GROUND WATER

OPEN FILE REPORT

AQUIFER TEST OF THE GLENN CHOWNING WELL NO. 2 UMATILLA COUNTY, OREGON

By

Michael J. Zwart

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WILLIAM H. YOUNG
Director

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INTRODUCTION

Purpose of Study

An aquifer test was conducted by the Oregon Water Resources Department from January 25 through 31, 1984. The well tested, owned by Glenn Chowning, is known as his number two well and will be referred to as the 'pumped well'. This well was selected for testing because of the following reasons.

1) It is located near the Furnish Canal, which allowed convenient disposal of the water withdrawn.

2) Two wells without pumps are located near the pumped well, allowing water levels at those wells to be monitored continuously with recorders.

3) There was interest in whether the location of a hydraulic boundary could be verified in the vicinity of the pumped well.

A hydraulic boundary was confirmed east of the City of Stanfield during a previous aquifer test. At that time, its location was inferred to extend northerly to within one mile east of the pumped well.

This aquifer test was part of a project to study the hydrogeology of the Columbia River Basalt Group in the Umatilla Structural Basin. Since the test was conducted, proceedings have been initiated to determine if the Stage Gulch area should be declared a critical ground water area. The hydrogeology of the Stage Gulch area, which includes the wells in this test, is now being studied in greater detail. The results of the study will be published as a ground water report prior to a hearing for critical ground water area determination.

Location of Wells

Pumped well	
Chowning #2	T4N/R29E-18dcb
Observation wells	
Chowning #3	T4N/R29E-18ddb
Chowning #4	T4N/R29E-19baa
West well	T4N/R29E-18ddb
Gossler well	T4N/R29E-19bcc
Walchli well	T4N/R29E-17abb

The aquifer test site is about three miles north of Stanfield and about three miles east of Hermiston (Figure 1).

Conclusions

1) The transmissivity of the basalt aquifer in the vicinity of the pumped well ranges from 990 to 11,800 gallons per day per foot (gpd/ft), or from 130 to 1,580 square feet per day (ft^2/d).

2) The storage coefficient for the aquifer ranges from 4.86×10^{-4} to 2.24×10^{-3}.

3) A hydraulic boundary was not confirmed in the vicinity of the test.

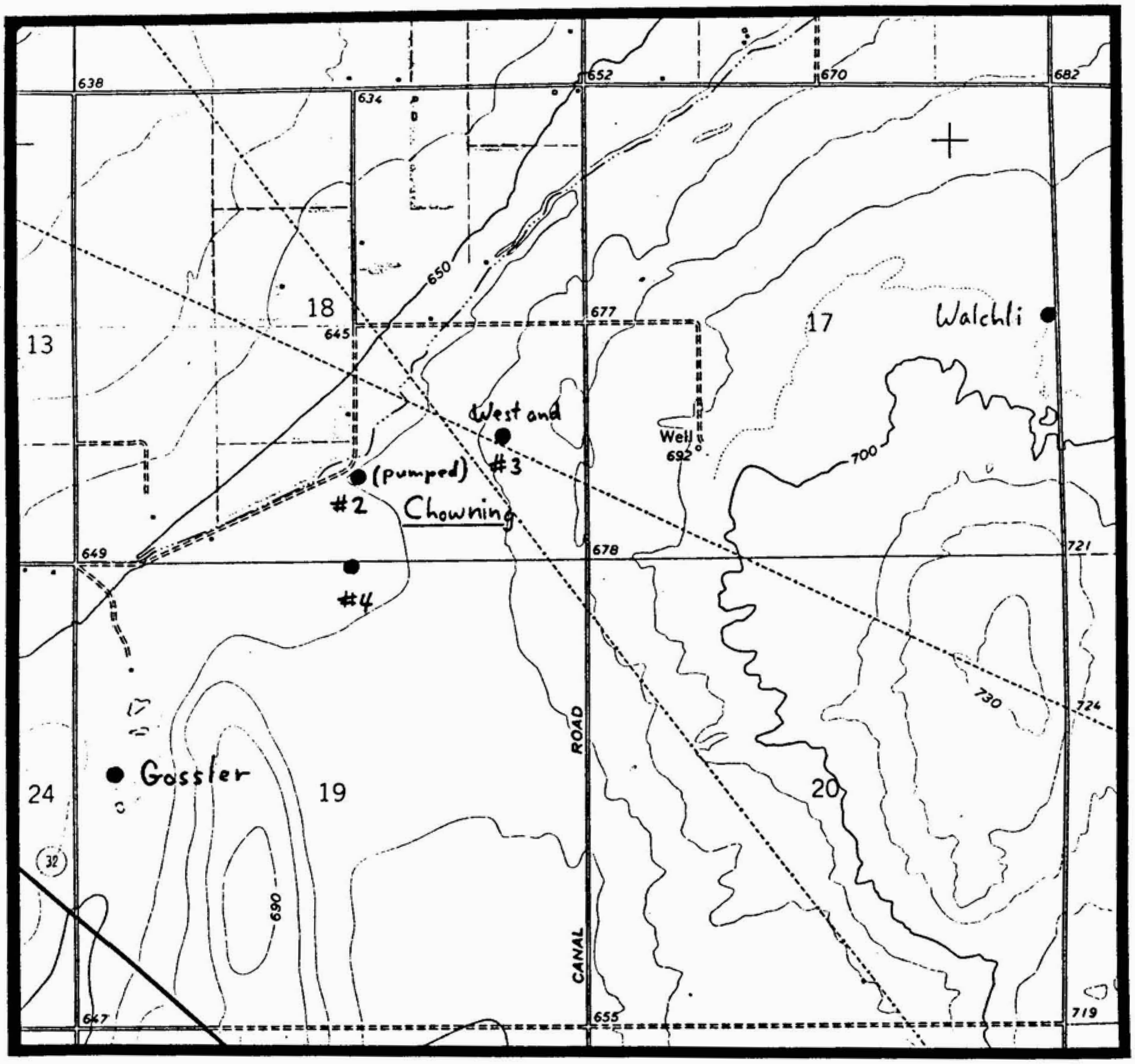

Figure 1. Location of aquifer test site. Map is from Stanfield, Oregon (1962) U. S. Geological Survey 7.5 minute quadrangle map. Scale is 1: 24,000.

Well Histories

The pumped well was constructed for M. L. Koester by W. R. Ille Drilling Company of Portland, Oregon and was completed on January 15, 1970. It was cased to 200 feet with 12-inch casing and drilled to a total depth of 643 feet, penetrating basalt from a depth of 198 feet to the bottom. The static water level was 38 feet below land surface upon completion. The well was bailer tested for two hours, producing 50 gallons per minute (gpm) with zero drawdown reported. The well was reamed and deepened to a total depth of 1,000 feet for a new owner, Glenn Chowning, by Larry Burd Well Drilling of Pendleton, Oregon on July 19, 1978. The static water level after deepening was 302 feet below land surface. No well test was performed upon deepening. The well produces water for supplemental irrigation of 217.8 acres under water right permit and application numbers G-5148 and G-5387, respectively. The well is equipped with a 125 horsepower motor and vertical line shaft turbine pump with bowls set to an unknown depth.

The Chowning #3 well was constructed by Troy Griffin of Hermiston, Oregon and was completed on June 6, 1977. It was cased with 10-inch casing to a depth of 235 feet and was drilled to a total depth of 1100 feet, penetrating basalt and claystone from a depth of 101 feet to the bottom. The static water level was 253 feet below land surface upon completion. The well was air tested for one hour, producing 400 gpm with 147 feet of drawdown. No pump has been installed in the well since 1978. Water right permit number G-7616 (Application G-8209) has been canceled reportedly because of the well's inability to produce the desired quantity of water and because the well bore is crooked. The department used this well for continuous recording of water levels in 1978 and 1979. At the time of the aquifer test, the well was instrumented with a Stevens Type F water level recorder.

The West well is an unnumbered Chowning well located 22.5 feet west of the #3 well. No water well report was found in department files for this well. It is cased with 8-inch casing, is not equipped with a pump, and has been unused for an unknown number of years. The static water level and total depth of this well were measured at the time of the aquifer test to be about 63 feet and 196 feet, respectively. These are consistent with other wells in the vicinity that produce water from an alluvial aquifer which overlies the basalt. This well may be the original # 3 well, which was described in water rights application number G-6765. The estimated depth reported in the application was 250 feet. Development under the terms of permit number G-6285 was not completed due to reported caving of the well. At the time of the aquifer test, this well was also instrumented with a Stevens Type F water level recorder.

The Chowning #4 well was constructed by Allison Drilling Company of Hermiston, Oregon and was completed on March 2, 1976. It was cased with 105 feet of 8-inch casing, perforated between 84 and 104 feet. It was drilled to a depth of 130 feet and penetrated only the alluvial aquifer. At the time of completion, the static water level was 43 feet below land surface. It was air tested for two hours, producing 300 gpm with 50 feet of drawdown. The owner reported that this well has been deepened to 241 feet, although no water well report is on file for the deepening. The well produces water for supplemental irrigation of 217.8 acres under water right permit and application numbers G-6285 and G-6765, respectively. The well is equipped with a 50 horsepower motor and vertical line shaft turbine pump with bowls set to a depth of 230 feet.

The Gossler well was reported to be constructed by Pete Wallace. No water well report was found in department files for this initial construction. Some construction information was reported in water rights application number G-9407. It stated a total depth of 1,100 feet with 211 feet of 12-inch casing. The static water level was reported as 300 feet below land surface. The well was deepened from 1,130 to 1,210 feet by Columbia Basin Well Drilling Company of Hermiston, Oregon and completed on May 16, 1980. The static water level was 300 feet below land surface upon completion. The well was air tested for one hour, producing 1,500 gpm. The well bore was reamed to a diameter of 12 inches in a depth interval of 545 to 855 feet by Troy Griffin of Hermiston, Oregon on October 6, 1982. At that time, the static water level was 315 feet below land surface. It was again air tested, producing 1500 gpm for one hour with the drill stem set to a depth of 850 feet. This well produces water for supplemental irrigation of 156.1 acres under water right permit number G-8802 and application number G-9407. It is equipped with a 150 horsepower motor and vertical line shaft turbine pump with bowls set to a depth of 500 feet.

The Walchli well was constructed for Patrick Walchli by Ladd Horn Well Drilling and completed on May 10, 1981. It was cased with 45 feet of 18-inch casing and 225 feet of 16-inch liner was installed. The total depth is 1,200 feet, with various basalt flows and interbeds penetrated from 40 feet to the bottom. The static water level was 185 feet below land surface upon completion. During a one hour air test, the well produced 2,000 gpm with the drill stem at a depth of 900 feet. The well produces water for supplemental irrigation of 317 acres under water right permit and application numbers G-9809 and G-10569, respectively. The well is equipped with a 250 horsepower motor and vertical line shaft turbine pump with bowls set to a depth of 510 feet. Pertinent data for the above wells are tabulated in Table 1.

Table 1. Wells measured during the Chowning #2 well aquifer test.

Well	Elevation* at well head	Water level prior to test	Water level elevation	Distance to pumped well
Pumped well	658	322	336	----
Chowning #3	672	206	466	1705
Chowning #4	656	140	516	960
West well	672	63	609	1685
Gossler	655	304	351	4300
Walchli	695	293	402	8100

*Elevations are in feet above mean sea level and are accurate to +/- five feet. Water levels are in feet below land surface datum, rounded to the nearest foot. Distances are in feet.

AQUIFER TEST

Test Methods

The pumped well was tested for 72 hours from 12:02 pm on January 25, 1984 to 12:02 pm on January 28, 1984. Water levels in it and five nearby wells were monitored with the use of electric tapes, airlines, or Stevens Type F water level recorders. Airline measurements were made with a certified Helicoid pressure gauge with a range of 0-100 pounds per square inch (psi). After the pump was shut off on January 28, 1984, water level recovery data were collected for about 72 hours, until January 31, 1984. A water level recorder installed at the #3 well continued to collect recovery data until February 16, 1984. The test was conducted prior to the 1984 irrigation season and well after the end of the 1983 irrigation season to minimize any potential effects of nearby pumping.

The data were collected by Michael J. Zwart and William L. Robertson of the Oregon Water Resources Department. Drawdown and recovery data were analysed by the Theis non-equilibrium and the Cooper-Jacob modified non-equilbrium methods. Elevations of well heads and distances to the pumped well were determined from a U. S. Geological Survey 1: 24,000 scale topographic map (Figure 1) and from final proof survey maps on file at the department (Appendix E).

Production of water at the pumped well averaged 566 gpm during the pumping period of 72 hours. Instantaneous flow rates, which remained relatively constant, and the total production were obtained from the totalizing flowmeter installed at the well.

Hydrochemistry

One water sample was collected at the pumped well near the end of the pumping period. The water temperature was 20.8 degrees Celsius and the electrical conductivity was 308 micromhos. These values compare well with the average reported by Robison (1971) in his study of local basalt hydrogeology. The water had no noticeable taste, color, or odor.

Disposal of Water

All water produced during the test was discharged into the Furnish Canal by the owner. This eliminated the less desirable options of applying the water for irrigation in subfreezing temperatures or of flooding the area near the well.

OBSERVATIONS AND CONCLUSIONS

Drawdown Test

Measurement of water levels at the pumped well were difficult prior to the drawdown phase of the aquifer test (Appendix B, figure B-1). The combination of hang ups in the well bore, cascading water, and a layer of oil floating on the water surface made repetitive use of an electric tape nearly impossible. However, these measurements allowed calculation of the effective length of the airline. The owner was unsure of the airline length as installed and it appeared that it was leaking at some point above its installed depth. All water level measurements during the pumping and recovery periods used the airline. The water level drew down below the effective bottom of the airline after only 600 minutes of pumping. Numerous efforts were made to continue measurement of the well with an electric tape, but none were successful. The Cooper-Jacob method was used to analyze the drawdown data. This plot (Appendix C, figure C-1) indicates a water level change of 53 feet per log cycle, resulting in a calculated transmissivity of 2,820 gpd/ft or 377 ft^2/d. If drawdown continued at this rate, the total drawdown after 72 hours of pumping would have been about 80 feet, with a water level of about 402 feet below land surface.

Although the Chowning #3 well is constructed to a similar depth as the pumped well, its water level prior to pumping was 130 feet higher than that of the pumped well. This feature often suggests the presence of a hydraulic boundary between the wells, with the result being that the pumping of one well has little or no drawdown effect on the other. However, the #3 well did draw down during the test. Its initial response was delayed, with the first noticeable drawdown occurring at about 2 hours of pumping (Appendix B, figure B-2). The water level continued to decline for 34 hours after the pump was shut off, with total drawdown at that time being just over 19 feet. Both the Theis and Cooper-Jacob methods were used to analyze the drawdown data. The Theis plot (Appendix C, figure C-2) did not match the type curve very well. Two quite different match points were chosen, representing an early data match and a late data match. Transmissivity and storage coefficient were calculated as 11,800 gpd/ft (1,580 ft^2/d) and 1.1×10^{-3} for the early data, and 2,620 gpd/ft (350 ft^2/d) and 6.7×10^{-4} for the late data. Use of the Cooper-Jacob method resulted in a plot (Appendix C, figure C-3) indicating a water level change of 40 feet per log cycle, and a transmissivity of 3,735 gpd/ft (500 ft^2/d). The storage coefficient was calculated to be 4.86×10^{-4}.

The Gossler well was measured with both an airline and an electric tape. The pump, motor and airline were recently installed to improve the well's overall capacity. The use of the airline was a lower priority than electric tape measurements. Drawdown at this distance was expected to be slight and the airline would not likely provide the needed accuracy. The airline itself appeared to have a slow leak above the water level and a major leak below the water level. This resulted in very inconsistent measurements. Access to an electric tape was relatively poor. An attempt to measure the water level through a plug in the column pipe resulted in a hang up and loss of over 100 feet of electric tape. Permission was received from the owner to remove a section of the discharge pipe to gain better access for measurement. This was done less than three hours prior to starting the test, which limited the amount of pre-test data necessary to establish any water level trend at the well. All subsequent measurements were made using an electric tape in the temporary access to the column pipe (Appendix B, figure B-3).

The Theis method was used to analyze the drawdown data at the Gossler well. The water level apparently began to draw down after about 2 hours of pumping. The water level continued to decline for over 35 hours after the pump was shut off, with total drawdown at that time being about 1.2 feet. The plot of data (Appendix C, figure C-4) did not match the type curve very well. Since the total drawdown was very slight, it was thought that variations in barometric pressure during the test could have influenced the water level. Copies of barometric recorder charts were obtained from the National Weather Service station at the Pendleton airport. The method in Walton (1970) was used to correct for barometric variations. The barometric efficiency of the Gossler well had to be assumed, due to the lack of sufficient pre-test data. The early drawdown data were replotted, assuming 30 percent barometric efficiency. This plot provided a more reasonable match to the type curve. Transmissivity was calculated to be 58,400 gpd/ft (7,800 ft^2/d) and storage coefficient is 1.77×10^{-3}.

The Chowning #4 well was measured with its installed airline during the test. Its water level did not respond during the test, as was expected since it seems to penetrate only the alluvial aquifer. No analysis was made of any data collected at this well (Appendix B, figure B-4).

The West well, like the #4 well, penetrates only the alluvial aquifer. Its water level was continuously recorded during the test. No response to the pumping was indicated, and no data analysis was therefore made (Appendix B, figure B-5).

The Walchli well was the most distant of the observation wells. It was measured with both an airline and an electric tape (Appendix B, figure B-6). The use of the airline was again less desirable than electric tape measurements. However, the electric tape became hung up during the early part of the drawdown test. The airline was used for a period until the electric tape could be freed and repaired. The lack of precision in the airline measurements resulted in a hydrograph that appeared to 'stair-step' during this period. The detailed hydrograph (Appendix B, figure B-7) includes only electric tape measurements at the well once they were resumed. The water level rose slightly during the first 70 hours of the drawdown test, then began to decline throughout the remainder of the drawdown and recovery phases of the test. This could be interpreted as a delayed response to the pumping and could be analyzed using the Theis method. No such analysis was attempted, however. It is believed that the results would be overly sensitive to how the pre-response water level trend were extrapolated. It seems that there is too much latitude in making that extrapolation to allow meaningful analysis

Recovery Test

The water level in the pumped well remained below the effective bottom of the airline for more than 43 hours after the pump was shut off. The recovery data collected after measurements resumed were analyzed using a variation of the Cooper-Jacob method. Residual drawdown was calculated because actual recovery could not be measured. This was plotted versus t/t', the ratio of the time since pumping started to the time since pumping stopped (Appendix C, figure C-5). Most of the data plot on a line having a water level change of 151 feet per log cycle. Transmissivity calculated from this data is 990 gpd/ft (132 ft^2/d). This is referred to as 'early' data on the plot, although it was not possible to collect the actual early recovery data. The water level was measured one additional time 9 days after the official end of the recovery test. This data point plots on a line having a water level change of 85 feet per log cycle. Transmissivity calculated from this 'late' data is 1,760 gpd/ft (235 ft^2/d).

Recovery of the water level in the Chowning #3 well was recorded until February 16, 1984. The water level was continuing to recover at that time, being slightly more than 4 feet lower than the level prior to pumping. Both the Theis and Cooper-Jacob methods were used to analyze the recovery data. For these methods, the recovery was calculated from an extrapolation of the water level trend in the drawdown phase of the test. The plot using the Theis method (Appendix C, figure C-6) matched the type curve reasonably well. The relatively long period of continuous record greatly aided the curve matching procedure. Transmissivity is calculated to be 5,150 gpd/ft (690 ft^2/d) and the storage coefficient is 2.24×10^{-3} with this method. With the usual Cooper-Jacob data plot, most of the data plot on a line having a water level recovery of 19 feet per log cycle. This results in calculated transmissivity of 7,860 gpd/ft (1,050 ft^2/d) and storage coefficient of 1.48×10^{-3} (Appendix C, figure C-7). In addition, a data plot of residual drawdown versus t/t' (Appendix C, figure C-8) was analyzed with this method. Most of the late recovery data plot on a line having a water level change of 71 feet per log cycle. The calculated transmissivity is 2,100 gpd/ft (280 ft^2/d) using this plot.

Recovery data collected from other wells were not analyzed.

Aquifer Characteristics

The aquifer characteristics of the basalt aquifer as calculated from the test data are summarized in Table 2.

Table 2. Summary of Aquifer Characteristics.

Well	Transmissivity gpd/ft (ft^2/d)	Storage Coefficient	Method
Pumped well	2,820 (377)	----	Cooper-Jacob drawdown
	990 (132)	----	Cooper-Jacob early recovery
	1,760 (235)	----	Cooper-Jacob late recovery
Chowning #3	11,800 (1,580)	1.10×10^{-3}	Theis early drawdown
	2,620 (350)	6.70×10^{-4}	Theis late drawdown
	3,735 (500)	4.86×10^{-4}	Cooper-Jacob drawdown
	7,860 (1,050)	1.48×10^{-3}	Cooper-Jacob recovery
	5,150 (690)	2.24×10^{-3}	Theis recovery
	2,100 (280)	----	Cooper-Jacob recovery (s' vs. t/t')
Gossler	58,400 (7,800)	1.77×10^{-3}	Theis drawdown

The transmissivity of the basalt aquifer ranges from 990 to 58,400 gpd/ft (132 to 7,800 ft^2/d). The transmissivity calculated at the Gossler well is suspect because no pre-test water level trend was established there and the barometric efficiency of the well was unknown. Excepting this figure, the average transmissivity in the area of the test is about 4,300 gpd/ft (575 ft^2/d). This is rather low when compared to the average for other aquifer tests in the Umatilla Basin. However, the results of a nearby test, conducted at the City of Stanfield #4 well by department personnel (Oberlander and Almy, 1979), indicated transmissivity to be very comparable to the above results. The transmissivity appears to be lower in the vicinity of the pumped well and as the cone of depression expanded, areas of greater transmissivity were intercepted. The storage coefficient is somewhat higher than the average for other aquifer tests, including the above mentioned Stanfield test. The delay in response of the observation wells may be partly the result of this feature.

The test did not indicate the presence of any hydraulic boundary, such as was confirmed by the Stanfield test. However, if the pumping period were longer, or more complete data were collected at the pumping well, a hydraulic boundary may have been detected. The response of the #3 well during the test was not expected because of the difference in water level elevation between it and the pumped well. It may be speculated that the water level in the #3 well could be elevated as a result of commingling of alluvial and basalt ground water. However, the quantity of cascading water in the well appears to be minor. In the absence of additional information, it is presumed that the water level reflects only the basalt aquifer.

Geology and Hydrogeology

Wells measured in this test penetrate either a regional basalt aquifer or an overlying and less areally extensive alluvial aquifer. The basalt aquifer is developed in rocks of the Columbia River Basalt Group, which is a thick sequence of many individual flood basalt flows. They were formed by volcanic eruptions over a period of several million years, beginning during Miocene time, about 16 to 17 million years ago. Individual basalt flows typically have a chilled and occasionally vesicular basal contact, a dense central portion, and are often vesicular and/or weathered at the top. The weathered and vesicular flow tops and bottoms are known as interflow zones. The interflow zones, and any interbeds of sedimentary deposits, which are sometimes present, are usually more permeable than the more dense central portions of the flows. The basalt forms the most important regional ground water reservoir in the area of the test. Its hydrogeology is difficult to study because many of the interbeds and interflow zones are hydraulically distinct and behave as individual aquifers. However, many deep wells penetrate multiple interflows to produce the maximum quantity of water. Also, the basalt aquifer is often compartmentalized by faults, folds, or stratigraphic pinching out of flows. These features are often poorly exposed because of overlying sedimentary or windblown deposits.

The regional basalt aquifer is the subject of an ongoing investigation to determine whether this area, known as the Stage Gulch area, should be declared a critical ground water area. Water level declines, interference between wells, and overdraft of the ground water resource have been documented and were the criteria used for the initiation of critical area proceedings. Water level declines continue in several of the basalt wells measured in this test (Appendix B, figure B-8). The results of this investigation will be published as a ground water report prior to any final critical ground water area determination.

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APPENDIX A

WATER LEVEL DATA

Pumped Well

Date and Time	Water Level Below l.s.d.	t, in minutes since pump on	t', in minutes since pump off	t/t'	s, in feet	s', in feet
1/17/84 16:30	320.00					
1/19/84 11:10	322.30					
1/20/84 10:50	320.60					
1/24/84 11:30	320.92					
1/25/84 11:15	321.95					
1/25/84 12:02	pump on					
1/25/84 12:05	325.53	3			3.58	
1/25/84 12:07	326.11	5			4.16	
1/25/84 12:11	326.69	9			4.74	
1/25/84 12:23	329.58	21			7.63	
1/25/84 12:42	332.35	40			10.40	
1/25/84 12:54	333.62	52			11.67	
1/25/84 13:02	334.66	60			12.71	
1/25/84 13:15	335.58	73			13.63	
1/25/84 13:28	337.08	86			15.13	
1/25/84 13:42	338.24	100			16.29	
1/25/84 13:52	339.39	110			17.44	
1/25/84 14:03	339.97	121			18.02	
1/25/84 14:12	340.55	130			18.60	
1/25/84 14:24	341.70	142			19.75	
1/25/84 14:33	342.74	151			20.79	
1/25/84 15:02	344.59	180			22.64	
1/25/84 15:40	346.32	218			24.37	
1/25/84 16:55	350.37	293			28.42	
1/25/84 17:55	354.99	353			33.04	
1/25/84 19:15	358.45	433			36.50	
1/25/84 20:02	360.76	480			38.81	
1/25/84 21:02	364.23	540			42.28	
1/25/84 22:02	365.38	600			43.43	
1/28/84 12:02	pump off	4320				
1/30/84 7:20	365.38	6918	2598	2.66		43.43
1/30/84 8:48	364.23	7006	2686	2.61		42.28
1/30/84 9:42	364.23	7060	2740	2.58		42.28
1/30/84 12:07	361.92	7205	2885	2.50		39.97
1/30/84 13:02	361.92	7260	2940	2.47		39.97
1/30/84 14:02	360.76	7320	3000	2.44		38.81
1/30/84 15:02	359.61	7380	3060	2.41		37.66
1/30/84 16:02	358.45	7440	3120	2.38		36.50
1/30/84 17:02	357.30	7500	3180	2.36		35.35
1/30/84 18:02	357.30	7560	3240	2.33		35.35
1/30/84 20:02	356.14	7680	3360	2.29		34.19
1/30/84 21:02	354.99	7740	3420	2.26		33.04
1/30/84 22:02	354.99	7800	3480	2.24		33.04
1/30/84 23:02	353.83	7860	3540	2.22		31.88
1/31/84 0:25	353.83	7943	3623	2.19		31.88
1/31/84 1:02	353.25	7980	3660	2.18		31.30
1/31/84 2:23	352.68	8061	3741	2.15		30.73

Pumped Well

1/31/84 3:15	351.52	8113	3793	2.14		29.57
1/31/84 5:02	350.94	8220	3900	2.11		28.99
1/31/84 6:27	350.37	8305	3985	2.08		28.42
1/31/84 7:22	349.79	8360	4040	2.07		27.84
1/31/84 8:02	349.79	8400	4080	2.06		27.84
1/31/84 9:18	349.21	8476	4156	2.04		27.26
1/31/84 11:12	347.48	8590	4270	2.01		25.53
1/31/84 13:06	346.21	8704	4384	1.99		24.26
1/31/84 14:02	346.14	8760	4440	1.97		24.19
2/1/84 9:10	339.97	9908	5588	1.77		18.02
2/8/84 14:50	327.84	20328	16008	1.27		5.89

#3 WELL

Date and Time	Water Level Below l.s.d.	t, in minutes since pump on	t', in minutes since pump off	t/t'	s, in feet	s', in feet
1/17/84 11:15	205.80					
1/17/84 14:25	205.80					
1/18/84 11:45	206.88					
1/19/84 11:17	206.85					
1/20/84 10:10	206.74					
1/21/84 7:00	206.52					
1/22/84 4:00	206.38					
1/23/84 1:00	206.25					
1/23/84 16:28	206.22					
1/24/84 15:13	206.17					
1/25/84 0:15	206.12					
1/25/84 7:30	206.08					
1/25/84 10:28	206.08					
1/25/84 12:02	pump on					
1/25/84 12:17	206.07	15				
1/25/84 13:45	206.07	103				
1/25/84 14:00	206.08	118			0.01	
1/25/84 14:40	206.15	158			0.08	
1/25/84 16:00	206.23	238			0.16	
1/25/84 22:56	207.00	654			0.93	
1/26/84 2:15	207.42	853			1.35	
1/26/84 3:41	207.74	939			1.67	
1/26/84 6:11	208.08	1089			2.01	
1/26/84 8:42	208.52	1240			2.45	
1/26/84 11:33	209.02	1411			2.95	
1/26/84 12:58	209.20	1496			3.13	
1/26/84 16:45	210.00	1723			3.93	
1/26/84 19:22	210.58	1880			4.51	
1/26/84 21:15	211.00	1993			4.93	
1/27/84 1:15	211.90	2233			5.83	
1/27/84 3:30	212.44	2368			6.37	
1/27/84 6:55	213.30	2573			7.23	
1/27/84 9:43	214.06	2741			7.99	
1/27/84 10:47	214.36	2805			8.29	
1/27/84 12:00	214.61	2878			8.54	
1/27/84 14:00	215.13	2998			9.06	
1/27/84 17:30	216.13	3208			10.06	
1/27/84 21:00	217.12	3418			11.05	
1/27/84 23:57	217.88	3595			11.81	
1/28/84 1:04	218.21	3662			12.14	
1/28/84 3:00	218.72	3778			12.65	
1/28/84 7:10	219.82	4028			13.75	
1/28/84 9:37	220.50	4175			14.43	
1/28/84 10:30	220.72	4228			14.65	
1/28/84 12:02	pump off	4320				
1/28/84 13:58	221.30	4436	116	38.24	15.23	15.23
1/28/84 19:00	222.62	4738	418	11.33	16.55	16.55

#3 WELL

1/29/84	0:51	223.75	5089	769	6.62	17.68	17.68
1/29/84	7:08	224.49	5466	1146	4.77	18.42	18.42
1/29/84	9:57	224.74	5635	1315	4.29	18.67	18.67
1/29/84	11:44	224.83	5742	1422	4.04	18.76	18.76
1/29/84	17:35	225.10	6093	1773	3.44	19.03	19.03
1/29/84	22:02	225.12	6360	2040	3.12	19.05	19.05
1/30/84	3:13	225.07	6671	2351	2.84		19.00
1/30/84	7:05	224.95	6903	2583	2.67		18.88
1/30/84	9:58	224.81	7076	2756	2.57		18.74
1/30/84	11:37	224.74	7175	2855	2.51		18.67
1/30/84	16:56	224.49	7494	3174	2.36		18.42
1/30/84	23:22	224.20	7880	3560	2.21		18.13
1/31/84	3:11	224.04	8109	3789	2.14		17.97
1/31/84	6:33	223.84	8311	3991	2.08		17.77
1/31/84	9:54	223.54	8512	4192	2.03		17.47
1/31/84	14:45	223.12	8803	4483	1.96		17.05
1/31/84	19:00	222.69	9058	4738	1.91		16.62
2/1/84	1:00	222.20	9418	5098	1.85		16.13
2/1/84	5:00	221.86	9658	5338	1.81		15.79
2/1/84	8:58	221.54	9896	5576	1.77		15.47
2/1/84	14:00	221.20	10198	5878	1.73		15.13
2/1/84	20:00	220.74	10558	6238	1.69		14.67
2/2/84	2:00	220.34	10918	6598	1.65		14.27
2/2/84	8:00	219.84	11278	6958	1.62		13.77
2/2/84	14:00	219.36	11638	7318	1.59		13.29
2/2/84	20:00	218.96	11998	7678	1.56		12.89
2/3/84	2:00	218.63	12358	8038	1.54		12.56
2/3/84	8:00	218.23	12718	8398	1.51		12.16
2/3/84	14:00	217.92	13078	8758	1.49		11.85
2/3/84	20:00	217.58	13438	9118	1.47		11.51
2/4/84	2:00	217.35	13798	9478	1.46		11.28
2/4/84	8:00	217.04	14158	9838	1.44		10.97
2/4/84	14:00	216.77	14518	10198	1.42		10.70
2/4/84	20:00	216.46	14878	10558	1.41		10.39
2/5/84	2:00	216.25	15238	10918	1.40		10.18
2/5/84	8:00	215.94	15598	11278	1.38		9.87
2/5/84	14:00	215.71	15958	11638	1.37		9.64
2/5/84	20:00	215.45	16318	11998	1.36		9.38
2/6/84	2:00	215.32	16678	12358	1.35		9.25
2/6/84	8:00	215.16	17038	12718	1.34		9.09
2/6/84	14:00	214.99	17398	13078	1.33		8.92
2/6/84	20:00	214.80	17758	13438	1.32		8.73
2/7/84	2:00	214.67	18118	13798	1.31		8.60
2/7/84	8:00	214.50	18478	14158	1.31		8.43
2/7/84	14:00	214.33	18838	14518	1.30		8.26
2/7/84	20:00	214.12	19198	14878	1.29		8.05
2/8/84	2:00	213.93	19558	15238	1.28		7.86
2/8/84	8:00	213.75	19918	15598	1.28		7.68
2/8/84	14:25	213.44	20303	15983	1.27		7.37

#3 WELL

2/8/84 20:00	213.30	20638	16318	1.26		7.23
2/9/84 2:00	213.10	20998	16678	1.26		7.03
2/9/84 8:00	212.96	21358	17038	1.25		6.89
2/9/84 14:00	212.81	21718	17398	1.25		6.74
2/9/84 20:00	212.71	22078	17758	1.24		6.64
2/10/84 2:00	212.60	22438	18118	1.24		6.53
2/10/84 14:00	212.47	23158	18838	1.23		6.40
2/11/84 2:00	212.33	23878	19558	1.22		6.26
2/11/84 14:00	212.00	24598	20278	1.21		5.93
2/12/84 2:00	211.84	25318	20998	1.21		5.77
2/12/84 14:00	211.49	26038	21718	1.20		5.42
2/13/84 2:00	211.40	26758	22438	1.19		5.33
2/13/84 14:00	211.19	27478	23158	1.19		5.12
2/14/84 2:00	211.18	28198	23878	1.18		5.11
2/14/84 14:00	211.17	28918	24598	1.18		5.10
2/15/84 2:00	210.90	29638	25318	1.17		4.83
2/15/84 14:00	210.69	30358	26038	1.17		4.62
2/16/84 2:00	210.51	31078	26758	1.16		4.44
2/16/84 9:30	210.40	31528	27208	1.16		4.33

Gossler Well

Date and Time	Water Level Below l.s.d.	t, in minutes since pump on	t', in minutes since pump off	t/t'	s, in feet	s', in feet
1/25/84 9:20	303.57					
1/25/84 12:02	pump on					
1/25/84 12:22	303.58	20				
1/25/84 13:00	303.54	58				
1/25/84 13:43	303.54	101				
1/25/84 14:13	303.56	131			0.02	
1/25/84 14:35	303.56	153			0.02	
1/25/84 16:18	303.58	256			0.04	
1/25/84 17:22	303.58	320			0.04	
1/25/84 18:35	303.61	393			0.07	
1/25/84 19:42	303.63	460			0.09	
1/25/84 20:32	303.63	510			0.09	
1/25/84 21:37	303.64	575			0.10	
1/25/84 22:42	303.64	640			0.10	
1/25/84 23:32	303.64	690			0.10	
1/26/84 1:05	303.65	783			0.11	
1/26/84 1:53	303.67	831			0.13	
1/26/84 3:30	303.69	928			0.15	
1/26/84 5:32	303.71	1050			0.17	
1/26/84 6:40	303.74	1118			0.20	
1/26/84 7:30	303.76	1168			0.22	
1/26/84 9:26	303.79	1284			0.25	
1/26/84 11:18	303.81	1396			0.27	
1/26/84 12:47	303.81	1485			0.27	
1/26/84 14:02	303.81	1560			0.27	
1/26/84 15:02	303.82	1620			0.28	
1/26/84 16:42	303.86	1720			0.32	
1/26/84 17:58	303.88	1796			0.34	
1/26/84 19:48	303.92	1906			0.38	
1/26/84 21:02	303.95	1980			0.41	
1/26/84 22:27	303.95	2065			0.41	
1/27/84 0:07	303.96	2165			0.42	
1/27/84 1:28	303.94	2246			0.40	
1/27/84 3:36	303.93	2374			0.39	
1/27/84 5:33	303.95	2491			0.41	
1/27/84 7:21	303.97	2599			0.43	
1/27/84 9:33	304.01	2731			0.47	
1/27/84 11:31	304.06	2849			0.52	
1/27/84 12:47	304.10	2925			0.56	
1/27/84 14:32	304.10	3030			0.56	
1/27/84 16:32	304.14	3150			0.60	
1/27/84 18:27	304.20	3265			0.66	
1/27/84 20:32	304.30	3390			0.76	
1/27/84 22:32	304.32	3510			0.78	
1/28/84 1:18	304.36	3676			0.82	
1/28/84 2:30	304.35	3748			0.81	
1/28/84 4:50	304.35	3888			0.81	

Gossler Well

1/28/84	7:48	304.36	4066			0.82	
1/28/84	9:48	304.38	4186			0.84	
1/28/84	11:19	304.36	4277			0.82	
1/28/84	12:00	304.37	4318			0.83	
1/28/84	12:02	304.37	4320			0.83	
1/28/84	12:27	304.37	4345	25	173.80	0.83	0.83
1/28/84	12:52	304.37	4370	50	87.40	0.83	0.83
1/28/84	13:15	304.37	4393	73	60.18	0.83	0.83
1/28/84	13:35	304.38	4413	93	47.45	0.84	0.84
1/28/84	13:57	304.38	4435	115	38.57	0.84	0.84
1/28/84	14:42	304.39	4480	160	28.00	0.85	0.85
1/28/84	16:02	304.39	4560	240	19.00	0.85	0.85
1/28/84	16:42	304.42	4600	280	16.43	0.88	0.88
1/28/84	17:25	304.49	4643	323	14.37	0.95	0.95
1/28/84	18:15	304.53	4693	373	12.58	0.99	0.99
1/28/84	19:07	304.53	4745	425	11.16	0.99	0.99
1/28/84	20:47	304.56	4845	525	9.23	1.02	1.02
1/28/84	21:22	304.57	4880	560	8.71	1.03	1.03
1/28/84	22:27	304.59	4945	625	7.91	1.05	1.05
1/28/84	23:27	304.62	5005	685	7.31	1.08	1.08
1/29/84	0:42	304.61	5080	760	6.68	1.07	1.07
1/29/84	2:37	304.59	5195	875	5.94	1.05	1.05
1/29/84	3:35	304.60	5253	933	5.63	1.06	1.06
1/29/84	5:36	304.62	5374	1054	5.10	1.08	1.08
1/29/84	7:38	304.64	5496	1176	4.67	1.10	1.10
1/29/84	8:58	304.65	5576	1256	4.44	1.11	1.11
1/29/84	11:34	304.69	5732	1412	4.06	1.15	1.15
1/29/84	12:27	304.71	5785	1465	3.95	1.17	1.17
1/29/84	13:52	304.71	5870	1550	3.79	1.17	1.17
1/29/84	14:22	304.69	5900	1580	3.73	1.15	1.15
1/29/84	16:27	304.68	6025	1705	3.53	1.14	1.14
1/29/84	17:22	304.68	6080	1760	3.45	1.14	1.14
1/29/84	18:22	304.68	6140	1820	3.37	1.14	1.14
1/29/84	19:22	304.74	6200	1880	3.30	1.20	1.20
1/29/84	20:55	304.72	6293	1973	3.19	1.18	1.18
1/29/84	22:27	304.76	6385	2065	3.09	1.22	1.22
1/29/84	23:22	304.76	6440	2120	3.04	1.22	1.22
1/30/84	0:58	304.74	6536	2216	2.95		1.20
1/30/84	3:02	304.68	6660	2340	2.85		1.14
1/30/84	5:30	304.68	6808	2488	2.74		1.14
1/30/84	6:55	304.67	6893	2573	2.68		1.13
1/30/84	8:40	304.68	6998	2678	2.61		1.14
1/30/84	11:27	304.65	7165	2845	2.52		1.11
1/30/84	12:37	304.63	7235	2915	2.48		1.09
1/30/84	13:22	304.61	7280	2960	2.46		1.07
1/30/84	14:37	304.57	7355	3035	2.42		1.03
1/30/84	16:27	304.56	7465	3145	2.37		1.02
1/30/84	17:27	304.56	7525	3205	2.35		1.02
1/30/84	18:22	304.56	7580	3260	2.33		1.02

Gossler Well

1/30/84 20:27	304.55	7705	3385	2.28		1.01
1/30/84 21:27	304.55	7765	3445	2.25		1.01
1/30/84 22:27	304.54	7825	3505	2.23		1.00
1/30/84 23:32	304.53	7890	3570	2.21		0.99
1/31/84 0:33	304.49	7951	3631	2.19		0.95
1/31/84 2:52	304.44	8090	3770	2.15		0.90
1/31/84 5:28	304.38	8246	3926	2.10		0.84
1/31/84 6:57	304.33	8335	4015	2.08		0.79
1/31/84 9:08	304.30	8466	4146	2.04		0.76
1/31/84 11:02	304.29	8580	4260	2.01		0.75

#4 Well

Date and Time	Water Level Below l.s.d.	t, in minutes since pump on	t', in minutes since pump off	t/t'
1/19/84 9:30	138.76			
1/25/84 11:40	139.33			
1/25/84 12:02	139.91			
1/25/84 12:35	139.91	33		
1/25/84 13:00	139.91	58		
1/26/84 9:10	139.22	1268		
1/26/84 14:42	139.22	1600		
1/27/84 23:00	139.22	3538		
1/28/84 11:55	138.76	4313		
1/28/84 12:02	pump off	4320		
1/31/84 13:09	138.76	8707	4387	1.98

West Well

Date and Time	Water Level	t, in minutes	t', in minutes	t/t'
	below l.s.d.	since pump on	since pump off	
1/17/84 9:45	63.38			
1/18/84 10:45	63.52			
1/18/84 18:00	63.48			
1/19/84 0:01	63.5			
1/19/84 8:40	63.54			
1/19/84 14:55	63.57			
1/20/84 10:00	63.54			
1/20/84 10:35	63.52			
1/20/84 22:00	63.41			
1/21/84 10:00	63.34			
1/23/84 16:36	63.19			
1/24/84 15:13	63.25			
1/25/84 10:30	63.23			
1/25/84 12:02	pump on			
1/25/84 12:15	63.22	13		
1/25/84 15:52	63.23	230		
1/25/84 22:58	63.32	656		
1/26/84 3:43	63.38	941		
1/26/84 10:50	63.44	1368		
1/27/84 1:16	63.39	2234		
1/27/84 9:45	63.39	2743		
1/28/84 1:05	63.41	3663		
1/28/84 7:11	63.39	4029		
1/28/84 12:02	pump off	4320		
1/28/84 12:55	63.32	4373	53	82.51
1/29/84 0:52	63.36	5090	770	6.61
1/29/84 7:09	63.39	5467	1147	4.77
1/29/84 11:45	63.43	5743	1423	4.04
1/29/84 19:37	63.43	6215	1895	3.28
1/30/84 7:06	63.44	6904	2584	2.67
1/31/84 1:00	63.39	7978	3658	2.18
1/31/84 6:37	63.36	8315	3995	2.08
1/31/84 9:27	63.35	8485	4165	2.04
1/31/84 9:32	63.35	8490	4170	2.04
1/31/84 10:06	63.24	8524	4204	2.03

Walchli Well

Date and Time	Water Level	t, in minutes	t', in minutes	t/t'
	Below l.s.d.	since pump on	since pump off	
1/20/84 8:50	296.33			
1/25/84 12:02	pump on			
1/25/84 14:00	293.09	118		
1/25/84 14:25	293.09	143		
1/25/84 14:45	293.09	163		
1/25/84 16:05	293.09	243		
1/25/84 17:12	292.17	310		
1/25/84 18:22	292.17	380		
1/25/84 19:32	292.17	450		
1/25/84 20:20	292.17	498		
1/25/84 21:22	292.17	560		
1/25/84 22:25	292.17	623		
1/25/84 23:17	292.17	675		
1/26/84 0:28	293.33	746		
1/26/84 2:14	293.33	852		
1/26/84 3:15	293.33	913		
1/26/84 5:20	293.33	1038		
1/26/84 6:25	293.33	1103		
1/26/84 7:52	293.33	1190		
1/26/84 8:32	293.38	1230		
1/26/84 11:03	293.35	1381		
1/26/84 12:32	293.35	1470		
1/26/84 13:52	293.35	1550		
1/26/84 14:52	293.35	1610		
1/26/84 16:27	293.35	1705		
1/26/84 17:47	293.35	1785		
1/26/84 19:32	293.35	1890		
1/26/84 20:47	293.35	1965		
1/26/84 22:17	293.35	2055		
1/26/84 23:57	293.35	2155		
1/27/84 1:04	293.33	2222		
1/27/84 2:20	293.30	2298		
1/27/84 3:23	293.29	2361		
1/27/84 5:15	293.30	2473		
1/27/84 7:08	293.30	2586		
1/27/84 9:17	293.28	2715		
1/27/84 11:15	293.17	2833		
1/27/84 12:37	293.16	2915		
1/27/84 14:17	293.13	3015		
1/27/84 16:22	293.13	3140		
1/27/84 18:17	293.11	3255		
1/27/84 20:17	293.10	3375		
1/27/84 22:17	293.06	3495		
1/28/84 0:55	293.05	3653		
1/28/84 2:48	293.04	3766		
1/28/84 4:15	292.99	3853		
1/28/84 7:25	292.92	4043		

Walchli Well

1/28/84	9:58	292.88	4196		
1/28/84	11:09	292.99	4267		
1/28/84	12:02	pump off	4320		
1/28/84	12:17	293.13	4335	15	289.00
1/28/84	12:37	293.13	4355	35	124.43
1/28/84	13:07	293.13	4385	65	67.46
1/28/84	13:24	293.14	4402	82	53.68
1/28/84	13:47	293.14	4425	105	42.14
1/28/84	14:32	293.14	4470	150	29.80
1/28/84	15:53	293.13	4551	231	19.70
1/28/84	16:32	293.17	4590	270	17.00
1/28/84	17:12	293.17	4630	310	14.94
1/28/84	18:02	293.17	4680	360	13.00
1/28/84	18:57	293.20	4735	415	11.41
1/28/84	20:32	293.24	4830	510	9.47
1/28/84	21:12	293.32	4870	550	8.85
1/28/84	22:12	293.28	4930	610	8.08
1/28/84	23:15	293.31	4993	673	7.42
1/29/84	0:19	293.32	5057	737	6.86
1/29/84	2:20	293.33	5178	858	6.03
1/29/84	3:18	293.34	5236	916	5.72
1/29/84	5:20	293.35	5358	1038	5.16
1/29/84	7:20	293.36	5478	1158	4.73
1/29/84	9:18	293.34	5596	1276	4.39
1/29/84	11:20	293.36	5718	1398	4.09
1/29/84	12:12	293.43	5770	1450	3.98
1/29/84	13:42	293.44	5860	1540	3.81
1/29/84	14:12	293.46	5890	1570	3.75
1/29/84	16:12	293.47	6010	1690	3.56
1/29/84	17:12	293.53	6070	1750	3.47
1/29/84	18:12	293.57	6130	1810	3.39
1/29/84	19:12	293.59	6190	1870	3.31
1/29/84	20:32	293.60	6270	1950	3.22
1/29/84	22:17	293.67	6375	2055	3.10
1/29/84	23:12	293.64	6430	2110	3.05
1/30/84	0:45	293.67	6523	2203	2.96
1/30/84	5:12	293.68	6790	2470	2.75
1/30/84	6:40	293.71	6878	2558	2.69
1/30/84	9:02	293.77	7020	2700	2.60
1/30/84	11:15	293.79	7153	2833	2.52
1/30/84	12:27	293.84	7225	2905	2.49
1/30/84	13:12	293.85	7270	2950	2.46
1/30/84	14:22	293.86	7340	3020	2.43
1/30/84	15:22	293.89	7400	3080	2.40
1/30/84	16:12	293.89	7450	3130	2.38
1/30/84	17:12	293.91	7510	3190	2.35
1/30/84	18:12	293.91	7570	3250	2.33
1/30/84	20:12	293.91	7690	3370	2.28
1/30/84	21:12	293.95	7750	3430	2.26

Walchli Well

1/30/84	22:12	293.95	7810	3490	2.24
1/30/84	23:12	293.95	7870	3550	2.22
1/31/84	0:48	293.95	7966	3646	2.18
1/31/84	2:38	293.97	8076	3756	2.15
1/31/84	5:14	293.97	8232	3912	2.10
1/31/84	6:43	293.98	8321	4001	2.08
1/31/84	8:42	294.04	8440	4120	2.05
1/31/84	10:42	294.07	8560	4240	2.02
2/8/84	15:00	293.58	20338	16018	1.27

APPENDIX B

HYDROGRAPHS

Figure B-1. Hydrograph for Pumped Well

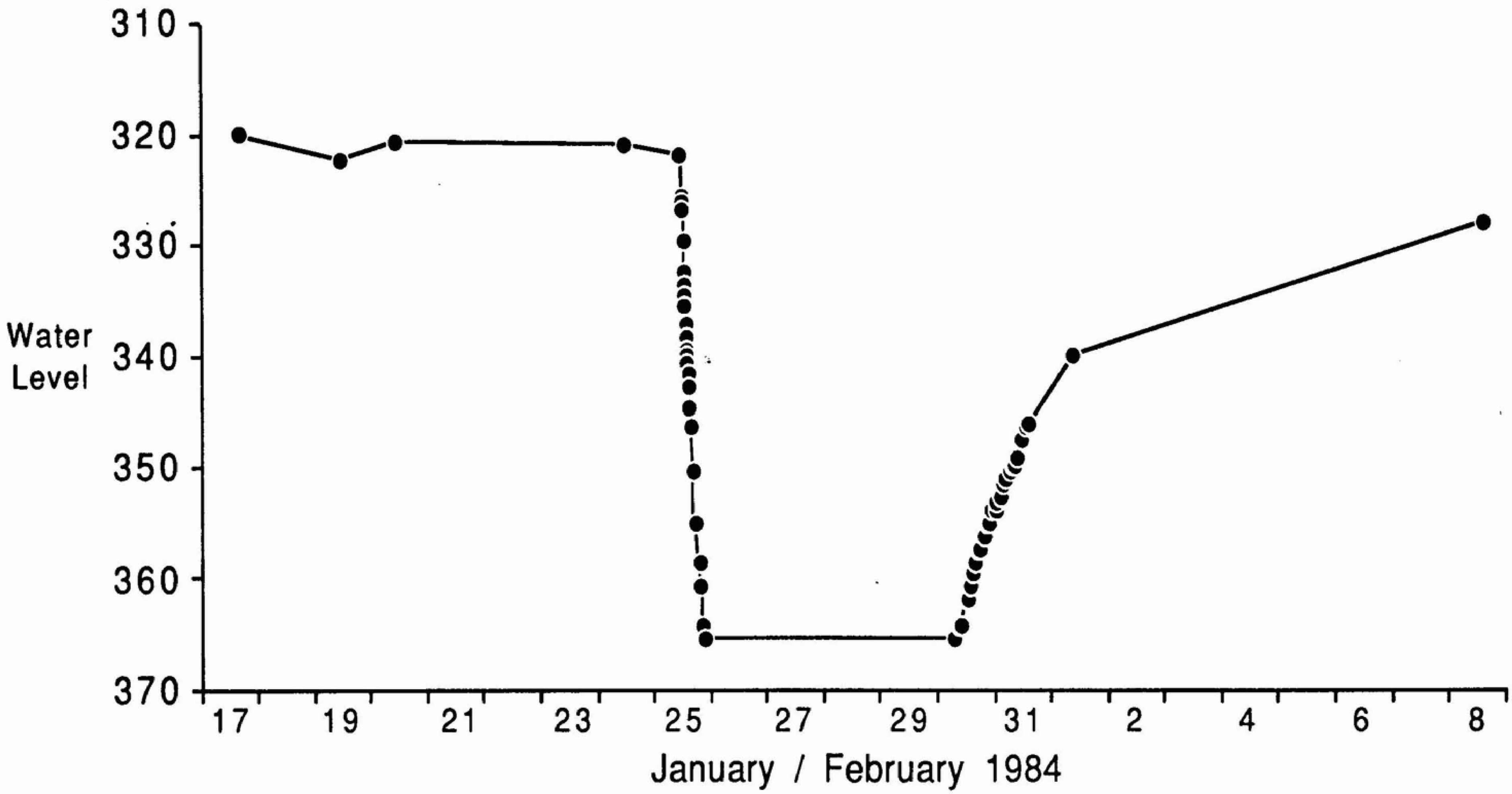


Figure B-2. Hydrograph for Number 3 Well

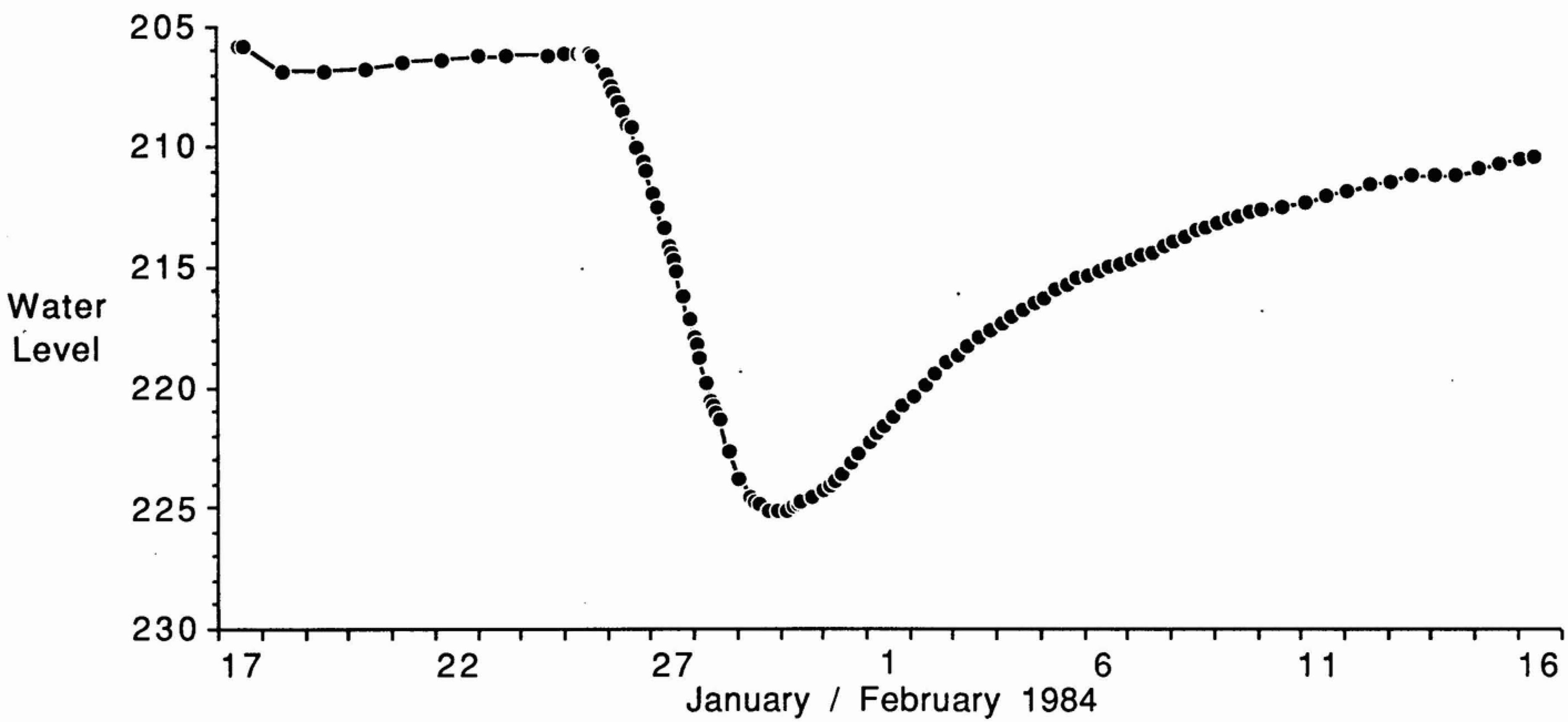


Figure B-3. Hydrograph for Gossler Well

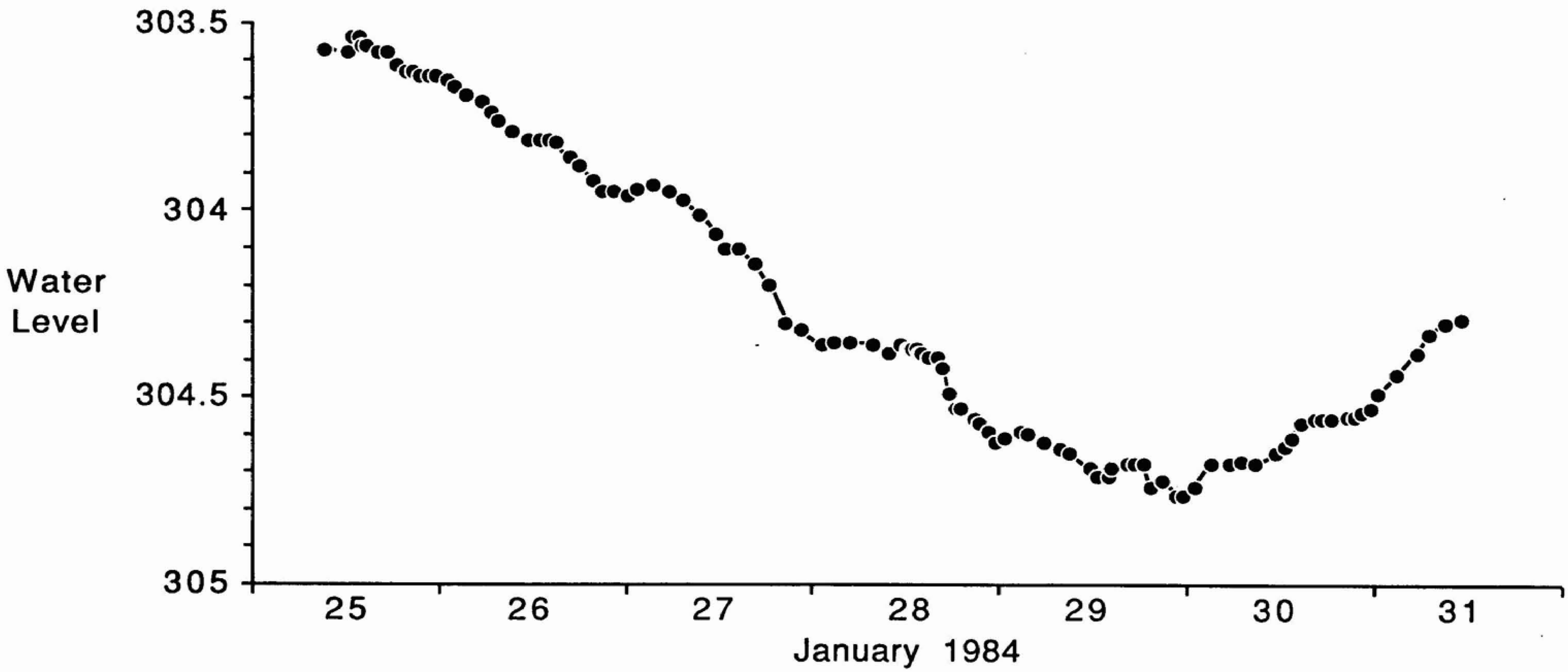
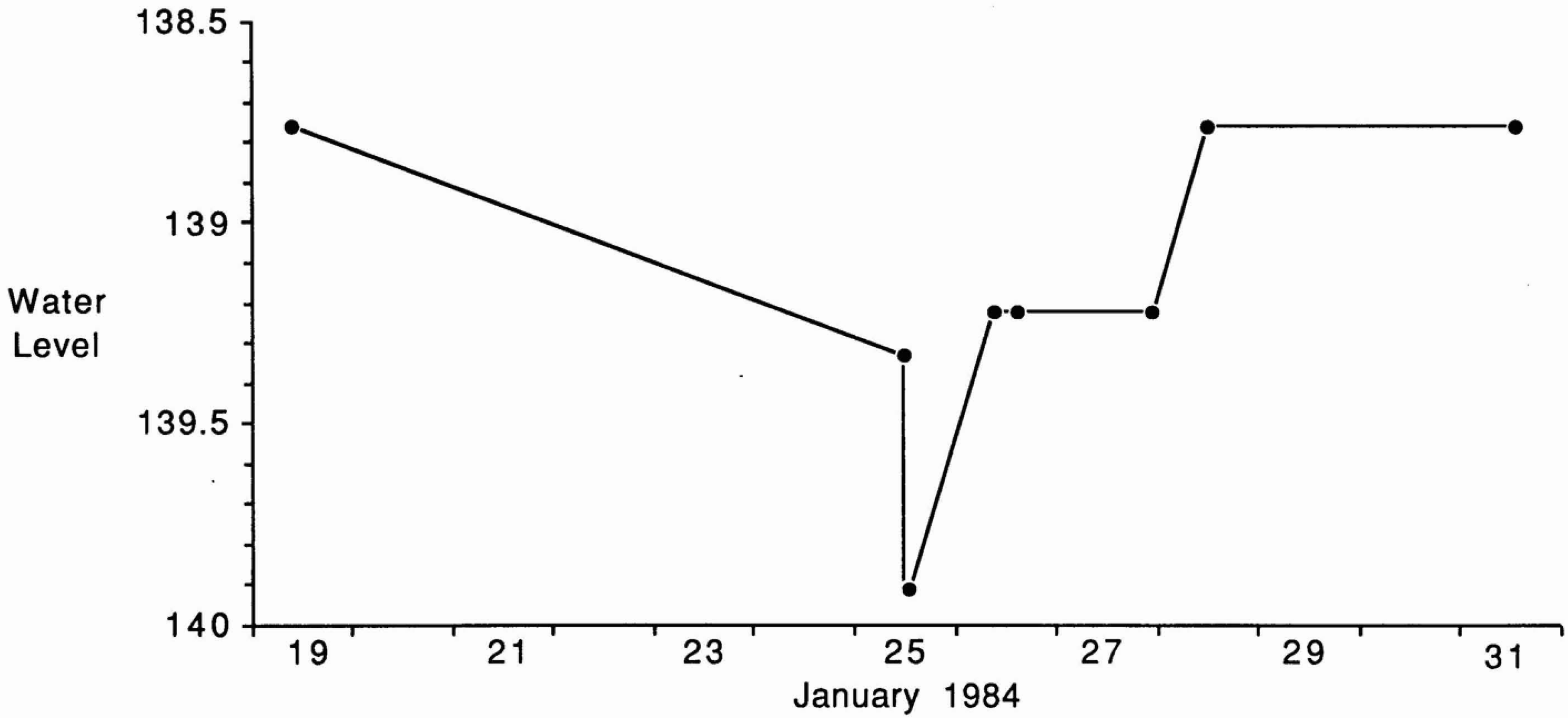


Figure B-4. Hydrograph for Number 4 Well



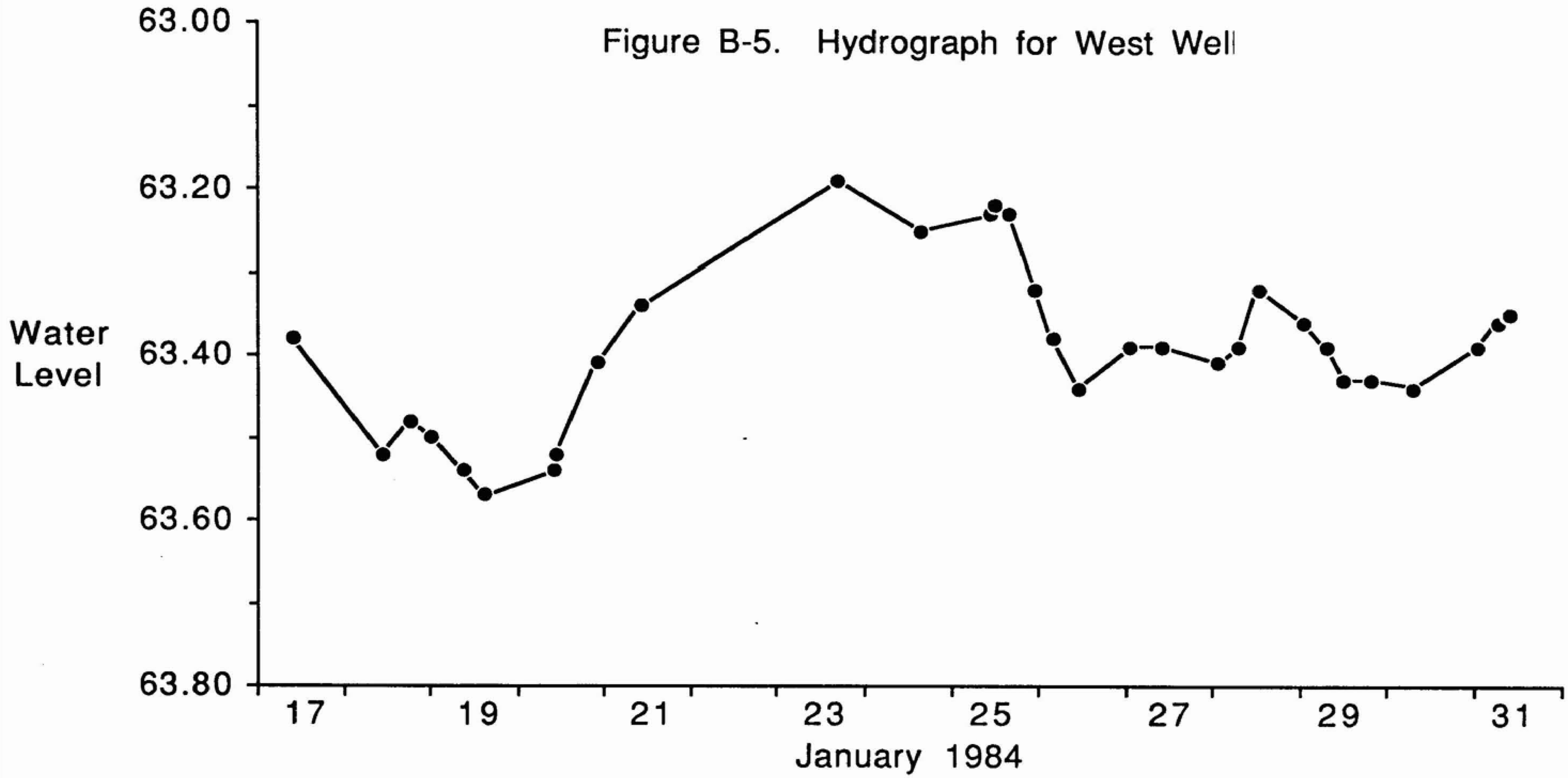


Figure B-5. Hydrograph for West Well

Figure B-6. Hydrograph for Walchli Well

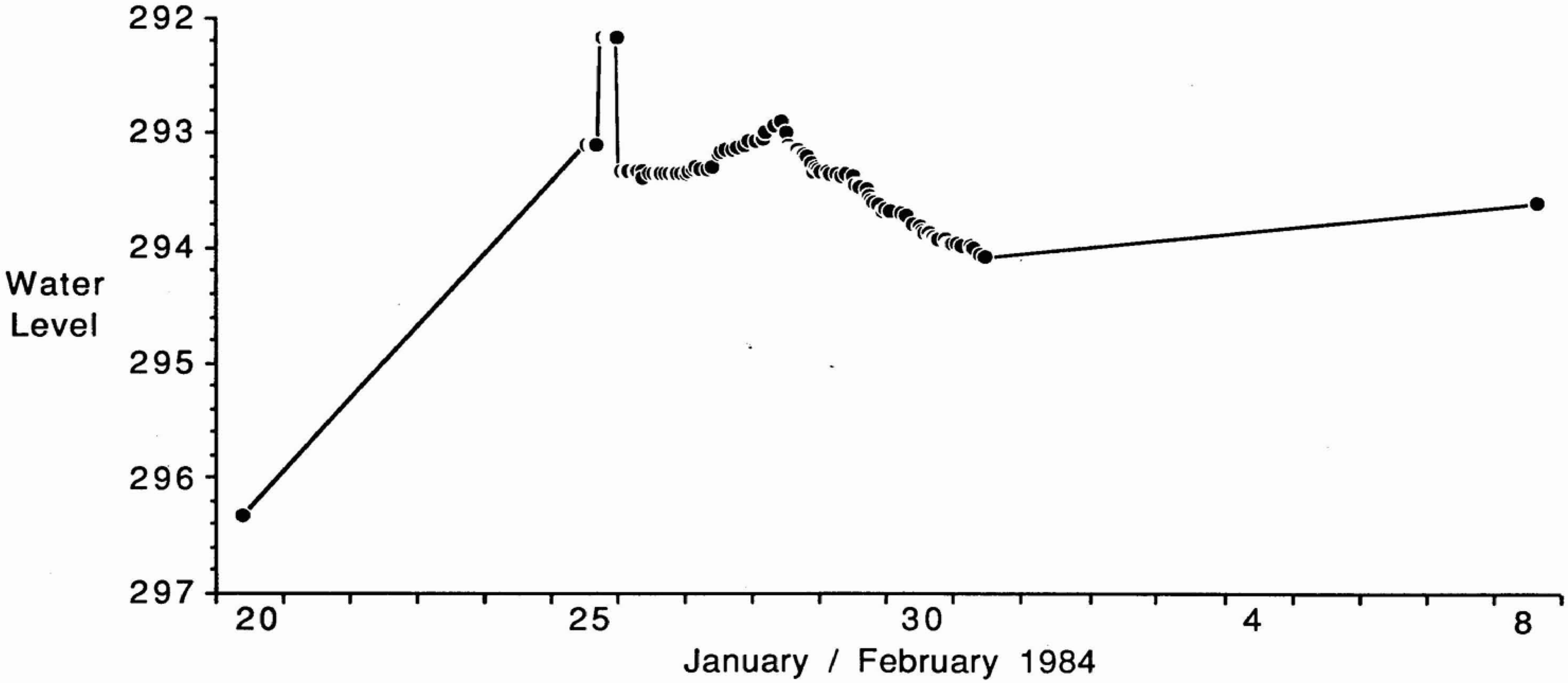
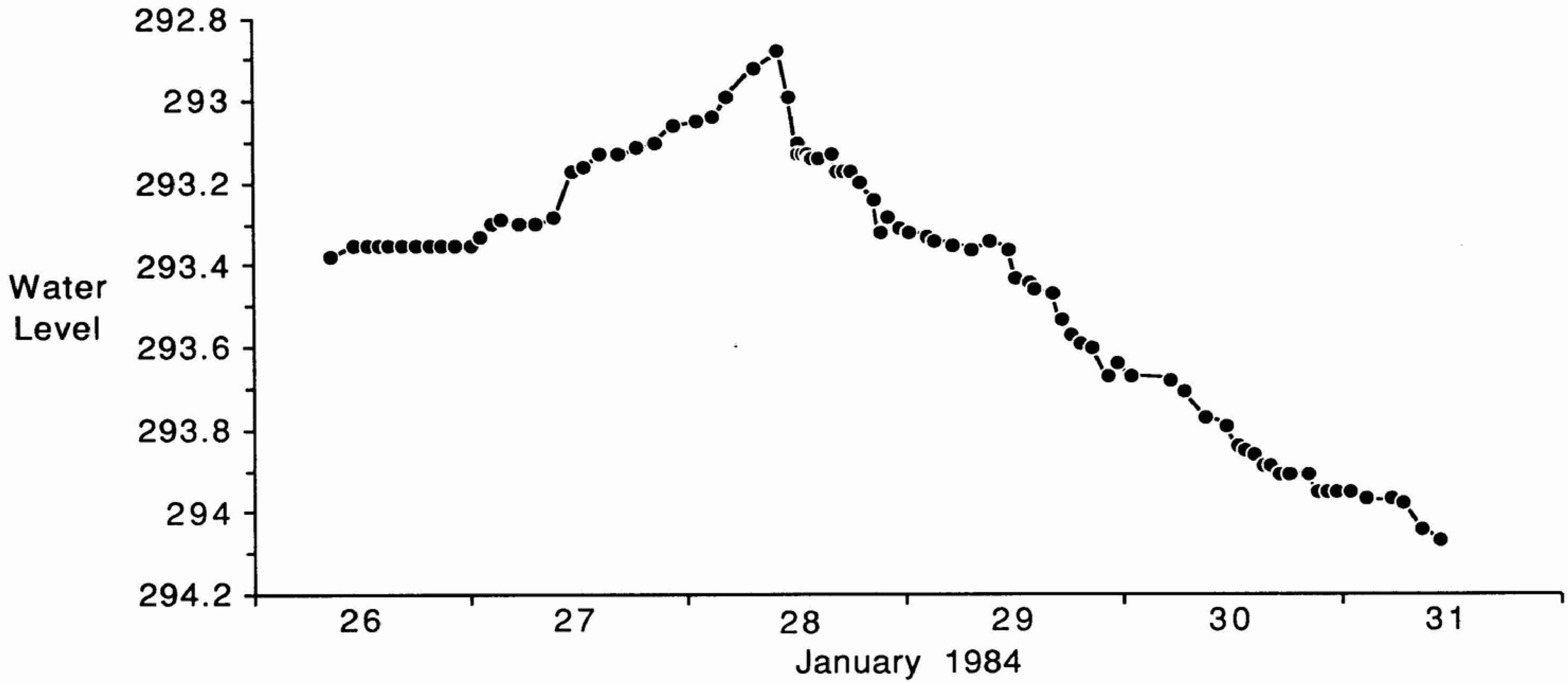


Figure B-7. Detailed Hydrograph for Walchli Well



APPENDIX C

ANALYTICAL GRAPHS OF TEST DATA

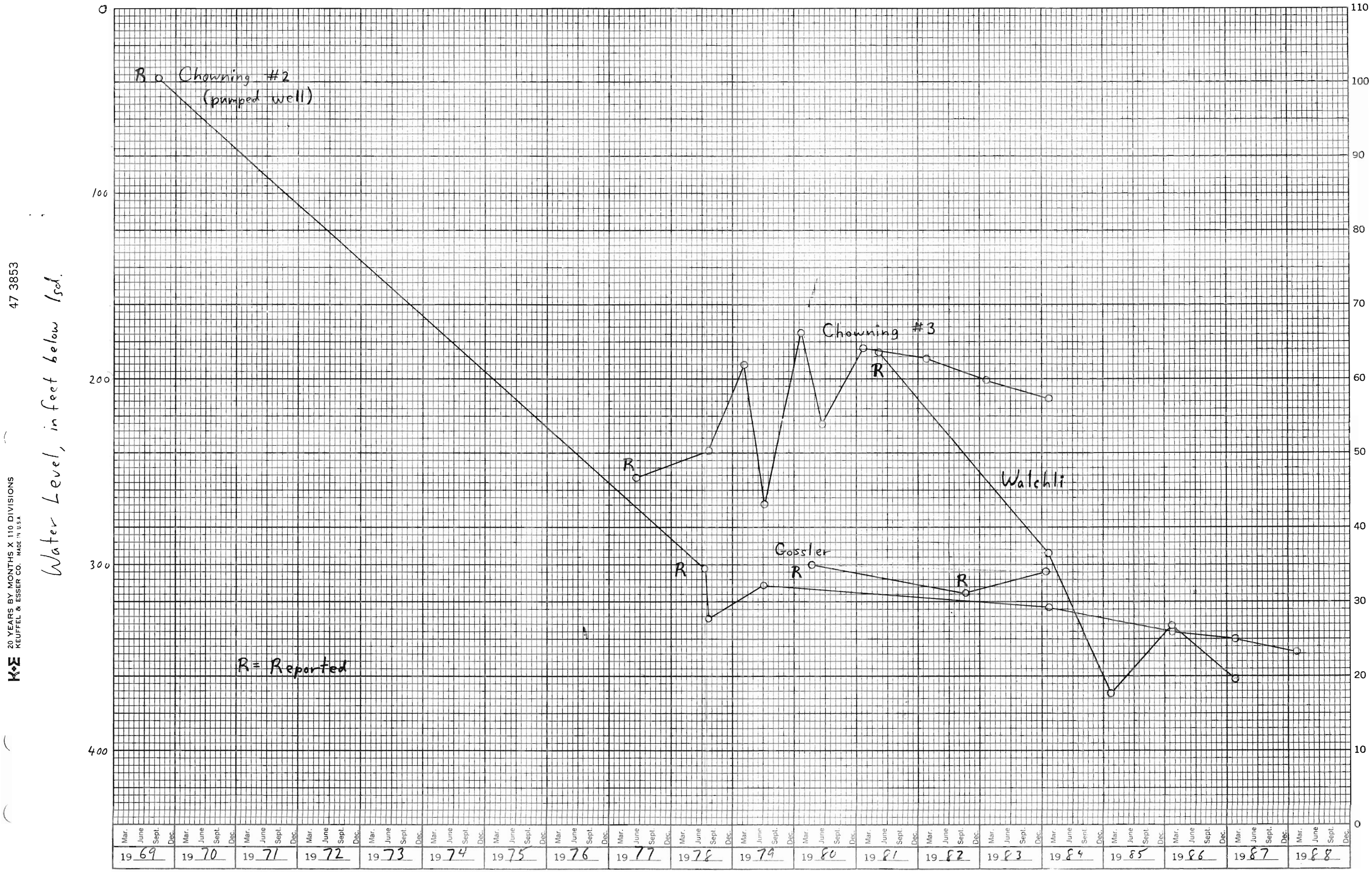


Figure B-8. Long term hydrographs for the four basalt wells.

Figure C-1. Semi-log Plot of
Time vs. Drawdown for Pumped Well

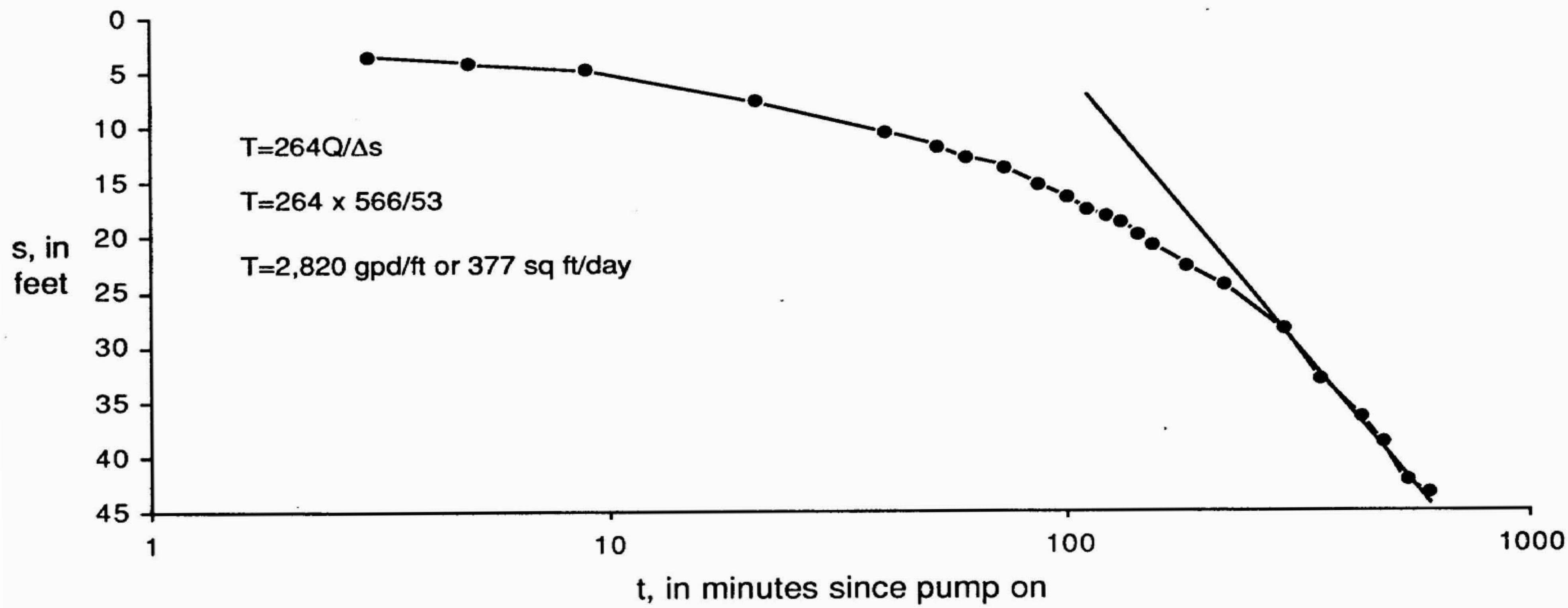
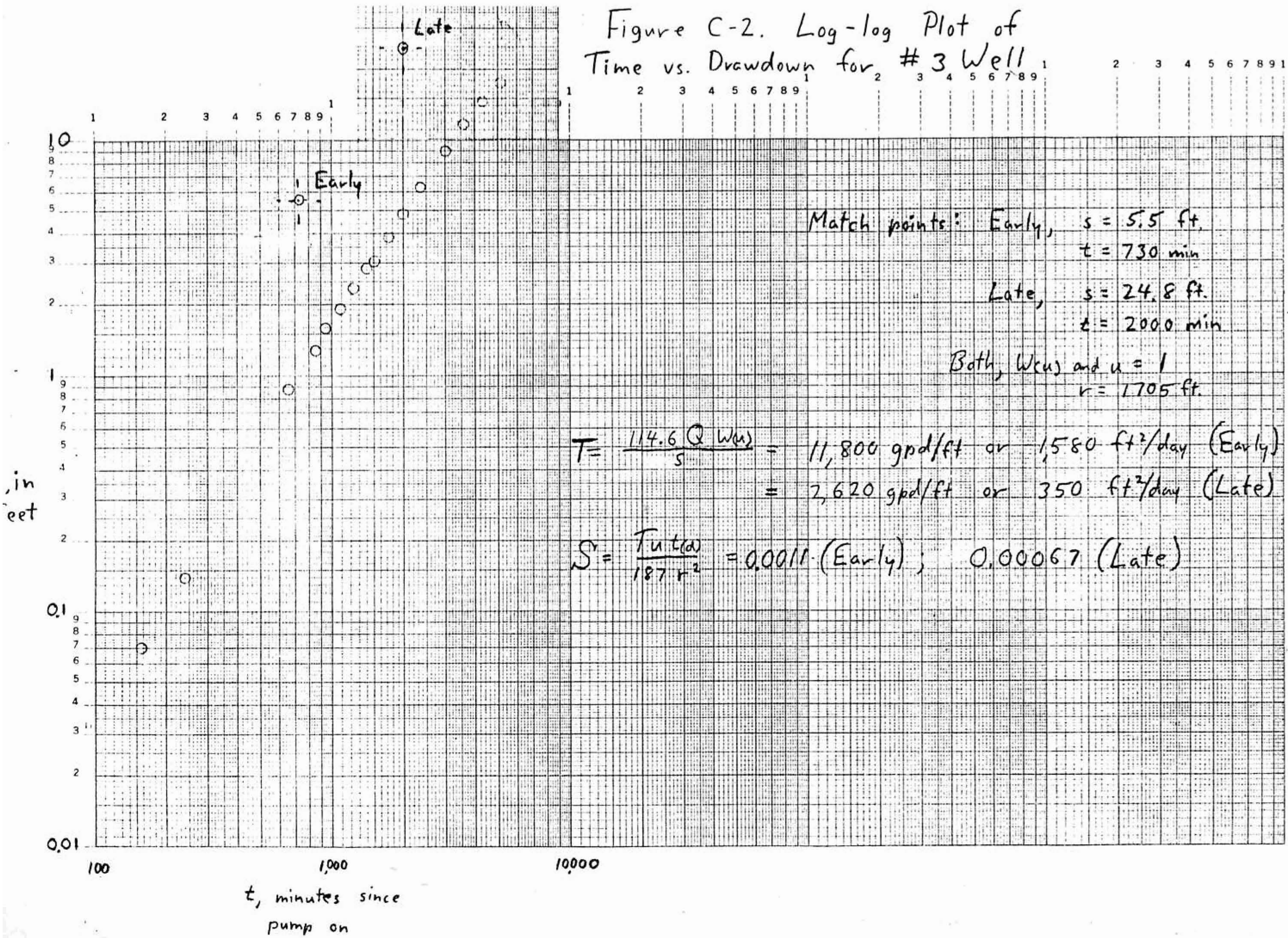


Figure C-2. Log-log Plot of Time vs. Drawdown for #3 Well



Match points: Early, s = 5.5 ft, t = 730 min

Late, s = 24.8 ft, t = 2000 min

Both, W(u) and u = 1

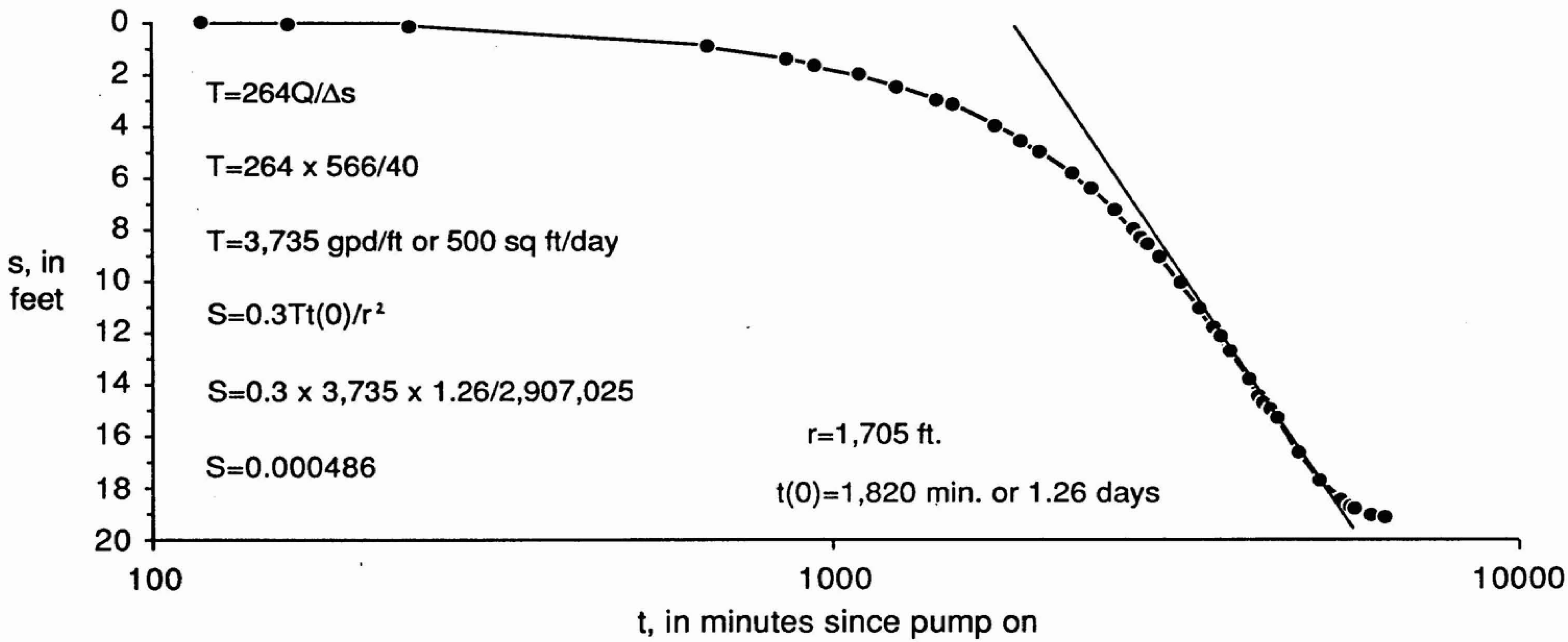
r = 1705 ft.

$T = \frac{114.6\,Q\,W(u)}{s}$ = 11,800 gpd/ft or 1,580 ft²/day (Early)

= 2,620 gpd/ft or 350 ft²/day (Late)

$S = \frac{T u t_{(d)}}{187 r^2}$ = 0.0011 (Early); 0.00067 (Late)

Figure C-3. Semi-log Plot of
Time vs. Drawdown for Number 3 Well



K&E LOGARITHMIC 3 x 5 CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A. 46 7522

Figure C-4. Log-log Plot of Time vs. Drawdown for the Gossler Well

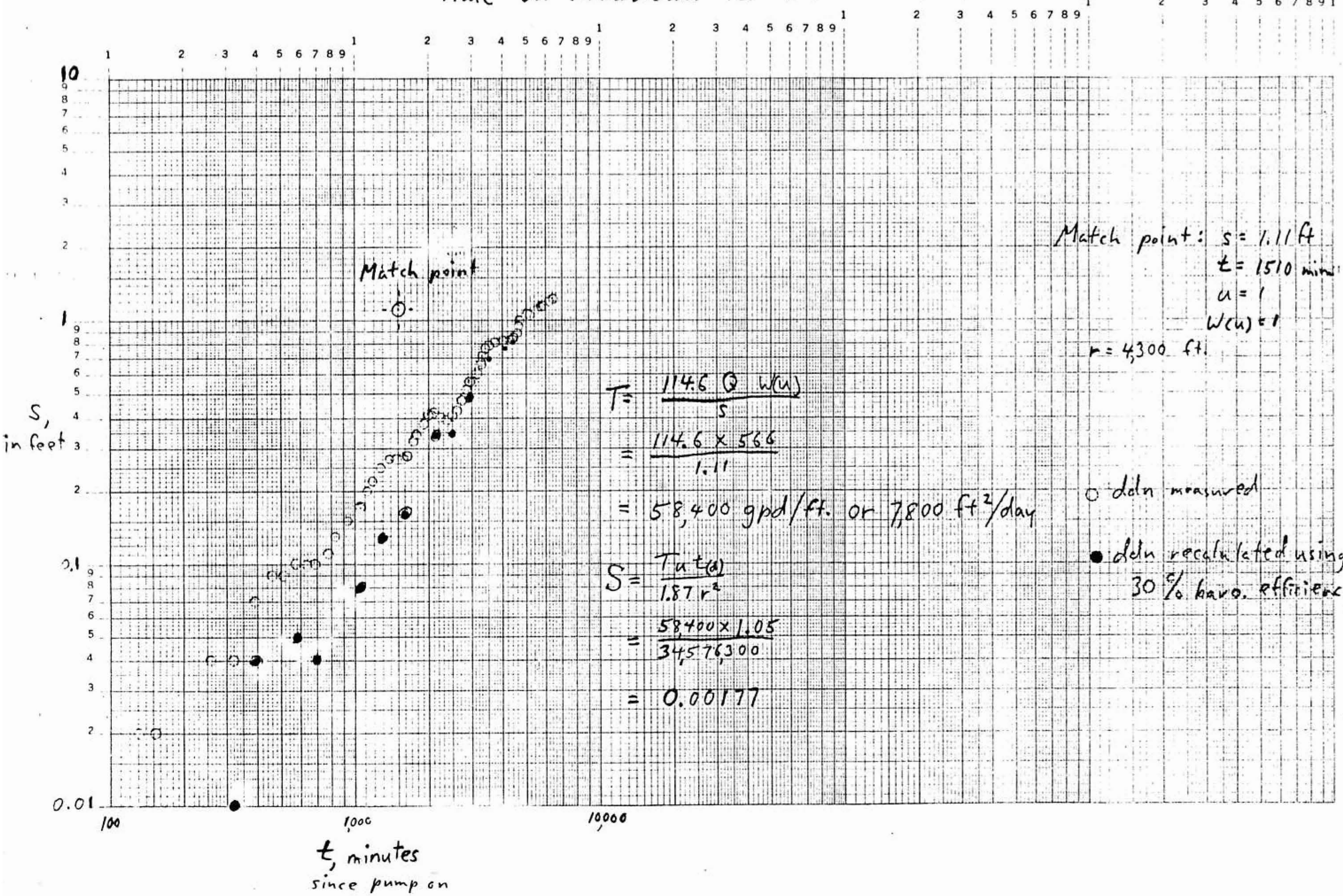
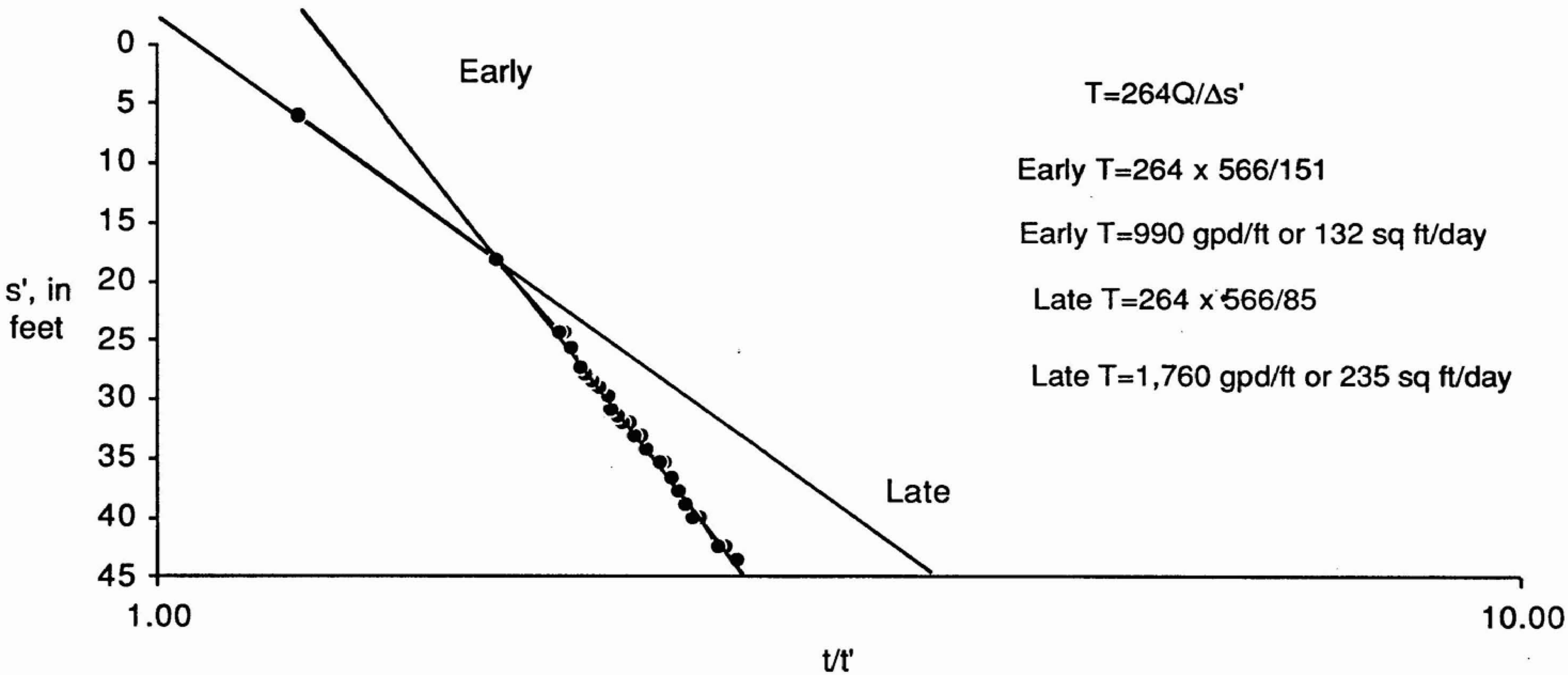
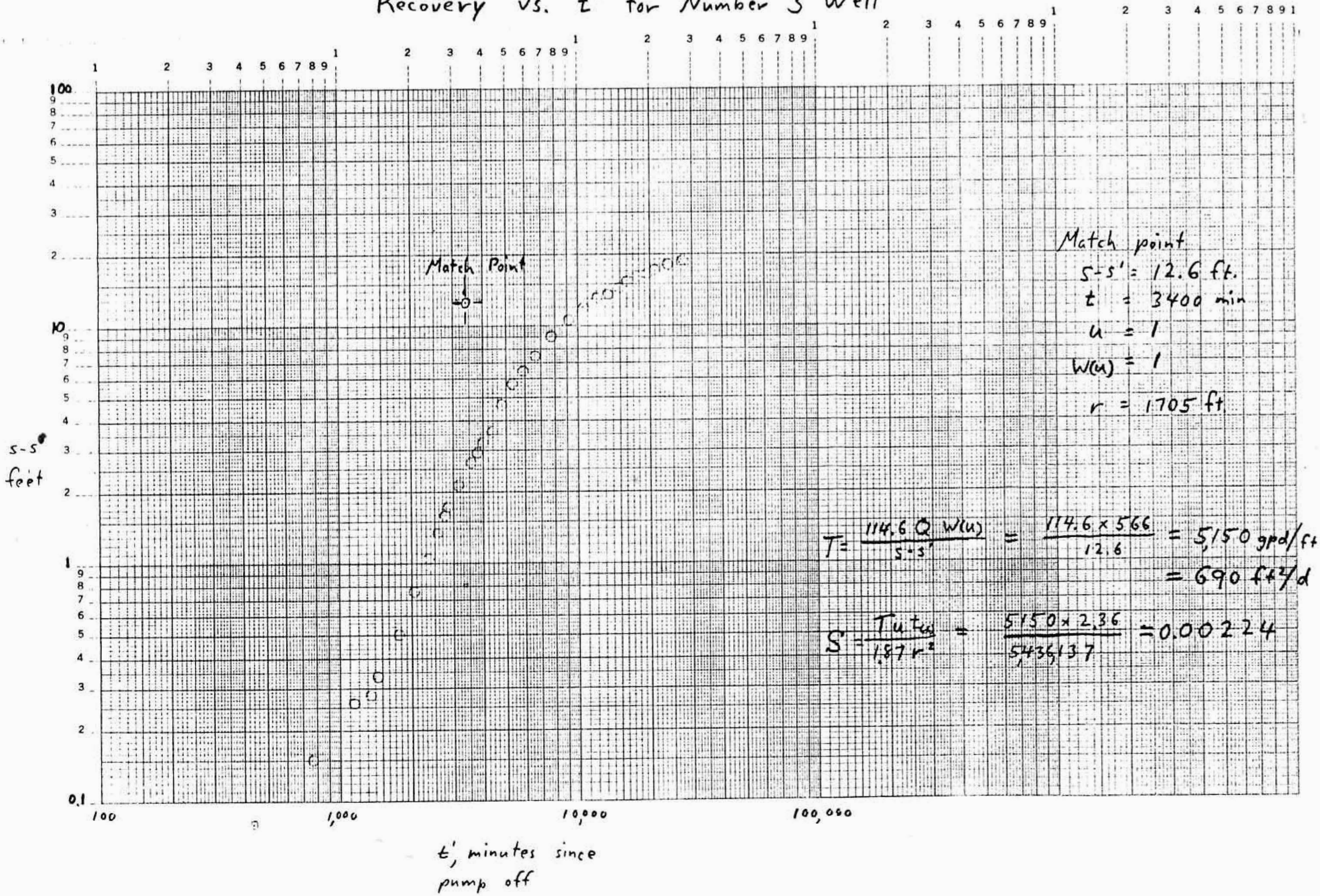


Figure C-5. Semi-log Plot of Residual Drawdown vs. t/t' for Pumped Well



K·E LOGARITHMIC 3 x 5 CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A. 46 7522

Figure C-6. Log-log Plot of Recovery vs. t' for Number 3 Well



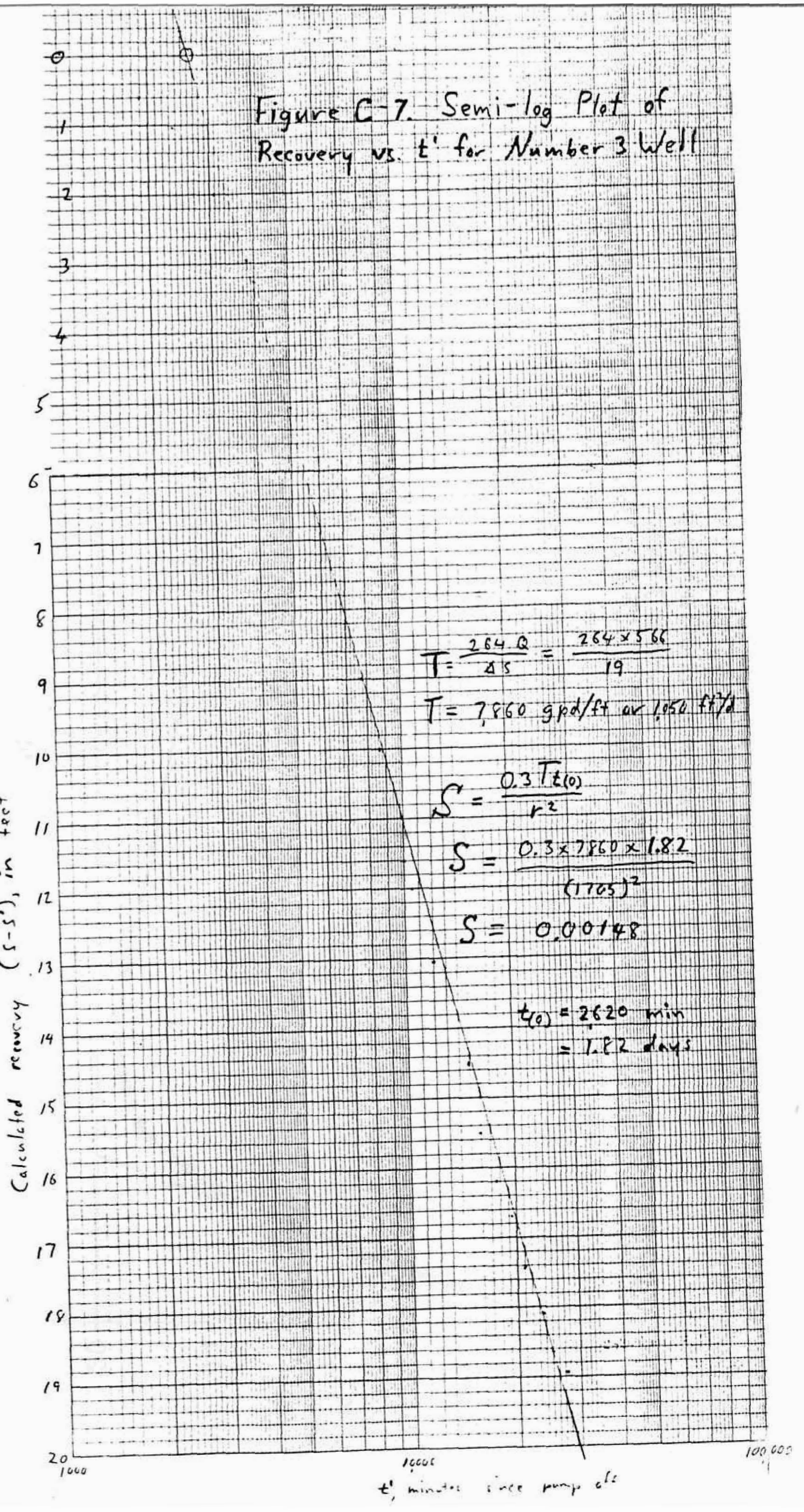
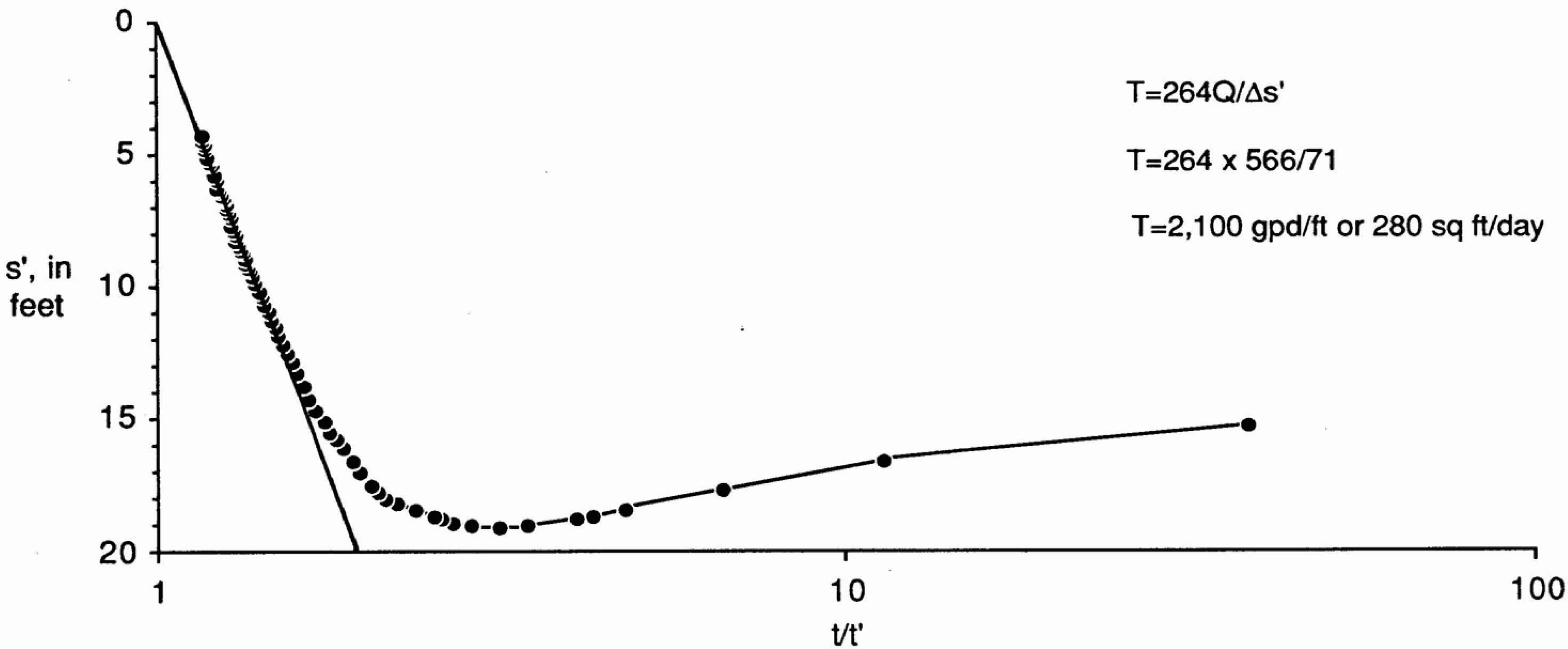


Figure C-7. Semi-log Plot of Recovery vs. t' for Number 3 Well

Figure C-8. Semi-log Plot of Residual Drawdown vs. t/t' for Number 3 Well



APPENDIX D

WELL LOGS

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED
JAN 19 1970
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

#2
G 5387

Pumped Well

State Well No. 4N/29-18dd
dcbc

State Permit No.

(1) OWNER:
Name M.L. Koester   assigned: Glenn S. Chowning
Address Rt. 1 Box 141 A Standfield

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☐
12" Diam. from 0 ft. to 209 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WATER LEVEL: Completed well.
Static level 38 ft. below land surface Date 9-25-69
Artesian pressure lbs. per square inch Date

(9) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
" " "
Bailer test 50 gal./min. with 0 ft. drawdown after 2 hrs.
Artesian flow g.p.m. Date
Temperature of water 58 Was a chemical analysis made? ☐ Yes ☒ No

(10) CONSTRUCTION:
Well seal—Material used Bentonite
Depth of seal 20' ft.
Diameter of well bore to bottom of seal 16 in.
Were any loose strata cemented off? ☐ Yes ☒ No Depth
Was a drive shoe used? ☒ Yes ☐ No
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(11) LOCATION OF WELL:
County Umatilla Driller's well number
SE ¼ SE ¼ Section 18 T. 4N R. 29E W.M.
Bearing and distance from section or subdivision corner

(12) WELL LOG:
Diameter of well below casing 12" to 6"
Depth drilled 343 ft. Depth of completed well 643 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level as drilling proceeds. Note drilling rates.

MATERIAL	From	To	SWL
Sand & Silt	0	8	0
Sand & Gravel	8	25	0
Sandy Clay Brown	25	60	–
Brown Clay	60	95	65
Blue Clay of Shale	95	198	38
Med Hard Basalt	198	240	38
Dense Basalt	240	343	38
Reduced Hole From			
12" Dia to 6" Dia.			
Hard Basalt	343	600	38
Vesecula Basalt	600	635	34
Hard Basalt	635	643	34

Work started 8-20 1969 Completed 1-15 1970
Date well drilling machine moved off of well 1-16 1970

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] J. Fred Hughson Date 1-16, 1970
(Drilling Machine Operator)
Drilling Machine Operator's License No. 51

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
NAME W. R. Ille Drilling Co Portland
(Person, firm or corporation) (Type or print)
Address 1045 NE 90 ave 97220
[Signed] W. R. Ille
(Water Well Contractor)
Contractor's License No. 405 Date 1-17, 1970

Pumped Well

The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED AUG 16 1978 WATER RESOURCES DEPT. SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

State Well No. 4N/29E-18db
State Permit No.

(1) OWNER:
Name GLEN CHOWNING
Address RT 1 BOX 1109
HERMISTON ORE

(2) TYPE OF WORK (check):
New Well ☐ Deepening ☑ Reconditioning ☑ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☑ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☑ Test Well ☐ Other ☐

CASING INSTALLED: Threaded ☐ Welded ☐
" Diam. from ft. to ft. Gage
" Diam. from EXISTING ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS: Perforated? ☐ Yes ☐ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☑ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used EXISTING
Well sealed from land surface to ft.
Diameter of well bore to bottom of seal in.
Diameter of well bore below seal in.
Number of sacks of cement used in well seal sacks
How was cement grout placed?

Was a drive shoe used? ☐ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☐ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County UMATILLA Driller's well number
NW ¼ SE ¼ Section 18 T. 4N R. 29E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found UNKNOWN ft.
Static level 302 ft. below land surface. Date 7-19-78
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 9 7/8 TO 1000 (12 TO 330)
Depth drilled 125 ft. Depth of completed well 1000 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
BASALT BLACK	330	645	
" BLACK W/BLUE SS	645	705	
" " "	705	795	
" BLACK	795	860	
" BLACK W/GR SS	860	956	
" BLACK & BLUE SS	956	964	
" GREY	964	1000	
BOTTOM OF 6" HOLE WAS 875			

RECEIVED AUG 16 1978 WATER RESOURCES DEPT. SALEM, OREGON

Work started 7-13 1978 Completed 7-19 1978
Date well drilling machine moved off of well 7-19 1978

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Tony Horan (Drilling Machine Operator) Date 7-19, 1978
Drilling Machine Operator's License No. 993

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Tony Bird Well Drilling (Person, firm or corporation) (Type or print)
Address Pendleton Ore
[Signed] Tony Bird (Water Well Contractor)
Contractor's License No. 544 Date 7-19, 1978

Chowning #3 Well

Original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED JUN - 9 1977 WATER RESOURCES DEPT. SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

(Do not write above this line)

Page 1

State Well No. 4n/29E-16da 18ddb

State Permit No.

(1) OWNER:

Name Glenn Chowning

Address Rt 1 Box 1109 Hermiston, Oregon 97838

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☒ Driven ☐ Cable ☐ Jetted ☐ Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☒ Test Well ☐ Other ☐

(5) CASING INSTALLED: Threaded ☐ Welded ☒

10" Diam. from 0 ft. to 235 ft. Gage 250

" Diam. from ft. to ft. Gage

" Diam. from ft. to ft. Gage

(6) PERFORATIONS: Perforated? ☐ Yes ☒ No.

Type of perforator used

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☒ No

Manufacturer's Name

Type Model No.

Diam. Slot size Set from ft. to ft.

Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

" " "

" " "

~~Bailer~~ air test 400 gal./min. with 147 ft. drawdown after 1 hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Well seal—Material used Cement

Well sealed from land surface to 235 ft.

Diameter of well bore to bottom of seal 13 in.

Diameter of well bore below seal 10 in.

Number of sacks of cement used in well seal 17 sacks

How was cement grout placed?

Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☒ No Size of gravel:

Gravel placed from ft. to ft.

(10) LOCATION OF WELL:

County Umatilla Driller's well number

N.E ¼ SE ¼ Section 16 T. 4 N. R. 29 E. W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found 97 ft.

Static level 253 ft. below land surface. Date 6/6/77

Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 10"-420' 8"420-1100

Depth drilled 1100 ft. Depth of completed well 1100 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Topsoil	0	4	
Sand	4	22	
Claystone, yellow	22	97	
Gravel	97	101	W.B.
Rock, dark brown	101	145	W.B.
Claystone, brown	145	189	
Claystone, gray	189	230	
Rock, med., black	230	245	
Basalt	245	302	
Rock, light brown	302	314	
Basalt	314	355	
Rock, med, black	355	370	
Basalt	370	397	
Basalt, hard, gray	397	430	
Basalt, med, gray	430	465	
Claystone, brown & blue	465	498	
Basalt, black	498	515	
Basalt, gray	515	533	
Rock, light brown	533	569	

Work started 5-13 1977 Completed 6-6 1977

Date well drilling machine moved off of well 6-6 1977

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] James T Leitch (Drilling Machine Operator) Date 6-6, 1977

Drilling Machine Operator's License No. 665

Water Well Contractor's Certification:

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

Name TROY GRIFFIN (Person, firm or corporation) (Type or print)

Address 900 HERMISTON AVE HERMISTON ORE

[Signed] Troy Griffin (Water Well Contractor)

Contractor's License No. 65 Date 6-6, 1977

Chowning #3 Well

The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

(Do not write above this line)

Page 2

State Well No. 4N/29E-17a .18ddb

State Permit No.

(1) OWNER:

Name Glenn Chowning

Address Rt 1 Box 1109 Hermiston, Oregon 97838

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(5) CASING INSTALLED: Threaded ☐ Welded ☐

" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS: Perforated? ☐ Yes ☐ No.

Type of perforator used

Size of perforations in. by in.

perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☐ No

Manufacturer's Name

Type Model No.

Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Well seal—Material used

Well sealed from land surface to ft.

Diameter of well bore to bottom of seal in.

Diameter of well bore below seal in.

Number of sacks of cement used in well seal sacks

How was cement grout placed?

Was a drive shoe used? ☐ Yes ☐ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☐ No

Type of water? depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☐ No Size of gravel:

Gravel placed from ft. to ft.

(10) LOCATION OF WELL:

County Umatilla Driller's well number

NE ¼ SE ¼ Section 16 T. 4N. R. 29E. W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found ft.

Static level ft. below land surface. Date

Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing

Depth drilled ft. Depth of completed well ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Basalt, gray	569	582	
Rock, dark brown & blue claystone	582	585	
Basalt & blue claystone	585	597	
Basalt, hard gray	597	629	
Rock, dark brown	629	663	
Rock, med. black	663	703	
Claystone, green & black rock	703	734	W.B.
Basalt black	734	769	
Rock, med. black	769	777	
Basalt, hard	777	791	
Rock, med. black & green claystone	791	868	W.B
Basalt	868	1023	
Rock, black & blue claystone	1023	1080	W.B.
Basalt, gray	1080	1100	

Work started 5-13 1977 Completed 6-6 1977

Date well drilling machine moved off of well 6-6 1977

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] (Drilling Machine Operator) Date , 19

Drilling Machine Operator's License No. 665

Water Well Contractor's Certification:

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

Name (Person, firm or corporation) (Type or print)

Address

[Signed] (Water Well Contractor)

Contractor's License No. 65 Date , 19

/

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

WATER WELL REPORT

STATE OF OREGON

(Please type or print)

(Do not write above this line)

RECEIVED #4
MAR 10 1976
WATER RESOURCES DEPT
SALEM, OREGON

4N/29-19

State Well No. Chowning #4 Well

State Permit No.

(1) OWNER:
Name Glenn Chowning
Address R. I Box I4I Stanfield, Ore. 97875

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

CASING INSTALLED:
Threaded ☐ Welded ☒
8" Diam. from 0 ft. to I05 ft. Gage 250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:
Perforated? ☒ Yes ☐ No.
Type of perforator used torch
Size of perforations I/8 in. by 3 in.
I24 perforations from 84 ft. to I04 ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
" " "
air Bailer test 300 gal./min. with 50 ft. drawdown after 2 hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used cement
Well sealed from land surface to I8 ft.
Diameter of well bore to bottom of seal I2 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 3 sacks
Number of sacks of bentonite used in well seal sacks
Brand name of bentonite
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Umatilla Driller's well number
¼ ¼ Section I9 T. 4N R. 29 W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 80 ft.
Static level 43 ft. below land surface. Date 3-2-76
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 8
Depth drilled I30 ft. Depth of completed well I30 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Surface sand brown	0	I0	
clay yellow	I0	80	
gravel	80	I05	43
clay with gravel	I05	I30	43

Work started 3-I 1976 Completed 3-2 1976
Date well drilling machine moved off of well 3-2 1976

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] R. C. Allison Date 3-6, 1976
(Drilling Machine Operator)
Drilling Machine Operator's License No. 300

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Allison Drilling Co.
(Person, firm or corporation) (Type or print)
Address R. 2 Box 2286 Hermiston, Ore. 97838
[Signed] R. C. Allison
(Water Well Contractor)
Contractor's License No. 419 Date 3-6, 1976

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310
within 30 days from the date of well completion.

WATER WELL REPORT

STATE OF OREGON

(Please type or print)

(Do not write above this line)

State Well No. 4N/29E-19bc

State Permit No. Gossler Well

(1) OWNER:

Name Loy Gossler

Address Rt. 3, Box 3268 Hermiston, Or 97838

(2) TYPE OF WORK (check):

New Well ☐ Deepening ☒ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☒ Driven ☐ Cable ☐ Jetted ☐ Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☒ Test Well ☐ Other ☐

(5) CASING INSTALLED: Threaded ☐ Welded ☐

" Diam. from ft. to ft. Gage

" Diam. from ft. to ft. Gage

" Diam. from ft. to ft. Gage

(6) PERFORATIONS: Perforated? ☐ Yes ☐ No.

Type of perforator used

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☐ No

Manufacturer's Name

Type Model No.

Diam. Slot size Set from ft. to ft.

Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom?

Yield: 1500 gal./min. with airtest drawdown after 1 hrs.

" " " "

" " " "

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow - g.p.m.

Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Well seal—Material used

Well sealed from land surface to ft.

Diameter of well bore to bottom of seal in.

Diameter of well bore below seal in.

Number of sacks of cement used in well seal sacks

How was cement grout placed?

Was a drive shoe used? ☐ Yes ☐ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☐ No Size of gravel:

Gravel placed from ft. to ft.

(10) LOCATION OF WELL:

County ~~Xxxxxxxx~~ Umatilla Driller's well number

SW ¼ NW ¼ Section 19 T. 4 N R. 29E W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found ft.

Static level 300' ft. below land surface. Date

Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 14"

Depth drilled 1210 ft. Depth of completed well 1210 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Black Basalt	1130	1165	
Blk Porous Basalt w/green claystone	1165	1190	WB
Black Basalt	1190	1210	

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JUN 02 1980
WATER RESOURCES DEPT
SALEM, OREGON

RECEIVED
JUL 9 1980
WATER RESOURCES DEPT
SALEM, OREGON

Work started 5/12 19 80 Completed 5/16 19 80

Date well drilling machine moved off of well 5/16 19 80

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Donald A. Dufresne (Drilling Machine Operator) Date 5/27, 1980

Drilling Machine Operator's License No. 1210

Water Well Contractor's Certification:

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

Name Columbia Basin Well Drilling Co. (Person, firm or corporation) (Type or print)

Address Rt. 1, Box 1961, Hermiston, Or.

[Signed] Ivan Cook (Water Well Contractor)

Contractor's License No. 772 Date 5/27/80, 19

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

Gossler Well

WATER WELL REPORT
STATE OF OREGON

RECEIVED
OCT 12 1982
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 4N/29E-19Cc b
State Permit No.
Record

(1) OWNER:
Name Loy M. Gossler
Address Rt 3 Bx 3268
City Hermiston State Or. 97838

(2) TYPE OF WORK (check):
New Well ☐ Deepening ☐ Reconditioning ☒ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED: Steel ☐ Plastic ☐ Threaded ☐ Welded ☐
None " Diam. from .... ft. to .... ft. Gauge ....
........" Diam. from .... ft. to .... ft. Gauge ....

LINER INSTALLED:
........" Diam. from .... ft. to .... ft. Gauge ....

(6) PERFORATIONS: Perforated? ☐ Yes ☐ No
Type of perforator used
Size of perforations in. by in.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.

(7) SCREENS: Well screen installed? ☐ Yes ☐ No
Manufacturer's Name ....
Type .... Model No. ....
Diam. .... Slot Size .... Set from .... ft. to .... ft.
Diam. .... Slot Size .... Set from .... ft. to .... ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
Air test 1500 gal./min. with drill stem at 850 ft. 1 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered .... ft.

(9) CONSTRUCTION: Special standards: Yes ☐ No ☐
Well seal—Material used Not disturbed
Well sealed from land surface to .... ft.
Diameter of well bore to bottom of seal .... in.
Diameter of well bore below seal .... in.
Number of sacks of cement used in well seal .... sacks
How was cement grout placed? ....

Was pump installed? No .... Type .... HP .... Depth .... ft.
Was a drive shoe used? ☐ Yes ☐ No Plugs .... Size: location .... ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☐ No Size of gravel: ....
Gravel placed from .... ft. to .... ft.

(10) LOCATION OF WELL:
County Umatilla Driller's well number
SW ¼ SW ¼ Section 19 T. 4 N. R. 29 E. W.M.
Tax Lot # Lot Blk Subdivision
Address at well location:

(11) WATER LEVEL: Completed well.
Depth at which water was first found ft.
Static level 315 ft. below land surface. Date 10-6-82
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing ....
Depth drilled 0 ft. Depth of completed well ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Reamed 8" to 12"			
From 545' to 855'			

Work started 9-30 1982 Completed 10-6 1982
Date well drilling machine moved off of well 10-6 1982

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] James T. [signature] (Drilling Machine Operator) Date 8-7, 1982
Drilling Machine Operator's License No. 665

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name TROY GRIFFIN (Person, firm or corporation) (Type or print)
Address 900 HERMISTON AVE HERMISTON OR.
[Signed] Troy Griffin (Water Well Contractor)
Contractor's License No. 65 Date 8-7, 1982

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report
WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
SP*12658-690

WATER WELL REPORT
STATE OF OREGON

RECEIVED
MAY 21 1981
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 4N/29E-17dd
Walchli Well
State Permit No. 17ad
Page 1 of 2

(1) OWNER:
Name Patrick Walchli
Address Loop RD
City Hermiston State Ore 97838

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☑ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☑ Other ☐
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED: Steel ☑ Plastic ☐ Threaded ☐ Welded ☑
18" Diam. from 0 ft. to 45 ft. Gauge .312
" Diam. from ft. to ft. Gauge

LINER INSTALLED:
16" Diam. from +2 ft. to 225 ft. Gauge .250

(6) PERFORATIONS: Perforated? ☐ Yes ☑ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☑ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " "
Air test 2000 gal./min. with drill stem at 900 ft. 1 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water 67 Depth artesian flow encountered ft.

(9) CONSTRUCTION: Special standards: Yes ☐ No ☐
Well seal—Material used Portland Cement
Well sealed from land surface to 45 ft.
Diameter of well bore to bottom of seal 22 in.
Diameter of well bore below seal 16 in.
Number of sacks of cement used in well seal 35 sacks
How was cement grout placed? Pumped

Was pump installed? No Type HP Depth ft.
Was a drive shoe used? ☑ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☐ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL: air line #80 [510]
County Umatilla Driller's well number
SE ¼ SE ¼ Section 17 T. 4N R. 29E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location:
On Edwards Rd.

(11) WATER LEVEL: Completed well. 185
Depth at which water was first found 310 ft.
Static level 185 ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 16 to 500, 12 to 1200
Depth drilled 1200 ft. Depth of completed well 1200 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Sand	0	40	
Black Basalt & Clay	40	225	
Black Basalt	225	240	
Black & Brown "	240	310	
Black Bors "	310	318	H_2O
Black "	318	340	
Black Basalt & Green Talc	340	346	H_2O
Black Basalt	346	450	
Black Basalt + Green Talc	450	465	H_2O
Black Basalt	465	510	
Black Basalt + Green Talc	510	570	H_2O
Black Basalt	570	700	
Black Basalt Green Talc	700	711	H_2O
Black Basalt	711	873	
Grey Basalt	873	945	
Black Basalt Green Talc	945	965	H_2O
Black Basalt	965	974	
Black Basalt Green Talc	974	1000	H_2O
Black Basalt	1000	1070	
Black Basalt - Green Talc	1070	1085	H_2O
Black Basalt	1085	1132	

Work started Jan 15 1981 Completed 5-10 1981
Date well drilling machine moved off of well 5-10 1981

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] (Drilling Machine Operator) Date, 19
Drilling Machine Operator's License No.

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name (Person, firm or corporation) (Type or print)
Address
[Signed] (Water Well Contractor)
Contractor's License No. Date, 19

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report
WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.
SP*12658-690

RECEIVED
MAY 21 1981
WATER RESOURCES DEPT
SALEM, OREGON

...ELL REPORT
...TE OF OREGON

State Well No. 4N/29E-17dd
Walchli Well
State Permit No.
Con't
page 2 of 2

(1) OWNER:
Name Patrick Walchli
Address
City State

(2) TYPE OF WORK (check):
New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☐ Driven ☐
Rot. Mud ☐ Dug ☐
C... ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED: Steel ☐ Plastic ☐ Threaded ☐ Welded ☐
......." Diam. from .... ft. to .... ft. Gauge ....
......." Diam. from .... ft. to .... ft. Gauge ....

LINER INSTALLED:
......." Diam. from .... ft. to .... ft. Gauge ....

(6) PERFORATIONS: Perforated? ☐ Yes ☐ No
Type of perforator used
Size of perforations in. by in.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.

(7) SCREENS: Well screen installed? ☐ Yes ☐ No
Manufacturer's Name ....
Type .... Model No. ....
Diam. .... Slot Size .... Set from .... ft. to .... ft.
Diam. .... Slot Size .... Set from .... ft. to .... ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
Air test gal./min. with drill stem at ft. hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered .... ft.

(9) CONSTRUCTION: Special standards: Yes ☐ No ☐
Well seal—Material used ....
Well sealed from land surface to .... ft.
Diameter of well bore to bottom of seal .... in.
Diameter of well bore below seal .... in.
Number of sacks of cement used in well seal .... sacks
How was cement grout placed? ....
....
....
Was pump installed? .... Type .... HP .... Depth .... ft.
Was a drive shoe used? ☐ Yes ☐ No Plugs .... Size: location .... ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☐ No Size of gravel: ....
Gravel placed from .... ft. to .... ft.

(10) LOCATION OF WELL:
County Driller's well number
¼ ¼ Section T. R. W.M.
Tax Lot # Lot Blk Subdivision
Address at well location:

(11) WATER LEVEL: Completed well.
Depth at which water was first found ft.
Static level ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing ....
Depth drilled ft. Depth of completed well ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Black Basalt + Gran Talc	1132	1148	H_2O
Black Basalt	1148	1178	
Black Bors Basalt + Gran Talc	1178	1200	H_2O

Work started 1-15 1981 Completed 5-20 1981
Date well drilling machine moved off of well 5-20 1981

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Ladd Ho... Date 5-20 1981
(Drilling Machine Operator)
Drilling Machine Operator's License No. 1345

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Ladd Ho... Well Drilling
(Person, firm or corporation) (Type or print)
Address Rt 1 Box 14 Rock Ore
[Signed] Ladd H...
(Water Well Contractor)
Contractor's License No. 739 Date 5-20, 1981

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the

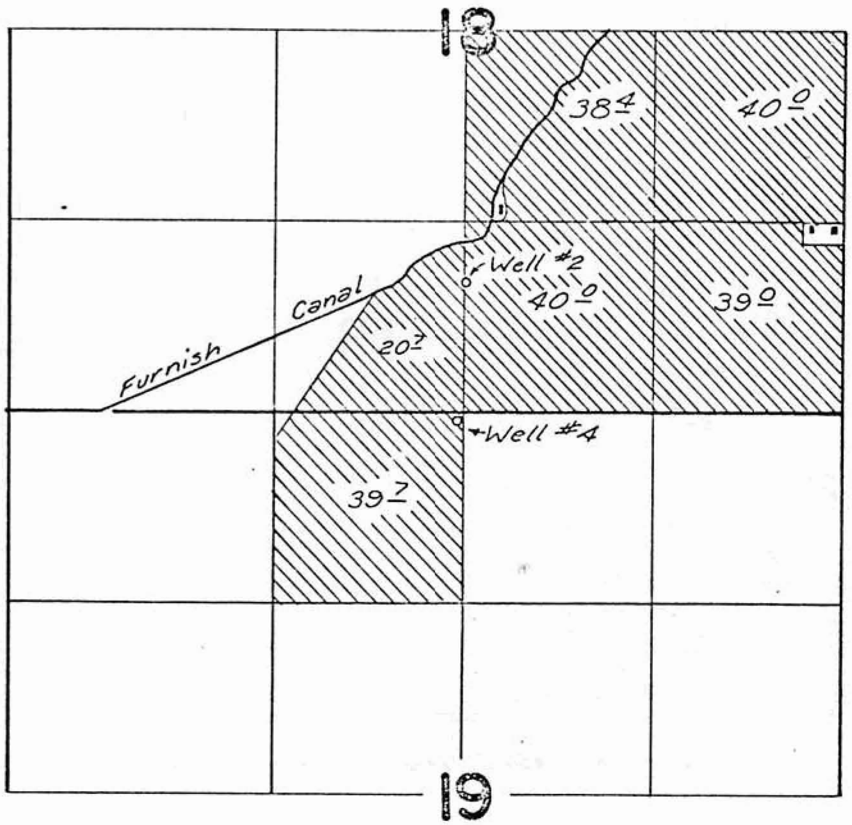
WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*12658-690

APPENDIX E

FINAL PROOF SURVEY MAPS

T. 4 N., R. 29 E., W.M.



Wells Loc.: #2,- 1730 ft S. & 20 ft E., from Ctr. Sec. 18; #4 - 50 ft. S. & 40 ft. W. from N. 1/4 Cor. Sec. 19

FINAL PROOF SURVEY

UNDER

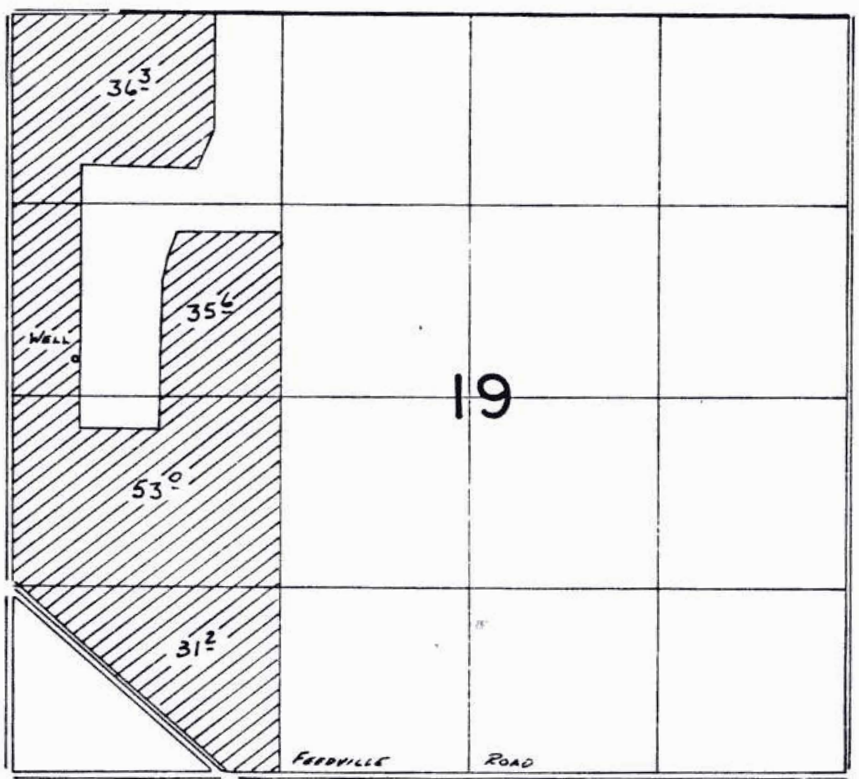
Application No. G-5387 G-6765 Permit No. G-5148 G-6285

IN NAME OF

Glenn S. Chowning

Surveyed July 31, 1976, by L.H. Nunn

T. 4N., R. 29E., W. M.



Well Loc: 250'N. & 450'E. From W 1/4 Cor. Section 19

FINAL PROOF SURVEY

UNDER

Application No. G-9407 Permit No. G-8802

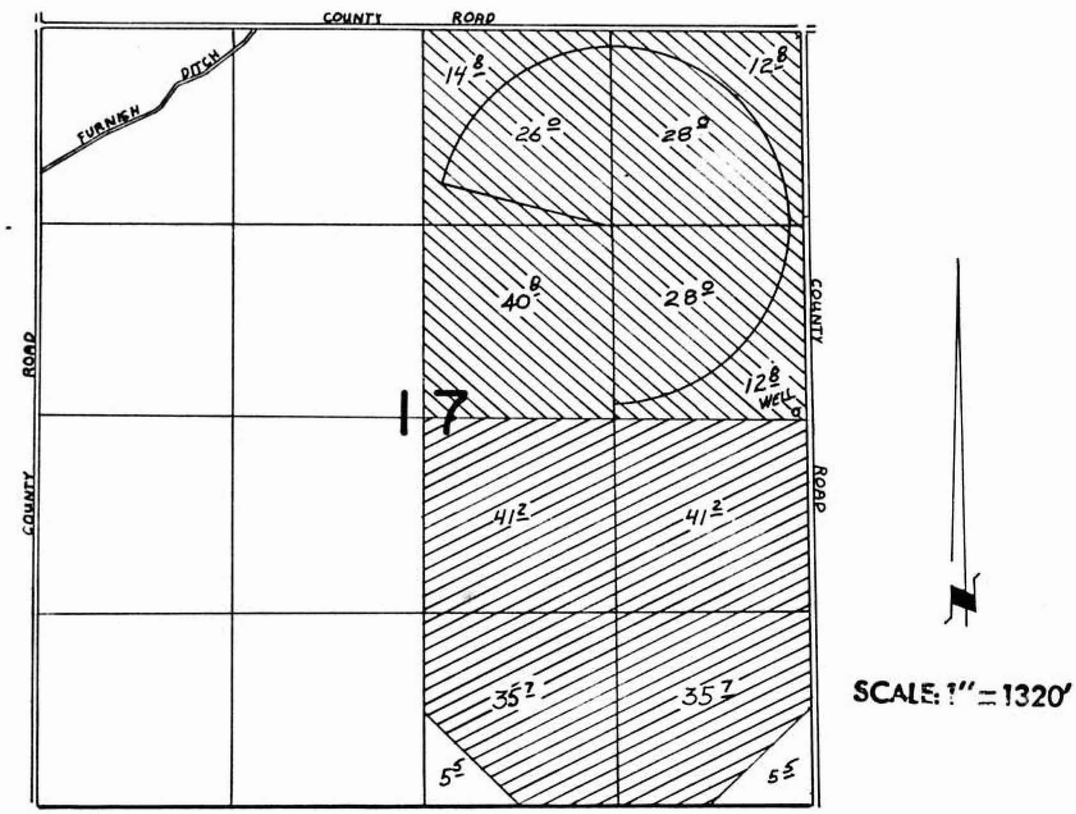
IN NAME OF

LOYALTA INC.

Surveyed *Nov. 22* 19*83*, by *Vernon Lee Church*

222R 11/28/83

T. 4 N. R. 29E. W. M.



WELL LOCATED 50' N. AND 100' W. FROM E. 1/4 COR. SEC. 17

PRIMARY SUPPLEMENTAL

FINAL PROOF SURVEY

UNDER

Application No. G-10569 Permit No. G-9809....

IN NAME OF

PATRICK C. WALCHLI

Surveyed ..Jan. 28.... 1985., by V.L.CHURCH...........