BROWN, ERDMAN & ASSOCIATES LTD.
1401 BEWICKE AVENUE, NORTH VANCOUVER, BRITISH COLUMBIA V7M 3C7
TELEPHONE 986-1557

PRODUCTION WELL AQUIFER TEST

FOR

MARY B. ADAMS

BOWEN ISLAND, BRITISH COLUMBIA

BY

H.W. REED, P.Eng.

October 1979
75-173

1.0 INTRODUCTION

The subject well was drilled in May 1976 and is located at Sealiegh Park on the West side of Bowen Island near Tunstall Bay. A 500 minute pumping test was run following construction to estimate pump requirements and the approximate productive capacity of the well.

An aquifer test of 1440 minutes length was conducted on the well in September 1977. At that time, our evaluation of the safe productive yield of the well, based upon the data presented, was 15.6 US gpm.

The well was tested again during August 1979 in compliance with a directive from the Comptroller of Water Rights and confirms that the well has a safe productive capacity of 15.6 US gpm.

2.0 AQUIFER TEST

The subject well was pumped from 14 to 18 August 1979 for a total test period of 6250 minutes (4.3 days). The discharge rate was initially set at 30 US gpm and was reduced by increments of 5 gpm until the pumping level stabilized.

At pumping rates of 30 and 25 US gpm the pumping level reached pump suction at a depth of 350 feet. A discharge of 20 US gpm was then maintained from 1400 to 4400 minutes

of the test. The pumping level at this rate was dropping slowly below the main water-bearing fracture at 255 feet and the projected drawdown plot indicated that the well would require a period of several weeks before stabilizing or breaking suction at the pump. The flow was therefore reduced to 15 US gpm at which rate the pumping level for the last 1200 minutes of the test was stable, apart from uncontrollable minor fluctuations in the pumping rate.

3.0 AQUIFER PARAMETERS

3.1 Specific Capacity

The specific capacity of the well at stabilization is calculated as follows:

Static water level	(+)	5 feet	(approx.)
Pumping level at 15 gpm		195 feet	(maximum depth)
		200 feet	

Specific capacity: $\frac{15 \text{ US gpm}}{200 \text{ feet}} = 0.075$ US gpm per foot of drawdown

3.2 Transmissivity

The attached semi-log plot of the aquifer test drawdown was used to calculate a transmissivity of 153 US gpd per foot for a pumping rate of 20 US gpm. This figure agrees very well with a value of 151 US gpd per foot derived using observation well data as shown on the attached plot of drawdown vs. distance.

3.3 Storativity

The coefficient of storage was calculated to be close to 1×10^{-4} using the Cooper-Jacobs method and the drawdown vs. distance plot.

4.0 AQUIFER TEST ANALYSIS

The aquifer test data indicates that fractures in the well below a depth of 255 feet are not producing a significant amount of water and the main fracture at that depth, therefore governs the maximum drawdown available.

The maximum well yield is calculated using the specific capacity as determined above:

$$\text{Well yield} = 0.075 \text{ US gpm per foot} \times 260 \text{ feet}$$
$$= 19.5 \text{ US gpm}$$

The well should, therefore, reach near stabilization close to a pumping level of 255 feet at this rate. Experience with similar aquifers shows that the parameters of transmissivity and storativity as noted above, are compatible with the 19.5 US gpm rate.

We note that this well has proved to be unaffected by seasonal variations and that it has been used as a domestic supply since 1976.

Our assessment of the subject well is based upon rigorous test conditions designed to evaluate its maximum potential. We therefore rate this well at 15.6 US gpm which allows a safety factor of 26% against the maximum calculated rate of 19.5 US gpm.

5.0 WATER QUALITY

A water sample was collected at the end of the test and submitted for pH, turbidity and chloride analyses. The inorganic chemical quality as tested in 1976 and 1979 shows the well to have soft water of good quality for domestic use. However, a high pH value near 9.5 exists which is due to an alkalinity imbalance as $CaCO_3$. No detrimental physiological effects are reportedly associated with a high pH where this factor is not caused by pollutants. Since the water is not intended for irrigation, we do not foresee any problems due to the high pH.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 The subject well is capable of sustained production at a rate of 15.6 US gpm.

6.2 The water is of good quality for domestic use, although the pH is above limits recommended for some special purposes.

6.3 A pump should be set in the well with suction at a depth of 260 feet. The pump should be capable of overcoming a head of 260 feet, plus the system pressure.

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Report On Analysis of Water Samples **File No.** 1938 D

Report No.

Reported to Brown Erdman & Associates Ltd., **Date** August 29, 1979.

1401 Bewicke Avenue,

North Vancouver, B.C.

We have tested the sample of water submitted by you on August 20, 1979 and report as follows:

SAMPLE IDENTIFICATION:

The sample was submitted in a plastic bottle labelled -

"Sealeigh Park
Bowen Island
19 August 1979"

METHOD OF TESTING:

The analyses were carried out in accordance with procedures described in "Standard Methods for the Examination of Water and Wastewater (14th Edition)" published by the American Public Health Association, 1975.

RESULTS OF TESTING:

Test		Result	
pH		9.50	
Turbidity		2.30	J.T.U.
Chlorides	Cl	13.0	mg/L

mg/L - milligrams per liter

J.T.U. - Jackson Turbidity Units.

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Judi M. Mitchell, B.Sc.,
Chemist.

/dn

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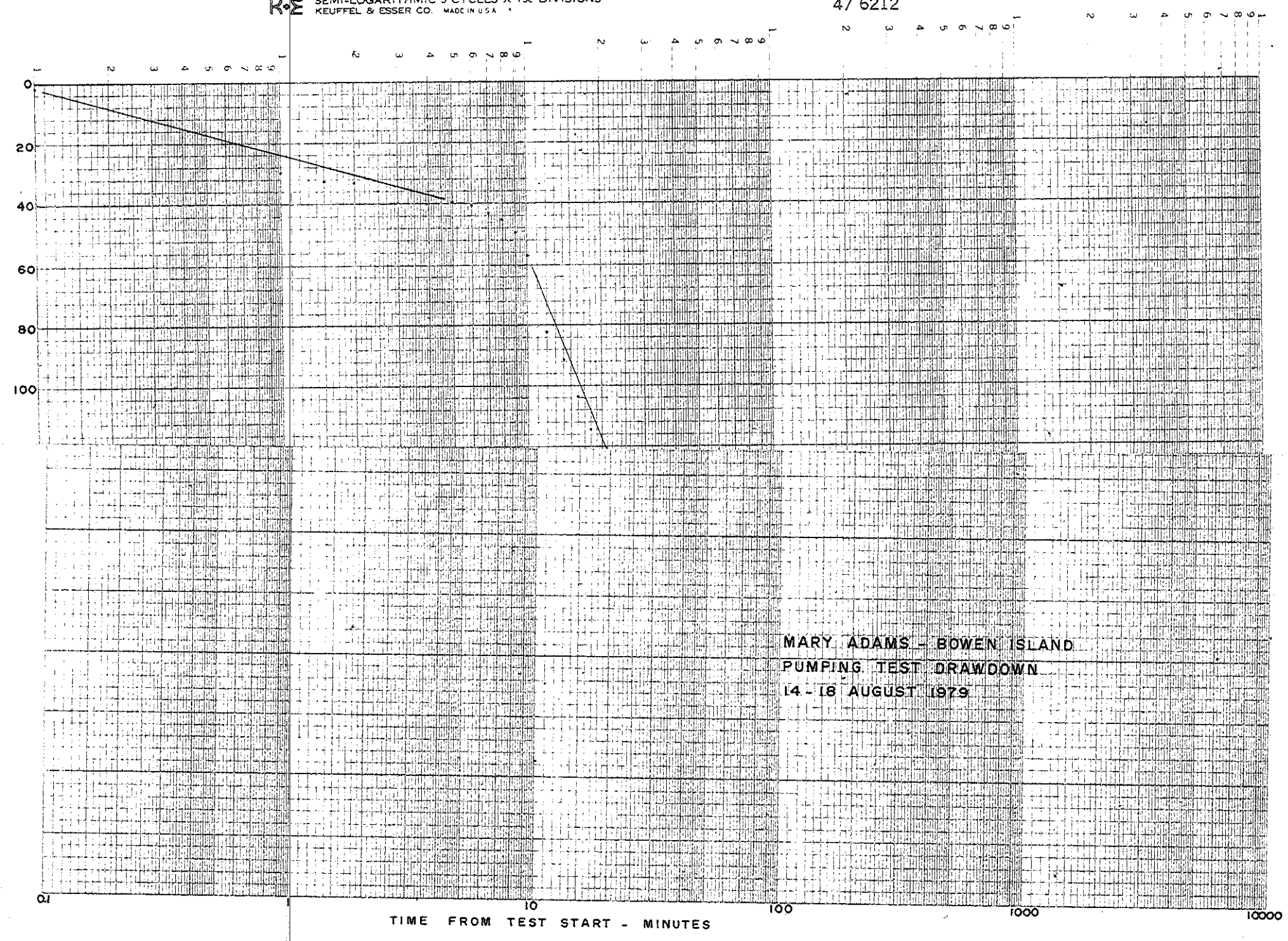

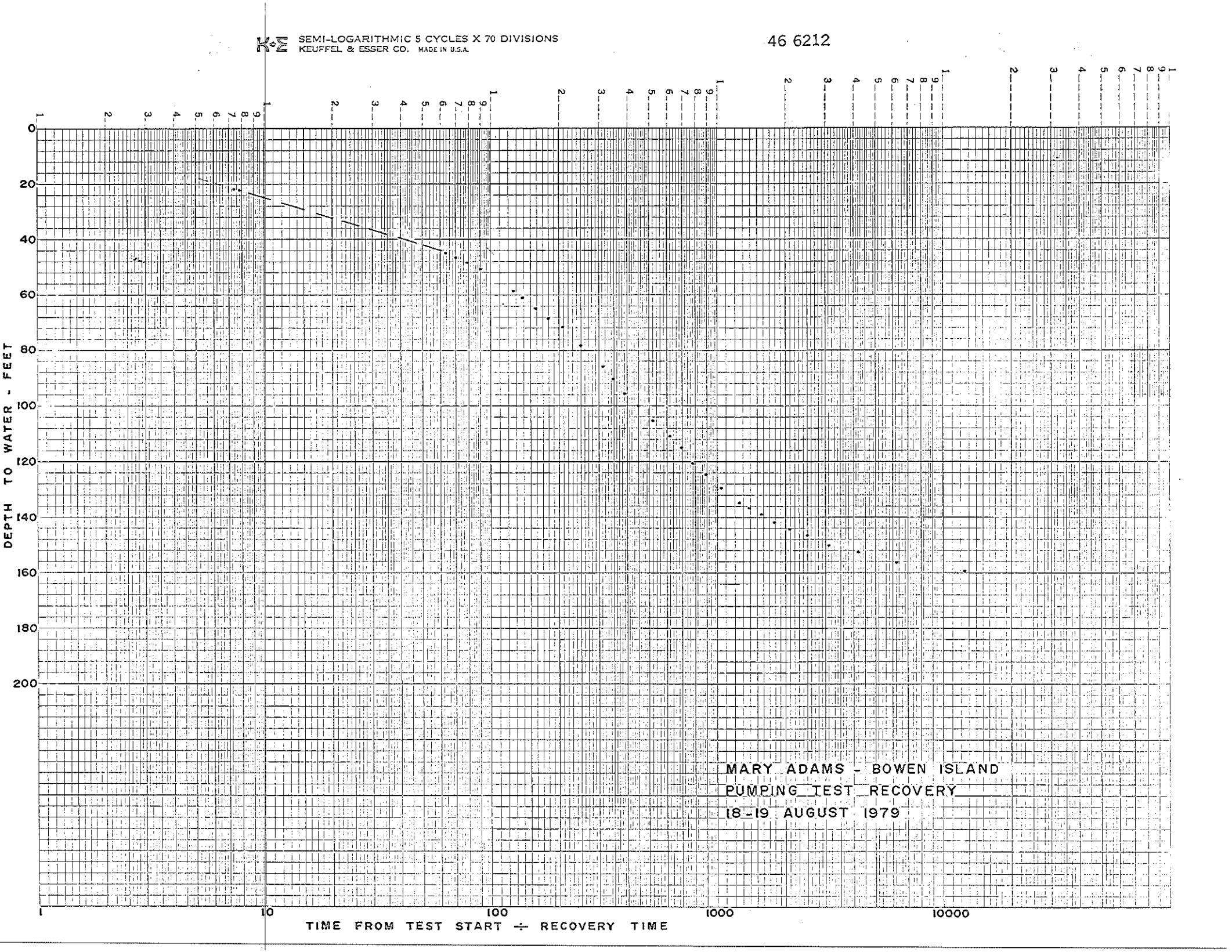
SEMI-LOGARITHMIC 5 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 6212
DEPTH TO WATER - FEET
0
20
40
60
80
100
120
140
160
180
200
1
10
100
1000
10000
TIME FROM TEST START ÷ RECOVERY TIME
MARY ADAMS - BOWEN ISLAND
PUMPING TEST RECOVERY
18-19 AUGUST 1979

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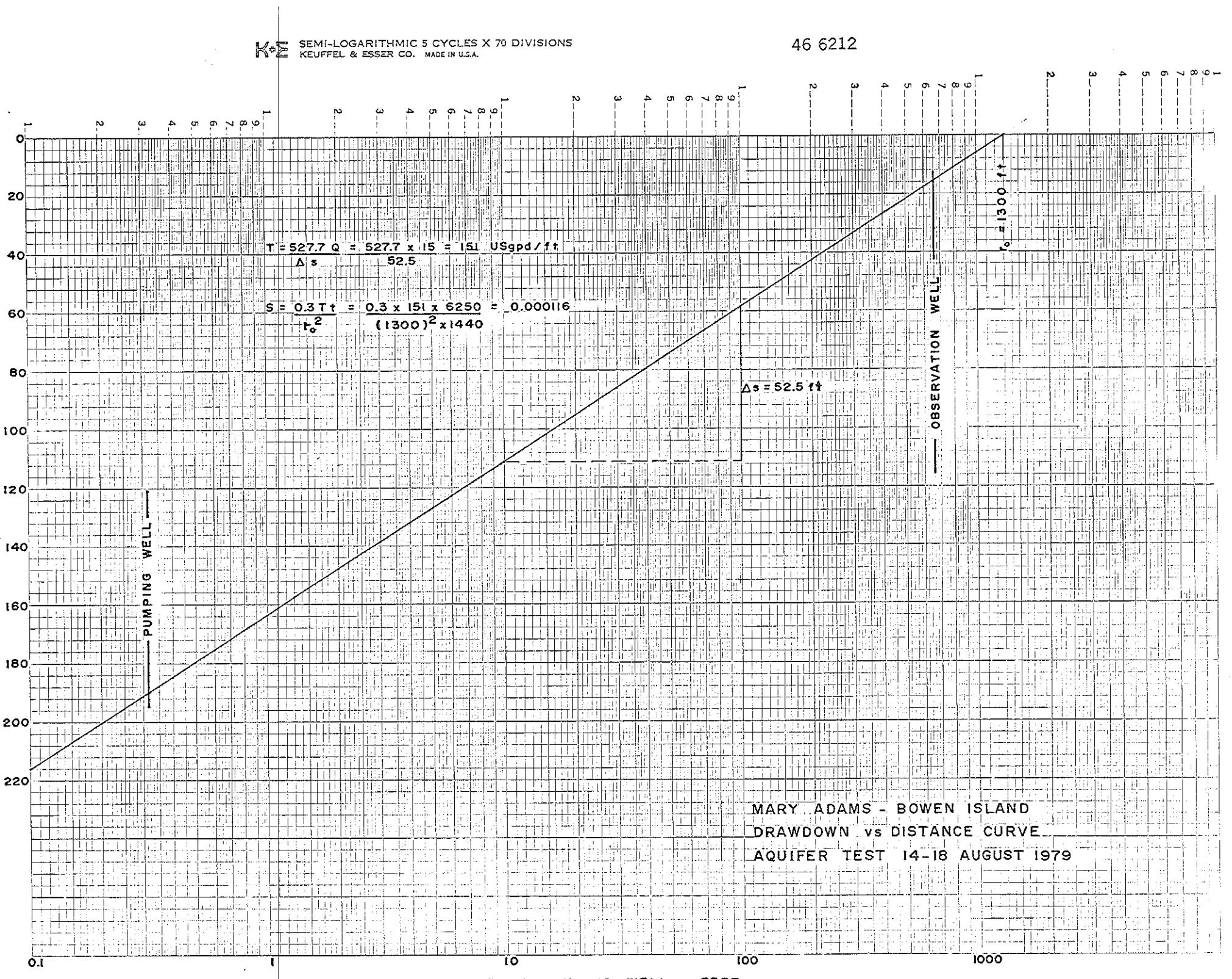

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NORTH VANCOUVER, BRITISH COLUMBIA

PAGE 1

WELL OWNER MARC ADAMS — WELL NO. 1 — DRAWDOWN ☐
LOCATION BOWEN ISLAND — JOB NO. 25-173 — RECOVERY ☐

DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER	Q US GPM	OBS. WELL	REMARKS
14-8-79	09:00	0.0	1.90		2.02	
		1	29.82	30		
		1.5	32.70			
		2	33.13			
		2.5	36.04			
	09:05	5	39.80			
		6	40.92			
		7	43.18			
		8	45.48			
		9	49.46			
	09:10	10	52.21			
		12	82.46			
		14	91.31			
		16	103.51			
		18	114.62			
	09:20	20	125.66			
	09:35	35	158.73			
	09:40	40	175.20			
	09:45	45	190.77			
	09:50	50	202.23			
	10:00	60	220.38			
	10:10	70	241.52			
	~~10:20~~	~~80~~	~~250.62~~			
	10:30	90	262.18			
	10:40	100	271.89			
	11:05	125	285.15			
	11:30	150	290.80			
	13:10	250	320.			
	14:00	300	350.	30		REDUCED RATE AT 14:10
	14:50	350	249.94	25		
	15:40	400	176.38			
	16:30	450	176.84			

DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER	Q GPM	OBS. WELL	REMARKS
14-8-79	17:20	500	191.68	25		
	18:10	550	202.51			
	19:00	600	203.35			
	19:50	650	231.93			
	20:40	700	255.00			
	21:30	750	267.12			
	22:20	800	277.54			
	23:10	850	277.53			
15-8-79	00:00	900	266.97			
	00:50	950	272.10			
	01:40	1000	283.82			
	02:30	1050	282.36			
	03:20	1100	280.55			
	04:10	1150	280.10			
	05:00	1200	290.50			
	05:50	1250	321.47			
	06:40	1300	331.12			
	07:30	1350	337.95			
	08:20	1400	341.01	½		* REDUCED RATE AT 09:00
	11:40	1600	232.11	20		
	12:30	1650	239.25			
	13:20	1700	242.63			
	14:10	1750	243.91		3.86	
	15:00	1800	243.90			
	16:40	1900	245.00			
	17:30	1950	245.55			
	18:20	2000	246.22			
	19:10	2050	253.51			
	20:00	2100	254.30			
	20:50	2150	254.72			
	21:40	2200	255.11			
	22:30	2250	255.48			
	23:20	2300	255.50	20		
16-8-79	00:10	2350	256.16			
	01:00	2400	256.73			

DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER	Q GPM	OBS. WELL	REMARKS
16-8-78	01:50	2450	267.46	20		
	02:40	2500	268.00			
	03:30	2550	268.70			
	04:20	2600	259.26			
	05:10	2650	259.82			
	06:00	2700	261.45			
	07:40	2800	262.86			
	10:10	2950	270.12		8.31	
	11:00	3000	270.58			
	12:40	3100	271.55			
	13:30	3150	271.70			
	14:20	3200	271.81		9.58	
	17:40	3400	271.81			
	18:30	3450	271.81			
	19:20	3500	271.96		10.40	
	21:00	3600	272.57			
	22:40	3700	273.05			
17-8-79	00:20	3800	273.28			
	02:00	3900	273.63			
	03:40	4000	273.97			
	05:20	4100	274.44			
	07:00	4200	274.92			
	08:40	4300	275.22		13.53	
	10:20	4400	275.57	20		← REDUCED RATE AT 10:50
	12:00	4500	214.51	15		
	12:50	4550	204.15			
	~~13:40~~	~~4600~~	~~205.70~~			
	14:30	4650	204.03			
	16:10	4750	201.12			
	17:00	4800	200.45			
	17:50	4850	198.80			
	18:40	4900	198.80			
	19:30	4950	198.57			
	20:20	5000	194.72			
	21:10	5050	189.63	15		

DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER	Q GPM	OBS. WELL	REMARKS
17-8-79	22:00	5100	185.82	15		
	22:50	5150	187.52			
	23:40	5200	192.95			
18-8-79	00:30	5250	191.45			
	01:20	5300	190.33			
	02.10	5350	190.40			
	03:00	5400	190.45			
	03:50	5450	190.53			
	04:40	5500	190.62			
	05:30	5550	190.39			
	06:20	5600	190.20			
	08:00	5700	189.95			12.5 °C
	08:50	5750	189.44			
	10:30	5850	189.05			
	11:20	5900	188.85			
	12:10	5950	188.69			
	13:50	6050	187.75		17.52	
	14:40	6100	193.85			
	15:30	6150	193.06			
	16:20	6200	188.27		17.52	
	17:10	6250	187.99	15	17.53	-- END PUMPING
	— RECOVERY —					
		0.5	159.41	—		
		1	156.20			
		1.5	152.33			
		2	150.22			
		2.5	146.85			
		3	144.18			
		3.5	141.60			
		4	139.10			
		4.5	136.38			
	17:05	5	135.13			
		6	129.00			
		7	124.45			

DATE	TIME	ELAPSED TIME MINUTES	DEPTH TO WATER	Q GPM		REMARKS
18-8-79	17:18	8	120.45	—		
		9	115.04			
	17:20	10	111.10			
		12	105.45			
		14	100.00			
		16	95 84			
		18	90.48			
	17:30	20	85.82			
	17:35	25	78.30			
	17:40	30	71.82			
	17:45	35	68.22			
	17:50	40	64.55			
	17:55	45	61.41			
	18:00	50	58.79			
	18:20	70	51.11			
	18:30	80	48.40			
	18:40	90	46.46			
	18:50	100	44.91			
19-8-79	10:20	930	22.50			
	11:10	980	21.97			