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~~General~~ Report

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Records of water-supply wells Guaje Canyon 6, Pajarito Mesa 1, and Pajarito Mesa 2, Los Alamos, New Mexico

Basic Data Report

By

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Prepared in cooperation with and for administrative release only to the Atomic Energy Commission and University of California, Los Alamos Scientific Laboratory, Los Alamos, New Mexico

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Table 1 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Mudstone, moderate reddish-orange. Almost 100 percent clay----------	10	1,445
Basalt, dense, black----------	25	1,470
Sandstone, silty and clayey, dark reddish-brown. Sand is arkosic quartz sand with weathered basalt fragments----------	135	1,605
Basalt, dense, black. Aphanitic with some phenocrysts of feldspar and olivene----------	60	1,665
Sandstone, silty and clayey, yellowish-brown. Sand is arkosic quartz sand with occasional basaltic and latitic debris. Probable basalt flows or rubble at intervals 1,720 to 1,730, 1,815 to 1,825, 1,905 to 1,915, and [illegible] to 1,970----------	340	2,005

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Records of water-supply wells Guaje Canyon 6,

Pajarito Mesa 1, and Pajarito Mesa 2,

Los Alamos, New Mexico, Basic Data Report

By

James B. Cooper, William D. Purtyman, and Edward C. John

Introduction

This report contains pertinent data on the geology, hydrology, and construction of three water wells drilled in 1964-65 to supplement the water supply of Los Alamos, N. Mex. The locations of these wells are shown on figure 1. The wells vary in depth from 1,530 feet to 2,300

Figure 1.--Map of the Los Alamos area showing locations of wells drilled in 1964-65.

feet and tap a common aquifer--the Tesuque Formation of the Santa Fe Group. The formation is Tertiary in age. The Tesuque Formation consists of slightly consolidated beds of silty sand and minor amounts of gravel and conglomerate. Basalt flows and volcanic breccia are interbedded with the sediments at places.

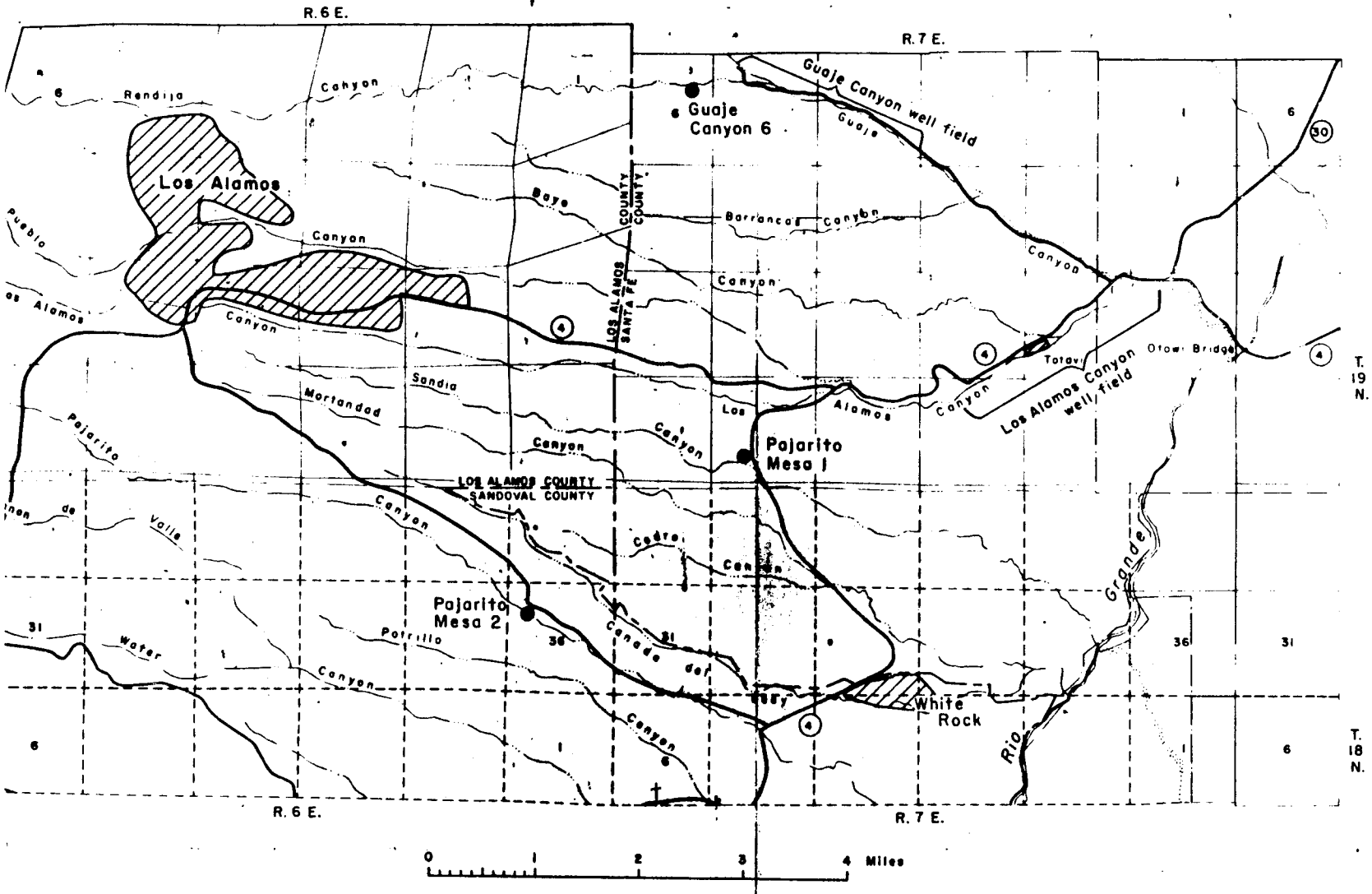

Figure 1.--Map of the Los Alamos area showing locations of wells drilled in 1964-65

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Ground water in the Tesuque Formation moves from west to east beneath Los Alamos. Depth to water in the three wells drilled in 1964-65 ranged from 560 to 820 feet. Yields of the wells ranged from about 400 gpm (gallons per minute) to about 1,500 gpm.

The drilling and construction of each of the three wells was divided into 2 main phases: 1) Drilling an approximate 10-inch diameter pilot hole to a predetermined depth; sampling the formations penetrated; and logging the hole electrically; and 2) reaming the pilot hole to the optimum depth of permeable material as determined from examination of drill cuttings and electric logs; casing; gravel-packing; developing by swabbing, bailing, and pumping.

Well construction and development was supervised by Gordon Herkenhoff and Associates, consulting engineers, Albuquerque, New Mexico. Personnel of the Geological Survey logged the drill cuttings, assisted in the evaluation of the electric logs, and observed drilling, sampling, well construction, and test-pumping.

Guaje Canyon well 6

The first of the three wells drilled in 1964-65 was in the Guaje Canyon well field. The decision of the Atomic Energy Commission to add a well to this field was based upon the existence of power and water-transmission lines and booster-pumping facilities in this area. A site in Rendija Canyon approximately 2,600 feet west of booster-pump station No. 1 was suggested by the Geological Survey after analysis of available water-level, aquifer-test, and well-production data (Purtymun and Cushman, 1963).

A descriptive log of drill cuttings from the pilot hole of Guaje Canyon 6 supply well is given in table 1. Electric logs are shown on figures 1a, 2, 3, and 4. Table 2 contains the construction record of

Figure 1a.--Temperature log of Guaje Canyon well 6.

Figure 2.--Gamma Ray-Neutron log of Guaje Canyon well 6.

Figure 3.--Induction-electrical log of Guaje Canyon well 6.

Figure 4.--Microlog (with caliper) of Guaje Canyon well 6.

Guaje Canyon well 6 and table 3 contains records of pumping tests made at the end of development. Appendix A is a record of a pumping test made on the finished well February-March 1965 at the request of the Atomic Energy Commission and transmitted in April 1965 as an administrative report. The report is added for the convenience of record.

Table 1.--Descriptive log of drill cuttings from Los Alamos supply well, Guaje Canyon 6, Rendija Canyon.

Location: NW¼SE¼NE¼ sec. 6, T. 19 N., R. 7 E., Santa Fe County, New Mexico.

Altitude: 6,422 feet above sea-level datum.

Total depth: 2,005 feet (pilot hole).

Date drilled: 1964.

Tools: Cable tool to 1,025 feet. Mud rotary 1,025 to 2,005 feet.

Driller: Burgett Drilling Co., Carlsbad, New Mexico.

Material	Thickness (feet)	Depth (feet)
Alluvium:		
Boulders, cobbles, granules, sand, silt, and clay. Samples consist of quartz, feldspar, and latitic debris----------	40	40
Puye Conglomerate, Fanglomerate Member:		
Conglomerate, very sandy to silty, dusty-brown. Coarse fragments are latite and quartz latite. Fine fraction is quartz, feldspar, and latitic debris----------	35	75
Volcanic ash, yellowish-orange. Badly weathered to clay----------	5	80
Conglomerate, very sandy to silty, dusty-brown. Coarse fragments are latite and quartz latite. Fine fraction is quartz, feldspar, and latitic debris----------	10	90
Volcanic ash, yellowish-orange. Badly weathered to clay. Some pumice fragments----------	10	100

Table 1 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Puye Conglomerate, Fanglomerate Member - Continued		
Conglomerate, very sandy to silty, dusty-brown. Coarse fragments are latite and quartz latite. Fine fraction is latitic debris. Fine fraction increases downward. Sample is 15 percent volcanic ash----------	20	120
Sandstone, silty to clayey, very dusky-red. Sand is quartz, feldspar, and latitic debris--	10	130
Puye Conglomerate, Totavi lentil:		
Conglomerate, sandy to silty, grayish-pink. Gravel is quartzite, granitic, and latitic debris. Sand is arkosic----------	70	200
Tesuque Formation:		
Sandstone, conglomeratic, silty to clayey, yellowish-red. Sand is arkosic. Gravel is latitic and granitic----------	25	225
Sandstone, silty and clayey to pebbly, clay is pale yellowish-brown and overall sample is dark yellowish-brown. Sand is feldspar, quartz, latitic, obsidian and hornblende debris-------	80	305
Mudstone, sandy with some pebbles, pale yellowish-gray. Sand is arkosic----------	5	310

Table 1 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Sandstone, silty and clayey, dark yellowish-brown. Sand is mostly arkosic quartz sand. Some basalt grains near top. Few latitic granules near base. Sand, very fine- to medium-grained, 80 to 85 percent, clay and silt 15 percent, and gravel 0-5 percent----------	60	370
Conglomerate, very sandy to clayey, dark yellowish-brown. Sand, very fine- to coarse-grained (mostly fine-grained), 45 percent; clay, 40 percent; and gravel, 15 percent------	15	385
Mudstone, sandy and gravelly, pale yellowish-brown. Clay and silt, 60 percent; sand, very fine- to medium-grained, 35 percent; and gravel, 0-5 percent----------	15	400
Sandstone, clayey to pebbly, pale yellowish-brown. Sand is arkosic with basaltic and latitic debris and some hornblende. Sand, very fine- to coarse-grained (mostly fine-grained) 65 percent; clay and silt 30 to 35 percent; gravel, granules and pebbles, 0 to 5 percent----------	10	410
Sandstone, silty and clayey, moderate-brown. Sand, very fine- to coarse-grained, 50 percent; clay and silt, 50 percent----------	15	425

Table 1 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Sandstone, silty and clayey, grayish-red. Sand is arkosic quartz sand with latitic and basaltic debris. Sand, very fine- to coarse-grained, 75 percent; clay 25 percent ---------	20	445
Mudstone, sandy, pale yellowish-brown. Silt and clay, 70 percent; sand, very-fine to medium-grained, 30 percent ----------	5	450
Sandstone, silty and clayey with some granules, very rusty-red. Sand is arkosic quartz sand with basaltic and latitic debris, basalt fragments decrease and latite fragments increase downward. Sand, very fine- to coarse-grained, 60 percent; silt and clay, 40 percent; some granules ----------	45	495
Mudstone, sandy, grayish-red. Sand is arkosic quartz sand with red volcanic, basaltic and latite debris. Silt and clay, 60 percent; sand, very fine- to medium-grained, 40 percent ------	90	585
Sandstone, silty and clayey with some granules, grayish-red. Sand is arkosic quartz sand with red volcanic, basaltic, and latitic debris. Sand, very fine- to very coarse-grained, 65 percent; silt and clay, 30 percent; gravel, granules and pebbles, 5 percent. (Water encountered at 585 feet, at depth 630 feet the water level was 572 feet) --------	65	650

Table 1 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Mudstone, sandy, grayish-red. Sand is arkosic quartz sand with basaltic and latitic debris. Clay and silt, 60 percent; sand, very fine- to medium-grained, 40 percent----------	10	660
Sandstone, silty and clayey, grayish-red. Sand is arkosic quartz sand with red volcanic, basaltic, and latitic debris. Sand, 50 to 65 percent; silt and clay, 30 to 45 percent; gravel, granules and pebbles, 5 percent------	20	680
Mudstone, sandy, light-brown. Sand is arkosic quartz sand. Silt and clay, 80 percent; sand, very fine- to medium-grained, 20 percent-----	30	710
Mudstone, sandy, light-brown. Sand is arkosic quartz sand with some basalt debris. Silt and clay 50 percent; sand, very fine- to coarse-grained (mostly fine), 50 percent----------	35	745
Sandstone, very silty and clayey with some gravel, dark yellowish-brown. Sand is arkosic quartz sand with mica grains and basalt and latite debris. Sand, very fine- to very coarse-grained (grain size increases downward), 50 percent; silt and clay, 40 percent; gravel, granules and pebbles, 10 percent----------	70	815

Table 1.--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Mudstone, sandy, light-brown. Sand is arkosic quartz sand with mica grains, basaltic and latitic debris, and pumice fragments. (Hole "loaded" at 850 feet to prevent caving.) Possibly thin basalt flow near bottom of interval----------	75	890
Sandstone, silty and clayey, pale-brown. Sand is arkosic quartz sand. Sand, very fine- to coarse-grained, 70 percent; silt and clay, 30 percent. Possible thin basalt flows in this interval----------	10	900
Mudstone, sandy, pale-brown. Sand is arkosic quartz sand. Silt and clay, 80 percent; sand, very fine- to medium-grained, 20 percent-----	10	910
Sandstone, silty, clayey and gravelly, moderate reddish-orange. Sand is arkosic quartz sand with basaltic and latitic debris. Gravel is basaltic and latitic debris. Sand, very fine- to coarse-grained, 60 percent; silt and clay 35 percent; gravel, granules and pebbles, 5 percent----------	20	930

Table 1 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Mudstone, sandy, moderate reddish-orange. Silt and clay, 85 percent; sand, very fine- to medium-grained, 15 percent----------	5	935
Sandstone, silt and clayey, dark yellowish-brown. Very poor samples recovered. Driller reported several probable basalt flows and clay beds in this interval. Some bit-broken basalt fragments along with bit-broken latite and obsidian fragments as well as some pieces of almost pure clay were found in the samples, but the mixing of material in the "loaded" hole prevented stratigraphic interpretation-------	110	1,045
Conglomerate, sandy, silty and clayey, dark yellowish-brown. Smaller sand fraction is arkosic quartz sand. Larger sand fraction and basaltic debris. Sand, very fine- to very coarse-grained, 50 percent; gravel, pebbles and granules, 25 percent; silt and clay, 25 percent---------	25	1,070

Table 1 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Basalt, some weathered zones, brownish-gray to grayish-black. Aphanitic with phenocrysts of feldspar and Olivene (Olivene being altered). Limonite staining on rock----------	100	1,170
Sandstone, silty and clayey, dark yellowish-brown. Sand is arkosic quartz sand with much weathered basalt debris----------	10	1,180
Basalt, some weathered zones, brownish-gray to grayish-black. Aphanitic with phenocrysts of feldspar and olivene----------	40	1,220
Sandstone, silty and clayey, dark reddish-brown. Sand is arkosic quartz sand with much weathered basalt debris----------	40	1,260
Mudstone, moderate reddish-orange. Almost 100 percent clay----------	10	1,270
Basalt, some weathered zones, brownish-gray to black. Aphanitic with feldspar and olivene phenocrysts----------	155	1,425
Sandstone, silty and clayey, dark reddish-brown. Contains much weathered basalt----------	10	1,435

Table 1 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)

Note: Samples of the drill cuttings were collected at 5-foot intervals by the contractor. These samples were then washed, by the Geological Survey, to remove most of the clay and silt and studied under the binocular microscope. The amount and type of materials present were determined by loss of content when washed and by visual inspection. The samples were described while wet. From depths of 80 feet to 210 feet and from 840 feet to 1,025 feet the samples were commonly contaminated by cuttings from further up the hole as the hole was drilled "loaded." The "loaded" method of drilling was used to prevent caving of the hole and consists of periodic stirring of the cuttings in the hole by lifting the heavy slurry from the bottom of the hole and dumping it back in the hole at the top. A very thick and heavy mud is thus maintained. Thickness and depth intervals of drill cutting samples have been correlated with data interpreted from electric logs and driller's logs.

Table 2 .--Construction record of Los Alamos supply well, Guaje Canyon 6, Rendija Canyon.

Total depth: 1,530 feet.

Date completed: April 1964

Casing and hole record: 28-inch hole from 0 to 206 feet. Cased with 24-inch ID pipe, cemented in hole.

22-inch hole from 210 to 1,530 feet. Cased with 12-inch ID blank pipe from 0 to 700 feet and with 12-inch ID pipe slotted with 3/32-inch louver openings from 700 to 1,530 feet.

Annulus between 12-inch pipe and 22-inch hole filled from 1,530 to 0 feet with washed and graded gravel ranging in size from about 1/32-inch to ¼-inch.

Gage lines: Two steel pipe gage lines each of 1½-inch diameter installed on outside of 12-inch pipe and enter pipe at a depth of 700 feet. An airline is installed in one gage line to a depth of 693 feet; the other is used for entry of mechanical water-level measuring devices.

Well development: The well was swabbed for 19 hours and bailed at an approximate rate of 30 gpm for 25 hours. Further development consisted of pumping for 167 hours at rates of 125 to 500 gpm.

Yield: Data obtained during the pumping phase of well development indicated that the optimum yield of the well is about 425 gpm. Specific capacity was determined to be about 4.5 gpm per ft of drawdown.

Table 3 .--Records of pumping tests, Los Alamos supply well, Guaje Canyon 6, Rendija Canyon

Test of March 26-27, 1964

Test made by W. D. Purtymun, U.S. Geological Survey and B. G. Hammock, Gordon Herkenhoff and Associates, near end of pumping for well development. Depth to water measured with airline.

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
3-26-64					
0800	-	-	-	-	Pump off
0830	-	-	-	-	Pump on
0835	-	-	472	88	-
0840	-	-	-	407	-
0845	-	-	-	286	-
0850	-	-	-	154	-
0855	-	-	472	77	-
0900	-	-	472	44	-
0905	-	-	-	55	-
0910	-	-	472	44	-
0915	-	-	-	33	-
0920	-	-	-	22	-
0925	-	-	-	11	-
0930	-	-	-	22	-
0945	-	-	-	18.3	-
1000	-	-	472	7.3	Pump off
1100	-	598	-	-	-

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
3-26-64					
1345	-	587.3	-	-	-
1415	-	586.1	-	-	Pump on
1415.5	0.5	647.3	-	-	-
1416	1	650.8	-	-	-
1417	2	642.7	-	-	-
1418	3	642.7	-	-	-
1419	4	642.7	-	-	-
1420	5	643.7	-	-	-
1421	6	645	-	-	-
1422	7	647.3	-	-	-
1423	8	647.3	-	-	-
1424	9	648.6	-	-	-
1425	10	649.8	-	110	-
1426	11	649.8	-	-	-
1427	12	651	-	-	-
1428	13	652.1	-	-	-
1429	14	652.1	-	-	-
1430	15	652.1	-	814	-
1431	16	652.1	-	-	-
1432	17	653.4	-	-	Discharge rate increased slight
1433	18	653.4	-	-	-
1434	19	653.4	-	-	-
1435	20	654.4	-	363	-

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
3-26-64					
1437	22	654.4	-	-	-
1439	24	-	-	-	-
1440	-	-	-	165	-
1441	26	656.7	-	-	-
1443	28	656.7	-	-	-
1445	30	657.8	-	121	-
1450	35	659	510	-	-
1455	40	659.7	514	-	-
1500	45	661.3	514	-	-
1505	50	662.5	-	117	-
1510	55	663.1	-	-	-
1515	60	663.6	526	-	-
1520	65	664.7	-	31.4	-
1525	70	665.4	522	-	-
1530	75	665.9	522	-	-
1535	80	666.4	-	-	-
1540	85	666.4	-	-	-
1545	90	667.1	-	-	-
1550	95	667.7	522	33	-
1559	-	-	-	-	Pump off
1605	110	603.8	-	-	-
1610	115	601.5	-	-	-
1615	120	600.3	-	-	Pump on

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
3-26-64					
1620	125	659	499	66	-
1625	130	660.1	495	352	-
1630	135	661.3	495	176	-
1635	140	662.5	495	132	-
1640	145	663.6	-	88	-
1645	150	664.7	499	77	-
1650	155	665.4	-	-	-
1655	160	665.9	-	-	-
1700	165	667.1	507	62.3	-
1712	177	665.9	-	-	-
1715	180	665.9	491	-	-
1725	190	665.9	479	-	-
1730	195	666.4	487	33	-
1740	205	666.4	-	-	-
1750	215	666.4	483	-	-
1800	225	667.1	483	14.6	-
1830	255	668.2	487	-	-
1900	285	668.2	487	-	-
1930	315	670.5	487	17	-
1950	335	-	-	-	-
1952	337	662.5	-	-	-
1953	338	661.3	-	-	-

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
3-26-64					
1955	340	661.3	401	-	-
2000	345	659.7	396	0	-
2005	350	659	-	-	-
2010	355	659.7	399	-	-
2015	360	659	-	-	-
2025	370	659	396	-	-
2030	375	659	396	0	-
2035	380	659	-	-	-
2100	405	657.8	392	0	-
2115	420	657.8	392	-	-
2130	435	659	405	2	Decrease discharge
2140	445	652.1	320	-	-
2145	450	647.3	320	-	-
2150	455	647.3	320	-	-
2155	460	647.3	320	-	-
2200	465	647.3	320	4.1	-
2210	475	646.3	320	-	-
2220	485	646.3	335	-	-
2230	495	646.3	330	-	-
2235	500	-	-	-	Decrease discharge
2240	505	636.3	231	-	-
2245	510	633.7	231	-	-

Table 3.--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
3-26-64					
2250	515	633.7	-	-	-
2300	525	633.7	238	4.1	-
2310	535	633.7	-	-	-
2320	545	632.5	245	-	-
2330	555	632.5	245	-	-
2333	-	-	-	-	Pump off
2335	-	599.2	-	-	-
2340	-	600.5	-	-	-
2345	-	600.5	-	-	-
3-27-64					
0815		581.5	-	-	Pump on
0816	1	638.5	-	-	-
0817	2	634.5	-	-	-
0818	3	631.5	-	-	-
0819	4	631.5	-	-	-
0820	5	633.5	449	-	-
0821	6	634.5	457	-	-
0822	7	635.5	-	-	-
0823	8	637	457	-	-
0824	9	638.5	-	-	-
0825	10	639.5	-	-	-
0826	11	640.5	-	-	-
0827	12	640.5	479	-	-

Table 3.--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
3-27-64					
0828	13	641.7	-	-	-
0829	14	641.7	-	-	-
0830	15	642.7	479	-	-
0835	20	-	495	-	-
0840	25	-	457	-	-
0845	30	-	469	-	-
0850	35	-	457	-	-
0855	40	-	457	-	-
0900	45	647.3	461	-	-
0905	50	647.3	461	-	-
0910	55	648.7	465	-	-
0915	60	648.7	465	-	-
0920	65	649.8	469	-	-
0925	70	650.9	469	-	-
0930	75	652.1	469	-	-
0935	80	652.1	469	-	-
0940	85	652.1	469	-	-
0945	90	653.2	469	-	-
0950	95	653.2	469	-	-
0955	100	653.2	469	-	-
1000	105	654.4	469	-	-
1005	110	654.4	472	-	-
1010	115	655.5	472	-	-

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
5-27-64					
1015	120	655.5	472	-	-
1018	-	-	-	-	Pump off
1025	-	598	-	-	

Note: Specific capacity of well from above test is about 6.0 gpm per ft of drawdown. Transmissibility of aquifer was not calculated. The specific capacity value is thought to be high because an absolute static water level was not established and because water levels in the aquifer were in a state of drawdown at time of tests due due to prior pumping. Depth-to-water measurements are referred to rig floor 4.0 feet above land surface.

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Test of July 15-16, 1964

Test made by G. A. Dinwiddie and E. C. John, U.S. Geological Survey after installation of permanent pump. Depth to water measured with electric measuring line.

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-15-64				
1211	0	589.35	0	Meter reading 17,536,000 Pump on
	1	652.14	550	-
	2	651.70	550	-
	3	653.10	550	-
	4	644.19	420	Adjusted discharge
	5	643.96	420	-
	6	644.58	420	-
	7	645.35	420	-
	8	645.85	-	-
	9	646.25	-	-
1221	10	646.74	-	-
	11	647.27	420	-
	12	647.68	-	-
	13	648.36	-	-
	14	648.77	-	-
	15	649.10	420	-
	16	649.60	-	-
	17	649.81	-	-
	18	650.18	-	-

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-15-64				
1230	19	650.51	-	-
	21	651.34	-	-
	23	651.84	-	-
	25	652.30	420	-
1238	27	652.80	420	-
1241	30	653.50	420	-
1242	31	-	305	Adjust discharge
	32	647.71	-	-
	34	642.15	305	-
	35	641.23	305	-
	37	640.74	-	-
	39	640.12	305	-
	40	639.97	-	-
	42	639.84	-	-
	44	639.81	-	-
	47	640.00	305	-
1301	50	640.29	305	-
	55	640.35	-	-
1311	60	640.42	-	-
	65	640.68	305	-
	70	640.98	-	-
	75	641.22	305	-

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-15-64				
1311	80	641.42	-	-
	85	641.67	305	-
	90	641.95	305	-
	95	642.06	-	-
1351	100	642.22	-	-
1401	110	642.64	-	-
1411	120	642.92	-	-
	130	644.48	310	-
	140	645.85	315	-
1441	150	645.22	305	Adjust discharge
	160	645.45	305	-
	170	643.65	295	-
1511	180	646.69	305	-
	190	646.93	300	-
	200	647.15	-	-
1541	210	647.42	305	-
	220	647.63	-	-
1611	240	647.92	305	-
	250	648.25	305	-
	260	648.50	305	-
16[illegible]	270	648.90	-	-
	[illegible]	649.19	305	-

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-15-64				
1641	290	649.49	-	-
1711	300	649.65	-	-
	320	649.91	305	-
	340	650.06	305	-
1811	360	650.30	305	-
1831	380	650.50	305	-
1851	400	650.62	305	-
1901	410	650.96	-	-
	490	651.53	-	-
	500	652.12	310	-
	520	650.96	304	Adjust discharge
2111	540	651.98	-	-
2141	570	652.07	304	-
2211	600	652.49	304	-
2241	630	652.37	302	-
2311	660	652.57	302	-
2341	690	653.13	310	Discharge increasing slightly, but not enough to adjust.
7-16-64				
0011	720	653.67	310	Do.
0111	780	653.28	305	-
0221	850	653.78	305	-
0341	930	653.81	305	-

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-16-64				
0451	1,000	654.41	305	-
0611	1,080	654.69	305	-
0731	1,160	655.20	305	-
0811	1,200	655.72	310	-
0931	1,280	655.06	304	-
1031	1,340	655.70	305	-
1211	1,440	655.89	305	-
1311	1,500	655.25	303	-
1341	1,530	655.98	311	-
1356	1,545	656.0	312	-
1406	1,555	656.22	312	Turned on Guaje 4 and 5 at 1403
1411	1,560	655.71	312	-
1421	1,570	656.09	314	-
1431	1,580	656.06	312	-
1441	1,590	656.02	-	-
1521	1,630	656.31	312	Turned off 4 and 5 at 1515
1541	1,650	656.07	310	-
1610	1,679	655.97	-	Pump off. End reading on meter is 18,090,9
1611	1,680	605.41	-	-
	1,681	599.18	-	Total water pumped = 554,900 gallons in 2 hours 59 minutes for an average discharge rate of 330 gpm.
	1,682	597.76	-	

Table 3 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-16-64				
1611	1,683	598.56	-	-
	1,684	601.00	-	-
	1,685	604.08	-	-
	1,686	608.64	-	-
	1,687	610.73	-	-
	1,688	611.81	-	-
	1,689	611.92	-	-
	1,691	611.97	-	-
	1,693	611.64	-	-
	1,695	611.35	-	-
	1,697	611.03	-	-
	1,699	610.70	-	-
	1,704	610.06	-	-
	1,709	609.18	-	-
	1,714	608.52	-	-
1650	1,719	607.89	-	-
1655	1,724	607.47	-	-
	1,729	606.94	-	-
	1,734	-	-	-
	1,739	606.09	-	-
	1,744	605.59	-	-
1720	1,749	605.26	-	-

Table 3.--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-16-64				
1730	1,759	604.41	-	-
1740	1,769	603.89	-	-
1750	1,779	603.24	-	-
1920	1,869	599.61	-	-
1950	1,899	598.72	-	-
2020	1,929	597.90	-	-
2100	1,969	596.95	-	-
2205	2,034	595.77	-	-
2300	2,089	594.92	-	-
2400	2,149	594.15	-	-
7-17-64				
0100	2,209	593.42	-	-
0200	2,269	592.81	-	-
0300	2,329	592.15	-	-
0400	2,389	591.72	-	-
0500	2,449	591.22	-	-
0600	2,509	590.83	-	-
0700	2,569	590.40	-	-
0940	2,669	589.50	-	-
1020	2,709	589.31	-	-
1100	2,749	389.09	-	-
1211	2,820	388.76	-	-

Note: Specific capacity of well from above test is 4.5 gpm per ft of drawdown. Transmissibility of aquifer calculated from drawdown measurements is 6,500 gpd per ft. and calculated from recovery measurements is 6,000 gpd per ft. Depth-to-water measurements are referred to top of 1 1/2-inch gage line 2.0 feet above land surface.

Table 3.--Records of pumping tests, Los Alamos supply well - Continued

Guaje Canyon well 6 was tested also in February and March 1965. The results of these tests are given in Appendix A.

Pajarito Mesa well 1

The second well drilled in 1964-65 is in Sandia Canyon about $2\frac{1}{2}$ miles north of White Rock. The general location of this well was suggested by the Atomic Energy Commission, so that it would be adjacent to a 10-inch water main that extends from the Los Alamos Canyon well-field southward to the water-storage tank at White Rock. A site for the well was chosen in Sandia Canyon by the Geological Survey following a study of the area along the 10-inch water main (Purtymun and Cushman, 1961).

A descriptive log of drill cuttings from the pilot hole of Pajarito Mesa 1 supply well is given in table 4. Electric logs are shown on figures 5, 6, 7, and 8. Table 5 contains the construction record of

Figure 5.--Temperature log of Pajarito Mesa well 1.

Figure 6.--Gamma Ray-Neutron log of Pajarito Mesa well 1.

Figure 7.--Induction-electrical log of Pajarito Mesa well 1.

Figure 8.--Microlog (with caliper) of Pajarito Mesa well 1.

Pajarito Mesa well 1; table 6 contains records of pumping tests made on the finished well.

Table 4.--Descriptive log of drill cuttings from Los Alamos supply well, Pajarito Mesa 1, Sandia Canyon.

Location: NW¼SE¼SW¼ sec. 20, T. 19 N., R. 7 E., Santa Fe County, New Mexico.

Altitude: 6,520 feet above sea level datum.

Total depth: 2,501 feet (pilot hole).

Date drilled: 1964.

Tools: Cable-tool to 825 feet. Mud rotary 825-2,501 feet.

Driller: Layne-Texas Co., Inc., Houston, Texas.

Material	Thickness (feet)	Depth (feet)
Bandelier Tuff, Otowi Member:		
Pumice, pinkish-gray, rhyolitic(?), porphyritic, rounded lumps as much as 1½-inches in diameter that contain phenocrysts of subhedral crystals of sanidine, vesicles are elongate and parallel ----------	5	5
Tuff, moderate yellowish-brown, pumiceous, texture ranges from ash through euhedral sanidine and small (1/32 to 1/8-inch) rounded grains of reddish and dark-brown volcanic rock that are probably rhyolite to latite ---------	10	15

Table 4 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Bandelier Tuff, Otowi Member - Continued		
Tuff, pale-yellowish-brown, pumiceous, texture ranges from ash and euhedral crystals to rounded grains, contains about 60 percent sanidine and quartz and about 40 percent grains of gray, red, and dark-brown igneous rock. At intervals purplish igneous rock (rhyolite to latite) as much as ½-inch in diameter, and obsidian is present	105	120
Bandelier Tuff, Guaje Member:		
Pumice, lump, pale-yellowish-brown to grayish-orange, lumps are subrounded to subangular and as much as 1½-inches in diameter, vesicles are elongate and show parallel flow texture, contains sanidine, quartz, and grains of igneous rock	30	150
Pumice, lump, very light-gray to gray, lumps to 1½-inches in diameter, sanidine and quartz	9	159
Sand and gravel, grayish-red, consists of silt to gravel as much as ¼-inch in diameter, some larger particles are rounded. Grains of sanidine, quartz, and black igneous rock	6	165

Table 4 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Basaltic Rocks of Chino Mesa, Unit 3:		
Basalt, dark-gray to grayish-black, porhyritic, phenocrysts are small olivene crystals. Probably solid unbrecciated zone as drilling is very difficult and hard ----------	34	199
Basalt, similar to above, contains scoria. Probably a brecciated interflow zone as drilling is easier and drilling mud was lost from 199 to 216 feet and from 220 to 236 feet ----------	37	236
Basalt, dense, similar to interval from 165 to 199 feet. Lost mud at 254 feet ----------	18	254
No samples, lost mud and samples into formation -	11	265
Basalt, grayish-black, porphyritic, fractured ---	10	275
Basalt, scoria (cinders) ----------	5	280
Basalt, grayish-black, dense (Hole started crooked at 284 feet with harder drilling, cavity from 303 to 304 feet) ----------	30	310
Basalt, grayish-black, fractured, contains some reddish-brown mudstone (lost drilling mud from 310 to 314 feet) ----------	30	340
No sample ----------	5	345

Table 4 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Basaltic Rocks of Chino Mesa - Continued		
Basalt, grayish-black, fractured, contains some mudstone and scoria	25	370
Basalt, grayish-black, dense	78	448
Basalt, grayish-black, brecciated, dense to slightly vesicular (contains water)	2	450
Basalt, grayish-black, brecciated, vesicular to scoriaceous, contains some mudstone	40	490
Basalt and sand, basalt, grayish-black, brecciated; sand, fine-to-coarse, quartz, clear to iron-stained, some tan clay	17	507
Old Alluvium:		
Sand and gravel, quartz and black latitic material, gravel-sized lumps of grayish-brown siltstone, heavy iron-staining	13	520
Sand and gravel, light-gray, quartz	5	525
Sand, quartz, frosted-to-clear, subangular-to-angular, well-sorted; 30 percent latitic sand	5	530
Sand and gravel, quartz, latite, and basalt, subangular-to-angular, pieces to ½-inch, fine-to-coarse sand	5	535
Siltstone, grayish-orange-pink, soft, contains mica and biotite	5	540

Table 4 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Old Alluvium - Continued		
No sample	5	545
Clay, light-brownish-gray, plastic	5	550
Puye Conglomerate, Fanglomerate Member:		
Conglomerate, greenish-gray, silty, subangular fragments of latitic rocks, trace basalt	55	605
Conglomerate, similar to interval from 550 to 605 feet, with angular-to-subround fine quartz gravel	5	610
Conglomerate, fine-to-coarse quartz sand and sanidine, ranges to fine gravel, mostly clear, angular, 10-20 percent latite	20	630
Conglomerate, as above, 40 percent latite	50	680
Conglomerate, as above, 75 percent latite	20	700
Conglomerate, as above, 10-20 percent latite	25	725
Conglomerate, subrounded pieces of latitic rock and a few pieces of milky quartz	15	740
Conglomerate, fine gravel-sized pieces of latite and frosted, iron-stained quartz sand, some biotite and sanidine	5	745
Conglomerate, very fine-to-medium latite gravel, minor quartz and biotite	10	755
Conglomerate, latite pebbles and fragments, much light-colored volcanic material, minor quartz, sanidine, and biotite. Many crystals of pyroxene	15	770

Table 4.--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Puye Conglomerate, Fanglomerate Member - Continued		
Conglomerate, gray-to-pink, latite pebbles and fragments, quartz phenocrysts, minor biotite and pyroxene	5	775
Puye Conglomerate, Totavi Lentil:		
Sand and gravel, quartz and quartzite pebbles and fragments to ½-inch	10	785
Sand and gravel, as above, fragments to 1-inch	5	790
Sand, fine-to-coarse quartz, with quartzite gravel and fragments to ¼-inch	5	795
Tesuque Formation:		
Tuff, light-gray to tan with white blotches, devitrified, waxey, contains angular lapilli of latite and crystals of pyroxene (rounded pieces several inches in diameter cave into hole)	41	836
Basalt, dark gray, granular, contains much feldspar and analcite(?), some magnetite	58	894
Basalt, as above, with olivene	72	966
Siltstone, brick red-to-pink, clay, some fine quartz sand	18	984
Siltstone, tan and much fine sand	70	1,054
Basalt, dark-gray to black, dense, some feldspar and olivene	40	1,094

Table 4 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Sand, fine-to-coarse, quartz, subrounded, clear-to-frosted, iron-staining. Some tan siltstone -	32	1,126
Silt, tan-to-cream, fine sandy ----------	24	1,150
Sand, fine, quartz, subangular ----------	16	1,166
Basalt and latite, dark-gray basalt, pink-to-brown latite with phenocrysts of feldspar -----	14	1,180
Sand, fine-to-coarse, quartz, subrounded-to-subangular, frosted, mostly brown-to-white. Some rounded fragments of volcanic rocks ------	21	1,201
Sand, fine-to-coarse, quartz, well-sorted, subrounded, clear-to-frosted, some iron-staining, a few grains of latite ----------	30	1,231
Silty sand, very fine, quartz, subangular, iron-stained, some fine latite gravel ----------	60	1,291
Sand, fine-to-coarse, quartz, subrounded, clear-to-iron-stained, latite gravels, some reddish-black basalt and tan micaceous silty clay -----	41	1,332
Sand, very fine-to-medium, trace coarse, quartz, subangular-to-subround, mostly gray, some clear-to-iron-stained, some latite gravel and tan and white silt ----------	116	1,448
Siltstone, gray, very fine-to-medium, trace quartz and latite sand ----------	26	1,474

Table 1.--Pumping and water-level recovery tests - Continued

Part 2 - Continued

Time	Time since pumping started (minutes)	Depth to water (feet)
3-5-65		
1400	4,080	661

Note: Water-level fluctuations after 1,200 minutes are irregular and time-drawdown relationship is indeterminate.

The above times and depth-to-water measurements were used in the calculation of aquifer transmissibility as shown in figure 3.

Figure 3.--Water-level drawdown plot, Guaje Well No. 6, Los Alamos, N. Mex. (Part 2)

Table 4 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Sand, very fine-to-medium, trace coarse, grayish-brown, subrounded, well-sorted, quartz. Some dark grains	26	1,500
Siltstone, light-gray to cream, very fine sand	6	1,506
Basalt, dark-gray to black, trace latite	4	1,510
Siltstone, light-gray to cream, some sand, and rounded latite pebbles	22	1,532
Sand, fine-to-medium, brown, quartz, and siltstone, light-gray to cream	14	1,546
Basalt, dark-gray to black	2	1,548
Sand, very fine-to-medium, quartz, subrounded, clear-to-frosted, trace cream silt	20	1,568
Siltstone, light-gray to cream	6	1,574
Silty sand, very fine-to-medium, subrounded, clear-to-frosted, much grayish-gray to cream silt	122	1,696
Sand, very fine-to-medium, quartz, subangular, clear with much iron-staining, a few dark grains, trace cream silt	20	1,716
Silty sand, very fine-to-medium, quartz, subangular-to-round, some iron-staining, much gray, cream, and tan silt	44	1,760

Table 4 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Sand, fine-to-coarse, quartz, subangular-to-round, mostly clear-to-frosted, much iron-staining, trace white clay and rounded latite grains	38	1,798
Siltstone, white-to-gray, very fine	8	1,806
Siltstone, very fine-to-medium, subangular-to-round, brownish-gray, trace white silt and rounded latite grains	68	1,874
Silty sand, as above with larger percentage of silt	52	1,926
Silty sand, very fine-to-medium, trace coarse, subrounded, brownish-gray with some iron-staining, much tan clayey silt, trace white silt	35	1,961
Silty sand, as above with less clayey silt	20	1,981
Silty sand, as above with no clayey silt	80	2,061
Silt, light-gray, very fine, sandy	10	2,071
Silty sand, very fine quartz sand and light-gray to cream silt	20	2,091
Silty sand, very fine-to-fine, grayish-brown	30	2,121
Sand, very fine-to-medium, quartz, subrounded, light-brown, and white-to-tan silt	10	2,131

Table 4 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Silty sand, very fine-to-fine, quartz, subrounded, light-gray, and white silt -------	50	2,181
Sand, very fine-to-fine, quartz, subrounded, light-brown to light-gray, some tan silt -----	29	2,210
Clay, gray, very fine-to-fine sandy ----------	62	2,272
Siltstone, very fine-to-fine, tan-to-gray -------	12	2,284
Sand, very fine-to-fine, occasional coarse grains, quartz, subangular, tan-to-gray ------	7	2,291
Silty sand, very fine-to-fine, quartz, subrounded, gray-to-tan, and white-to-gray silt ----------	37	2,328
Siltstone, light-gray to tan, very fine --------	6	2,334
Sand, very fine-to-medium, quartz, tan, some silt ----------	40	2,374
Silty sand, very fine-to-fine, gray-to-tan sand, and white-to-gray silt ----------	27	2,401
Sand, very fine-to-fine, some medium-to-coarse, tan, subrounded, loose ----------	41	2,442
Conglomerate, fine-to-coarse, some fine gravel, quartz, and much gray to reddish-gray rounded latitic rock ----------	16	2,458

Table 4 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Sand, very fine-to-fine, some medium-to-coarse, tan, subrounded, some silt ----------	43	2,501

Note: Interval from 165 to 507 feet (Unit 3 of Basaltic rocks of Chino Mesa) is exposed, in part, near top of the hill west of Totavi.

Samples of the drill cuttings were collected by the contractor/ at 5-foot intervals from 0 to 825 feet and at 10-foot intervals from 825 to 2,501 feet. These samples were then washed, by the Geological Survey, and studied under the binocular microscope. The samples were described dry. Thickness and depth intervals of drill cutting samples have been correlated with data interpreted from electric logs and driller's logs.

Table 5.--Construction record of Los Alamos supply well, Pajarito Mesa 1, Sandia Canyon

Total depth: 2,499 feet

Date Completed: February 1965

Casing and hole record: 28-inch hole from 0 to 474 feet. Cased with 24-inch ID pipe, cemented in hole.

22-inch hole from 474 to 2,499 feet. Cased with 12-inch ID blank pipe from 0 to 945 feet and with 12-inch ID pipe slotted with 3/32-inch louver openings from 945 to 2,499 feet.

Annulus between 12-inch pipe and 22-inch hole filled from 2,499 to 0 feet with washed and graded gravel ranging in size from about 1/32-inch to ¼-inch.

Gage lines: Two steel-pipe gage lines each of 2-inch diameter installed on outside of 12-inch pipe and enter pipe at a depth of 950 feet. An airline will be installed in one gage line; the other is used for entry of mechanical water-level measuring devices.

Well development: The well was swabbed for 68 hours and bailed for 65 hours. Further development consisted of pumping for 189 hours at rates of 400 to 850 gpm.

Yield: Data obtained during the pumping phase of well development indicated that the optimum yield of the well is about 700 gpm. Specific capacity was determined to be about 15 gpm per ft of drawdown.

Table 6 .--Records of pumping tests, Los Alamos supply well,

Pajarito Mesa 1, Sandia Canyon

Test of February 11-13, 1965

Tests made by J. B. Cooper, U.S. Geological Survey, near end of pumping for well development. Depth to water measured with electric measuring line.

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
2-11-65					
1527	-	-	-	-	Pump off
1555	-	746.12	-	-	-
1600	-	-	-	-	Pump on
	2.5	769.5	-	-	-
	4	775.3	-	-	-
1605	5	-	717	176	-
	6	774.1	-	-	-
	8	774.5	-	-	-
	10	774.8	717	550	-
	12	775.2	-	-	-
1615	15	-	717	242	-
	14	775.4	-	-	-
	16	775.8	-	-	-
	18	775.9	-	-	-
	20	776.2	-	-	-
	22	776.3	-	-	-
	24	776.4	-	-	-
	26	776.5	-	-	-
	28	776.6	-	-	-

Table 6.--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
2-11-65					
1630	30	776.7	726	176	-
	35	776.9	-	-	-
	40	777.0	-	-	-
1645	45	777.2	-	121	-
	50	777.4	-	-	-
	55	777.3	-	-	-
1700	60	777.6	735	129	-
	70	777.8	-	-	-
	80	778.0	-	-	-
1730	90	778.2	735	77	-
	100	778.3	-	-	-
	115	778.5	-	-	-
1800	120	-	735	30.8	-
	125	778.4	-	-	-
1810	-	-	-	-	Pump off
2-12-65					
1155	-	-	-	-	Pump off
1210	-	749.3	-	-	-
1225	-	748.4	-	-	-
1245	-	746.05	-	-	-
1259	-	745.75	-	-	-

Table 6 .--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
2-12-65					
1300	-	-	-	-	Pump on
	1.5	780.0	-	-	-
	2.25	778.0	-	-	-
	3	778.1	-	-	-
	4	778.3	-	-	-
	5	778.6	-	779	-
	6	778.8	-	-	-
	7	779.1	-	-	-
	8	779.2	-	-	-
	9	779.4	-	-	-
1310	10	779.6	831	836	-
	12	780.0	-	-	-
	14	780.5	-	-	-
1315	15	-	838	429	-
	16	780.9	-	-	-
	18	781.2	-	-	-
	20	781.5	-	-	-
	22	781.7	-	-	-
	24	781.9	-	-	-
	26	782.0	-	-	-
	28	782.2	-	-	-

Table 6.--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Sand content of water (ppm)	Remarks
2-12-65					
1330	30	782.3	844	180.3	-
	35	782.6	-	-	-
	40	782.8	-	-	-
	45	783.1	-	-	-
	50	783.2	-	-	-
	55	783.3	-	-	-
1400	60	783.4	844	-	-
	70	783.7	-	-	-
	80	783.9	-	-	-
1430	90	784.1	844	-	-
	100	784.3	-	-	-
	110	784.4	-	-	Last measureme

Test of February 12-13, 1965

Following well development, measurements of water-level recovery were made by personnel of Layne-Texas Co., Inc. with electric measuring line.

Time	Depth to water (feet)	Remarks
2-12-65		
2100	762.7	Pump off
2115	747.3	-
2130	746.4	-
2145	746.0	-
2200	745.7	-
2230	745.2	-
2300	744.8	-
2330	744.3	-
2-13-65		
0730	743.5	-
1130	742.5	-
1730	741.5	-
2-15-65		
0800	736.7	-

Note: Specific capacity of well from above tests is about 17 gpm per ft of drawdown. Transmissibility of aquifer calculated from drawdown measurements is about 55,000 gpd per ft. Both of these values are thought to be high because an absolute static water level was not established and because water levels in the aquifer were in a state of drawdown at time of tests, due to prior pumping. Depth-to-water measurements are referred to rig floor 4.3 feet above land surface.

Pajarito Mesa well 2

The last well drilled in 1964-1965 is in Pajarito Canyon a few hundred feet east of a technical area known as Pajarito site. The general location of this well was stipulated by the Atomic Energy Commission to be between the confluence of Twomile Canyon and Pajarito Canyon on the west and White Rock on the east. The site in Pajarito Canyon chosen for the well was suggested by the Geological Survey following a study of the area. (Purtymun and John, 1964.)

A descriptive log of drill cuttings from the pilot hole of Pajarito Mesa 2 supply well is given in table 7. Electric logs are shown on figures 9, 10, 11, and 12. Table 8 contains the construction record of Pajarito Mesa well 2; table 9 contains records of pumping tests made on the finished well.

Figure 9.--Temperature log of Pajarito Mesa well 2.

Figure 10.--Gamma Ray-Neutron log of Pajarito Mesa well 2.

Figure 11.--Induction-electrical log of Pajarito Mesa well 2.

Figure 12.--Microlog (with caliper) of Pajarito Mesa well 2.

Table 7 .--Descriptive log of drill cuttings from Los Alamos supply well, Pajarito Mesa 2, Pajarito Canyon.

Location: SW¼NW¼NW¼ sec. 36, T. 19 N., R. 6 E., Los Alamos County, New Mexico.

Altitude: 6,715 feet above sea level datum.

Total depth: 2,600 feet (pilot hole).

Date drilled: 1965.

Tools: Cable-tool to 617 feet. Mud rotary 617-2,600 feet.

Driller: Layne-Texas Co., Inc., Houston, Texas.

Material	Thickness (feet)	Depth (feet)
Alluvium:		
Boulders and clay, boulders of latite as large as 12 inches and grayish-brown clay; some sand and gravel----------	7	7
Sand and gravel, sand is light-gray, fine-to-coarse and composed of crystals and fragments of sanidine and quartz; gravel is fine-to-coarse and composed of latite and tuff--------	23	30
Bandelier Tuff, Otowi Member:		
Tuff, buff, silty, consists mostly of sanidine and quartz crystals, many fragments of rhyolite and latite, trace of pumice near 105 feet----	95	125

top of Guaje

do not agree

Table 7 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Bandelier Tuff, Otowi Member - Continued		
Tuff, mostly crystals of sanidine and quartz with rhyolite and latite fragments; much white and tan pumice----------	40	165
Tuff, light-gray, consists of crystals and fragments of sanidine, quartz, and glass and many brown and gray rhyolite fragments to 1/8 inch----------	60	225
Pumice, buff----------	10	235
Tuff, crystals and fragments of sanidine, quartz, glass in sand-size grains and gravel of rhyolite, latite, and basalt, much white pumice--------	65	300
Pumice, light-gray to tan----------	15	315
Tuff, crystals and fragments of sanidine, quartz, glass and dark volcanic rocks with much white pumice (show of water at 335 feet)-----	30	345
Tuff, gray, composed of sand-size grains of sanidine, quartz, and glass crystals and many gravels of rhyolite and latite, trace pumice----------	45	390
Tuff, crystals and fragments of sand-size sanidine, quartz, and glass----------	15	405

Table 7 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Bandelier Tuff, Guaje Member:		
Pumice, light-tan to light-gray, lumps as large as 1/4 inch----------	27	432
Unit 3 of basaltic rocks of Chino Mesa:		
Basalt, black, dense, with some iron-staining, trace tan clayey silt, minor olivene, pyrite, and white crystalline material----------	73	505
Basalt, dark reddish-brown and dark-gray, dense----------	10	515
Basalt, dark-gray, dense with buff, clay and silt (caliper log indicates a zone of lost circulation 522-534 feet)----------	15	530
Basalt, dark-gray to black, vuggy, trace olivene----------	15	550
Basalt, scoria, dark-gray to reddish-brown, vuggy, trace buff clay (caliper log indicates a zone of lost circulation 546-564 feet)------	20	570
Basalt, gray to greenish-gray, granular to fine-grained glassy structure, much olivene and feldspar crystals----------	20	590
Basalt, black, brown, and red, vuggy, contains scoria----------	15	605
Basalt, dark grayish-red, dense, trace olivene and feldspar crystals----------	12	617

Table 7 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Unit 3 - Continued		
Basalt (no samples. Electric logs and driller's logs indicate this interval to be basalt. Hole was drilled without circulation.)----------	83	700
Puye Conglomerate, Fanglomerate Member:		
Conglomerate (no samples. Electric logs and driller's logs indicate this interval to be conglomerate. Hole was drilled without circulation.)----------	30	730
Conglomerate, sand is fine-to-coarse, quartz, frosted and rounded; gravel is mostly latite, much basalt----------	4	734
Basalt, dark-gray, dense----------	4	738
Conglomerate, as 730 to 734 feet----------	20	758
Basalt, as 734 to 738 feet----------	12	770
Conglomerate, greenish-gray, sand is fine-to-coarse, subrounded-to-rounded frosted quartz and subrounded-to-subangular basalt and latite; gravel sizes are subangular-to-subrounded basalt and latite; contains crystals and fragments of sanidine, quartz, and glass-----	230	1,000

Table 7 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Puye Conglomerate, Fanglomerate Member - Continued		
Conglomerate, as 770 to 1,000 feet but contains much larger percentage of gravel size particles and some chert and tan silty clay----------	168	1,168
Conglomerate, as 1,000 to 1,168 feet but contains white and tan fibrous pumice--------	18	1,186
Conglomerate, gray-to-tan, mostly sand composed of subrounded basalt and latite and frosted quartz, occasional gravel size; contains tan pumice, and white to light-gray silt-----	64	1,250
Conglomerate, mostly gravel size, subangular-to-subrounded basalt and latite, much pumice from 1,250 to 1,280 feet----------	90	1,340
Puye Conglomerate, Totavi Lentil:		
Gravel and sand, composed of subrounded gravels of quartzite, chalcedony, and quartz, and large chips from cobbles----------	70	1,410
Tesuque Formation:		
Sand, light pinkish-gray to dark-gray, fine-to-coarse, subrounded-to-rounded, quartz, some fine-to-coarse gravels of quartz and quartzite----------	138	1,548

Table 7 .--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Conglomerate, sand is grayish-pink, subangular-to-subrounded quartz; gravel is subrounded quartz and quartzite and a few gravels of vuggy basalt----------	292	1,840
Basalt, black to dark-gray, coarse crystalline with gray to green waxey clay filling some vugs and some vug lining of white crystals---	52	1,892
Sand and gravel, mostly sand-sized grains of fine-medium subrounded quartz, some subrounded gravels of basalt and latite, many chips of basalt. Interval may contain thin basalt flows----------	216	2,108
Conglomerate, sand, well-sorted, fine-to-coarse, and subrounded gravels of latite and quartzite----------	110	2,218
Basalt, brown, red, and black, weathered appearance, contains clay and white crystals in vugs----------	94	2,312

Table 7.--Descriptive log of drill cuttings - Continued

Material	Thickness (feet)	Depth (feet)
Tesuque Formation - Continued		
Sand, grayish-pink, very fine-to-medium, subangular-to-subrounded, quartz, contains tan and cream clay and a few rounded basalt gravels--------	58	2,370
Sand, as 2,312 to 2,370 feet but coarser grained with white clay----------	40	2,410
Sand, grayish-pink, coarse-to-very coarse, rounded-to-subrounded, quartz, some white and tan clay----------	50	2,460
Clayey sand, fine-to-coarse sand with much white and tan clay----------	30	2,490
Clay, tan to white, sandy----------	20	2,510
Clayey sand, as 2,460 to 2,490, contains much basalt (possible basalt layer at 2,506 to 2,508 according to electric logs)----------	20	2,530
Sand, pinkish-gray to tan, fine-to-coarse, subangular-to-subrounded quartz and white to tan clay----------	70	2,600

Note: Sample obtained from bottom of drill bit after removal from hole at 2,600 feet is tan sandy clay and subangular fragments up to 1 inch of dark-gray, hard, structureless, very fine silty, non-calcareous shale. Exterior of shale fragments have lining of calcareous material on weathered surface.

Table 7 .--Descriptive log of drill cuttings - Continued

Note: Samples of the drill cuttings were collected by the contractor at 5-foot intervals from 0 to 617 feet and at 10-foot intervals from 617 to 2,600 feet. These samples were then washed by the Geological Survey and studied under the binocular microscope. The samples were described dry. Thickness and depth intervals of drill cutting samples have been correlated with data interpreted from electric logs and driller's logs.

Table 8 .--Construction record of Los Alamos supply well, Pajarito Mesa 2, Pajarito Canyon

Total depth: 2,300 feet

Date completed: July 1965

Casing and hole record: 30-inch hole from 0 to 504 feet. Cased with 26-inch ID pipe, cemented in hole.

24-inch hole from 504 to 2,300 feet. Cased with 14-inch ID blank pipe from 0 to 1,004 feet and with 14-inch ID pipe slotted with 3/32-inch louver openings from 1,004 to 2,300 feet.

Annulus between 14-inch pipe and 24-inch hole filled from 2,300 to 0 feet with washed and graded gravel ranging in size from about 1/32-inch to ¼-inch.

Gage lines: Two steel-pipe gage lines each of 2-inch diameter installed on outside of 14-inch pipe and enter pipe at a depth of 1,000 feet. An airline will be installed in one gage line; the other is used for entry of mechanical water-level measuring devices.

Well development: The well was swabbed for 102 hours and bailed for 44 hours. Further development consisted of pumping for 74 hours at rates of 600 to 1,470 gpm.

Yield: Data obtained during the pumping phase of well development indicated that the optimum yield of the well is about 1,200 gpm. Specific capacity was determined to be about 24 gpm per ft of drawdown.

Table 9 .--Record of pumping test, Los Alamos supply well Pajarito Mesa 2, Pajarito Canyon, July 6-7, 1965

Test made by J. B. Cooper, U.S. Geological Survey and B. G. Hammock, Gordon Herkenhoff and Associates. Depth to water measured with electric measuring line.

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-6-65				
0845	-	826.8	-	Static water level
0854	-	-	-	Pump on
	1	830.8	-	Depth to water measurements between 1 and 32 minutes are erratic and probably inaccurate. Gage line appears to be dirty and oily.
	3	832.9	-	
	6	831.1	1,162	
	11	830.95	-	
	20	851.6	1,218	
	32	870.0	-	Washed out gage line.
	54	870.2	-	Temp. F 73°.
0945	-	-	1,218	-
0956	62	870.8	1,218	-
1019	85	871.2	1,218	-
1033	99	871.1	1,218	-
1058	124	872.6	1,218	-
1129	155	872.6	1,209	-
1200	186	872.4	1,218	-

Table 9.--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-6-65				
1230	216	872.5	1,218	-
1300	246	872.5	1,218	-
1305	251	875.4	1,218	-
1330	276	876.0	1,227	Temp. F 73°
1400	306	875.9	1,218	-
1430	336	876.1	1,218	-
1500	366	876.3	1,218	-
1600	426	876.4	1,209	-
1630	456	876.7	1,209	-
1705	491	872.4	1,200	-
1730	516	872.1	1,209	-
1745	531	872.1	1,209	Temp. F 73.5°
1800	546	872.1	1,209	-
1801	-	-	-	Decrease discharge
1815	-	-	990	-
1830	-	-	1,094	-
1845	-	870.0	1,043	-
1900	-	871.0	1,043	-
1930	-	871.1	1,043	-
2000	-	871.1	1,043	-
2030	-	871.1	1,043	-
2100	-	870.8	1,022	Decrease discharge

Table 9.--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-6-65				
2104	-	864.4	838	-
2130	-	863.7	851	-
2200	-	863.4	851	Decrease discharge
2205	-	856.4	617	-
2230	-	856.0	666	-
2300	-	856.2	650	Pump off
2310	-	-	-	Pump on
2317	-	881.9	1,461	-
2330	-	883.5	1,461	-
2345	-	886.5	1,476	-
2400	-	883.5	1,476	-
7-7-65				
0015	-	882.8	1,476	Pump off
0030	-	831.05	-	Recovery measurements
0045	-	831.00	-	-
0100	-	830.91	-	-
0115	-	830.90	-	-
0147	-	830.75	-	-
0246	-	830.75	-	-
0341	-	830.0	-	-
0448	-	829.6	-	-
0550	-	829.0	-	-

Table 9.--Records of pumping tests, Los Alamos supply well - Continued

Time	Time since pump started (minutes)	Depth to water (feet)	Discharge (gpm)	Remarks
7-7-65				
0640	-	829.0	-	-
0723	-	828.8	-	-
0800	-	828.35	-	End of measurements

Note: Well had been idle for 74 hours prior to start of test. Specific capacity of well from above test is about 24 gpm per ft of drawdown. Transmissibility of aquifer calculated from drawdown measurements is about 40,000 gpd per ft. Depth-to-water measurements are referred to rig floor 4.0 feet above land surface.

References

Cooper, J. B., 1965, Pumping tests of February and March 1965, Guaje Well No. 6, Los Alamos, New Mexico: U.S. Geol. Survey Admin. Rept., April 1965, 28 p.

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Purtymun, W. D., and John, Edward, 1964, Site for a municipal supply well in Pajarito Canyon near Los Alamos, New Mexico: U.S. Geol. Survey Admin. Rept., April 1964, 15 p.

APPENDIX A

Pumping tests of February and March 1965

Guaje well No. 6, Los Alamos, New Mexico

APPENDIX A

Pumping tests of February and March 1965

Guaje Well No. 6

Los Alamos, New Mexico

By

James B. Cooper

Introduction

From February 24 to March 30, 1965, water-level drawdown and recovery tests were made on Well No. 6 in the Guaje Canyon well field at Los Alamos, New Mexico. Various production rates and duration of pumping and recovery periods were suggested by the Geological Survey and were administered by Mr. Hal York of Zia Company, Water Superintendent of the Los Alamos water-supply system.

Water levels were measured by a recording gage attached to an airline of known length. Discharge measurements for each period of pumping were obtained from a totalizing meter on the pump discharge line.

The measurements and pertinent data for 3 periods of pumping and water-level recovery in Guaje Well No. 6 are given in table 1 and time-drawdown or recovery plots are shown on figures 1 through 6.

Table 1.--Pumping and water-level recovery tests,

Guaje Well No. 6, Los Alamos, N. Mex.

Part 1 Water-level drawdown test

Pump started: February 24, 1965, at 1315 hours.

Pump stopped: February 27, 1965, at 1330 hours.

Period of pumping: 72 hours 15 minutes.

Average discharge: 407 gpm (gallons per minute).

Remarks: Well had been idle for 10 hours 45 minutes prior to starting test. Static water level was 576.5 feet.

Time	Time since pumping started (minutes)	Depth to water (feet)
2-24-65		
1330	15	631
1345	30	635
1400	45	638
1430	75	640
1500	105	646
1530	135	647
1630	195	649
1700	225	650
1800	285	652.5
1900	345	654
2000	405	655
2100	465	656
2200	525	657

Table 1.--Pumping and water-level recovery tests - Continued

Part 1 - Continued

Time	Time since pumping started (minutes)	Depth to water (feet)
2-25-65		
0300	825	658
0600	1,005	659.5
0700	1,065	661
0900	1,185	662.5
1200	1,365	663
1500	1,545	664
1800	1,725	665
2100	1,905	666.5
2-26-65		
0800	2,565	666.5
1100	2,745	668
1800	3,165	668
2-27-65		
0200	3,645	670
1300	4,305	670

The above times and depth-to-water measurements were used in calculation of aquifer transmissibility as shown in figure 1.

Figure 1.--Water-level drawdown plot, Guaje Well No. 6, Los Alamos, N. Mex. (Part 1)

NO. 340R L410 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
4 CYCLES X 10 DIVISIONS PER INCH

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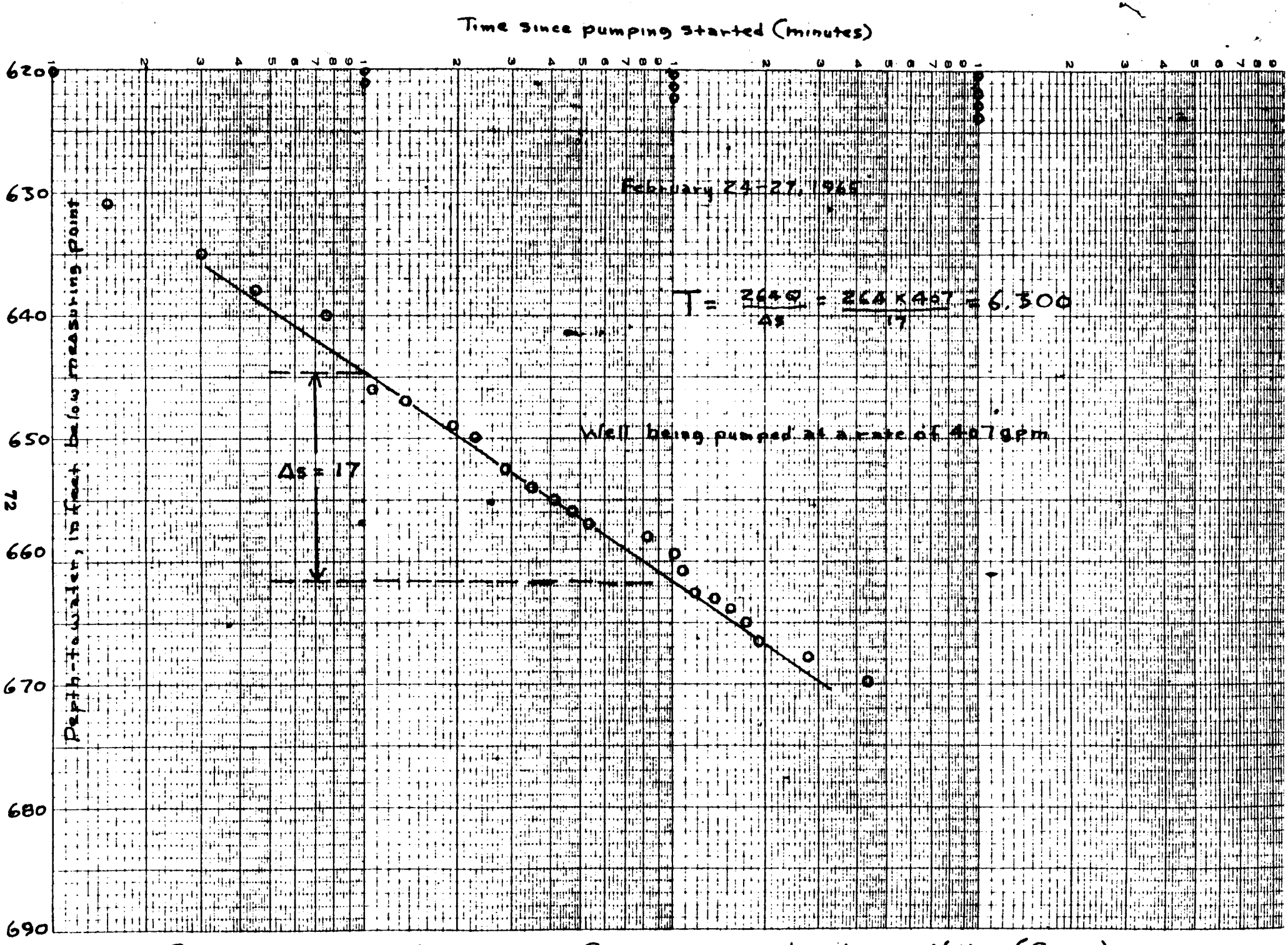

Figure 1.--Water-level drawdown plot, Guaje Well No. 6, Los Alamos, N. Mex. (Part 1)

Table 1.--Pumping and water-level recovery tests - Continued

Part 1-A Water-level recovery test

Pump stopped: February 27, 1965, at 1330 hours.

Measurements stopped: March 2, 1965, at 2000 hours.

Period of recovery: 78 hours 30 minutes.

Remarks: Well had been pumped 72 hours 15 minutes at an average discharge rate of 407 gpm prior to test. Static water level prior to pumping was 576.5 feet.

Time	Time since pumping stopped (minutes)	Depth to water (feet)
2-27-65		
1400	30	609
1430	60	604
1500	90	602
1530	120	599.5
1600	150	598
1630	180	596
1700	210	595
1730	240	594
1800	270	592.5
1900	330	591
2030	420	589
2200	510	588
2330	600	587

Table 1.--Pumping and water-level recovery tests - Continued

Part 1-A - Continued

Time	Time since pumping stopped (minutes)	Depth to water (feet)
2-28-65		
0100	690	586
0300	810	585
0600	990	583.5
1100	1,290	582
1500	1,530	581
2000	1,830	580
3-1-65		
1300	2,850	579
1800	3,150	578
3-2-65		
2000	4,710	578.5

The above times and depth to water measurements were used in the calculation of aquifer transmissibility as shown in figure 2.

Figure 2.--Water-level recovery plot, Guaje Well No. 6, Los Alamos, N. Mex. (Part 1-A)

NO. 340R 1410 DIETZGEN GRAPH PAPER
SEMI-LOGARITHMIC
4 CYCLES X 10 DIVISIONS PER INCH

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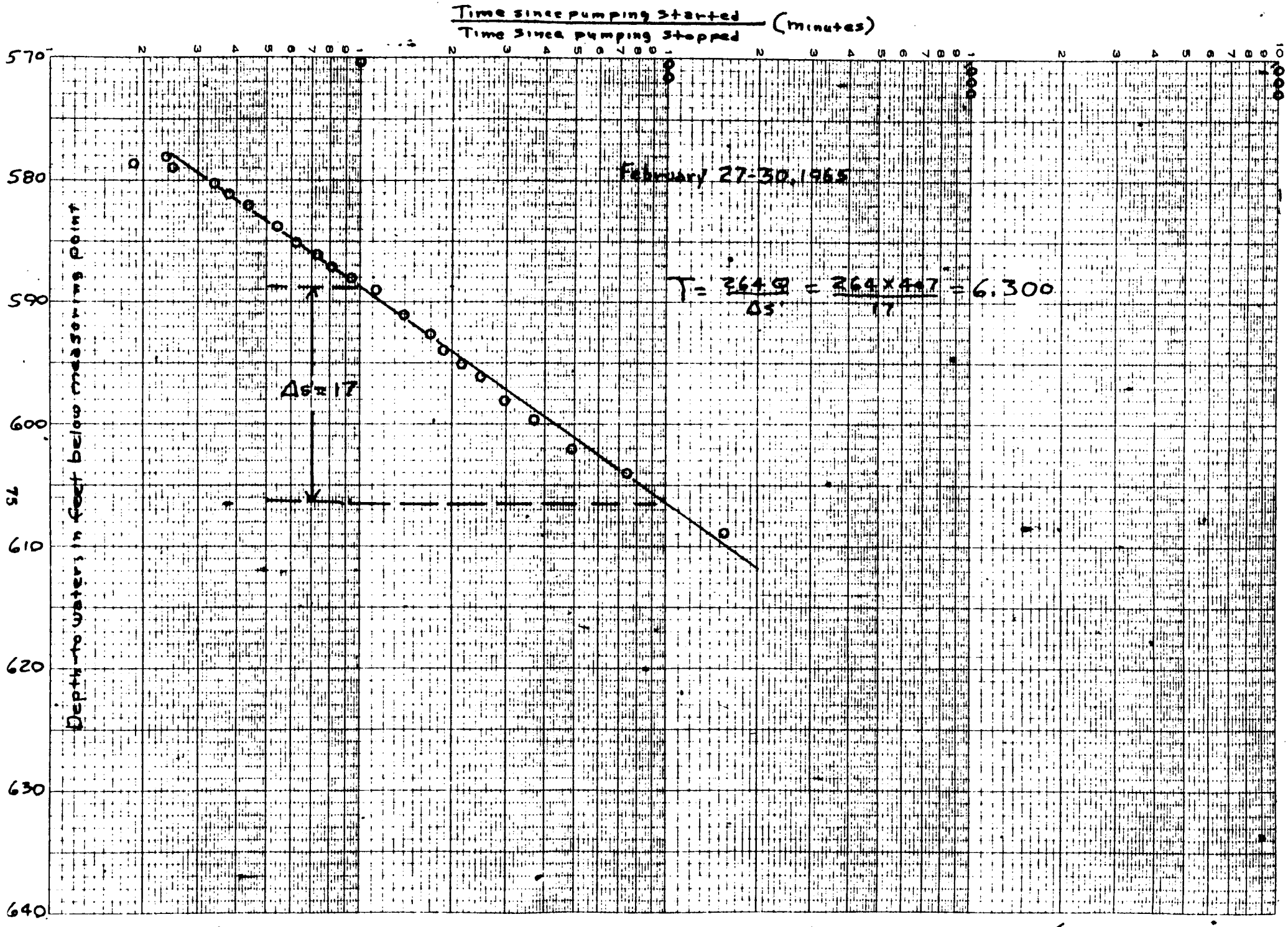

Figure 2. Water level recovery plot, Guaje Well No. 6, Los Alamos N. Mex. (Part A)

Table 1.--Pumping and water-level recovery tests - Continued

Part 2 Water-level drawdown test

Pump started: March 2, 1965, at 1700 hours.

Pump stopped: March 6, 1965, at 0800 hours.

Period of pumping: 87 hours.

Average discharge: 345 gpm.

Remarks: Well had been idle for 75 hours 30 minutes prior to starting test. Static water level was 578 feet.

Time	Time since pumping started (minutes)	Depth to water (feet)
3-2-65		
1800	60	633
1900	120	636.5
2000	180	640
2100	240	641
2200	300	642
2300	360	643.5
2400	420	645
3-3-65		
0100	480	646
0200	540	647
0300	600	647.5
0500	720	648
0730	870	649
0930	990	651
1200	1,140	652.5
1300	1,200	654

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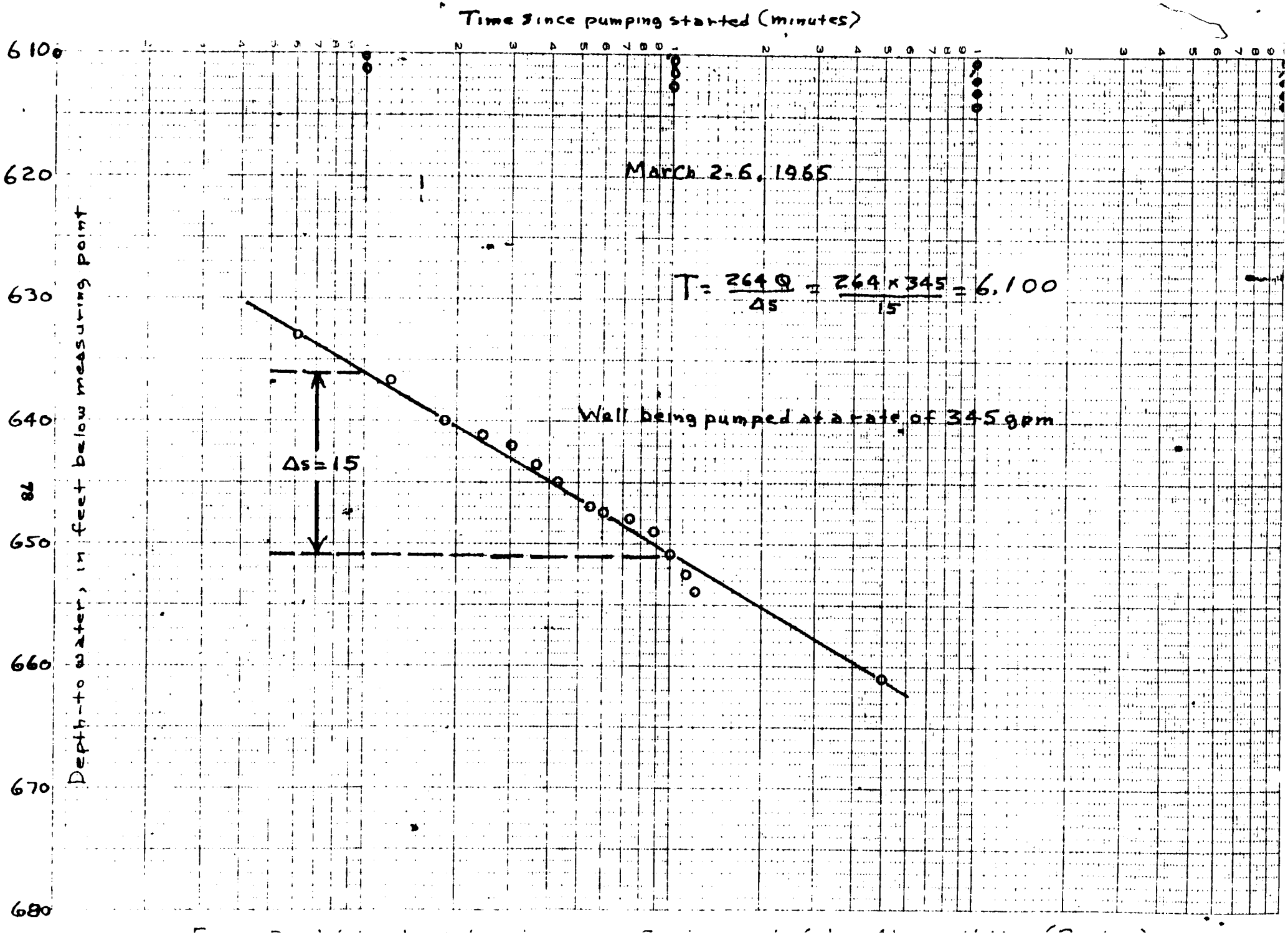

Table 1.--Pumping and water-level recovery tests - Continued

Part 2-A Water-level recovery test

Pump stopped: March 6, 1965, at 0800 hours.

Measurements stopped: March 8, 1965, at 1400 hours.

Period of recovery: 54 hours.

Remarks: Well had been pumped 87 hours at an average discharge rate of 345 gpm prior to test. Static water level prior to pumping was 578 feet.

Time	Time since pumping stopped (minutes)	Depth to water (feet)
3-6-65		
0830	30	608
0900	60	604
0930	90	603
1000	120	601
1030	150	599.5
1100	180	598
1130	210	597
1200	240	596
1230	270	595
1330	330	594
1530	450	591
1800	600	589
2300	900	587

Table 1.--Pumping and water-level recovery tests - Continued

Part 2-A - Continued

Time	Time since pumping stopped (minutes)	Depth to water (feet)
3-7-65		
0900	1,500	585
1700	1,980	582
3-8-65		
1400	3,240	580

The above times and depth-to-water measurements were used in the calculation of aquifer transmissibility as shown in figure 4.

Figure 4.--Water-level recovery plot, Guaje Well No. 6, Los Alamos, N. Mex. (Part 2-A)

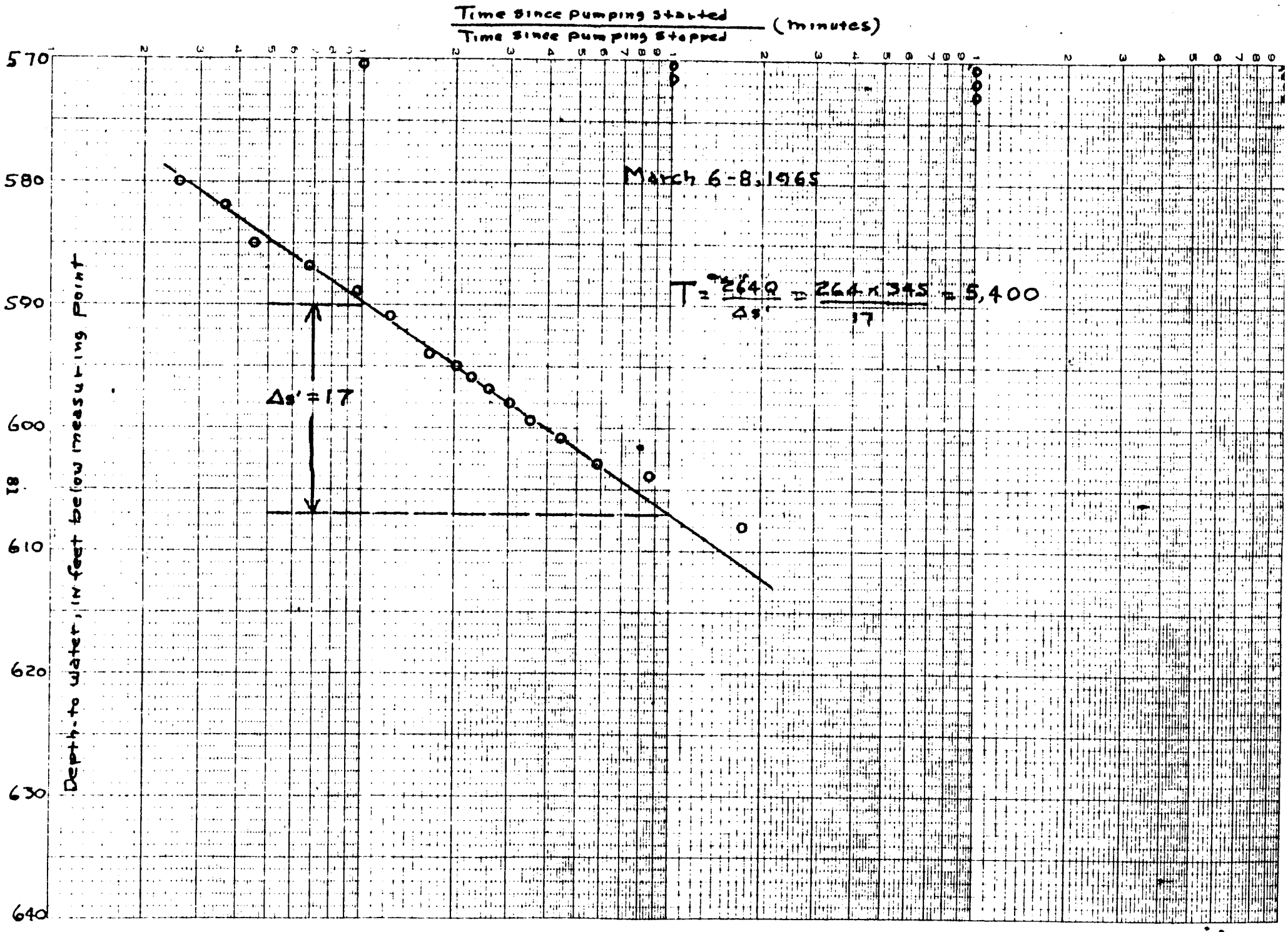
Time since pumping started / Time since pumping stopped (minutes)
Depth to water, in feet below measuring point
570
580
590
600
610
620
630
640
March 6-8, 1965
$T = \frac{264Q}{\Delta s'} = \frac{264 \times 345}{17} = 5,400$
$\Delta s' = 17$

Table 1.--Pumping and water-level recovery tests - Continued

Part 3 Water-level drawdown test

Pump started: March 16, 1965, at 0840 hours.

Pump stopped: March 23, 1965, at 1140 hours.

Period of pumping: 171 hours.

Average discharge: 405 gpm.

Remarks: Well had been idle for 89 hours 40 minutes prior to starting test. Static water was 578 feet.

Time	Time since pumping started (minutes)	Depth to water (feet)
3-16-65		
0900	20	631
1000	80	640
1100	140	647
1200	200	650
1300	260	654
1400	320	655
1500	380	656
1600	440	658
1900	620	661
2400	920	663
3-17-65		
0700	1,340	665
1800	2,000	668
3-19-65		
0400	4,040	670
3-20-65		
0600	5,600	672

Table 1.--Pumping and water-level recovery tests - Continued

Part 3 - Continued

Time	Time since pumping started (minutes)	Depth to water (feet)
3-22-65		
0700	8,540	675
3-23-65		
0700	9,980	675

The above times and depth-to-water measurements were used in the calculation of aquifer transmissibility as shown in figure 5.

Figure 5.--Water-level drawdown plot, Guaje Well No. 6, Los Alamos, N. Mex. (Part 3)

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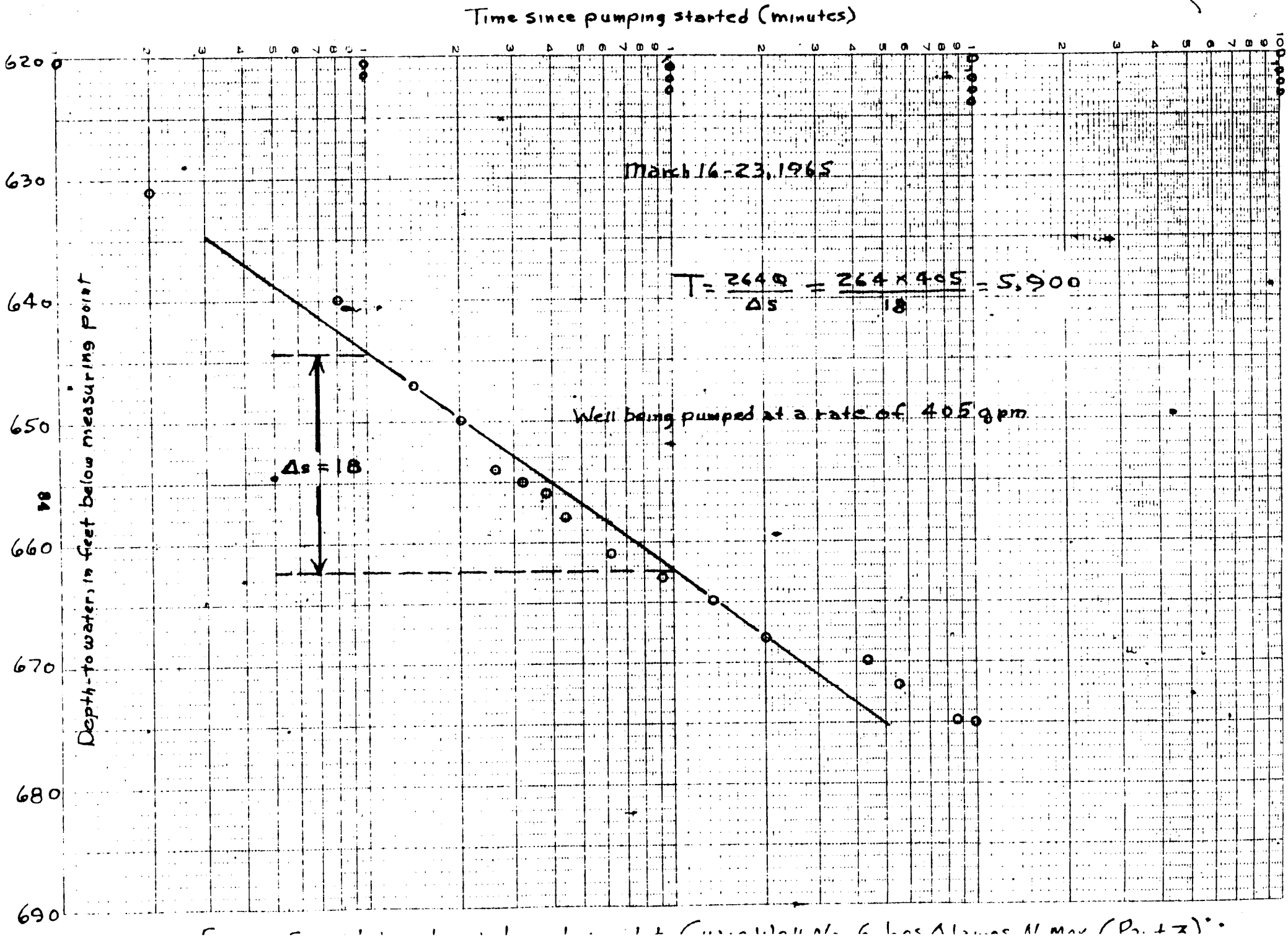

Figure [illegible] Hydrograph of Observation Well No. 6 Los Alamos N. Mex. (Part 3)

Table 1.--Pumping and water-level recovery tests - Continued

Part 3-A Water-level recovery test

Pump stopped: March 23, 1965, at 1140 hours.

Measurements stopped: March 30, 1965, at 0700 hours.

Period of recovery: 163 hours 20 minutes.

Remarks: Well had been pumped 171 hours at an average discharge rate of 405 gpm prior to test. Static water level prior to pumping was 578 feet.

Time	Time since pumping stopped (minutes)	Depth to water (feet)
3-23-65		
1200	20	617
1300	80	608
1400	140	603
1500	200	601
1600	260	598
1700	320	596
1830	410	594
2030	530	591
2330	710	589
3-24-65		
0400	980	587
1100	1,400	585
2000	1,940	582
3-25-65		
1400	3,020	580
3-26-65		
2400	5,060	578

Table 1.--Pumping and water-level recovery tests - Continued

Part 3-A - Continued

Time	Time since pumping stopped (minutes)	Depth to water (feet)
3-28-65		
1200	7,220	575
3-30-65		
0700	9,800	573

The above times and depth-to-water measurements were used in the calculation of aquifer transmissibility as shown in figure 6.

Figure 6.--Water-level recovery plot, Guaje Well No. 6, Los Alamos, N. Mex. (Part 3-A)

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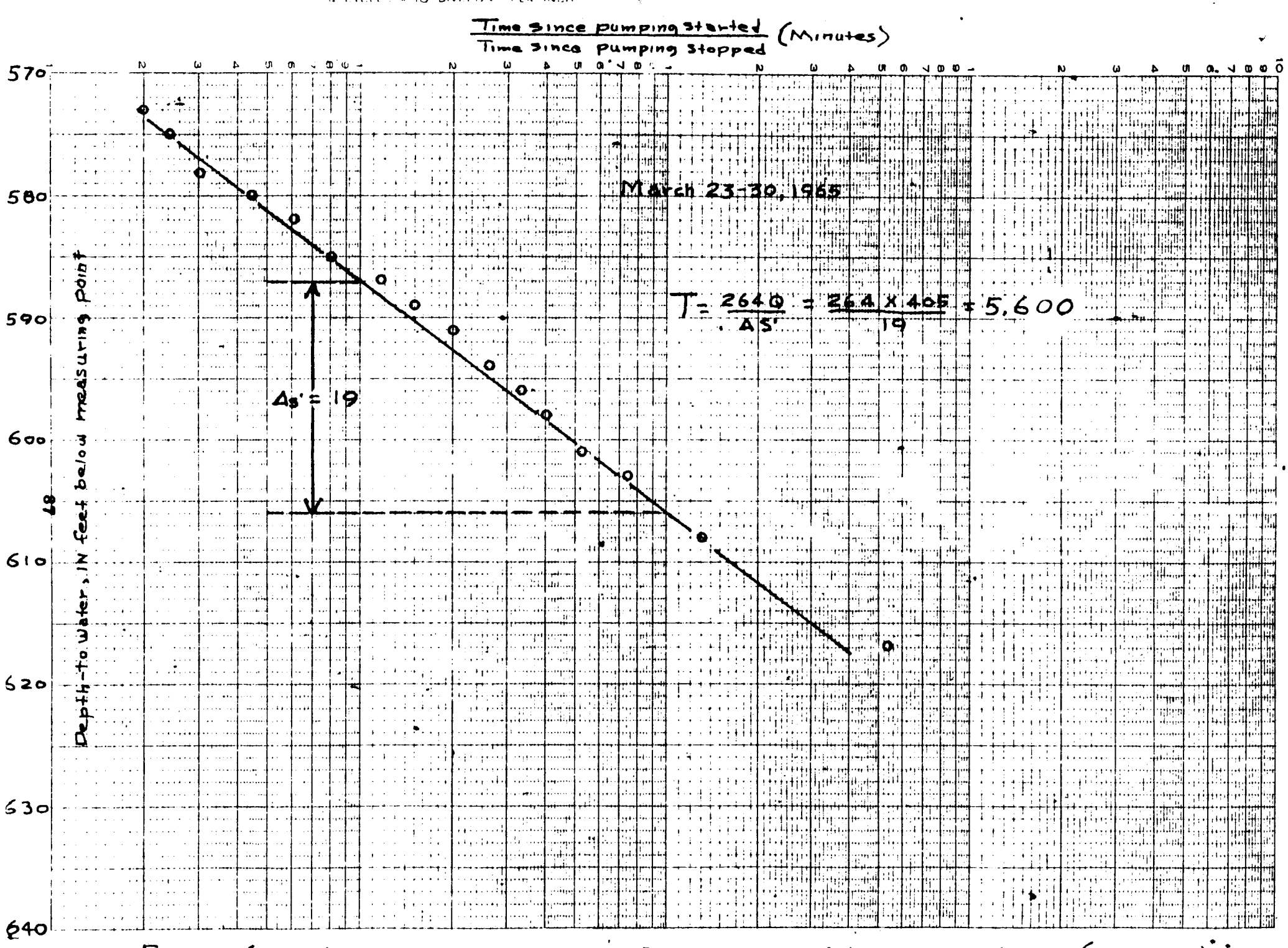

Specific capacity and coefficient of transmissibility

The specific capacity (gallons per minute of discharge per foot of drawdown) of Guaje Well No. 6, as shown by the data in table 1, averaged 4.3. The coefficient of transmissibility, calculated from data in table 1 and figures 1 through 6, averaged 6,000 gpd per foot (gallons per day per foot).

The water-level data points, as plotted against the logarithm of time in figure 1 and in figure 5, indicate that after about 2,000 minutes of pumping at discharge rates of slightly more than 400 gpm the slope of the drawdown line decreases. A similar anomaly was noted by Griggs (1964, p. 99) and was interpreted as indicating interformational leakage, that is, leakage of water from or through less permeable confining beds in the aquifer. If long pumping periods does induce leakage, the result will be a somewhat higher coefficient of transmissibility and higher pumping levels than calculated from the first part of the pumping tests. The decrease in drawdown possibly could be due to physical conditions in the water-distribution system which would create back-pressure on the pumping equipment in the well and cause lower pumping rates and higher water levels at certain times. Interformational leakage should be reflected in all drawdown and recovery curves.

Figure 7 shows the drawdown of water level at selected pumping

Figure 7.--Calculated time-drawdown plot of water level in Guaje Well No. 6, Los Alamos, N. Mex., when pumped continuously at selected rates of discharge.

rates that can be expected in Guaje Well No. 6. These calculations are for a well pumping continuously. If pumping is not continuous and the water level is allowed to recover, higher pumping levels will result. Moreover, the calculations do not take into account the possibility that recharge boundaries might be intercepted during long pumping periods, which would also result in higher pumping levels, or conversely, impermeable boundaries which would result in lower pumping levels.

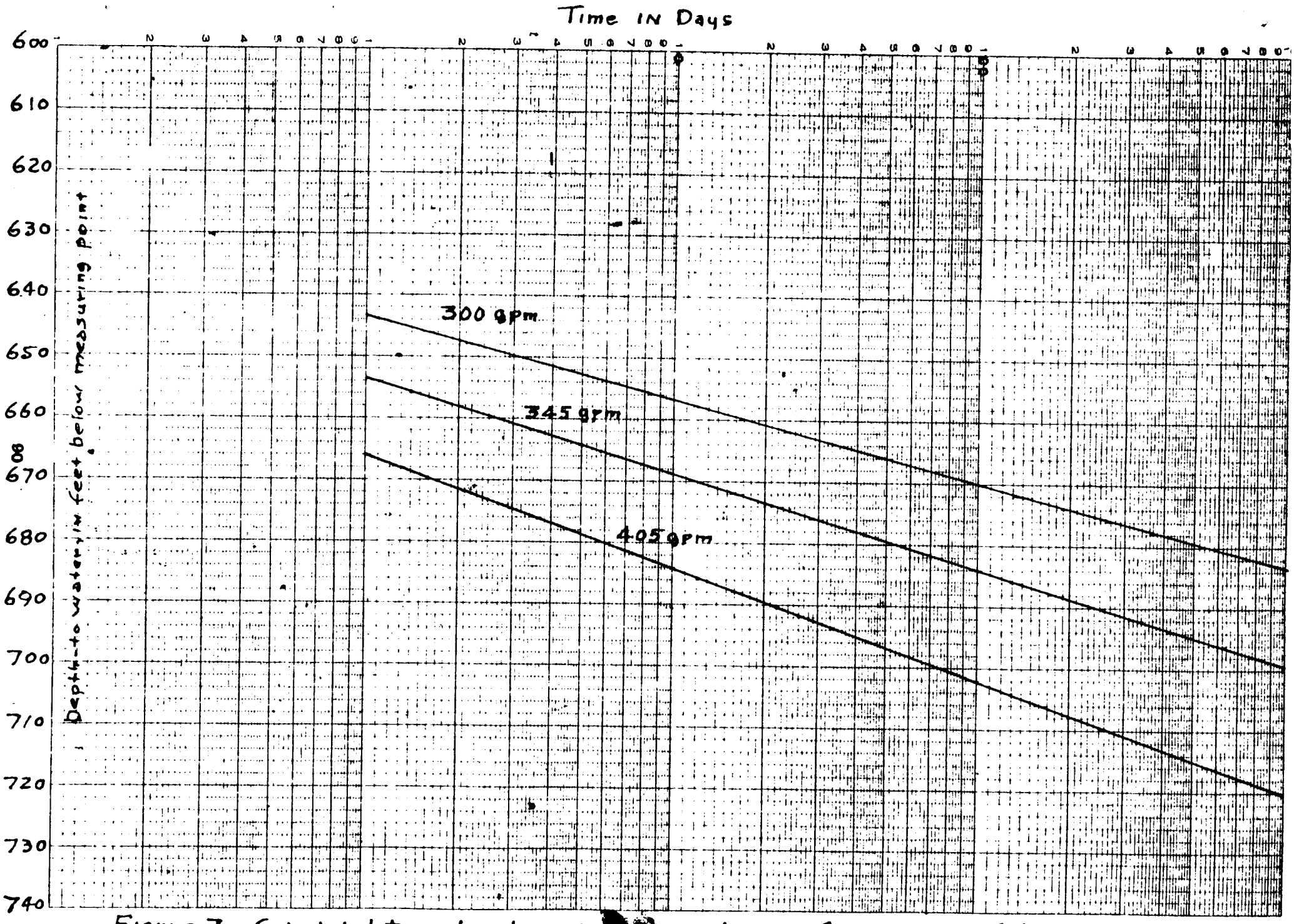

Figure 7.--Calculated time-drawdown pl[illegible]ter level in Guage Well No. 6, Los Alamos, N. Mex.,

Conclusions

Guaje Well No. 6, at the present time, can be pumped continuously at the maximum pump discharge rate of about 400 gpm for about 30 days before the water level reaches the top of the pump bowls at 700 feet. By decreasing the pumping rate to about 350 gpm a continuous pumping period of 300 to 400 days can be achieved before this condition occurs.

No attempt is made here to propose a pumping schedule for Guaje Well No. 6 as the demands upon the well imposed by the daily and seasonal fluctuations of water consumption at Los Alamos will, to a large degree, govern the pumping schedule. However, if such demands for water indicate that Guaje Well No. 6 must continuously furnish a supply over a long time interval it is suggested that the well be pumped at a rate not to exceed 350 gpm. A pumping rate of 350 gpm or lower will result in higher pumping levels and in a yield of more water over a longer time interval than can be obtained from a higher pumping rate.

As much as 400 gpm can, of course, be obtained from the well over short time intervals. If this quantity of water is needed by the system and the well is pumped at its maximum rate close attention must be given to the water levels and periodically the well must be rested to allow water levels to recover. The length of time necessary for adequate water-level recovery is generally equal to the length of time the well was pumped.

Reference

Griggs, R. L., 1964, Geology and ground-water resources of the Los Alamos area, New Mexico: U.S. Geol. Survey Water-Supply Paper 1753, 107 p.