

AQUIFER TEST  
SANDLIN WELL - 11N/21E-22G  
LOWER YAKIMA VALLEY  
RESULTS AND PROJECTIONS

by E. A. Nemecek

March 23, 1978

Open-File Technical Report 78-03

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MEMORANDUM

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

TO: Bill Myers

FROM: E. A. Nemecek

SUBJECT: Aquifer Test - Sandlin Well - 11N, 21E, 22G  
Results and Projections. Lower Yakima Valley

DATE: March 23, 1978

State of  
Washington  
Department  
of Ecology



On November 29-December 6, 1977, a drawdown-recovery test was performed on the subject well using one observation well to monitor the results. A definite response was noted in the observation well located approximately 1850 feet away (11N, 21E, 22K).

The data obtained were analyzed by use of the Jacob Modified Non-Equilibrium Formula. Both the observation well and pumping well data were used for final computations. Results indicate an average transmissivity (T) of 2,370 gal/day/ft. (very low) and a storage coefficient (S) of  $3.5 \times 10^{-5}$ . The pumped well analysis was used in conjunction with the observation well and final results were averaged. Agreement of final results was good.

The data obtained from analysis, T and S, were used to make projected drawdown vs. time curves for radii of 0.25, 0.5, and 1.0 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.

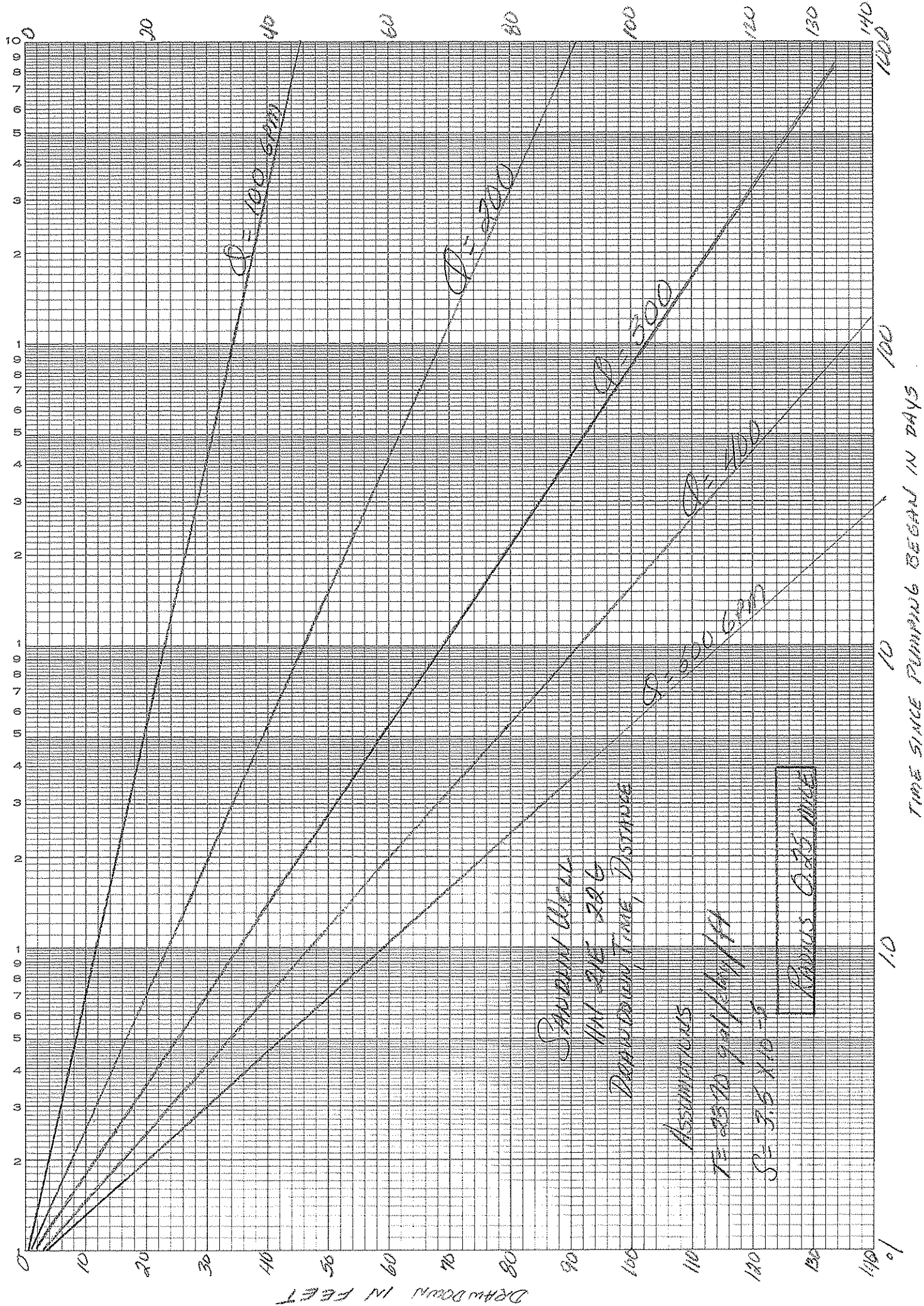
It should be noted that any other wells tapping this aquifer and within reasonable distance of each other will cause mutual interference, that is, their drawdowns will be additive upon other wells within their effective radii. Assuming similar aquifer conditions (a large assumption) a crude measure of 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.

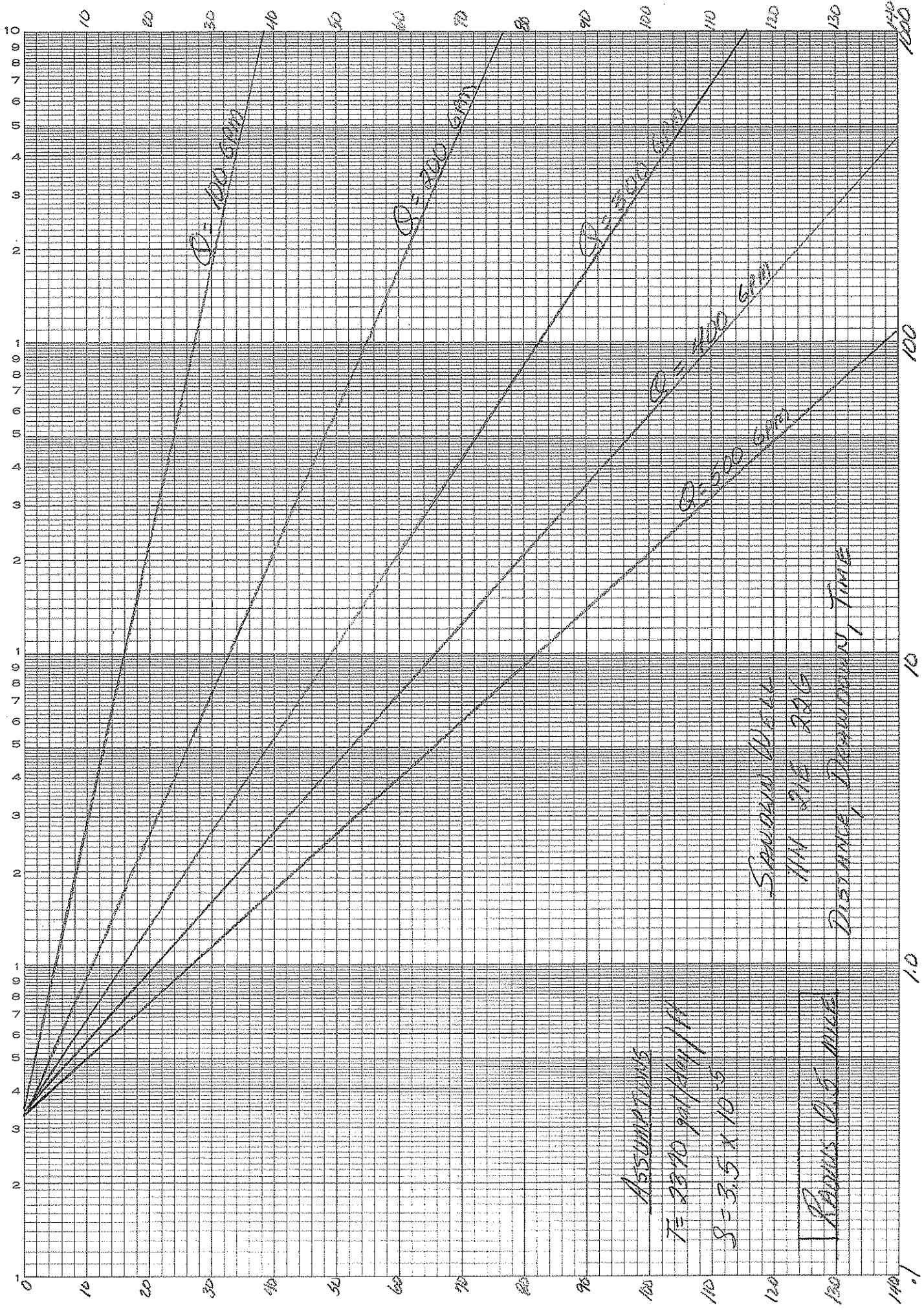
This aquifer (Mabton interbed(?)) has poor production characteristics and drawdowns in wells will be extreme as will well interference effects. From drillers and geophysical logs it appears other units in the section, although not utilized by this well, would also have a potential for yielding water if they could be tapped. Use of such aquifers would lessen the stress imposed on the Mabton(?).

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

EAN:ee

ECY 010-4





Assumptions

$T = 2370 \text{ gal/day/ft}$   
 $S = 3.5 \times 10^{-5}$

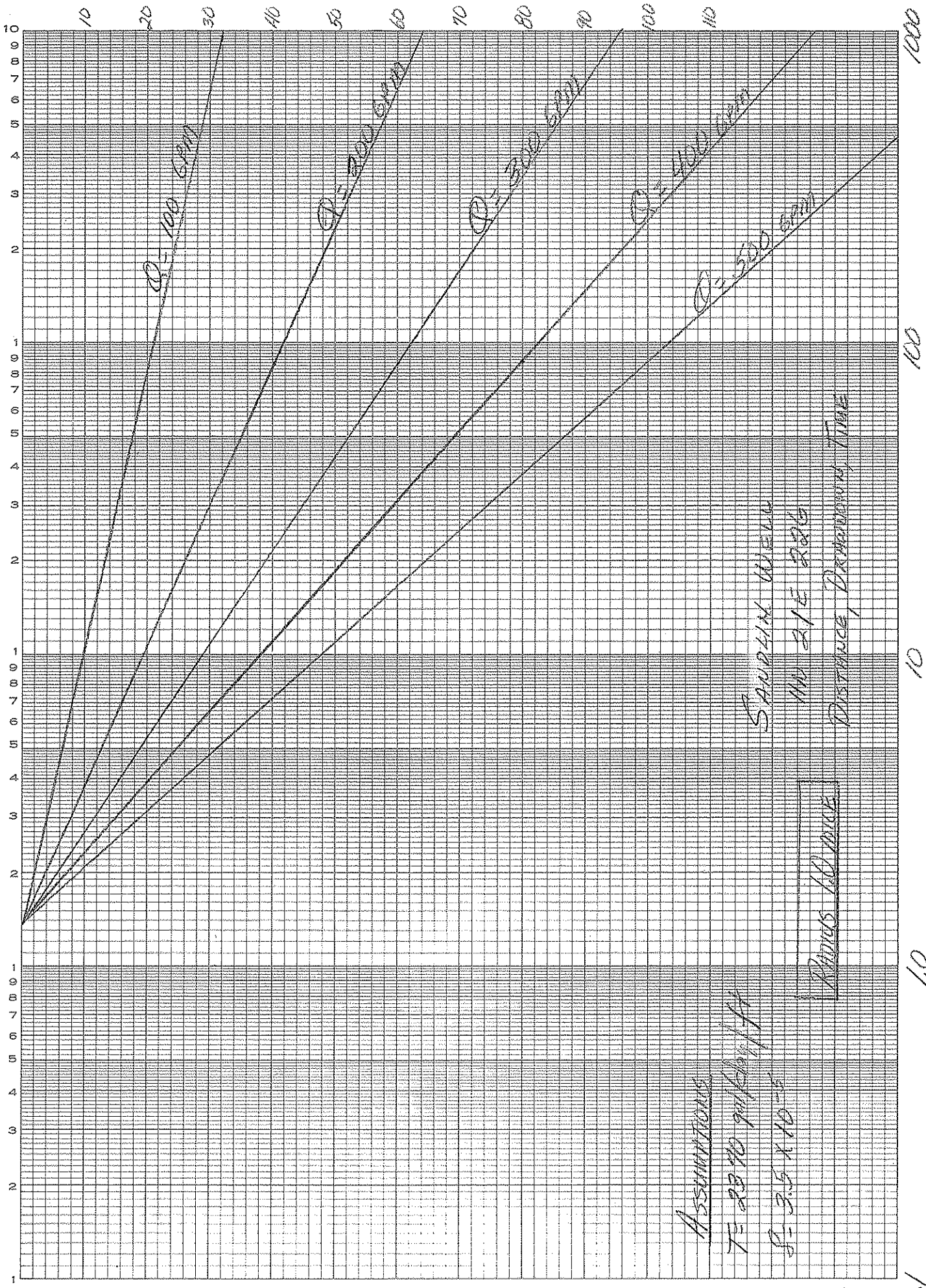
Sandwich Well  
 11/11 216 206

Radius 0.5 miles

Distance, Drawdown, Time

TIME IN DAYS SINCE PUMPING BEGAN

DRAWDOWN IN FEET



Assumptions

$T = 20 \text{ to } 25 \text{ min} / \text{ft}$   
 $S = 3.5 \times 10^{-5}$

Radius 10 miles

SANDHILL WELLS  
 NW 1/4 E 226  
 DISTANCE, DAMBOURD, TIME

1000  
100  
10  
1  
TIME IN DAYS SINCE PUMPING BEGAN

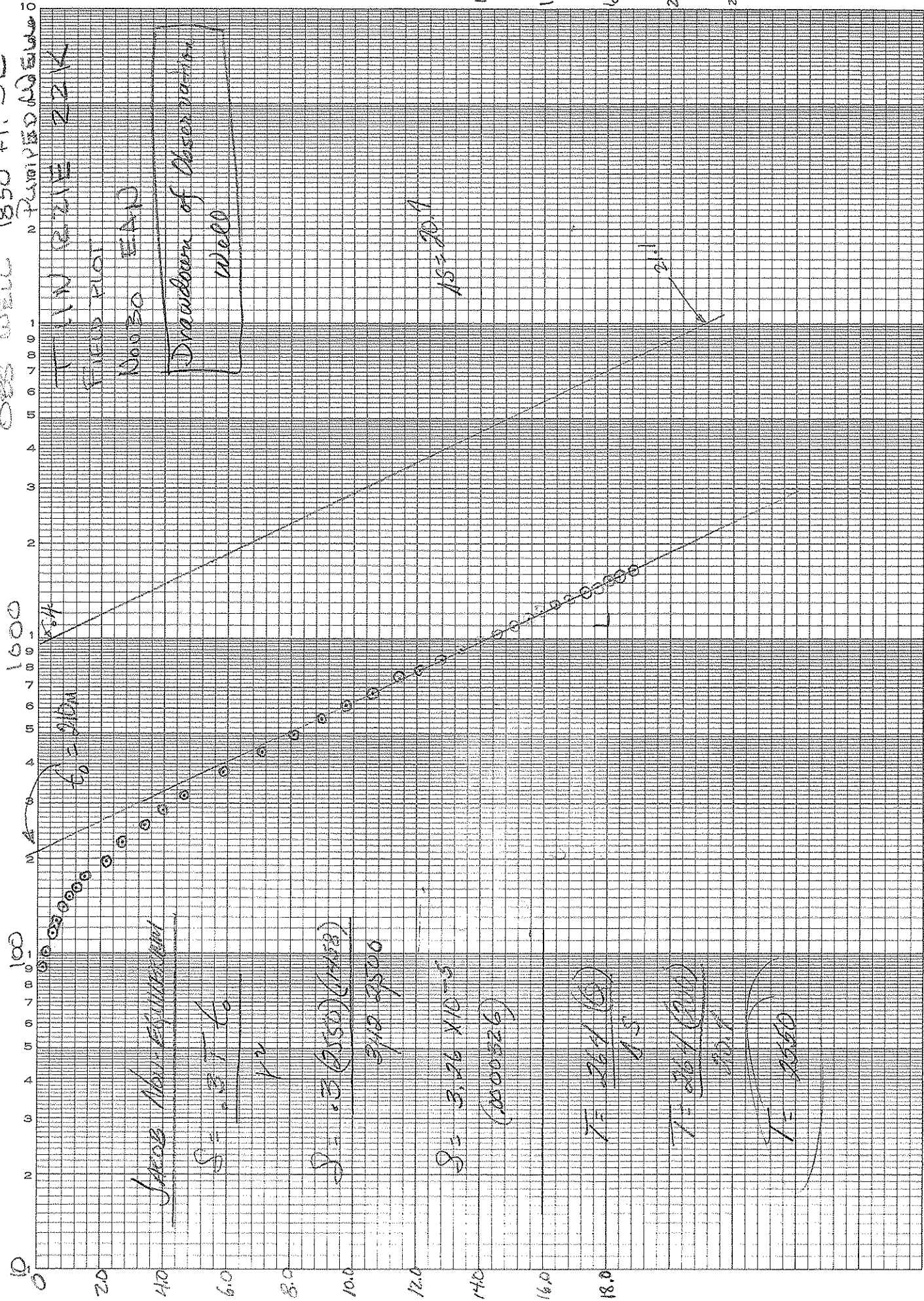
P. Best

OES WELL 1850 FT. SE  
PUMPED OBSERV

1 IN GZIE ZK  
FIELD PLOT

NO. 30 EAD

Drawdown of Observation Well



Stages Now Equilibrium

$$S = 0.37 C_0$$

$$S = 0.3 (2550) (1.15^2)$$

370 2500

$$S = 3.26 \times 10^{-5}$$

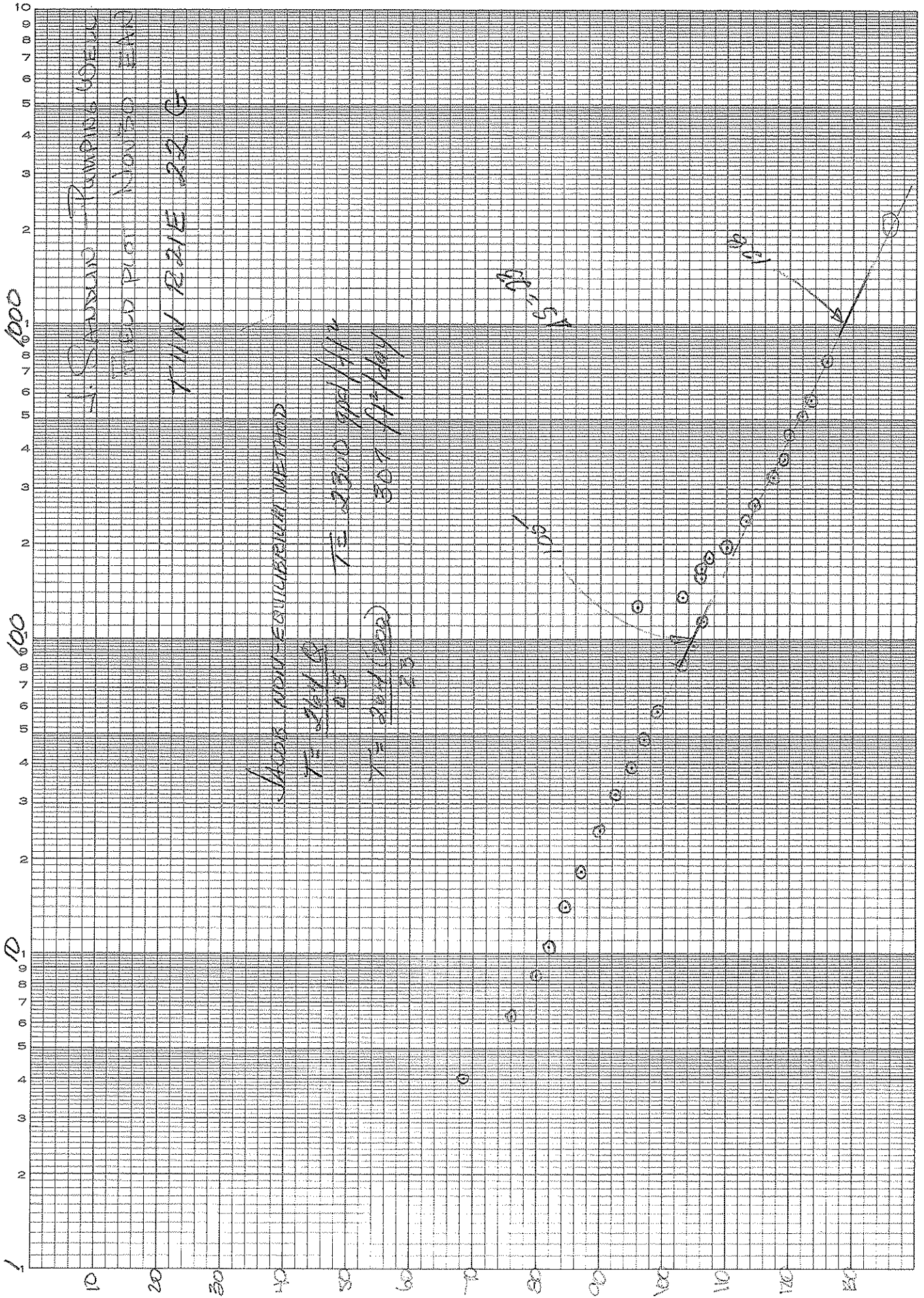
(200026)

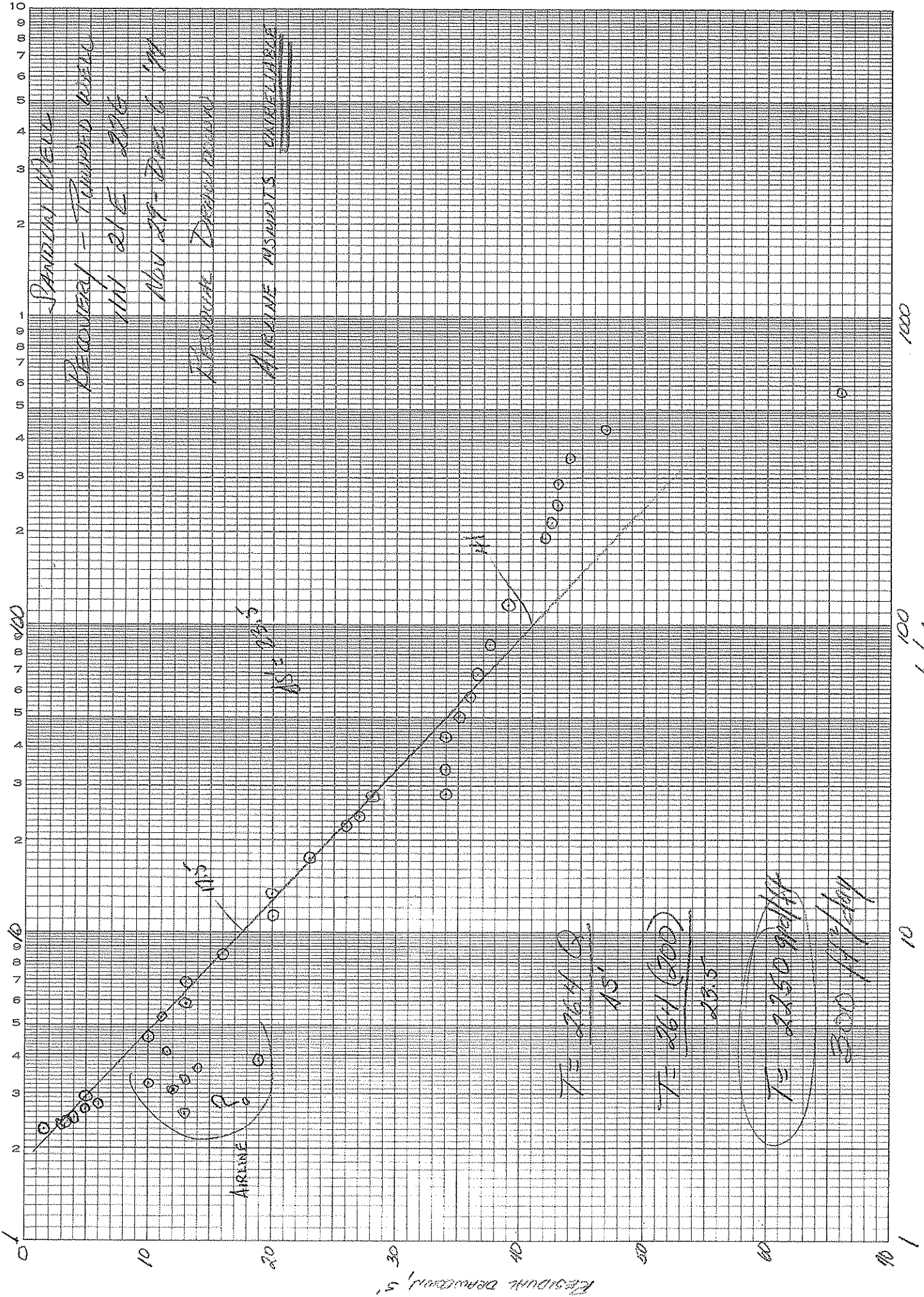
$$T = \frac{264}{1.5}$$

$$T = \frac{261}{20.1}$$

$$T = 2660$$

14  
16  
18  
20  
22





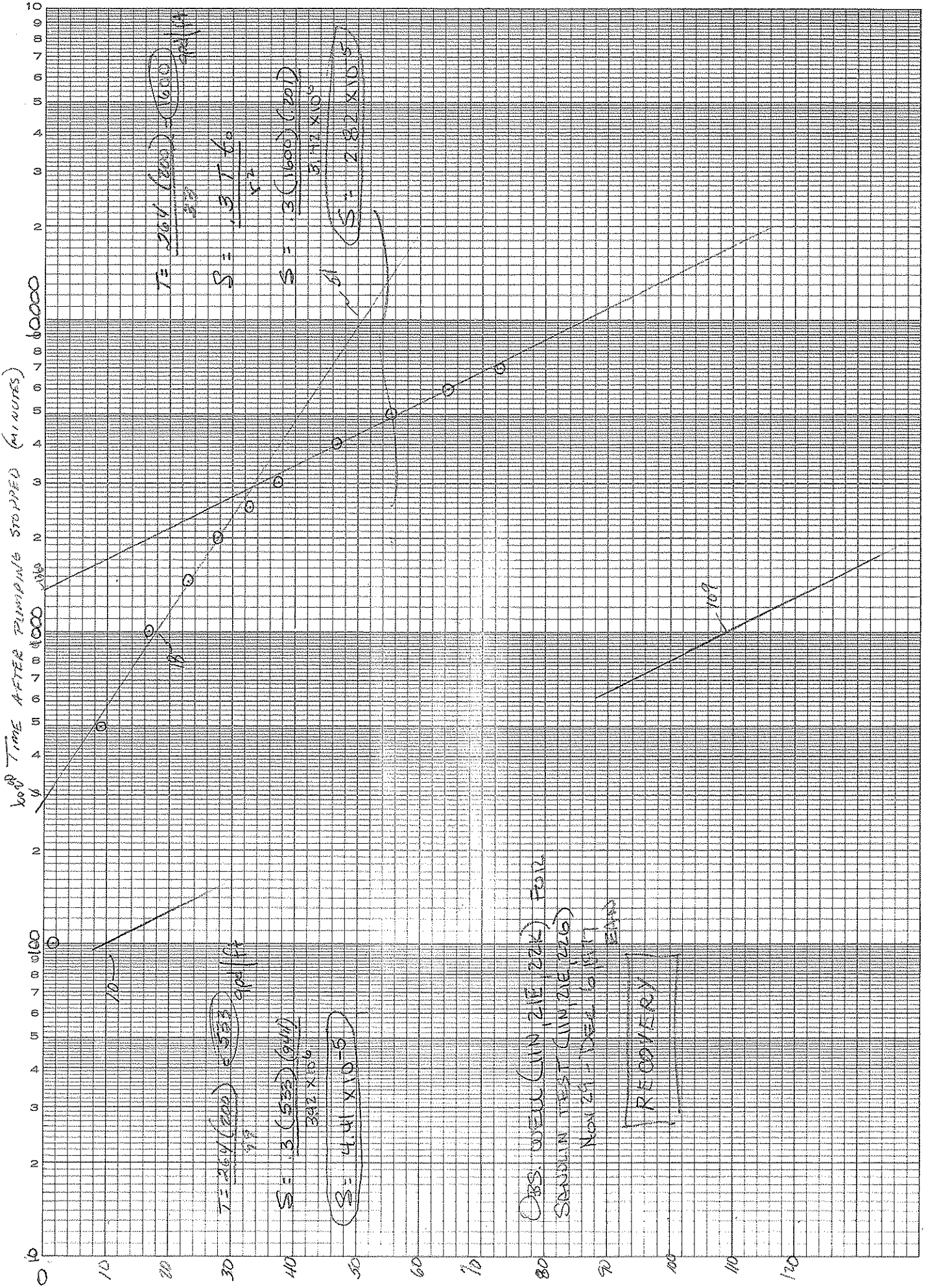
1000  
100  
10  
1

1000

100

10





CALCULATED RECOVERY (S-S)

TABLE 2

## FLOW THROUGH CIPOLLETTI WEIRS

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

$MGD = CFS \times .646$

Head Ft.	LENGTH OF WEIR CREST IN FEET											
	1		1 1/2		2		3		4		5	
	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



AQUIFER TEST

Sheet 1 of       

Owner Best, Peter Location TIN R21E 22K Well No. OBS-

Date 11-30-77 Meas. by Omni Pumping Test DD County YAKIMA

Meas. point Edge of casing Elev. Meas. Point       

Meas. equipment E-TAPE

DTW 359.42 t<sub>0</sub> 1045 Nov 30 Q 200 GPM r 1850 FEET

(342.22)

Date	Hour	Water level			s	t	1440r <sup>2</sup> t	Remarks
		Held	Wet	Depth (DTW)				
11-30	1045							
	1215				.15	90		
	1220				.18	95		
	1225				.24	100		
	1230				.29	105		
	1236			t	.36	111		
	1241			116	.44		Linton started here	
	1245			120	.50		Tape slipped on next 2 readings	
	1250			125	.58		by .22ft.	
	1256			131	.69			
	1300			135	.73			
	1305				.82	140		
	1310				.90	145		
	1315				1.01	150		
	1321				1.12	156		
	1325				1.20	160		
	1330				1.29	165		
	1340			t	1.48	175		
	1356			191	<del>2.38</del>	2.14	Corrected because Ed t	
	1400			195	<del>2.46</del>	2.22	Linton moved tape, subtract	
	1430			225	2.73	3.24		
	1500			255	3.35		MEAS FROM 9/65 ADD 2.75 FEET	
	1530			285	3.99			





AQUIFER TEST

Owner PETER BEST Location                          Well No. ORS  
 Date 12-1-77 Meas. by                          Test                  County                   
 Meas. point                          Elev. Meas. Point                           
 Meas. equipment                           
 DTW                           $t_0$                            $Q$                            $r$                          

Date	Hour	Water level			s	t	1440r <sup>2</sup> t	Remarks
		Held	Wet	Depth (DTW)				
DEC 1	1508			19.18		1703		
	1510			19.18		1705	PUMP OFF	
	1511			19.19		1701		
	1512			19.20		2		
	1513			19.20		3		
	1514			19.20		4	1512 - 1516	
	1515			19.21		5	TRIMPOSED	
	1516			19.21		6	9 to 5 connected	
	1517			19.22		7	Back to 9	
	1518			19.23		8		
	1519			19.24		9		
	1520			19.24		10		
	1521			19.25		11		
	1523			19.26		13		
	1525			19.27		15		
	1529			19.30		19		
	1533			19.32		23		
	1535			19.34		25		
	1540			19.37		30		
	1546			19.42		36		
	1550			19.45		40		
	1555			19.48		45		
	1600			19.50		50		



AQUIFER TEST

Sheet 4 of       

Owner R. Best Location \_\_\_\_\_ Well No. 035  
 Date Nov 30 - '77 Meas. by \_\_\_\_\_ Test \_\_\_\_\_ County \_\_\_\_\_  
 Meas. point \_\_\_\_\_ Elev. Meas. Point \_\_\_\_\_  
 Meas. equipment \_\_\_\_\_  
 DTW  $\circ$  \_\_\_\_\_  $t_0$  \_\_\_\_\_  $Q$  \_\_\_\_\_  $r$  \_\_\_\_\_

Date	Hour	Water level			s'	t	$\frac{1440r^2}{t}$	Remarks
		Held	Wet	Depth (DTW)				
DEC 1	1615				19.53	65		
	1645				19.45	95		
	1715				19.23	125		
	1745				18.90	155		
	1815				18.58	185		
	1845				18.17	215		
	1915				17.65	245		
	2015				16.89	305		
	2115				16.08	365		
	2220				15.19	430		
	2308				14.60	478		
DEC 2	0027				13.84	557		
	0118				13.35	608		
	0203				12.99	653		
	0408				12.02	778		
	0512				11.55	842		
	0615				11.19	905		
	0715				10.89	965		
	0815				10.53	1025		
	0910				10.25	1080		
	1018				9.90	1148		
	1132				9.58	1222		



AQUIFER TEST

Owner J. Best Location \_\_\_\_\_ Well No. \_\_\_\_\_  
 Date \_\_\_\_\_ Meas. by \_\_\_\_\_ Test Rec County \_\_\_\_\_  
 Meas. point \_\_\_\_\_ Elev. Meas. Point \_\_\_\_\_  
 Meas. equipment E-Trap  
 DTW  $o$  \_\_\_\_\_  $t_o$  \_\_\_\_\_  $Q$  \_\_\_\_\_  $r$  \_\_\_\_\_

Date	Hour	Water level			s'	t	1440r <sup>2</sup> t	Remarks
		Held	Wet	Depth (DTW)				
<del>DEC 2</del>								
	1212				9.42	1262		
	1315				9.13	1325		
	1405				8.92	1375		
	1509				8.69	1439		
	1606				8.78	1496		
DEC 5	0948	365.0	-1.8	362.2	2.78	5438		
DEC 6	1505			360.81	1.39	7195		



AQUIFER TEST

Owner SANDLIN Location 11N 21E 22E Well No. \_\_\_\_\_  
 Date Nov 29-30 '77 Meas. by L. WILDRICK E. NEWICK Test DD-REG County YANWA  
 Meas. point Access 1" pipe W. side Elev. Meas. Point 1282 AMSL  
 Meas. equipment AIRLINE - QUESTIONABLE ACCURACY  
 DTW 434?  $t_0$  Nov 30 1045  $Q$  200 GPM  $r$  1850 FEET

Date	Hour	Water level			s	t		Remarks
		Held	Wet	Depth (DTW)				
Nov 29	1500						UNABLE TO MEASURE	
Nov 30	0950			434?			AIRLINE ??	
Nov 30	1045						PUMP ON	
	1047						WATER AT SURFACE	
	1049			502.5	62.5	4		
	1051:30			510.0	76.0	6.33		
	1053:30			514.0	80.0	8.5		
	1055:30			516.0	82.0	10.5		
	1059			518.5	84.5	14		
	1103			521.0	87.0	18		
	1110			524.0	90.0	25		
	1117			526.5	92.5	32		
	1124			529.0	95.0	39		
	1133			531.0	97.0	48		
	1144			533.0	99.0	59		
	1207			537.0	103.0	82		
	1220			539.0	105.0	95		
	1239			540.5	106.5	114		
	1247-1249						PUMP OFF	
	1252			530.0	96.0	127	2 MINUTES	
	1301			537.0	103.0	136		
	1320			540.0	106.0	155		
	1332			540.0	106.0	167		





AQUIFER TEST

Owner SNOW Location \_\_\_\_\_ Well No. Pump 116  
 Date Nov 30 - 79 Meas. by E. NEMECYK L. WILCOCK Test DD County \_\_\_\_\_  
 Meas. point \_\_\_\_\_ Elev. Meas. Point \_\_\_\_\_  
 Meas. equipment AIRLINE  
 DTW o \_\_\_\_\_ t<sub>o</sub> \_\_\_\_\_ Q \_\_\_\_\_ r \_\_\_\_\_

Date	Hour	Water level			s	t	t/k'	Remarks
		Held	Wet	Depth (DTW)				
Nov 30	1345			541.0	107	180		
	1400			544.0	110	195		
	1442			547.0	113	237		
	1509			548.5	114.5	264		
	1610			551.5	117.5	325		
	1655			553.0	119.0	370		
	1815			554.0	120.0	450		
	1912			556.0	122.0	507		
	2018			557.5	123.5	573		
	2146			560.3	126.0	680	AIRLINE END	
	ABANDONED MEAS LOST			400' SOUNDER WIRE (CHEAP SOUNDER WIRE)				
DEC 1	1510						PUMP OFF	
	PUMP OFF 1510 (PA)			5'	1705	0		
	1513			500	66	1708 / 3	569	
	1514			481	47	1709 / 4	427	
	1515			478	44	1710 / 5	342	
	1516			477	43	1711 / 6	285	
	1517			477	43	1712 / 7	245	
	1518			476.5	42.5	1713 / 8	214	
	1519			476	42	1714 / 9	190	
	1525			473.0	39	1720 / 15	115	
	1630			471.5	37.5	1725 / 20	86	
	1535			470.5	36.5	1730 / 25	69	

45  
18  
27  
660  
135



AQUIFER TEST

Owner SANDLIN Location \_\_\_\_\_ Well No. \_\_\_\_\_  
 Date Nov 30 - '77 Meas. by \_\_\_\_\_ Test REC County \_\_\_\_\_  
 Meas. point \_\_\_\_\_ Elev. Meas. Point \_\_\_\_\_  
 Meas. equipment AIRLINE  
 DTW o \_\_\_\_\_ t<sub>o</sub> \_\_\_\_\_ Q \_\_\_\_\_ r \_\_\_\_\_

Date	Hour	Water level			s'	t	t'	t/t'	Remarks
		Held	Wet	Depth (DTW)					
Dec 1	1540			470.0	36	1735	30	58	
	1545			469.0	35	1740	35	50	
	1551			468.0	34	1746	41	42.6	?
	1602			468.0	34	1757	52	33.8	?
	1613			468.0	34	1768	63	28.1	?
	1614			462.0	28	1769	64	21.6	Reading when needles first hesitates for
	1625			461.0	27	1780	75	23.7	50% of 23.7 = 11.85
	1631			460.0	26	1786	81	22.0	
	1655			459.0	23	1810	105	17.24	AIR SET TIMES - WAIT 30 SECS - READ
	1730			454.0	20	1845	140	13.18	
	1800			454.0	20	1875	170	11.03	
	1900			450.0	16	1935	230	8.41	
	2000			447.0	13	1995	290	6.88	
	2100			447.0	13	2055	360	5.87	
	2150			445.0	11	2105	400	5.26	Not sufficient pressure to empty airline
	2310			444.0	10	2185	480	4.55	OK pressure. Well OK
Dec 2	0021			445.5	11.5	2256	551	4.09	
	0109			453.0	19	2304	399	3.85	
	0211			448.0	14	2366	461	3.58	
	0330			447.0	13	2445	740	3.30	POOR READING
	0400			444.0	10	2475	770	3.21	?? AIRLINE
	0515			446.0?	12	2550	845	3.02	" "
	0608			439.0	5	2608	898	2.90	



AQUIFER TEST

Sheet 4 of 5

Owner Sandlin Location \_\_\_\_\_ Well No. \_\_\_\_\_  
 Date Nov-2 Meas. by \_\_\_\_\_ Test Rec County \_\_\_\_\_  
 Meas. point \_\_\_\_\_ Elev. Meas. Point \_\_\_\_\_  
 Meas. equipment Airline  
 DTW o \_\_\_\_\_ t o \_\_\_\_\_ Q \_\_\_\_\_ r \_\_\_\_\_

Date	Hour	Water level			s	t	t'	t/t'	Remarks
		Held	Wet	Depth (DTW)					
Dec 2	0705			440.0	6	2660	955	2.79	questionable
	0803			439.0	5	2713	1013	2.68	
	0905			437.0	13	2700	1015	2.59	" ???
	1008			438.0	4	2843	1138	2.50	"
	1118			437.5 437.0	3.5	2913	1208	2.41	" EMERG NEWHERZ

Handwritten notes at bottom right corner.



AQUIFER TEST

Sheet 5 of 5

Owner Sandlin Location \_\_\_\_\_ Well No. \_\_\_\_\_  
 Date \_\_\_\_\_ Meas. by \_\_\_\_\_ Test Rec County \_\_\_\_\_  
 Meas. point \_\_\_\_\_ Elev. Meas. Point \_\_\_\_\_  
 Meas. equipment Airline  
 DTW  $t_0$  \_\_\_\_\_  $t$  \_\_\_\_\_  $t'$  \_\_\_\_\_

Date	Hour	Water level			① DEPTH	t	t'	② t/t'	Remarks
		Held	Wet	Depth (ft)					
Dec 2	1202			3	437.	295	1252	2.36	BRAW NEEDLE BACK TO peg 5 times Read 1120 sec.
	1300			1.5	435.5	3015	1310	2.30	
	1400			.5	434.5	3075	1370	2.24	
	1505			.5	434.5	3140	1435	2.19	
	1601			.5	434.5	3196	1491	2.14	
Dec 5	0940				428.5	735	5430	1.31	
Dec 6	1500				429.0	8895	7190	1.24	