

1506-00033

# WILLIAM E. NORK, Inc.

1026 W. First Street • Reno, Nevada 89503

CONSULTING SERVICES IN HYDROLOGY AND GEOLOGY  
Phone (702) 322-2604

4/12/00 Pumping 203.15'  
230 gpm (according to  
telemetry)

December 7, 1983  
83-311

$$7700 \text{ gal/ft} = \frac{264.230}{\Delta s} \quad \Delta s = \frac{264.230}{7700}$$

Jake Huber  
PYRAMID RANCH HOMES  
470 Rockwell  
Sparks, NV 89431

Re: Countryside Unit 1 North Well and South Well constant-discharge pumping test results

Dear Mr. Huber:

As per your request WILLIAM E. NORK, INC. conducted aquifer pumping tests in two wells located at Countryside Unit 1 in Spanish Springs Valley, Washoe County, Nevada. The two wells are referred to as the North and South wells. Robertson Engineering personnel serviced the diesel engine, installed 3/4-inch diameter stilling wells in each well, provided 600 feet of discharge pipe for the North Well test, and prepared each pump for testing. The North Well was pumped for a duration of 72 hours as per Washoe County regulations and guidelines for testing quasi-municipal water wells. Duration of the South Well pumping test was reduced to 48 hours on the precondition that it respond similarly to the North Well.

This letter/report is a summary of the testing results.

## TESTING

### North Well

Testing of the North Well commenced at 1430 hours 11/4/83. The test was terminated after 55 minutes due to failure of the thrust bearing in the gear head. The gear head was replaced and testing was recommenced 11/9/83. Water levels were monitored in the pumped well (North Well), a nearby Observation Well, and the South Well throughout the test.

The 72-hour constant-discharge pumping test began at 1200 hours 11/9/83. Static water level in the pumped well prior to testing was 56.18 feet below datum (datum = top of stilling well). Static water level in the Observation Well and the South Well were 71.29 and 41.10 feet, respectively.

1983-1988 (week)

The pumping rate was held constant at 450 gallons per minute (gpm) for the duration of the test. Testing was terminated at 1200 hours 11/12/83. Drawdown in the pumped well at the conclusion of the test was 277.52 feet, a pumping water level of 333.70 feet. Drawdown in the Observation Well, located approximately 300 feet from pumped well, was 19.16 feet. No drawdown attributable to pumping could be perceived in the South Well, a distance of approximately 2,400 feet to the south. Drawdown data for the pumped and observation wells are plotted in Figures 1 and 2.

Recovery of water levels in the pumped well was rapid, approximately 90 percent within 30 minutes. Residual drawdown data for the pumped and observation wells are plotted in Figures 3 and 4, respectively.

The aquifer characteristics were calculated by the Jacob approximation of the Theis Equation and the Theis Recovery Method. Values for transmissivity, the overall ability of the aquifer to transmit ground water, ranged from 4,569 to 10,110 GPD/ft with an average of 8,447 GPD/ft calculated from late-time drawdown and residual-drawdown data. Aquifer storativity was calculated to be 0.0026, a value characteristic of semi-confined aquifers. Calculations in support of these values are provided in Figures 1 through 4. The lack of response in the South Well is consistent with the drawdown expected after only three days of pumping given the aquifer characteristics calculated from the testing data.

Water samples for chemical analysis were collected after 24, 48 and 72 hours of pumping as required by the Washoe County District Health Department. Results will be forwarded upon receipt.

#### South Well

The South Well was pumped for a duration of 48 hours. Testing commenced at 1300 hours 11/18/83. Static water level prior to testing was 42.00 feet below datum (datum = top of stilling well). Static water levels in the Observation Well and the North Well, both approximately 2,400 feet to the north, were 75.37 and 57.22 feet, respectively. Pumping rate was kept constant at 350 gpm. Drawdown in the

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pumped well at the conclusion of testing was 248.49 feet, a pumping water level of 290.49 feet. No response to pumping of the South Well was noted in either the Observation Well or the North Well. Drawdown data are plotted in Figure 5.

Recovery of water levels in the pumped well was rapid, approximately 95 percent within two hours. Residual-drawdown data are plotted in Figure 6.

Data were analyzed by the Jacob approximation of the Theis Equation and the Theis Recovery Method. Transmissivity calculated from both drawdown and residual-drawdown data was 7,700 GPD/ft. No value for storativity could be calculated due to a lack of response in either the Observation Well or the North Well.

Water samples for chemical analysis were collected after 24 and 48 hours of pumping. Results will be forwarded upon receipt.

#### YIELD RATING

The lack of step-drawdown pumping tests precludes any quantitative assessment of well efficiency or well losses for either well. However, they were examined qualitatively. The very rapid recovery of water levels in each well after the pumps were shut off, the steep early-time drawdown and residual-drawdown data plots, presence of cascading water (South Well), and dramatic changes in pumping water level associated with minute changes in pumping rate all suggest significant well losses.

#### North Well

On the basis of late-time drawdown data, the North Well can be expected to yield up to 400 gallons per minute. After 20 years of pumping continuously at this rate and in the absence of recharge, the drawdown in the well is expected to be approximately 300 feet, a pumping water level of 356 feet below land surface. It should be noted that some of the well casing perforations will be exposed, contributing to a potential for cascading water. However, no entrained air was noted in the discharge at any time during the test indicating that none of the potential problems often associated with cascading water are to be expected.

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Table 1.

Calculated drawdown at selected distances from the pumped wells (in the absence of recharge).

Distance (feet)	Pumping Rate (gpm)	Duration (years)	Drawdown (feet)
2,400	320	1	18.0
2,400	400	1	22.5
2,400	320	20	31.7
2,400	400	20	39.6
5,000	320	1	12.0
5,000	400	1	15.0
5,000	320	20	25.2
5,000	400	20	31.5

As illustrated in the table the wells will have a noticeable interference effect on each other and nearby domestic wells. However, the amount is not excessive and in fact will be less since recharge does occur even in years of lower-than-average precipitation.

If you have any questions please do not hesitate to contact our office.

Sincerely,

WILLIAM E. NORK, INC.

*Dale C. Bogenig/bh*

Dale C. Bogenig  
Hydrogeologist

Attachments

cc: Dave Frear

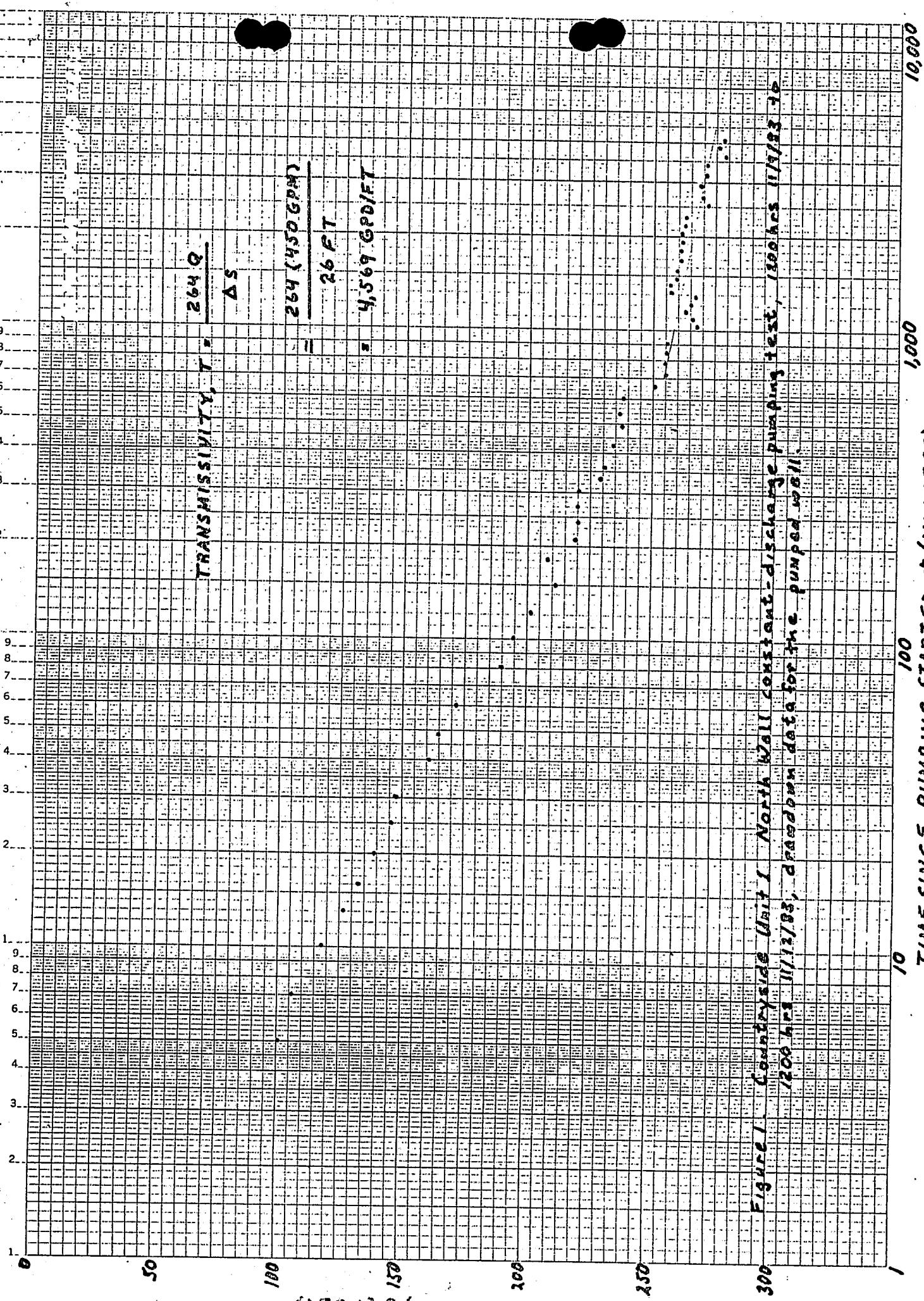
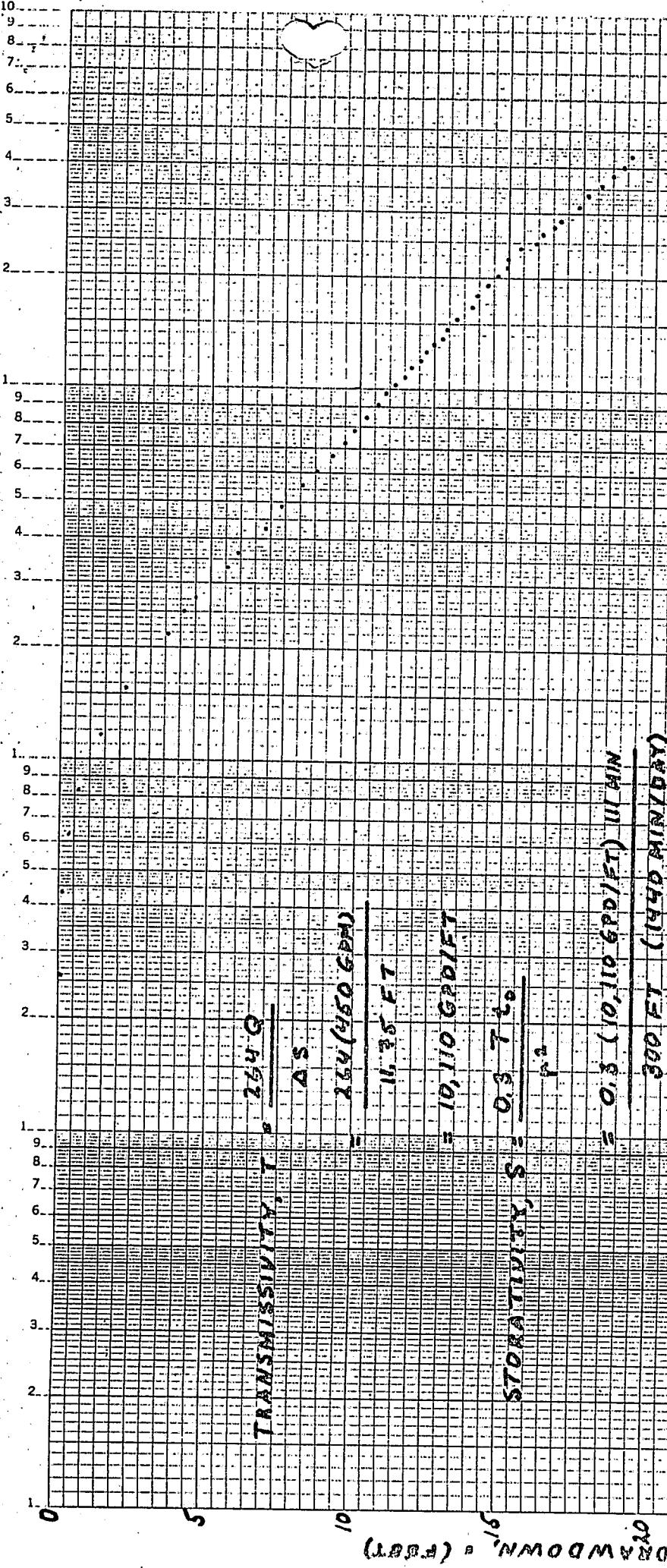


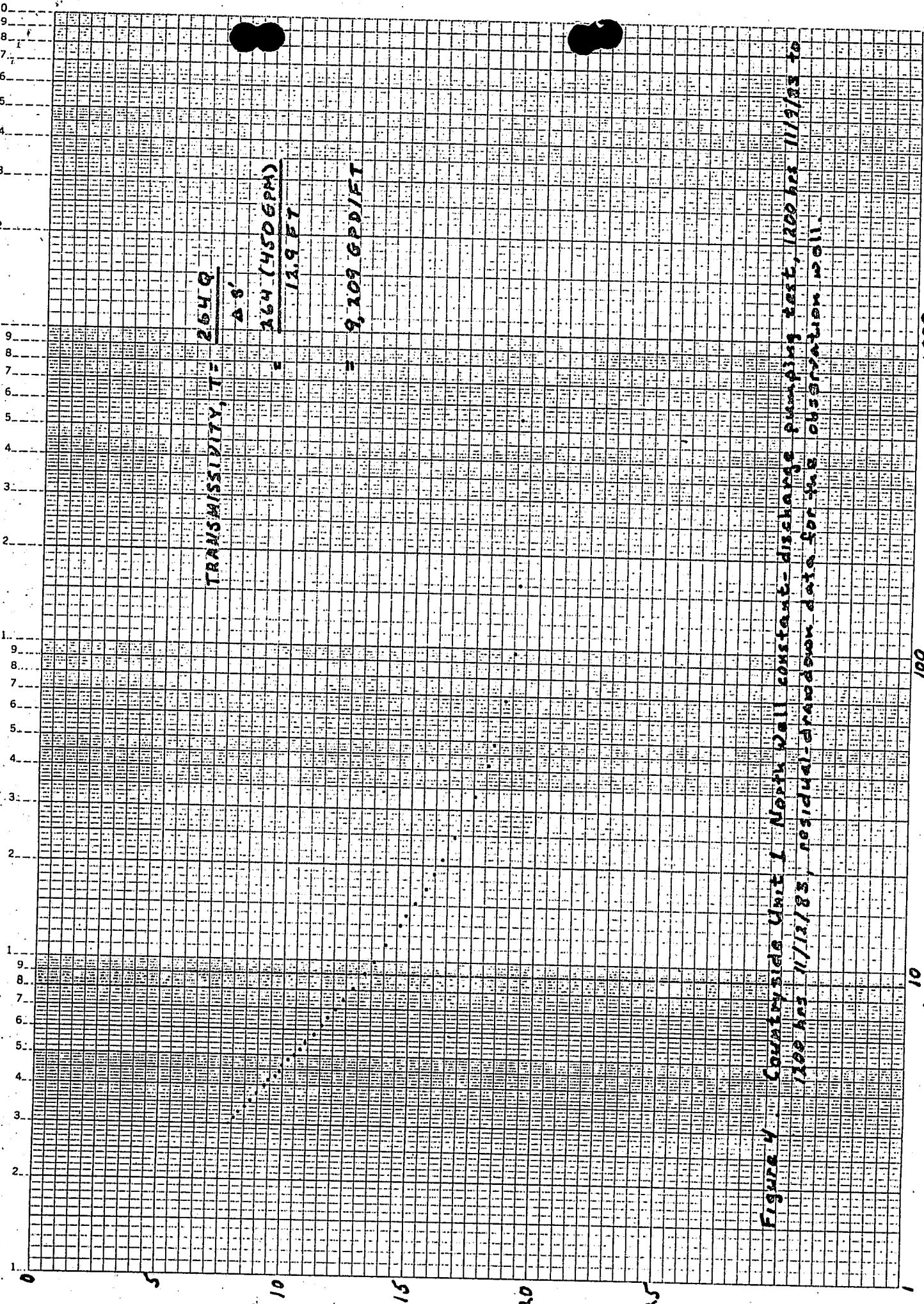
Figure 1. Constant-head Unit 1 North Well constant-discharge pumping test, 1/20 acres 11/17/83-10  
1200 hrs 11/12/83, raw data for the pumped well.



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Figure 2 - Constant-discharge pumping test, 1200 ft<sup>2</sup>, 11/9/83 to 1202 ft<sup>2</sup>, 11/12/83, drawdown data for the observation well.

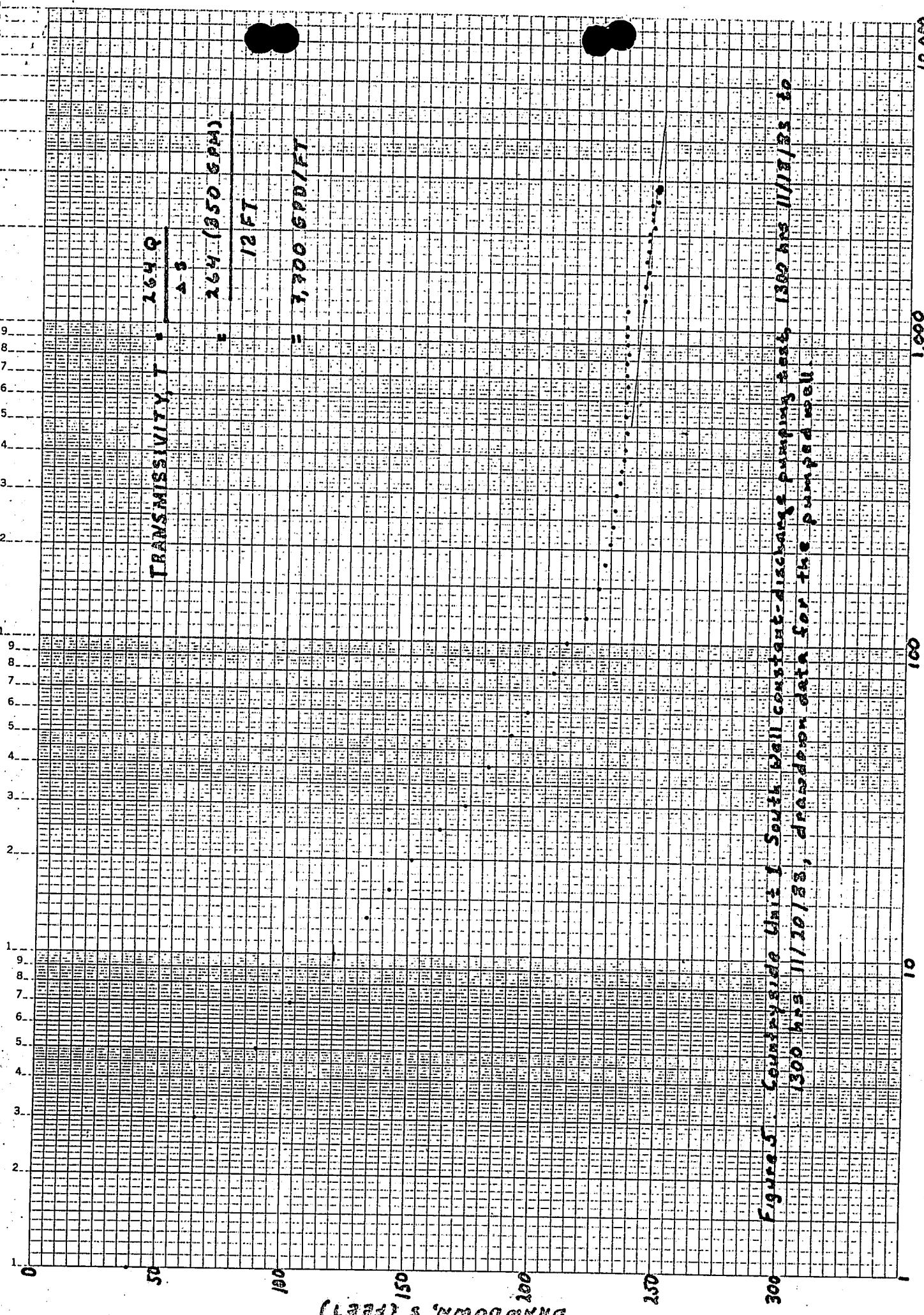
10,000  
1,000  
100  
10  
1



10,000

100

10



300 Figure 5. County Side Unit 1. Semi-log constant-discharge pumping test, 1300 gpd 11/13/33, dredge data for the pumped well.

1000  
100  
10  
1

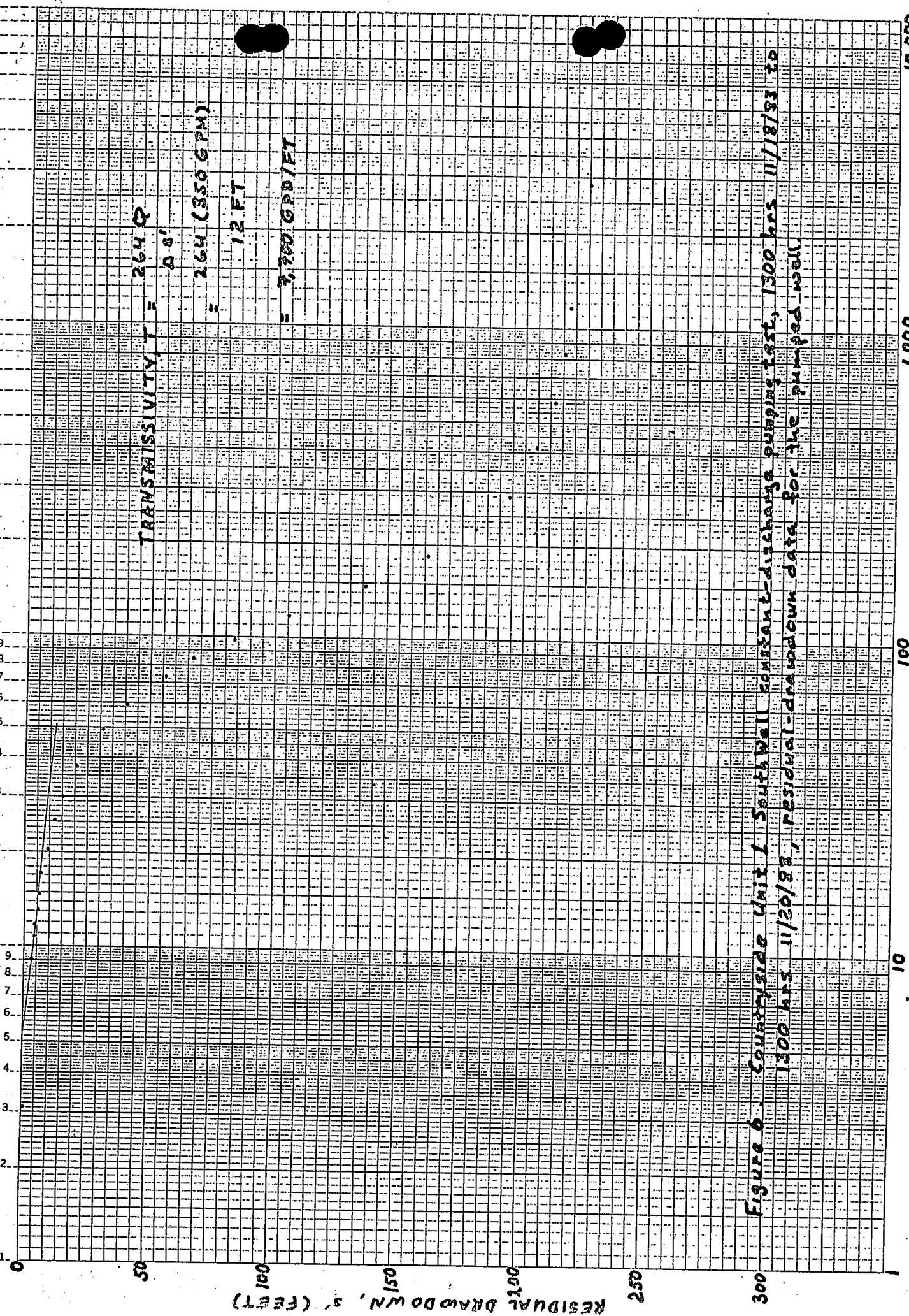


Figure 6. Counter-side Unit 1 South Wall constant-drawdown data for the planned well. 300 ft x 100 ft x 100 ft (TIME SINCE PUMPING STOPPED ÷ TIME SINCE PUMPING STOPPED)

$t/t'$  (TIME SINCE PUMPING STOPPED ÷ TIME SINCE PUMPING STOPPED)

## PUMPING TEST DATA

WELL NO. NORTH WELL

TYPE OF PUMPING TEST CONSTANT-Q  
PUMPING/RECOVERY DATA  
M.P. FOR WATER LEVELS TOP OF STILLING WELL  
DISTANCE FROM PUMPING WELL \_\_\_\_\_  
LOCATION NW 1/4 SEC 6 T 20N R 21E

PUMPING/OBSERVATION WELL  
OTHER OBSERVATION WELL(S) \_\_\_\_\_  
OBS #1, SO. WELL  
PUMP ON: DATE 11/9/82 TIME 1200  
PUMP OFF: DATE \_\_\_\_\_ TIME \_\_\_\_\_

CLOCK TIME	ELAPSED TIME (minutes)	t/t'	WATER LEVEL MEASUREMENT (feet)	PUMPING RATE (gpm)		BOTTOM OF STILLING WELL = 380	REMARKS
				(S) or s'	INCHES Q		
	t	t'					
1200	0		56.18				
1202	2		166.57				
	3				24 1/2 450		
1205	5		156.60	100.48	23 435		
1207	7		161.70	105.58	24 1/2 450		
1210	10		173.74	117.56	24 1/2 450		
1213	13		182.83	126.65	24 1/2 450		
1216	16		187.83	131.70	24 1/2 450		
1220	20		193.47	137.29	25 455		
1225	25		201.23	145.05	24 445		
1230	30		202.94	146.66	23 1/2 440		
1240	40		216.82	160.14	24 1/2 450		
1248	48		220.83	164.65	24 445		
1300	60		237.57	171.39	25 460		
1320	80		246.58	190.20	25 455		
1340	100		250.92	194.74	24 1/2 448		
1401	121		256.96	200.78	24 1/2 450		WYN & HALL TEST SITE
1430	150		267.70	211.52			
1500	180		263.93	207.75	23 1/2 440		
1530	210		274.70	218.52	23 3/4 445		
1600	240		275.45	219.27	23 1/4 445	ENGINE RPM = 1125	
1630	270		275.75	219.17	23 1/2 440	TEMP = 182°F OIL PRESSURE = 45 PSIG	T = 21.0°C E.C. = 272 MMHO/CM
1700	300		276.17	219.99	23 1/2 440	PH = 7.92	FUEL GENERATOR.
1730	330		284.27	228.09	24 1/2 450	INCR Q → 450 GPM @ 1720	
1800	360		285.66	229.48	" "		
1900	420		294.76	228.58	24 1/8 452	ADJ Q @ 1844	
2000	480		301.94	235.76	24 1/2 450	ENGINE RPM = 1140 TEMP = 179°F	GIC PRESSURE = 44 PSIG
2100	540		302.22	236.04	24 1/8 448	T = 21.0°C E.C. = 272 MMHO/CM	PH = 7.92
2200	600		303.40	237.41	24 1/2 450	ENGINE RPM = 1,200 TEMP = 180°F	OIL PRESSURE = 45 PSIG
						T = 21.0°C E.C. = 284 MMHO/CM	pH = 6.92

## PUMPING TEST DATA

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WELL NO. NORTH WELL

TYPE OF PUMPING TEST CONSTANT-Q  
PUMPING/RECOVERY DATA  
M.P. FOR WATER LEVELS TOP OF STILLING WELL  
DISTANCE FROM PUMPING WELL \_\_\_\_\_  
LOCATION NW 1/4 SEC 6 T. 20 N. R. 21 E

PUMPING OBSERVATION WELL  
OTHER OBSERVATION WELL(S) \_\_\_\_\_  
OBS #1, SO. WELL  
PUMP ON: DATE 11/14/83 TIME 1200  
PUMP OFF: DATE \_\_\_\_\_ TIME \_\_\_\_\_

CLOCK TIME	ELAPSED TIME (minutes)	t/t'	WATER LEVEL MEASUREMENT (feet)		PUMPING RATE (gpm)	STILLING WELL @ 380' REMARKS
			56.18	(S) or S'		
			t	t'		
11/9 2300	660			309.10	251.92	24 3/4 452 ADJ Q TO 24 3/4" @ 245 10-15 MPH WIND FROM SW
2400	720			311.10	254.92	24 1/2 450 T = 21.0°C E.C. = 285 MMHO/CM pH = 7.42 RPM = 1200, TEMP = 171°F, OIL = 45 PSIG
11/10 0100	780			310.44	254.26	24 3/8 449 11/10/83 FUEL ENGINE CHARGE STILL HAS NOT REACHED SP. SPEC RD.
0200	840			311.18	255.00	24 1/2 450
0300	900			311.40	255.22	24 3/8 449
0400	960			313.63	257.45	24 3/8 447 Adj Q @ 0340, 0445 rpm 1225 T = 19.4°C; EC = 288 (2K); pH = 7.04
0500	1020			322.92	266.74	24 3/4 451 rpm = 1225 oil = 46#, T = 178°F
0600	1080			321.82	265.64	24 3/8 447
0700	1140			319.83	263.65	24 1/4 446 adj. Q @ 0720, topped up oil line tank steady wind from S.
0800	1200			321.88	265.70	24 1/2 450 T = 21°C; EC = 283 (2K); pH = 7.07 rain
0900	1260			322.19	266.01	24 3/8 447 no water on rd. (sp. spms) topped rpm = 1225, oil = 46#, T = 182°F fuel tank
1000	1320			314.89	258.71	24 3/4 451 constant & steady wind from S.
1100	1380			313.55	257.37	24 1/2 450 no water on rd. (sp. spms)
1200	1440			315.86	259.68	24 5/8 450 T = 181°F; rpm = 1210; oil = 46#
1400	1560			316.17	259.99	24 1/2 450 T = 182°F; oil = 46#; rpm = 1215 wh flange small tank on
1600	1680			316.45	260.27	24 1/2 450 T = 20.6°C; EC = 286 (2K); pH = 6.90 (calib. in 100')
1800	1800			316.80	260.62	24 1/2 450 rpm = 1225, oil = 46#, T = 182°F, recirculation, rain
2000	1920			318.80	262.62	24 1/2 450 rpm = 1225; oil = 46#, T = 20.0°C, EC = 244 (2K); pH = 6.99
2200	2040			318.20	262.02	24 1/4 446 no H2O on Spms. Spring Rd. rpm = 1225, oil = 46#, full line, st. 11 = 10.8 ft. t. 10.8 ft. min = -40, rain
2400	2160			318.90	262.71	24 1/2 450 T = 20.2°C; EC = 296 (2K); pH = 6.99
11/11 0200	2280			318.50	262.32	24 1/2 450 no recirculation of H2O from pump, float on read. rpm = 1225, T = 180°F, oil = 46#
0400	2400			319.45	263.27	24 1/2 450 Barometric = -86
0600	2520			328.19	272.01	24 3/4 451 T = 20.5°C; EC = 293 (2K); pH = 6.73. Pump rate = 110 adj. Q = 124 1/2 0430, 65 gal fuel drum empty, light rain, no wind.
0800	2644			325.72	269.54	24 1/2 450 cleaning out, no rain
1000	2760			325.78	269.60	24 1/2 450 T = 182°F; rpm = 1240; oil = 46#
1200	2880			325.16	268.98	24 3/8 447 T = 20.8°C; EC = 299; pH = 6.67
1613	3133			328.04	271.86	24 1/2 450 T = 20.04; EC = 289; pH = 6.80, clear + still
2000	3360			329.03	272.85	24 1/2 450 T = 19.4; EC = 296; pH = 6.79
2400	3600			332.02	275.84	24 1/2 450 T = 19.9; EC = 293; pH = 6.71
11/12 0423	3863			331.62	275.44	24 3/8 447 T = 20.2; EC = 295 (2K); pH = 7.39

Project No. 83-311

## PUMPING TEST DATA

Page 3 of

of

WELL NO. north well

TYPE OF PUMPING TEST constant Q  
PUMPING RECOVERY DATA  
M.P. FOR WATER LEVELS top of spilling well  
DISTANCE FROM PUMPING WELL  
LOCATION MW 1/4 sec 6, T. 20 N., R. 21 E.

PUMPING OBSERVATION WELL

OTHER OBSERVATION WELL(S)

obs # 1, so well

PUMP ON: DATE 11/9/83 TIME 1200

PUMP OFF: DATE 1/1/86 TIME

## PUMPING TEST DATA

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WELL NO. north well

TYPE OF PUMPING TEST constant Q  
 PUMPING RECOVERY DATA  
 M.P. FOR WATER LEVELS beginning well  
 DISTANCE FROM PUMPING WELL \_\_\_\_\_  
 LOCATION Sec 6, T. 20N., R. 21E.

PUMPING OBSERVATION WELL  
 OTHER OBSERVATION WELL(S) \_\_\_\_\_

obs #1, S. well

PUMP ON: DATE 11/9/83 TIME 1000

PUMP OFF: DATE 11/12/83 TIME 1200

CLOCK TIME	ELAPSED TIME (minutes)		t/t'	WATER LEVEL MEASUREMENT (feet) 56.18' s. or (s')	PUMPING RATE (gpm)	REMARKS
	t	t'				
11-12-83	1200	4320	0	oo	—	
	1202	4322	2	2161	169.01	112.83
	1203	4323	3	1441	147.35	91.17
	1205	4325	5	865	126.27	70.09
	1207	4327	7	618.14	112.53	56.35
	1210	4330	10	433	102.58	46.40
	1213	4333	13	333.31	92.94	36.76
	1216	4336	16	271	90.39	34.21
	1220	4340	20	217	88.42	32.24
	1225	4345	25	173.8	86.57	30.39
	1230	4350	30	145	83.84	27.66
	1240	4360	40	109	77.77	21.59
	1253	4373	53	82.51	74.75	18.57
	1300	4380	60	73	73.69	17.51
	1320	4400	80	55	71.54	15.36
	1340	4420	100	44.2	70.09	13.91
	1400	4440	120	37	69.06	12.88
	1430	4470	150	29.8	67.84	11.66
	1500	4500	180	25	67.06	10.88
	1530	4530	210	21.57	66.40	10.22
	1600	4560	240	19	65.89	9.71
	1630	4590	270	17	65.43	9.25
	1700	4620	300	15.4	65.05	8.87
	1731	4651	33.1	14.05	64.68	8.50
	1801	4681	361	12.97	64.41	8.23
	1901	4741	42.1	11.26	63.88	7.70
	2000	4800	480	10	63.44	7.26
	2100	4860	540	9	63.09	6.91
	2200	4920	600	8.2	62.73	6.55
	2301	4981	661	7.54	62.42	6.24

## PUMPING TEST DATA

WELL NO. north well

## TYPE OF PUMPING TEST Constant Q

**PUMPING/RECOVERY DATA**

M.P. FOR WATER LEVELS top of stilling well  
DISTANCE FROM PUMPING WELL.

DISTANCE FROM PUMPING WELL  
LOCATION NW  $\frac{1}{4}$

LOCATION NW  $\frac{1}{4}$ , SEC. 6, T. 20 N., R. 21 E.

PUMPING OBSERVATION WELL

OTHER OBSERVATION WELL(S)

obs. #1, south wall

PUMP ON: DATE 11-9-83 TI

PUMP OFF: DATE 11-7-85 TIME 1200

SEARCHED DATE 11-12-83 INDEXED 1200

## PUMPING TEST DATA

WELL NO. OBS 1

TYPE OF PUMPING TEST CONSTANT-Q  
PUMPING RECOVERY DATA  
M.P. FOR WATER LEVELS T.O.C.  
DISTANCE FROM PUMPING WELL: \_\_\_\_\_  
LOCATION: \_\_\_\_\_

PUMPING OBSERVATION WELL  
OTHER OBSERVATION WELL(S) \_\_\_\_\_  
NO. WELL; SO. WELL \_\_\_\_\_  
PUMP ON: DATE 11/9/85 TIME 1200  
PUMP OFF: DATE \_\_\_\_\_ TIME \_\_\_\_\_

CLOCK TIME	ELAPSED TIME (minutes)		t/t'	WATER LEVEL MEASUREMENT (feet)	PUMPING RATE (gpm)		REMARKS
	t	t'			(S) or s'	Q	
1200	0			71.29	0		
1225	26			71.35	0.06		
1243	43			71.46	0.15		
1303	63			71.67	0.38		
1323	83			71.97	0.68		
1357	117			72.69	1.40		
1434	154			73.50			
1539	219			74.85	2.21		
1610	250			75.41	3.56		
1635	275			75.80	4.51		
1733	323			76.82	5.53		
1804	364			77.26	5.97		
1907	427			78.14	6.85		
2008	488			78.75	7.46		
2107	547			79.38	8.08		
2206	606			79.87	8.58		
2304	664			80.38	9.09		
0003	723			80.82	9.53		11/10/85
0103	783			81.16	9.87		
0204	844			81.55	10.26		
0303	903			81.92	10.63		
0410	970			82.19	10.90		
0505	1025			82.50	11.21		
0603	1083			82.78	11.49		
0703	1143			83.05	11.76		
0803	1203			83.30	12.01		
0903	1263			83.56	12.27		
1003	1323			83.80	12.51		
1103	1383			84.08	12.79		
1203	1443			84.25	12.96		
1403	1563			84.57	13.28		

## PUMPING TEST DATA

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WELL NO. OBS # /

TYPE OF PUMPING TEST Constant Q  
PUMPING RECOVERY DATA  
M.P. FOR WATER LEVELS TOC  
DISTANCE FROM PUMPING WELL  
LOCATION

PUMPING OBSERVATION WELL  
OTHER OBSERVATION WELL(S)

No. 4266, S. W. L.

PUMP ON: DATE 11/9/83 TIME 1200  
PUMP OFF: DATE  TIME

## WILLIAM E. R. INC.

1026 West First Street  
RENO, NEVADA 89503  
(702) 322-2604

JOB \_\_\_\_\_  
SHEET NO. \_\_\_\_\_ OF 2  
CALCULATED BY DCB DATE 12/2/83  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
SCALE \_\_\_\_\_

20 YEARS

$$u = 1.87 r^2 S = 1.87 (2,400 \text{ FT})^2 0.0026 = 4.7 \times 10^{-4} \therefore w(u) = 7.09$$

T t      8,200 GPD/ft (7,305 DAYS)

$$S = \frac{114.6 Q}{T} w(u) = \frac{114.6 (320 \text{ GPM}) 7.09}{8,200 \text{ GPD/ft}} = 36.71 \text{ FT}$$

$$S = \frac{114.6 Q}{T} w(u) = \frac{114.6 (400 \text{ GPM}) 7.09}{8,200 \text{ GPD/ft}} = 39.63 \text{ FT}$$

$$u = 1.87 r^2 S = 1.87 (5,000 \text{ FT})^2 0.0026 = 2.03 \times 10^{-3} \therefore w(u) = 5.64$$

T t      8,200 GPD/ft (7305 DAYS)

$$S = \frac{114.6 Q}{T} w(u) = \frac{114.6 (320 \text{ GPM}) 5.64}{8,200 \text{ GPD/ft}} = 25.22 \text{ FT}$$

$$S = \frac{114.6 Q}{T} w(u) = \frac{114.6 (400 \text{ GPM}) 5.64}{8,200 \text{ GPD/ft}} = 31.52 \text{ FT}$$

## PUMPING TEST DATA

Page 3 of \_\_\_\_\_WELL NO. obs. # 1

TYPE OF PUMPING TEST confined  $Q = 450 \text{ gpm}$   
 PUMPING/RECOVERY DATA  
 M.P. FOR WATER LEVELS T.O.C.  
 DISTANCE FROM PUMPING WELL \_\_\_\_\_  
 LOCATION \_\_\_\_\_

PUMPING/OBSERVATION WELL  
 OTHER OBSERVATION WELL(S)

N. well, S. wellPUMP ON: DATE 11/9/83 TIME 1200PUMP OFF: DATE 11/12/83 TIME 1200

CLOCK TIME	ELAPSED TIME (minutes)		t/t'	WATER LEVEL MEASUREMENT (feet)		PUMPING RATE (gpm)		REMARKS
	t	t'		71.29	s. or s'	—	Q	
1200	4320	0	—	90.45	19.16	—	—	
1208	4328	8	541	90.45	19.16	—	—	pump shut in 1200 11/12/83
1227	4347	27	161	90.49	19.20	—	—	
1245	4365	45	97	90.28	18.99	—	—	
1305	4385	65	67.46	90.01	18.72	—	—	
1330	4410	90	49	89.64	18.35	—	—	
1345	4425	105	42.14	89.36	18.07	—	—	
1415	4455	135	33	88.85	17.56	—	—	
1503	4503	183	24.61	88.09	16.80	—	—	
1533	4533	213	21.28	87.64	16.35	—	—	
1603	4563	243	18.78	87.26	15.97	—	—	
1632	4592	272	16.88	86.89	15.60	—	—	
1702	4622	302	15.30	86.55	15.26	—	—	
1734	4654	334	13.93	86.14	14.85	—	—	
1803	4683	363	12.90	85.94	14.65	—	—	
1903	4743	423	11.21	85.39	14.10	—	—	
2002	4802	482	9.96	84.95	13.66	—	—	28.7 % recovery
2102	4862	542	8.97	84.52	13.23	—	—	
2203	4923	603	8.16	84.08	12.79	—	—	
2303	4983	663	7.52	83.74	12.45	—	—	
0002	5042	722	6.98	83.33	12.04	—	—	37.2 % recovery
0100	5100	780	6.54	83.09	11.80	—	—	
0201	5161	841	6.14	82.83	11.54	—	—	
0304	5224	904	5.78	82.54	11.25	—	—	
0402	5282	962	5.49	82.22	10.93	—	—	43 % recovery
0503	5343	1023	5.22	82.02	10.73	—	—	
0602	5402	1082	4.99	81.78	10.49	—	—	
0703	5463	1143	4.78	81.56	10.27	—	—	
0802	5522	1202	4.59	81.33	10.04	—	—	
0901	5581	1261	4.43	81.15	9.86	—	—	49 % recovery

Project No.

83-377

## PUMPING TEST DATA

Page 4 of 1

WELL NO. obs. # 1

TYPE OF PUMPING TEST constant Q - 450 gpm  
PUMPING RECOVERY DATA  
M.P. FOR WATER LEVELS T.O.C.  
DISTANCE FROM PUMPING WELL \_\_\_\_\_  
LOCATION \_\_\_\_\_

PUMPING/OBSERVATION WELL  
OTHER OBSERVATION WELL(S)

K. will is well

PUMP ON: DATE 4/6/03 RT

PUMP ON: DATE 1/9/83 TIME 1200  
PUMP OFF: DATE 1/10/83 TIME 1100

PUMP OFF: DATE 11/12/83 TIME 1200

## PUMPING TEST DATA

WEIGHT NO.

TYPE OF PUMPING TEST CLOSED BOREHOLE  
PUMPING/RECOVERY DATA  
M.P. FOR WATER LEVELS 1000 ft. above sea level  
DISTANCE FROM PUMPING WELL 1000 ft.  
LOCATION Mt. G. T. H. I. E.

PUMPING/OBSERVATION WELL  
OTHER OBSERVATION WELL(S) 1

PUMP ON: DATE 1/19/83 TIME 1200  
PUMP OFF: DATE  TIME

## PUMPING TEST DATA

WELL NO. South well

TYPE OF PUMPING TEST constant Q  
 PUMPING/RECOVERY DATA  
 M.P. FOR WATER LEVELS 50.0 in 10 sec.  
 DISTANCE FROM PUMPING WELL  
 LOCATION nw 1/4, sec. 6 T10N, R21E

PUMPING OBSERVATION WELL  
 OTHER OBSERVATION WELL(S) N.  
well 1; obs # 1  
 PUMP ON: DATE 11/9/83 TIME 1200  
 PUMP OFF: DATE 11/12/83 TIME 1200

CLOCK TIME	ELAPSED TIME (minutes)		t/t'	WATER LEVEL MEASUREMENT (feet)		PUMPING RATE (gpm)	REMARKS
	t	t'		41.10	s. or (s')		
11/12/83	1200	4320	0	∞	—	—	pump off 1200
	1210	4330	10	41.51	.41		downward trend made by DCB
	1230	4350	30	41.51	.41		
	1247	4367	47	41.30	.20		
	1310	4390	70	41.34	.24		
	1333	4413	93	41.32	.22		
	1350	4430	110	41.33	.23		
	1420	4460	140	41.32	.22		
	1509	4509	189	41.29	.19		sounder line frayed in a bent 2 spots
	1540	4540	220	41.39	.29		line frayed, raining, windy
	1607	4567	247	41.29	.17		windy
	1637	4597	277	41.30	.20		
	1705	4625	305	41.27	.17		
	1737	4657	337	41.25	.15		
	1806	4686	366	41.27	.17		
	1906	4746	426	41.35	.25		
	2005	4805	485	41.30	.20		
	2105	4865	545	41.29	.19		
	2206	4926	606	41.30	.20		
	2306	4986	666	41.30	.20		
11-13-83	0005	5045	725	41.27	.17		
	0106	5106	786	41.49	.39		Decided to change probe on this reading to see if there is a difference
	0204	5164	844	41.50	.40		
	0307	5227	907	41.48	.38		
	0405	5285	965	41.48	.38		
	0507	5347	1027	41.45	.35		
	0606	5406	1086	41.43	.33		
	0707	5467	1147	41.41	.31		
	0806	5526	1206	41.38	.28		
	0905	5585	1265	41.37	.27		

WELL NO. south well

TYPE OF PUMPING TEST constant Q  
PUMPING/RECOVERY DATA  
M.P. FOR WATER LEVELS shift in 10" csg.  
DISTANCE FROM PUMPING WELL \_\_\_\_\_  
LOCATION sec 1/4, sec 6, T 20 N, R 21 E

PUMPING/OBSERVATION WELL

**OTHER OBSERVATION WELL(S)**

N. well; obs. # 1

PUMP ON: DATE 11/9/83 TIME 1200

PUMP OFF: DATE 11/12/83 TIME 1200

## PUMPING TEST DATA

WELL NO. SOUTH WELL

TYPE OF PUMPING TEST

PUMPING RECOVERY DATA

M.P. FOR WATER LEVELS

TOP OF STILLING WELL  
DISTANCE FROM PUMPING WELL.

LOCATION

PUMPING OBSERVATION WELL  
OTHER OBSERVATION WELL(S)OBSERVATION #1. NORTH WELL  
PUMP ON: DATE 11/19/83 TIME 1320  
PUMP OFF: DATE \_\_\_\_\_ TIME \_\_\_\_\_

CLOCK TIME	ELAPSED TIME (minutes)	t/t'	WATER LEVEL MEASUREMENT (feet)	PUMPING RATE (gpm)	REMARKS	
					(S) or S'	INCHES
t	t'					Q
1300	0		42.00	0		
1301	1		81.44	37.44	14 1/4	350
1302	3		112.71	72.71	"	"
1305	5		131.73	84.73	"	"
1307	7		145.77	102.77	"	"
1310	10		162.47	129.47	1"	"
1313	13		176.30	154.30	15 1/4	350.4
1316	16		184.83	142.83	14 3/4	347.7
1320	20		194.25	152.25	14 1/4	350
1325	25		205.27	163.27	15	350.7
1332	30		215.28	173.28	15 3/4	353.8
1340	40		224.27	182.27	14 1/2	344.8
1350	50		233.11	191.11	15	350.7
1428	60		237.89	177.89	14 1/4	347.7
1420	70		250.89	207.89	14 1/4	"
1440	100		257.53	213.53	15	350.7
1500	120		263.14	221.14	15	"
1530	130		267.57	225.57	15	"
1600	180		269.48	227.48	14 1/4	350
1630	210		271.86	229.86	15	350.7
1700	240		273.15	231.15	15	350.7
1730	270		275.62	231.62	14 1/4	350
1800	300		274.65	232.65	14 3/8	349
1830	330		275.96	233.96	15	350.7
1900	360		276.70	234.70	14 1/4	350
2000	420		277.70	235.70	14 1/4	350
2058	480		277.83	235.83	14 3/4	347.7
2158	540		277.87	235.87	15	350.7
2300	600		277.84	235.84	15	350.7
0010	660		277.82	235.82	15	350.7
0100	710		277.84	235.84	15	350.7

T=18.0°C, E.C.=285 MMHO/CM, pH=7.08  
NO SAND OR SILT IN DISCHARGE

1300 RPM, 180°F, 50 PSIG

1300 RPM, 180°F, 50 PSIG

T=17.9; EC=299; pH=7.07

increased RPM to 1520 (14.5" to 15")  
50 PSI 180°50 PSI 180° 1520 RPM  
T=17.9; EC=263; pH=6.99

11-19-83

WILLIAM E. NORK, INC.

TYPE OF PUMPING TEST CONSTANT Q  
PUMPING/RECOVERY DATA  
M.P. FOR WATER LEVELS Top of Stillings Well  
DISTANCE FROM PUMPING WELL —  
LOCATION

WELL NO. SOUTH WELL

~~PUMPING~~ OBSERVATION WELL  
OTHER OBSERVATION WELL(S)

OBSERVATION WELL #1, NORTH WELL  
PUMP ON: DATE 11/18/83 TIME 1300  
PUMP OFF: DATE 11-20-83 TIME 1300

Project No. 83-3

## PUMPING TEST DATA.

Page / of

WELL NO. South Well

**TYPE OF PUMPING TEST**      *Constant*      *Q*

### PUMPING/RECOVERY DATA

M.P. FOR WATER LEVELS Top of Stilling Well  
DISTANCE FROM PUMPING WELL —

**LOCATION** FRUITLAND, WEEZ

PUMPING/OBSERVATION WELL

OTHER OBSERVATION WELL(S)

Obs. well #1, North Well

PUMP ON: DATE 11-18-83 TIME 1300

PUMP OFF: DATE 11-20-87 TIME 13:00

CLOCK TIME	ELAPSED TIME (minutes)		t/t'	WATER LEVEL MEASUREMENT (feet)		PUMPING RATE (gpm)		REMARKS
	t	t'		(42.00)	s. or $\frac{s}{s}$	Q		
1300	2880	0	∞	290.49	248.49			
1301	2881	1	2881	267.34	225.34			
1302	2882	2	1153	260.55	218.55			
1303	2883	3	823.86	258.39	216.39			
1305	2885	5	577	253.95	211.95			
1307	2887	7	412.43	247.54	205.54			
1310	2890	10	289	236.49	194.49			
1313	2893	13	222.54	222.58	180.58			
1316	2896	16	181	203.16	161.16			
1320	2900	20	145	178.41	136.41			
1325	2905	25	116.2	147.53	105.53			
1330	2910	30	97	125.91	83.91			
1335	2915	35	83.29	109.80	67.80			
1340	2920	40	73	98.39	56.39			
1350	2930	50	58.6	82.66	40.66			
1400	2940	60	49	73.30	31.30			Showing.
1420	2960	80	37	62.61	20.61			
1440	2980	100	29.8	57.36	15.36			Still showing.
1500	3000	120	25	53.96	11.96			95.2% recovered a.t.t.
1530	3030	150	20.2	51.08	9.08			
1600	3060	180	17	49.34	7.34			
1630	3090	210	14.71	48.15	6.15			
1700	3120	240	13	47.22	5.22			
1730	3150	270	11.67	46.70	4.70			
1800	3180	300	10.6	46.24	4.24			
1900	3240	360	9	45.55	3.55			98.6% recovered.
1110	4130	1340	3.1	43.02	1.02			" 1/21/80

## PUMPING TEST DATA

Page 1 of

WELL NO. OBSERVATION #

TYPE OF PUMPING TEST CONSTANT-Q

PUMPING/RECOVERY DATA

M.P. FOR WATER LEVELS T28 F GAGE

DISTANCE FROM PUMPING WELL,

LOCATION

PUMPING/OBSERVATION WELL

OTHER OBSERVATION WELL(S)

NORTH WELL WITH WELL

PUMP ON: DATE 11/16/83 TIME 1300

PUMP OFF: DATE TIME

CLOCK TIME	ELAPSED TIME (minutes)	t/t'	WATER LEVEL MEASUREMENT (feet)	PUMPING RATE (gpm)		REMARKS
				t	s or s'	
11/18/83 1220	-40		75.37			
1335	35		75.35			
1404	64		75.35			
1427	87		75.34			
1504	124		75.32			
1604	184		75.36			
1708	218 - 248		75.35			
1810	310	340	75.31			
1905	335	375	75.32			
2023	443		75.19			
2102	482		75.23			
2206	546		75.22			
2305	605		75.22			
11/19/83 0005	665		75.22			
0105	725		75.17			
0205	785		75.12			
0305	845		75.12			
0405	905		75.10			
0505	965		75.08			
0607	1027		75.05			
0704	1084		75.03			
0805	1145		75.01			
0905	1205		75.00			
1012	1272		75.04			
1150	1370		74.96			
1335	1475		74.90			
1503	1563		74.87			
1704	1684		74.74			
1908	1808		74.82			
2105	1925		74.74			
2303	2043		74.72			wind picking up, slight sprinkle

## PUMPING TEST DATA

Page 1 OF

WELL NO. NORTH WELL

TYPE OF PUMPING TEST CONSTANT-Q  
PUMPING RECOVERY DATA  
M.P. FOR WATER LEVELS TOP OF STILLING WELL  
DISTANCE FROM PUMPING WELL  
LOCATION

PUMPING OBSERVATION WELL  
OTHER OBSERVATION WELL(S)

OBSERVATION, SOUTH WELL  
PUMP ON: DATE 11/19/83 TIME 1300  
PUMP OFF: DATE  TIME

CLOCK TIME	ELAPSED TIME (minutes)	t/t'	WATER LEVEL, MEASUREMENT (feet)	PUMPING RATE (gpm)		REMARKS
				(S) or s'	Q	
11/18/83	1228	-32	57.22			
	1337	38	57.19			
	1407	68	57.34			
	1429	89	57.29			
	1506	126	57.26			
	1608	188	57.26			
	1712	222	57.35			
	1805	305	57.32			
	1910	340	57.37			
	2027	447	57.35			
	2107	487	57.42			
	2210	550	57.43			
	2308	608	57.41			
11/18/83	0001	661	57.38			
11/19/83	0109	729	57.31			
	0210	790	57.31			
	0308	848	57.31			NEEDLE OF SCOPE STICKING A LITTLE TRY TO REPRODUCE EXACT READING
	0411	911	57.32			
	0509	969	57.22			NEEDLE STICKING
	0611	1031	57.23			
	0707	1087	57.28			
	0808	1148	57.26			
	0908	1208	57.31			pulled probe out & cleaned; dropped probe back in and listened for "plop" if H2O level.
	1014	1274	57.17			
	1155	1375	57.13			
	1337	1477	57.09			
	1505	1565	57.07			
	1706	1686	57.02			
	1910	1810	57.10			
	2110	1930	57.16			
11/19/83	2308	2048	57.15			

Project No. 83-3

## PUMPING TEST DATA

Page 2 of 2

WELL NO. obs. # 1

TYPE OF PUMPING TEST constant Q - 350 gpm  
PUMPING/RECOVERY DATA

## PUMPING/RECOVERY DATA

M. P. FOR WATER LEVEL

TABLE FOR WATER LEVEL DISTANCE FROM BUMPS

DISTANCE FROM PUMPING WELL  
LOCATION

**LOCATION**

PUMPING / OBSERVATION WELL

OTHER OBSERVATION WELL(S)

St. MEL'S. S. A. 15

W. WEEI, S. WEER  
PUMP ON: DATE: 11/18/02

PUMP ON: DATE 11/18/83 TIME 1300  
PUMP OFF: DATE \_\_\_\_\_ TIME \_\_\_\_\_

PUMP OFF: DATE \_\_\_\_\_ TIME \_\_\_\_\_

Project No. 83-31

## PUMPING TEST DATA

Page 2 of

WELL NO. north well

TYPE OF PUMPING TEST Constant Q - 3500 gpm

(PUMPING) RECOVERY DATA

M.P. FOR WATER LEVELS top of siphoning well  
DISTANCE FROM PUMPING WELL

DISTANCE FROM PUMPING WELL  
LOCATION

**LOCATION**

PUMPING/OBSERVATION WELL

OTHER OBSERVATION WELL(S)

obs. #1 1 8/11/11

PUMP ON: DATE 11/18/93 TIME 1200

PUMP OFF: DATE 11/18/83 TIME

WILLIAM E. R. INC.  
1026 West First Street  
RENO, NEVADA 89503  
(702) 322-2604

JOB \_\_\_\_\_  
SHEET NO. \_\_\_\_\_ OF 2  
CALCULATED BY DCB DATE 12/2/83  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
SCALE \_\_\_\_\_

CALCULATIONS IN SUPPORT OF PREDICTED DRAWDOWN

$$T = 8,200 \text{ GPD/ft}$$

$$S = 0.0026$$

1 YEAR

$$\frac{u}{T} = \frac{1.87 r^2 S}{8,200 \text{ GPD/ft}} = \frac{1.87 (2,400 \text{ FT})^2 0.0026}{8,200 \text{ GPD/ft} (365 \text{ DAYS})} = 0.01 \therefore w(u) = 4.03$$

$$\frac{s}{T} = \frac{114.6 Q}{8,200 \text{ GPD/ft}} = \frac{114.6 (320 \text{ GPM}) 4.03}{8,200 \text{ GPD/ft}} = 18.02 \text{ FT}$$

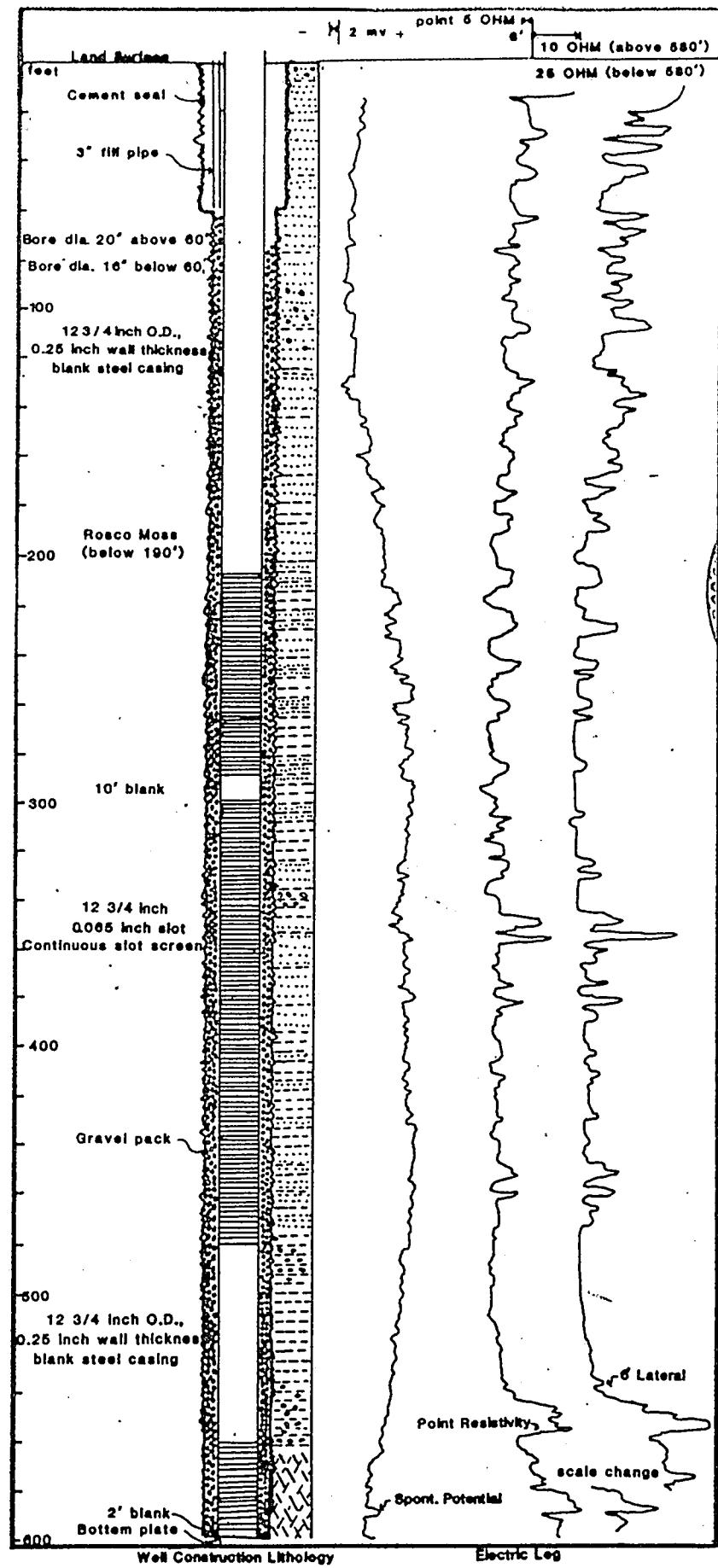
$$\frac{s}{T} = \frac{114.6 Q}{8,200 \text{ GPD/ft}} = \frac{114.6 (400 \text{ GPM}) 4.03}{8,200 \text{ GPD/ft}} = 22.53 \text{ FT}$$

$$\frac{u}{T} = \frac{1.87 r^2 S}{8,200 \text{ GPD/ft}} = \frac{1.87 (5,000 \text{ FT})^2 0.0026}{8,200 \text{ GPD/ft} (365 \text{ DAYS})} = 0.04 \therefore w(u) = 2.68$$

$$\frac{s}{T} = \frac{114.6 Q}{8,200 \text{ GPD/ft}} = \frac{114.6 (320 \text{ GPM}) 2.68}{8,200 \text{ GPD/ft}} = 11.99 \text{ FT}$$

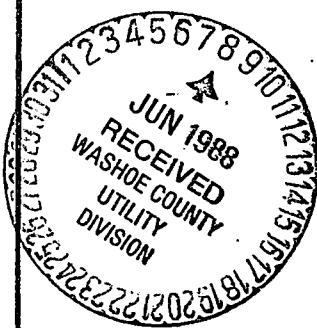
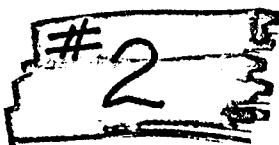
$$\frac{s}{T} = \frac{114.6 Q}{8,200 \text{ GPD/ft}} = \frac{114.6 (400 \text{ GPM}) 2.68}{8,200 \text{ GPD/ft}} = 14.98 \text{ FT}$$

"New" North well @ Countryside Estates



"1988"

Replaced Sand pumping  
well in Sec 6  
T 20N R 21E.



Pump rate: 1000 gpm 2/12/88  
Pump rate: 1000 gpm 2/14/88

00-7-1 Brookside - Savings North Well  
Step-Down Test  
K-E SEMI-LOGARITHMIC 4 CYCLES X 70 DIVISIONS  
KEUFFEL & ESSER CO. MADE IN U.S.A.

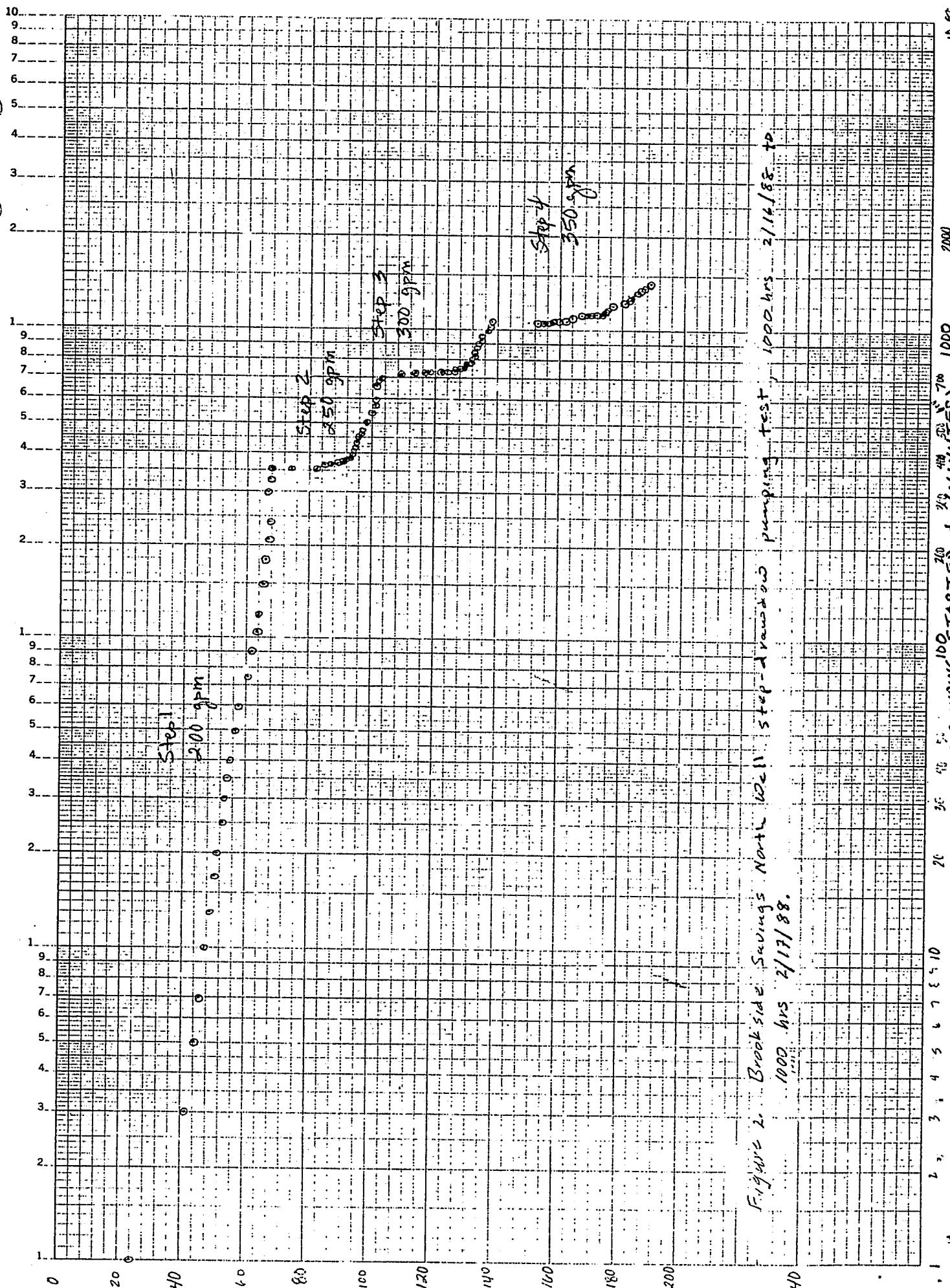


Figure 2. Brookside Savings North Well step-down pumping test 1000 hrs 2/16/88 to 2/17/88.

**WILLIAM E. NORK, INC.**  
 1026 West First Street  
 RENO, NEVADA 89503  
 (702) 322-2604

JOB 88-437  
 SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_  
 CALCULATED BY DCR DATE 2/18/88  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 SCALE \_\_\_\_\_

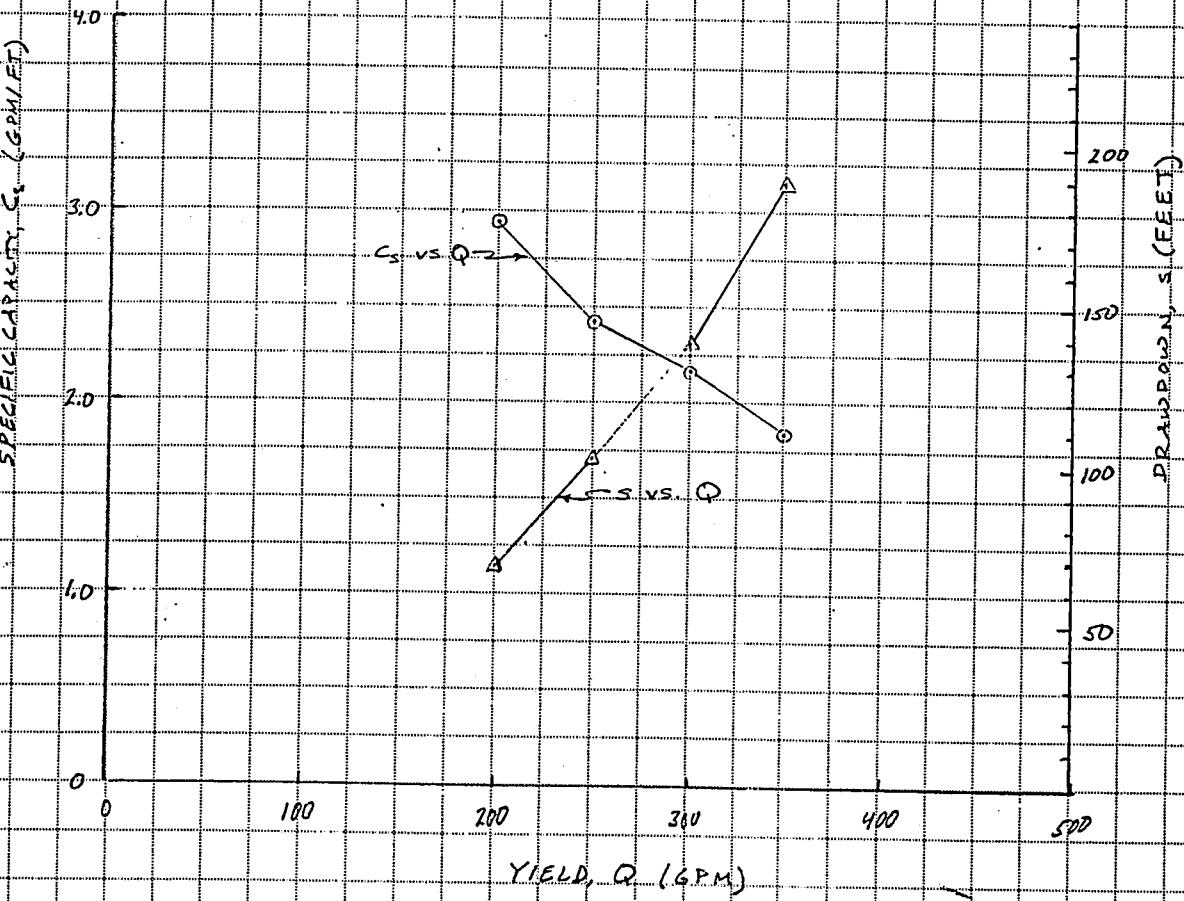


Figure 3. Specific capacity and drawdown versus well yield, Brooksia  
 North Well step-drawdown pumping test, 1000 hrs. 2/16/88 to  
 1000 hrs 2/17/88

**WILLIAM E. NORK, INC.**  
 1026 West First Street  
 RENO, NEVADA 89503  
 (702) 322-2604

JOB 25-457  
 SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_  
 CALCULATED BY DCR DATE 3/17-18/88  
 CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 SCALE \_\_\_\_\_

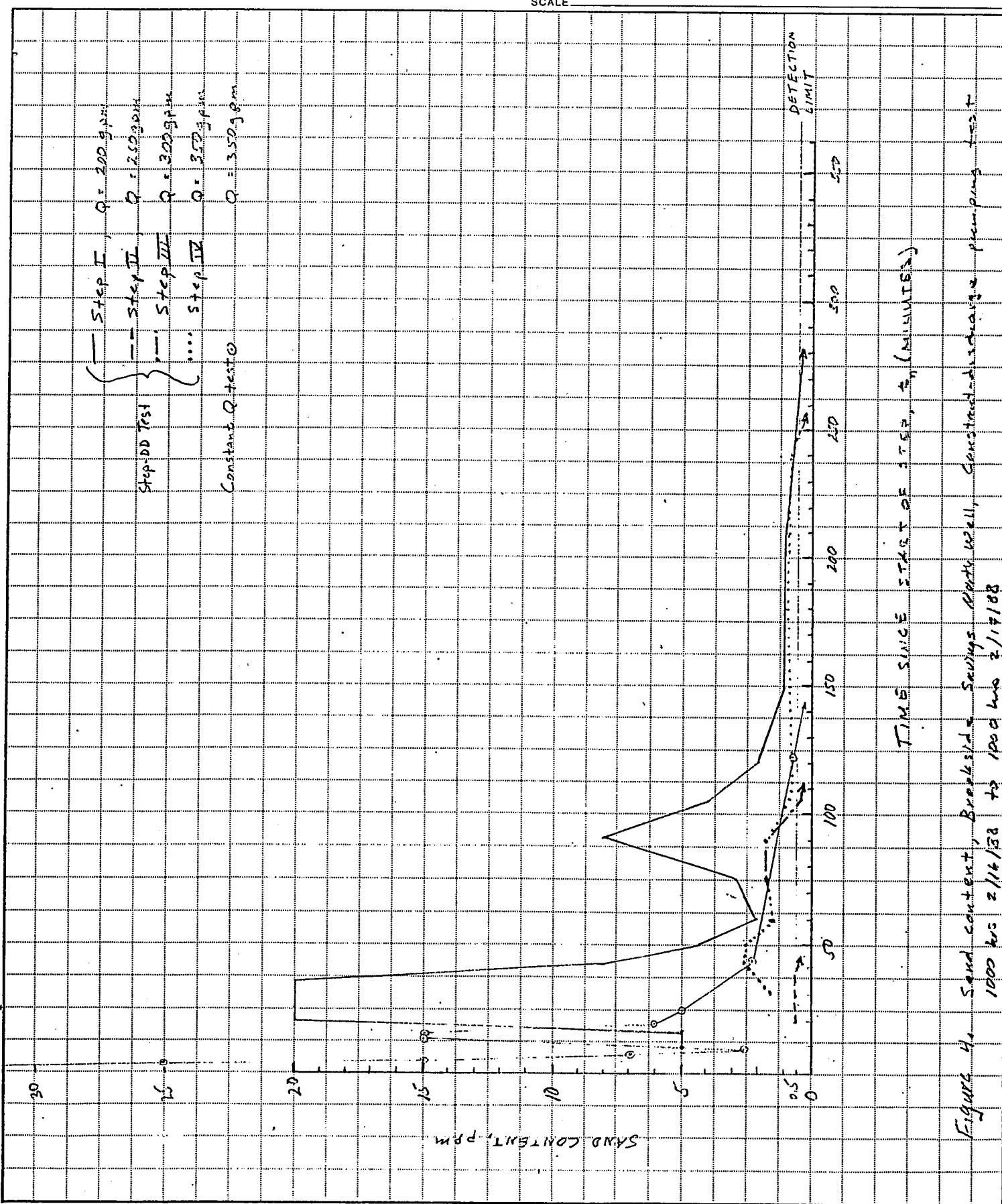


Figure 4. Sand content, Boulders Savings County well, densitometer change pumping test  
 1000 hrs 2/16/88 to 1000 hrs 2/17/88

## **WILLIAM E. NORK, INC.**

1026 West First Street  
RENO, NEVADA 89503  
(702) 322-2604

JOB 68-437  
SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_  
CALCULATED BY D.C.R. DATE 2/17/88  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
SCALE \_\_\_\_\_

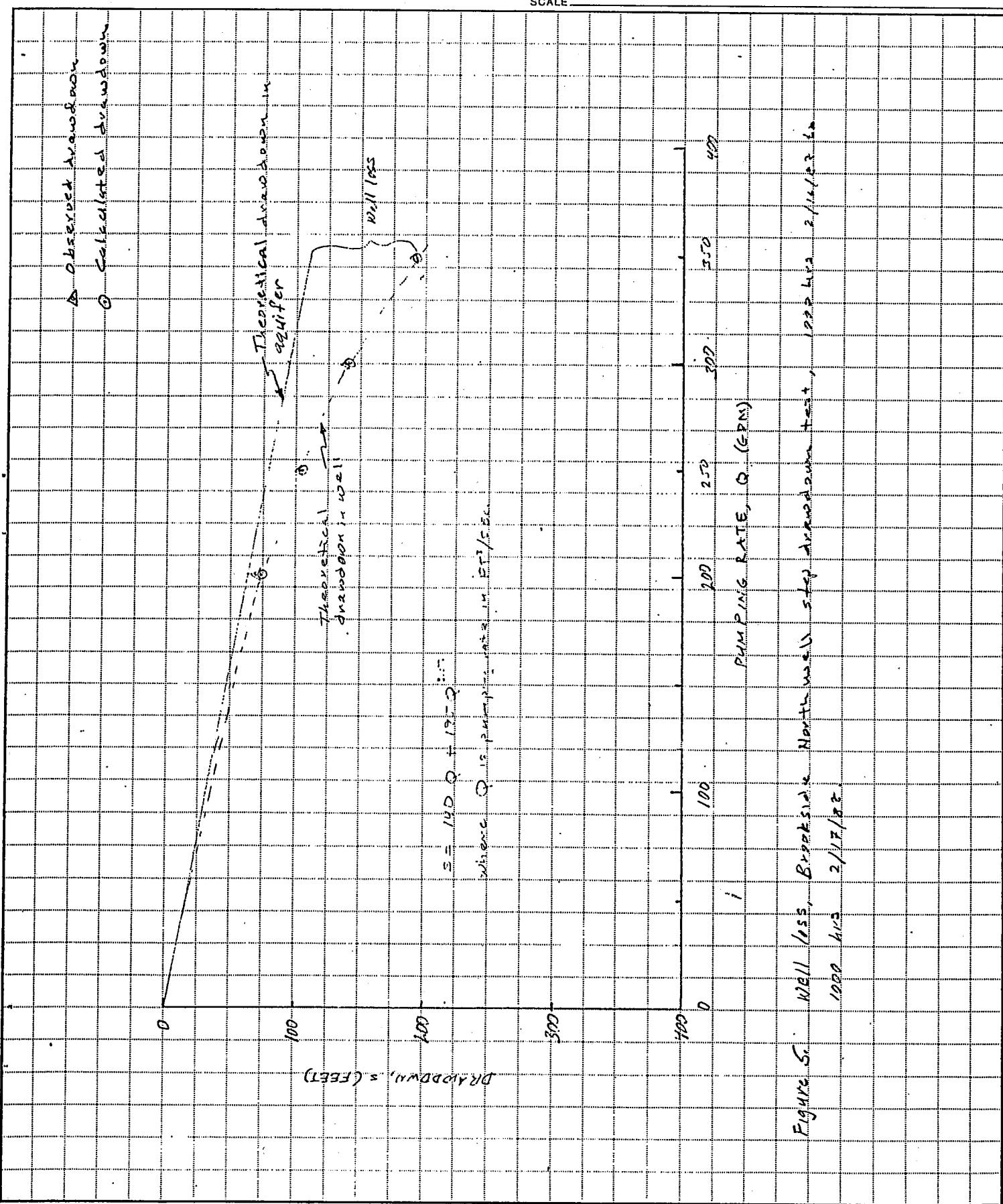


Figure 5. 10/21/1955, Brookside Northwell stage dredge test, 1922-672-214-23-62

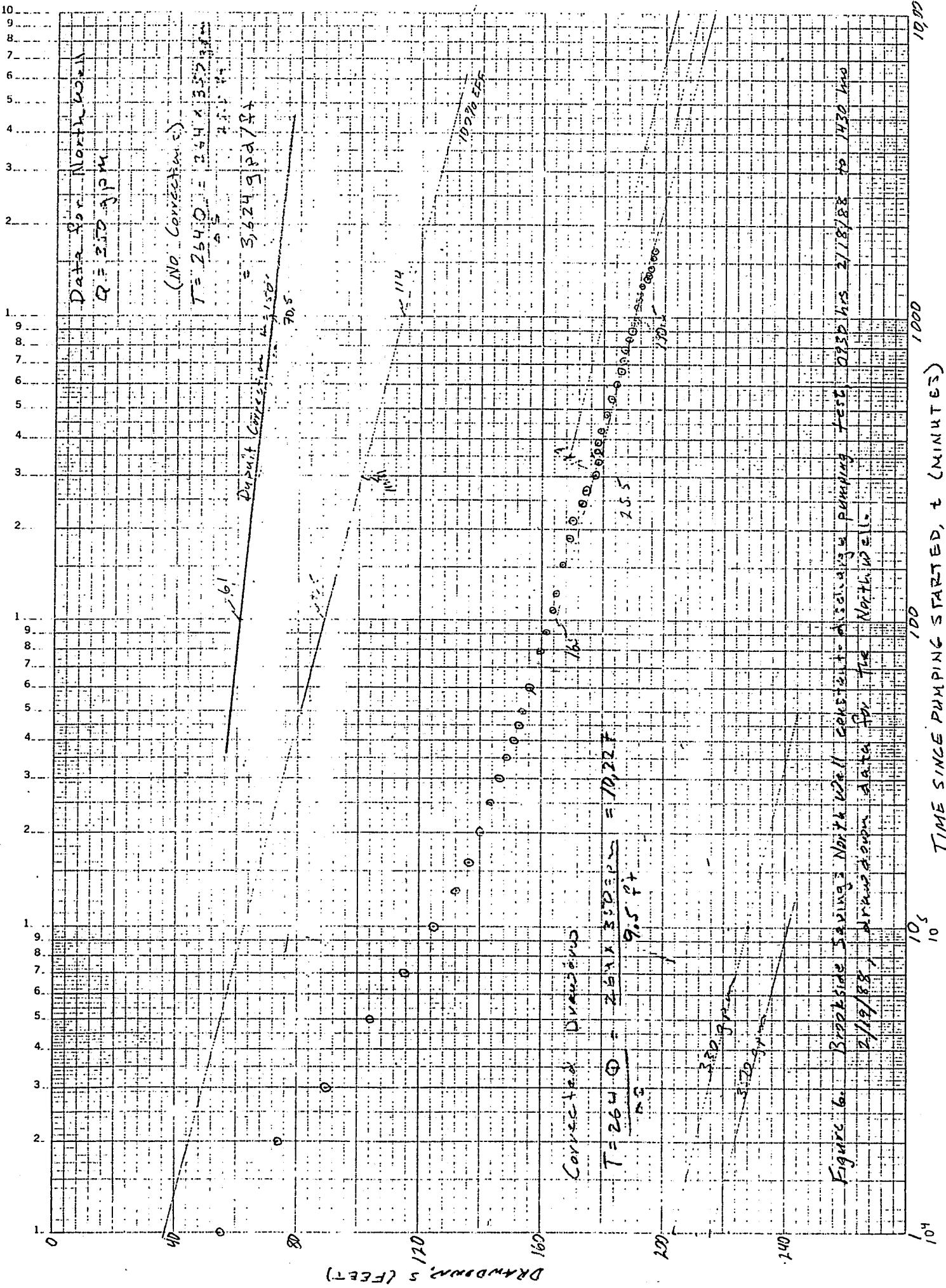


Figure 6. Borehole drawdown data for the North Well. The data were taken during a pumping test on 2/19/88, drawn down 320 feet for 1000 minutes.

10<sup>4</sup>

10<sup>3</sup>

10<sup>2</sup>

10<sup>1</sup>

10<sup>0</sup>

WILLIAM E. NOR INC.  
1026 West First Street  
RENO, NEVADA 89503  
(702) 322-2604

JOB 5-1-1  
SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_  
CALCULATED BY DC-B DATE \_\_\_\_\_  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
SCALE \_\_\_\_\_

TO FILE

FROM: DCB

RE: DRAFT CORRECTIONS

$$S^* = S - (S^2 / 2m)$$

(ref: Jacob, 1944)

$S^*$  - drawdown that would occur in an equivalent non-leaky artesian aquifer (feet)

$S$  - observed drawdown under water-table conditions (feet)

$m$  - initial saturated thickness (feet)

$t = 100$  minutes drawdown = 86.5 ft (assuming 100% G.P.F.)

$t = 1,000$  minutes drawdown = 114 ft. " " "

Assume aquifer thickness = 150 ft (found by trial & error AND comparison w/  
E-log)

$$S_{100}^* = 86.5 \text{ ft} - [(86.5 \text{ ft})^2 / 2(150 \text{ ft})] = 61.6 \text{ ft}$$

$$S_{1000}^* = 114 \text{ ft} - [(114 \text{ ft})^2 / 2(150 \text{ ft})] = 70.7 \text{ ft}$$

Note - refer to top line of Figure 6 - Brookside North Well Report

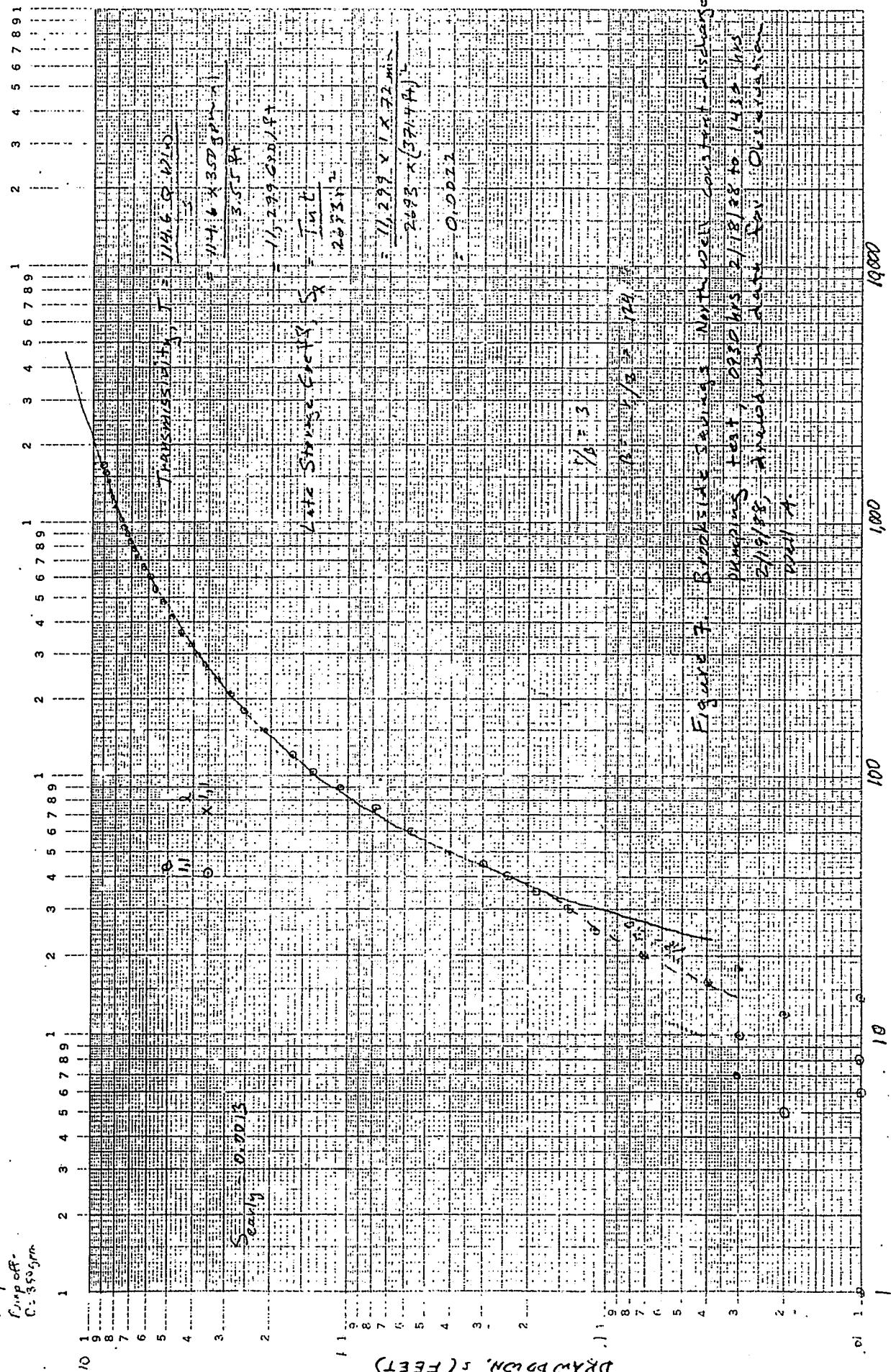
88-439 Brackide North Well constant-Q test

Pump on: 0638 2-18-88

Pump off:

C: 350 gpm

Observer with A

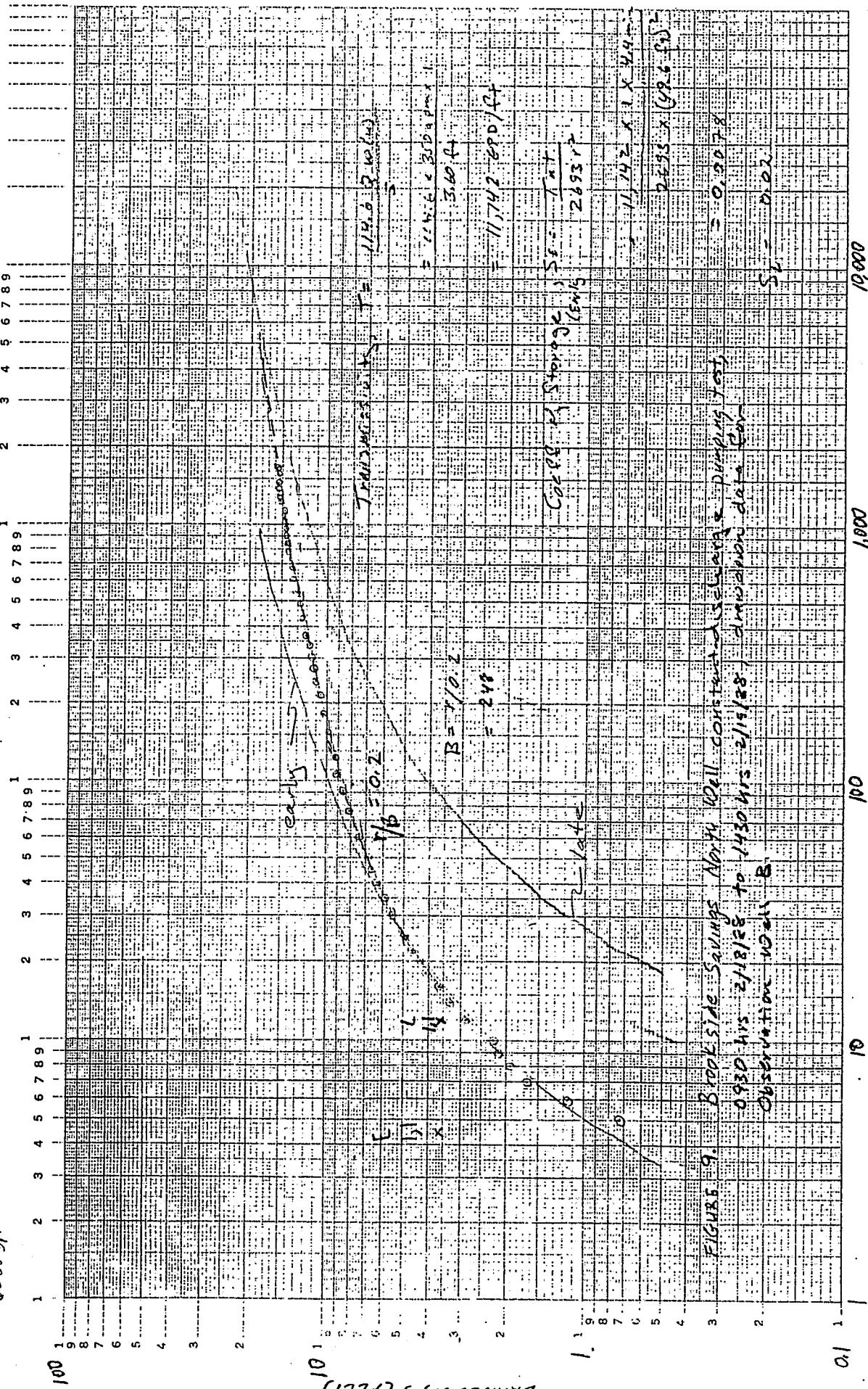




88-433 Brantle No. 11 Constant-Q test

2-18-88  
093-01181

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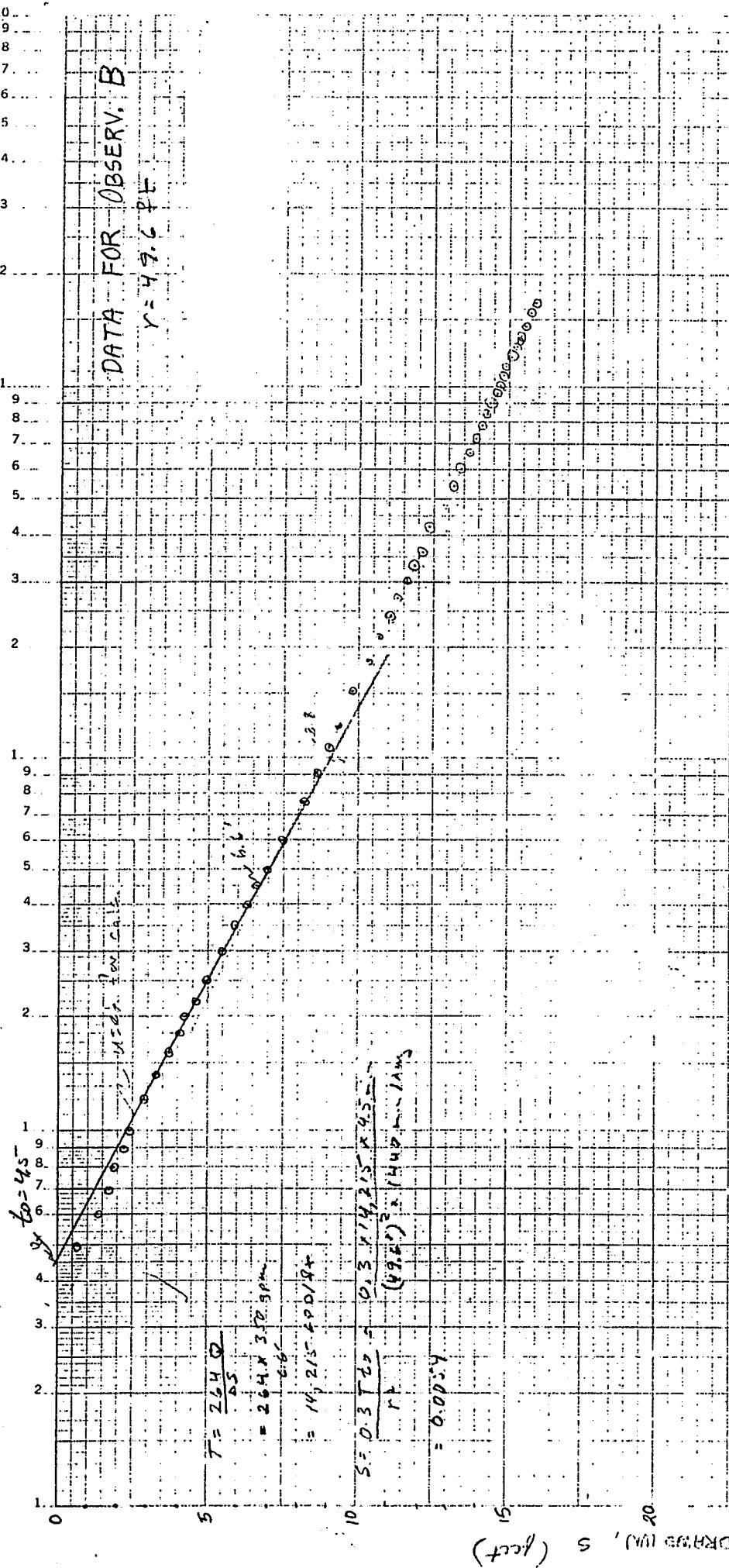
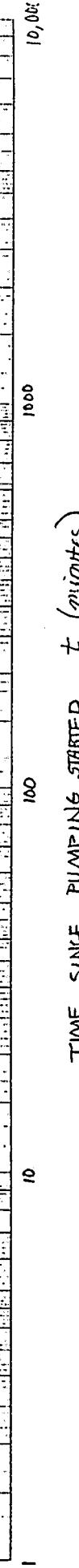


Figure 10 Brookside Sawmill well constant discharge pumping test, 0936 hrs 27/2/83 to 1/19/82, discharge date 2/21/82. Description 4211 B



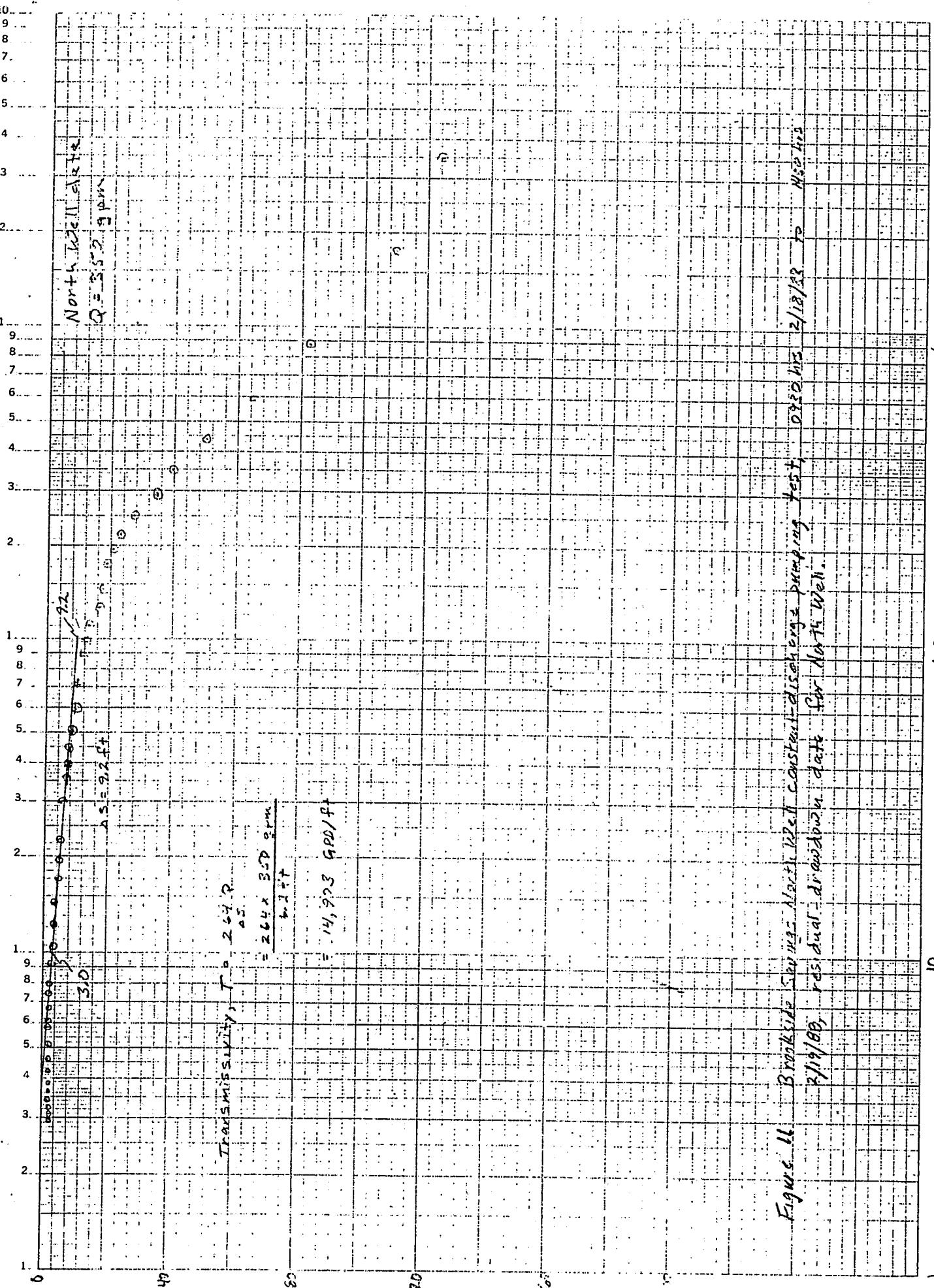


Figure 11. Broadsides using North Texas constant discharge pump test, 0200 hrs 2/17/68 at North Texas Well.

$\frac{1}{2} t$ , TIME SINCE PUMPING STOPPED  
100

RECOVERY DATA FOR  
OBSERVATION WELL A

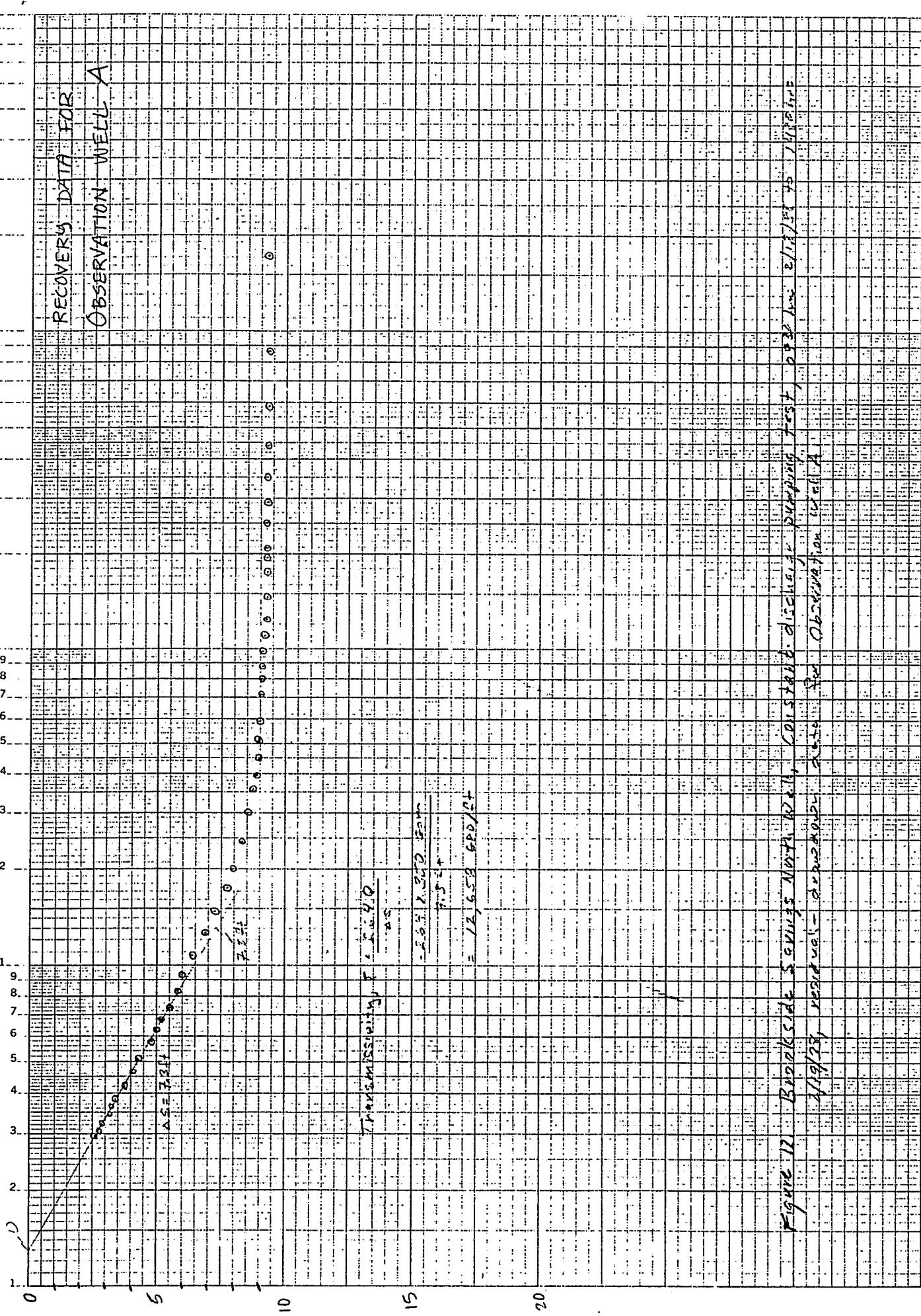


Figure 11: Block side scaling notes, 10/27, 1933. Recovery Data for Observation Well A

$t/t'$  (TIME SINCE PUMPING STOPPED)

1000

10

▼ 00-721 Constant D Test - Recovery  
K+E SEMI-LOGARITHMIC 4 CYCLES X 70 DIVISIONS  
KEUFFEL & ESSER CO. MADE IN U.S.A.

Temp on: 07-00 at 07:50  
Pump off: 2-19-88 at 14:30  
46.6010

RECOVERY DATA FOR  
OBSERVATION WELL B

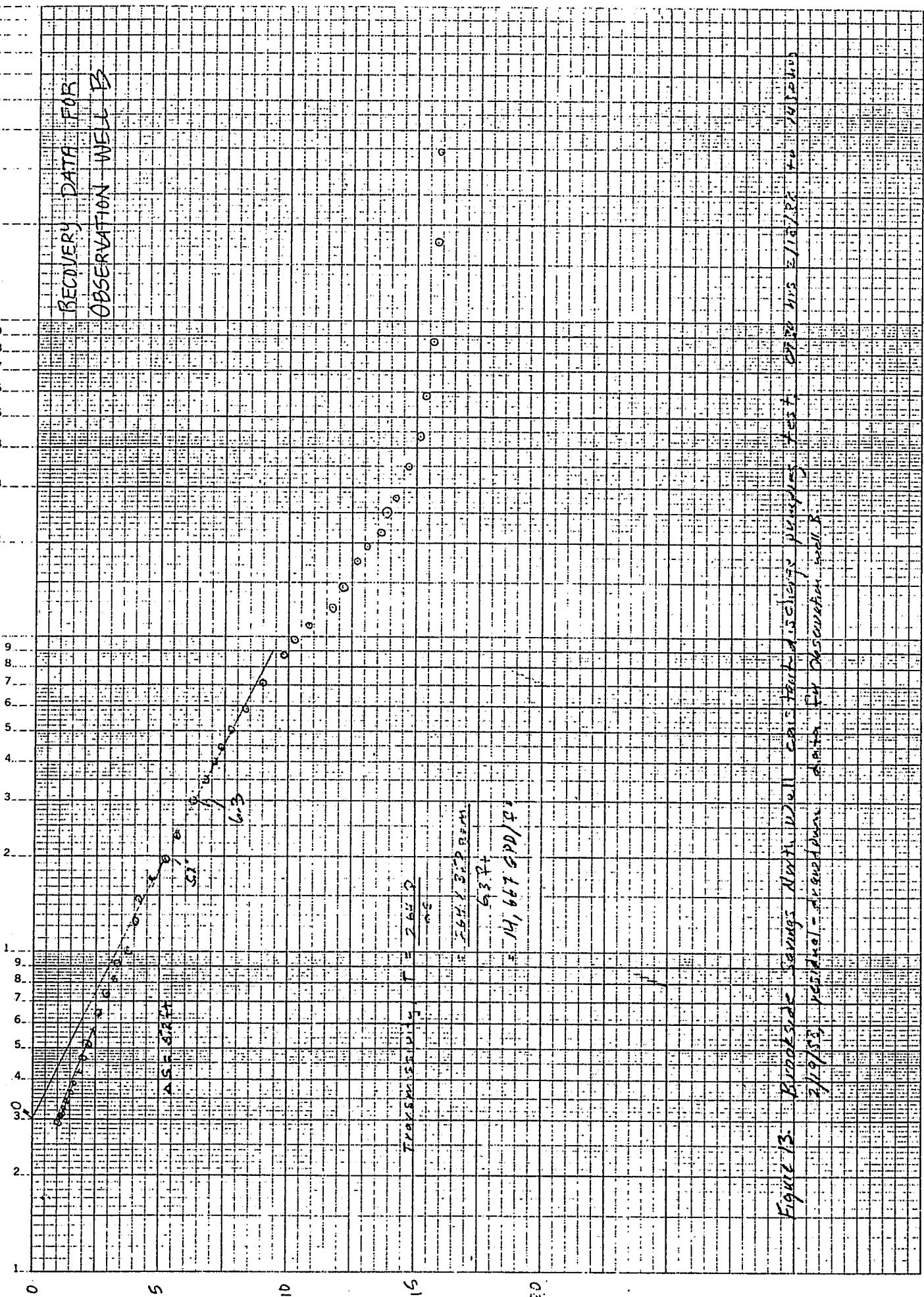


Figure 13. Recovery data for Observation Well B. The graph shows percent recovery versus time since pumping stopped. The data points are plotted as open circles, and a smooth curve is drawn through them. The curve starts at approximately 10% at 0 hours, rises to a peak of about 60% at 6 hours, and then gradually declines towards 100% recovery by 20 hours. A vertical line is drawn at 6.3 hours, and a horizontal line is drawn at 65% recovery. The intersection point is marked with a cross. Handwritten notes near the bottom right of the plot area include  $T = 6.3 / 3.2 R = 65$ , 6.3 ft, and 14,667 GPD/ft.

$t/11$  (Time since pumping started)  $\div$  Time since pumping stopped  
1000

DEPTH TO WATER (feet below land surface); ESTIMATED TRANSMISSIVITY

TRANSECT FOR GEOLOGIC CROSS-SECTION

A

64'

T = 22,000 GPD/ft  
pump test 12/77 (TIC)

52'

T = 6400 GPD/ft  
pump test 7/86 (DRAGAN)

37'

T = 26,000 GPD/ft  
pump test 8/86 (DRAGAN)

26'

T = 64,000 GPD/ft  
pump test 1/84 (MAHIN)

56'

T = 12,000 GPD/ft  
pump test 2/84 (MAHIN)

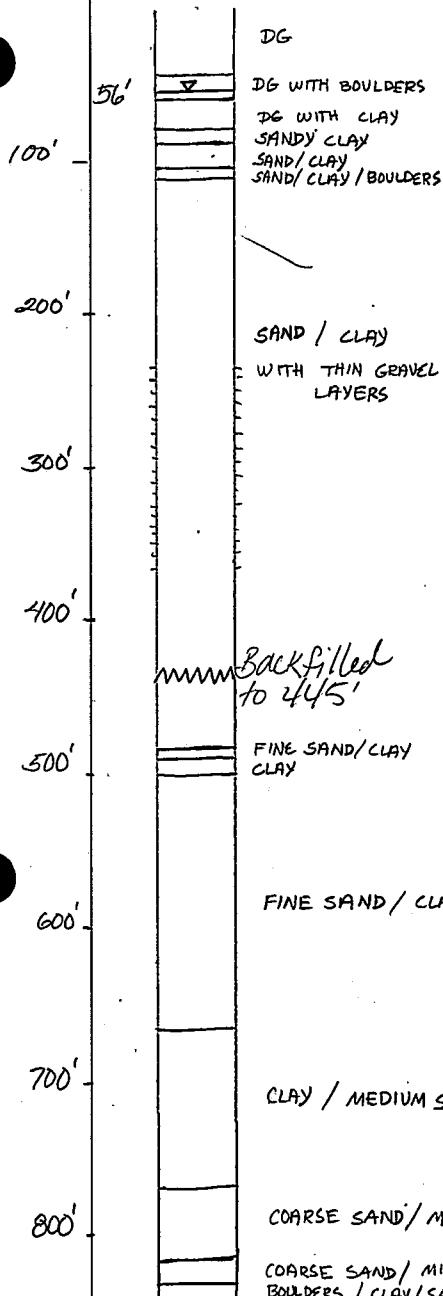
A

## WASHOE COUNTY DEPARTMENT OF PUBLIC WORKS

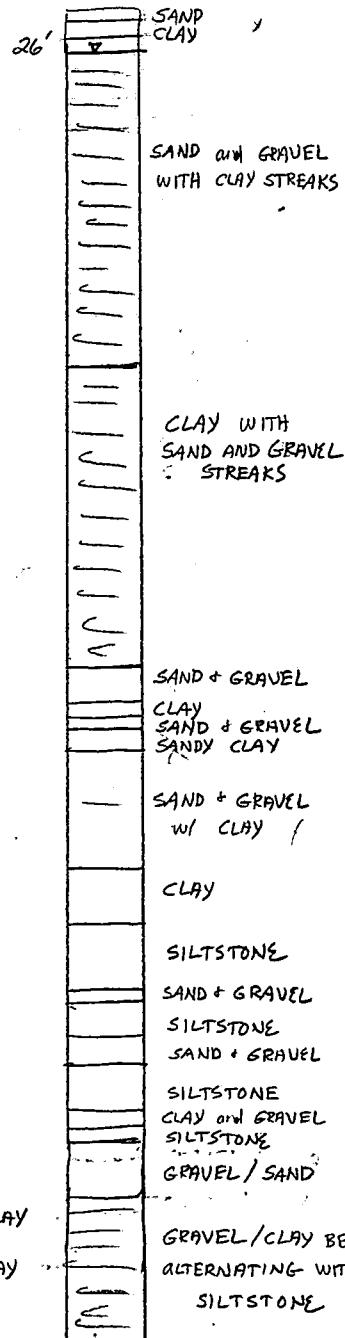
REVISIONS	DATE	UTILITY DIVISION			SHEET NO.
		DATE	BY		OF
		Scale	APPROVED		
					SHEET(S)

A — GEOLOGIC CROSS-SECTION A'

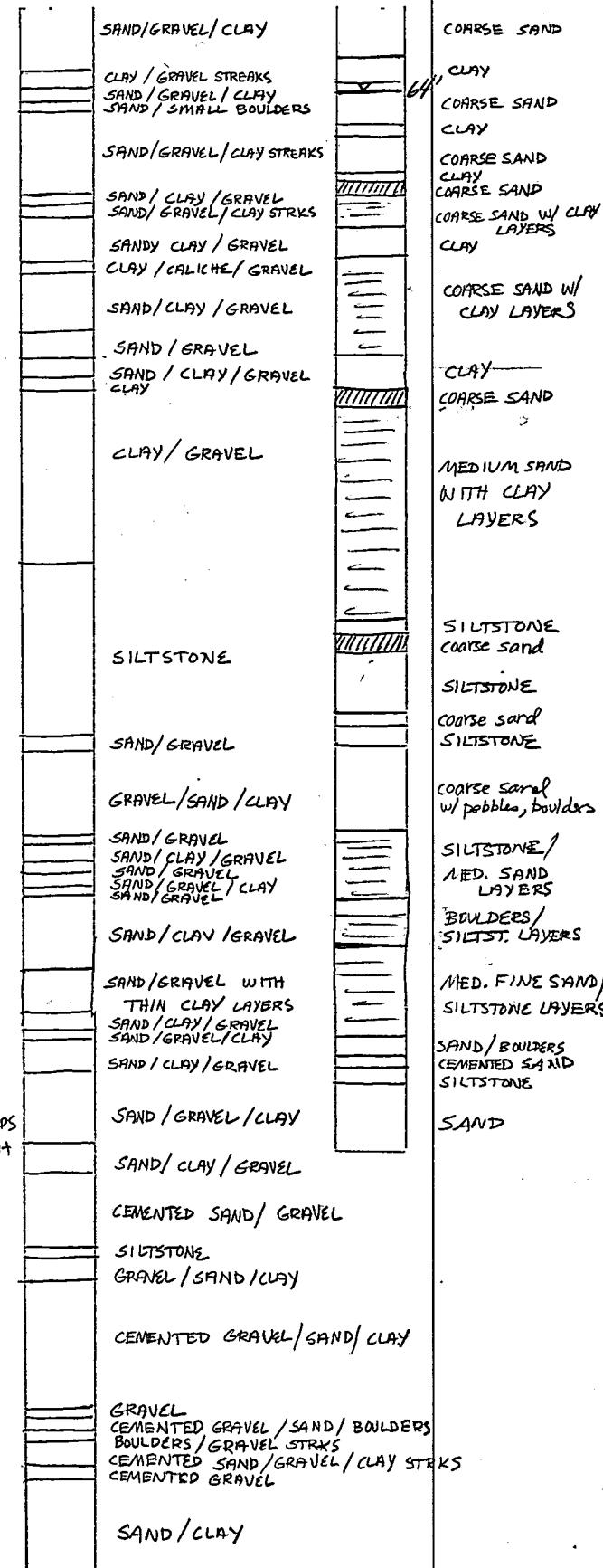
DESERT SPRINGS  
SOUTH WELL



SIERRA PACIFIC  
TEST HOLE #18



SIERRA PACIFIC  
TEST HOLE #19



## DESCRIPTION OF SKY RANCH WELLS

PHYSICAL PROPERTIES	SS1	SS3	SS6
depth	787	180	203
casing	10	12	12
date completed	10-8-57	4-25-77	5-13-77
static water level	64	52	37
perforations	37-787	70-170	70-193
pump setting	approx 150	approx 165	approx 140
pump characteristics	60 HP	30 HP	100 HP
pumping capacity	625 gpm	250-300 gpm	400-600 gpm (overequipped at 900)

## PUMP TESTS

SS1	1964 report to SPPCo	$Q = 600 \text{ gpm}$ for 21 hours $T = 25,000 \text{ GPD/ft}$ spec capacity = 15 gpm/ft
	12/77 by TIC	$Q = 630 \text{ gpm}$ for 72 hours $T = 22,900 \text{ GPD/ft}$ spec capacity = 17 gpm/ft
SS3	7/86 by Dan Dragan	$Q = 340 \text{ gpm}$ for 22 hours $T = 6400$ (early data) $T = 1700$ (late data) $T = 8370$ (recovery) spec capacity = 3.6 gpm/ft
SS6	12/77 by TIC	$Q = 900 \text{ gpm}$ for 72 hours $T = 39,500 \text{ GPD/ft}$ (recovery) spec capacity = 20 gpm/ft
	8/86 by Dan Dragan	$Q = 635 \text{ gpm}$ for 24 hours $T = 26,000 \text{ GPD/ft}$ (pumping) $T = 43,000 \text{ GPD/ft}$ (recovery) spec capacity = 10.5 gpm/ft

Dan:

Attached is the information you requested for the Pyramid Ranch project.

Comparison of the "depth to bedrock" contours with drillers logs indicate that the gravity survey may show depth to a confining layer/clay beds rather than bedrock. For example, Sierra Pacific test hole #19 was drilled to a depth of 1141 ft without reaching bedrock, but a thick clay/siltstone sequence was encountered at 270 ft.

According to the 1964 report to Sierra Pacific, test hole #18 and #19 each encountered the best water-bearing materials above 290 ft. It was estimated that a well screened in the sand and gravel from 70-290 ft would yield 300-400 gpm.

A water quality sample taken from a depth of 855-875 ft in test hole #19 shows sulfate, iron, and fluoride in concentrations which exceed drinking water standards.

500 ft test hole w/ E-Logs

Demand?

**DESCRIPTION OF DESERT SPRINGS WELLS**

PHYSICAL PROPERTIES	North well	South well
depth	306	445 (orig 848)
casing	10	16
date completed	11-25-79	8-25-63
static water level	26	56
perforations	58-288	238-360
pump setting		unknown
pump characteristics	75 HP	unknown
pumping capacity	800 gpm	unknown

**PUMP TESTS**

North well

11/79 by Waterresource Eng.  
(Kieth Meador/George Ball)

Q=1200 gpm for 15 hours  
T=21,000 GPD/ft (recovery)  
spec capacity = 38 gpm/ft

1/84 by Don Mahin

Q=800 gpm for 16 hours  
T=64,000 GPD/ft  
spec capacity = 22.7 gpm/ft

South well

1984 report to SPPCo

Q=400 gpm for 24 hours  
T=7000 GPD/ft  
spec capacity = 4 gpm/ft

2/84 by Don Mahin

Q=450 gpm for 22 hours  
T=12,000 GPD/ft  
spec capacity = 5.4 gpm/ft







## DIVISION OF WATER RESOURCES

## PLATE II

## WELL DRILLERS REPORT

Please complete this form in its entirety

North Well CCCC

1. OWNER SPANISH SPRINGS DEV. CO. or  
DESERT SPRINGS--Jim Patterson, Owner

ADDRESS 7755 Pyramid Lake Highway  
Sparks, NV 89431

2. LOCATION SE  $\frac{1}{4}$  SE  $\frac{1}{4}$  Sec 34 T. 21 N. # R. 20 E. M. D. B. & M. Washoe County  
PERMIT NO. 29266

3.	TYPE OF WORK	4.	PROPOSED USE	5. TYPE WELL
New Well	<input type="checkbox"/>	Domestic	<input type="checkbox"/>	Cable <input type="checkbox"/> Rotary <input checked="" type="checkbox"/>
Deepen	<input type="checkbox"/>	Municipal	<input checked="" type="checkbox"/>	Other <input type="checkbox"/> reverse

## 6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
sandy clay		0	23	23
sand		23	31	8
clay		31	43	12
sandy clay		43	55	12
clay		55	58	3
sand		58	73	15
fine gravel		73	77	4
sandy/clay streaks		77	186	109
sandy clay		186	190	4
sand		190	198	8
sandy clay		198	199	1
clay		199	203	4
decomposed granite		203	206	3
sandy clay		206	208	2
coarse sand		208	212	4
sand/clay streaks		212	216	4
coarse sand		216	227	11
clay		227	246	19
decomposed granite		246	253	7
clay		253	259	6
sandy clay		259	266	7
clay		266	268	2
sandy clay		268	271	3
clay		271	306	35

Date started 11/18/79 19  
Date completed 11/25/79 19

## 7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

## BAILER TEST

G.P.M.	Draw down	feet	hours
G.P.M.	Draw down	feet	hours
G.P.M.	Draw down	feet	hours

## 8. WELL CONSTRUCTION

Diameter hole 18 inches Total depth 300 feet

Casing record

Diameter	From	To
10-3/4 OD inches	0 feet	300 feet
inches	feet	feet
inches	feet	feet
inches	feet	feet
inches	feet	feet

Surface seal: Yes  No  Type CEMENT

Depth of seal

Gravel packed: Yes  No 

Gravel packed from 55 feet to 300 feet

Perforations:

Type perforation mill slots 3/32" x 2 $\frac{1}{2}$ " long  
Size perforation

From	feet to	288 feet
From	feet to	feet

## 9. WATER LEVEL

Static water level 22 Feet below land surface

Flow G.P.M. ~ 800

Water temperature cold F. Quality clear

## 10. DRILLERS CERTIFICATION

This well was drilled under my supervision and the report is true to the best of my knowledge.

Name /s/ Paul Williams

Address 22 South Patterson, Sparks, NV

Nevada contractor's license number 14483

Nevada driller's license number 957

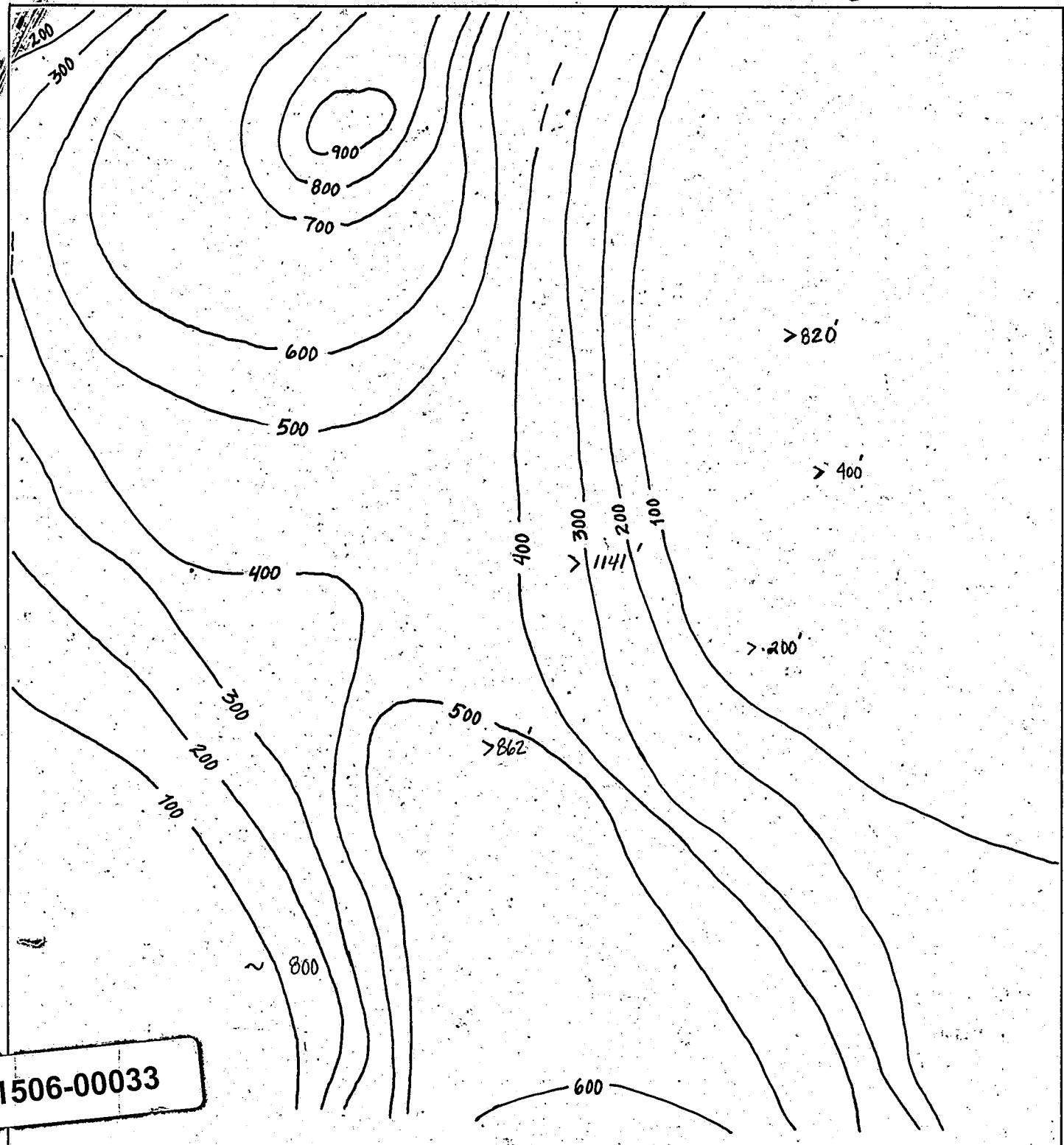
Signed

Date 11/26/79

Pyramid Ranch Project : WQ from nearby wells

WELL LOCATION	OWNER	DEPTH	CAS	SAMPLE DATE	TDS	SD4	NO3	As	Fe	Mn	HARD	Ca	Mg	Na	K	C1	F1	ALKAL	HC03	CO3	pH	COLOR	TURB	Zn	Cu	Si
Desert Springs SW	Washoe County	848	16	Jun 1963	258	72	=	=	0.1	=	44	10	5	84	=	17	=	116	142	0	7.4	=	=	=	=	
Desert Springs SW	Washoe County	445	16	Feb 1964	195	34	=	=	0.18	=	36	9	3	65	=	14	=	121	148	0	7.5	=	=	=	19	
Desert Springs SW	Washoe County			Mar 1979	347	27	6.7	0.005	0.32	0.03	33	10	2	62	3	10	0.7	110	134	0	7.85	7	2	=	=	
Desert Springs NW	Washoe County	306	10	Nov 1979	410	76	16.8	0.01	0.05	0	101	29	7	83	5	42	0.62	130	159	0	7.81	5	1.8	=	=	
Desert Springs NW	Washoe County			Dec 1979	413	75	16.7	0.015	0	0.02	104	30	7	84	5	45	0.64	130	159	0	7.95	12	8.1	=	=	
Desert Springs NW	Washoe County			Oct 1981	430	73	22.2	0.01	0.01	0	123	35	8	83	4	58	0.62	126	154	0	8.02	3	0.5	0.02	0.01	
assume NW	Washoe County			May 1982	437	71	28	0.01	0	0	128	38	8	83	4	67	0.59	184	163	0	8.01	1.5	0.4	=	=	
Sky Ranch SS1	Sky Ranch Utility	821	10	Apr 1964	229	30	=	=	=	=	165	39	16	10	24	0.15	120	146	0	7.62	=	=	=	=	22	
Sky Ranch SS1	Sky Ranch Utility			Oct 1976	298	32	24.1	0.005	0.09	0.01	168	41	16	18	4	26	0.04	112	137	0	7.82	3	1.4	=	=	
Sky Ranch SS3	Sky Ranch Utility	180	12	Nov 1978	285	32	35	0	0.05	0	158	42	0	25	4	23	0.4	0	159	0	7.7	0	0	=	=	
Sky Ranch SS3	Sky Ranch Utility			Jul 1986	305	52	26	0.008	0.08	0.02	150	38	13	23	4	25	0.1	=	129	0	7.6	=	0.1	<0.02	=	
Sky Ranch SS6	Sky Ranch Utility	203	12	Dec 1977	371	57	8.9	0.005	0.06	0	201	49	19	41	5	20	0.14	190	212	8	8.29	4	0.2	=	=	
Sky Ranch SS6	Sky Ranch Utility			Nov 1978	409	63	4	0.005	0.1	0	231	58	21	38	5	24	0.12	302	246	0	7.55	17	0.9	=	=	
Sky Ranch SS6	Sky Ranch Utility			Nov 1981	372	56	8.5	0.005	0.16	0.01	207	53	18	37	5	18	0.12	200	244	0	8.19	3	1.2	0.03	0	
Sky Ranch SS6	Sky Ranch Utility			May 1983	389	52	8.2	0.005	0.01	0	202	51	18	37	5	19	0.1	208	254	0	7.91	3	0.3	0.02	0.01	
Sky Ranch SS6	Sky Ranch Utility			Aug 1986	402	58	10.1	0.007	<0.02	<0.02	55	19	41	6	31	0.1	206	=	=	=	4	0.01	<0.02	=	=	
Test hole #18	Sierra Pacific	862	=	Mar 1979	440	87	17.1	0.005	0	0.01	190	53	14	60	5	55	0.38	130	159	0	7.88	7	0.1	=	=	
Test hole #19	Sierra Pacific	1141	=	Apr 1964	660	255	=	=	(1)	0.01	20	6	1	218	=	112	(2.8)	68	83	0	7.73	=	=	=	10	
Harold Gun Club	"	325	8	Oct 1974	240	16	14.7	0.005	0.04	0.01	143	31	11	26	4	9	0.12	138	168	0	7.81	0	0.7	=	=	
	"	=		May 1979	208	17	11	0	0.09	0	120	30	11	30	5	12	0.2	130	159	0	7.79	7	1.8	=	=	

DEPTH TO "BEDROCK": contours - gravity survey  
numbers in pencil - based on drifters logs



## WASHOE COUNTY DEPARTMENT OF PUBLIC WORKS

		UTILITY DIVISION		SHEET NO. OF SHEET(S)
REVISIONS	DATE	DATE	BY	
		Scale	APPROVED	