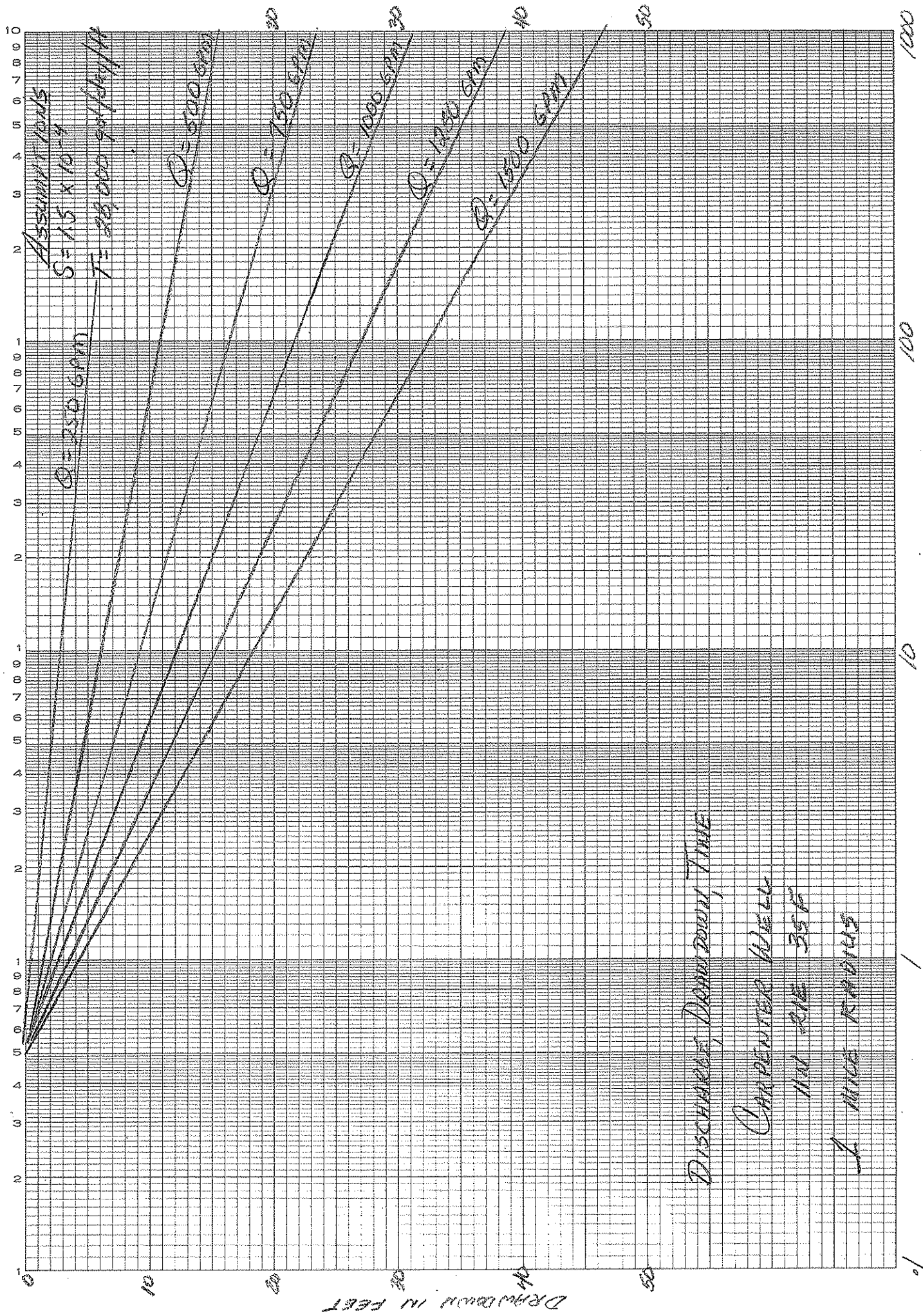
These curves indicate the theoretical drawdown at different pumping rates for varying periods of time. Interpolation between curves for uncomputed pumping rates is of sufficient accuracy if care is taken when calculations are made. The curves accompany this memo.

It should be noted that any other wells tapping this aquifer and within reasonable distance of each other will cause mutual interference, that is, their drawdowns will be additive upon other wells within their effective radii. Assuming similar aquifer conditions (a large assumption) a crude measure of total interference could be estimated by using the attached curves, distances between wells, pumping rates, and duration of pumpage to simply add the interference of one well to the next, and to the next and so on until all wells within interference range are accounted for.

If you have any questions concerning the above do not hesitate to call.

EAN:ee

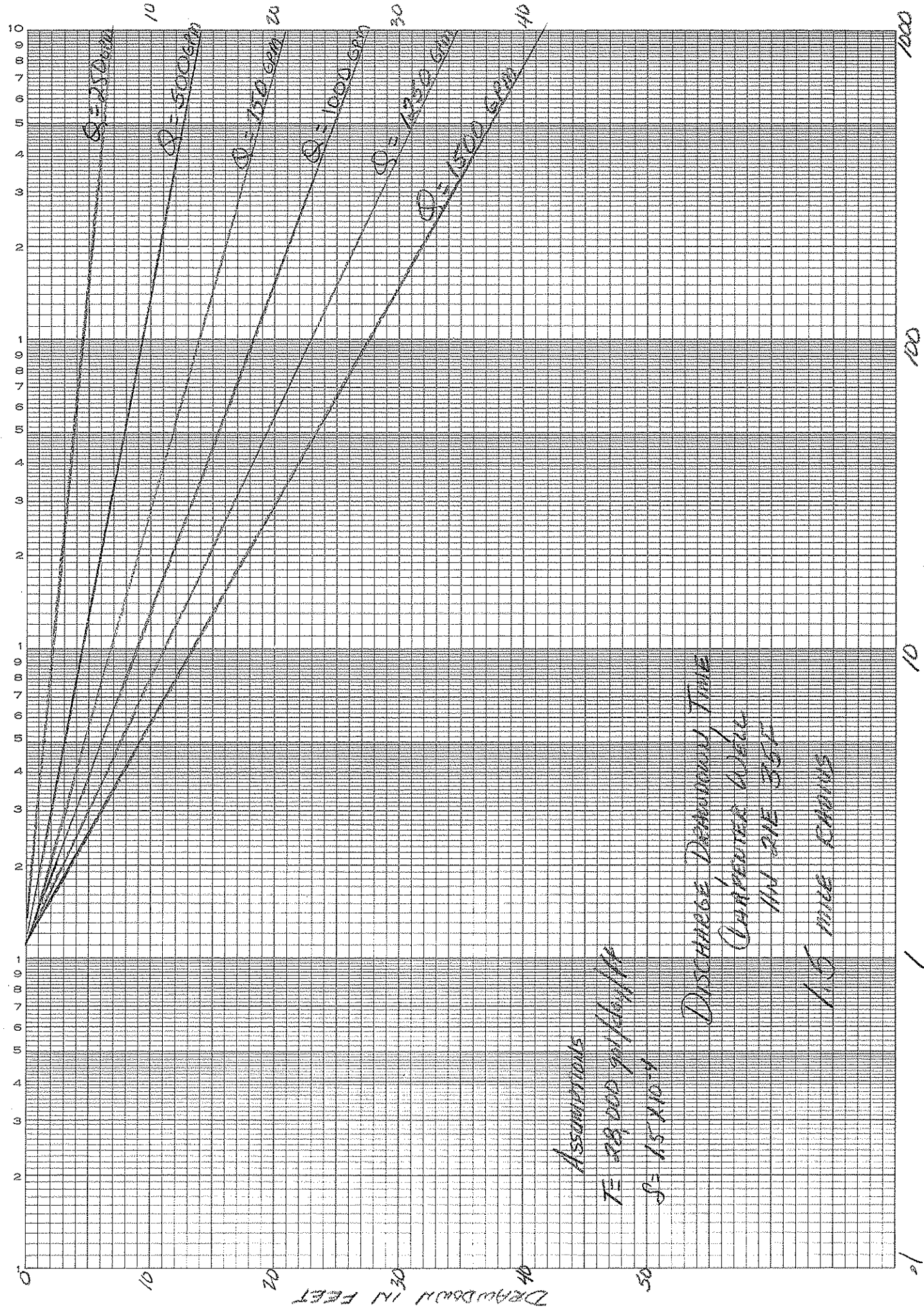
ECY 010-4



Discharge, Downward, Time

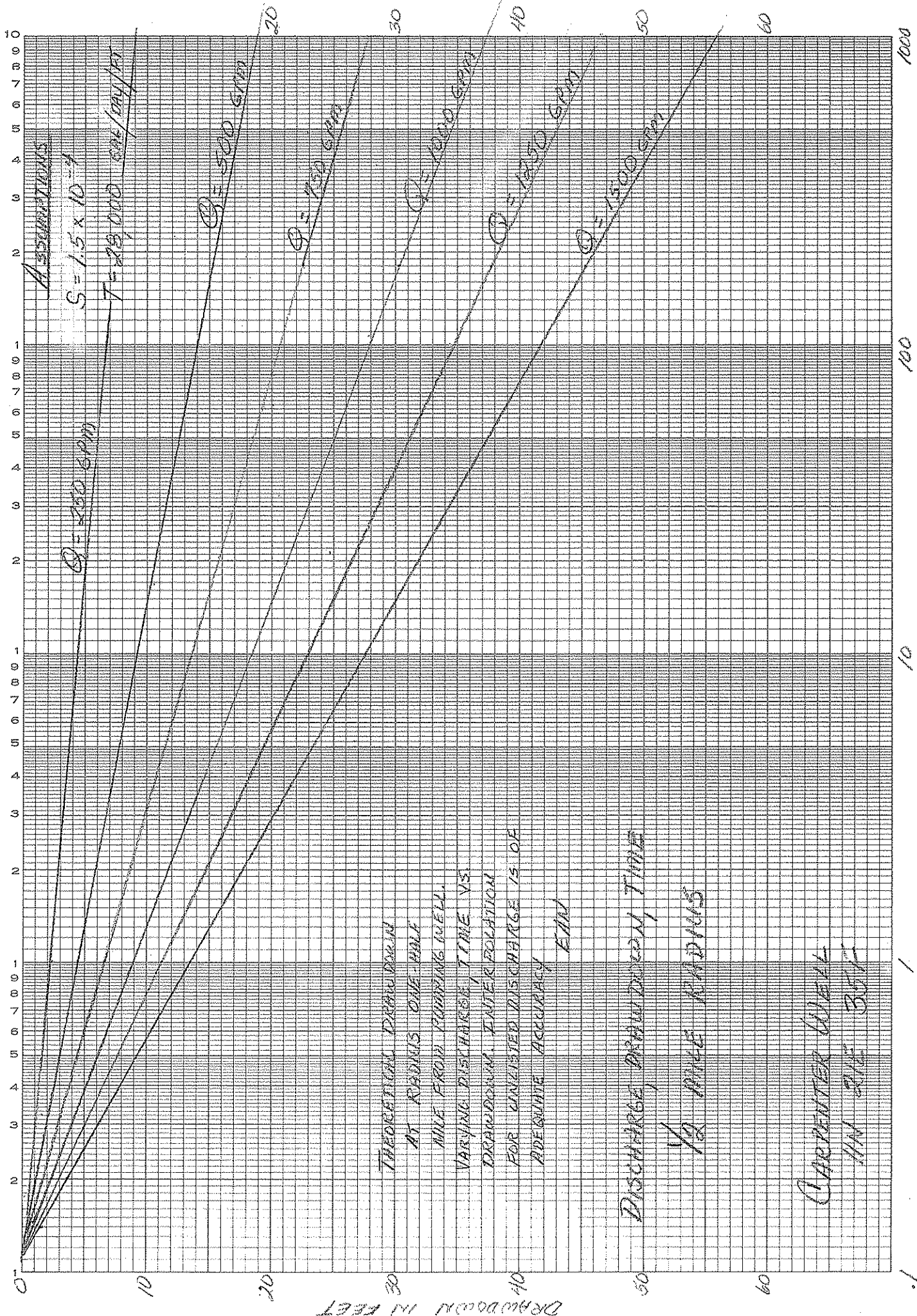
CHAMPION WELL  
IN RHE 35F

A. MICE RAVENS



TIME IN DAYS SINCE PUMPING BEGAN

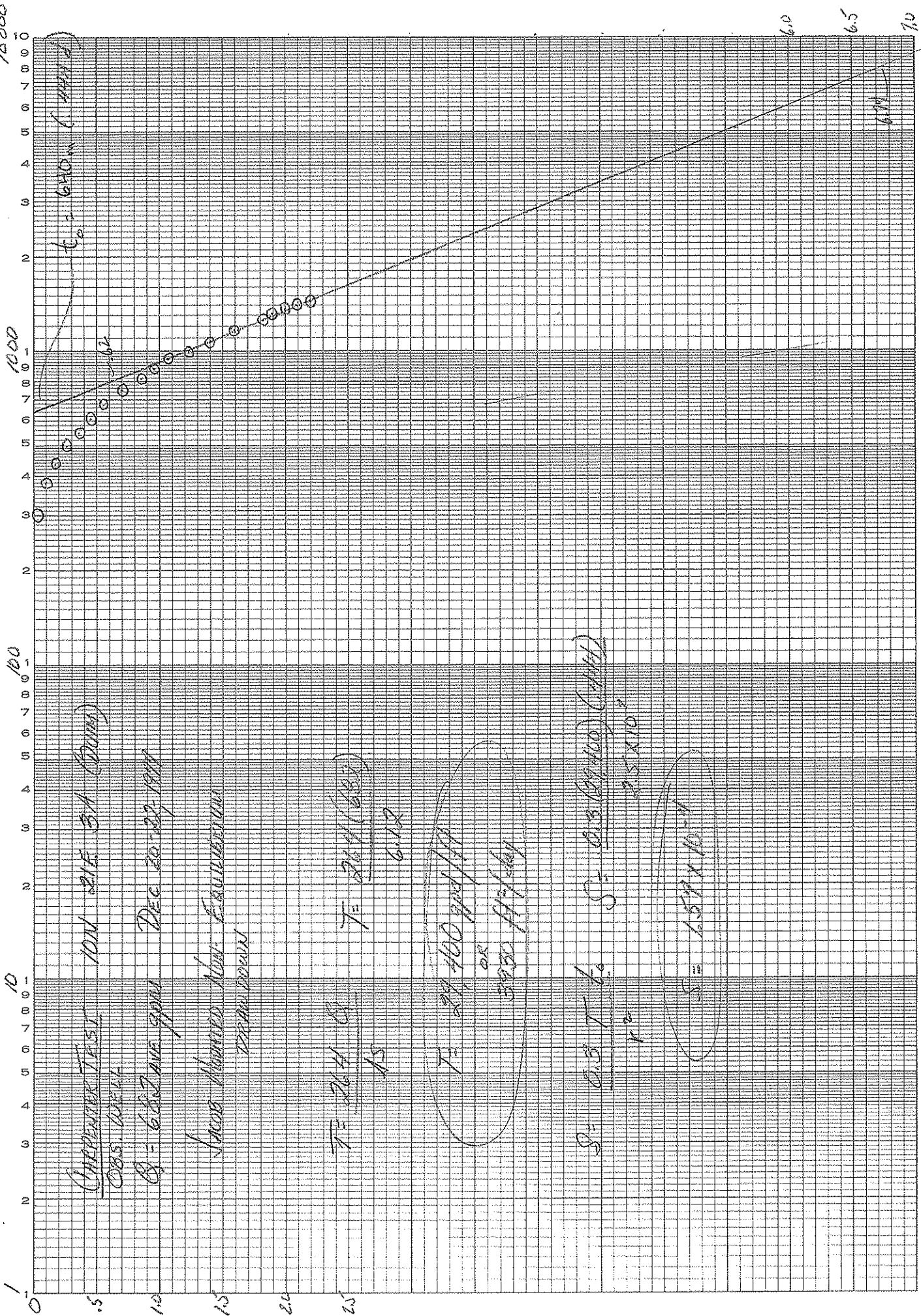
1000  
100  
10  
1



DRAWDOWN IN FEET

TIME IN DAYS SINCE PUMPING BEGAN

TIME IN MINUTES



CHAMBER TEST 10W 24E 3A (DUM)  
OBS. WELL

Q = 682 gpd DEC 20-22, 1940

SAND MOUNTAIN NEW EXHAUSTION  
DRAINDOWN

T = 244 (640)  
6.12

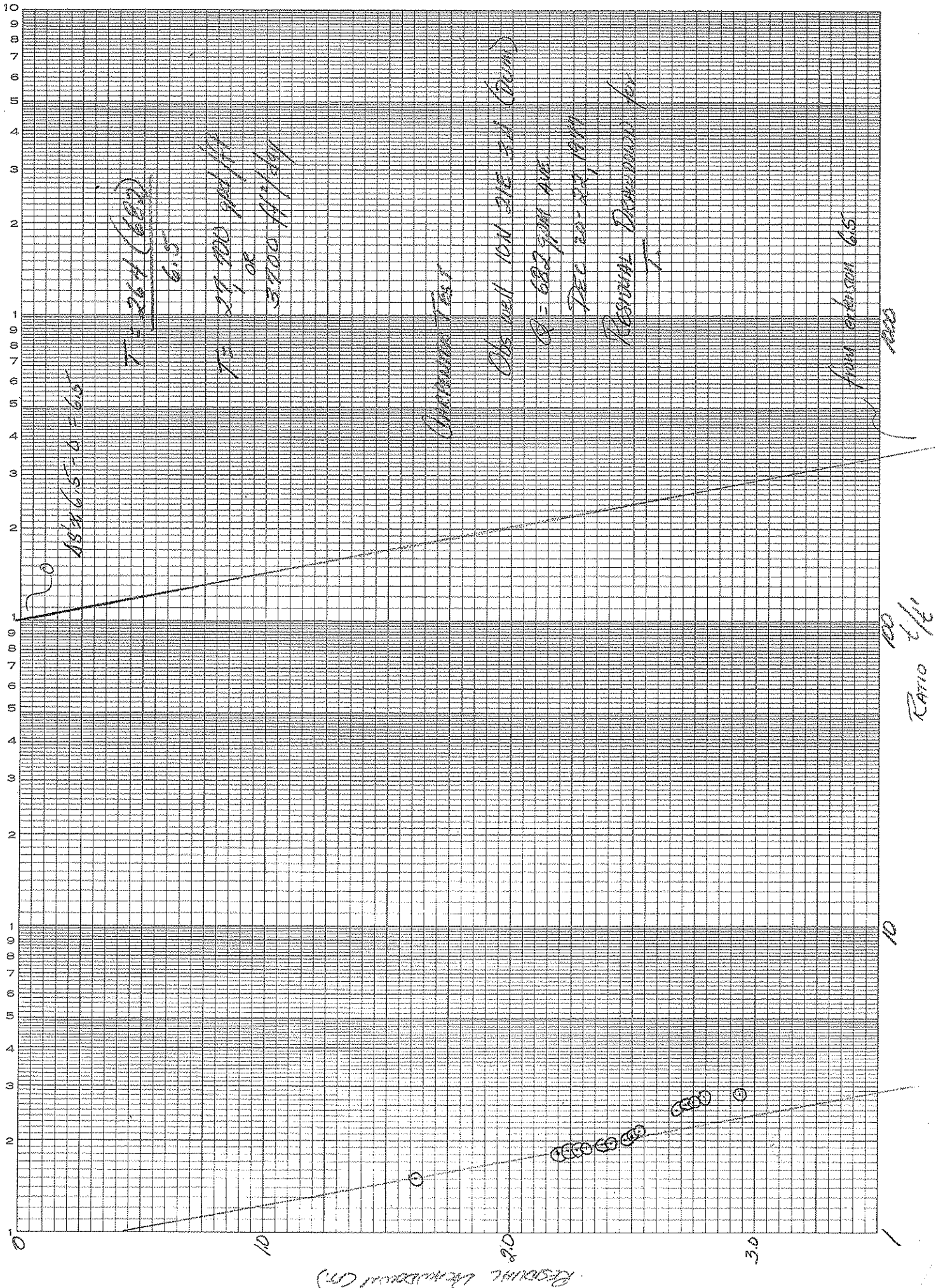
T = 244 400 gpd/day  
or  
5000 ft<sup>2</sup>/day

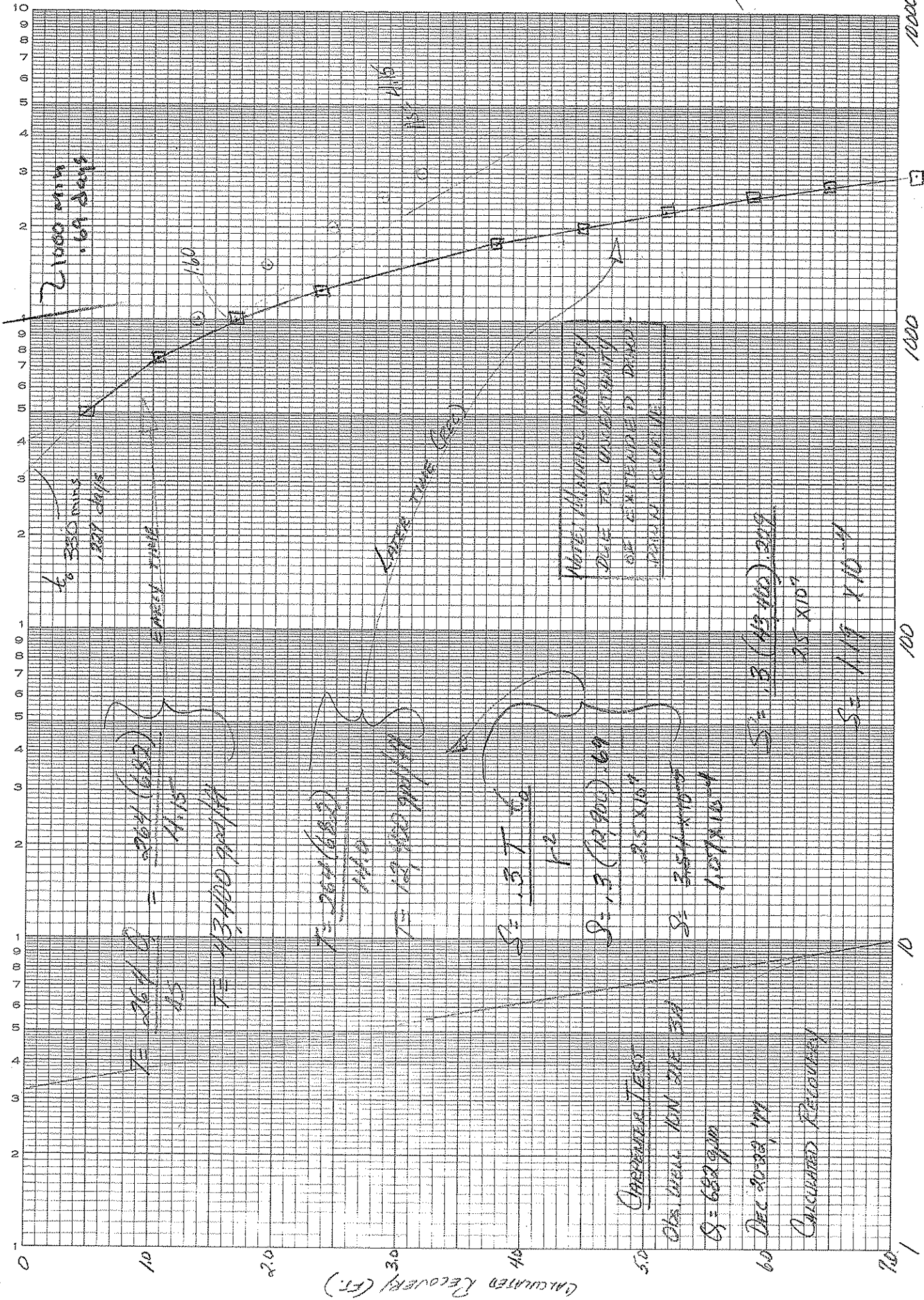
S = 0.5 T t<sub>0</sub> S = 0.5 (2440) (444.4)  
2.5 x 10<sup>7</sup>

S = 1.57 x 10<sup>-4</sup>

60  
65  
70

DRAINDOWN IN FEET





2100 gpm  
169 days

330 gpm  
1200 days

$T = \frac{264(6.42)}{40}$   
 $T = 41.5$

$T = \frac{43400 \text{ gpm/ft}}{1115}$   
 $T = 38.9$

$T = \frac{264(6.82)}{1110}$   
 $T = 15.9$

$T = \frac{129000 \text{ gpm/ft}}{1410}$   
 $T = 91.5$

$S = \frac{1.376}{172}$   
 $S = 7.97 \times 10^{-3}$

$S = \frac{1.3(12900)}{25 \times 10^4}$   
 $S = 6.756 \times 10^{-3}$

$S = \frac{354 \times 1000}{1.07 \times 10^4}$   
 $S = 32.99 \times 10^{-3}$

$S = \frac{1.3(42 \text{ Mio})}{25 \times 10^4}$   
 $S = 2.184 \times 10^{-3}$

$S = \frac{1.19 \times 10^4}{10000}$   
 $S = 1.19 \times 10^{-3}$

WATER STORAGE CAPACITY  
DUE TO UNCERTAINTY  
OF EXTENDED DEMAND  
BEYOND CURVE

CHECKED TEST

Obs well 10N 21E 3A  
Q = 652 gpm

DEC 30 1969

CALCULATED RECOVERY

-5.8



1/2" IN FEET

1-1-2000 ppm/lb

1-3-2000 (5000)

1-2-2000 (5000)

CHRONICLE TEST  
RUMPLED WELL RECORDING 4-9-2000  
Q-6002 ppm AIE

AIRLINE RESULTS CONTINUOUS

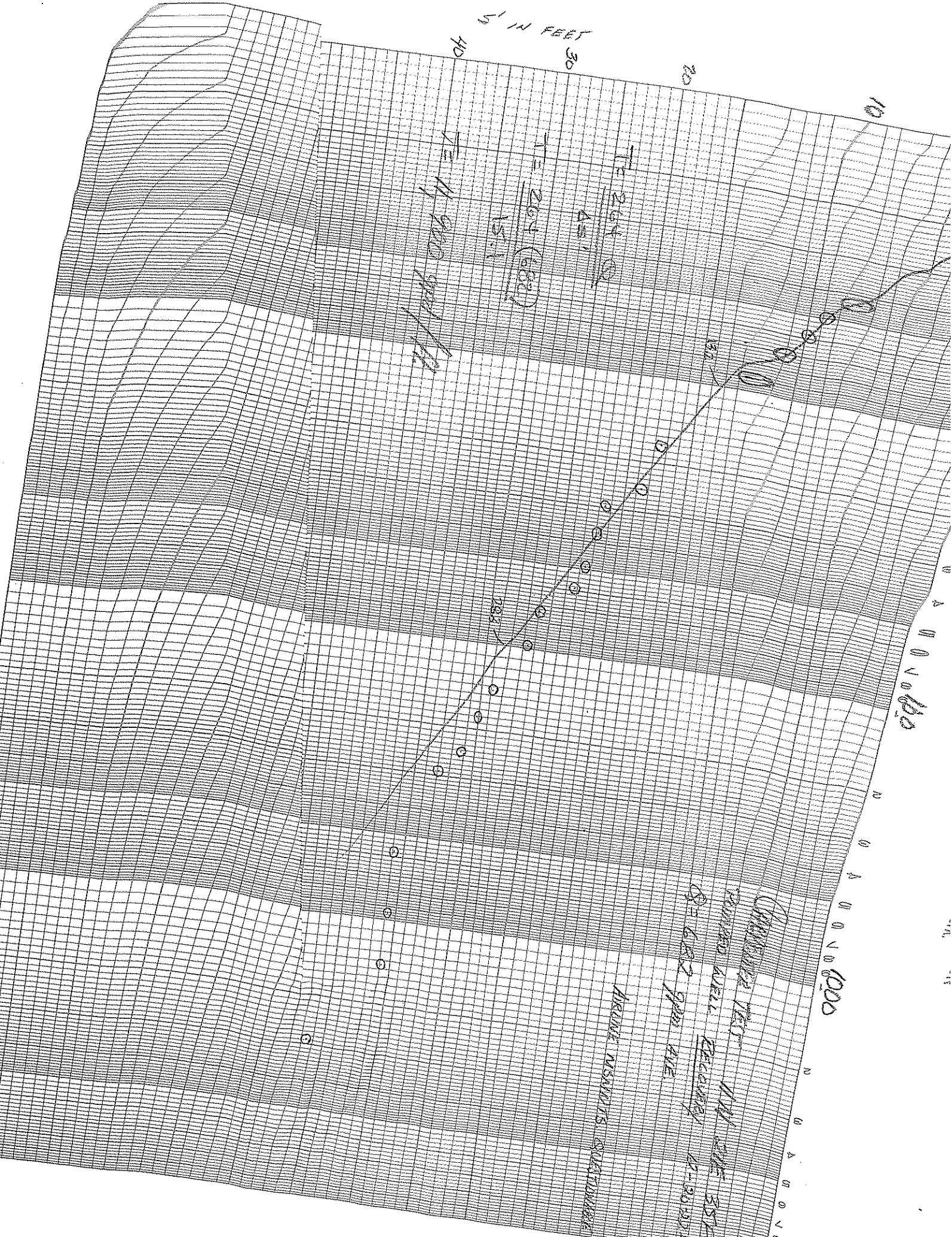


TABLE 2

## FLOW THROUGH CIPOLLETTI WEIRS

Formula  $CFS = 3.367LH^{3/2}$

MGD = CFS X .646

Head Ft.	LENGTH OF WEIR CREST IN FEET											
	1		2		3		4		5		6	
	CFS	MGD	CFS	MGD	CFS	MGD	CFS	MGD	CFS	MGD	CFS	MGD
.01	.003	.002	.01	.01	.01	.01	.01	.01	.01	.01	.02	.01
.02	.010	.006	.01	.01	.02	.01	.03	.02	.04	.03	.05	.03
.03	.018	.012	.03	.02	.04	.03	.05	.03	.07	.04	.09	.06
.04	.027	.017	.04	.03	.05	.03	.08	.05	.11	.07	.13	.08
.05	.038	.024	.06	.04	.08	.05	.11	.07	.15	.10	.19	.12
.06	.050	.032	.07	.05	.10	.06	.15	.10	.20	.13	.25	.16
.07	.062	.040	.09	.06	.12	.08	.19	.12	.25	.16	.31	.20
.08	.072	.046	.11	.07	.15	.10	.23	.15	.30	.19	.38	.25
.09	.091	.059	.14	.09	.18	.12	.27	.17	.36	.23	.45	.29
.10	.107	.069	.16	.10	.21	.14	.32	.21	.43	.28	.53	.34
.11	.123	.079	.18	.12	.25	.16	.37	.24	.49	.32	.61	.40
.12	.140	.090	.21	.14	.28	.18	.42	.27	.56	.36	.70	.45
.13	.158	.102	.24	.16	.32	.21	.47	.30	.63	.41	.79	.51
.14	.176	.114	.26	.17	.35	.23	.53	.34	.71	.46	.88	.57
.15	.196	.127	.29	.19	.39	.25	.59	.38	.78	.51	.98	.63
.16	.216	.140	.32	.21	.43	.28	.65	.42	.86	.56	1.08	.70
.17	.236	.152	.35	.23	.47	.30	.71	.46	.94	.61	1.18	.76
.18	.257	.166	.39	.25	.51	.33	.77	.50	1.03	.67	1.29	.83
.19	.279	.180	.42	.27	.56	.36	.84	.54	1.12	.72	1.39	.90
.20	.301	.194	.45	.29	.60	.39	.90	.58	1.20	.78	1.51	.97
.21	.324	.209	.49	.31	.65	.42	.97	.63	1.30	.84	1.62	1.05
.22	.347	.224	.52	.34	.69	.45	1.04	.67	1.39	.90	1.74	1.12
.23	.371	.240	.56	.36	.74	.48	1.11	.72	1.49	.96	1.86	1.20
.24	.396	.256	.59	.38	.79	.51	1.19	.77	1.58	1.02	1.98	1.28
.25	.421	.272	.63	.41	.84	.54	1.26	.82	1.68	1.09	2.10	1.36
.26	.446	.288	.67	.43	.89	.58	1.34	.87	1.79	1.15	2.23	1.44
.27	.472	.305	.71	.46	.94	.61	1.42	.92	1.89	1.22	2.36	1.53
.28	.499	.323	.75	.48	1.00	.65	1.50	.97	2.00	1.29	2.49	1.61
.29	.526	.340	.79	.51	1.05	.68	1.58	1.02	2.10	1.36	2.63	1.70
.30	.553	.358	.83	.54	1.11	.72	1.66	1.07	2.21	1.43	2.77	1.79
.31	.581	.376	.87	.56	1.16	.75	1.74	1.13	2.32	1.50	2.91	1.88
.32	.609	.394	.91	.59	1.22	.79	1.83	1.18	2.44	1.58	3.05	1.97
.33	.638	.413	.96	.62	1.28	.83	1.91	1.24	2.55	1.65	3.19	2.06
.34	.667	.432	1.00	.65	1.33	.86	2.00	1.29	2.67	1.73	3.34	2.16
.35	.697	.451	1.05	.68	1.39	.90	2.09	1.35	2.79	1.80	3.49	2.25

ESCAR NVA 42 WISSEVELD CARTRIDGE DM  
RDM 681 05 X 05

DM 3014181 125000  
125000

Handwritten notes in the top left corner, possibly including a date or location.



Handwritten text at the bottom of the page, possibly a signature or a note.



Owner CARPENTER Location 11N 21E 35F Well No. PUMPING  
 Date DEC 20-21 '77 Meas. by E. NEMEC & C. CLINE Test DD-REL County YACONA  
 Meas. point AIRLINE <sup>O. RAMIREZ</sup> Elev. Meas. Point 1045 TOPG 20'  
 Meas. equipment AIRLINE LENGTH 350 FEET  
 DTW 172.1  $t_0$  1000 DEC 20 0 682 <sup>(TIME WT. AVERAGE)</sup> r     

Date	Hour	Water level			s	t	1440r2 t	Remarks
		Held Air Gage	Wet HEAD	Depth (DTW)				
Dec 19	1450	97.0						
Dec 20	1000	97.0	197.9	172.1		0	PUMP ON	
	1001	71.0	104	186.0	13.9	1		
	1004	70.5	162.9	187.1	15.0	4	INCREASE Q	
	1007	65.0	150.2	192.8	27.7	7	INCREASE Q	
	1012	63.5	146.7	203.3	31.2	12	Q STABILIZING	
	1019	62.25	143.3	206.2	34.1	19	Q = 730' GPM TRUNC KEY	
	1026	61.5	142.1	207.9	35.8	26		
	1033	61.0	140.9	209.1	37.0	31		
	1036	60.75	140.3	209.7	37.6	36	Q = 841/8 310	
	1043	59.5	139.7	210.3	38.2	42		
	1045	59.25	139.2	210.8	38.7	45		
	1203	58.5	135.1	214.9	42.8	123		
	1205						N. WEIR .315 } 678	
	1210						S. WEIR .21 } 6PM	
	1230						S. " .21 } 678	
	1235	58.25	134.6	215.5	43.4	155	N. WEIR .345 } 6PM	
	1305	58.0	133.9	216.1	44.0	185		
	1330						N. WEIR .345 } 648	
	1335						S. " .19 } 6PM	
	1420	57.75	133.4	216.6	44.5	260		
	1504						N. WEIR .345 } 648	
	1515						S. WEIR .105 } 6PM	

350  
12/21/77  
12/22/77

350  
12/21/77

12/21/77  
12/22/77



AQUIFER TEST

Sheet 2 of       

SAMPLE WATER

Owner        Location        Well No.         
 Date 12/20/00 Meas. by        Test DD County YAK  
 Meas. point AIRLINE Elev. Meas. Point         
 Meas. equipment AIRLINE LENGTH 350 FEET  
 DTW         $t_0$          $Q$          $r$        

Date	Hour	Water level			s	t	$\frac{1440r^2}{t}$	Remarks
		Held	Wet	Depth (DTW)				
DEC 20	15:30	53.7	121.05	226.0	53.8?	337	INCREASED PUMP DEMAND	
							VALVE CLOSED & PRODUCE 200	
	16:25						S. WEIR .24 (713)	
	16:30						N. WEIR .34 (69m)	
	16:40	47.5	109.7	240.3	68.2?	400		
	17:30						S. WEIR .23 (700)	
	17:45						N. WEIR .34 (69m)	
	19:08						S. WEIR .22 (682)	
	19:14		52.0				N. " .34	
	19:15	22.5	3				3 IS AIR LEAKING	
							CANT SURVEY	
	20:10						S. WEIR .22 (682)	
	20:15						N. WEIR .34	
	20:19	17?						
	2:114						S. WEIR .22 (682)	
	2:120	13?					N. WEIR .34 (682)	
	22:45						S. WEIR .22 (682)	
	22:50	10?	23.1	326.9		770	N. WEIR 34 (682)	
	23:45						S. WEIR .22 (682)	
	24:00	19.5				840	N. WEIR .34	
DEC 21	01:00	19.5				900		



AQUIFER TEST

Owner CARPENTER Location                      Well No.               
 Date Dec 20 77 Meas. by                      Test              County               
 Meas. point                      Elev. Meas. Point                       
 Meas. equipment AIRLINE 350 FT LONG  
 DTW o                      t<sub>0</sub>                      Q                      r                     

Date	Hour	Water level			s	t	1440 <sup>2</sup> t <sup>2</sup> /L	Remarks
		Held AIR	Wet HEAD	Depth (DTW)				
Dec 21	0100						N. WEIR .34	
	0105						S. WEIR .22	
	0250	19.5				1010	N. WEIR .34	
	0255	PURGED					S. WEIR .22	
	0540	24.0					N. WEIR .34	
	0545	*1X0? AIRLINE					S. WEIR .22	
	0800	53.5	123.6	226.4	54.3	1320	N. WEIR .34	
	0820						S. WEIR .22	
	0945	51.25	118.4	231.6	59.5	1425	N=.34 S=.225	
							PUMP OFF	
12/21/77	1000				s	t	t'	
		59.0	136.3	213.7	41.6	1440.5	.5	2881
		61.5	142.1	208.0	35.9	1441	1.0	1441
		61.5		208.0	"	1441.5	1.5	961
		61.5		208.0	"	1442.5	2.5	577
		62.75	145.0	205.0	32.9	1445	5.0	289
		63.5	146.7	203.3	31.2	1446	6.0	241
						1447	7.0	207
		64.0	147.8	202.2	30.1	1448	8.0	181
						1449	9.0	161
		64.5	149.0	201.0	28.9	1450	10.0	145
		65.5	151.3	198.7	26.6	1455	15.0	97



AQUIFER TEST

Owner CARPENTER Location ZILLIAT Well No.         
 Date 12/21/77 Meas. by NEWBORN/OLIVE Test REC. County YAK.  
 Meas. point AIRLINE 350' Elev. Meas. Point         
 Meas. equipment AIRLINE 350 LOGG  
 DTW         $t_0$          $Q$          $r$        

Date	Hour	Water level			s'	t'	$\frac{1440r^2}{t'}$	Remarks	
		Held PSI	Wet HEAD	Depth (DTW)					
12/21/77	1020	65.75	151.9	198.1	26.0	1460	20 min	73	Recovery curve
		67.0	154.8	195.2	23.1	1465	25	58.6	Recovery curve
		67.75	155.4	194.6	22.5	1470	30	49.0	
		67.5	156.9	194.1	22.0	1480	40	37.0	
	1050	67.75	156.5	193.5	21.4	1490	50	29.8	
	1100	69.0	159.4	190.6	18.5	1500	60	25.0	
	1138	69.5	160.6	189.5	17.4	1530	90	17.0	
	1203	69.0	READINGS			1560	120	13.0	unable to get into line
	1238	68.25	DEGENERATE			1590	150	10.6	
	1304	70.0	166.3	183.7	11.6	1620	180	9.0	
	1400	72.25	166.9	183.1	11.0	1650	210		
	1400	72.25	↓	↓	11.0	1680	240	7.0	
	1500	72.75	168.0	182.0	9.9	1740	300	5.80	
	1600	73.25	169.2	180.8	8.7	1800	360	5.00	
	1715	73.75	170.4	179.6	7.5	1875	435	4.31	AIRLINE (COPPER TUBE) BROKE OFF



AQUIFER TEST

Sheet 1 of       

Owner G. DUIM Location ZILMAN Well No. OBS  
 Date Dec 20-23 '77 Meas. by CUNE Test DB County YAK  
 Meas. point 1/2" ACCESS PIPE E. SIDE Elev. Meas. Point 939 AUTOMETER  
 Meas. equipment E-TAPE  
 DTW 66.17 ft to 1000 Dec 20 '77 68.20m TIME MEASURED r 5000 ft  
AVERAGE ± 100

Date	Hour	Water level			s	t	1440r <sup>2</sup> t	Remarks
		Held	Wet	Depth (DTW)				
DEC 19	1510			66.65				
DEC 20	0945			66.17				
"	0957				0			
	1000			66.17	0	0		
					0	1 min.		
					0	2		
					0	3		
					0	4		
				66.17	0	5		
	1010				0	10		
				66.17	0	15		
	1020				0	20		
				66.17	0	25		
	1030				0	30		
				66.17	0	35		
					0	40		
					0	45		
					0	50		
					0	55		
	1100				0	60		
					0	70		
					0	80		
				66.17	0.01	90		





Owner G. DUMM Location ZILLAH Well No. 085  
 Date 12/20/77 Meas. by C. CLINE Test DD County YAKIMA  
 Meas. point MEAS. POINT 3000 Elev. Meas. Point         
 Meas. equipment R. TAPE  
 DTW 0  $t_0$          $Q$          $r$  5000 FT  
 $\pm 100$

Date	Hour	Water level			s	t	$\frac{1440r^2}{t}$	Remarks
		Held	Wet	Depth (DTW)				
12/20	1140			66.12	+0.01	100		
					+0.01	110		
					+0.01	120		
	1332				+0.03		SUBSIDING	
	1345				+0.03	1	" "	
						210		
						240		
						270		
<del>12/20</del>	<del>1455</del>	<del>1500</del>		66.20	-0.03	300		
	1615			66.23	-0.10	380		
	1710			66.35	-0.18	435		
	1830			66.43	-0.27	495		
	1900			66.52	-0.35	545		
	2000			66.62	-0.45	605		
	2100			66.73	-0.56	670		
	2220			66.81	-0.70	745		
	2300			67.02	-0.85	815	TIME UNKNOWN. LINE BLANK. ASSUME 2330. EAN	
DEC 21	0030				-0.95	875		
	0130				-1.08	935		
	0230				-1.22	995		
	0400				-1.40	1085		
	0525				-1.60	1170		
	0700				-1.82	1265		

IGNORE  
5 MINS.  
off.  
FAULT OF  
C. CLINE







AQUIFER TEST

Sheet 1 of 1

Owner HURLBURT Location \_\_\_\_\_ Well OBS(N)  
 Date DEC 20 - '77 Meas. by E. NEMCEK C. CLINE Test DD-REC County YAKIMA  
 Meas. point EDGE CASING Elev. Meas. Point 1197 ALTIMETER  
 Meas. equipment E-TAPE  
 DTW 294.52 t. 1000 DEC 20 Q r. \_\_\_\_\_

Date	Hour	Water level			s	t	1440r <sup>2</sup> t	Remarks
		Held	Wet	Depth (DTW)				
Dec 19	1435			294.42				
Dec 20	0930			294.52				
"	1250				—		NO CHANGE	
	1442			294.52			"	
	1605			"			"	
	1658			294.48		+0.04		
	1757			294.48		+0.04		
	1845			294.47		+0.05		
	1947			294.52		0		
	2053			"		0		
	2230			"		0		
	2325			"		0		
DEC 21	0037				0			
	0240				0			
	0533				0			
	0750				0			
	0925				0			
<p>NO CHANGE. ASSUME NO EFFECT. PROBABLY NOT DEEP ENOUGH.</p>								









DATA SUMMARY

ORIGINAL TO:  
...C.C.....  
COPIES TO:  
.....  
.....  
.....  
LAB. FILES.....

Source CARPENTER Well @ GRANNA

Collected By C. CLINE

Date Collected 12-21-77

Log Number: 77-7815 CONT.: 7815

Station:									
pH	7.7								
Turbidity (NTU)									
Sp. Conductivity (umhos/cm)	403.								
COD									
BOD (5 day)									
Total Coliform (Col./100ml)									
Fecal Coliform (Col./100ml)									
NO3-N (Filtered)	0.01								
NO2-N (Filtered)									
NH3-N (Unfiltered)									
T. Kjeldahl-N (Unfiltered)									
O-PO4-P (Filtered)									
Total Phos.-P (Unfiltered)									
Total Solids									
Total Non. Vol. Solids									
Total Suspended Solids									
Total Sus. Non Vol. Solids									
Chlorides	4.					ZINC :			<.01
T. HARDNESS (as CaCO3)	116.					MANGANESE :			0.10
CALCIUM	32.					COPPER :			<.02
MAGNESIUM	10.					IRON :			0.65
Sodium	24.					CHROMIUM :			<.02
						LEAD :			<.05

Note: All results are in PPM (mg/L) unless otherwise specified. ND is "None Detected"  
" < " is "Less Than" and " > " is "Greater Than"