GREEN MEADOWS WELL FIELD HYDROGEOLOGICAL AND ECOLOGICAL ASSESSMENT OF SHALLOW AQUIFER SYSTEM

Prepared for:

FLORIDA CITIES WATER COMPANY
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1.0 INTRODUCTION

This report has been prepared by Environmental Science and Engineering, Inc. (ESE) of Gainesville, Florida, for Florida Cities Water Company (FCWC) of Sarasota, Florida, as part of a study of the surficial aquifer at the Green Meadows well field. The study was performed to comply with Special Conditions 25 through 27 of Water Use Permit Number 36-00150-W, issued May 13, 1982, by the South Florida Water Management District (SFWMD). The referenced special conditions specify that the following tasks be completed by FCWC:

1. Perform an environmental impact assessment (EIA) of the effects of withdrawals from the surficial aquifer on the overlying wetlands,
2. Conduct an aquifer performance test (APT) on the surficial aquifer, and
3. Develop a monitoring program for the Green Meadows well field.

A copy of the complete water use permit is provided in Appendix A.

In 1982, ESE performed an initial site evaluation of the FCWC Green Meadows well field. The evaluation included both hydrologic and environmental components. The conclusions were summarized in the Phase I Report (ESE, 1982).

The results of the initial evaluation were used to prepare a Plan of Study (POS), which was submitted to SFWMD. In a subsequent meeting with SFWMD staff, the POS was modified to require the following:

1. One short-term (24-hour) pump test in a ponded area,
2. One long-term (72-hour) pump test in a sheetflow area,
3. Hydrologic monitoring, and
4. A census of indicator species to set baseline conditions.

After arrival at the site to set pumps for the test, it was discovered that the existing shallow production wells were crooked. Pump

installation was possible only at Well 4, which is located in a sheetflow area. After further discussions with SFWMD (telephone communication with Richard Bower), the study was again modified to require only one long-term (96-hour) pump test at Well 4.

Therefore, the final study plan consisted of the following three parts:

1. One long-term pump test in a sheetflow area,
2. Hydrologic monitoring, and
3. A census of indicator species to set baseline conditions.

Due to problems with the pump and rainfall affecting the pump test, it was agreed among ESE, FCWC, and SFWMD that if enough data were obtained in the aborted pump test to analyze the system and address all of the SFWMD questions and concerns, that a 96-hour pumping test would not be necessary. ESE reviewed the data and determined that enough data had been obtained.

2.0 HYDROLOGIC SETTING

2.1 REGIONAL

2.1.1 Topography and Climate

The Green Meadows well field encompasses about 4.5 square miles in southeastern Lee County. It is about 15 miles southeast of Fort Myers, between Alico Road and State Route 82 (see Figure 2-1). The well field lies on the eastern slope of the Immokalee Rise, a physiographic feature occupying much of eastern Lee County (SFWMD, 1982). The site is a poorly drained area with little topographic relief. The elevation ranges from 25 to 30 feet (ft) above mean sea level (msl).

The climate of Lee County is subtropical, characterized by a wet season (June to September) and a dry season (October to May). The average annual rainfall is 52 inches at Fort Myers (SFWMD, 1983) based on a minimum of 20 years of data. Approximately 70 percent of the total annual rainfall occurs during the wet season (SFWMD, 1982).

The FCWC staff at the Green Meadows Water Treatment Plant (WTP) measures and records daily rainfall at that location. These data are plotted in Figure 2-2 by Julian date beginning January 1, 1983, and ending February 28, 1985. Figure 2-3 and Table 2-1 present the data summarized by month. From these data, it can be seen that 1983 rainfall was approximately 12 inches above average while 1984 rainfall was 1 inch below average. The average annual potential evapotranspiration (ET) was approximately 56 inches per year (ipy) (Smajstrla et al., 1984), while actual ET has been estimated to be 41 ipy (Dohrenwend, 1977). The difference between rainfall and ET is either retained in storage or discharged as surface and subsurface runoff, primarily to the Caloosahatchee River and the Gulf of Mexico.

2.1.2 Hydrogeology

The sequence of aquifers and confining zones comprising the geologic cross section of Lee County has been investigated by several authors and

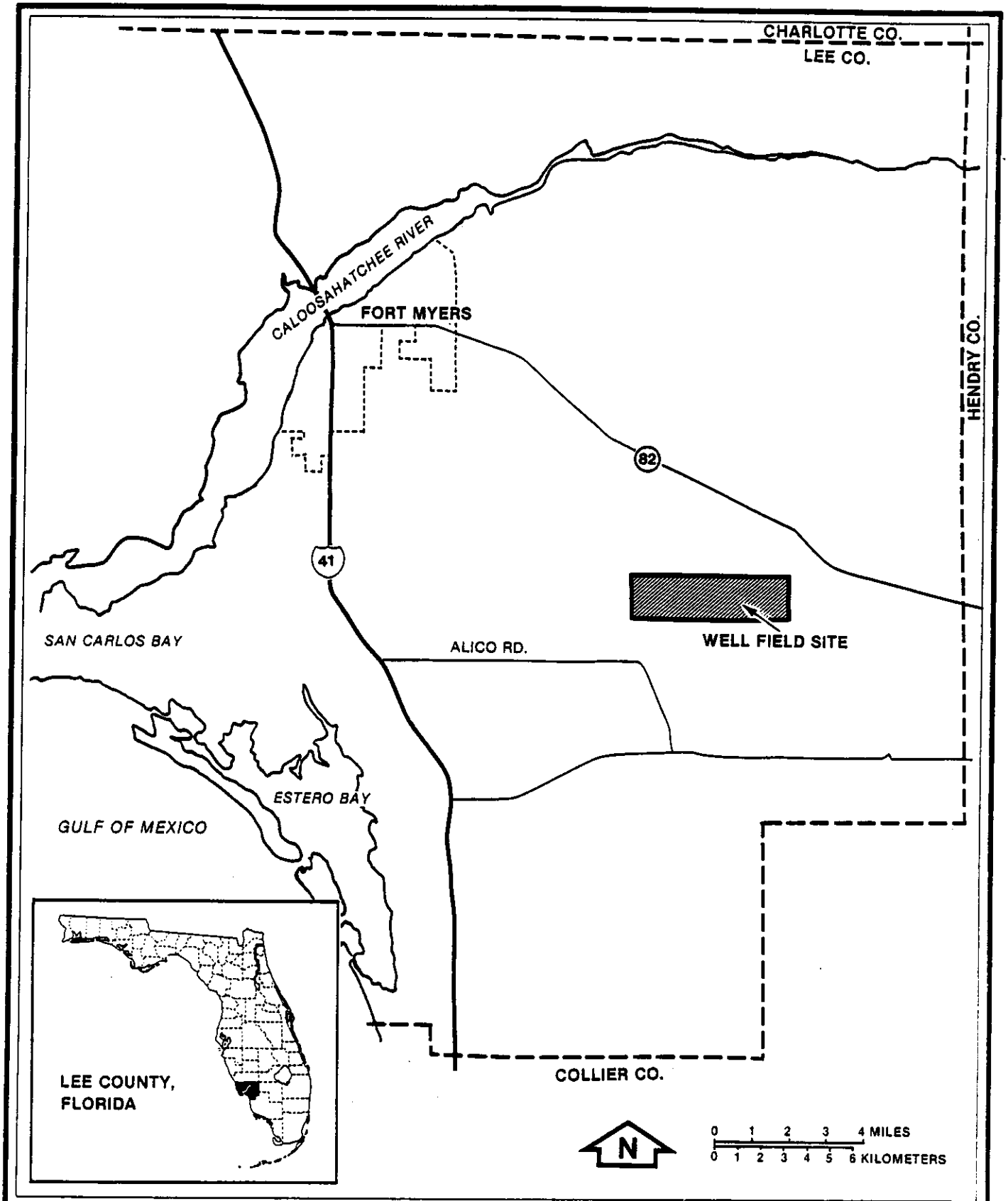

Figure 2-1
GREEN MEADOWS WELL FIELD LOCATION

SOURCE: SFWMD, 1982.

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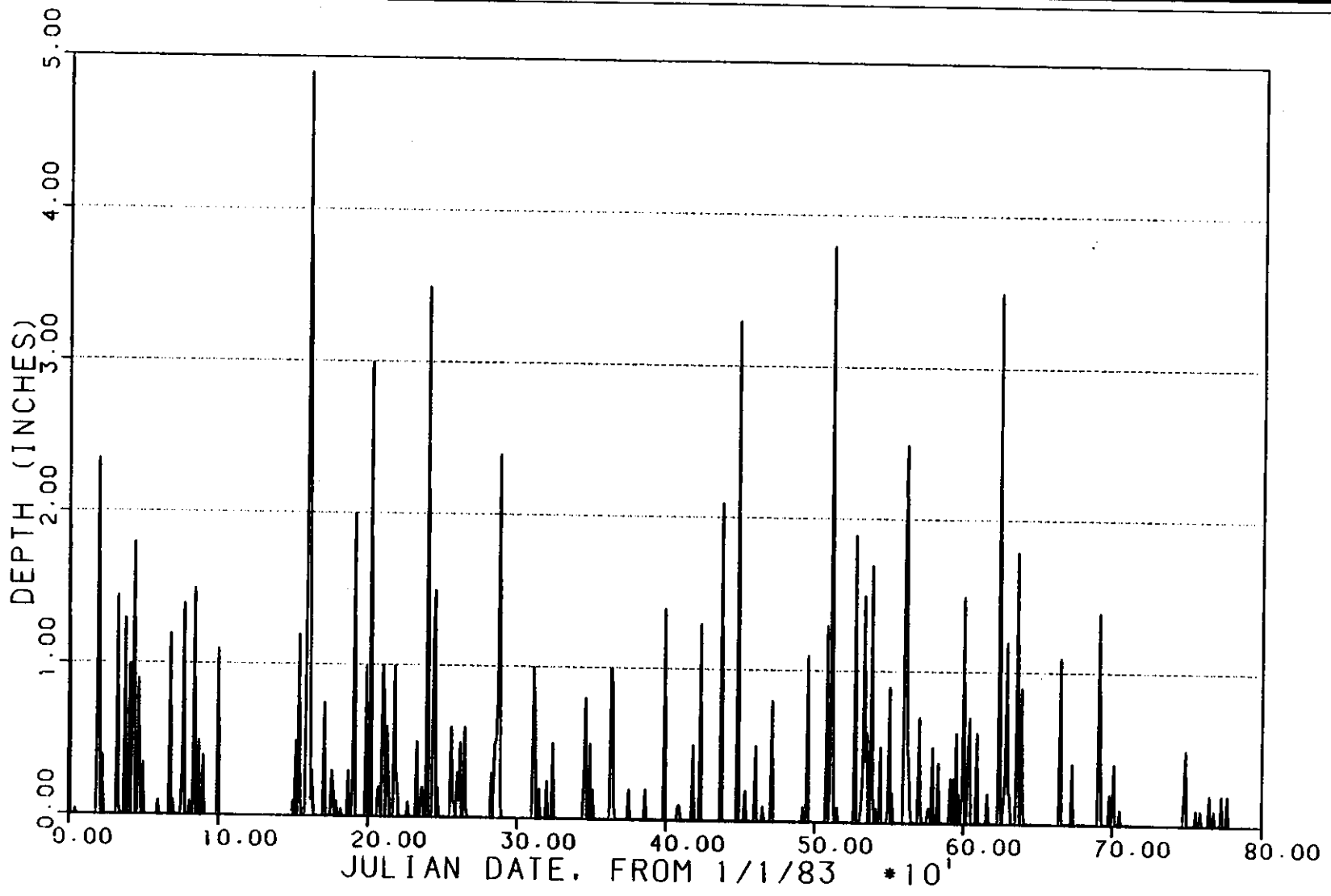

Figure 2-2
DAILY RAINFALL AT GREEN MEADOWS WTP, JANUARY 1, 1983, TO FEBRUARY 28, 1985

SOURCE: ESE, 1985.

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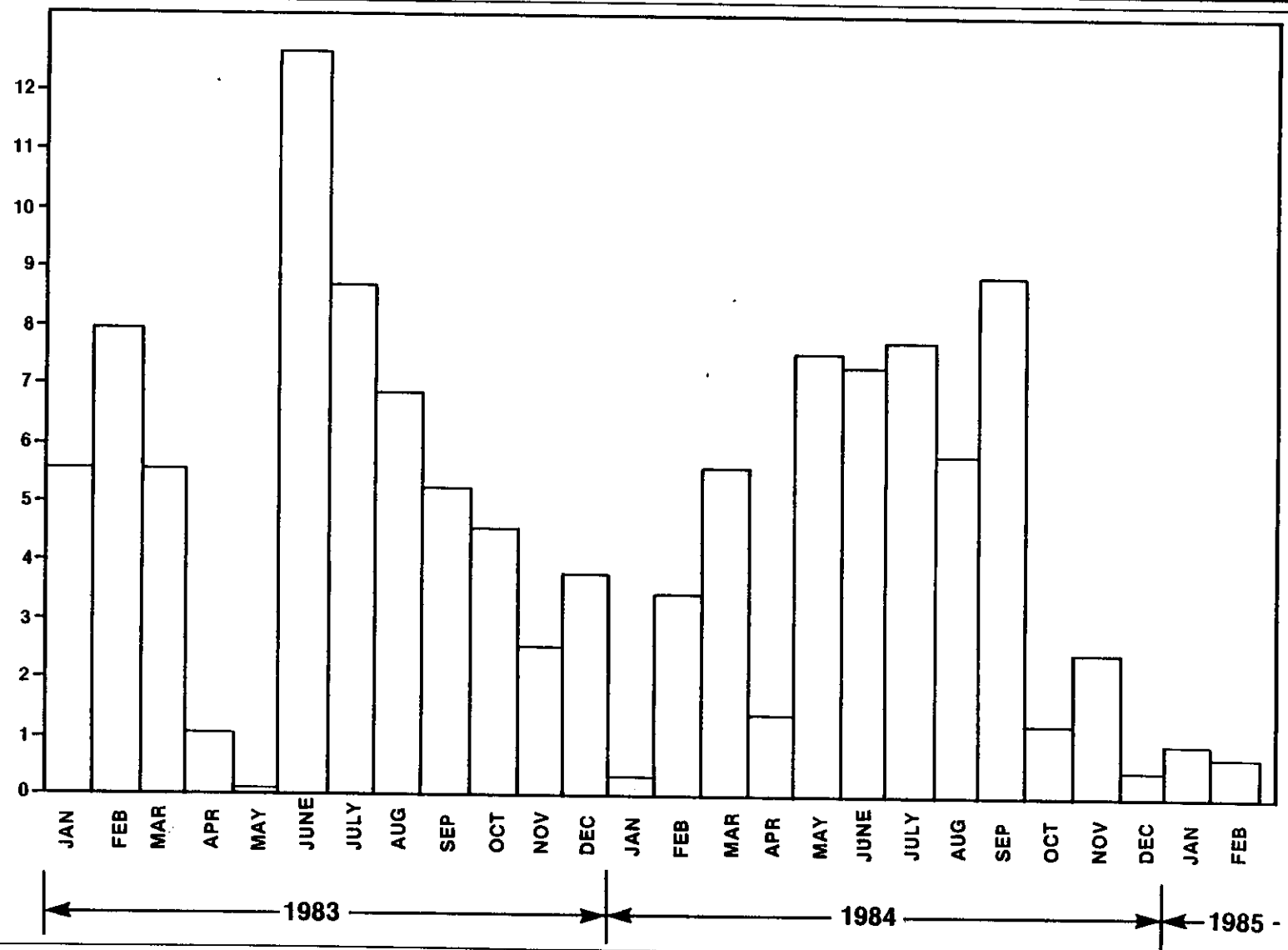

Figure 2-3
MONTHLY RAINFALL AT GREEN MEADOWS WTP, JANUARY 1, 1983, TO FEBRUARY 28, 1985

SOURCE: ESE, 1985.

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Table 2-1. Monthly Rainfall at Green Meadows WTP and Average Monthly Rainfall at Fort Myers

Month	Rainfall (inches)		
	1983	1984	Average*
January	5.6	0.4	1.5
February	8.0	3.4	2.2
March	5.6	5.6	2.6
April	1.1	1.4	2.6
May	0.1	7.5	3.8
June	12.8	7.3	9.0
July	8.8	7.7	9.1
August	6.9	5.8	7.4
September	5.3	9.0	8.5
October	4.6	1.2	4.1
November	2.7	2.5	1.2
December	3.8	0.5	1.3
Annual	65.3	52.3	53.3

*Based on 30-year period from 1931-1960.

Sources: Butson and Prine, 1968.
ESE, 1985.

summarized by SFWMD (1982). Unless otherwise noted, the discussion presented here follows that report, including the nomenclature proposed for the various geologic features.

In Lee County, the surficial aquifer is underlain by the Hawthorn and Floridan Aquifer systems (Figure 2-4). The surficial aquifer is between 25 and 50 ft thick in central Lee County and thickens in a southeasterly direction. Contact between this aquifer and the upper Hawthorn confining zone occurs approximately 50 ft below land surface in the study area. An unconfined water table, intermittent confining beds, and the Tamiami producing zone make up the surficial aquifer.

The Hawthorn Aquifer system consists of three confining and two producing zones: the upper Hawthorn confining zone, the Sandstone aquifer, the mid-Hawthorn confining zone, the mid-Hawthorn aquifer, and the lower Hawthorn confining zone. The majority of the municipal well fields in Lee County utilize the Hawthorn Aquifer system and the deeper Floridan Aquifer system for their water supply sources. The Floridan Aquifer system consists of four zones: the lower Hawthorn/Tampa producing zone, a zone of semi-permeable confining beds, the Suwannee aquifer, and deeper aquifers.

The hydraulic connection between the surficial aquifer system and the deeper systems is considered to be slight, with confining bed permeability and relative head elevations controlling local vertical movement. Water levels in the surficial aquifer are very responsive to rainfall, which supplies the majority of the recharge to the aquifer.

According to SFWMD (1982), water-level fluctuations in the surficial aquifer between wet and dry seasons have reached 8 ft in some parts of the county. The surficial aquifer is recharged through infiltration, precipitation, and subsurface flow from adjacent areas.

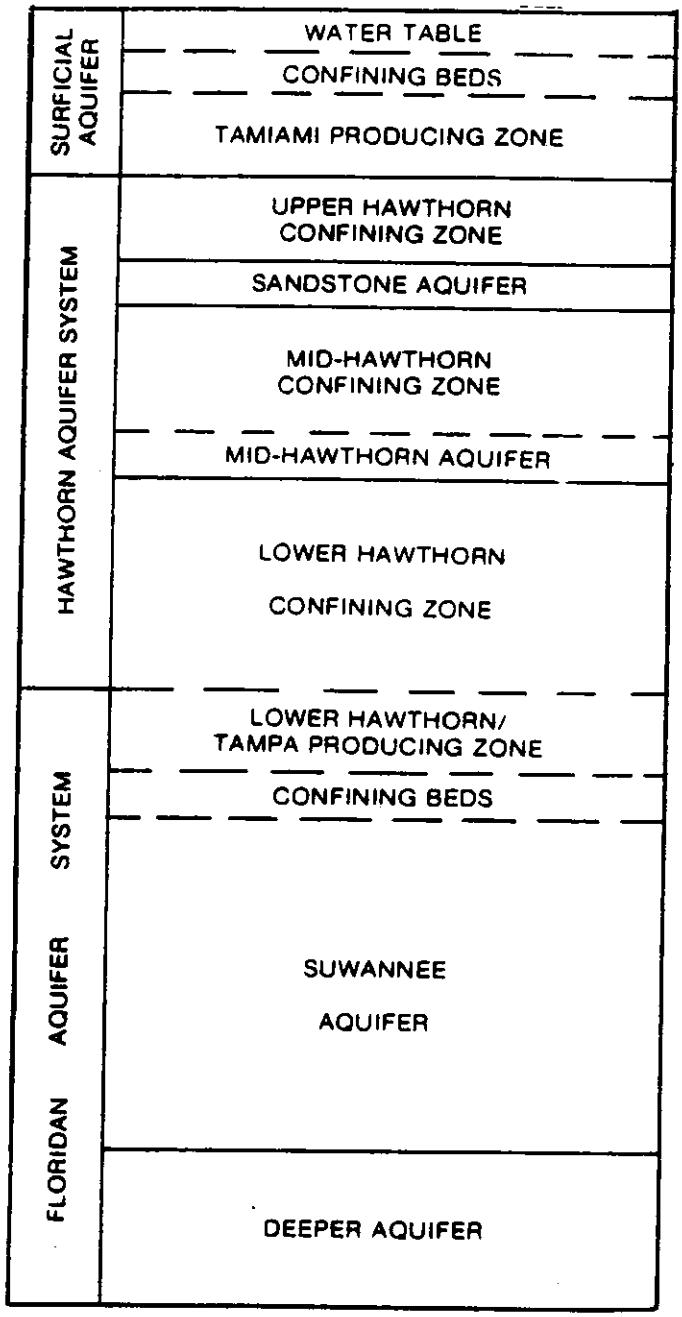

Figure 2-4
REGIONAL HYDROGEOLOGIC CROSS SECTION

SOURCE: SFWMD, 1982.

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2.2 SITE-SPECIFIC FEATURES

2.2.1 Test Wells

Construction of test wells was initiated after the proposed APT was agreed on by SFWMD and ESE. The information from the test wells was used to determine the site-specific hydrogeologic features. The drilling program specified four 4-inch-diameter monitor wells around shallow production zone well 4 (SPZ4). The wells were designed to penetrate completely the production zone of the surficial aquifer. After collapse of Well SPZ4, a new pumped well, Production Well 4 (PRO4), was installed to enable completion of the APT. Figure 2-5 details the typical construction of these wells. The well logs are included in Appendix B.

Figure 2-6 shows a cross section of the surficial aquifer from these well logs. The cross section is relatively uniform, with the major difference between the geology of the test site and the generalized regional cross section being the absence of a confining layer between the surficial sands and the limestone-producing zone. A clay layer was found 60 ft below land surface (bls) forming the top of the upper Hawthorn confining zone.

2.2.2 Water-Level Fluctuations and Hydroperiod

Surface and ground water levels were recorded at the test site during 1983-1984. Continuous recorders were maintained on a shallow well (M4-1) and in an area of ponded surface water from September 1983 to March 1984. The objective of this monitoring was to determine the degree of connection between surface and ground water level fluctuations. Figures 2-7 and 2-8 show the changes in water levels for the recorded time period. The daily rainfall producing these observed water levels is plotted in Figure 2-9. Comparison of these three figures shows the immediate response of the water levels to each rainfall event. Both ground and surface water levels plots show a general decrease over the period of record as would be expected at the end of the annual dry season. A plot of surface water levels versus ground water levels exhibits a linear

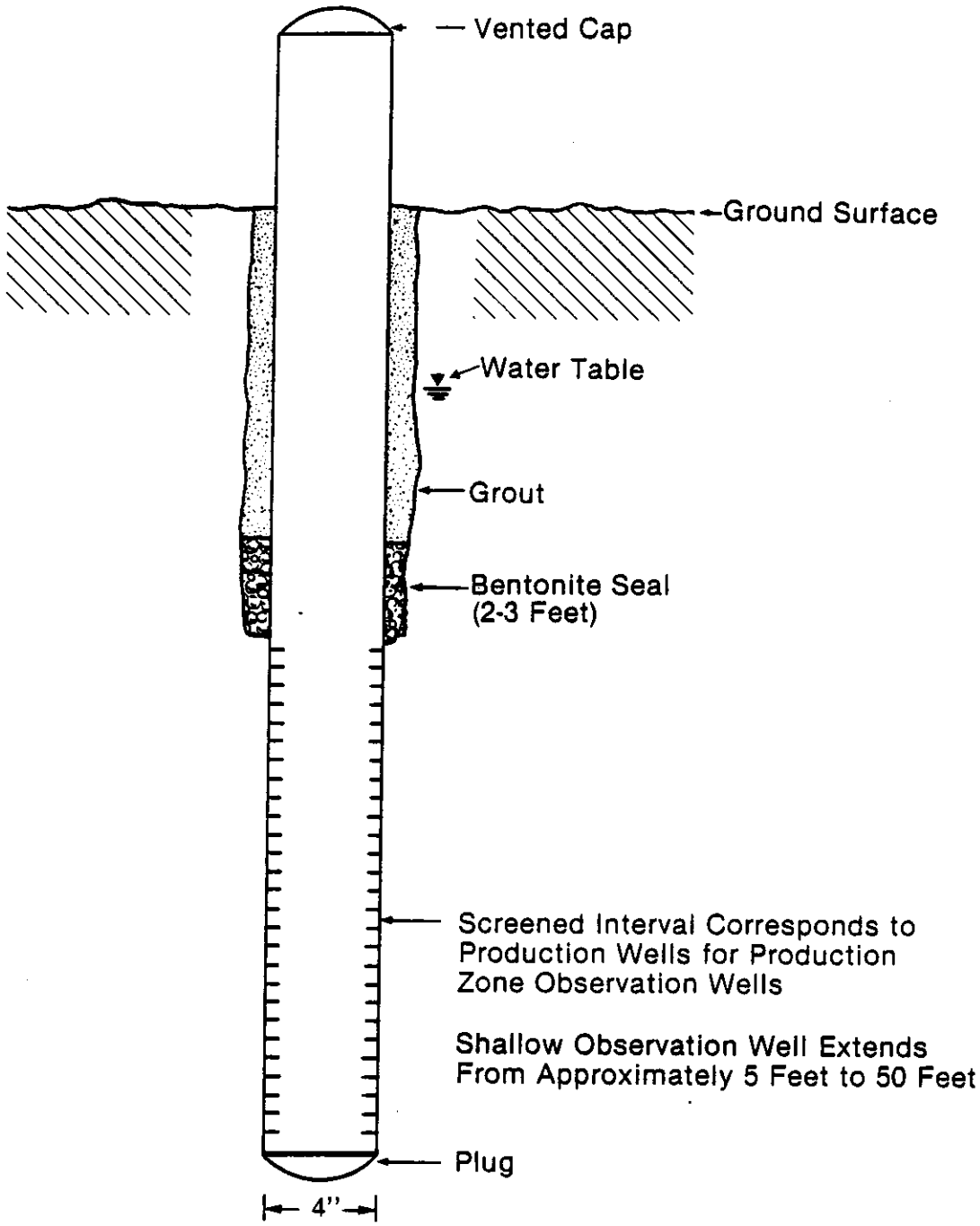

Figure 2-5
TYPICAL CONSTRUCTION OF OBSERVATION WELLS

SOURCE: ESE, 1985.

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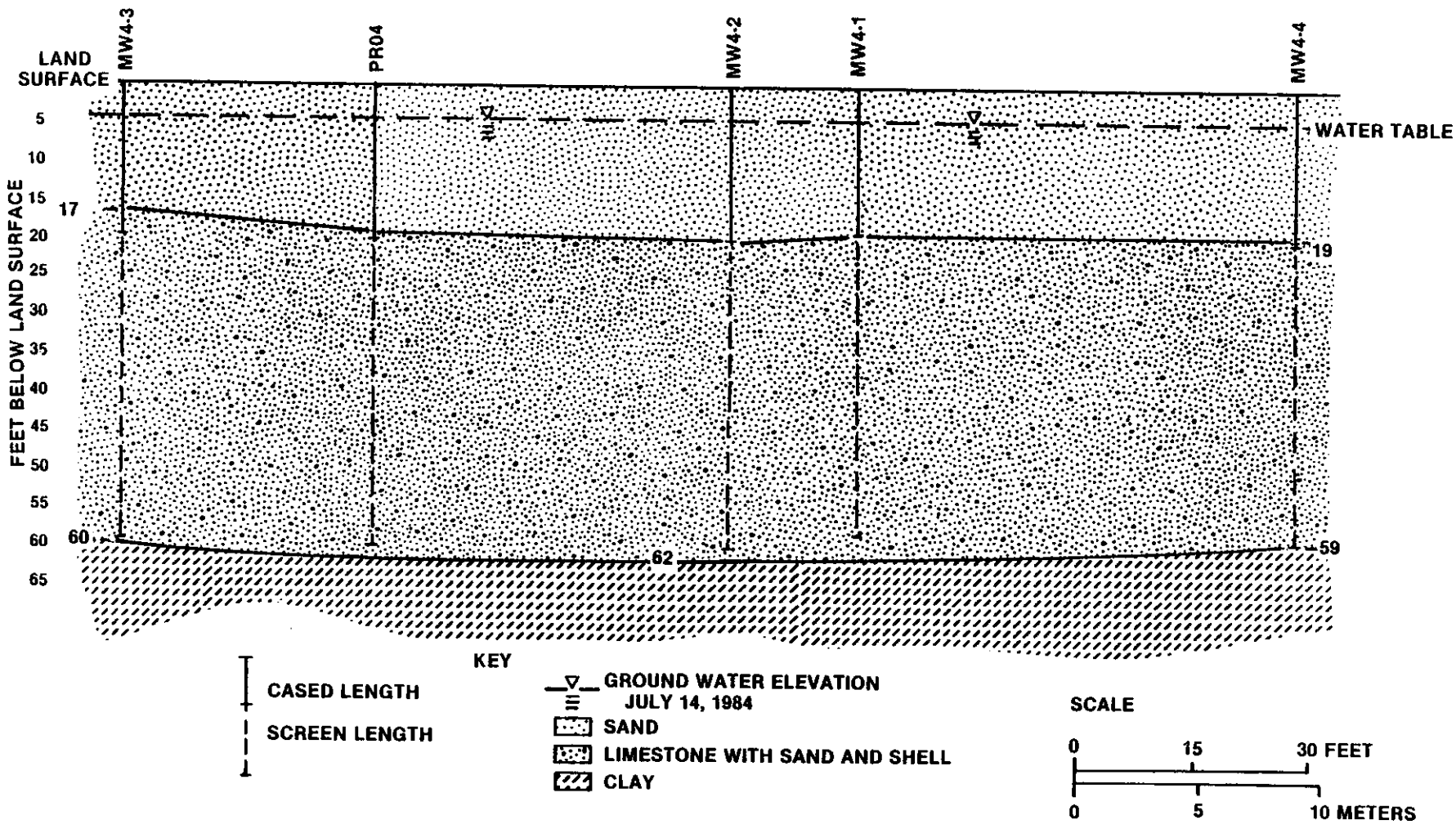

Figure 2-6
EAST-WEST CROSS SECTION BASED ON WELL LOGS AT SITE 4

SOURCE: ESE, 1985.

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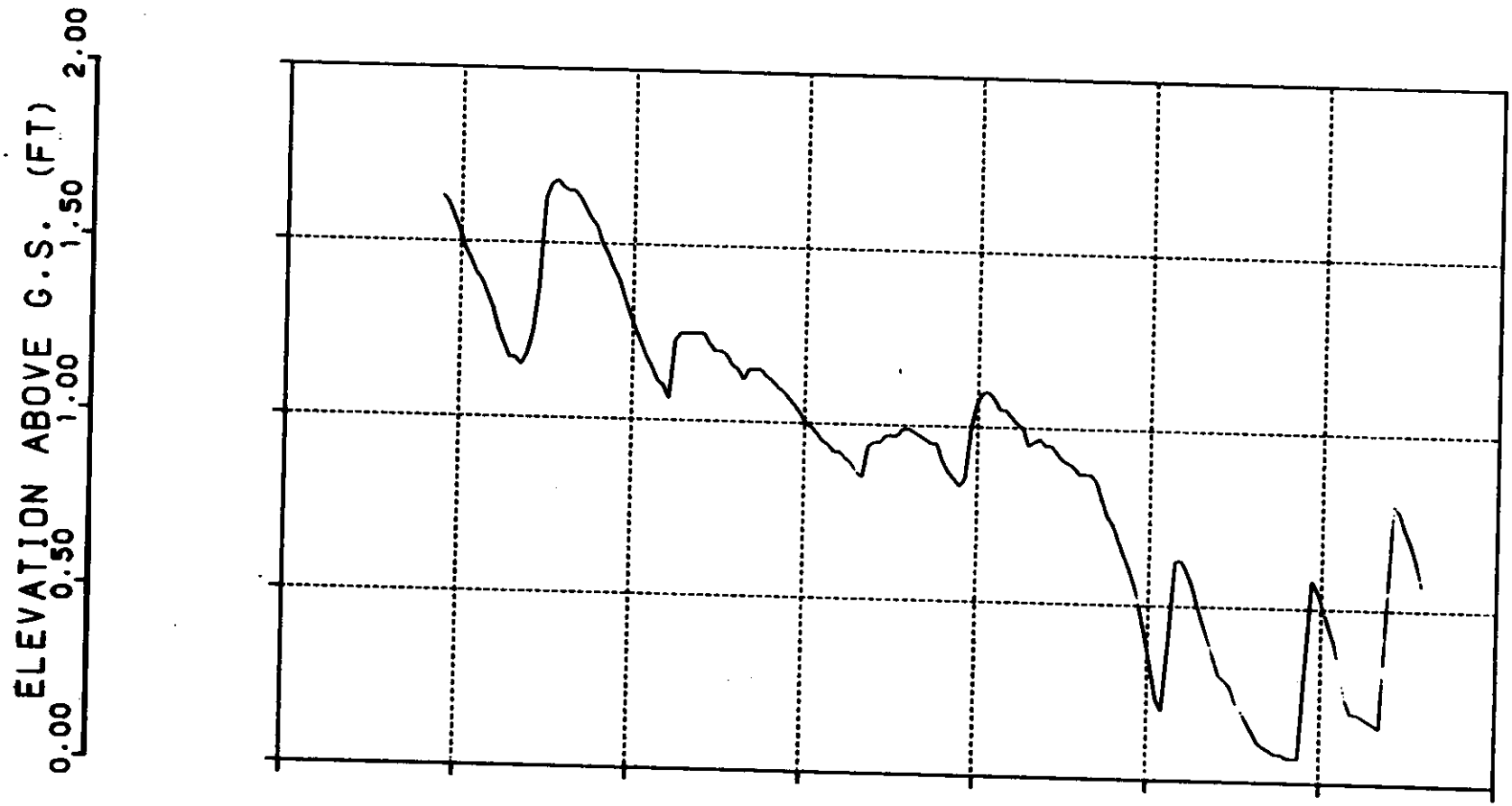

Figure 2-7
SURFACE WATER LEVELS AT SITE 4

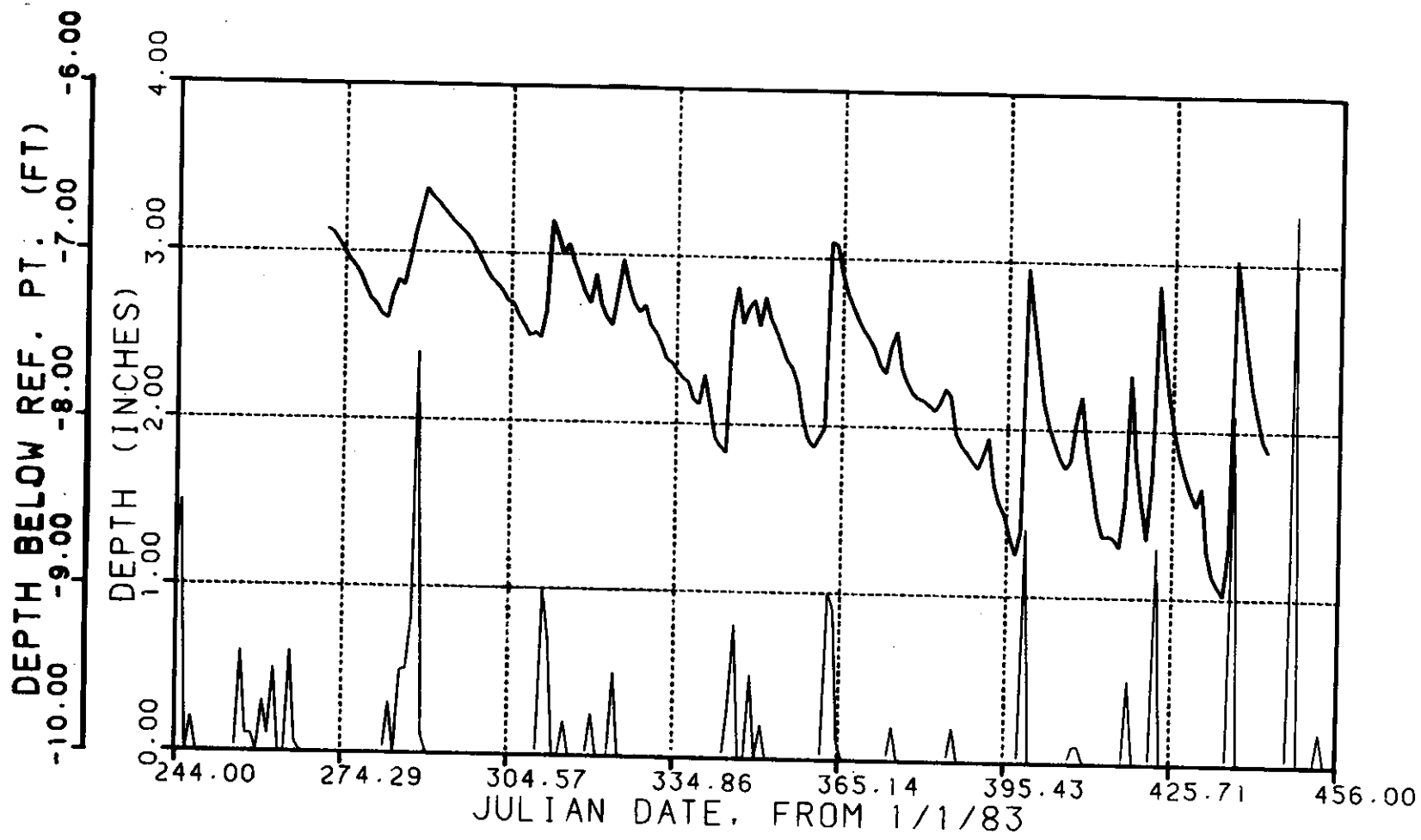

Figure 2-8
GROUND WATER LEVELS AT SITE 4

SOURCE SE, 1985.

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trend as seen in Figure 2-10. The correlation coefficient of the data (R^2 = 0.62) confirms this trend. However, due to the large range of ground water fluctuations at low surface water levels, these data should not be used as a means to predict specific ground water levels from surface water depth. This information does allow the use of long-term ground water level changes (hydroperiod) as an index of surface water-level trends.

The ground water hydroperiod was evaluated at Wells L-1999 and L-2204 (Figure 2-11). The existing hydroperiod of each well, as represented by a stage-duration curve, is presented in Figures 2-12 and 2-13. Periodic recompilation of the curves as new data are collected would permit a check on changes to the hydroperiod caused by pumping from the surficial aquifer.

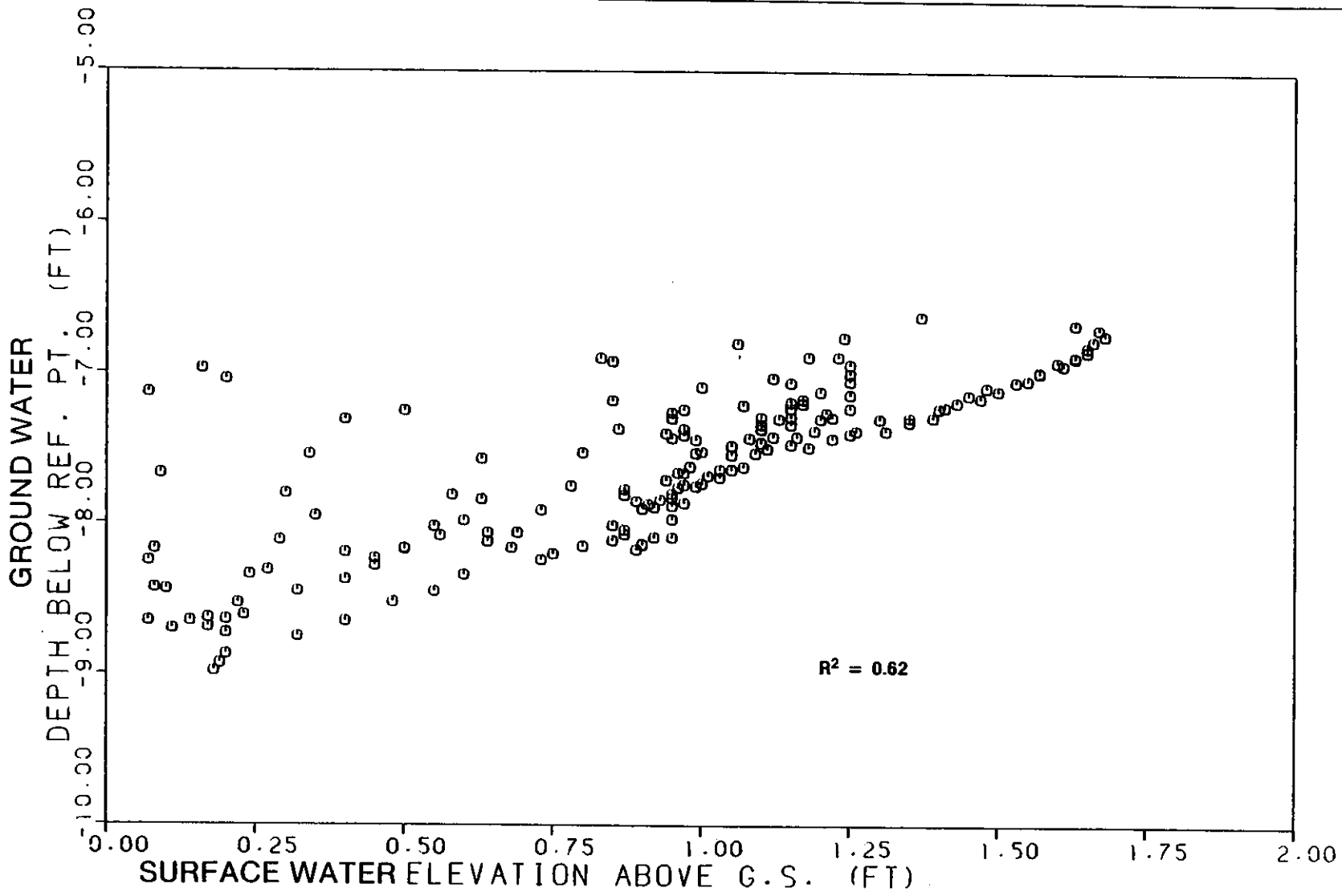

Figure 2-10
PLOT OF SURFACE WATER LEVELS VERSUS GROUND WATER LEVELS AT SITE 4

SOURCE: ESE, 1985.

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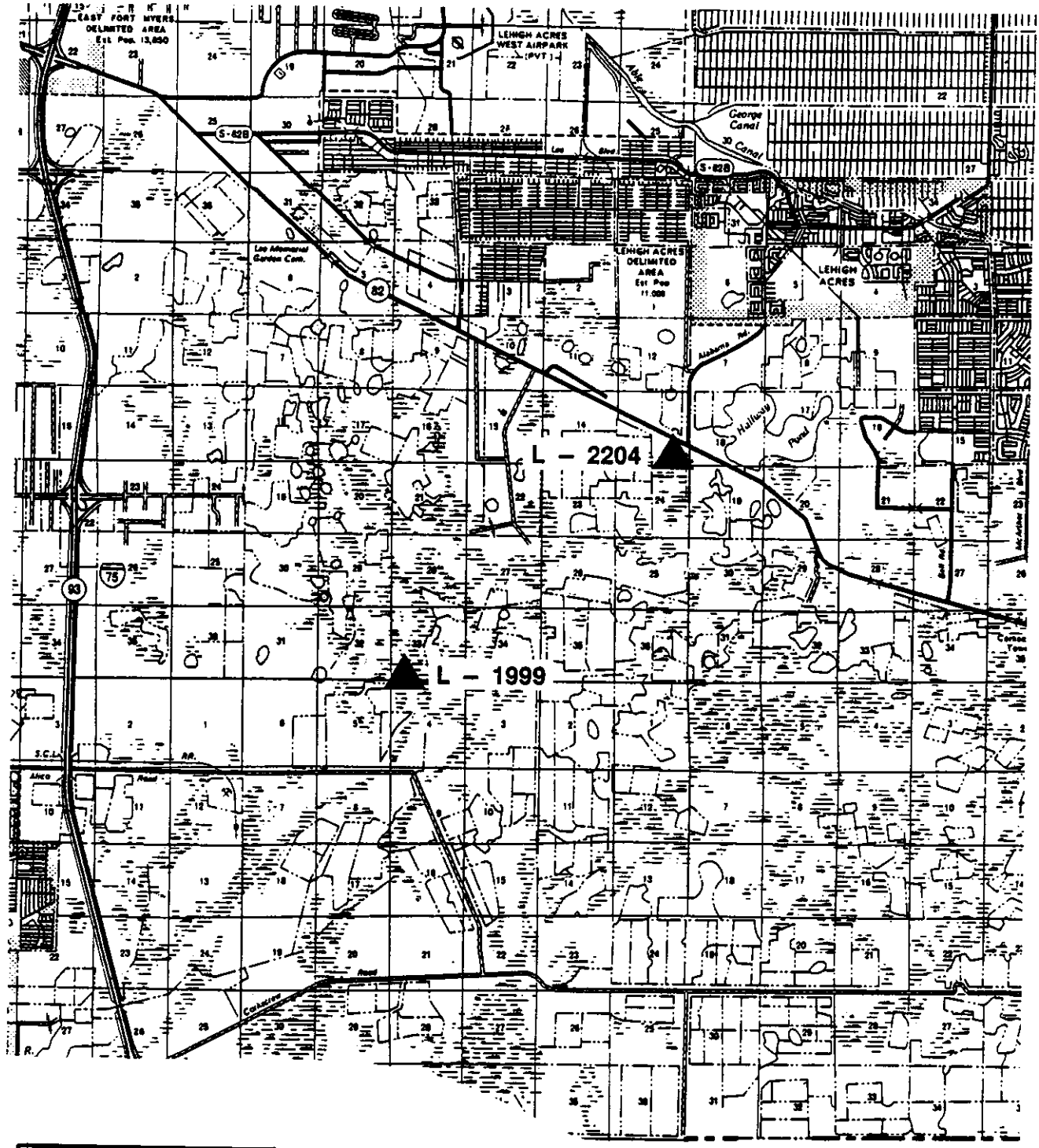

Figure 2-11
LOCATIONS OF SURFICIAL AQUIFER MONITOR WELLS

SOURCE: SFWMD, 1982.

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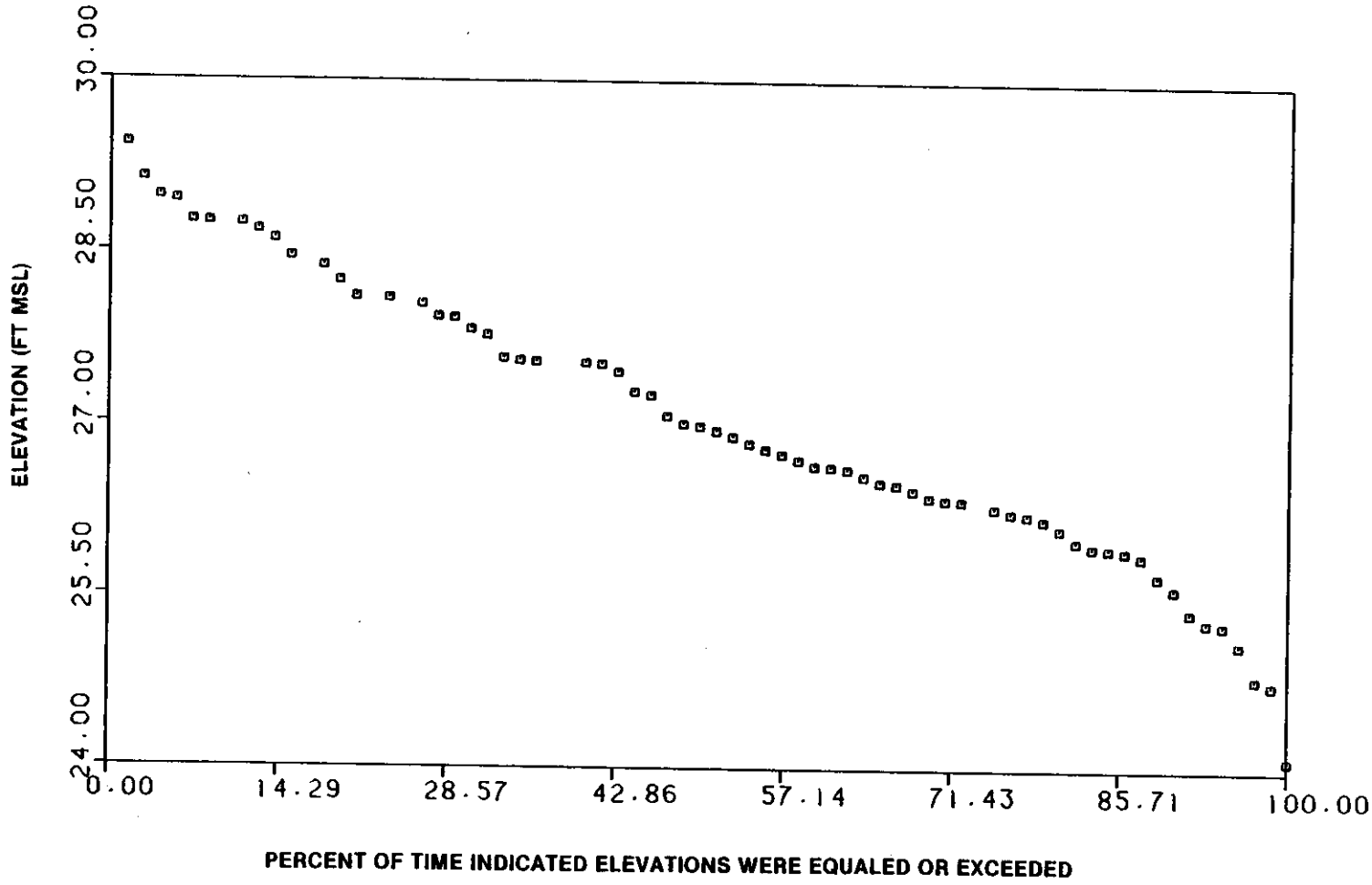

Figure 2-12
STAGE-DURATION CURVE FOR WELL L-2204 BASED ON MONTHLY READINGS, OCTOBER 1975 TO SEPTEMBER 1981
SOURCE: ESE, 1985.

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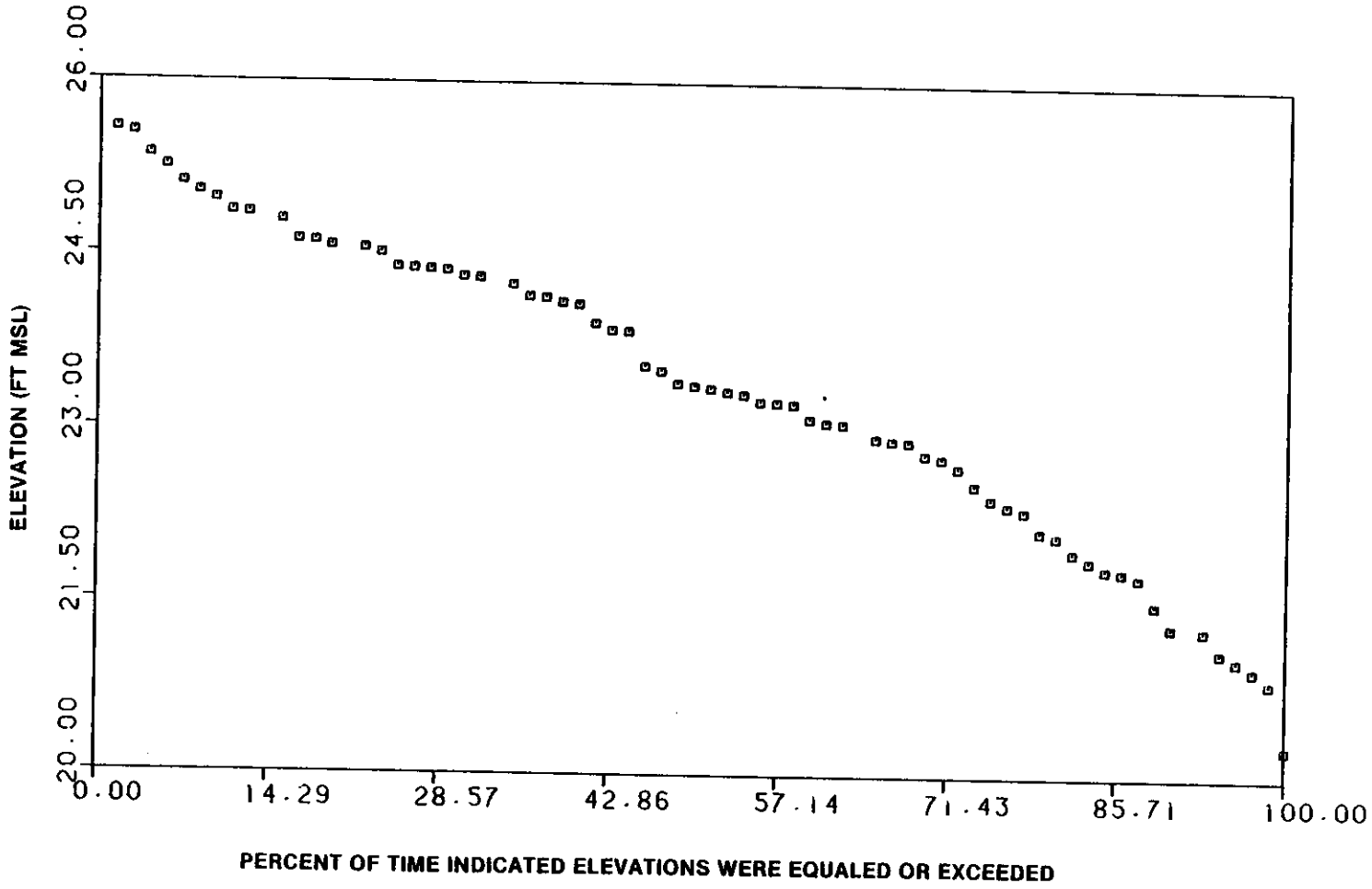

Figure 2-13
STAGE-DURATION CURVE FOR WELL L-1999 BASED ON MONTHLY READINGS, OCTOBER 1975 TO SEPTEMBER 1981
SOURCE: ESE, 1985.

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3.0 AQUIFER PERFORMANCE TEST

The pump test program was originally scheduled for July and August 1983. Due to high-water conditions onsite, the tests were delayed until March 21, 1984. At that time, a step drawdown test was conducted on an existing shallow production well (SPZ4) followed by a constant rate performance test. Before the constant rate test could be completed, the unscreened well collapsed, forcing termination of the test with only 10 hours of data available for analysis. A second production well was drilled in May 1984 (PR04), and a second constant rate performance test was conducted from July 17, 1984, to July 20, 1984. The test was terminated after 62 hours due to pump failure. Slug tests were conducted at the various piezometers during July 1984.

The following sections describe the procedures, analysis, and results of the March 1984 step drawdown test and the July 1984 constant rate performance test and slug tests.

3.1 PROCEDURE

3.1.1 General

The locations of the 26 piezometers, 4 monitor wells, and 2 production wells are shown in Figure 3-1. Locations and radial distances from PR04 were based on the specifications outlined in the POS for an APT of Well SPZ4. These distances were modified as a result of the change in pumped well location from SPZ4 to PR04. The test pumping units were supplied by the McGregor Pump Company and were equipped with a calibrated orifice meter on the discharge side of the pumps.

3.1.2 Step Drawdown Test

The step drawdown test was performed at four constant discharge rates: 490 gallons per minute (gpm), 750 gpm, 900 gpm, and 1,000 gpm. The flow rates represent 98 percent, 150 percent, 180 percent, and 200 percent, respectively, of the design capacity (500 gpm) of the existing shallow zone production wells at the Green Meadows well field. The discharge

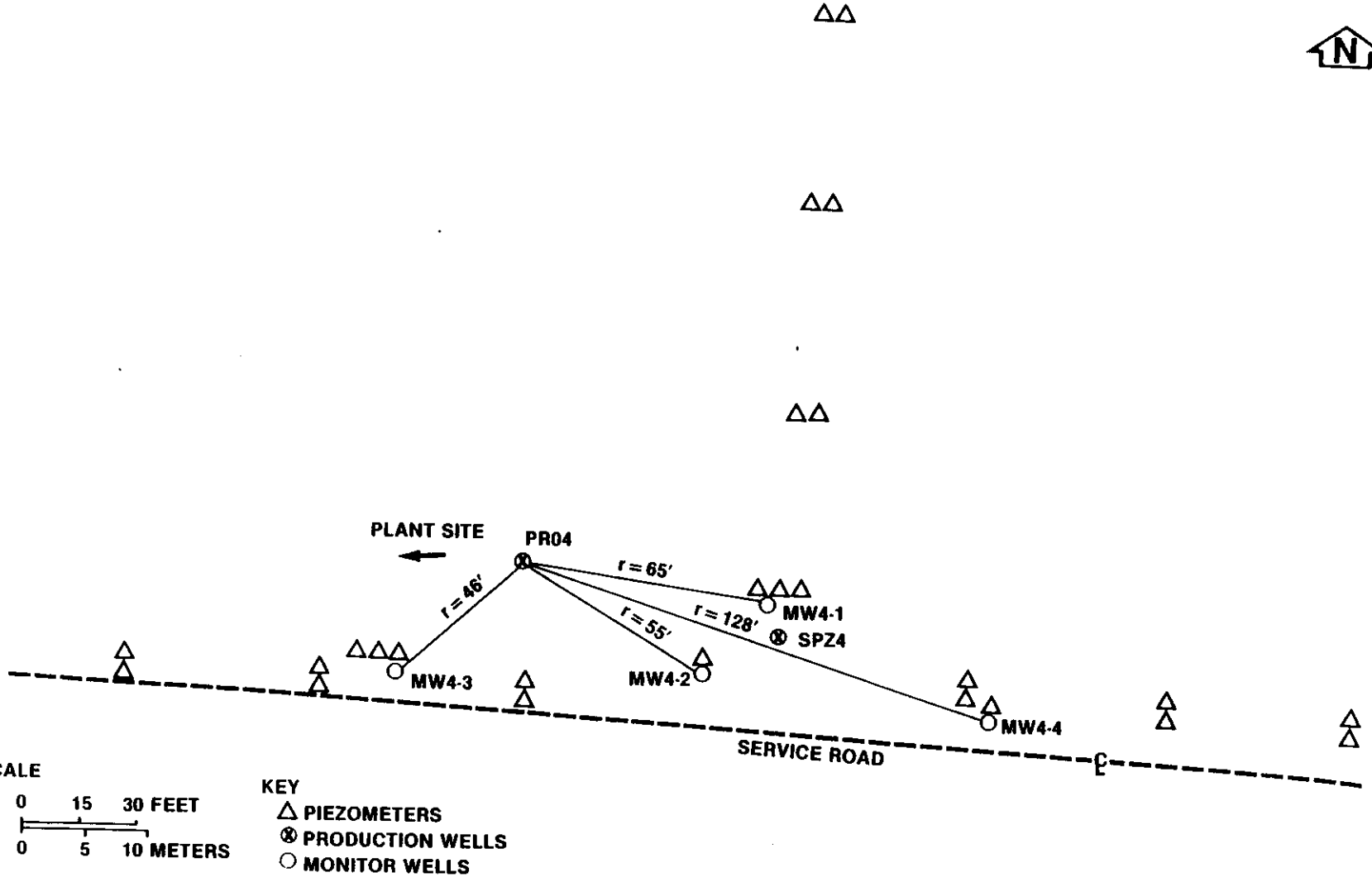

Figure 3-1
LOCATIONS OF PRODUCTION WELLS, PIEZOMETERS AND APT MONITOR WELLS

SOURCE: ESE, 1986

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from the pump was conveyed through 70 ft of pipeline to a swampy area south of the access road. Minimum pumping and recovery periods of 30 minutes and 20 minutes, respectively, were maintained throughout the test. A copy of the raw data is provided in Appendix C.

3.1.3 Constant-rate Discharge Test

The constant-rate discharge test was conducted from July 17, 1984, through July 20, 1984. The total pumping time was approximately 62 hours, and the discharge rate was maintained at approximately 1,280 gpm by periodic monitoring of a calibrated orifice meter. The discharged water was conveyed from the site through 250 ft of 8-inch pipe and 300 ft of lined ditch to a pond.

Water levels were measured with one of three monitor types. Water levels in the production well (PR04) were measured with an electric tape. Wells MW41, MW42, MW43, MW44, and piezometers P43C, P41A, and P43B were measured with a Paroscientific digiquartz data logger. The schedule shown in Table 3-1 was used for measuring drawdowns during the test for all wells and piezometers logged with the Paroscientific instrument. Piezometer P41S was measured with an Envirolab data logger on the schedule shown in Table 3-2. The schedules in Tables 3-1 and 3-2 either meet or exceed the measurement frequency suggested by SFWMD. Approximately 62 hours after pumping started, the pump failed, and the test was ended. A copy of the data is provided in Appendix D.

3.1.4 Slug Tests

The slug tests were conducted during July 1984. The purpose of the tests was to determine the hydraulic conductivity (K) of the sand aquitard. Either a Stevens water-level recorder or an Envirolab data logger was used to measure the systems response. Water levels or pressures were recorded from the start of the test, when a polyvinyl chloride (PVC) "slug" of known volume was placed in the well, and water-level changes were monitored until the well reached equilibrium. The raw data are listed in Appendix E.

Table 3-1. Frequency of Measurement for Wells MW41, MW42, MW43, MW44 and Piezometers P43C, P41A, and P43B

Frequency of Measurement	Time after Pumping Started
Every 10 seconds	0 to 3 minutes
Every 20 seconds	3 to 4 minutes
Every 30 seconds	4 to 10 minutes
Every 1 minute	10 to 25 minutes
Every 2 minutes	25 to 45 minutes
Every 5 minutes	45 to 90 minutes
Every 30 minutes	90 minutes to 9 hours
Every 1 hour	9 to 62 hours

Source: ESE, 1984.

Table 3-2. Frequency of Measurement for Piezometer P41S

Frequency of Measurement	Time after Pumping Started
Every 10 seconds	0 to 5 minutes
Every 30 seconds	5 to 10 minutes
Every 1 minute	10 to 30 minutes
Every 5 minutes	30 to 100 minutes
Every 15 minutes	100 minutes to 8 hours
Every 30 minutes	8 to 24 hours
Every 1 hour	24 to 62 hours

Source: ESE, 1984.

3.2 ANALYSIS AND RESULTS

3.2.1 Step Drawdown Test

The prediction of drawdown in the pumped well and well efficiency were determined by analysis of the March 21, 1984 step drawdown test of Well SPZ4. Figure 3-2 is a plot of the data as pressure versus time. The data were analyzed using a method presented in Bear (1979).

The general form of the drawdown equation is:

$$S_T = S_f + S_w \qquad (3\text{-}1)$$

where: S_T = total measured drawdown (ft),
S_f = drawdown due to formation losses (ft), and
S_w = drawdown due to well losses (ft).

The losses are functions of the flow rate, Q (gpm), and substitution of these functions into the general form of the equation results in the following:

$$S_T = C_f Q + C_w Q^n \qquad (3\text{-}2)$$

where: C_f = formation constant (ft/gpm),
C_w = well constant (ft/gpm^n), and
n = exponent due to turbulence.

Assigning a value of n = 2, a plot of Q versus the specific drawdown (defined as S_T/Q) is obtained on linear scale paper. The best linear fit is determined from which C_w and C_f are calculated. C_w is the slope of the line while C_f is the intercept value of S_T/Q at which Q equals zero. Calculations and results are shown in Table 3-3 and Figure 3-3. Plots of predicted and actual drawdown versus flow rate and efficiency versus flow rate are given in Figure 3-4.

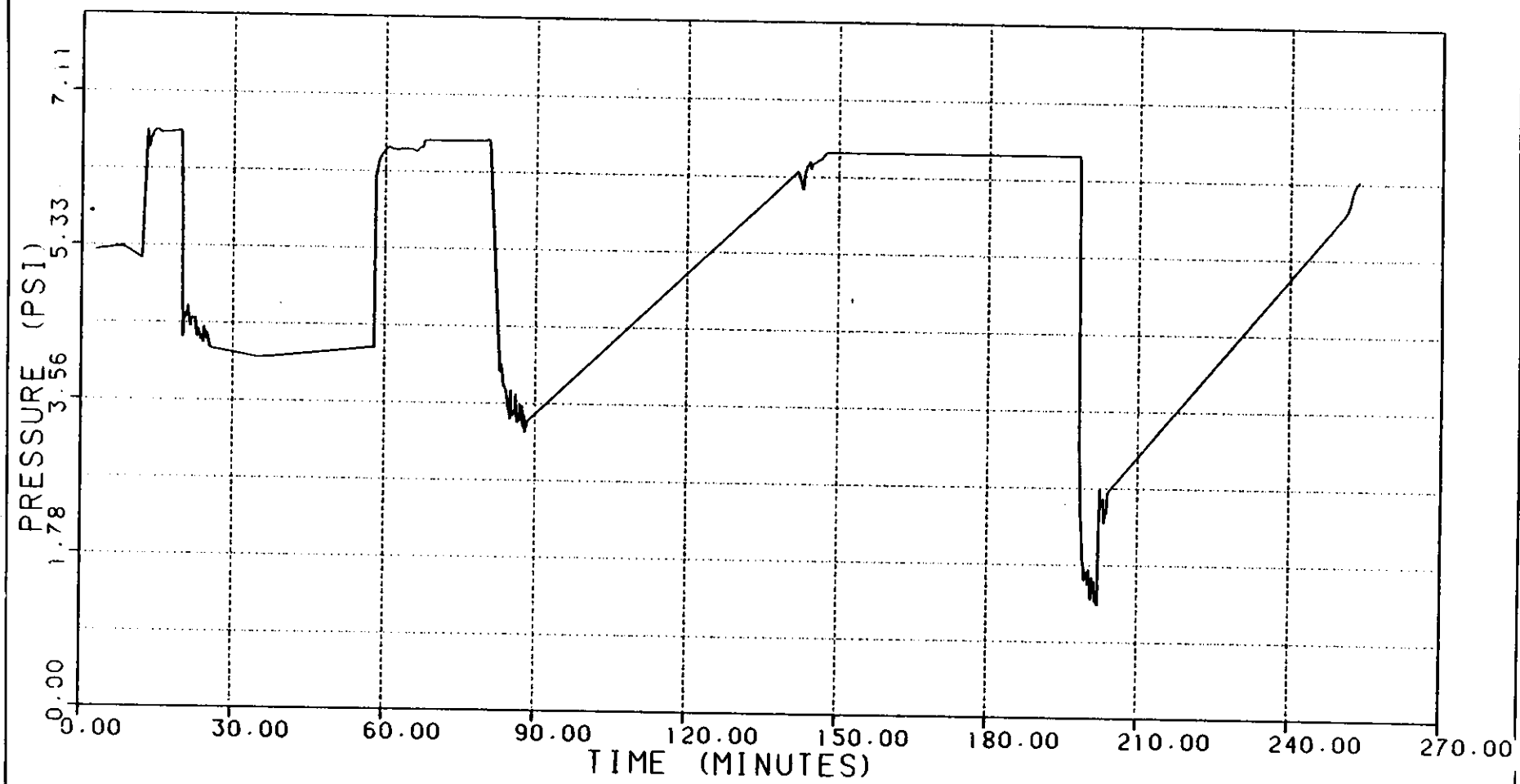

Figure 3-2
PLOT OF DRAWDOWN VERSUS TIME FOR STEP DRAWDOWN TEST OF WELL SPZ4

SOURCE: ESE, 1985.

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Table 3-3. Step Drawdown Analysis

Discharge Steps (m)	Q_m (gpm)	S_{Tm} (ft)	S_{Tm}/Q_m (ft · gpm^{-1})	$E = \frac{S_f}{S_{Tm}} * 100$ (%)
1	490	3.42	0.00698	56
2	750	6.03	0.00504	45
3	900	7.81	0.00868	41
4	1,000	11.99	0.01199	38

Source: ESE, 1985.

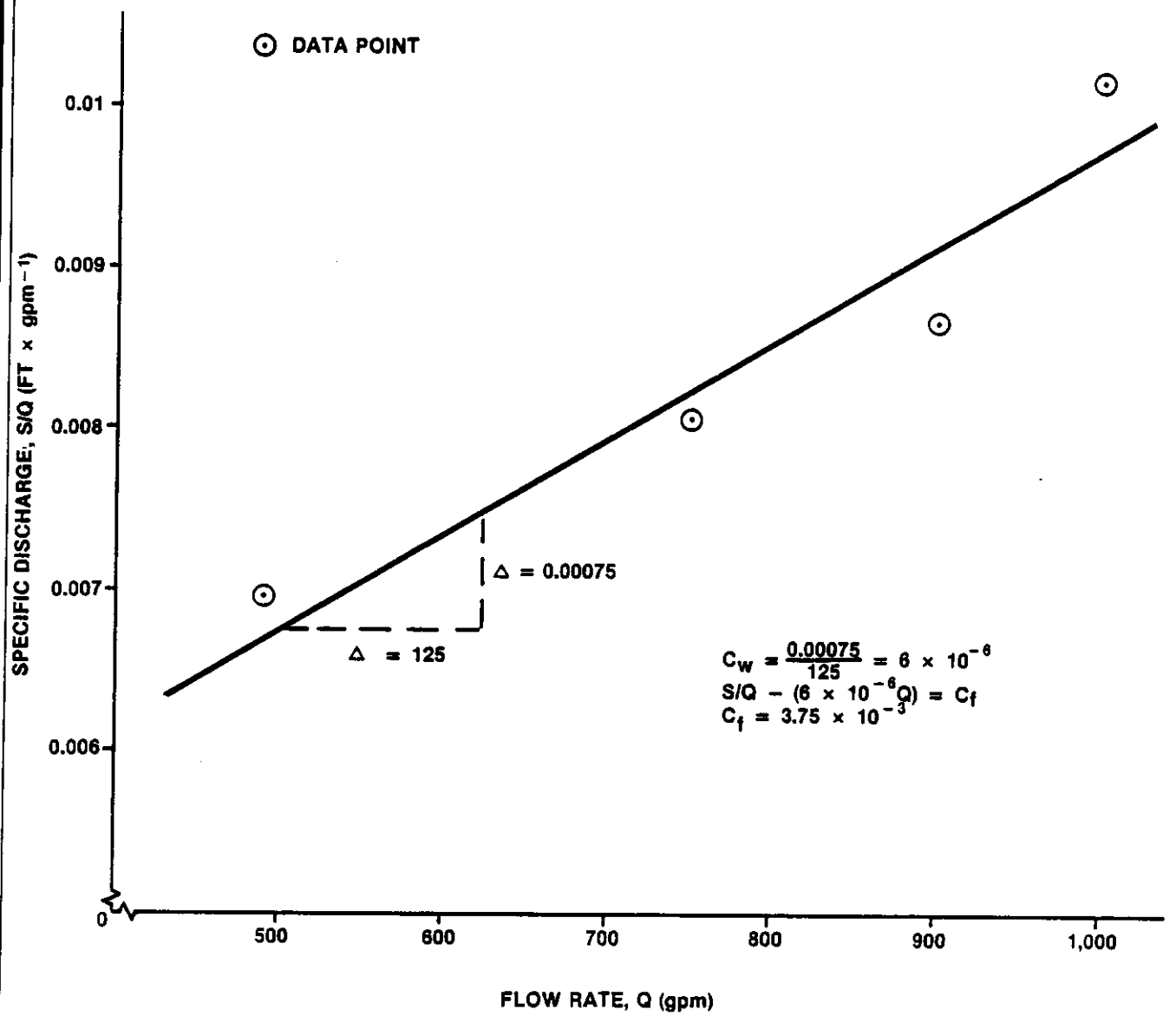

Figure 3-3
STEP DRAWDOWN ANALYSIS

SOURCE: ESE, 1985.

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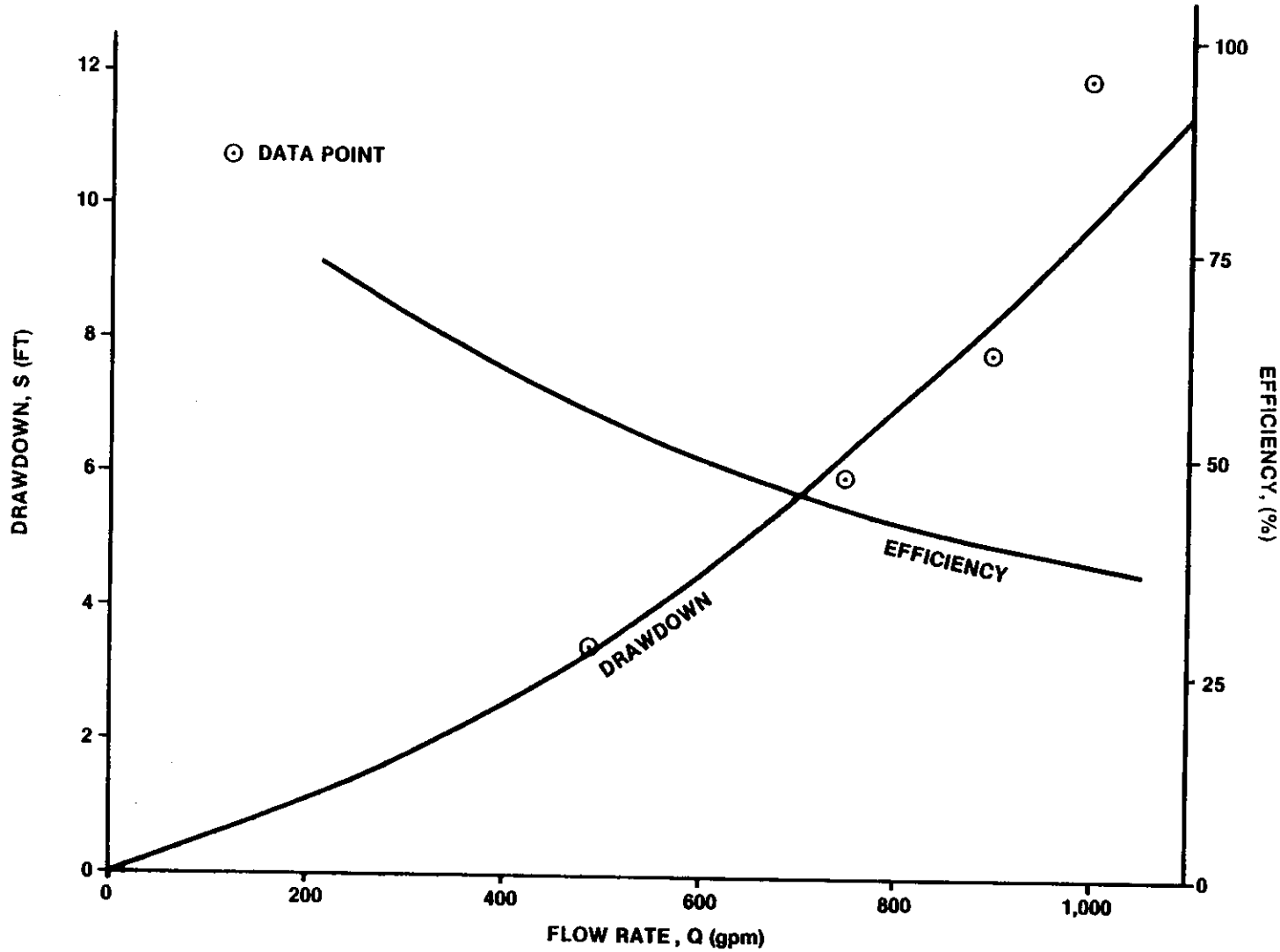

Figure 3-4
PLOT OF DRAWDOWN AND EFFICIENCY VERSUS FLOW RATE

SOURCE: ESE, 1985.

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3.2.2 Constant-Rate Test

The layer of material that overlies the pumped aquifer at the test site consists of medium and fine sand with some shell. This layer retards the downward movement of water from the surface; therefore, the underlying aquifer is considered semiconfined.

The aquifer test data were analyzed to determine the system parameters using the Hantush and Jacob (1955) analytical model for an unsteady-state leaky aquifer and the Neuman and Witherspoon (1972) ratio method for leaky confining beds.

Data from the pump test were incorporated into a data management system designed for ESE's PRIME computer. Data retrieval was made both in tabulated form, consisting of time, elapsed time, drawdown, and time/radius squared (t/r^2) (see Appendix D), and as data plots, consisting of log and semilog, time versus drawdown, and t/r^2 against drawdown (see Appendix F).

Nonsteady-State Leaky Aquifer Model--As a first step in the analysis of the constant rate pump test, the data plots [log time (t) versus log drawdown (s)] were compared to the leaky aquifer type curves (Hantush and Jacob, 1955). Results of the analysis are presented in Table 3-4. The plots and match points are shown in Figures 3-5, 3-6, 3-7, and 3-8. A copy of the type curve is shown in Figure 3-9. After an appropriate fit to the curves, the data were analyzed using the following equations:

$$s = \frac{192.5\ Q}{4\ \pi\ T}\ W\ (u,\ r/B) \qquad (3\text{-}3)$$

$$u = \frac{1{,}440\ r^2 S}{4tT} \qquad (3\text{-}4)$$

Table 3-4. Aquifer Coefficients Determined by Use of Nonsteady-State Leaky Aquifer Type Curves

Well Number	T (ft^2/d)	S	K' (ft^2/d)
MW41	98,100	0.00017	0.632
MW42	103,200	0.00034	0.928
MW43	122,600	0.00055	0.887
MW44	116,000	0.00023	0.677

Source: ESE, 1985.

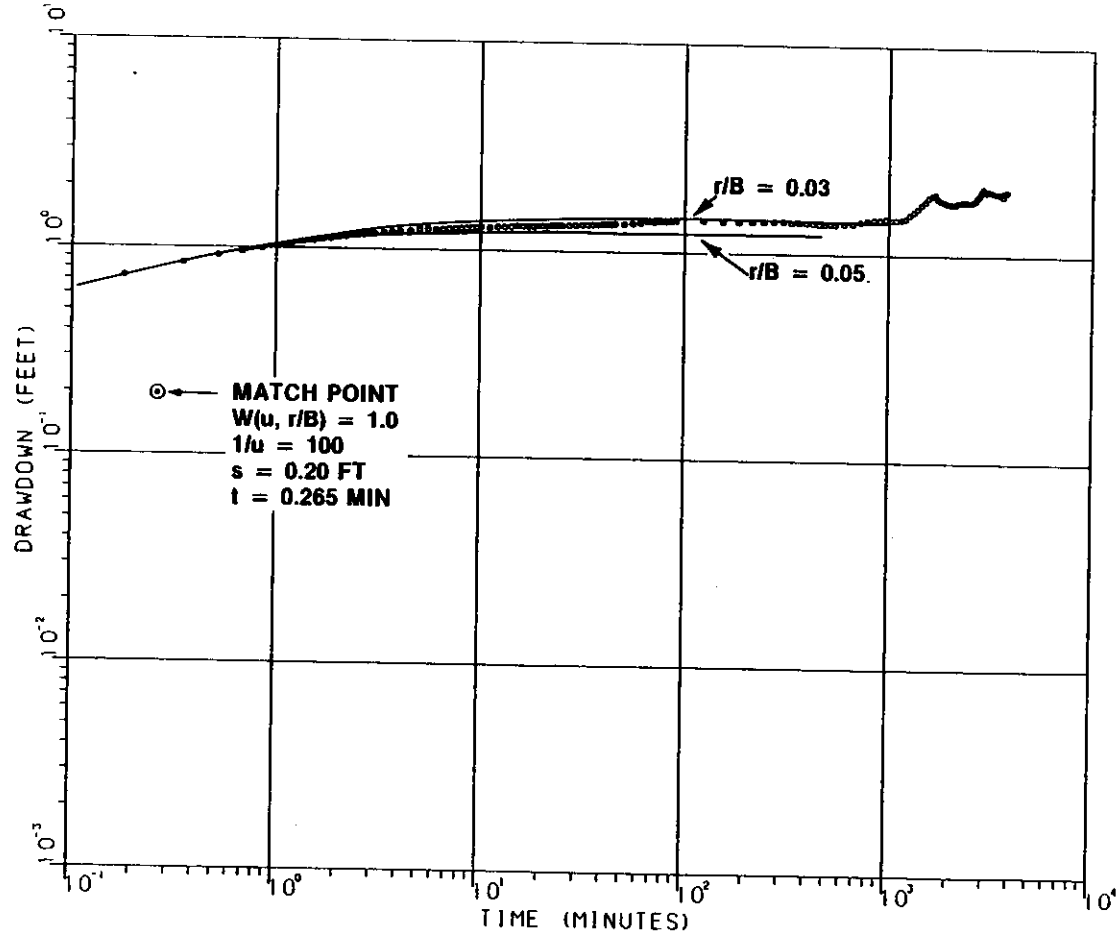

Figure 3-5
WATER-LEVEL DRAWDOWN IN WELL M4-1

SOURCE: ESE, 1985.

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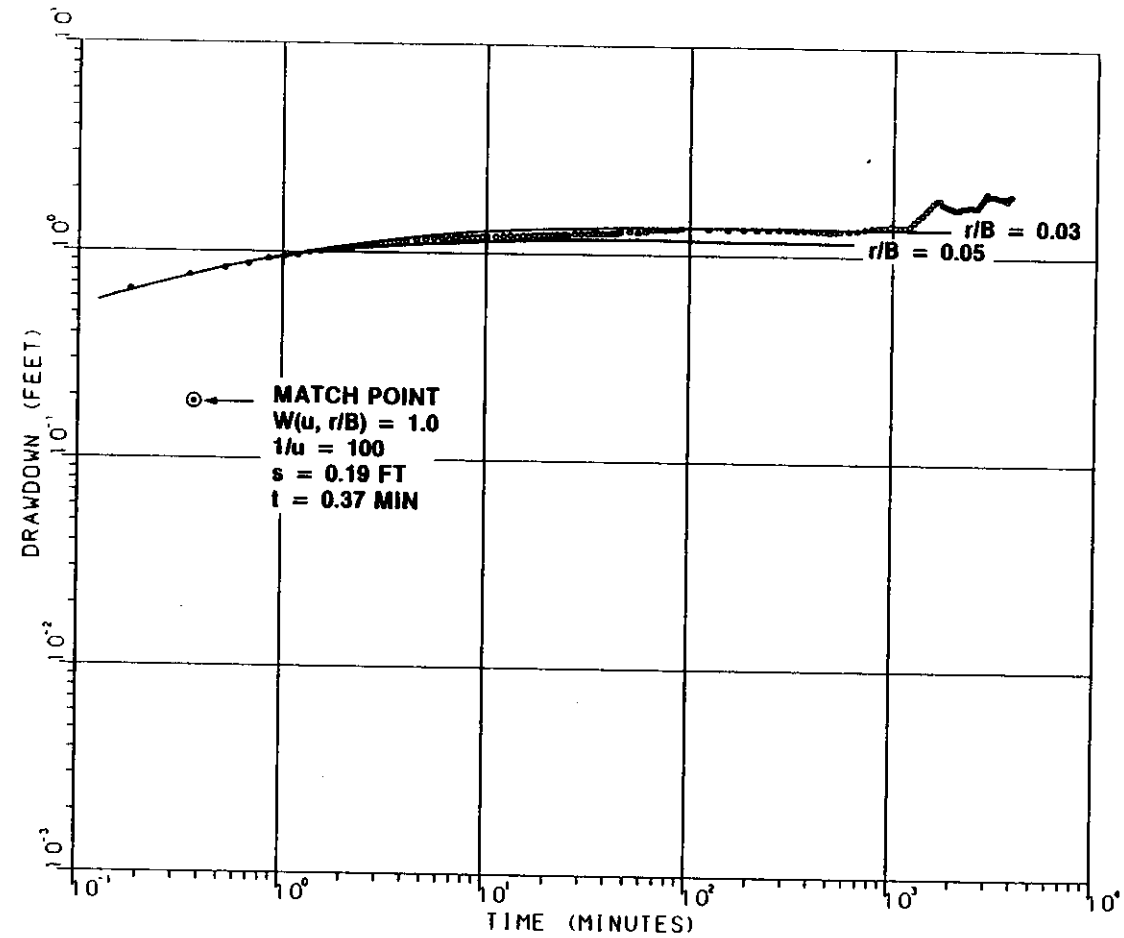

DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-2
RADIUS : 55.00 FEET
DISCHARGE : 1280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

Figure 3-6
WATER-LEVEL DRAWDOWN IN WELL M4-2

SOURCE: ESE, 1985.

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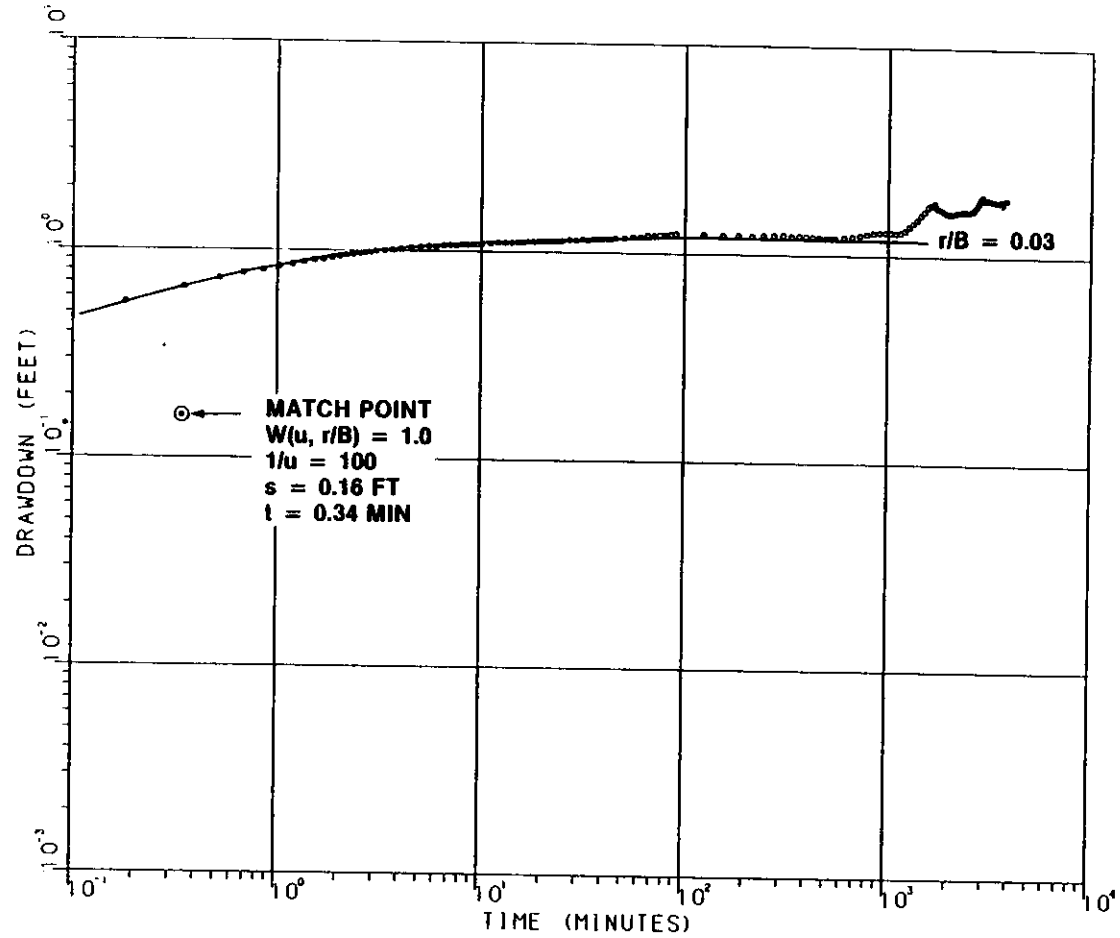

DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-3
RADIUS : 46.00 FEET
DISCHARGE : 1280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

Figure 3-7
WATER-LEVEL DRAWDOWN IN WELL M4-3

SOURCE: ESE, 1985.

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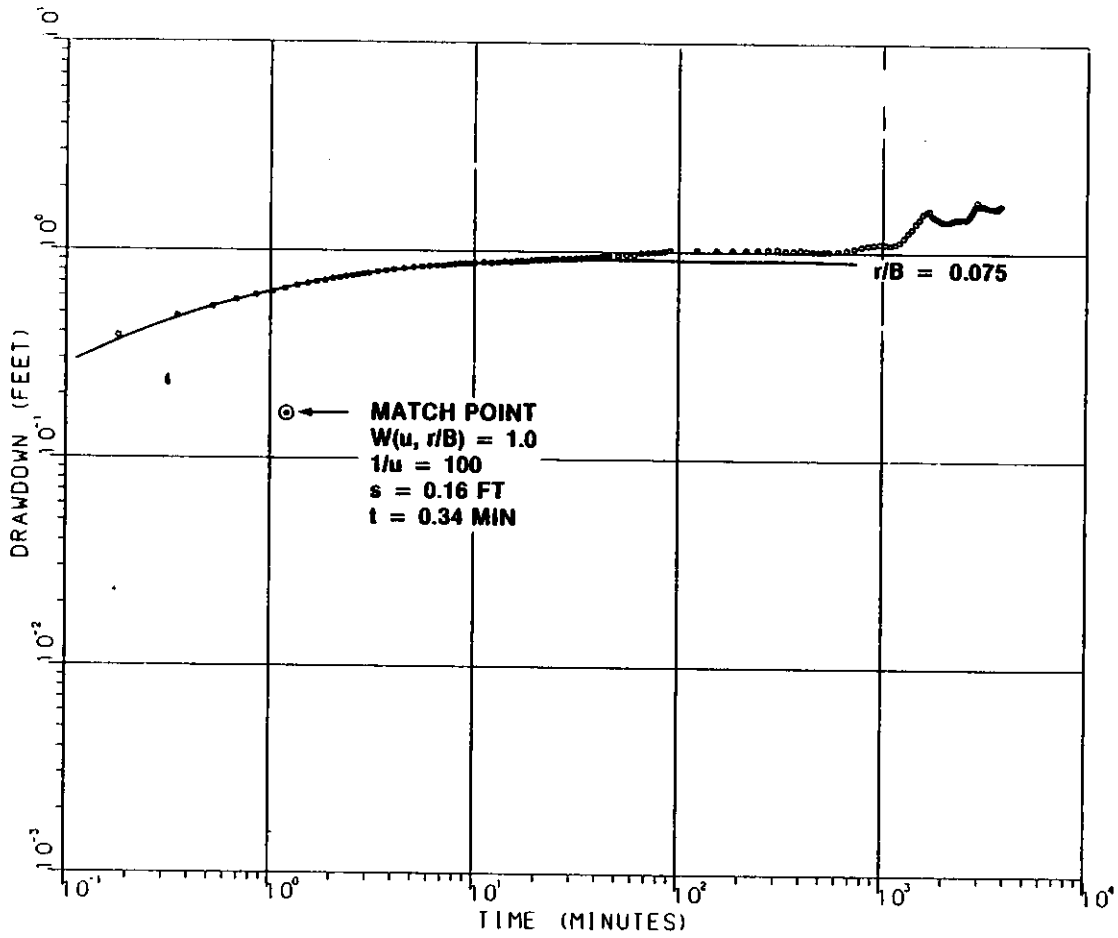

Figure 3-8
WATER-LEVEL DRAWDOWN IN WELL M4-4

SOURCE: ESE, 1985.

FLORIDA CITIES WATER COMPANY

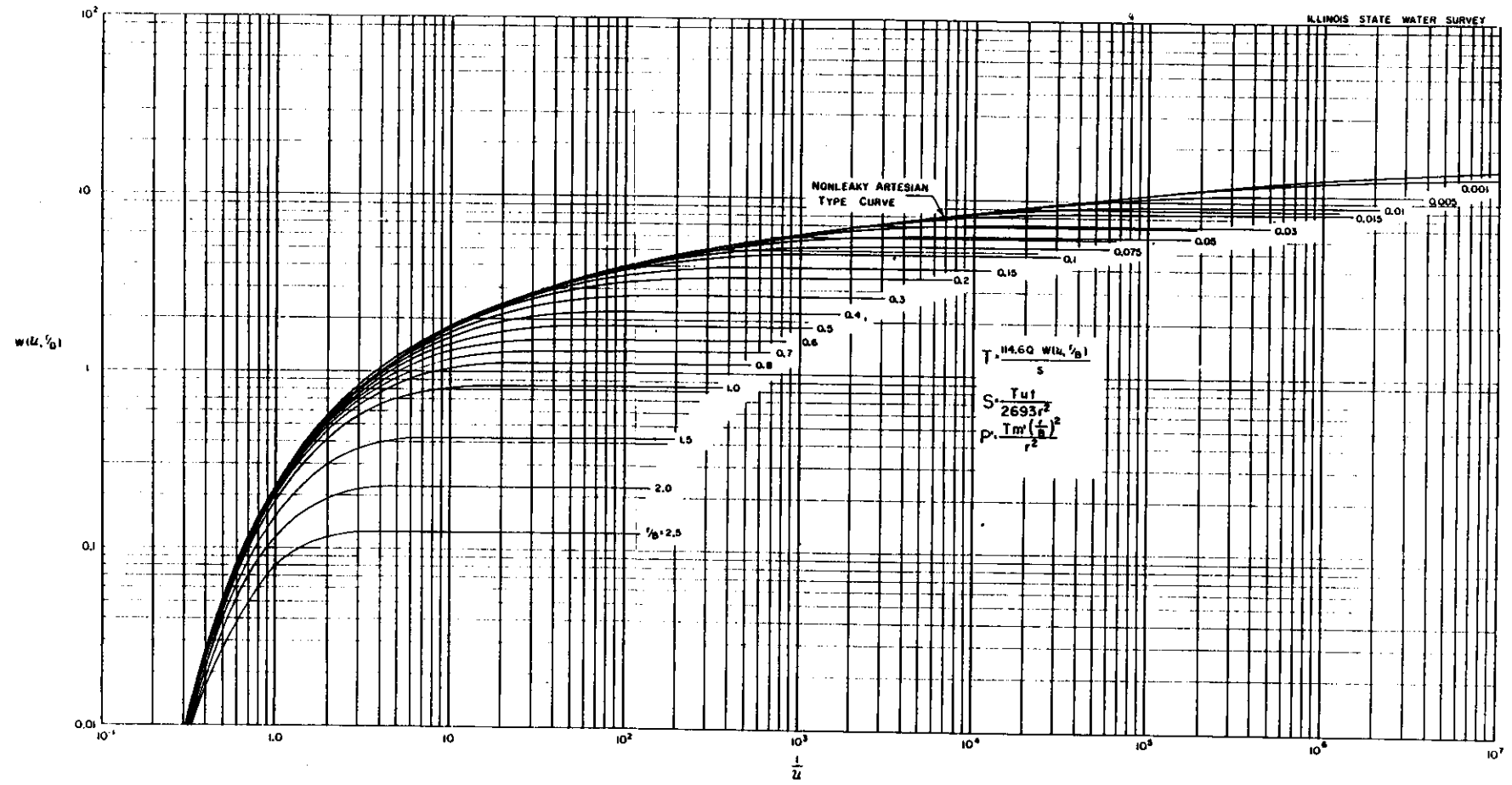

PLATE 1. NONSTEADY STATE LEAKY ARTESIAN TYPE CURVES

Figure 3-9
TYPE CURVE FOR NONSTEADY-STATE LEAKY ARTESIAN AQUIFER

SOURCE: Illinois State Water Survey, 1962.

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$$K' = \frac{Tb' (r/B)^2}{r^2} \qquad (3\text{-}5)$$

where: K' = vertical hydraulic conductivity of aquitard (ft/d),
T = transmissivity (ft^2/d),
Q = pumping rate (gpm),
s = drawdown (feet),
t = time since pumping started (minutes),
r = radial distance from pumping well (feet),
b' = aquitard thickness (feet),
B = $(Tb'/K')^{\frac{1}{2}}$, a leakage factor (feet), and
S = storage coefficient.

The resulting average values of the aquifer coefficients are:

T = 111,000 ft^2/d, 11,000 ?. see page 3-21
S = 0.00032, and
K' = 0.781 ft/d.

Ratio Method--The ratio method (Neuman and Witherspoon, 1972) was used to calculate the specific storage (S_s') of the sand aquitard overlying the pumped aquifer. This method models the pressure response of a low-permeability layer adjacent to a pumped layer of higher permeability. The following procedure was used:

1. T and S of the pumped aquifer were determined using data from MW43, the monitor well closest to PR04 (r = 46 ft). The values of T and S determined using the leaky aquifer type curves were utilized in all the following calculations.

   These values were checked against those produced with the Jacob (1950) semi-log method, recommended by Neuman and Witherspoon

(1972) with weighted early time data. The transmissivity values were within 7 percent, while the values of storage agreed within 1 percent.

2. Dimensionless time (t_D) in the aquifer was determined using the following equation:

$$t_D = 9.28 \times 10^{-5} \frac{Tt}{r^2 S} \qquad (3\text{-}6)$$

where: t = time, selected from early in the test (min);
r = radius to the production well (ft);
T = transmissivity (gpd/ft); and
S = storage.

3. The ratio of drawdown in the shallow well to drawdown in the deep well (s'/s) at the same early time used in Step 2 was determined.

4. Using the plot of t_D' versus t_D developed by Neuman and Witherspoon (1972), dimensionless time in the aquitard (t_D') was determined. This plot has been reproduced as Figure 3-10.

5. The hydraulic diffusivity of the aquitard (α') was then determined from:

$$\alpha' = 1.077 \times 10^4 \, t_D' \, Z^2/t \qquad (3\text{-}7)$$

where: t = early time value used in Steps 2 and 3 (min), and
z = vertical distance from the top/bottom of the aquifer to the observation point in the aquitard.

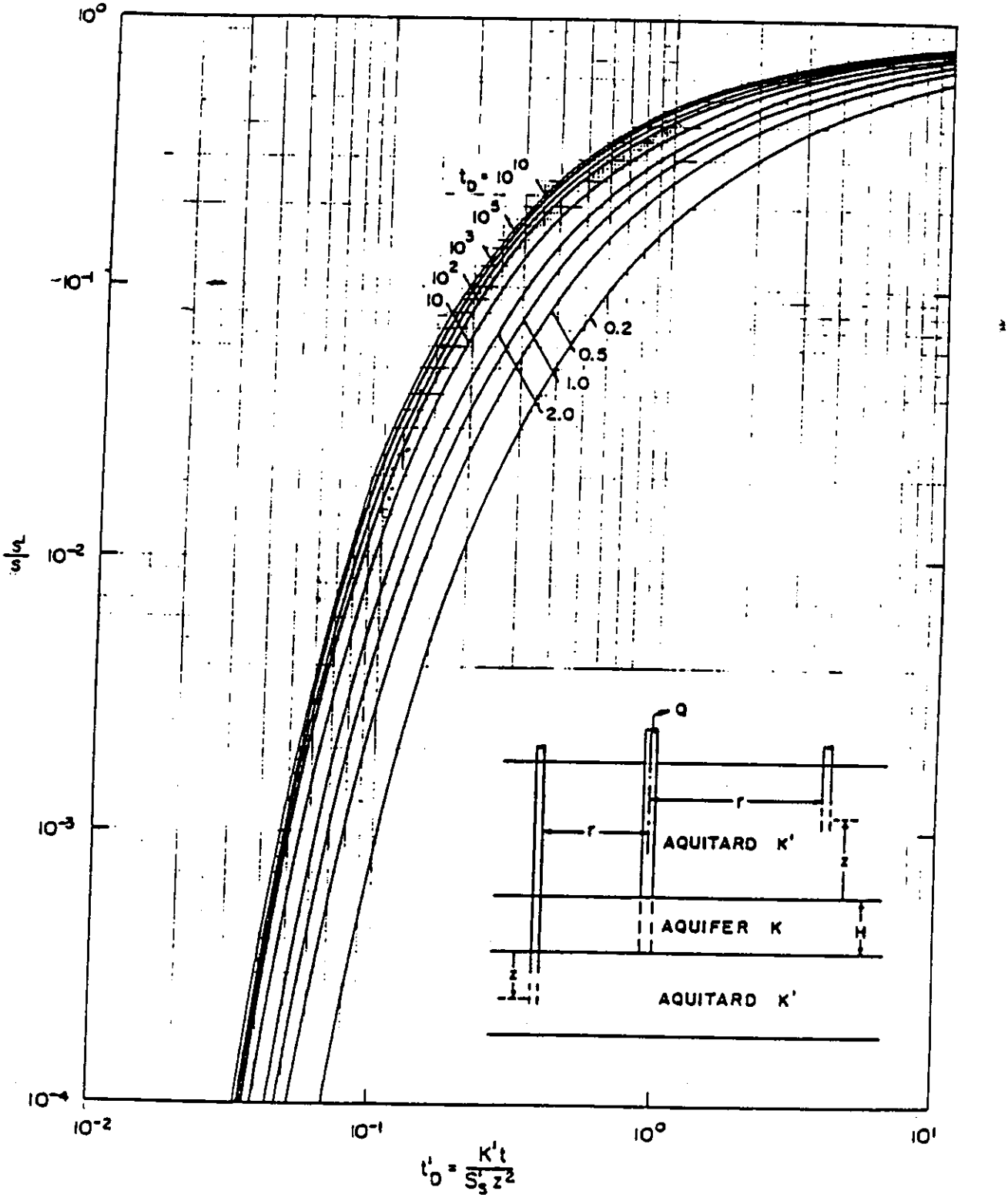

Figure 3-10
VARIATION OF s'/s WITH t_D' FOR SEMI-INFINITE AQUITARD

SOURCE: Neuman and Witherspoon, 1972.

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Since α' is defined as the ratio of the hydraulic conductivity of the aquitard (K') to the specific storage of the aquitard (S_s'), the specific storage is found to be:

$$S_s' = K' / \alpha' \text{ (in ft}^{-1}\text{)} \qquad (3\text{-}8)$$

The values of S_s' and the intermediate steps are given in Tables 3-5 and 3-6.

Based on the analysis by the ratio method and the leaky aquifer-type curve, hydraulic parameters were determined to be:

$T = 11{,}000 \text{ ft}^2/\text{d}$
$S = 0.00032$
$K' = 0.781 \text{ ft/d}$
$S_s' = 7.4 \times 10^{-5} \text{ ft}^{-1}$

3.2.3 Slug Tests

Slug tests to determine hydraulic conductivity were performed on 23 wells at the test site. Data were analyzed using the methods of Hvorslev (1951) and Bouwer and Rice (1976). The slug test data are presented in Appendix E, and the results of the analysis are shown in Table 3-7.

The data were analyzed for unconfined conditions using either the Method C procedure of Hvorslev (1951) or Bouwer and Rice (1976). Hvorslev's Method C (1951) was used for piezometers open at the tip only. The Bouwer and Rice (1976) method was used where the piezometer was screened for its full length (indicated by the "S" designation in the well number).

The average hydraulic conductivity was determined to be 4.1×10^{-6} ft/sec (0.35 ft/day), which is similar in magnitude to the average K determined from the constant-rate pumping test (0.781 ft/day) with the Hantush and Jacob (1955) method. Therefore, the slug test results confirm the results of the constant rate test and the use of the constant-rate test results in modeling the impacts of future withdrawals.

Table 3-5. Ratio Method Analysis at MW43 using P43B and P43C

Calculation	Piezometer			
	P43B		P43C	
	3 min	8 min	3 min	8 min
S'/s	0.1	0.34	0.018	0.08
t_D	219	585	219	585
t_D'	0.23	0.65	0.105	0.19
Z (ft)	11.7	11.7	15.5	15.5
α' (gpd/ft)	113,030	119,787	90,562	8,213
S_s' (ft^{-1})	0.000059	0.000055	0.000073	0.00011

Source: ESE, 1985.

Table 3-6. Ratio Method Analysis at MW41 Using P41A and P41S

Calculation	Piezometer			
	P41A		P41S	
	7 min	10 min	7 min	10 min
S'/s	0.015	0.11	0.43	0.48
t_D	256	366	256	366
t_D'	0.115	0.23	1.1	1.3
Z (ft)	14.2	14.2	12.4	12.4
α' (gpd/ft)	35,677	49,948	260,228	215,279
S_s' (ft^{-1})	0.00019	0.00013	0.000026	0.000031

Source: ESE, 1985.

Table 3-7. Hydraulic Conductivity Test Results

Well No.	Hydraulic Conductivity (ft/s)	
	Hvorslev Method C (1951)	Bouwer and Rice (1976)
T11A	2.2×10^{-6}	--
T11B	1.3×10^{-6}	--
T12A	9.7×10^{-7}	--
T12B	1.0×10^{-7}	--
T13A	3.5×10^{-6}	--
T13B	2.3×10^{-8}	--
T21A	8.5×10^{-7}	--
T22A	5.7×10^{-9}	--
T22B	2.9×10^{-8}	--
T23A	7.9×10^{-8}	--
T23B	3.2×10^{-9}	--
T31A	1.3×10^{-5}	--
T32A	2.3×10^{-5}	--
T32B	3.7×10^{-8}	--
T33A	5.2×10^{-6}	--
T33B	1.7×10^{-7}	--
P41S	--	1.5×10^{-5}
PZ41	6.5×10^{-7}	--
PZ44	2.0×10^{-6}	--
MW5S	--	2.5×10^{-5}
P61A	1.4×10^{-5}	--
P61B	7.6×10^{-6}	--
P62	1.1×10^{-5}	--

Source: ESE, 1985.

4.0 ANALYSIS OF WELL FIELD IMPACTS

4.1 INTRODUCTION

The potential impacts of withdrawals from the surficial aquifer on the ecosystem in the vicinity of the Green Meadows well field were determined using two different analytical models. The first, developed by Hantush and Jacob (1955), models nonsteady flow in an infinite leaky confined aquifer with a constant source bed. This model was used to simulate wet season conditions. The second, developed by Hantush (1960), is a modification of the first model and takes into consideration the storage in the semipervious confining layer while head in the layer supplying the leakage is allowed to decline due to the absence of recharge. This second model was used to determine the dry season impacts. The pumping rates used in the two models for the 28 existing and potential well locations were the design pumping rates of the existing surficial aquifer wells (500 gpm) and the present actual pumping rates of the existing wells (200 gpm).

4.2 WET SEASON

4.2.1 Model Description

The Hantush and Jacob (1955) nonsteady-state leaky artesian aquifer model was defined in Section 3.2.2.

The well function may be approximated by an algebraic expression and solved with the aid of a computer. Walton (1983) developed a series of ground water models suitable for microcomputers, which include the Hantush and Jacob (1955) analytical model. ESE staff modified the model for use in multiple well simulations. The use of this model requires the assumption of a constant head source bed throughout the radius of influence of the well field.

This assumption is reasonable for the Green Meadows well field location during the wet season for the following reasons:

1. Type curves derived from the Hantush and Jacob (1955) model provided the best fit to the data collected during the July 1984 constant-rate pump test. The test was conducted during the wet season, and standing water was covering much of the site. Therefore, the assumption of constant head in the source bed is valid for that portion of the well field during part of the 1984 wet season.
2. During a normal wet season, standing water may be expected to cover a large percentage of the site. Based on the flood-prone area map prepared by the U.S. Geological Survey (USGS) (1973) for this area, approximately 97 percent of the 24-square-mile area immediately over and adjacent to the Green Meadows well field is flood prone. Although the flood-prone map depicts an extreme flood event, due to the slight change in topography over the site, flood events of lesser magnitude would also cover large portions of the site. Additionally, drawdowns due to pumping in areas not inundated under normal wet season conditions would likely extend under areas of constant head, thereby satisfying the assumption for those locations.
3. Adequate volumes of water exist during normal wet season conditions to more than compensate for the proposed withdrawals. Therefore, sufficient water is available to maintain constant head levels. The offsite surface flow was measured in September 1982 near the end of the wet season and found to be 53.2 million gallons per day (MGD). The water elevation in Well L-1999 at that time was 25.42 ft msl, 3 percent above the monthly average of 24.65 ft msl. The preceding month the water level was also 3 percent above the monthly average. Therefore, the measured offsite flow was approximately that of average conditions. At full development, the water withdrawn by the 28 shallow wells at 500 gpm each would be 18.7 MGD or only 35 percent of the measured surplus runoff from the site. Therefore, adequate quantities of water exist onsite during the wet season to replace that withdrawn and maintain constant head conditions.

Based on the constant-rate pump test results, topography, and runoff volumes, the assumption of constant head is met under average conditions.

4.2.2 Impacts

The duration of water levels in Well L-1999 in excess of the average wet season level is from 2 to 4 months. Therefore, a 4-month pumping duration (120 days) was selected for modeling purposes as the longest stress period during which the model would be applicable. The impacts were examined for both a single well and for the well field with all potential wells in use, at both 200 gpm and 500 gpm.

The drawdown after 120 days at various radial distances from a single pumped well is shown in Figure 4-1. At both 200 gpm and 500 gpm, the drawdown at distances greater than 1 mile is less than 0.01 ft with the maximum drawdown of approximately 1 ft occurring near the pumped well at 500 gpm. The variation of drawdown with time at a radial distance of 1 ft from a pumped well is shown in Figure 4-2. The drawdown reaches a constant at approximately 0.01 day (15 minutes) for both pumping rates, indicating that steady-state conditions were attained.

Predicted drawdowns in the region of the well field under full development after 120 days of continuous pumping from all 28 wells at 200 gpm and 500 gpm, respectively, are shown in Figure 4-3 and 4-4. Under worst-case conditions, pumping all wells at 500 gpm for 120 days, the drawdown is less than 0.01 ft at distances greater than 1 mile from the well field boundary.

4.3 DRY SEASON

4.3.1 Model Description

A modification to the Hantush and Jacob (1955) model was proposed by Hantush (1960) in which the storage (S') in the semipervious confining layer supplying the leakage was taken into consideration. In addition, recharge is eliminated resulting in a system in which all water supplied

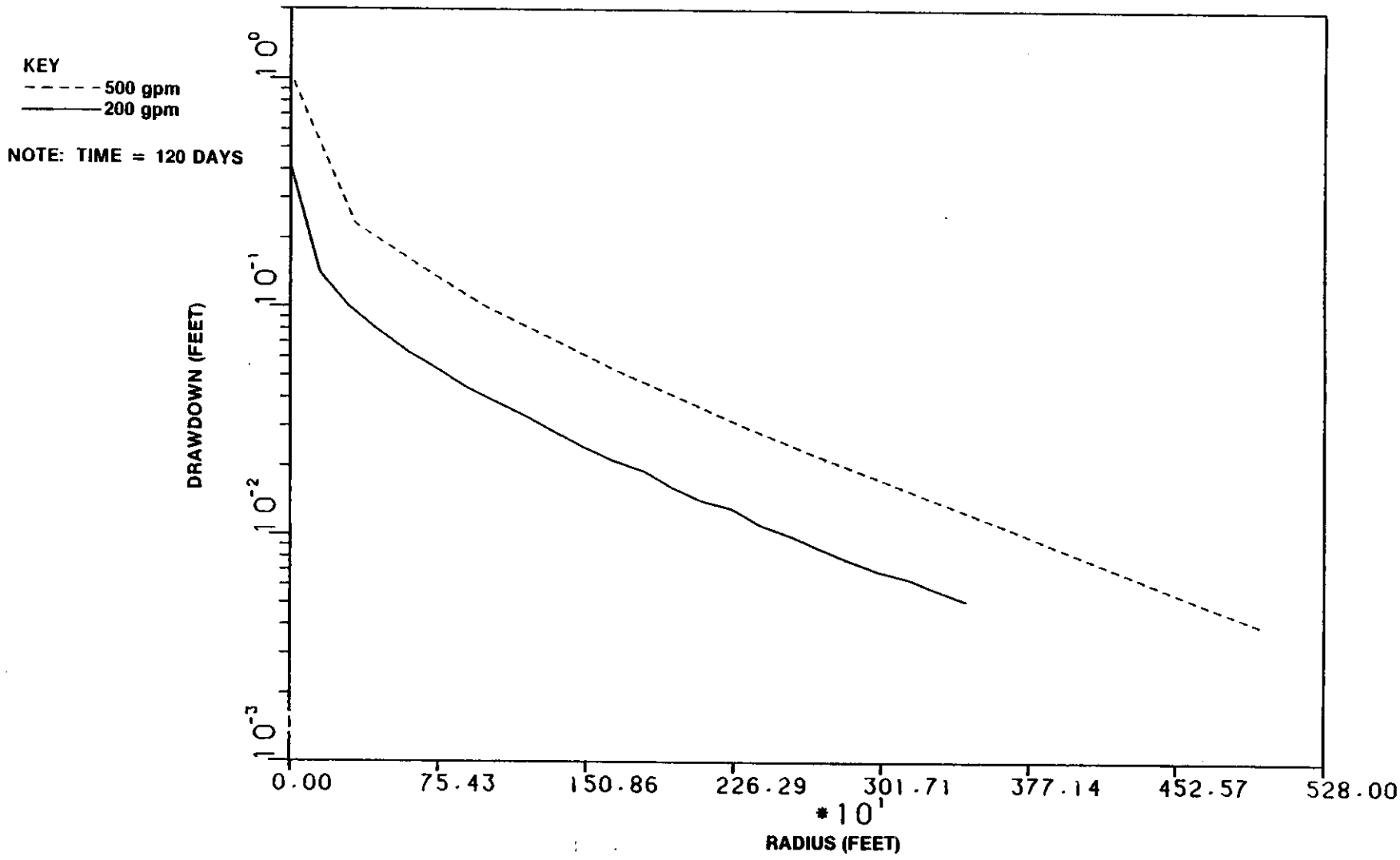

Figure 4-1
WELL DRAWDOWN VERSUS RADIUS, HANTUSH AND JACOB (1955) MODEL

SOURCE: ESE, 1985.

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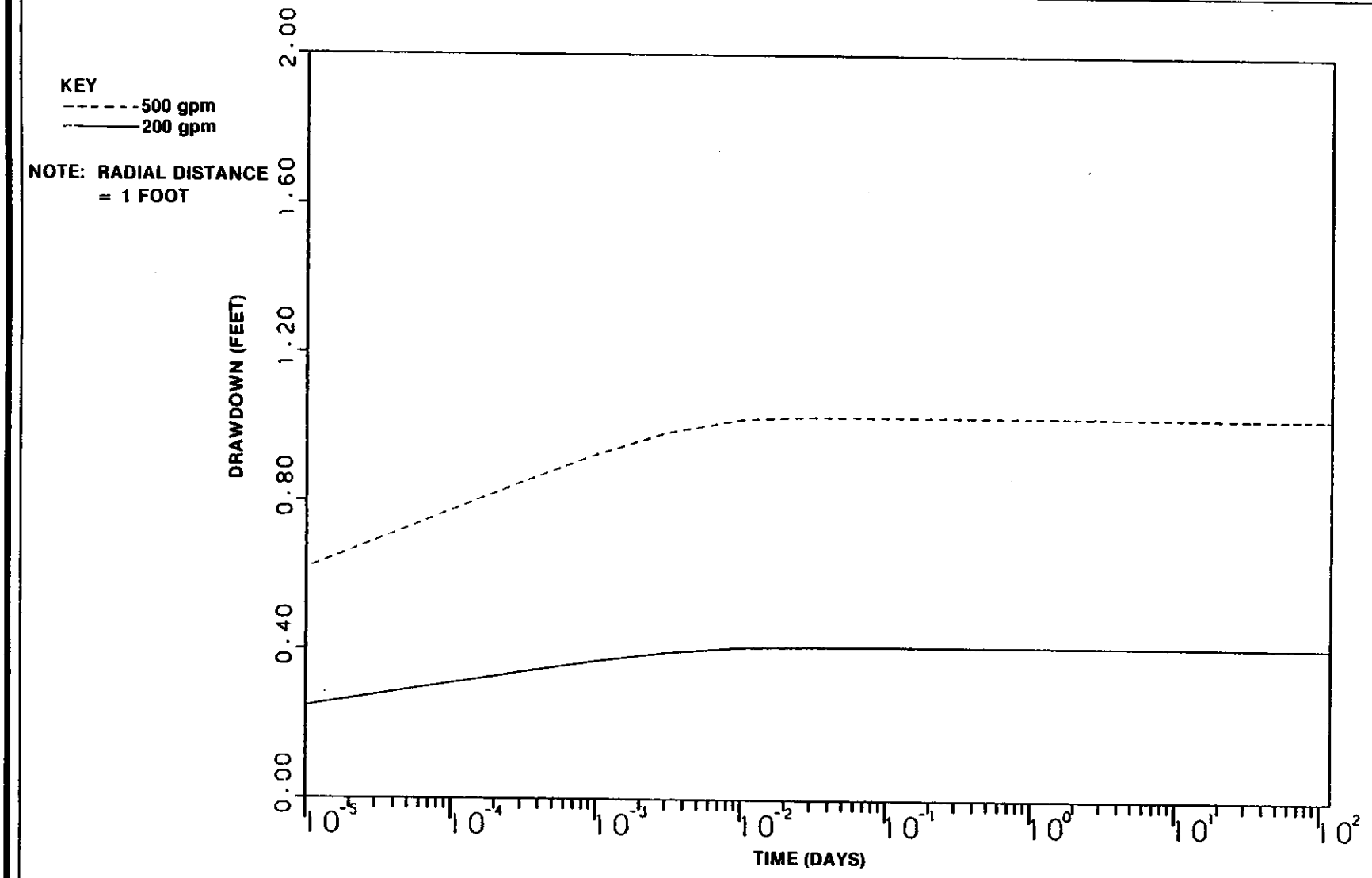
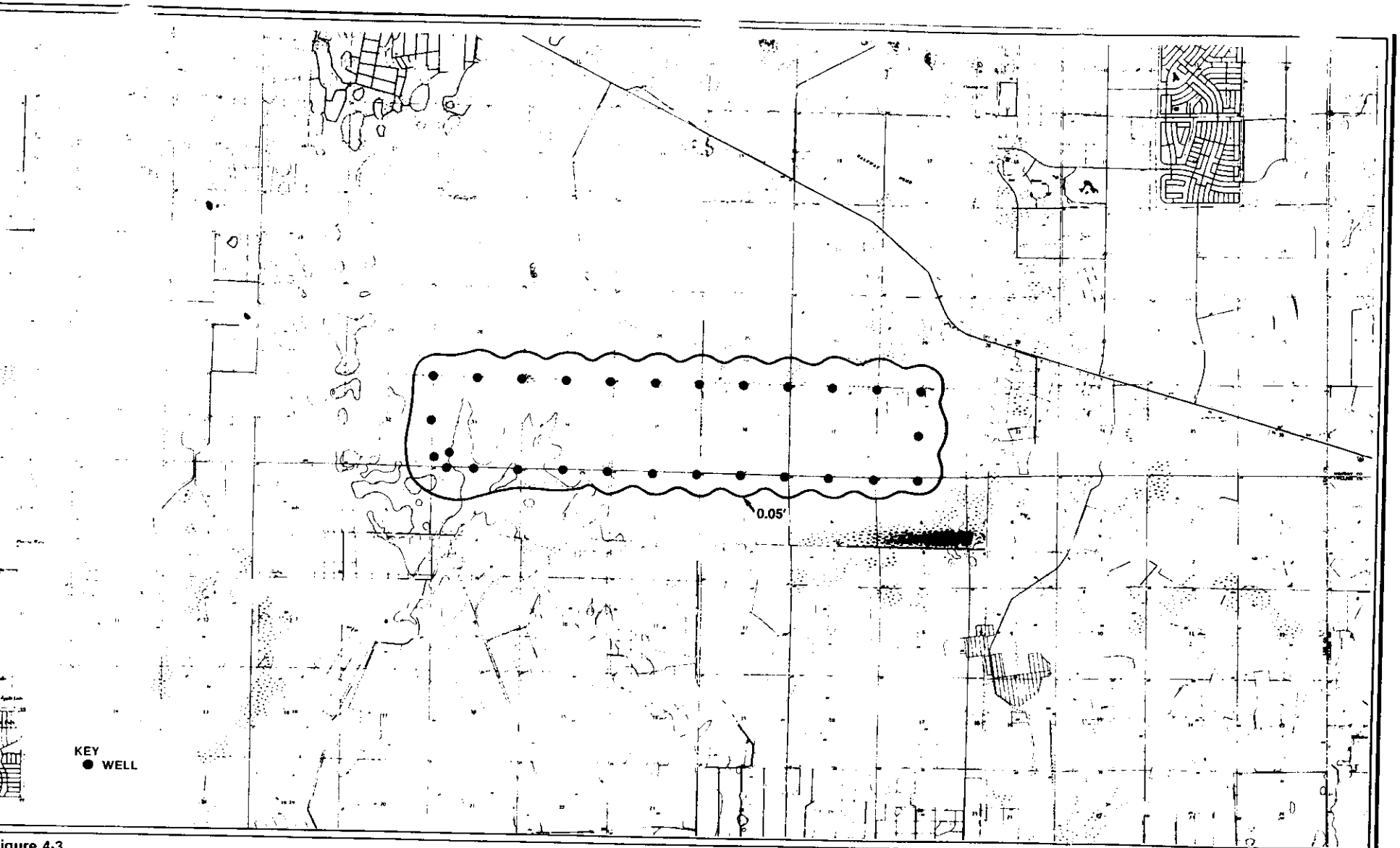


Figure 4-2
WELL DRAWDOWN VERSUS TIME, HANTUSH AND JACOB (1955) MODEL

SOURCE: ESE, 1985.

FLORIDA CITIES WATER COMPANY



igure 4-3
VET SEASON DRAWDOWN FOR WELL FIELD
T 200 gpm AND 120 DAYS
OURCE: ESE, 1985.

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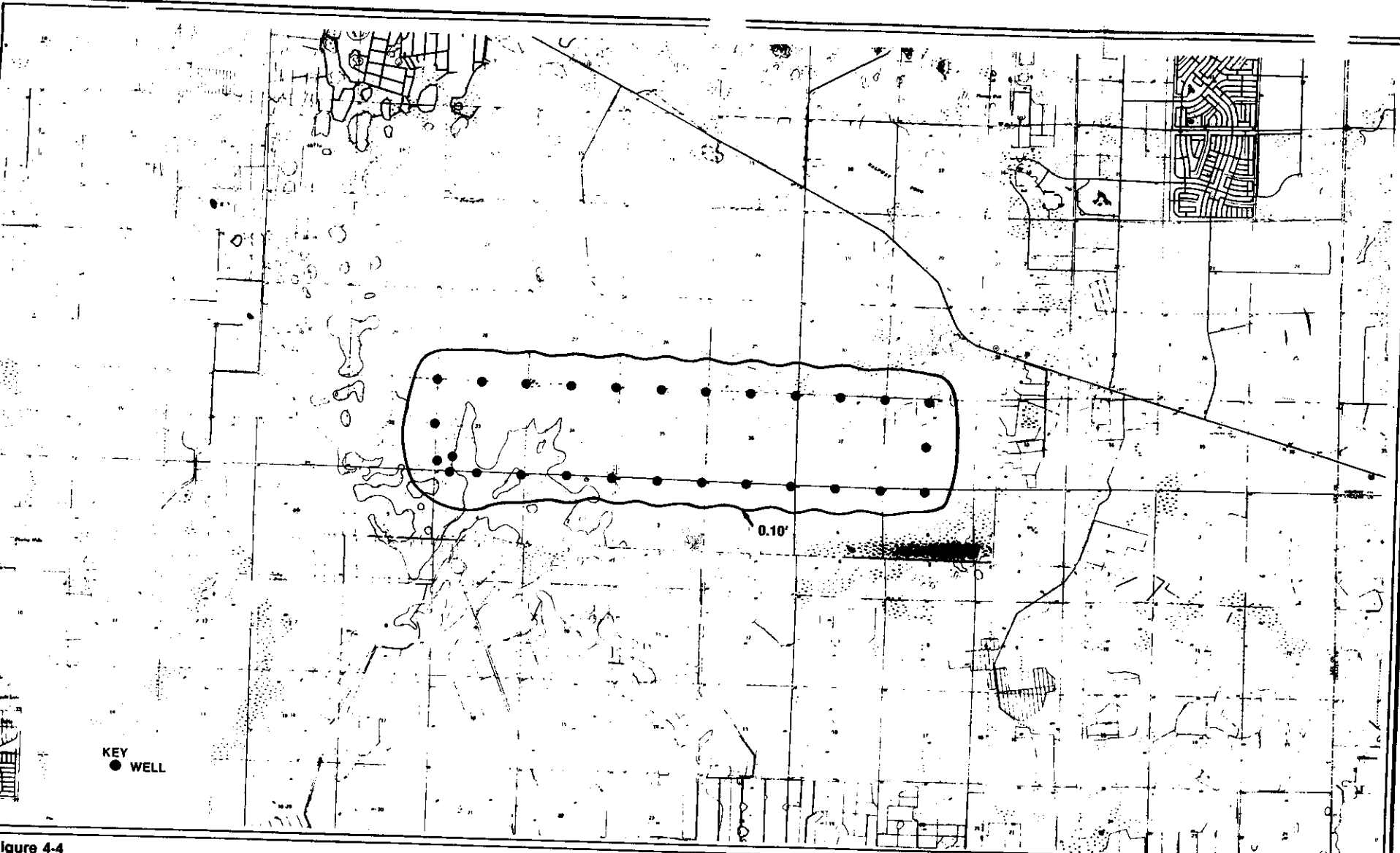

Figure 4-4
WET SEASON DRAWDOWN FOR WELL FIELD
AT 500 gpm AND 120 DAYS

SOURCE: ESE, 1985.

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to the pumped aquifer is derived from storage in the pumped aquifer and the overlying semipervious confining layer. This approximates conditions at the Green Meadows well field during the dry season.

The model equations are defined as follows:

$$s = \frac{Q}{4\pi T} W[u(1 + \frac{S'}{S})] \qquad (4\text{-}3)$$

and $$u = r^2 S/4Tt \qquad (4\text{-}4)$$

where: $W[u(1 + S'/S)]$ = well function for a confined aquifer, and
S' = storage coefficient for the semipervious layer.

The analytical model was programmed on an ESE microcomputer using algebraic approximations and routines designed for multiple well systems.

4.3.2 Impacts

As in the wet season simulations, the impacts of the proposed withdrawals were simulated for both a single well and for the entire well field, at both 200 gpm and 500 gpm.

The drawdown after 120 days at various radial distances from a single withdrawal well is shown in Figure 4-5. The variation of drawdown with time at a radial distance of 1 ft from a single well is shown in Figure 4-6. Predicted drawdowns in the region of the well field under full development after 120 days of continuous pumping at 200 gpm and 500 gpm, respectively, are shown in Figures 4-7 and 4-8.

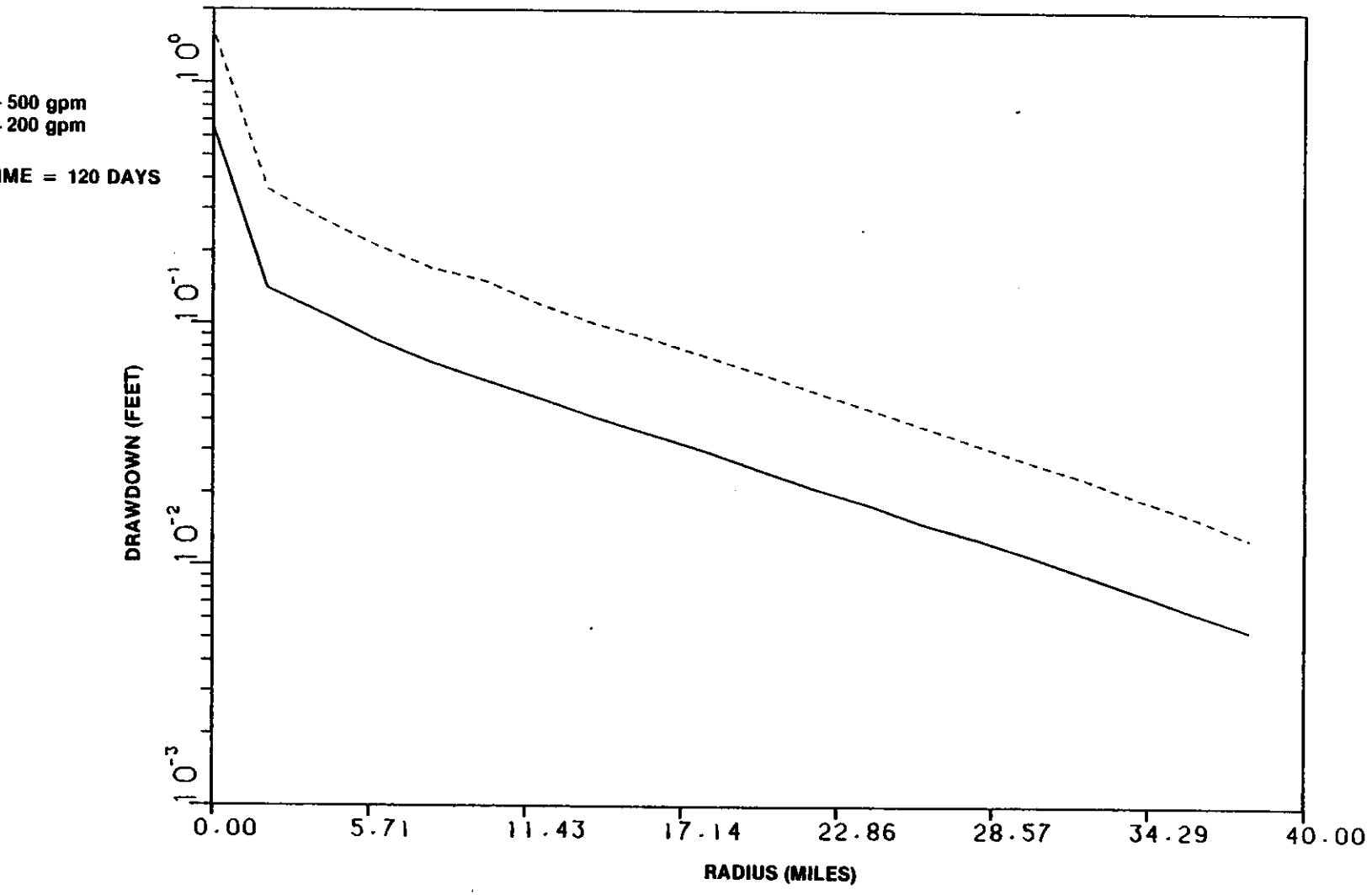

Figure 4-5
WELL DRAWDOWN VERSUS RADIUS, HANTUSH (1960) MODEL

SOURCE: ESE, 1985.

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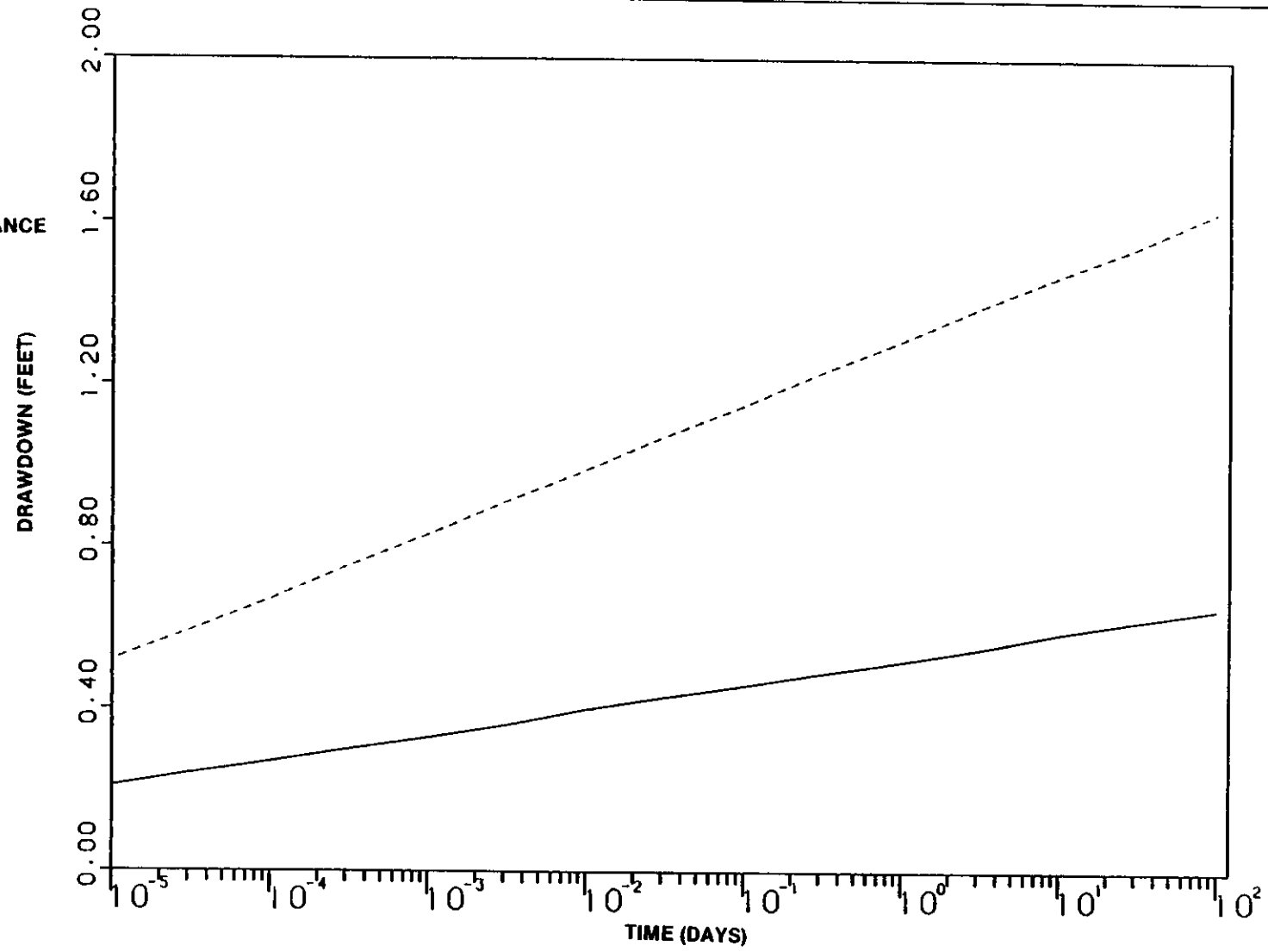

Figure 4-6
WELL DRAWDOWN VERSUS TIME, HANTUSH (1960) MODEL

SOURCE: ESE, 1985.

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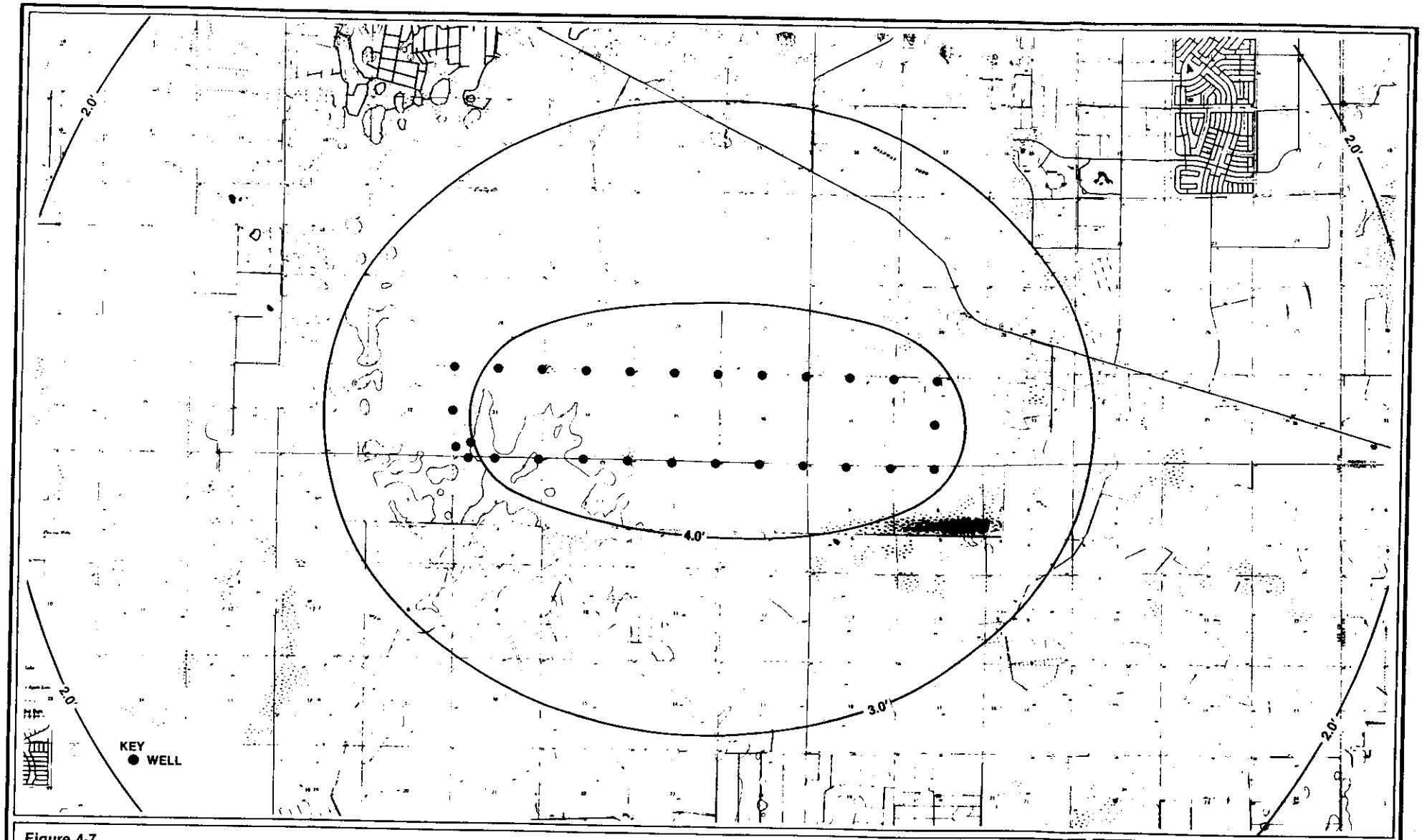

Figure 4-7
DRY SEASON DRAWDOWN FOR WELL FIELD AT 200 gpm AND 120 DAYS

SOURCE: ESE, 1985.

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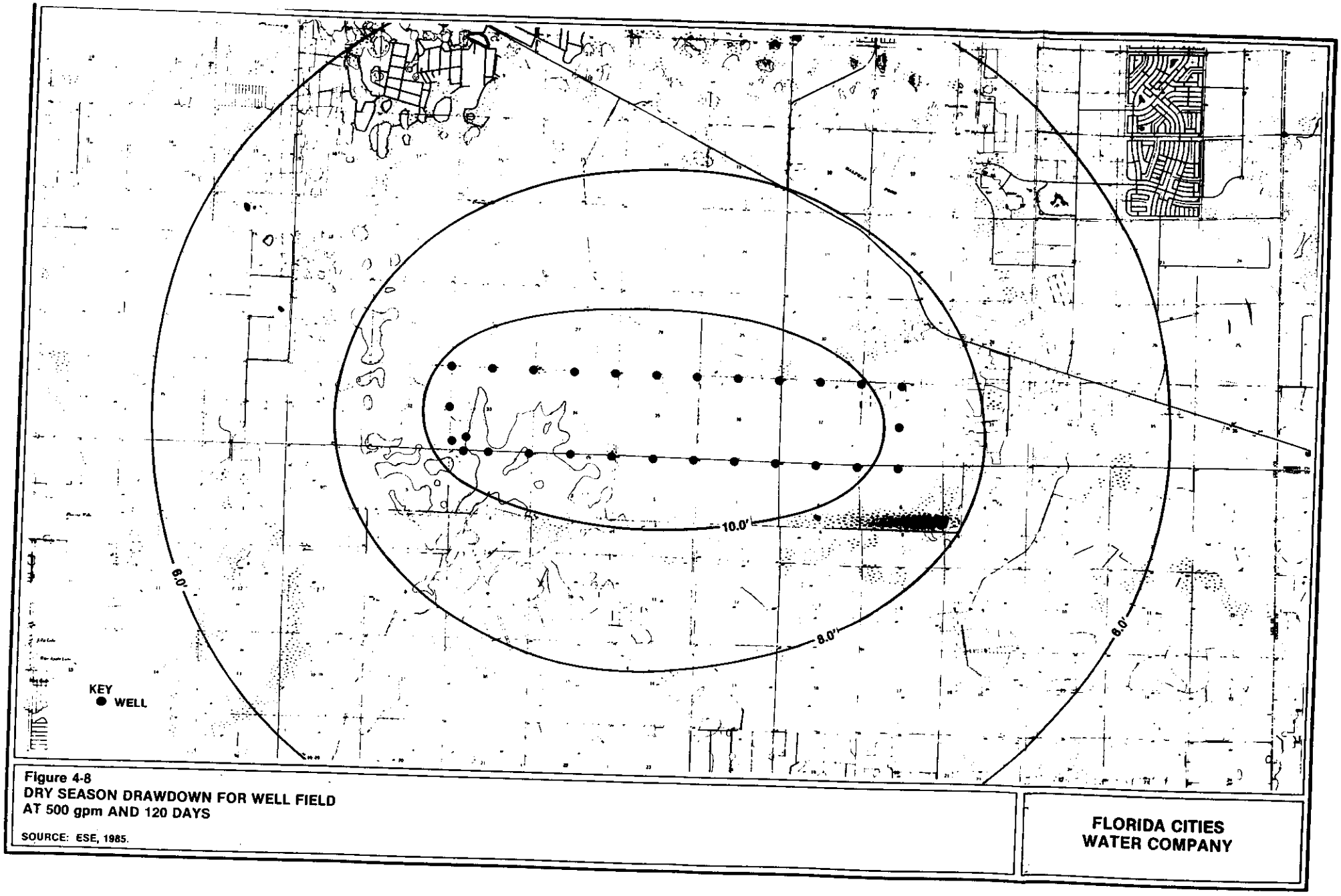

Figure 4-8
DRY SEASON DRAWDOWN FOR WELL FIELD AT 500 gpm AND 120 DAYS

SOURCE: ESE, 1985.

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5.0 ECOLOGICAL MONITORING AND ASSESSMENT

5.1 OBJECTIVE

The objective of the ecological monitoring described in this report was to obtain baseline information from which to assess the effects of withdrawals from the shallow aquifer system on the wetland systems onsite.

Well field vegetation communities were described in the Phase I Report (ESE, 1982), based on an ecological assessment conducted in August 1982. A wildlife habitat assessment was also included in the Phase I Report.

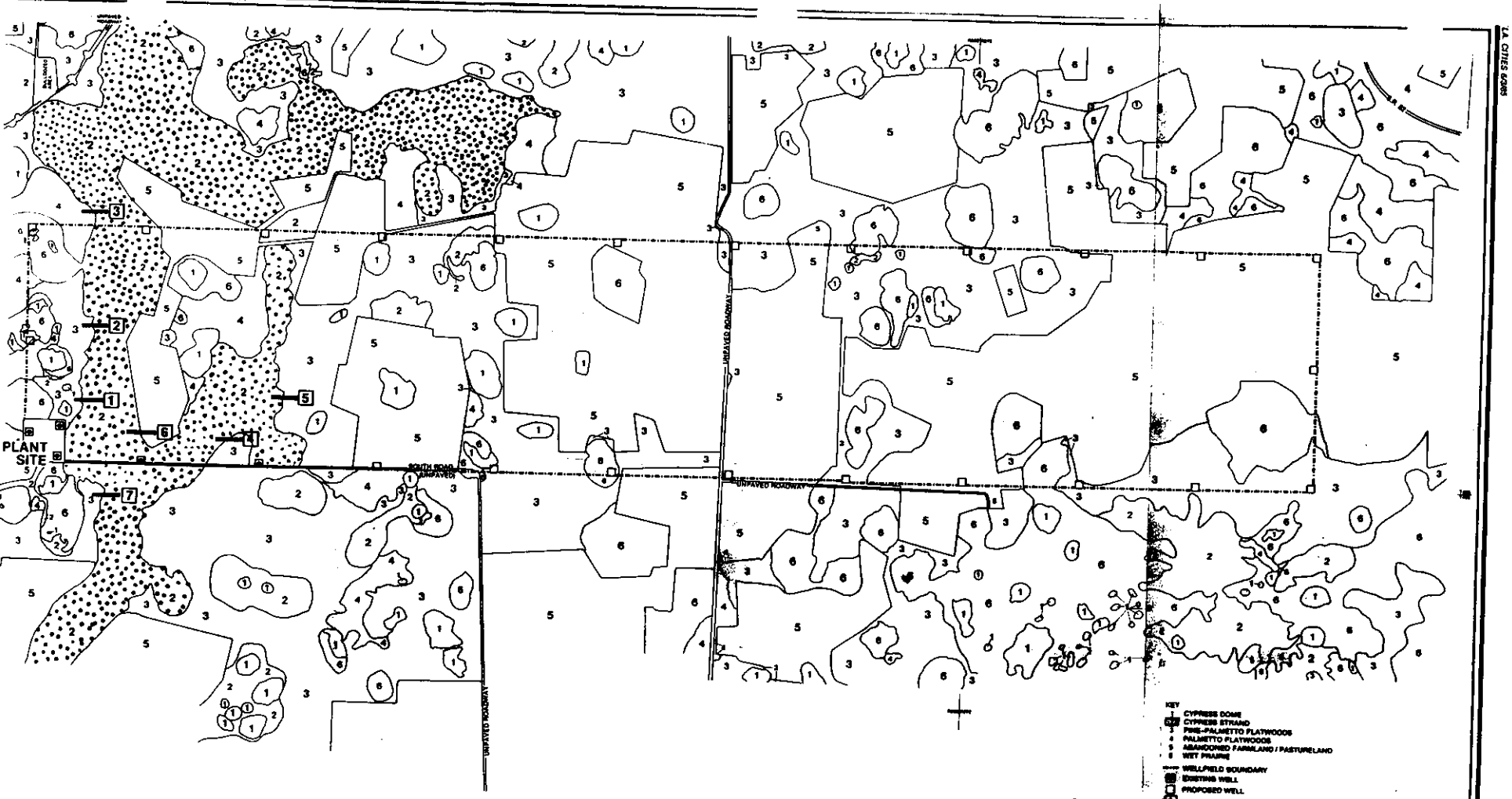
As a result of the information obtained from hydrogeological and ecological assessments performed in Phase I, a large cypress strand just east of the western boundary of the well field was selected as an indicator of ecological impacts caused by drawdown due to shallow aquifer pumping (Figure 5-1).

This large branched strand, which occupies most of Section 33, Township 45S, and Range 26E, is the wetland most likely to be affected by the withdrawals. Monitoring was conducted along permanent transects established at various locations in August 1984 along the edge of the strand. Wet prairies located west of the strand were also surveyed and species composition noted.

Future impacts to wetlands attributable to shallow aquifer pumping can be evaluated by determining the location and extent of any changes in species composition in the wet prairies and in the transects established at the edge of the strands.

5.2 INDICATOR SPECIES

The three species selected for quantitative sampling are common in the region and are sensitive indicators of long-term changes in hydroperiod.



ure 5-1
CATION OF CYPRESS STRAND AND
TLAND MONITORING TRANSECTS

RCE: ESE, 1985.

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They are bald cypress (Taxodium distichum), melaleuca (Melaleuca quinquenervia), and South Florida slash pine (Pinus elliottii var. densa).

Bald cypress--Cypress strands occur along major drainage paths and usually have a north-south orientation. Water flows slowly through the strands via sheet flow during the wet season; in the dry season, there is often no flow. Cypress distribution is affected by drainage, logging, and fire. The mature tree is more fire-tolerant than hardwoods and fire therefore excludes hardwood invasion (Wade et al., 1980). Mature cypress can survive continuous flooding of approximately 20 centimeters (cm) depth and depths higher than 20 cm for shorter periods of time (Harms et al., 1980). However, seedlings establish only when soils are moist, but not submerged (Demaree, 1932). If soils are allowed to dry out for 3 months or more, cypress will survive, but cypress seedlings will not be able to compete successfully with fast-growing hardwoods, and the cypress will be replaced by less flood-tolerant hardwoods (Conner et al., 1981). Cypress is favored, then, by long periods of submergence with occasional periods of drawdown during which new seedlings establish on soil neither dry nor submerged, but moist.

Melaleuca--Some of the largest natural strands of melaleuca are in Lee County, one of the two counties where Melaleuca originated in Florida (Cost and Craver, 1980). Although Melaleuca frequently invades land following alterations in drainage and other disturbances to natural vegetation, Woodall (1980) reports that Melaleuca is well adapted to both disturbed and undisturbed habitats in southern Florida. For this reason, its presence and/or increase is not necessarily attributable to habitat alteration. The tree is very fire-tolerant and sheds seeds after a burn. It tolerates flooded conditions by producing a fibrous sheath of "water roots" from the base of the trunk to high water level (Myers, 1983).

Favorable sites for establishment are those where soils remain moist to saturated, but rarely submerged during the 4- to 6-month wet season (Myers, 1983). Ecotones between pine flatwoods and cypress strands are especially susceptible to Melaleuca establishment (Wade et al., 1980).

South Florida Slash Pine--South Florida slash pine is the dominant species in south Florida flatwoods. It tolerates widely fluctuating moisture conditions. Pines regenerate well on the margins of ponds and typically expand into partially drained cypress strands (Wade et al., 1980). South Florida slash pine is extremely fire tolerant, in contrast to the northern variety of slash pine. Fire suppression can result in replacement of flatwoods by hardwood forest (Wade et al., 1980). Pines will not tolerate long periods of submergence.

Any change in hydroperiod due to shallow aquifer pumping should result in increased establishment of Melaleuca and slash pine and decreased establishment of cypress.

5.3 METHODOLOGY

5.3.1 Transect Location

Seven permanent transects were established in locations throughout the strand at various distances from the wells. A 3- to 5-ft high wooden stake marked with the transect number was placed at the upland end of each transect, except Transect 7.

The wooden stake marking Transect 7 was placed at the wetland end of the transect for easier visibility. The stakes were painted red and yellow. Trees near each stake were spray painted as a guide to its location for future monitoring. Each transect was established across the ecotone of the swamp edge and was 80 to 100 meters (m) long. Transect locations are shown in Figure 5-1.

5.3.2 Quadrat Sampling

Consecutive quadrats, 5 m x 5 m, were delineated along the transects. The stake marking each transect represented the northeast corner of the first quadrat for Transects 1, 2, 3; the northwest corner of the first quadrat for Transects 4, 5, 6; and the northeast corner of the last quadrat for Transect 7. Adult trees (>3 m in height) and juvenile trees ($\leq$ 3 m in height) of the three indicator species were counted separately in each quadrat so that changes in recruitment of young trees as well as survival of mature trees could be monitored.

In addition, the length of each distinct plant association along the transect was measured so that any future changes in understory vegetation can be determined. Understory associations varied widely between transects because moisture conditions varied throughout the strand.

5.4 RESULTS

Plant species that occurred in the transects are listed in Table 5-1. The length of the plant associations along each transect and the number of juvenile and adult pine, Melaleuca, and cypress trees in each association are summarized in Table 5-2. There are indications that the strands have already been altered by human activities. Bordering agricultural fields have been drained. Charred tree trunks were observed throughout the strand and adjacent flatwoods. Large strands of Melaleuca occur along the southern boundary road and the eastern portion of the section. Individual melaleuca trees were scattered in the flatwoods and at the pine-cypress ecotone of the strand.

However, the strand itself is healthy, and the abundance of juvenile cypress trees indicates active regeneration. The transects were deliberately located in areas with few Melaleuca trees, but even where Melaleuca was absent from quadrats, all areas had at least a few Melaleuca trees in sight of the quadrats.

Table 5-1. Plant Species in Transects

Scientific Name	Common Name
Melaleuca quinquenervia	Cajeput
Pinus elliottii var. densa	Slash Pine
Serenoa repens	Saw Palmetto
Stillingia aquatica	Queen's Delight
Taxodium distichum	Bald Cypress
Sabal palmetto	Cabbage Palm
Sagittaria lancifolia	
Thalia geniculata	Alligator Flag
Utricularia spp.	Bladderwort
Aster caroliniensis	
Bacopa caroliniana	Fragrant Bacopa
Bacopa monnieri	Water Hyssop
Blechnum serrulatum	Swamp Fern
Boehmeria cylindrica	Button Hemp
Centella asiatica	Coinwort
Hydrocotyle umbellata	Pennywort
Hyptis alata	Bittermint
Ilex cassine	Dahoon Holly
Myrica cerifera	Wax Myrtle
Panicum hemitomon	Maidencane
Polygonum hydropiperoides	Smartweed
Pontederia lanceolata	Pickerelweed
Proserpinaca palustris	Mermaid Weed
Rhynchospora divergens	Beak Rush
Rhynchospora tracyi	Beak Rush
Cladium jamaicense	Sawgrass
Hypericum spp.	St. Johns wort
Ludwigia repens	Ludwigia
Hydrolea corymbosa	Sky flower
Cuphea carthagenensis	Cuphea
Baccharis halimifolia	Groundsel tree
Commelina gigas	Climbing dayflower

Source: ESE, 1985.

Table 5-2. Vegetation in Transects Along Cypress Strand Ecotone

Transect Number	Understory Plant Association	Length of Association (m)	Number of Trees					
			Pine		Melaleuca		Cypress	
			A*	J*	A	J	A	J
1	Serenoa repens	15	5	1	0	0	0	0
	Cladium-Blechnum	60	2	1	0	5	61	27
	Panicum hemitomon-Bacopa	10	0	0	0	0	11	2
	Hydrolea-Aster	15	0	0	0	0	29	29
2	Panicum hemitomon-Blechnum	40	1	0	0	0	71	74
	Cladium	60	0	0	0	0	79	237
	Bacopa							
3	Panicum hemitomon-Blechnum	30	0	0	0	0	48	155
	Bacopa	20	0	0	0	0	56	294
	Hydrolea-Panicum hemitomon							
	Ludwigia repens	35	0	0	0	0	67	343
4	Hypericum-Centella-Stillingia	50	6	1	0	1	7	13
	Ludwigia-Hydrolea-Pontederia	50	1	0	0	0	45	373
5	Hypericum-Aristida	40	5	6	0	0	14	23
	Blechnum-Ludwigia	60	5	5	0	0	57	153
6	Centella-Cuphea	10	2	0	1	1	8	8
	Cuphea-Ludwigia	70	0	0	1	0	152	122

Table 5-2. Vegetation in Transects Along Cypress Strand Ecotone
(Continued, Page 2 of 2)

Transect Number	Understory Plant Association	Length of Association (m)	Number of Trees					
			Pine		Melaleuca		Cypress	
			A*	J*	A	J	A	J
7	Blechnum-Baccharis-Ilex cassine	50	1	3	0	0	52	22
	Ludwigia-Panicum hemitomon† Hydrocotyle	35	0	0	0	0	7	30

*A = adult tree (>3 m height).
J = juvenile tree (≤3 m height).
†Commelina gigas (Climbing dayflower) is in this association. It is listed by Ward (1978) as threatened.

Source: ESE, 1985.

The understory associations varied between transects because areas of the strand differed widely in hydroperiod. Some areas of the strand were flooded in the center and bore aquatic species such as pickerelweed (Pontederia lanceolata), arrowleaf (Sagittaria spp.), and alligator flag (Thalia geniculata). Other areas were dry from the east to the west edge, and wetland species were mixed with weedy species. Transects were not established in these dry areas, because changes in hydroperiod due to shallow aquifer pumping would have little effect.

Wet prairies west of the strand contained 0.2 and 0.5 m of water at the time of survey. Stillingia aquatica and shrubby Hypericum spp. were scattered through the prairies. Hydrolea corymbosa, alligator flag, pickerelweed, and other wetland species dominated prairie communities.

6.0 RECOMMENDATIONS

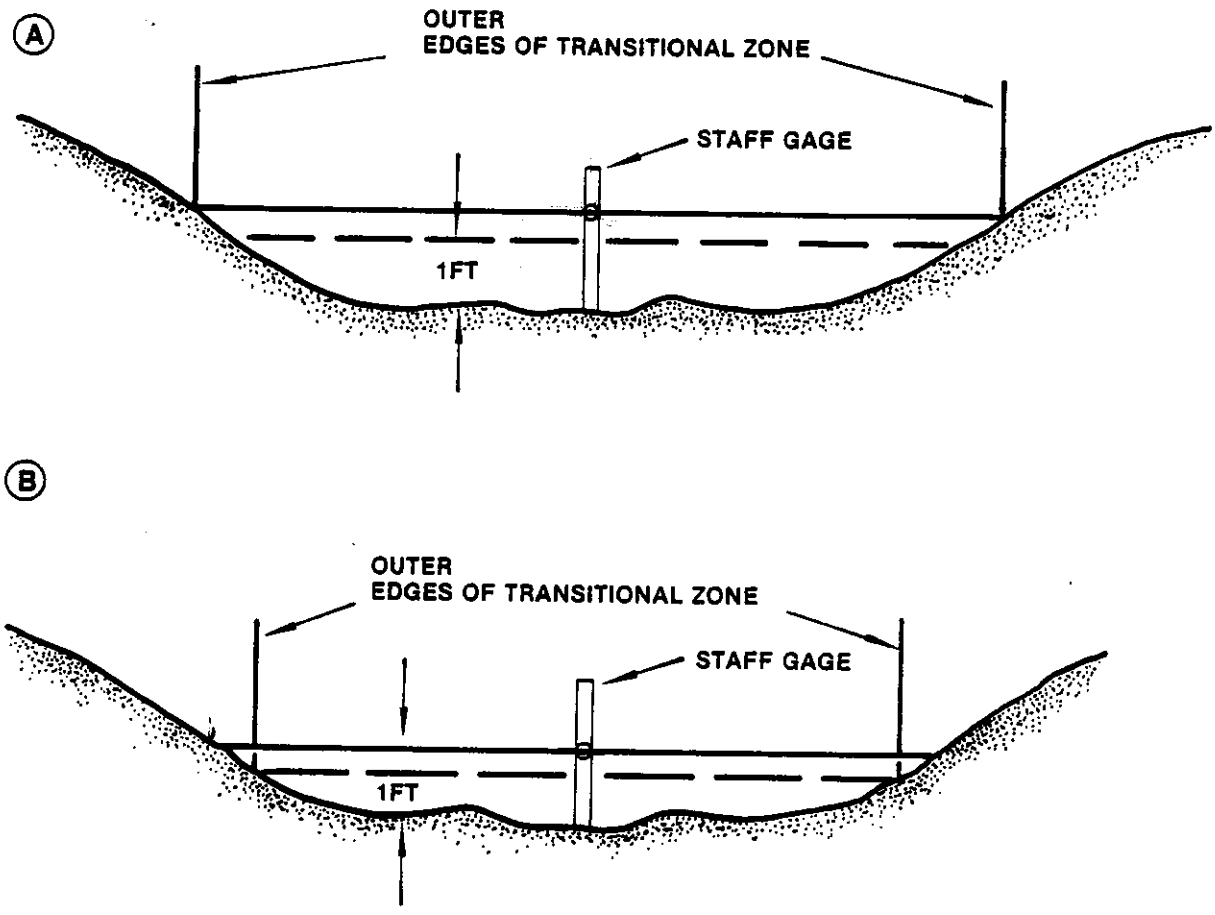
6.1 OPERATION PROGRAM

6.1.1 Normal Conditions

The edges of the cypress strand are the areas most sensitive to impacts resulting from pumping of the shallow aquifer. Any proposed pumping schedules should be designed to maintain the same frequency and duration of ground surface submergence and soil saturation that currently exists. Changes to the frequency or duration of the hydrologic regime will alter the competitive balance between upland and wetland species, permitting pine and Melaleuca to invade the transitional wetland zone, and causing changes in the understory associations as well. However, the depth of submergence may be safely altered in such a way that adverse impacts are eliminated. Maintenance of a minimum depth of water during the wet season such that saturated soil conditions are maintained at the outer edges of the transitional wetland zone or that a minimum depth of 1 ft of water is maintained in the central, wetter areas (whichever is greater) would ensure the continued vitality of the wetland. Water in excess of this level may be considered available for use through withdrawals from the surficial aquifer.

This concept is shown in Figure 6-1. The edges of the transitional zone should be established by an ecologist and the elevations of these points determined by a surveyor. Theoretically, the two edges should be at the same elevation. The surveyor would then determine the average elevation of the center of the wetland. The higher of the two elevations would be used as the control elevation for pumping.

A practical means for implementing the desired control of pumping is to use a reference point equipped with a staff gage as the basis for pumping decisions. When water levels rise above a control elevation, pumping may begin. When water levels recede below this level, pumping should stop. The recommended location for such a control point is at the upstream end of the strand where it enters the well field (see Figure 6-2).



Ⓐ CONTROL ELEVATION IS TRANSITIONAL ZONE ELEVATION

Ⓑ CONTROL ELEVATION IS 1FT ABOVE AVERAGE WETLAND BOTTOM

Figure 6-1
TYPICAL WETLAND CROSS-SECTIONS SHOWING ALTERNATE OPERATIONAL SCENARIOS

SOURCE: ESE, 1986

FLORIDA CITIES WATER COMPANY

gure 6-2
ROPOSED LOCATION OF STAFF GAGE

URCE: FSE, 1985.

FLORIDA CITIES WATER COMPANY

The following steps should be undertaken to establish the operating program:

1. Define the outer edges of the transitional wetlands by a vegetative survey conducted by an ecologist,
2. Determine the elevation of the wetland edges established in Step 1 by surveying,
3. Establish the average ground surface elevation in the wetland and add 1 ft,
4. Install a staff gage, as shown in Figure 6-1, and indicate on the gage the greater of the two elevations determined in Steps 2 and 3,
5. Monitor water levels at the staff gage and begin pumping when water levels exceed the control elevation, and
6. Stop pumping when water levels recede below the control elevation.

Implementation of Steps 1 through 6 described above would ensure proper control and meet the objective of minimizing adverse impacts to the ecology of the area.

Under normal conditions with the assumption of constant head throughout the well field, the period of allowable pumping would correspond to the annual wet season, and the impacts would be those discussed in Section 4.2. Under such conditions, all pumps should be available for use, not just those near the cypress strand. However, due to the variability of rainfall and the resulting water levels, the defined wet season (June to September) should not be used as an inflexible guide to pumping.

6.1.2 Drought Conditions

Periods of lower than average rainfall can occur during the annual dry season. These periods can correspond to periods of high demand from the service area. At such times, it may be necessary to withdraw from the surficial aquifer to maintain a minimum level of service.

Table 6-1 presents an operation schedule showing the effects of pumping several different well combinations in order of increasing impact. One or more of the combinations could be selected for potential implementation under drought conditions. The Hantush (1960) model was used to simulate the drawdown at the cypress slough after 120 days of pumping with the given well combination. Well numbers correspond to those in Figure 6-2, with the initial pumped well being No. 16, in the extreme northeast corner of the well field. Wells are added from east to west, alternating flow rates between 200 gpm and 500 gpm as necessary to minimize drawdown. The maximum total flow rate (Q_T) obtainable without exceeding a calculated drawdown of 1 ft at the slough is 2,000 gpm (combination No. 13).

The maximum allowable impact to the slough is one criterion governing selection of a well combination. For example, if limiting drawdown in the slough at 120 days to 0.5 ft were desired, only combinations up to and including No. 7 should be used. The impacts could be reduced further by initiating the emergency withdrawals with the lowest numbered combination that will meet the demand. If initially only 200 gpm are required for supplemental water, Well 16 could be operated at 200 gpm, and the number of wells and flow rates increased up through combination No. 7 as the demand increases. This would delay the time at which 0.5 ft of drawdown is experienced at the slough.

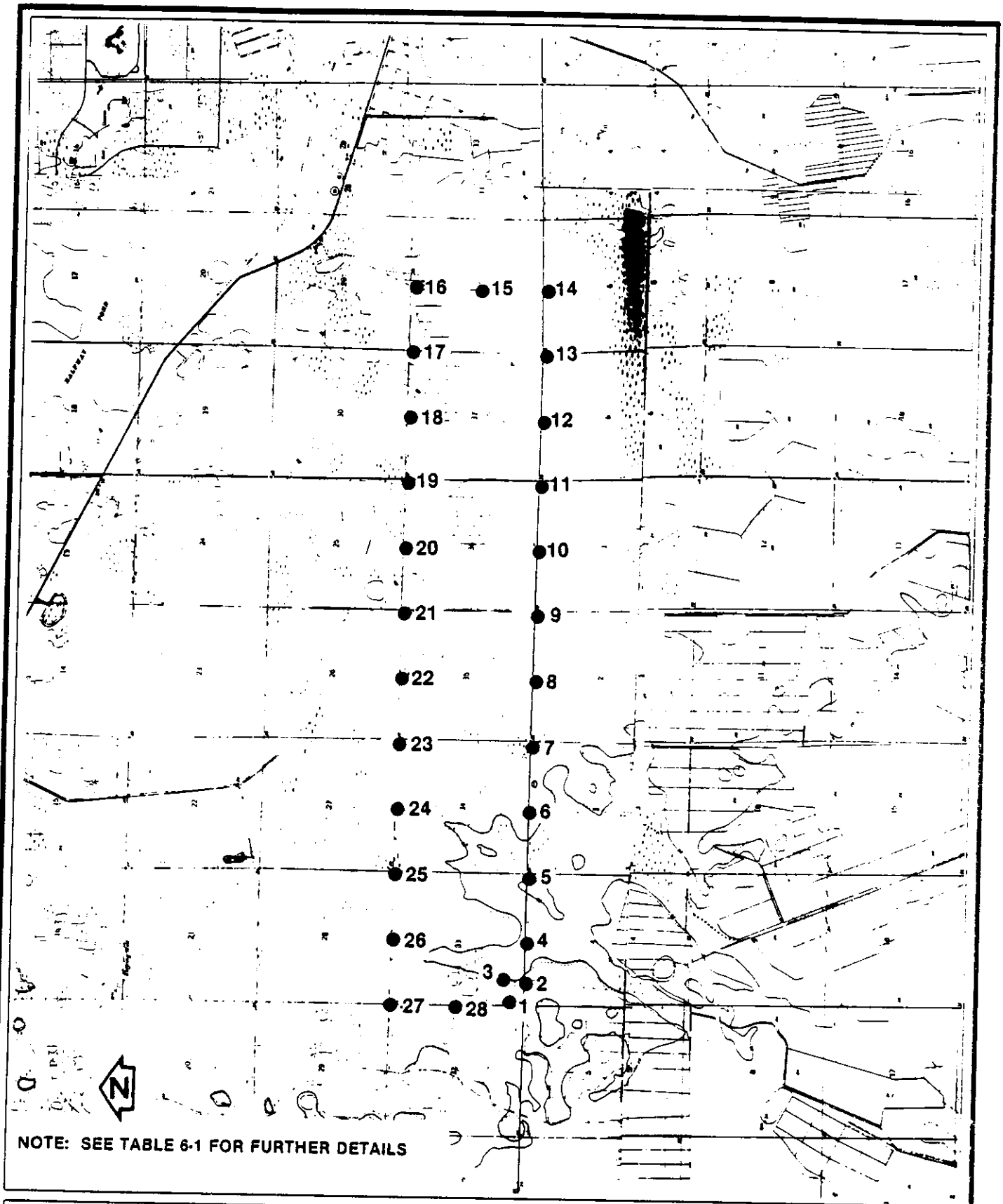
Increased economic efficiency could be obtained by keeping the required number of wells to a minimum. Continuing the previous example, use of only Wells 15 and 16 would allow a 4-stage pumping sequence (combinations No. 1, 2, 3, and 6) while maintaining a drawdown of less than 0.5 ft. Therefore, if well field development is accomplished in stages over a long period of time, initial well placement should begin at the east end of the well field to secure the necessary emergency water source.

Table 6-1. Pumping Combinations and Drawdown at Slough for Drought Conditions After 120 Days

Combination Number	Well(s)	Q_i (gpm)	Q_T (gpm)	s (ft)
1	16	200	200	0.09
2	15, 16	200	400	0.19
3	16	500	500	0.23
4	14-16	200	600	0.28
5	14-17	200	800	0.38
6	15, 16	500	1,000	0.47
7	13-17	200	1,000	0.48
8	13-18	200	1,200	0.58
9	12-18	200	1,400	0.69
10	14-16	500	1,500	0.70
11	12-19	200	1,600	0.80
12	11-19	200	1,800	0.91
13	14-17	500	2,000	0.95

Note: $Q_T = Q_i$ * Number of wells.

Source: ESE, 1985.



NOTE: SEE TABLE 6-1 FOR FURTHER DETAILS

Figure 6-3
WELL LOCATION NUMBERING SYSTEM

SOURCE: ESE, 1985.

FLORIDA CITIES WATER COMPANY

6.2 MONITORING PROGRAM

The monitoring program consists of two parts: (1) monitoring of ecological parameters, and (2) monitoring of the hydroperiod. Use of both ecological and hydrological measures to monitor long-term effects will adequately assure the identification of adverse impacts should any result. Short-term effects on surrounding lands and other water users will be minimized by adherence to the recommended operation program.

6.2.1 Ecological Monitoring

Annual monitoring should be conducted in summer, particularly for the first 5 years of pumping along the permanent transects established for this survey. Any changes in species abundance or composition indicating an invasion of upland species should lead to a re-examination of pumping procedures to reduce the impact of withdrawal on the wetland species.

The nearby wet prairies should also be examined for invasion of pines and other upland species. At the end of 5 years, the results of the annual surveys should be reviewed, along with rainfall records, to indicate whether the weather conditions were typical and to determine if shallow aquifer pumping can be conducted without long-term impact to the overlying and adjacent wetlands.

6.2.2 Hydroperiod Monitoring

Monthly water-level data should continue to be collected at Well L-1999 and added to the stage duration curve shown in Figure 2-13. A long-term downward shift in this curve may indicate a significant impact upon the hydroperiod. For example, currently 70 percent of the time an elevation of approximately 22.5 ft msl is equaled or exceeded. If this were to change due to pumping impacts, the elevation at 70 percent would decrease. However, the stage-duration curve should only be used as a secondary check on the ecological monitoring. This is due to the collection frequency of the stage data, which is monthly rather than daily and, therefore, only a partial duration series. Full series are preferred for duration curves (Linsley, Kohler, and Paulhus, 1958). Therefore, this type of frequency analysis should only be used as a long-term indication of possible impacts.

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APPENDIX A
WATER USE PERMIT

FORM PA-31
REV. 11/79

South Florida
Water Management District
WATER USE PERMIT NO. Re-Issue 36-00150-W

(NON-ASSIGNABLE)

DATE ISSUED: May 13, 1982 EXPIRATION DATE May 13, 1992

AUTHORIZING: THE CONTINUATION OF AN EXISTING USE OF GROUNDWATER FROM THE UPPER HAWTHORN, TAMIAMI ZONE II AND WATER TABLE AQUIFERS FOR PUBLIC WATER SUPPLY WITH AN ANNUAL ALLOCATION OF 3.348 BILLION GALLONS.

LOCATED IN: LEE COUNTY, SECTION -- TWP. 45,46S RGE. 23,24,25E

ISSUED TO: Florida Cities Water Company
South Lee County System
(Cypress Lakes and Green Meadows Wellfields)
P.O. Box 5846
Sarasota, Florida 33579

This Permit is issued pursuant to Application for Permit No. -- dated ---, 19 -- for the Use of Water as specified above and subject to the Special Conditions set forth below. Said application, including all plans and specifications attached thereto, is by reference made a part hereof.

Upon written notice to the permitee, this permit may be temporarily modified, or restricted under a Declaration of Water Shortage or a Declaration of Emergency due to Water Shortage in accordance with provisions of Ch. 373, Fla. Statutes, 1973 and applicable rules and regulations of the South Florida Water Management District.

This Permit may be permanently or temporarily revoked, in whole or in part, for the violation of the conditions of the permit or for the violation of any provision of the Water Resources Act and regulations thereunder.

This Permit does not convey to permittee any property rights nor any privileges other than those specified herein, nor relieve the permittee from complying with any law, regulation, or requirement affecting the rights of other bodies or agencies.

SPECIAL CONDITIONS ARE AS FOLLOWS:

SEE SHEETS 2, 3, 4 AND 5 OF 5 - 28 GROUNDWATER SPECIAL CONDITIONS.

FILED WITH THE CLERK OF THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT
ON 5-17-82
BY [signature]
DEPUTY CLERK

LIMITING CONDITIONS

1. APPLICATION FOR AN ADDITIONAL ALLOCATION OR MODIFICATION MAY BE MADE AT ANY TIME.

2. THIS PERMIT SHALL EXPIRE 10 YEARS FROM THE DATE OF ISSUANCE.

3. MAXIMUM DAY WITHDRAWALS SHALL SATISFY THE FOLLOWING CONDITION:

   A. MAXIMUM DAY WITHDRAWAL SHALL NOT EXCEED 17.03 MGD. MAXIMUM DAY WITHDRAWAL SHALL NOT EXCEED 1.5 MGD FOR THE CYPRESS LAKES WELLFIELD AND 15.53 MGD FOR THE GREEN MEADOWS WELLFIELD.

4. PERMITTEE SHALL SUBMIT TO THE DISTRICT COPIES OF THE MONTHLY D.E.R. WATER TREATMENT PLANT REPORTS.

   THE REPORTS SHALL BE SUBMITTED ON A MONTHLY BASIS FOLLOWING THE MONTH OF RECORD. PERMITTEE SHALL BEGIN SUBMITTING REPORTS IN THE MONTH FOLLOWING THE MONTH OF PERMIT ISSUANCE. REPORTS SHALL BE LEGIBLE, AND THE WATER USE PERMIT NUMBER SHALL BE ATTACHED TO ALL REPORTS.

5. IN THE EVENT OF A DECLARED WATER SHORTAGE, WATER WITHDRAWAL REDUCTIONS SHALL BE MADE AS SPECIFIED BY THE DISTRICT.

6. PERMITTEE SHALL MITIGATE ANY ADVERSE IMPACT CAUSED BY WITHDRAWALS ON LEGAL USES WHICH EXISTED AT THE TIME OF PERMIT APPLICATION. DISTRICT RESERVES THE RIGHT TO CURTAIL FUTURE PUMPAGE RATES IF PUMPAGE CAUSES AN ADVERSE IMPACT ON LEGAL USES OF WATER WHICH EXISTED AT THE TIME OF APPLICATION. ADVERSE IMPACTS ARE EXEMPLIFIED BY BUT NOT LIMITED TO THE FOLLOWING: 1) REDUCTION IN WELL WATER LEVELS RESULTING IN A REDUCTION OF 10% IN THE ABILITY OF AN ADJACENT WELL TO PRODUCE WATER (AN ADJACENT WELL MAY BE A DOMESTIC WELL, LAWN IRRIGATION WELL, PUBLIC WATER SUPPLY WELL, ETC.) 2) SIGNIFICANT REDUCTION IN WATER LEVELS IN AN ADJACENT WATER BODY SUCH AS A LAKE, POND, OR A CANAL SYSTEM, RESULTING IN A SIGNIFICANT IMPAIRMENT OF THE USE OF WATER IN THAT WATER BODY, 3) SALINE WATER INTRUSION OR INDUCTION OF POLLUTANTS INTO THE WATER SUPPLY OF AN ADJACENT WATER USE RESULTING IN A SIGNIFICANT REDUCTION IN WATER QUALITY.

7. PERMITTEE SHALL MITIGATE ANY ADVERSE IMPACT ON-SITE LAND USE WHICH EXISTED AT THE TIME OF APPLICATION, AS A CONSEQUENCE OF WITHDRAWALS PERMITTED HEREIN TO THE SATISFACTION OF THE DISTRICT. THE DISTRICT RESERVES THE RIGHT TO CURTAIL FUTURE PUMPAGE RATES IF INCREASED WITHDRAWALS CAUSE AN ADVERSE IMPACT ON LAND USE WHICH EXISTED AT THE TIME OF APPLICATION. ADVERSE IMPACTS ARE EXEMPLIFIED BY BUT NOT LIMITED TO THE FOLLOWING: 1) SIGNIFICANT REDUCTION IN WATER LEVELS IN AN ADJACENT WATER BODY SUCH AS A LAKE, POND, OR CANAL SYSTEM WHICH IS NOT BEING USED AS A SOURCE OF WATER: 2) LAND COLLAPSE OR SUBSIDENCE CAUSED BY REDUCTION IN WATER LEVELS; 3) DAMAGE TO CROPS AND OTHER TYPES OF VEGETATION, THE ELIMINATION OF WHICH WOULD CAUSE FINANCIAL HARM TO THE LANDOWNER.

8. THE ANNUAL ALLOCATION SPECIFIED HEREIN IS NOT A GUARANTEE EITHER THAT THE WATER IS AVAILABLE OR THAT THE ANNUAL ALLOCATION WILL NOT PRODUCE AN ADVERSE

IMPACT, BUT REPRESENTS THE BEST EVALUATION BY THE DISTRICT STAFF OF AVAILABLE DATA. THE ALLOCATION MAY BE SUBJECT TO CHANGE IF THE RESULTS OF MONITORING ACTIVITIES SPECIFIED HEREIN DEMONSTRATE AN ADVERSE IMPACT OR SIGNIFICANT ADVANCE OF THE SALINE WATER INTERFACE.

9. IF THE PERMITTEE WILL NOT SERVE A NEW DEMAND LOCATED WITHIN THE SERVICE AREA FOR WHICH THE ANNUAL ALLOCATION WAS CALCULATED, THE ANNUAL ALLOCATION MAY BE SUBJECT TO MODIFICATION.

10. ONE MONTH PRIOR TO NEW WELL CONSTRUCTION, PERMITTEE SHALL SUBMIT TO THE DISTRICT FOR APPROVAL ALL OF THE FOLLOWING ITEMS FOR EACH PROPOSED WELL: PROPOSED DEPTH OF WELL, PROPOSED DEPTH OF CASING, LOCATION OF OTHER WELLS WITHIN 300' OF PROPOSED SITE, MAP OF PROPOSED SITE, INSTALLED CAPACITY, EVALUATION OF IMPACT OF WITHDRAWALS FROM THE SITE ON EXISTING USES AND LOCATION OF ALL SOURCES OF POLLUTION WITHIN 500' (EXCLUDING SEPTIC TANKS FOR SINGLE FAMILY DWELLINGS).

11. PERMITTEE SHALL PERFORM SPECIFIC CAPACITY TESTS ON ALL NEW WELLS WITHIN ONE MONTH OF CONSTRUCTION. THESE DATA SHALL BE SUBMITTED TO THE DISTRICT WITHIN ONE MONTH. PERMITTEE SHALL SUBMIT THE PUMPING RATE, DURATION OF THE TEST AND THE DRAWDOWN AT THE END OF THE TEST.

12. NEW WELL CONSTRUCTION OR MODIFICATION OF EXISTING WELLS SHALL BE PERFORMED PER FAC 17-21 AND 17-22. NEW WELL OR MODIFICATIONS OF EXISTING WELLS SHALL BE UNDER THE DIRECTION AND UNDER THE SUPERVISION OF A WATER WELL CONTRACTOR LICENSED BY THE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION. PERMITTEE SHALL OBTAIN A DER WELL CONSTRUCTION PERMIT PRIOR TO CONSTRUCTING A WELL.

13. THE DISTRICT AND THE DEPARTMENT OF ENVIRONMENTAL REGULATION SHALL BE NOTIFIED AT LEAST 5 DAYS PRIOR TO THE CONSTRUCTION OF PROPOSED WELLS.

14. PERMITTEE SHALL SUPPLY THE FLORIDA BUREAU OF GEOLOGY AND THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT WITH DRILL CUTTINGS FROM ANY NEW WELLS. THE CUTTINGS SHALL BE COLLECTED EVERY FIVE FEET OR EVERY FORMATION CHANGE, WHICHEVER COMES FIRST. SAMPLE BAGS SHALL BE PROVIDED BY THE PERMITTEE. ONE WELL SHALL BE RESISTIVITY AND GAMMA-RAY LOGGED IF THE WELL IS CONSTRUCTED USING MUD-ROTARY TECHNIQUE AND ONLY GAMMA-RAY LOGGED IF THE WELL IS CONSTRUCTED BY ANY OTHER METHOD. LOGS AND LOCATION MAPS OF THE WELL SHALL BE SENT TO BOTH THE DISTRICT AND THE BUREAU OF GEOLOGY WITHIN ONE MONTH OF THE DATE OF CONSTRUCTION. CUTTINGS SENT TO THE DISTRICT SHOULD BE SENT TO: WATER USE DIVISION, RESOURCE CONTROL DEPARTMENT; SFWMD, P.O. BOX "V", W. PALM BEACH, FLORIDA 33402. THE ADDRESS OF THE FLORIDA BUREAU OF GEOLOGY IS AS FOLLOWS: FLORIDA BUREAU OF GEOLOGY, 903 W. TENNESSEE, TALLAHASSEE, FLORIDA 32304.

15. A DRILLER'S WELL COMPLETION REPORT FOR NEW OR MODIFIED WELLS SHALL BE PROVIDED TO THE DISTRICT WITHIN ONE MONTH OF DATE OF WELL CONSTRUCTION OF MODIFICATION.

16. SOURCE CLASSIFICATION IS GROUNDWATER FROM THE TAMIAMI (LEHIGH ACRES SANDSTONE) AQUIFER, UPPER HAWTHORN AQUIFER, AND SURFICIAL AQUIFER.

17. USE CLASSIFICATION IS PUBLIC SUPPLY.

18. THE DIRECTOR OF THE RESOURCE CONTROL DEPARTMENT OR HIS AUTHORIZED REPRESENTATIVES SHALL BE PERMITTED TO ENTER, INSPECT AND OBSERVE THE PUBLIC WATER

SYSTEM UPON DISTRICT STAFF IDENTIFICATION IN ORDER TO DETERMINE COMPLIANCE WITH SPECIAL CONDITIONS.

19. PERMITTEE SHALL NOTIFY THE DISTRICT OF ANY CHANGE IN SERVICE TERRITORY OR AREA WITHIN 30 DAYS OF THE CHANGE IN BOUNDARY.

20. PERMITTEE SHALL DETERMINE "UNACCOUNTED FOR" DISTRIBUTION SYSTEM LOSSES IF THE PERMITTEE DISTRIBUTES WATER WITHIN ONE MILE OF SURFACE SALINE WATER. LOSSES SHALL BE DETERMINED FOR THE ENTIRE DISTRIBUTION SYSTEM ON A MONTHLY BASIS. PERMITTEE SHALL DEFINE THE MANNER IN WHICH "UNACCOUNTED FOR" LOSSES ARE CALCULATED. DATA COLLECTION SHALL BEGIN WITHIN SIX MONTHS OF PERMIT ISSUANCE. LOSSES SHALL BE SUBMITTED TO THE DISTRICT ON A YEARLY BASIS FROM THE DATE OF PERMIT ISSUANCE WITH NO DATA SUBMITTED MORE THAN ONE MONTH AFTER EXPIRATION OF THE ONE YEAR PERIOD.

21. IF ANY CONDITIONS OF THIS PERMIT ARE VIOLATED, THE PERMIT SHALL BE SUBJECT TO REVIEW AND POSSIBLE REVOCATION AND MODIFICATION, OR ENFORCEMENT ACTION.

22. PERMITTEE SHALL RECORD PUMPING VOLUMES FROM EACH OF THE GREEN MEADOWS WELLS ON A MONTHLY BASIS. THE RECORDED DATA SHALL BE SUBMITTED TO THE DISTRICT EVERY MONTH STARTING THE MONTH FOLLOWING PERMIT ISSUANCE.

23. PERMITTEE SHALL RECORD DAILY RAINFALL AT THE GREEN MEADOWS WATER TREATMENT PLANT SITE. THE RECORDED DATA SHALL BE SUBMITTED TO THE DISTRICT EVERY MONTH STARTING THE MONTH FOLLOWING PERMIT ISSUANCE.

24. PERMITTEE SHALL LIMIT ANNUAL WITHDRAWALS FROM THE CYPRESS LAKES WELLFIELD TO 0.55 BGY (1.5 MGD) AND ANNUAL WITHDRAWALS FROM THE GREEN MEADOWS WELLFIELD TO 2.898 BGY (7.67 MGD). WITHDRAWALS AT GREEN MEADOWS SHALL BE MADE FROM THE TAMIAMI ZONE II AQUIFER AND SURFICIAL AQUIFER; HOWEVER, WITHDRAWALS FROM TAMIAMI ZONE II AQUIFER SHALL NOT EXCEED 6.0 MGD ON AN AVERAGE DAY BASIS, AND WITHDRAWALS FROM THE SURFICIAL AQUIFER SHALL NOT EXCEED 4.0 MGD ON AN AVERAGE DAY BASIS. PERMITTEE SHALL PROVIDE METERING IN ORDER TO BE ABLE TO TABULATE WITHDRAWALS FROM TAMIAMI ZONE II AND SURFICIAL AQUIFERS SEPARATELY.

25. WITHIN TWO YEARS OF PERMIT ISSUANCE, PERMITTEE SHALL CONDUCT AN ENVIRONMENTAL IMPACT ASSESSMENT OF WITHDRAWALS FROM THE SURFICIAL AQUIFER ON CYPRESS AREAS IN THE GREEN MEADOWS WELLFIELD AREA. THE ASSESSMENT SHALL DETERMINE THE BACKGROUND HYDROPERIOD OF THE AREAS, THE DEGREE TO WHICH THE CYPRESS AREAS ARE INTERCONNECTED HYDROLOGICALLY WITH THE SURFICIAL AQUIFER, AND POTENTIAL IMPACTS RESULTING FROM WITHDRAWALS. THE ASSESSMENT SHALL ALSO RECOMMEND A MONITORING PROGRAM FOR EVALUATING IMPACT, AND A WELLFIELD OPERATING PROGRAM FOR SURFICIAL AQUIFER WELLS TO MINIMIZE OR OFFSET ADVERSE IMPACT. PERMITTEE SHALL SUBMIT A PROPOSAL TO THE DISTRICT OUTLINING THE METHOD AND SCOPE OF THE ASSESSMENT WITHIN THREE MONTHS OF PERMIT ISSUANCE.

26. WITHIN ONE YEAR OF PERMIT ISSUANCE, PERMITTEE SHALL PERFORM AN AQUIFER PERFORMANCE TEST OF THE SURFICIAL AQUIFER AT THE GREEN MEADOWS WELLFIELD. PERMITTEE SHALL SUBMIT A PRELIMINARY PROPOSAL FOR THE TEST PROGRAM TO THE DISTRICT WITHIN SIX MONTHS OF PERMIT ISSUANCE.

27. PERMITTEE SHALL DEVELOP A PERFORMANCE MONITORING PROGRAM FOR THE GREEN MEADOWS WELLFIELD. THE PURPOSE OF THE PROGRAM SHALL BE TO DETERMINE THE EFFECT OF WITHDRAWALS FROM BOTH THE TAMIAMI ZONE II AND WATER TABLE AQUIFERS ON REGIONAL HYDROLOGY, AND TO FURNISH THE DISTRICT WITH SUITABLE INFORMATION TO USE IN EVALUATING FUTURE REQUESTS FOR INCREASES IN ALLOCATION IN SUPPORT OF FUTURE AQUIFER TESTING.

28. PERMITTEE SHALL CONTINUE TO IMPLEMENT THE EXISTING SALT WATER INTRUSION MONITORING AND MANAGEMENT PROGRAM AT THE CYPRESS LAKES WELLFIELD, AND THE MULTI-DEPTH POTENTIOMETRIC HEAD MONITORING PROGRAM AT GREEN MEADOWS WELLFIELD.

APPENDIX B
WELL LOGS

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

WELL COMPLETION REPORT

TYPE OF WORK: [x] New Construction [ ] Repair [ ] Deepening [ ] Plugging [ ] Other _____

PERMIT NUMBER: 1436

WELL NUMBER: #4

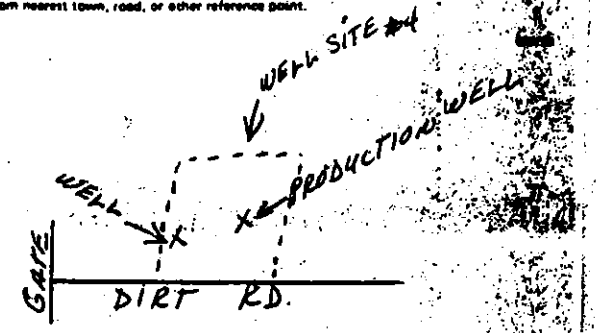
OWNER: FLA CITIES WATER CO.
Last Name First Name Initial
[ ] Number Street
SARASOTA FL
City State
Area Code Phone Number Zip Code

TYPE OF WELL: [x] Water Well [ ] Test Well [ ] Recharge [ ] Observation [ ] Waste Disposal [ ] Other _____

USE: [ ] Domestic [ ] Irrigation [ ] Industrial [ ] Commercial [ ] Public Supply [x] Other: Test Production Well

WELL LOCATION: ¼ ¼ ¼ of Section _____ Township [ ] (N-S) Range [ ] (E-W)
Latitude Deg. Min. Sec. N
Longitude Deg. Min. Sec. W
Lot No. Subdivision
Address in Section
Number Street/Road
GRAN MEADOW
City County

SKETCH LOCATION OF WELL in relation to local landmarks, giving direction and distance from nearest town, road, or other reference point.



OWNER WELL NUMBER OR NAME: [ ]

DRILL METHOD: [x] Rotary [ ] Cable Tool [ ] Jet [ ] Auger [ ] Other: _____

SURFACE CASING, CASING, AND LINER MATERIAL:

Steel Dia. (In.) Black	Galv.	S. Steel	Steel Wt. lbs /ft.)	Dia. (In.) PVC	Other	From (Ft.)	To (Ft.)	Schedule No.	Joints*
		10				44	20	40	W
		18	SURFACE CASING			41	23		

* Describe Material: _____
* TC = Threaded and Coupled, TCW = Threaded, Coupled, and Welded, W = Welded, S = Sanded (PVC), O = Other: _____

GROUT: [ ] None [x] Neat Cement [ ] Other _____

Type and Percent of Additives and Grout Volume or Number of 94 lb. Sacks

	From (Ft.)	To (Ft.)
FOR SURFACE CASING 5 BAGS	0	23

FINISH: [x] Open Hole [ ] Perforated or Slotted Casing [ ] Gravel Pack [x] Sandpoint or Screen Attached to Well Casing [ ] Sandpoint or Screen Telescoped with Packer Inside Casing (Packer Material: _____)

Sandpoint/Screen Material	Dia. (In.)	Slot Size (In.)	From (Ft.)	To (Ft.)
STAINLESS STEEL 40'	10	.060	20	60

[ ] Other Finish: _____

QUALITY TEST: [ ] None [ ] Bacteria _____ Date [x] Chemical _____ Date
By: [ ] Health Dept. [ ] USGS [x] Other Driller
[x] Clear [ ] Colored [x] Sulphur [ ] Salty [ ] Iron [ ] Other _____
Conductance (Micromhos) [ ] [ ] [ ] [ ] [ ] [ ] UA Chloride [ ] [ ] [ ] [ ] 1510 ppm
Hardness [ ] [ ] [ ] [ ] ppm as calcium carbonate pH [ ] [ ] Temp [ ] [ ] °F
Well Disinfected: [ ] No [ ] Yes _____ (Date)

WELL TEST, by: [ ] Natural Flow 1500 G.P.M. [x] Airlift [ ] Bailer [ ] Permanent Pump [ ] Test Pump [ ] None
Discharge Measured By: [ ] Bailer [x] Estimated [ ] Current Meter [ ] Orifice [ ] Trajectory [ ] Weirs [x] Volumetric [ ] Other _____
Measured Static Water Level [ ] + [-] - [ ] [ ] [5] Ft.
Measured Pumping Water Level [ ] + [ ] - [ ] [ ] [ ] Ft.
After [ ] [ ] Hours At [ ] [ ] [ ] [ ] G.P.M.
Specific Capacity [ ] [ ] [ ] [ ] G.P.M./Ft. of Drawdown
Measuring Pt. (Describe): _____
Elevation is [ ] [ ] [ ] Ft. [ ] Above [ ] Below Land Surface
Elevation of Measuring Pt. = [ ] [ ] [ ] Ft. [ ] Above [ ] Below MSL

WELL EQUIPMENT: [ ] Open [ ] Cased [ ] Valved [ ] Permanent Pump [ ] Temporary Pump
Type Pump: [ ] Centrifugal [ ] Cylinder [ ] Jet [ ] Submersible [ ] Turbine [ ] Other _____
Power: [ ] Diesel [ ] Electric [ ] Gasoline [ ] Other _____
Horsepower [ ] [ ] [ ] [ ] Capacity [ ] [ ] [ ] [ ] [ ] G.P.M.
Intake/Injection Depth [ ] [ ] [ ] [ ] Ft.

WELL LOG

Bore Hole (In.)	Casing Size (In.)	Depth (Ft.) From	Depth (Ft.) To	Examine cuttings at 20 ft. or smaller intervals and log changes. Give color, grain size/kind, hard or soft material. Note any caving. Indicate presence of fossils. Attach additional sheets if necessary.
23½	18	0	19	SAND
		19	23	HARD WHITE LIMESTONE
				SET & CEMENTED 18" SURFACE CASING
17"	10	23	27	GRAY & WHITE LIMESTONE
		27	57	WATER LOSS WHILE DRILLING
		57	65	MARLY WHITE LIMESTONE

Total Depth [ ] [ ] 60 Ft. Producing Zone Material: [ ] Sand [ ] Shell [ ] Broken Shell [x] Limestone [ ] Other: _____
Top of Producing Zone [ ] [ ] 24 Ft., Bottom of Producing Zone [ ] [ ] 60 Ft.
[ ] Drill Cuttings Sent to Bureau of Geology

A060 — License No.
Water Well Contractor's Signature
Address
5 13 — Completion Date
Driller Signature

FDER Form 17-1.21(2) Effective November 30, 1982

ESE ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

Job No. 83505

Client FLORIDA CITIES WATER COMPANY

Project GREEN MEADOWS WELLFIELD

Location of Boring:	
Water Level	
Time	
Date	

Boring No MW-1 Date 10 JAN 84 Sheet ___ of ___

Type of Boring _____ Rig _____

Casing used _____ Size _____ Drilling mud used _____

Boring begun _____ Boring completed _____

Ground Elevation _____ referred to _____ Datum

Field Party: _____

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Blows/foot on Sampler	Well Construct	Soil Graph	DEPTH IN FEET		DESCRIPTION Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
				7' STEEL		0	2'	WOOD, MUCK & ORGANIC DEBRIS
						5	5'	BR-TAN MED/FINE SAND W/SHELL
				13' SOLID		10	10'	TAN SAND W/SHELL
						15		
						20	19'	HARD WHITE LIMEROCK
							21	ROCK HARD W/ POCKETS OF SAND & SHELL
						25		
						30		
				39' SCREEN		35		
						40	39	LOST PARTIAL CIRCULATION
						45	44	} LOST ALL CIRCULATION
						50	51	
						55		} CIRC. ON AND OFF
						60	62	GREEN SOFT CLAY
						65		DRILLED TO 65'

Geologist _____

ESE ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

Job No. 83505

Client FLORIDA CITIES WATER COMPANY

Project GREEN MEADOWS WELLFIELD

Location of Boring:	
Water Level	
Time	
Date	

Boring No. MW-2 Date 11 JAN 84 Sheet ___ of ___

Type of Boring _____ Rig _____

Casing used _____ Size _____ Drilling mud used _____

Boring begun _____ Boring completed _____

Ground Elevation _____ referred to _____ Datum

Field Party: _____

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Blows/foot on Sampler	Well Construct	Soil Graph	DEPTH IN FEET		DESCRIPTION Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
				7' STEEL 12' SOLID 39' SCREEN		0 5 10 15 20 25 30 35 40 45 50 55 60 65	2' 5' 20' 25' 35' 40' 45' 62'	TAN BROWN SAND - MUCK - WOOD TAN MED SAND LIMEROCK - HARD WHITE HARD WHITE LIMEROCK W/SAND. SLIGHT LOSS OF WATER IN FORMATION AT TOP. SOME SHELL W/ROCK. LOST CIRCULATION SCATTERED RETURNS AFTER EASIER DRILLING EASY DRILLING - SANDY LIMEROCK - SCATTERED WATER RETURN SWITCHED TO AIR FOR DRILLING - WELL IS PRODUCING LOTS OF WATER. SOFT GREEN CLAY DRILLED TO 65'

Geologist

ESE ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

Job No. 83505

Client FLORIDA CITIES WATER COMPANY

Project GREEN MEADOWS WELLFIELD

Location of Boring:	
Water Level	
Time	
Date	

Boring No. MW-3 Date 13 JAN 84 Sheet ___ of ___

Type of Boring _____ Rig _____

Casing used _____ Size _____ Drilling mud used _____

Boring begun _____ Boring completed _____

Ground Elevation _____ referred to _____ Datum

Field Party: _____

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Blows/foot on Sampler	Well Construct	Soil Graph	DEPTH IN FEET		DESCRIPTION Soil type, color, texture, consistency, sampler driving notes, blows per foot on casing, depths wash water lost, observed fluctuations in water level, notes on drilling ease, etc.
				7' STEEL		0	2'	TAN-BROWN MED SAND W/ SHELL
						5		
				13' SOLID		10		
						15	17'	HARD WHITE LIMEROCK
				39' SCREEN		20		HARD LIMEROCK W/ SHELL & SAND
						25		
						30		
						35	35'	LOST CIRCULATION
						40	37'	SCATTERED WATER RETURN - SANDY LIMEROCK DRILLING EASIER
						45	45'	SWITCHING TO AIR ROTARY
						50		
						55		
						60	60'	GREEN SOFT CLAY
						65		DRILLED TO 65'

Geologist

ESE ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.

Job No. 83505

Client FLORIDA CITIES WATER COMPANY
Project GREEN MEADOWS WELL FIELD

Location of Boring:	
Water Level	
Time	
Date	

Boring No MW-4 Date 16 JAN 84 Sheet ___ of ___
Type of Boring _____ Rig _____
Casing used _____ Size _____ Drilling mud used _____
Boring begun _____ Boring completed _____
Ground Elevation _____ referred to _____ Datum
Field Party: _____

Depth of Casing, ft.	Sample No.	Sample depth from-to (in feet)	Blows/foot on Sampler	Well Construct	Soil Graph	DEPTH IN FEET		DESCRIPTION
				8' STEEL		0	2'	TAN / YELLOW BROWN SAND W SAND
						5	7'	TAN SAND W/ SHELL AND SAND
				12' SOLID		10		
						15		
				—		20	19'	WHITE LIMEROCK
				39' SCREEN		25		
						30	28'	ROCK SOFTER - MORE SAND WATER CIRC. IS SCATTERED
						35		
						40		
						45	45'	SWITCHED TO AIR
						50		
						55		
						60	59'	CLAY
						65		DRILLED TO 65'

Geologist

APPENDIX C
STEP DRAWDOWN TEST DATA TABLES

STEP DRAWDOWN TEST

PROJECT #83E[illegible]
PAGE #1

WELL NUMBER : SPZ4
INITIAL PRESSURE : 6.67 PSI
NUMBER OF STEPS : 4
FLOW RATE(1) : 450 GPM
FLOW RATE(2) : 750 GPM
FLOW RATE(3) : 900 GPM
FLOW RATE(4) : 1[illegible]00 GPM

TEST STARTING DATE : MAR 21, 1984 TIME : 13:1[illegible]:00

DATE	TIME	ELAPSED TIME, T (MINUTES)	PRESSURE (PSI)
(STEP ONE)			
03/21/1984	13:12:00	2.00	5.2700
03/21/1984	13:18:00	8.00	5.3200
03/21/1984	13:22:00	12.00	5.18[illegible]
03/21/1984	13:23:00	13.00	6.67[illegible]
03/21/1984	13:23:20	13.33	6.46[illegible]
03/21/1984	13:23:40	13.67	6.57[illegible]
03/21/1984	13:24:00	14.00	6.61[illegible]
03/21/1984	13:24:10	14.17	6.6300
03/21/1984	13:24:20	14.33	6.65[illegible]
03/21/1984	13:24:30	14.50	6.6600
03/21/1984	13:24:40	14.67	6.6700
03/21/1984	13:24:50	14.83	6.6700
03/21/1984	13:25:00	15.00	6.66[illegible]
03/21/1984	13:25:20	15.33	6.6600
03/21/1984	13:25:40	15.67	6.63[illegible]
03/21/1984	13:29:[illegible]	19.[illegible]	6.65[illegible]
03/21/1984	13:29:15	19.25	6.66[illegible]
03/21/1984	13:29:30	19.50	6.66[illegible]
3/21/1984	13:29:45	19.75	6.66.[illegible]
(STEP TWO)			
03/21/1984	13:30:[illegible]	20.00	5.68[illegible]
03/21/1984	13:30:10	20.17	4.29[illegible]
03/21/1984	13:30:20	20.33	4.55[illegible]
03/21/1984	13:30:30	20.5[illegible]	4.43[illegible]
03/21/1984	13:30:40	20.67	4.56[illegible]
03/21/1984	13:30:50	20.83	4.51[illegible]
03/21/1984	13:31:00	21.00	4.55[illegible]
3/21/1984	13:31:10	21.17	4.55[illegible]
03/21/1984	13:31:20	21.33	4.55[illegible]
3/21/1984	13:31:30	21.5[illegible]	4.47[illegible]
03/21/1984	13:31:40	21.67	4.4[illegible]

STEP DRAWDOWN TEST

PROJECT #8355
PAGE #02

WELL NUMBER : SP24
INITIAL PRESSURE : 6.67 PSI
NUMBER OF STEPS : 4
FLOW RATE(1) : 490 GPM
FLOW RATE(2) : 750 GPM
FLOW RATE(3) : 900 GPM
FLOW RATE(4) : 1000 GPM

TEST STARTING DATE : MAR 21, 1984 TIME : 13:10:00

DATE	TIME	ELAPSED TIME, T (MINUTES)	PRESSURE (PSI)
03/21/1984	13:31:50	21.83	4.4800
03/21/1984	13:32:00	22.00	4.5100
03/21/1984	13:32:10	22.17	4.5100
03/21/1984	13:32:20	22.33	4.4700
03/21/1984	13:32:30	22.50	4.4600
03/21/1984	13:32:40	22.67	4.5100
03/21/1984	13:32:50	22.83	4.3500
03/21/1984	13:33:00	23.00	4.2800
03/21/1984	13:33:10	23.17	4.3900
03/21/1984	13:33:20	23.33	4.3700
03/21/1984	13:33:30	23.50	4.3200
03/21/1984	13:33:40	23.67	4.2500
03/21/1984	13:33:50	23.83	4.3900
03/21/1984	13:34:00	24.00	4.3000
03/21/1984	13:34:10	24.17	4.2100
03/21/1984	13:34:20	24.33	4.4000
03/21/1984	13:34:30	24.50	4.3200
03/21/1984	13:34:40	24.67	4.3600
03/21/1984	13:34:50	24.83	4.2500
03/21/1984	13:35:00	25.00	4.3300
03/21/1984	13:35:30	25.50	4.1500
03/21/1984	13:45:00	35.00	4.0500
03/21/1984	14:07:00	57.00	4.1800
03/21/1984	14:08:00	58.00	4.1800
03/21/1984	14:08:10	58.17	6.2000
03/21/1984	14:08:20	58.33	4.1800
03/21/1984	14:08:30	58.50	4.2700
03/21/1984	14:08:40	58.67	6.3200
03/21/1984	14:08:50	58.83	4.3500
03/21/1984	14:09:00	59.00	4.3700
03/21/1984	14:09:10	59.17	4.4000
03/21/1984	14:09:20	59.33	6.4200
03/21/1984	14:09:30	59.50	6.4200
03/21/1984	14:09:40	59.67	6.4300

STEP DRAWDOWN TEST

PROJECT #83515
PAGE #03

WELL NUMBER : SP74
INITIAL PRESSURE : 6.67 PSI
NUMBER OF STEPS : 4
FLOW RATE(1) : 490 GPM
FLOW RATE(2) : 750 GPM
FLOW RATE(3) : 900 GPM
FLOW RATE(4) : 1000 GPM

TEST STARTING DATE : MAR 21, 1984 TIME : 13:10:30

DATE	TIME	ELAPSED TIME, T (MINUTES)	PRESSURE (PSI)
03/21/1984	14:09:50	59.83	6.4600
03/21/1984	14:10:00	60.00	6.4600
03/21/1984	14:10:10	60.17	6.4700
03/21/1984	14:10:20	60.33	6.4800
03/21/1984	14:10:30	60.50	6.5000
03/21/1984	14:10:40	60.67	6.5000
03/21/1984	14:10:50	60.83	6.5000
03/21/1984	14:11:00	61.00	6.5000
03/21/1984	14:11:10	61.17	6.4800
03/21/1984	14:11:20	61.33	6.4700
03/21/1984	14:11:30	61.50	6.4600
03/21/1984	14:11:40	61.67	6.4700
03/21/1984	14:11:50	61.83	6.4800
03/21/1984	14:12:00	62.00	6.4800
03/21/1984	14:12:10	62.17	6.4700
03/21/1984	14:12:20	62.33	6.4600
03/21/1984	14:12:30	62.50	6.4600
03/21/1984	14:12:40	62.67	6.4600
03/21/1984	14:12:50	62.83	6.4700
03/21/1984	14:13:00	63.00	6.4800
03/21/1984	14:13:10	63.17	6.4800
03/21/1984	14:13:20	63.33	6.4800
03/21/1984	14:13:30	63.50	6.4800
03/21/1984	14:13:40	63.67	6.4700
03/21/1984	14:13:50	63.83	6.4800
03/21/1984	14:14:00	64.00	6.4800
03/21/1984	14:14:10	64.17	6.4800
03/21/1984	14:14:20	64.33	6.4800
03/21/1984	14:14:30	64.50	6.4700
03/21/1984	14:14:40	64.67	6.4700
03/21/1984	14:14:50	64.83	6.4700
03/21/1984	14:15:00	65.00	6.4700
03/21/1984	14:15:10	65.17	6.4700
03/21/1984	14:15:20	65.33	6.4700

STEP DRAWDOWN TEST

PROJECT #83[illegible]5
PAGE #04

WELL NUMBER : SF74
INITIAL PRESSURE : 6.67 PSI
NUMBER OF STEPS : 4
FLOW RATE(1) : 490 GPM
FLOW RATE(2) : 750 GPM
FLOW RATE(3) : [illegible] GPM
FLOW RATE(4) : 1[illegible]0 GPM

TEST STARTING DATE : MAR 21, 1984 TIME : 13:1[illegible]:0[illegible]

DATE	TIME	ELAPSED TIME, T (MINUTES)	PRESSURE (PSI)
03/21/1984	14:15:30	65.50	6.4700
03/21/1984	14:15:40	65.67	6.4600
03/21/1984	14:15:50	65.83	6.4500
03/21/1984	14:16:00	66.00	6.4500
03/21/1984	14:16:10	66.17	6.4500
03/21/1984	14:16:20	66.33	6.4600
03/21/1984	14:16:30	66.50	6.4700
03/21/1984	14:16:40	66.67	6.4800
03/21/1984	14:16:50	66.83	6.5000
03/21/1984	14:17:00	67.00	6.5000
03/21/1984	14:17:10	67.17	6.5000
03/21/1984	14:17:20	67.33	6.5000
03/21/1984	14:17:30	67.50	6.5100
03/21/1984	14:17:40	67.67	6.5200
03/21/1984	14:30:00	80.00	6.5200
03/21/1984	14:30:15	80.25	6.5000
03/21/1984	14:30:30	80.50	6.6000
03/21/1984	14:30:45	80.75	6.5900
(STEP THREE)			
03/21/1984	14:33:00	83.00	3.9200
03/21/1984	14:33:20	83.33	4.0100
03/21/1984	14:33:40	83.67	3.7700
03/21/1984	14:34:00	84.00	3.7200
03/21/1984	14:34:10	84.17	3.7100
03/21/1984	14:34:20	84.33	3.6600
03/21/1984	14:34:30	84.50	3.5700
03/21/1984	14:34:40	84.67	3.4900
03/21/1984	14:34:50	84.83	3.5200
03/21/1984	14:35:00	85.00	3.3700
03/21/1984	14:35:10	85.17	3.7100
03/21/1984	14:35:20	85.33	3.4100
03/21/1984	14:35:30	85.50	3.4200
03/21/1984	14:35:40	85.67	3.4100

STEP DRAWDOWN TEST

PROJECT #8355
PAGE #05

WELL NUMBER : SPZ4
INITIAL PRESSURE : 6.67 PSI
NUMBER OF STEPS : 4
FLOW RATE(1) : 490 GPM
FLOW RATE(2) : 750 GPM
FLOW RATE(3) : 900 GPM
FLOW RATE(4) : 1000 GPM

TEST STARTING DATE : MAR 21, 1984 TIME : 13:1?:0?

DATE	TIME	ELAPSED TIME, T (MINUTES)	PRESSURE (PSI)
03/21/1984	14:35:50	85.83	3.48?0
03/21/1984	14:36:00	86.00	3.43?0
03/21/1984	14:36:10	86.17	3.67?0
03/21/1984	14:36:20	86.33	3.40?0
03/21/1984	14:36:30	86.50	3.33?0
03/21/1984	14:36:40	86.67	3.35?0
03/21/1984	14:36:50	86.83	3.36?0
03/21/1984	14:37:00	87.00	3.55?0
03/21/1984	14:37:10	87.17	3.36?0
03/21/1984	14:37:20	87.33	3.41?0
03/21/1984	14:37:30	87.50	3.53?0
03/21/1984	14:37:40	87.67	3.28?0
03/21/1984	14:37:50	87.83	3.43?0
03/21/1984	14:38:00	88.00	3.22?0
03/21/1984	14:38:10	88.17	3.36?0
03/21/1984	14:38:20	88.33	3.28?0
03/21/1984	14:38:30	88.50	3.35?0
03/21/1984	14:38:40	88.67	3.36?0
03/21/1984	15:32:00	142.00	6.29?0
03/21/1984	15:33:00	143.00	6.27?0
03/21/1984	15:33:10	143.17	6.21?0
03/21/1984	15:33:20	143.33	6.26?0
03/21/1984	15:33:30	143.50	6.30?0
03/21/1984	15:33:40	143.67	6.32?0
03/21/1984	15:33:50	143.83	6.35?0
03/21/1984	15:34:00	144.00	6.37?0
03/21/1984	15:34:10	144.17	6.37?0
03/21/1984	15:34:20	144.33	6.40?0
03/21/1984	15:34:30	144.50	6.31?0
03/21/1984	15:34:40	144.67	6.36?0
03/21/1984	15:34:50	144.83	6.34?0
03/21/1984	15:35:00	145.00	6.37?0
03/21/1984	15:35:10	145.17	6.39?0
03/21/1984	15:35:20	145.33	6.34?0

STEP DRAWDOWN TEST

PROJECT #835[illegible]
PAGE #[illegible]

WELL NUMBER : SP74
INITIAL PRESSURE : 6.67 PSI
NUMBER OF STEPS : 4
FLOW RATE(1) : 490 GPM
FLOW RATE(2) : 750 GPM
FLOW RATE(3) : 900 GPM
FLOW RATE(4) : 1000 GPM

TEST STARTING DATE : MAR 21, 1984 TIME : 13:10:00

DATE	TIME	ELAPSED TIME, T (MINUTES)	PRESSURE (PSI)
03/21/1984	15:35:30	145.50	6.3800
03/21/1984	15:35:40	145.67	6.4000
03/21/1984	15:35:50	145.83	6.4100
03/21/1984	15:36:00	146.00	6.4100
03/21/1984	15:36:10	146.17	6.4100
03/21/1984	15:36:20	146.33	6.4200
03/21/1984	15:36:30	146.50	6.4200
03/21/1984	15:36:40	146.67	6.4200
03/21/1984	15:36:50	146.83	6.4500
03/21/1984	15:37:00	147.00	6.4600
03/21/1984	15:37:30	147.50	6.5000
03/21/1984	16:28:00	198.00	6.5000
03/21/1984	16:28:10	198.17	6.5000
(STEP FOUR)			
03/21/1984	16:28:20	198.33	3.1800
03/21/1984	16:28:30	198.50	2.7800
03/21/1984	16:28:40	198.67	2.3600
03/21/1984	16:28:50	198.83	2.2100
03/21/1984	16:29:00	199.00	1.9800
03/21/1984	16:29:10	199.17	1.9000
03/21/1984	16:29:20	199.33	1.8000
03/21/1984	16:29:30	199.50	1.6000
03/21/1984	16:29:40	199.67	1.6800
03/21/1984	16:29:50	199.83	1.7000
03/21/1984	16:30:00	200.00	1.7100
03/21/1984	16:30:10	200.17	1.5500
03/21/1984	16:30:20	200.33	1.7300
03/21/1984	16:30:30	200.50	1.6700
03/21/1984	16:30:40	200.67	1.5300
03/21/1984	16:30:50	200.83	1.3900
03/21/1984	16:31:00	201.00	1.6500
03/21/1984	16:31:10	201.17	1.5100
03/21/1984	16:31:20	201.33	1.4700

STEP DRAWDOWN TEST

PROJECT #83505
PAGE #07

WELL NUMBER : SF24
INITIAL PRESSURE : 6.67 PSI
NUMBER OF STEPS : 4
FLOW RATE(1) : 490 GPM
FLOW RATE(2) : 750 GPM
FLOW RATE(3) : 900 GPM
FLOW RATE(4) : 1000 GPM

TEST STARTING DATE : MAR 21, 1984 TIME : 13:10:00

DATE	TIME	ELAPSED TIME, T (MINUTES)	PRESSURE (PSI)
03/21/1984	16:31:30	201.50	1.6000
03/21/1984	16:31:40	201.67	1.3600
03/21/1984	16:31:50	201.83	1.3700
03/21/1984	16:32:00	202.00	1.3500
03/21/1984	16:32:10	202.17	1.3100
03/21/1984	16:32:20	202.33	2.2600
03/21/1984	16:32:30	202.50	2.6700
03/21/1984	16:32:40	202.67	2.4500
03/21/1984	16:32:50	202.83	2.4700
03/21/1984	16:33:00	203.00	2.4700
03/21/1984	16:33:10	203.17	2.5500
03/21/1984	16:33:20	203.33	2.2700
03/21/1984	16:33:30	203.50	2.3700
03/21/1984	16:33:40	203.67	2.4200
03/21/1984	16:33:50	203.83	2.3700
03/21/1984	16:34:00	204.00	2.6200
03/21/1984	17:21:00	251.00	5.8000
03/21/1984	17:21:30	251.50	5.9100
03/21/1984	17:22:00	252.00	6.0100
03/21/1984	17:22:10	252.17	6.0500
03/21/1984	17:22:20	252.33	6.1000
03/21/1984	17:22:30	252.50	6.1300
03/21/1984	17:22:40	252.67	6.1600
03/21/1984	17:22:50	252.83	6.1800
03/21/1984	17:23:00	253.00	6.2000
03/21/1984	17:23:15	253.25	6.2200
03/21/1984	17:23:30	253.50	6.2300
03/21/1984	17:23:45	253.75	6.2500

APPENDIX D

AQUIFER PUMP TEST DATA TABLES

PUMP TEST (DRAWDOWN PHASE)

PROJECT NOTES
PAGE #1

WELL NUMBER : MW-1
RADIUS (R) : 45.00 FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 20.7181 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:45:01	0.02	20.5966	0.1215	0.280	0.49449E-05
14:45:11	0.18	20.4824	0.3157	0.728	0.43392E-04
14:45:21	0.35	20.3519	0.3663	0.845	0.82940E-04
14:45:31	0.52	20.3211	0.3970	0.916	0.12229E-03
14:45:41	0.68	20.3035	0.4146	0.956	0.16174E-03
14:45:51	0.85	20.2891	0.4300	0.992	0.20119E-03
14:46:01	1.02	20.2749	0.4432	1.022	0.24063E-03
14:46:11	1.18	20.2632	0.4549	1.049	0.28008E-03
14:46:21	1.35	20.2507	0.4674	1.078	0.31953E-03
14:46:31	1.52	20.2456	0.4725	1.090	0.35897E-03
14:46:41	1.68	20.2375	0.4806	1.109	0.39842E-03
14:46:51	1.85	20.2338	0.4842	1.117	0.43787E-03
14:47:01	2.02	20.2273	0.4908	1.132	0.47732E-03
14:47:11	2.18	20.2221	0.4960	1.144	0.51677E-03
14:47:21	2.35	20.2148	0.5033	1.161	0.55621E-03
14:47:31	2.52	20.2119	0.5062	1.168	0.59566E-03
14:47:41	2.68	20.2104	0.5077	1.171	0.63511E-03
14:47:51	2.85	20.2067	0.5114	1.180	0.67456E-03
14:48:01	3.02	20.2031	0.5150	1.188	0.71400E-03
14:48:21	3.35	20.1975	0.5206	1.200	0.79289E-03
14:48:41	3.68	20.1921	0.5260	1.213	0.87179E-03
14:49:01	4.02	20.1877	0.5304	1.224	0.95068E-03
14:49:31	4.52	20.1855	0.5326	1.229	0.10697E-02
14:50:01	5.02	20.1738	0.5443	1.256	0.11874E-02
14:50:31	5.52	20.1723	0.5458	1.259	0.13052E-02
14:51:01	6.02	20.1774	0.5407	1.247	0.14241E-02
14:51:31	6.52	20.1739	0.5443	1.256	0.15429E-02
14:52:01	7.02	20.1701	0.5480	1.264	0.16617E-02
14:52:31	7.52	20.1672	0.5509	1.271	0.17801E-02
14:53:01	8.02	20.1657	0.5524	1.274	0.18974E-02

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE #2

WELL NUMBER : P4-1
RADIUS (R) : 65.00 FEET
DISCHARGE (Q) : 1290[illegible].00 GPM
STATIC PRESSURE : 20.7191 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:53:31	8.52	20.1642	0.5539	1.278	0.20158E-02
14:54:01	9.02	20.1627	0.5554	1.281	0.21341E-02
14:54:31	9.52	20.1606	0.5575	1.286	0.22525E-02
14:55:01	10.02	20.1591	0.5590	1.289	0.23708E-02
14:56:05	11.08	20.1590	0.5583	1.288	0.26233E-02
14:57:05	12.08	20.1547	0.5634	1.300	0.28600E-02
14:58:05	13.08	20.1554	0.5627	1.298	0.30966E-02
14:59:05	14.08	20.1532	0.5649	1.303	0.33333E-02
15:00:05	15.08	20.1489	0.5693	1.313	0.35700E-02
15:01:05	16.08	20.1494	0.5685	1.311	0.38067E-02
15:02:05	17.08	20.1510	0.5671	1.308	0.40434E-02
15:03:05	18.08	20.1503	0.5678	1.310	0.42801E-02
15:04:05	19.08	20.1474	0.5707	1.316	0.45168E-02
15:05:05	20.08	20.1466	0.5715	1.318	0.47535E-02
15:06:05	21.08	20.1466	0.5715	1.318	0.49901E-02
15:07:05	22.08	20.1437	0.5744	1.325	0.52268E-02
15:08:05	23.08	20.1415	0.5766	1.330	0.54635E-02
15:09:05	24.08	20.1415	0.5766	1.330	0.57002E-02
15:10:05	25.08	20.1430	0.5751	1.327	0.59369E-02
15:12:05	27.08	20.1415	0.5766	1.330	0.64103E-02
15:14:05	29.08	20.1393	0.5788	1.335	0.68837E-02
15:16:21	31.35	20.1378	0.5803	1.339	0.74011E-02
15:18:21	33.35	20.1364	0.5817	1.342	0.78745E-02
15:20:21	35.35	20.1349	0.5832	1.345	0.83479E-02
15:22:21	37.35	20.1342	0.5839	1.347	0.88212E-02
15:24:21	39.35	20.1306	0.5876	1.355	0.92946E-02
15:26:21	41.35	20.1291	0.5891	1.359	0.97679E-02
15:28:21	43.35	20.1312	0.5869	1.354	0.10241E-01
15:30:21	45.35	20.1241	0.5940	1.370	0.10714E-01
15:45:21	60.35	20.1276	0.5905	1.362	0.11187E-01

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : MW-1
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : 12[illegible] GPM
STATIC PRESSURE : 20.7181 PSI

PUMP STARTING DATE : JUL 17, 1994 TIME = 14:45:[illegible]
PUMP STOPPING DATE : JUL 20, 1994 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1994)					
15:40:21	55.35	20.1224	0.5957	1.374	0.131[illegible]E-01
15:45:21	60.35	20.1180	0.6001	1.384	0.14284E-01
15:50:21	65.35	20.1163	0.6118	1.411	0.15467E-01
15:55:21	70.35	20.1100	0.6081	1.403	0.166515-01
16:00:21	75.35	20.1063	0.6118	1.411	0.17834E-01
16:05:21	80.35	20.1063	0.6118	1.411	0.19018E-01
16:10:21	85.35	20.1041	0.6140	1.416	0.202[illegible]E-01
16:15:21	90.35	20.1004	0.6177	1.425	0.213[illegible]E-01
16:48:01	123.02	20.0982	0.6199	1.430	0.28[illegible]16E-01
17:18:01	153.02	20.1041	0.6140	1.416	0.362[illegible]E-01
17:48:01	183.02	20.1034	0.6147	1.418	0.43319E-01
18:18:01	213.02	20.1019	0.6162	1.421	0.504[illegible]E-01
18:48:01	243.02	20.1004	0.6177	1.425	0.575[illegible]E-01
19:18:01	273.02	20.0975	0.6206	1.432	0.646[illegible]E-01
19:48:01	303.02	20.0953	0.6228	1.437	0.717[illegible]E-01
20:18:01	333.02	20.1041	0.6140	1.416	0.788[illegible]E-01
20:48:01	363.02	20.1019	0.6162	1.421	0.859[illegible]E-01
21:18:01	393.02	20.1041	0.6140	1.416	0.93[illegible]E-01
21:48:01	423.02	20.1063	0.6118	1.411	0.10[illegible]E 00
22:18:01	453.02	20.1114	0.6067	1.400	0.10[illegible]E 00
22:48:01	483.02	20.1114	0.6067	1.400	0.11[illegible]E 00
23:18:01	513.02	20.1100	0.6081	1.403	0.12142E 00
23:48:01	543.02	20.1122	0.6059	1.398	0.12[illegible]E 00
00:48:01	603.02	20.1092	0.6089	1.405	0.14273E 00
01:48:01	663.02	20.1048	0.6133	1.415	0.15[illegible]E 00
02:48:01	723.02	20.0931	0.6250	1.442	0.171135 00
03:48:01	783.02	20.0821	0.6360	1.467	0.18[illegible]E 00
04:46:01	843.02	20.0755	0.6426	1.482	0.19[illegible]E 00
05:48:01	903.02	20.0755	0.6426	1.482	0.21[illegible]E 00
06:48:01	963.02	20.0711	0.6470	1.493	0.22[illegible]E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #14

WELL NUMBER : M4-1
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : 12900.00 GPM
STATIC PRESSURE : 20.7191 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:30:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 18, 1984)					
17:48:01	1123.02	20.0770	0.6411	1.479	0.249173E 01
18:48:01	1183.02	20.0762	0.6419	1.481	0.256634E 01
19:48:01	1143.02	20.0740	0.6441	1.486	0.270954E 01
10:48:01	1203.02	20.0652	0.6529	1.506	0.284745E 00
11:48:01	1263.02	20.0381	0.6800	1.569	0.298954E 00
12:48:01	1323.02	20.0125	0.7056	1.628	0.313146E 00
13:48:01	1383.02	19.9883	0.7298	1.684	0.327334E 00
14:48:01	1443.02	19.9531	0.7650	1.765	0.341654E 00
15:48:01	1503.02	19.9281	0.7900	1.822	0.355746E 00
16:48:01	1563.02	19.9878	0.8303	1.915	0.369954E 00
17:48:01	1623.02	19.8702	0.8479	1.956	0.384156E 00
18:48:01	1683.02	19.8577	0.8604	1.985	0.398355E 00
19:48:01	1743.02	19.9025	0.8156	1.881	0.412556E 00
20:48:01	1803.02	19.9171	0.8010	1.848	0.426756E 00
21:48:01	1863.02	19.9281	0.7900	1.822	0.440956E 00
22:48:01	1923.02	19.9391	0.7790	1.797	0.455156E 00
23:48:01	1983.02	19.9443	0.7738	1.785	0.469356E 00
00:48:42	2043.70	19.9472	0.7709	1.778	0.483372E 01
01:49:41	2103.68	19.9457	0.7724	1.782	0.497791E 00
02:49:41	2163.68	19.9333	0.7848	1.810	0.512111E 00
03:49:41	2223.68	19.9311	0.7870	1.815	0.526432E 00
04:49:41	2283.68	19.9259	0.7922	1.827	0.540752E 00
05:49:41	2343.68	19.9259	0.7922	1.827	0.555472E 00
06:49:41	2403.68	19.9245	0.7936	1.831	0.569892E 00
07:49:41	2463.68	19.9291	0.7890	1.820	0.584312E 00
08:49:41	2523.68	19.9259	0.7922	1.827	0.598732E 00
09:49:41	2583.68	19.9223	0.7958	1.836	0.613152E 00
10:49:41	2643.68	19.9069	0.8112	1.871	0.627572E 00
11:49:41	2703.68	19.8895	0.8286	1.912	0.642092E 00
12:49:41	2763.68	19.8577	0.8604	1.985	0.656412E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : M4-1
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : 12[illegible].[illegible] GPM
STATIC PRESSURE : 20.7181 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:[illegible]:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 19, 1984)					
13:48:41	2883.68	19.8291	0.8890	2.051	0.[illegible]E [illegible]
14:48:41	2923.68	19.7961	0.9220	2.127	0.[illegible]E [illegible]
15:48:41	2943.68	19.8299	0.8882	2.049	0.696[illegible]E [illegible]
16:48:41	3003.68	19.8291	0.8890	2.051	0.71[illegible]E [illegible]
17:48:41	3063.68	19.8189	0.8992	2.074	0.72513E 0[illegible]
18:48:41	3123.68	19.8240	0.8941	2.063	0.73933E [illegible]
19:48:41	3183.68	19.8306	0.8875	2.047	0.753[illegible]E [illegible]
20:48:41	3243.68	19.8378	0.8802	2.030	0.76774E [illegible]
21:48:41	3303.68	19.8401	0.8780	2.025	0.781[illegible]E [illegible]
22:48:41	3363.68	19.8423	0.8758	2.020	0.79614E [illegible]
23:48:41	3423.68	19.8488	0.8692	2.005	0.81[illegible]E [illegible]
00:48:41	3483.68	19.8453	0.8728	2.013	0.824[illegible]E [illegible]
01:48:41	3543.68	19.8394	0.8787	2.027	0.83[illegible]E [illegible]
02:48:41	3603.68	19.8731	0.8450	1.949	0.852[illegible]E [illegible]
03:48:41	3663.68	19.8335	0.8846	2.041	0.86714E [illegible]
04:48:41	3723.68	19.8321	0.8860	2.044	0.88135E [illegible]
05:48:41	3783.68	19.8255	0.8926	2.059	0.895[illegible]E [illegible]

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE # 1

WELL NUMBER : M4-2
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 23.2513 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:45:01	0.02	23.1675	0.0839	0.193	0.[illegible]E-[illegible]
14:45:11	0.18	22.[illegible]674	0.2839	0.655	0.[illegible]E-04
14:45:21	0.35	22.[illegible]17[illegible]	0.3343	0.771	0.11570E-03
14:45:31	0.52	22.8899	0.3614	0.834	0.17080E-03
14:45:41	0.68	22.8737	0.3776	0.871	0.22590E-03
14:45:51	0.85	22.8493	0.4020	0.927	0.28099E-03
14:46:01	1.02	22.8394	0.4119	0.950	0.33609E-03
14:46:11	1.18	22.8322	0.4191	0.967	0.39118E-03
14:46:21	1.35	22.8178	0.4335	1.000	0.44628E-03
14:46:31	1.52	22.8142	0.4371	1.008	0.50139E-03
14:46:41	1.68	22.8070	0.4443	1.025	0.55647E-03
14:46:51	1.85	22.8060	0.4453	1.027	0.61157E-03
14:47:01	2.02	22.7980	0.4533	1.046	0.66667E-03
14:47:11	2.18	22.7952	0.4561	1.052	0.72176E-03
14:47:21	2.35	22.7853	0.4660	1.075	0.77686E-03
14:47:31	2.52	22.7826	0.4687	1.081	0.83196E-03
14:47:41	2.68	22.7790	0.4723	1.089	0.88705E-03
14:47:51	2.85	22.7767	0.4750	1.096	0.94215E-03
14:48:01	3.02	22.7700	0.4813	1.110	0.99725E-03
14:48:21	3.35	22.7682	0.4831	1.114	0.11[illegible]E-02
14:49:41	3.68	22.7611	0.4912	1.133	0.12176E-02
14:49:01	4.02	22.7556	0.4967	1.143	0.13278E-02
14:49:31	4.52	22.7484	0.5029	1.160	0.14831E-02
14:50:01	5.02	22.7465	0.5048	1.164	0.16[illegible]E-02
14:50:31	5.52	22.7402	0.5111	1.179	0.18837E-02
14:51:01	6.02	22.7383	0.5130	1.191	0.19[illegible]E-02
14:51:31	6.52	22.7429	0.5084	1.173	0.21543E-02
14:52:01	7.02	22.7348	0.5165	1.191	0.23196E-02
14:52:31	7.52	22.7366	0.5147	1.187	0.24849E-02
14:53:01	8.02	22.7357	0.5156	1.189	0.26501E-02

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : W4-[illegible]
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : 12[illegible].[illegible] GPM
STATIC PRESSURE : 23.2513 PSI

PUMP STARTING DATE : JUL 17, 1994 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:[illegible]:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:53:31	8.52	22.7331	0.5183	1.196	0.281[illegible]E-02
14:54:01	9.02	22.7339	0.5174	1.194	0.2[illegible]E-02
14:54:31	9.52	22.7294	0.5219	1.204	0.314[illegible]E-02
14:55:01	10.02	22.7267	0.5246	1.210	0.33113E-02
14:56:05	11.08	22.7267	0.5246	1.210	0.366395E-02
14:57:05	12.08	22.7240	0.5273	1.216	0.39945E-02
14:58:05	13.08	22.7195	0.5318	1.227	0.43251E-02
14:59:05	14.08	22.7249	0.5264	1.214	0.465565E-02
15:00:05	15.08	22.7195	0.5318	1.227	0.49862E-02
15:01:05	16.08	22.7213	0.5300	1.223	0.531685E-02
15:02:05	17.08	22.7150	0.5363	1.237	0.564745E-02
15:03:05	18.08	22.7168	0.5345	1.233	0.597805E-02
15:04:05	19.08	22.7141	0.5372	1.239	0.630865E-02
15:05:05	20.08	22.7150	0.5363	1.237	0.663925E-02
15:06:05	21.08	22.7123	0.5390	1.243	0.696985E-02
15:07:05	22.08	22.7114	0.5399	1.245	0.730045E-02
15:08:05	23.08	22.7132	0.5381	1.241	0.763105E-02
15:09:05	24.08	22.7087	0.5426	1.252	0.796165E-02
15:10:05	25.08	22.7132	0.5381	1.241	0.829225E-02
15:12:05	27.08	22.7051	0.5462	1.260	0.895345E-02
15:14:05	29.08	22.7060	0.5453	1.258	0.961465E-02
15:16:21	31.35	22.7060	0.5453	1.258	0.107864E-01
15:18:21	33.35	22.7023	0.5490	1.266	0.114485E-01
15:20:21	35.35	22.7033	0.5480	1.264	0.121105E-01
15:22:21	37.35	22.7033	0.5480	1.264	0.12347E-01
15:24:21	39.35	22.7033	0.5480	1.264	0.13[illegible]E-01
15:26:21	41.35	22.7006	0.5507	1.270	0.134685E-01
15:28:21	43.35	22.7006	0.5507	1.270	0.14[illegible]E-01
15:30:21	45.35	22.6996	0.5507	1.270	0.14[illegible]E-01
15:35:21	50.35	22.6988	0.5525	1.298	0.166485E-01

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : M4-8
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : 12[illegible] GPM
STATIC PRESSURE : 23.2513 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	FLAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/P**2 (MIN/SQFT)
(JUL 17, 1984)					
15:40:21	55.35	22.6952	0.5561	1.283	0.18288E-01
15:45:21	60.35	22.6889	0.5625	1.298	0.19953E-01
15:50:21	65.35	22.6753	0.5760	1.329	0.21603E-01
15:55:21	70.35	22.6744	0.5769	1.331	0.23256E-01
16:00:21	75.35	22.6762	0.5751	1.327	0.24918E-01
16:05:21	80.35	22.6708	0.5805	1.339	0.26562E-01
16:10:21	85.35	22.6726	0.5787	1.335	0.28215E-01
16:15:21	90.35	22.6664	0.5849	1.349	0.29968E-01
16:48:01	123.02	22.6691	0.5832	1.345	0.40667E-01
17:18:01	153.02	22.6699	0.5814	1.341	0.50584E-01
17:48:01	183.02	22.6691	0.5832	1.345	0.60511E-01
18:18:01	213.02	22.6708	0.5805	1.339	0.70419E-01
18:48:01	243.02	22.6690	0.5823	1.343	0.80336E-01
19:18:01	273.02	22.6663	0.5850	1.349	0.90253E-01
19:48:01	303.02	22.6681	0.5832	1.345	0.10017E 00
20:18:01	333.02	22.6726	0.5787	1.335	0.11039E 00
20:48:01	363.02	22.6708	0.5805	1.339	0.12001E 00
21:18:01	393.02	22.6690	0.5823	1.343	0.12992E 00
21:48:01	423.02	22.6762	0.5751	1.327	0.13994E 00
22:18:01	453.02	22.6762	0.5751	1.327	0.14978E 00
22:48:01	483.02	22.6825	0.5688	1.312	0.15967E 00
23:18:01	513.02	22.6780	0.5733	1.322	0.16959E 00
23:48:01	543.02	22.6762	0.5751	1.327	0.17991E 00
00:48:01	603.02	22.6726	0.5787	1.335	0.19974E 00
01:48:01	663.02	22.6699	0.5814	1.341	0.21919E 00
02:48:01	723.02	22.6564	0.5949	1.372	0.23911E 00
03:48:01	783.02	22.6492	0.6021	1.389	0.25885E 00
04:48:01	843.02	22.6447	0.6066	1.399	0.27868E 00
05:48:01	903.02	22.6437	0.6076	1.402	0.29852E 00
06:48:01	963.02	22.6756	0.6157	1.420	0.31837E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : M4-2
RADIUS (R) : 55.00 FEET
DISCHARGE (Q) : 1200.00 GPM
STATIC PRESSURE : 23.2513 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 18, 1984)					
07:48:01	1023.02	22.6410	0.6103	1.409	0.338198E 00
08:48:01	1083.02	22.6447	0.6066	1.399	0.358902E 00
09:48:01	1143.02	22.6419	0.6094	1.406	0.377866E 00
10:48:01	1203.02	22.6329	0.6184	1.427	0.397669E 00
11:48:01	1263.02	22.6041	0.6472	1.493	0.417535E 00
12:48:01	1323.02	22.5752	0.6761	1.560	0.437336E 00
13:48:01	1383.02	22.5517	0.6996	1.614	0.457208E 00
14:48:01	1443.02	22.5202	0.7311	1.687	0.477035E 00
15:48:01	1503.02	22.4895	0.7618	1.757	0.496866E 00
16:48:01	1563.02	22.4552	0.7961	1.836	0.516702E 00
17:48:01	1623.02	22.4327	0.8186	1.888	0.536535E 00
18:48:01	1683.02	22.4246	0.8267	1.907	0.556375E 00
19:48:01	1743.02	22.4642	0.7871	1.816	0.576202E 00
20:48:01	1803.02	22.4751	0.7762	1.791	0.596034E 00
21:48:01	1863.02	22.4877	0.7636	1.761	0.615867E 00
22:48:01	1923.02	22.4949	0.7564	1.745	0.635671E 00
23:48:01	1983.02	22.5048	0.7465	1.722	0.655554E 00
00:48:42	2043.70	22.5085	0.7428	1.713	0.675619E 00
01:48:41	2103.68	22.5066	0.7447	1.718	0.695443E 00
02:48:41	2163.68	22.4922	0.7591	1.751	0.715227E 00
03:48:41	2223.68	22.4931	0.7582	1.749	0.735113E 00
04:48:41	2283.68	22.4866	0.7627	1.759	0.754944E 00
05:48:41	2343.68	22.4858	0.7663	1.768	0.774777E 00
06:48:41	2403.68	22.4805	0.7708	1.778	0.794611E 00
07:48:41	2463.68	22.4895	0.7618	1.757	0.814444E 00
08:48:41	2523.68	22.4904	0.7609	1.755	0.834278E 00
09:48:41	2583.68	22.4877	0.7636	1.761	0.854111E 00
10:48:41	2643.68	22.4661	0.7852	1.811	0.873944E 00
11:48:41	2703.68	22.4391	0.8122	1.873	0.893778E 00
12:48:41	2763.68	22.4137	0.8376	1.932	0.913611E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : M4-2
RADIUS (R) : 55.00 FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 23.2513 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 19, 1984)					
13:48:41	2823.68	22.3859	0.8655	1.997	0.93345E 00
14:48:41	2883.68	22.3569	0.8944	2.063	0.95328E 00
15:48:41	2943.68	22.3894	0.8619	1.988	0.97312E 00
16:48:41	3003.68	22.3876	0.8637	1.992	0.99295E 00
17:48:41	3063.68	22.3849	0.8664	1.999	0.10128E 01
18:48:41	3123.68	22.3840	0.8673	2.001	0.10326E 01
19:48:41	3183.68	22.3930	0.8583	1.980	0.10525E 01
20:48:41	3243.68	22.3948	0.8565	1.976	0.10723E 01
21:48:41	3303.68	22.4029	0.8484	1.957	0.10921E 01
22:48:41	3363.68	22.3993	0.8520	1.965	0.11120E 01
23:48:41	3423.68	22.4083	0.8430	1.945	0.11318E 01
00:48:41	3483.68	22.4029	0.8484	1.957	0.11516E 01
01:48:41	3543.68	22.4020	0.8493	1.959	0.11715E 01
02:48:41	3603.68	22.4282	0.8231	1.899	0.11913E 01
03:48:41	3663.68	22.3948	0.8565	1.976	0.12111E 01
04:48:41	3723.68	22.3885	0.8628	1.990	0.12310E 01
05:48:41	3783.68	22.3849	0.8664	1.999	0.12508E 01

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : MW-3
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 24.0709 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984) .					
14:45:01	0.02	23.9849	0.0859	0.198	0.78765E-05
14:45:11	0.18	23.8283	0.2425	0.559	0.96641E-04
14:45:21	0.35	23.7831	0.2877	0.664	0.16541E-03
14:45:31	0.52	23.7533	0.3175	0.732	0.24417E-03
14:45:41	0.68	23.7336	0.3372	0.778	0.32294E-03
14:45:51	0.85	23.7212	0.3496	0.806	0.40170E-03
14:46:01	1.02	23.7081	0.3627	0.837	0.48047E-03
14:46:11	1.18	23.6993	0.3715	0.857	0.55923E-03
14:46:21	1.35	23.6891	0.3817	0.881	0.63800E-03
14:46:31	1.52	23.6811	0.3897	0.899	0.71676E-03
14:46:41	1.68	23.6775	0.3933	0.907	0.79553E-03
14:46:51	1.85	23.6702	0.4006	0.924	0.87429E-03
14:47:01	2.02	23.6644	0.4064	0.937	0.95306E-03
14:47:11	2.18	23.6585	0.4123	0.951	0.10318E-02
14:47:21	2.35	23.6542	0.4166	0.961	0.11106E-02
14:47:31	2.52	23.6498	0.4210	0.971	0.11894E-02
14:47:41	2.68	23.6469	0.4239	0.978	0.12681E-02
14:47:51	2.85	23.6447	0.4261	0.983	0.13469E-02
14:48:01	3.02	23.6403	0.4305	0.993	0.14256E-02
14:48:21	3.35	23.6345	0.4363	1.006	0.15832E-02
14:48:41	3.68	23.6323	0.4385	1.012	0.17417E-02
14:49:01	4.02	23.6272	0.4436	1.023	0.18995E-02
14:49:31	4.52	23.6192	0.4516	1.042	0.21345E-02
14:50:01	5.02	23.6177	0.4531	1.045	0.23695E-02
14:50:31	5.52	23.6126	0.4582	1.057	0.26071E-02
14:51:01	6.02	23.6141	0.4567	1.054	0.28434E-02
14:51:31	6.52	23.6083	0.4625	1.067	0.30797E-02
14:52:01	7.02	23.6061	0.4647	1.072	0.33160E-02
14:52:31	7.52	23.6075	0.4633	1.069	0.35523E-02
14:53:01	8.02	23.6024	0.4684	1.081	0.37886E-02

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE #12

WELL NUMBER : M4-3
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 12[illegible].00 GPM
STATIC PRESSURE : 24.3708 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:53:31	8.52	23.6039	0.4669	1.077	0.40245E-02
14:54:01	9.02	23.6017	0.4691	1.082	0.42612E-02
14:54:31	9.52	23.6010	0.4698	1.084	0.44975E-02
14:55:01	10.02	23.5973	0.4735	1.092	0.47338E-02
14:56:05	11.08	23.5944	0.4764	1.099	0.52379E-02
14:57:05	12.08	23.5908	0.4800	1.107	0.57105E-02
14:58:05	13.08	23.5908	0.4800	1.107	0.61930E-02
14:59:05	14.08	23.5910	0.4808	1.109	0.66656E-02
15:00:05	15.08	23.5879	0.4829	1.114	0.71282E-02
15:01:05	16.08	23.5879	0.4829	1.114	0.76008E-02
15:02:05	17.08	23.5835	0.4873	1.124	0.80734E-02
15:03:05	18.08	23.5849	0.4859	1.121	0.85460E-02
15:04:05	19.08	23.5820	0.4888	1.128	0.90186E-02
15:05:05	20.08	23.5813	0.4895	1.129	0.94912E-02
15:06:05	21.08	23.5820	0.4888	1.128	0.99638E-02
15:07:05	22.08	23.5806	0.4902	1.131	0.10436E-01
15:08:05	23.08	23.5813	0.4895	1.129	0.10909E-01
15:09:05	24.08	23.5791	0.4917	1.134	0.11382E-01
15:10:05	25.08	23.5769	0.4939	1.139	0.11854E-01
15:12:05	27.08	23.5719	0.4990	1.151	0.12799E-01
15:14:05	29.08	23.5733	0.4975	1.148	0.13744E-01
15:16:21	31.35	23.5688	0.5019	1.158	0.14816E-01
15:18:21	33.35	23.5719	0.4990	1.151	0.15761E-01
15:20:21	35.35	23.5674	0.5034	1.161	0.16706E-01
15:22:21	37.35	23.5660	0.5048	1.164	0.17651E-01
15:24:21	39.35	23.5645	0.5063	1.168	0.18596E-01
15:26:21	41.35	23.5638	0.5070	1.170	0.19542E-01
15:28:21	43.35	23.5653	0.5055	1.166	0.20487E-01
15:30:21	45.35	23.5601	0.5107	1.178	0.21432E-01
15:35:21	50.35	23.5570	0.5138	1.185	0.23795E-01

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE # 3

WELL NUMBER : M4-3
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 24.0709 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
15:40:21	55.35	23.5529	0.5179	1.195	0.26158E-01
15:45:21	60.35	23.5521	0.5187	1.197	0.28521E-01
15:50:21	65.35	23.5419	0.5289	1.220	0.30884E-01
15:55:21	70.35	23.5434	0.5274	1.217	0.33247E-01
16:00:21	75.35	23.5390	0.5318	1.227	0.35610E-01
16:05:21	80.35	23.5398	0.5310	1.225	0.37973E-01
16:10:21	85.35	23.5346	0.5362	1.237	0.40336E-01
16:15:21	90.35	23.5310	0.5398	1.245	0.42698E-01
16:48:01	123.02	23.5317	0.5391	1.244	0.58136E-01
17:18:01	153.02	23.5346	0.5362	1.237	0.72314E-01
17:48:01	183.02	23.5346	0.5362	1.237	0.86492E-01
18:18:01	213.02	23.5368	0.5340	1.232	0.10067E 00
18:48:01	243.02	23.5325	0.5383	1.242	0.11485E 00
19:18:01	273.02	23.5310	0.5398	1.245	0.12902E 00
19:48:01	303.02	23.5295	0.5413	1.249	0.14320E 00
20:18:01	333.02	23.5354	0.5354	1.235	0.15738E 00
20:48:01	363.02	23.5332	0.5376	1.240	0.17156E 00
21:18:01	393.02	23.5354	0.5354	1.235	0.18574E 00
21:48:01	423.02	23.5383	0.5325	1.228	0.19991E 00
22:18:01	453.02	23.5405	0.5303	1.223	0.21409E 00
22:48:01	483.02	23.5456	0.5252	1.212	0.22827E 00
23:18:01	513.02	23.5441	0.5267	1.215	0.24245E 00
23:48:01	543.02	23.5434	0.5274	1.217	0.25662E 00
00:48:01	603.02	23.5383	0.5325	1.228	0.28498E 00
01:48:01	663.02	23.5332	0.5376	1.240	0.31333E 00
02:48:01	723.02	23.5244	0.5464	1.260	0.34169E 00
03:48:01	783.02	23.5164	0.5544	1.279	0.37005E 00
04:48:01	843.02	23.5099	0.5609	1.294	0.39841E 00
05:48:01	903.02	23.5055	0.5653	1.304	0.42676E 00
06:48:01	963.02	23.5048	0.5660	1.306	0.45511E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #4

WELL NUMBER : M4-3
RADIUS (R) : 46.[illegible] FEET
DISCHARGE (Q) : 12[illegible] GPM
STATIC PRESSURE : 24.[illegible] PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 13, 1984)					
[illegible]7:48:01	1[illegible]23.02	23.5040	0.5668	1.307	0.48347E 00
[illegible]8:48:01	1[illegible]83.02	23.5099	0.5609	1.294	0.51182E 00
09:48:01	1143.02	23.5062	0.5646	1.302	0.54018E 00
10:48:01	1203.02	23.4938	0.5770	1.331	0.56853E 00
11:48:01	1263.02	23.4661	0.6047	1.395	0.59689E 00
12:48:01	1323.02	23.4399	0.6309	1.455	0.62524E 00
13:48:01	1383.02	23.4180	0.6528	1.506	0.65360E 00
14:48:01	1443.02	23.3831	0.6878	1.587	0.68195E 00
15:48:01	1503.02	23.3546	0.7162	1.652	0.71031E 00
16:48:01	1563.02	23.3150	0.7549	1.741	0.73867E 00
17:48:01	1623.02	23.2999	0.7700	1.776	0.76702E 00
18:48:01	1683.02	23.2875	0.7833	1.807	0.79538E 00
19:48:01	1743.02	23.3276	0.7432	1.714	0.82373E 00
20:48:01	1803.02	23.3400	0.7308	1.686	0.85209E 00
21:48:01	1863.02	23.3524	0.7184	1.657	0.88044E 00
22:48:01	1923.02	23.3641	0.7067	1.630	0.90880E 00
23:48:01	1983.02	23.3736	0.7002	1.615	0.93715E 00
00:48:42	2043.70	23.3721	0.6987	1.612	0.96583E 00
01:48:41	2103.68	23.3736	0.7002	1.615	0.99419E 00
02:48:41	2163.68	23.3614	0.7124	1.639	0.10226E 01
03:48:41	2223.68	23.3569	0.7169	1.647	0.10510E 01
04:48:41	2283.68	23.3539	0.7199	1.654	0.10793E 01
05:48:41	2343.68	23.3517	0.7221	1.659	0.11077E 01
06:48:41	2403.68	23.3509	0.7229	1.661	0.11360E 01
07:48:41	2463.68	23.3546	0.7192	1.652	0.11643E 01
08:48:41	2523.68	23.3561	0.7177	1.649	0.11927E 01
09:48:41	2583.68	23.3490	0.7248	1.665	0.12210E 01
10:48:41	2643.68	23.3312	0.7426	1.706	0.12494E 01
11:48:41	2703.68	23.3057	0.7681	1.765	0.12777E 01
12:48:41	2763.68	23.2817	0.7921	1.820	0.13061E 01

PUMP TEST (DRAWDOWN PHASE)

PROJECT #87505
PAGE #18

WELL NUMBER : MW-3
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 24.0709 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/P**2 (MIN/SQFT)
(JUL 19, 1984)					
13:48:41	2823.68	23.2532	0.8176	1.886	0.13344E 01
14:48:41	2883.68	23.2274	0.8504	1.962	0.13628E 01
15:48:41	2943.68	23.2540	0.8168	1.884	0.13912E 01
16:48:41	3003.68	23.2547	0.8161	1.883	0.14195E 01
17:48:41	3063.68	23.2445	0.8263	1.906	0.14479E 01
18:48:41	3123.68	23.2503	0.8205	1.893	0.14762E 01
19:48:41	3183.68	23.2569	0.8139	1.878	0.15046E 01
20:48:41	3243.68	23.2612	0.8096	1.868	0.15329E 01
21:48:41	3303.68	23.2664	0.8044	1.856	0.15613E 01
22:48:41	3363.68	23.2664	0.8044	1.856	0.15896E 01
23:48:41	3423.68	23.2707	0.8001	1.846	0.16180E 01
00:48:41	3483.68	23.2707	0.8001	1.846	0.16464E 01
01:48:41	3543.68	23.2642	0.8066	1.861	0.16747E 01
02:48:41	3603.68	23.2994	0.7804	1.800	0.17031E 01
03:48:41	3663.68	23.2598	0.8110	1.871	0.17314E 01
04:48:41	3723.68	23.2562	0.8146	1.879	0.17598E 01
05:48:41	3783.68	23.2496	0.8212	1.894	0.17881E 01

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : M4-4
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 28.3522 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:45:01	0.02	28.2944	0.0578	0.133	0.101735E-05
14:45:11	0.18	28.1948	0.1574	0.386	0.111[illegible]E-04
14:45:21	0.35	28.1428	0.2094	0.483	0.21362E-04
14:45:31	0.52	28.1200	0.2322	0.536	0.31535E-04
14:45:41	0.68	28.1015	0.2507	0.578	0.41707E-04
14:45:51	0.85	28.0875	0.2647	0.611	0.51880E-04
14:46:01	1.02	28.0779	0.2743	0.633	0.62052E-04
14:46:11	1.18	28.0691	0.2831	0.653	0.72225E-04
14:46:21	1.35	28.0586	0.2936	0.677	0.82397E-04
14:46:31	1.52	28.0514	0.3008	0.693	0.92570E-04
14:46:41	1.68	28.0463	0.3059	0.706	0.10274E-03
14:46:51	1.85	28.0420	0.3102	0.716	0.11292E-03
14:47:01	2.02	28.0349	0.3173	0.732	0.12309E-03
14:47:11	2.18	28.0323	0.3199	0.738	0.13326E-03
14:47:21	2.35	28.0270	0.3252	0.750	0.14343E-03
14:47:31	2.52	28.0235	0.3287	0.758	0.15361E-03
14:47:41	2.68	28.0209	0.3313	0.764	0.16378E-03
14:47:51	2.85	28.0165	0.3357	0.774	0.17395E-03
14:48:01	3.02	28.0156	0.3366	0.776	0.18412E-03
14:48:21	3.35	28.0086	0.3436	0.793	0.20447E-03
14:48:41	3.68	28.0042	0.3480	0.803	0.22481E-03
14:49:01	4.02	27.9999	0.3523	0.813	0.24516E-03
14:49:31	4.52	27.9955	0.3567	0.823	0.27568E-03
14:50:01	5.02	27.9911	0.3611	0.833	0.30619E-03
14:50:31	5.52	27.9876	0.3646	0.841	0.33671E-03
14:51:01	6.02	27.9858	0.3664	0.845	0.36723E-03
14:51:31	6.52	27.9823	0.3699	0.853	0.39775E-03
14:52:01	7.02	27.9832	0.3690	0.851	0.42826E-03
14:52:31	7.52	27.9797	0.3725	0.859	0.45878E-03
14:53:01	8.02	27.9771	0.3751	0.865	0.48931E-03

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : W4-4
RADIUS (R) : 128.00 FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 28.3522 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:53:31	8.52	27.9744	0.3778	0.872	0.519825E-03
14:54:01	9.02	27.9736	0.3786	0.873	0.550333E-03
14:54:31	9.52	27.9744	0.3778	0.872	0.580985E-03
14:55:01	10.02	27.9718	0.3804	0.878	0.611737E-03
14:56:05	11.08	27.9692	0.3830	0.884	0.676475E-03
14:57:05	12.08	27.9709	0.3813	0.880	0.737515E-03
14:58:05	13.08	27.9692	0.3830	0.884	0.798545E-03
14:59:05	14.08	27.9649	0.3874	0.894	0.859588E-03
15:00:05	15.08	27.9665	0.3857	0.890	0.920161E-03
15:01:05	16.08	27.9630	0.3892	0.898	0.981455E-03
15:02:05	17.08	27.9630	0.3892	0.898	0.104275E-02
15:03:05	18.08	27.9639	0.3883	0.896	0.110375E-02
15:04:05	19.08	27.9595	0.3927	0.906	0.116485E-02
15:05:05	20.08	27.9569	0.3953	0.912	0.122585E-02
15:06:05	21.08	27.9560	0.3962	0.914	0.128685E-02
15:07:05	22.08	27.9578	0.3944	0.910	0.134795E-02
15:08:05	23.08	27.9560	0.3962	0.914	0.140895E-02
15:09:05	24.08	27.9543	0.3979	0.918	0.146995E-02
15:10:05	25.08	27.9516	0.4006	0.924	0.153105E-02
15:12:05	27.08	27.9525	0.3997	0.922	0.165320E-02
15:14:05	29.08	27.9516	0.4006	0.924	0.177515E-02
15:16:21	31.35	27.9490	0.4023	0.928	0.191135E-02
15:18:21	33.35	27.9490	0.4032	0.930	0.203355E-02
15:20:21	35.35	27.9481	0.4041	0.932	0.215576E-02
15:22:21	37.35	27.9472	0.4050	0.934	0.227797E-02
15:24:21	39.35	27.9464	0.4058	0.936	0.240017E-02
15:26:21	41.35	27.9437	0.4085	0.942	0.252238E-02
15:28:21	43.35	27.9412	0.4120	0.950	0.264585E-02
15:30:21	45.35	27.9385	0.4137	0.954	0.276795E-02
15:35:21	50.35	27.9358	0.4164	0.961	0.307315E-02

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : M4-4
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : [illegible] GPM
STATIC PRESSURE : 28.3522 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
15:40:21	55.35	27.9332	0.4190	0.967	0.33783E-02
15:45:21	60.35	27.9323	0.4199	0.969	0.36833E-02
15:50:21	65.35	27.9227	0.4295	0.991	0.39886E-02
15:55:21	70.35	27.9218	0.4304	0.993	0.42938E-02
16:00:21	75.35	27.9201	0.4321	0.997	0.45991E-02
16:05:21	80.35	27.9192	0.4330	0.999	0.49042E-02
16:10:21	85.35	27.9148	0.4374	1.009	0.52094E-02
16:15:21	90.35	27.9095	0.4427	1.021	0.55145E-02
16:48:01	123.02	27.9087	0.4435	1.023	0.75083E-02
17:18:01	153.02	27.9104	0.4418	1.019	0.93394E-02
17:48:01	183.02	27.9095	0.4427	1.021	0.11170E-01
18:18:01	213.02	27.9087	0.4435	1.023	0.13002E-01
18:48:01	243.02	27.9078	0.4444	1.025	0.14833E-01
19:18:01	273.02	27.9034	0.4488	1.035	0.16664E-01
19:48:01	303.02	27.9025	0.4497	1.037	0.18495E-01
20:18:01	333.02	27.9087	0.4435	1.023	0.20326E-01
20:48:01	363.02	27.9096	0.4426	1.021	0.22157E-01
21:18:01	393.02	27.9052	0.4470	1.031	0.23988E-01
21:48:01	423.02	27.9104	0.4418	1.019	0.25819E-01
22:18:01	453.02	27.9131	0.4391	1.013	0.27650E-01
22:48:01	483.02	27.9148	0.4374	1.009	0.29481E-01
23:18:01	513.02	27.9139	0.4383	1.011	0.31312E-01
23:48:01	543.02	27.9131	0.4391	1.013	0.33143E-01
00:48:01	603.02	27.9095	0.4427	1.021	0.36805E-01
01:48:01	663.02	27.9034	0.4488	1.035	0.40467E-01
02:48:01	723.02	27.8964	0.4558	1.051	0.44129E-01
03:48:01	783.02	27.8886	0.4654	1.074	0.47792E-01
04:48:01	843.02	27.8806	0.4716	1.088	0.51454E-01
05:48:01	903.02	27.8762	0.4760	1.098	0.55116E-01
06:49:01	963.02	27.8727	0.4795	1.106	0.58779E-01

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE #14

WELL NUMBER : M4-4
RADIUS (R) : 100.00 FEET
DISCHARGE (Q) : 1280.00 GPM
STATIC PRESSURE : 28.3522 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 18, 1984)					
07:48:01	1023.02	27.8745	0.4777	1.102	0.62440E-01
08:48:01	1083.02	27.8780	0.4742	1.094	0.66102E-01
09:48:01	1143.02	27.8736	0.4786	1.104	0.69764E-01
10:48:01	1203.02	27.8631	0.4891	1.128	0.73426E-01
11:48:01	1263.02	27.8377	0.5145	1.187	0.77088E-01
12:48:01	1323.02	27.8087	0.5435	1.254	0.80751E-01
13:48:01	1383.02	27.7850	0.5672	1.308	0.84413E-01
14:48:01	1443.02	27.7499	0.6023	1.389	0.88075E-01
15:48:01	1503.02	27.7219	0.6303	1.454	0.91737E-01
16:48:01	1563.02	27.6833	0.6689	1.543	0.95399E-01
17:48:01	1623.02	27.6693	0.6829	1.575	0.99061E-01
18:48:01	1683.02	27.6570	0.6952	1.604	0.10272E 00
19:48:01	1743.02	27.6973	0.6549	1.511	0.10639E 00
20:48:01	1803.02	27.7105	0.6417	1.480	0.11005E 00
21:48:01	1863.02	27.7219	0.6303	1.454	0.11371E 00
22:48:01	1923.02	27.7341	0.6181	1.426	0.11737E 00
23:48:01	1983.02	27.7394	0.6128	1.414	0.12103E 00
00:48:42	2043.70	27.7394	0.6128	1.414	0.12474E 00
01:48:41	2103.68	27.7385	0.6137	1.416	0.12840E 00
02:48:41	2163.68	27.7306	0.6216	1.434	0.13206E 00
03:48:41	2223.68	27.7254	0.6269	1.446	0.13572E 00
04:48:41	2283.68	27.7227	0.6295	1.452	0.13938E 00
05:48:41	2343.68	27.7236	0.6286	1.450	0.14305E 00
06:48:41	2403.68	27.7201	0.6321	1.458	0.14671E 00
07:48:41	2463.68	27.7201	0.6321	1.458	0.15037E 00
08:48:41	2523.68	27.7227	0.6295	1.452	0.15403E 00
09:48:41	2583.68	27.7157	0.6365	1.468	0.15770E 00
10:48:41	2643.68	27.6991	0.6531	1.507	0.16136E 00
11:48:41	2703.68	27.6729	0.6794	1.567	0.16502E 00
12:48:41	2763.68	27.6473	0.7049	1.626	0.16868E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT #83[illegible]
PAGE #[illegible]

WELL NUMBER : MW-4
RADIUS (R) : 12[illegible] FEET
DISCHARGE (Q) : 128[illegible] GPM
STATIC PRESSURE : 28.3522 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 19, 1984)					
13:48:41	2823.68	27.6197	0.7329	1.691	0.17234E 00
14:48:41	2883.68	27.5833	0.7689	1.774	0.17601E 00
15:48:41	2943.68	27.6158	0.7364	1.699	0.17967E 00
16:48:41	3003.68	27.6193	0.7329	1.691	0.18333E 00
17:48:41	3063.68	27.6114	0.7408	1.709	0.18699E 00
18:48:41	3123.68	27.6149	0.7373	1.701	0.19065E 00
19:48:41	3183.68	27.6237	0.7285	1.681	0.19432E 00
20:48:41	3243.68	27.6289	0.7233	1.669	0.19798E 00
21:48:41	3303.68	27.6315	0.7207	1.663	0.20164E 00
22:48:41	3363.68	27.6333	0.7189	1.658	0.20530E 00
23:48:41	3423.68	27.6394	0.7128	1.644	0.20897E 00
00:48:41	3483.68	27.6359	0.7163	1.652	0.21263E 00
01:48:41	3543.68	27.6324	0.7198	1.660	0.21629E 00
02:48:41	3603.68	27.6438	0.7084	1.634	0.21995E 00
03:48:41	3663.68	27.6254	0.7268	1.677	0.22361E 00
04:48:41	3723.68	27.6219	0.7303	1.685	0.22728E 00
05:48:41	3783.68	27.6149	0.7373	1.701	0.23094E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT #83[illegible]
PAGE #1

FILL NUMBER : P4'A
RADIUS (R) : 65.[illegible] FEET
DISCHARGE (Q) : 128[illegible].00 GPM
STATIC PRESSURE : 16.0725 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:45:01	0.02	16.0759	-0.0034	-0.008	0.39448E-05
14:45:11	0.18	16.0725	0.0000	0.000	0.43392E-04
14:45:21	0.35	16.0759	-0.0034	-0.008	0.82840E-04
14:45:31	0.52	16.0759	-0.0034	-0.008	0.12229E-03
14:45:41	0.68	16.0725	0.0000	0.000	0.16174E-03
14:45:51	0.85	16.0690	0.0035	0.008	0.20118E-03
14:46:01	1.02	16.0828	-0.0103	-0.024	0.24063E-03
14:46:11	1.18	16.0759	-0.0034	-0.008	0.28008E-03
14:46:21	1.35	16.0690	0.0035	0.008	0.31953E-03
14:46:31	1.52	16.0655	0.0070	0.016	0.35897E-03
14:46:41	1.68	16.0828	-0.0103	-0.024	0.39842E-03
14:46:51	1.85	16.0725	0.0000	0.000	0.43787E-03
14:47:01	2.02	16.0690	0.0035	0.008	0.47732E-03
14:47:11	2.18	16.0759	-0.0034	-0.008	0.51677E-03
14:47:21	2.35	16.0655	0.0070	0.016	0.55621E-03
14:47:31	2.52	16.0725	0.0000	0.000	0.59566E-03
14:47:41	2.68	16.0690	0.0035	0.008	0.63511E-03
14:47:51	2.85	16.0621	0.0104	0.024	0.67456E-03
14:48:01	3.02	16.0725	0.0000	0.000	0.71401E-03
14:48:21	3.35	16.0690	0.0035	0.008	0.75295E-03
14:48:41	3.68	16.0586	0.0140	0.032	0.79179E-03
14:49:01	4.02	16.0551	0.0174	0.040	0.83063E-03
14:49:31	4.52	16.0586	0.0140	0.032	0.89068E-03
14:50:01	5.02	16.0655	0.0070	0.016	0.95074E-03
14:50:31	5.52	16.0551	0.0174	0.040	0.10107E-02
14:51:01	6.02	16.0482	0.0243	0.056	0.10707E-02
14:51:31	6.52	16.0447	0.0278	0.064	0.11306E-02
14:52:01	7.02	16.0274	0.0451	0.104	0.11906E-02
14:52:31	7.52	16.0412	0.0313	0.072	0.12505E-02
14:53:01	8.02	16.0378	0.0416	0.096	0.13104E-02

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : P4'A
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : 12[illegible].[illegible] GPM
STATIC PRESSURE : 16.0725 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:53:31	8.52	16.[illegible]	0.0416	0.096	0.20158E-02
14:54:01	9.02	16.[illegible]	0.0625	0.144	0.21341E-02
14:54:31	9.52	16.[illegible]	0.0625	0.144	0.22525E-02
14:55:01	10.02	16.0066	0.0659	0.152	0.23708E-02
14:56:05	11.08	16.0031	0.0694	0.160	0.26233E-02
14:57:05	12.08	15.9822	0.0903	0.208	0.28600E-02
14:58:05	13.08	15.9857	0.0868	0.200	0.30966E-02
14:59:05	14.08	15.9857	0.0868	0.200	0.33333E-02
15:00:05	15.08	15.9753	0.0972	0.224	0.35700E-02
15:01:05	16.08	15.9545	0.1180	0.272	0.38067E-02
15:02:05	17.08	15.9545	0.1180	0.272	0.40434E-02
15:03:05	18.08	15.9476	0.1249	0.288	0.42801E-02
15:04:05	19.08	15.9476	0.1249	0.288	0.45168E-02
15:05:05	20.08	15.9337	0.1388	0.320	0.47535E-02
15:06:05	21.08	15.9337	0.1388	0.320	0.49901E-02
15:07:05	22.08	15.9163	0.1562	0.360	0.52268E-02
15:08:05	23.08	15.9163	0.1562	0.360	0.54635E-02
15:09:05	24.08	15.8956	0.1769	0.408	0.57002E-02
15:10:05	25.08	15.8990	0.1735	0.400	0.59369E-02
15:12:05	27.08	15.8851	0.1874	0.432	0.64103E-02
15:14:05	29.08	15.8817	0.1908	0.440	0.68836E-02
15:16:21	31.35	15.8539	0.2186	0.504	0.74211E-02
15:18:21	33.35	15.8470	0.2255	0.520	0.78935E-02
15:20:21	35.35	15.8435	0.2290	0.528	0.83669E-02
15:22:21	37.35	15.8297	0.2429	0.560	0.88402E-02
15:24:21	39.35	15.8226	0.2499	0.576	0.93136E-02
15:26:21	41.35	15.8122	0.2603	0.600	0.97870E-02
15:28:21	43.35	15.7950	0.2775	0.640	0.10261E-01
15:30:21	45.35	15.7879	0.2846	0.657	0.10734E-01
15:35:21	50.35	15.774[illegible]	0.2984	0.688	0.11917E-01

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : P4'A
RADIUS (R) : 65.00 FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 16.0725 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
15:40:21	55.35	15.7429	0.3296	0.760	0.13101E-01
15:45:21	60.35	15.7360	0.3365	0.776	0.14294E-01
15:50:21	65.35	15.7186	0.3539	0.816	0.15467E-01
15:55:21	70.35	15.7082	0.3643	0.840	0.16651E-01
16:00:21	75.35	15.6839	0.3886	0.896	0.17834E-01
16:05:21	80.35	15.6908	0.3817	0.881	0.19018E-01
16:10:21	85.35	15.6735	0.3990	0.920	0.20201E-01
16:15:21	90.35	15.6597	0.4128	0.952	0.21385E-01
16:48:01	123.02	15.6353	0.4372	1.009	0.29116E-01
17:18:01	153.02	15.5972	0.4753	1.096	0.36017E-01
17:48:01	183.02	15.5798	0.4927	1.137	0.43318E-01
18:18:01	213.02	15.5867	0.4858	1.121	0.50419E-01
18:48:01	243.02	15.5764	0.4961	1.144	0.57519E-01
19:18:01	273.02	15.5694	0.5031	1.161	0.64619E-01
19:48:01	303.02	15.5625	0.5100	1.176	0.71720E-01
20:18:01	333.02	15.5694	0.5031	1.161	0.78821E-01
20:48:01	363.02	15.5694	0.5031	1.161	0.85921E-01
21:18:01	393.02	15.5798	0.4927	1.137	0.93022E-01
21:48:01	423.02	15.5798	0.4927	1.137	0.10012E 00
22:18:01	453.02	15.5729	0.4996	1.152	0.10722E 00
22:48:01	483.02	15.5937	0.4788	1.104	0.11432E 00
23:18:01	513.02	15.5798	0.4927	1.137	0.12142E 00
23:48:01	543.02	15.5764	0.4961	1.144	0.12852E 00
00:48:01	603.02	15.5764	0.4961	1.144	0.14273E 00
01:48:01	663.02	15.5660	0.5065	1.168	0.15693E 00
02:48:01	723.02	15.5591	0.5135	1.185	0.17113E 00
03:48:01	783.02	15.5591	0.5135	1.185	0.18533E 00
04:48:01	843.02	15.5486	0.5239	1.209	0.19953E 00
05:48:01	903.02	15.5382	0.5343	1.233	0.21373E 00
06:48:01	963.02	15.5313	0.5412	1.248	0.22793E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT #8[illegible]
PAGE #14

WELL NUMBER : P4'A
RADIUS (R) : 65.[illegible] FEET
DISCHARGE (Q) : 1280[illegible] GPM
STATIC PRESSURE : 16.0725 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 18, 1984)					
07:48:01	1123.02	15.5417	0.5308	1.224	0.242135E 00
08:48:01	1183.02	15.5417	0.5308	1.224	0.256634E 00
09:48:01	1143.02	15.5347	0.5378	1.241	0.270[illegible]54E 00
10:48:01	1203.02	15.5313	0.5412	1.248	0.284[illegible]74E 00
11:48:01	1263.02	15.5070	0.5655	1.304	0.299[illegible]94E 00
12:48:01	1323.02	15.4827	0.5898	1.361	0.313[illegible]14E 00
13:48:01	1383.02	15.4549	0.6176	1.425	0.327[illegible]34E 00
14:48:01	1443.02	15.4272	0.6453	1.489	0.341[illegible]54E 00
15:48:01	1503.02	15.4029	0.6696	1.545	0.355[illegible]74E 00
16:48:01	1563.02	15.3682	0.7043	1.625	0.369[illegible]94E 00
17:48:01	1623.02	15.3509	0.7216	1.665	0.384[illegible]15E 00
18:48:01	1683.02	15.3162	0.7563	1.745	0.398[illegible]35E 00
19:48:01	1743.02	15.3335	0.7390	1.705	0.412[illegible]55E 00
20:48:01	1803.02	15.3682	0.7043	1.625	0.426[illegible]75E 00
21:48:01	1863.02	15.3855	0.6870	1.585	0.440[illegible]95E 00
22:48:01	1923.02	15.3890	0.6835	1.577	0.455[illegible]15E 00
23:48:01	1983.02	15.4064	0.6661	1.537	0.469[illegible]35E 00
00:48:42	2043.70	15.3821	0.6904	1.593	0.483[illegible]72E 00
01:48:41	2103.68	15.3959	0.6766	1.561	0.497[illegible]91E 00
02:48:41	2163.68	15.3891	0.6835	1.577	0.512[illegible]15E 00
03:48:41	2223.68	15.3786	0.6939	1.601	0.526[illegible]35E 00
04:48:41	2283.68	15.3821	0.6904	1.593	0.540[illegible]55E 00
05:48:41	2343.68	15.3717	0.7008	1.617	0.554[illegible]75E 00
06:48:41	2403.68	15.3786	0.6939	1.601	0.568[illegible]95E 00
07:48:41	2463.68	15.3821	0.6904	1.593	0.583[illegible]12E 00
08:48:41	2523.68	15.3855	0.6870	1.585	0.597[illegible]32E 00
09:48:41	2583.68	15.3786	0.6939	1.601	0.611[illegible]52E 00
10:48:41	2643.68	15.3578	0.7147	1.649	0.625[illegible]72E 00
11:48:41	2703.68	15.3370	0.7355	1.697	0.639[illegible]92E 00
12:48:41	2763.68	15.3196	0.7529	1.737	0.654[illegible]12E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE #05

WELL NUMBER : P41A
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : [illegible] GPM
STATIC PRESSURE : 16.0725 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 19, 1984)					
13:48:41	2823.68	15.2746	0.7979	1.841	0.66933E 00
14:48:41	2883.68	15.2433	0.8292	1.913	0.68253E 00
15:48:41	2943.68	15.2537	0.8188	1.889	0.69673E 00
16:48:41	3003.68	15.2641	0.8084	1.865	0.71093E 00
17:48:41	3063.68	15.2606	0.8119	1.873	0.72513E 00
18:48:41	3123.68	15.2641	0.8084	1.865	0.73933E 00
19:48:41	3183.68	15.2849	0.7876	1.817	0.75353E 00
20:48:41	3243.68	15.2849	0.7876	1.817	0.76774E 00
21:48:41	3303.68	15.2918	0.7806	1.801	0.78194E 00
22:48:41	3363.68	15.2918	0.7806	1.801	0.79614E 00
23:48:41	3423.68	15.2988	0.7737	1.785	0.81034E 00
00:48:41	3483.68	15.2884	0.7841	1.809	0.82454E 00
01:48:41	3543.68	15.2953	0.7772	1.793	0.83874E 00
02:48:41	3603.68	15.2815	0.7910	1.825	0.85294E 00
03:48:41	3663.68	15.2884	0.7841	1.809	0.86714E 00
04:48:41	3723.68	15.2780	0.7945	1.833	0.88135E 00
05:48:41	3783.68	15.2815	0.7910	1.825	0.89555E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE #1

WELL NUMBER : P-1S
RADIUS (R) : 65.00 FEET
DISCHARGE (Q) : 1200.00 GPM
STATIC PRESSURE : 3.6105 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 06:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:45:10	0.17	3.6105	0.0000	0.000	0.39449E-04
14:45:20	0.33	3.6105	0.0000	0.000	0.78895E-04
14:45:30	0.50	3.6105	0.0000	0.000	0.11834E-03
14:45:40	0.67	3.6105	0.0000	0.000	0.15779E-03
14:45:50	0.83	3.6075	0.0030	0.007	0.19724E-03
14:46:00	1.00	3.6030	0.0075	0.017	0.23669E-03
14:46:10	1.17	3.6000	0.0105	0.024	0.27613E-03
14:46:20	1.33	3.6000	0.0105	0.024	0.31558E-03
14:46:30	1.50	3.5955	0.0150	0.035	0.35503E-03
14:46:40	1.67	3.5925	0.0180	0.042	0.39448E-03
14:46:50	1.83	3.5850	0.0255	0.059	0.43393E-03
14:47:00	2.00	3.5805	0.0300	0.069	0.47337E-03
14:47:10	2.17	3.5775	0.0330	0.076	0.51282E-03
14:47:20	2.33	3.5700	0.0405	0.093	0.55227E-03
14:47:30	2.50	3.5625	0.0480	0.111	0.59172E-03
14:47:40	2.67	3.5505	0.0600	0.138	0.63116E-03
14:47:50	2.83	3.5400	0.0705	0.163	0.67061E-03
14:48:00	3.00	3.5325	0.0780	0.180	0.71006E-03
14:48:10	3.17	3.5250	0.0855	0.197	0.74951E-03
14:48:20	3.33	3.5175	0.0930	0.215	0.78895E-03
14:48:30	3.50	3.5100	0.1005	0.232	0.82840E-03
14:48:40	3.67	3.4980	0.1125	0.260	0.86785E-03
14:48:50	3.83	3.4950	0.1155	0.266	0.90730E-03
14:49:00	4.00	3.4830	0.1275	0.294	0.94675E-03
14:49:10	4.17	3.4755	0.1350	0.311	0.98619E-03
14:49:20	4.33	3.4680	0.1425	0.329	0.10256E-02
14:49:30	4.50	3.4605	0.1500	0.346	0.10651E-02
14:49:40	4.67	3.4530	0.1575	0.363	0.11045E-02
14:49:50	4.83	3.4455	0.1650	0.381	0.11440E-02
14:50:00	5.00	3.4380	0.1725	0.398	0.11834E-02

PUMP TEST (DRAWDOWN PHASE)

PROJECT #83585
PAGE #32

WELL NUMBER : P41S
RADIUS (R) : 65.00 FEET
DISCHARGE (Q) : 1290.00 GPM
STATIC PRESSURE : 3.6135 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 06:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/P**2 (MIN/SQFT)
(JUL 17, 1984)					
14:50:30	5.50	3.4275	0.1830	0.422	0.13018E-02
14:51:00	6.00	3.4125	0.1980	0.457	0.14231E-02
14:51:30	6.50	3.3975	0.2130	0.491	0.15385E-02
14:52:00	7.00	3.3750	0.2355	0.543	0.16568E-02
14:52:30	7.50	3.3675	0.2430	0.561	0.17751E-02
14:53:00	8.00	3.3825	0.2280	0.526	0.16935E-02
14:53:30	8.50	3.3705	0.2400	0.554	0.20118E-02
14:54:00	9.00	3.3525	0.2580	0.595	0.21302E-02
14:54:30	9.50	3.3375	0.2730	0.630	0.22485E-02
14:55:00	10.00	3.3255	0.2850	0.657	0.23669E-02
14:56:00	11.00	3.3150	0.2955	0.682	0.26035E-02
14:57:00	12.00	3.3150	0.2955	0.682	0.28402E-02
14:58:00	13.00	3.3075	0.3030	0.699	0.30769E-02
14:59:00	14.00	3.3075	0.3030	0.699	0.33136E-02
15:00:00	15.00	3.3075	0.3030	0.699	0.35503E-02
15:01:00	16.00	3.3030	0.3075	0.709	0.37870E-02
15:02:00	17.00	3.3000	0.3105	0.716	0.40237E-02
15:03:00	18.00	3.3000	0.3105	0.716	0.42604E-02
15:04:00	19.00	3.3000	0.3105	0.716	0.44970E-02
15:05:00	20.00	3.3000	0.3105	0.716	0.47337E-02
15:06:00	21.00	3.2925	0.3180	0.734	0.49704E-02
15:07:00	22.00	3.2955	0.3150	0.727	0.52071E-02
15:08:00	23.00	3.2955	0.3150	0.727	0.54438E-02
15:09:00	24.00	3.2925	0.3180	0.734	0.56805E-02
15:10:00	25.00	3.2955	0.3150	0.727	0.59172E-02
15:11:00	26.00	3.2955	0.3150	0.727	0.61538E-02
15:12:00	27.00	3.3000	0.3105	0.716	0.63905E-02
15:13:00	28.00	3.3030	0.3075	0.709	0.66272E-02
15:14:00	29.00	3.3030	0.3075	0.709	0.68639E-02
15:15:00	30.00	3.3075	0.3030	0.699	0.71006E-02

PUMP TEST (DRAWDOWN PHASE)

PROJECT #83505
PAGE #13

WELL NUMBER : P41S
RADIUS (R) : 65.00 FEET
DISCHARGE (Q) : 1280.00 GPM
STATIC PRESSURE : 3.6105 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 06:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
15:20:00	35.00	3.2925	0.3180	0.734	0.82840E-02
15:25:00	40.00	3.2775	0.3330	0.768	0.94675E-02
15:30:00	45.00	3.2775	0.3330	0.768	0.10651E-01
15:35:00	50.00	3.2580	0.3525	0.813	0.11834E-01
15:40:00	55.00	3.2655	0.3450	0.796	0.13018E-01
15:45:00	60.00	3.2580	0.3525	0.813	0.14201E-01
15:50:00	65.00	3.2505	0.3600	0.830	0.15385E-01
15:55:00	70.00	3.2550	0.3555	0.820	0.16568E-01
16:00:00	75.00	3.2550	0.3555	0.820	0.17751E-01
16:05:00	80.00	3.2475	0.3630	0.837	0.18935E-01
16:10:00	85.00	3.2430	0.3675	0.848	0.20118E-01
16:15:00	90.00	3.2505	0.3600	0.830	0.21302E-01
16:20:00	95.00	3.2730	0.3375	0.779	0.22485E-01
16:36:00	111.00	3.3105	0.3000	0.692	0.26272E-01
16:51:00	126.00	3.2925	0.3180	0.734	0.29822E-01
17:06:00	141.00	3.2730	0.3375	0.779	0.33373E-01
17:21:00	156.00	3.2700	0.3405	0.785	0.36923E-01
17:36:00	171.00	3.2625	0.3480	0.803	0.40473E-01
17:51:00	186.00	3.2625	0.3480	0.803	0.44024E-01
18:06:00	201.00	3.2580	0.3525	0.813	0.47574E-01
18:21:00	216.00	3.2655	0.3450	0.796	0.51124E-01
18:36:00	231.00	3.2730	0.3375	0.779	0.54675E-01
18:51:00	246.00	3.2730	0.3375	0.779	0.58225E-01
19:06:00	261.00	3.2850	0.3255	0.751	0.61775E-01
19:21:00	276.00	3.2805	0.3300	0.761	0.65325E-01
19:36:00	291.00	3.2805	0.3300	0.761	0.68876E-01
19:51:00	306.00	3.2730	0.3375	0.779	0.72426E-01
20:06:00	321.00	3.2730	0.3375	0.779	0.75976E-01
20:21:00	336.00	3.2655	0.3450	0.796	0.79527E-01
20:36:00	351.00	3.2625	0.3480	0.803	0.83077E-01

PUMP TEST (DRAWDOWN PHASE)

PROJECT #83505
PAGE #24

WELL NUMBER : P41S
RADIUS (R) : 65.00 FEET
DISCHARGE (Q) : 1290.00 GPM
STATIC PRESSURE : 3.6105 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 06:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
20:51:00	366.00	3.2580	0.3525	0.813	0.86627E-01
21:06:00	381.00	3.2505	0.3600	0.830	0.90178E-01
21:21:00	396.00	3.2550	0.3555	0.820	0.93728E-01
21:36:00	411.00	3.2475	0.3630	0.837	0.97278E-01
21:51:00	426.00	3.2430	0.3675	0.848	0.10083E 00
22:06:00	441.00	3.2400	0.3705	0.855	0.10438E 00
22:21:00	456.00	3.2355	0.3750	0.865	0.10793E 00
22:36:00	471.00	3.2355	0.3750	0.865	0.11148E 00
23:06:00	501.00	3.2325	0.3780	0.872	0.11858E 00
23:36:00	531.00	3.2325	0.3780	0.872	0.12568E 00
00:06:00	561.00	3.2250	0.3855	0.889	0.13278E 00
00:36:00	591.00	3.2280	0.3825	0.882	0.13988E 00
01:06:00	621.00	3.2280	0.3825	0.882	0.14698E 00
01:36:00	651.00	3.2205	0.3900	0.900	0.15408E 00
02:06:00	681.00	3.2280	0.3825	0.882	0.16118E 00
02:36:00	711.00	3.2280	0.3825	0.882	0.16828E 00
03:06:00	741.00	3.2250	0.3855	0.889	0.17538E 00
03:36:00	771.00	3.2205	0.3900	0.900	0.18249E 00
04:06:00	801.00	3.2175	0.3930	0.907	0.18959E 00
04:36:00	831.00	3.2175	0.3930	0.907	0.19669E 00
05:06:00	861.00	3.2130	0.3975	0.917	0.20379E 00
05:36:00	891.00	3.2100	0.4005	0.924	0.21089E 00
06:06:00	921.00	3.2100	0.4005	0.924	0.21799E 00
06:36:00	951.00	3.2025	0.4080	0.941	0.22509E 00
07:06:00	981.00	3.1875	0.4230	0.976	0.23219E 00
07:36:00	1011.00	3.1725	0.4380	1.010	0.23929E 00
08:06:00	1041.00	3.1680	0.4425	1.021	0.24639E 00
08:36:00	1071.00	3.1350	0.4755	1.097	0.25349E 00
09:06:00	1101.00	3.1530	0.4575	1.055	0.26059E 00
09:36:00	1131.00	3.1500	0.4605	1.062	0.26769E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : P4:S
RADIUS (R) : 65.00 FEET
DISCHARGE (Q) : 1290.00 GPM
STATIC PRESSURE : 3.6105 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 06:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 18, 1984)					
10:06:00	1161.00	3.1500	0.4605	1.062	0.27479E 00
10:36:00	1191.00	3.1350	0.4755	1.097	0.28199E 00
11:06:00	1221.00	3.1350	0.4755	1.097	0.28899E 00
11:36:00	1251.00	3.1200	0.4905	1.131	0.29609E 00
12:06:00	1281.00	3.1005	0.5100	1.176	0.30320E 00
12:36:00	1311.00	3.0930	0.5175	1.194	0.31030E 00
13:06:00	1341.00	3.1005	0.5100	1.176	0.31740E 00
13:36:00	1371.00	3.0855	0.5250	1.211	0.32450E 00
14:06:00	1401.00	3.1155	0.4950	1.142	0.33160E 00
14:36:00	1431.00	3.0825	0.5280	1.218	0.33870E 00
15:36:00	1491.00	3.0675	0.5430	1.253	0.35290E 00
16:36:00	1551.00	3.0300	0.5805	1.339	0.36710E 00
17:36:00	1611.00	3.0555	0.5550	1.280	0.38130E 00
18:36:00	1671.00	3.0450	0.5655	1.304	0.39550E 00
19:36:00	1731.00	3.0705	0.5400	1.246	0.40970E 00
20:36:00	1791.00	3.0855	0.5250	1.211	0.42391E 00
21:36:00	1851.00	3.0900	0.5205	1.201	0.43811E 00
22:36:00	1911.00	3.0630	0.5475	1.263	0.45231E 00
23:36:00	1971.00	3.0480	0.5625	1.298	0.46651E 00
00:36:00	2031.00	3.0480	0.5625	1.298	0.48071E 00
01:46:00	2101.00	3.0375	0.5730	1.322	0.49738E 00
02:46:00	2161.00	3.0300	0.5805	1.339	0.51158E 00
03:46:00	2221.00	3.0405	0.5700	1.315	0.52569E 00
04:46:00	2281.00	3.0330	0.5775	1.332	0.53988E 00
05:46:00	2341.00	3.0255	0.5850	1.349	0.55408E 00
06:46:00	2401.00	2.9955	0.6150	1.419	0.56828E 00
07:46:00	2461.00	2.9505	0.6600	1.522	0.58249E 00
08:46:00	2521.00	2.9775	0.6330	1.460	0.59669E 00
09:46:00	2581.00	2.9580	0.6525	1.505	0.61089E 00
10:46:00	2641.00	2.9325	0.6780	1.564	0.62508E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT #83505
PAGE #26

WELL NUMBER : P41S
RADIUS (R) : 65.00 FEET
DISCHARGE (Q) : 1280.00 GPM
STATIC PRESSURE : 3.6105 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:46:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 06:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSUPE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 19, 1984)					
11:46:00	2701.00	2.9205	0.6900	1.592	0.63929E 00
12:46:00	2761.00	2.9130	0.6975	1.609	0.65349E 00
14:46:00	2881.00	2.9625	0.6480	1.495	0.68189E 00
16:46:00	3001.00	2.9475	0.6630	1.529	0.71030E 00
18:46:00	3121.00	2.9475	0.6630	1.529	0.73870E 00
20:46:00	3241.00	2.9205	0.6900	1.592	0.76710E 00
22:46:00	3361.00	2.9280	0.6825	1.574	0.79550E 00
00:46:00	3481.00	2.9130	0.6975	1.609	0.82391E 00
02:46:00	3601.00	2.9205	0.6900	1.592	0.85231E 00
04:46:00	3721.00	2.9100	0.7005	1.616	0.88071E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT PAGE 15
PAGE # 1

WELL NUMBER : P436
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 16.3341 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/P**2 (MIN/SQFT)
(JUL 17, 1984)					
14:45:01	0.02	16.3350	-0.0009	-0.002	0.78765E-05
14:45:11	0.18	16.3333	0.0008	0.002	0.86641E-04
14:45:21	0.35	16.3316	0.0025	0.006	0.16541E-03
14:45:31	0.52	16.3333	0.0008	0.002	0.24417E-03
14:45:41	0.68	16.3341	0.0000	0.000	0.32294E-03
14:45:51	0.85	16.3341	0.0000	0.000	0.40170E-03
14:46:01	1.02	16.3333	0.0008	0.002	0.48047E-03
14:46:11	1.18	16.3316	0.0025	0.006	0.55923E-03
14:46:21	1.35	16.3341	0.0000	0.000	0.63800E-03
14:46:31	1.52	16.3333	0.0008	0.002	0.71676E-03
14:46:41	1.68	16.3316	0.0025	0.006	0.79553E-03
14:46:51	1.85	16.3316	0.0025	0.006	0.87429E-03
14:47:01	2.02	16.3308	0.0033	0.008	0.95306E-03
14:47:11	2.18	16.3284	0.0057	0.013	0.10318E-02
14:47:21	2.35	16.3300	0.0041	0.009	0.11106E-02
14:47:31	2.52	16.3292	0.0049	0.011	0.11894E-02
14:47:41	2.68	16.3267	0.0074	0.017	0.12681E-02
14:47:51	2.85	16.3259	0.0082	0.019	0.13469E-02
14:48:01	3.02	16.3267	0.0074	0.017	0.14256E-02
14:48:21	3.35	16.3234	0.0107	0.025	0.15837E-02
14:48:41	3.68	16.3234	0.0107	0.025	0.17417E-02
14:49:01	4.02	16.3218	0.0123	0.028	0.18998E-02
14:49:31	4.52	16.3185	0.0156	0.036	0.21345E-02
14:50:01	5.02	16.3160	0.0181	0.042	0.23692E-02
14:50:31	5.52	16.3110	0.0231	0.053	0.26039E-02
14:51:01	6.02	16.3077	0.0264	0.061	0.28434E-02
14:51:31	6.52	16.3044	0.0297	0.069	0.30797E-02
14:52:01	7.02	16.3020	0.0321	0.074	0.33160E-02
14:52:31	7.52	16.2987	0.0354	0.082	0.35523E-02
14:53:01	8.02	16.2954	0.0387	0.089	0.37886E-02

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : P-[illegible]
RADIUS (R) : [illegible] FEET
DISCHARGE (Q) : [illegible] GPM
STATIC PRESSURE : 16.3341 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:53:31	8.52	16.2913	0.0428	0.099	0.40249E-02
14:54:31	9.02	16.2871	0.0470	0.108	0.42612E-02
14:54:31	9.52	16.2830	0.0511	0.118	0.44975E-02
14:55:01	10.02	16.2789	0.0552	0.127	0.47339E-02
14:56:05	11.08	16.2723	0.0618	0.143	0.52379E-02
14:57:05	12.08	16.2632	0.0709	0.164	0.57105E-02
14:58:05	13.08	16.2566	0.0775	0.179	0.61830E-02
14:59:05	14.08	16.2492	0.0849	0.196	0.66556E-02
15:00:05	15.08	16.2419	0.0923	0.213	0.71282E-02
15:01:05	16.08	16.2360	0.0981	0.226	0.76008E-02
15:02:05	17.08	16.2286	0.1055	0.243	0.80734E-02
15:03:05	18.08	16.2229	0.1113	0.257	0.85460E-02
15:04:05	19.08	16.2170	0.1171	0.270	0.90186E-02
15:05:05	20.08	16.2088	0.1253	0.289	0.94912E-02
15:06:05	21.08	16.2005	0.1336	0.308	0.99638E-02
15:07:05	22.08	16.1964	0.1377	0.318	0.10436E-01
15:08:05	23.08	16.1906	0.1435	0.331	0.10909E-01
15:09:05	24.08	16.1848	0.1493	0.344	0.11382E-01
15:10:05	25.08	16.1766	0.1575	0.363	0.11854E-01
15:12:05	27.08	16.1659	0.1682	0.388	0.12799E-01
15:14:05	29.08	16.1576	0.1765	0.407	0.13744E-01
15:16:21	31.35	16.1453	0.1888	0.436	0.14816E-01
15:18:21	33.35	16.1378	0.1963	0.453	0.15761E-01
15:20:21	35.35	16.1287	0.2054	0.474	0.16706E-01
15:22:21	37.35	16.1205	0.2136	0.493	0.17651E-01
15:24:21	39.35	16.1088	0.2252	0.519	0.18596E-01
15:26:21	41.35	16.0995	0.2342	0.540	0.19542E-01
15:28:21	43.35	16.0900	0.2441	0.563	0.20487E-01
15:30:21	45.35	16.0834	0.2507	0.578	0.21432E-01
15:35:21	50.35	16.0659	0.2682	0.620	0.23795E-01

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : P-7B
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 1280[illegible].00 GPM
STATIC PRESSURE : 16.3341 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
15:40:21	55.35	16.0462	0.2879	0.664	0.261585E-01
15:45:21	60.35	16.0306	0.3035	0.700	0.285216-01
15:50:21	65.35	16.0149	0.3192	0.736	0.309[illegible]4E-01
15:55:21	70.35	15.9984	0.3357	0.774	0.33247E-01
16:00:21	75.35	15.9844	0.3497	0.807	0.35610E-01
16:05:21	80.35	15.9720	0.3621	0.835	0.37973E-01
16:10:21	85.35	15.9613	0.3728	0.860	0.40336E-01
16:15:21	90.35	15.9497	0.3844	0.887	0.426995-01
16:48:01	123.02	15.9051	0.4290	0.990	0.581365-01
17:18:01	153.02	15.8746	0.4595	1.060	0.723145-01
17:48:01	183.02	15.8548	0.4793	1.106	0.864925-01
18:18:01	213.02	15.8449	0.4892	1.128	0.100675 00
18:48:01	243.02	15.8358	0.4983	1.149	0.114955 00
19:18:01	273.02	15.8284	0.5057	1.167	0.129225 00
19:48:01	303.02	15.8234	0.5107	1.178	0.143205 00
20:18:01	333.02	15.8243	0.5098	1.176	0.157385 00
20:48:01	363.02	15.8226	0.5115	1.180	0.171565 00
21:18:01	393.02	15.8243	0.5098	1.176	0.185745 00
21:48:01	423.02	15.8268	0.5073	1.170	0.199915 00
22:18:01	453.02	15.8300	0.5041	1.163	0.214095 00
22:48:01	483.02	15.8358	0.4983	1.149	0.228275 00
23:18:01	513.02	15.8340	0.4999	1.153	0.242455 00
23:48:01	543.02	15.8325	0.5016	1.157	0.256625 00
00:48:01	603.02	15.8284	0.5057	1.167	0.284985 00
01:48:01	663.02	15.8251	0.5090	1.174	0.313335 00
02:48:01	723.02	15.8144	0.5197	1.199	0.341695 00
03:48:01	783.02	15.8094	0.5247	1.210	0.370055 00
04:48:01	843.02	15.8036	0.5305	1.224	0.398415 00
05:48:01	903.02	15.8061	0.5280	1.218	0.426765 00
06:48:01	963.02	15.8036	0.5305	1.224	0.455115 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT #83515
PAGE #14

WELL NUMBER : P47R
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 1280.00 GPM
STATIC PRESSURE : 15.3341 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 18, 1984)					
07:48:01	1023.02	15.8061	0.5280	1.219	0.48347E 00
08:48:01	1083.02	15.8086	0.5255	1.212	0.51182E 00
09:48:01	1143.02	15.8119	0.5222	1.205	0.54018E 00
10:48:01	1203.02	15.8119	0.5222	1.205	0.56853E 00
11:48:01	1263.02	15.8012	0.5329	1.229	0.59689E 00
12:48:01	1323.02	15.7838	0.5503	1.269	0.62524E 00
13:48:01	1383.02	15.7640	0.5701	1.315	0.65360E 00
14:48:01	1443.02	15.7360	0.5981	1.380	0.68195E 00
15:48:01	1503.02	15.7062	0.6279	1.448	0.71031E 00
16:48:01	1563.02	15.6815	0.6526	1.505	0.73867E 00
17:48:01	1623.02	15.6600	0.6741	1.555	0.76702E 00
18:48:01	1683.02	15.6419	0.6922	1.597	0.79538E 00
19:48:01	1743.02	15.6394	0.6947	1.603	0.82373E 00
20:48:01	1803.02	15.6435	0.6906	1.593	0.85209E 00
21:48:01	1863.02	15.6575	0.6766	1.561	0.88044E 00
22:48:01	1923.02	15.6691	0.6650	1.534	0.90880E 00
23:48:01	1983.02	15.6749	0.6592	1.521	0.93715E 00
00:48:42	2043.70	15.6741	0.6600	1.522	0.96563E 00
01:48:41	2103.68	15.6757	0.6584	1.519	0.99418E 00
02:48:41	2163.68	15.6675	0.6666	1.538	0.10225E 01
03:48:41	2223.68	15.6650	0.6691	1.543	0.10513E 01
04:48:41	2283.68	15.6642	0.6699	1.545	0.10798E 01
05:48:41	2343.68	15.6666	0.6675	1.540	0.11076E 01
06:48:41	2403.68	15.6658	0.6683	1.542	0.11360E 01
07:48:41	2463.68	15.6675	0.6666	1.538	0.11643E 01
08:48:41	2523.68	15.6716	0.6625	1.528	0.11927E 01
09:48:41	2583.68	15.6724	0.6617	1.526	0.12210E 01
10:48:41	2643.68	15.6708	0.6633	1.530	0.12494E 01
11:48:41	2703.68	15.6625	0.6716	1.549	0.12777E 01
12:48:41	2763.68	15.6443	0.6898	1.591	0.13061E 01

PUMP TEST (DRAWDOWN PHASE)

PROJECT #83[illegible]
CASE #[illegible]

WELL NUMBER : [illegible]
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 1280[illegible].00 GPM
STATIC PRESSURE : 16.3341 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 19, 1984)					
13:48:41	2823.68	15.6221	0.7120	1.642	0.13344E 01
14:48:41	2883.68	15.5940	0.7401	1.707	0.13628E 01
15:48:41	2943.68	15.5865	0.7476	1.725	0.13912E 01
16:48:41	3003.68	15.5940	0.7401	1.707	0.14195E 01
17:48:41	3063.68	15.5700	0.7641	1.763	0.14479E 01
18:48:41	3123.68	15.5766	0.7575	1.747	0.14762E 01
19:48:41	3183.68	15.5923	0.7418	1.711	0.15046E 01
20:48:41	3243.68	15.5956	0.7385	1.704	0.15329E 01
21:48:41	3303.68	15.5948	0.7393	1.705	0.15613E 01
22:48:41	3363.68	15.5956	0.7385	1.704	0.15896E 01
23:48:41	3423.68	15.6006	0.7335	1.692	0.16180E 01
00:48:41	3483.68	15.5964	0.7377	1.702	0.16464E 01
01:48:41	3543.68	15.5907	0.7434	1.715	0.16747E 01
02:48:41	3603.68	15.5808	0.7533	1.738	0.17031E 01
03:48:41	3663.68	15.5725	0.7616	1.757	0.17314E 01
04:48:41	3723.68	15.5725	0.7616	1.757	0.17598E 01
05:48:41	3783.68	15.5725	0.7616	1.757	0.17881E 01

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : P47C
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 1280[illegible].00 GPM
STATIC PRESSURE : 17.6750 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:45:01	0.02	17.6759	-0.0009	-0.002	0.78765E-05
14:45:11	0.18	17.6750	0.0000	0.000	0.86641E-04
14:45:21	0.35	17.6731	0.0019	0.004	0.16541E-03
14:45:31	0.52	17.6722	0.0028	0.006	0.24417E-03
14:45:41	0.68	17.6713	0.0037	0.009	0.32294E-03
14:45:51	0.85	17.6694	0.0056	0.013	0.40170E-03
14:46:01	1.02	17.6667	0.0083	0.019	0.48047E-03
14:46:11	1.18	17.6648	0.0102	0.024	0.55923E-03
14:46:21	1.35	17.6639	0.0111	0.026	0.63800E-03
14:46:31	1.52	17.6593	0.0157	0.036	0.71676E-03
14:46:41	1.68	17.6556	0.0194	0.045	0.79553E-03
14:46:51	1.85	17.6547	0.0203	0.047	0.87429E-03
14:47:01	2.02	17.6519	0.0231	0.053	0.95306E-03
14:47:11	2.18	17.6482	0.0268	0.062	0.10318E-02
14:47:21	2.35	17.6445	0.0305	0.070	0.11106E-02
14:47:31	2.52	17.6436	0.0314	0.072	0.11894E-02
14:47:41	2.68	17.6380	0.0370	0.085	0.12681E-02
14:47:51	2.85	17.6343	0.0407	0.094	0.13469E-02
14:48:01	3.02	17.6297	0.0453	0.104	0.14256E-02
14:48:21	3.35	17.6242	0.0508	0.117	0.15832E-02
14:48:41	3.68	17.6140	0.0610	0.141	0.17407E-02
14:49:01	4.02	17.6057	0.0693	0.160	0.18983E-02
14:49:31	4.52	17.5937	0.0813	0.188	0.21345E-02
14:50:01	5.02	17.5826	0.0924	0.213	0.23708E-02
14:50:31	5.52	17.5687	0.1063	0.245	0.26071E-02
14:51:01	6.02	17.5556	0.1192	0.275	0.28434E-02
14:51:31	6.52	17.5429	0.1321	0.305	0.30797E-02
14:52:01	7.02	17.5298	0.1451	0.335	0.33161E-02
14:52:31	7.52	17.5188	0.1562	0.360	0.35523E-02
14:53:01	8.02	17.5077	0.1673	0.386	0.37886E-02

PUMP TEST (DRAWDOWN PHASE)

PROJECT PAGE
PAGE

WELL NUMBER : P-7C
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 1280.00 GPM
STATIC PRESSURE : 17.6750 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
14:53:31	8.52	17.4948	0.1802	0.416	0.40249E-02
14:54:01	9.02	17.4865	0.1885	0.435	0.42612E-02
14:54:31	9.52	17.4735	0.2015	0.465	0.44975E-02
14:55:01	10.02	17.4615	0.2135	0.493	0.47338E-02
14:56:05	11.08	17.4393	0.2357	0.544	0.52379E-02
14:57:05	12.08	17.4199	0.2551	0.588	0.57185E-02
14:58:05	13.08	17.4005	0.2745	0.633	0.61830E-02
14:59:05	14.08	17.3829	0.2921	0.674	0.66556E-02
15:00:05	15.08	17.3682	0.3068	0.708	0.71292E-02
15:01:05	16.08	17.3497	0.3253	0.750	0.76028E-02
15:02:05	17.08	17.3367	0.3383	0.780	0.80764E-02
15:03:05	18.08	17.3229	0.3521	0.812	0.85460E-02
15:04:05	19.08	17.3109	0.3641	0.840	0.90186E-02
15:05:05	20.08	17.2998	0.3752	0.866	0.94912E-02
15:06:05	21.08	17.2868	0.3882	0.896	0.99638E-02
15:07:05	22.08	17.2757	0.3993	0.921	0.10436E-01
15:08:05	23.08	17.2655	0.4095	0.945	0.10909E-01
15:09:05	24.08	17.2563	0.4187	0.966	0.11382E-01
15:10:05	25.08	17.2461	0.4289	0.989	0.11854E-01
15:12:05	27.08	17.2295	0.4455	1.028	0.12799E-01
15:14:05	29.08	17.2166	0.4584	1.057	0.13744E-01
15:16:21	31.35	17.2045	0.4705	1.085	0.14816E-01
15:18:21	33.35	17.1925	0.4825	1.113	0.15761E-01
15:20:21	35.35	17.1842	0.4908	1.132	0.16706E-01
15:22:21	37.35	17.1740	0.5010	1.156	0.17651E-01
15:24:21	39.35	17.1639	0.5111	1.179	0.18596E-01
15:26:21	41.35	17.1574	0.5176	1.194	0.19542E-01
15:28:21	43.35	17.1518	0.5232	1.207	0.20487E-01
15:30:21	45.35	17.1463	0.5287	1.220	0.21432E-01
15:35:21	50.35	17.1352	0.5398	1.245	0.23795E-01

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : P-3C
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 12900.00 GPM
STATIC PRESSURE : 17.6750 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 17, 1984)					
15:40:21	55.35	17.1241	0.5509	1.271	0.26158E-01
15:45:21	60.35	17.1174	0.5574	1.286	0.28521E-01
15:50:21	65.35	17.1093	0.5657	1.305	0.30884E-01
15:55:21	70.35	17.1019	0.5731	1.322	0.33247E-01
16:00:21	75.35	17.0973	0.5777	1.333	0.35610E-01
16:05:21	80.35	17.0917	0.5833	1.346	0.37973E-01
16:10:21	85.35	17.0890	0.5860	1.352	0.40336E-01
16:15:21	90.35	17.0853	0.5897	1.360	0.42699E-01
16:49:01	123.02	17.0769	0.5981	1.380	0.58136E-01
17:18:01	153.02	17.0760	0.5990	1.382	0.72314E-01
17:48:01	183.02	17.0760	0.5990	1.382	0.86492E-01
18:18:01	213.02	17.0769	0.5981	1.380	0.10067E 00
18:48:01	243.02	17.0760	0.5990	1.382	0.11485E 00
19:18:01	273.02	17.0723	0.6027	1.390	0.12902E 00
19:48:01	303.02	17.0714	0.6036	1.392	0.14320E 00
20:18:01	333.02	17.0751	0.5999	1.384	0.15738E 00
20:48:01	363.02	17.0788	0.5962	1.375	0.17156E 00
21:18:01	393.02	17.0816	0.5934	1.369	0.18574E 00
21:48:01	423.02	17.0806	0.5944	1.371	0.19991E 00
22:18:01	453.02	17.0853	0.5897	1.360	0.21409E 00
22:48:01	483.02	17.0880	0.5870	1.354	0.22827E 00
23:18:01	513.02	17.0871	0.5879	1.356	0.24245E 00
23:48:01	543.02	17.0862	0.5888	1.358	0.25663E 00
00:48:01	603.02	17.0816	0.5934	1.369	0.28499E 00
01:48:01	663.02	17.0779	0.5971	1.377	0.31333E 00
02:48:01	723.02	17.0649	0.6101	1.407	0.34169E 00
03:48:01	783.02	17.0594	0.6156	1.420	0.37005E 00
04:48:01	843.02	17.0557	0.6193	1.429	0.39841E 00
05:48:01	903.02	17.0520	0.6230	1.437	0.42676E 00
06:48:01	963.02	17.0483	0.6267	1.446	0.45511E 00

PUMP TEST (DRAWDOWN PHASE)

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : P47C
RADIUS (R) : 46.00 FEET
DISCHARGE (Q) : 12800.00 GPM
STATIC PRESSURE : 17.6750 PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 18, 1984)					
07:48:01	1023.02	17.0501	0.6249	1.442	0.48347E 00
08:48:01	1083.02	17.0520	0.6230	1.437	0.51192E 00
09:48:01	1143.02	17.0510	0.6240	1.439	0.54018E 00
10:48:01	1203.02	17.0418	0.6332	1.461	0.56853E 00
11:48:01	1263.02	17.0177	0.6573	1.516	0.59689E 00
12:48:01	1323.02	16.9937	0.6813	1.572	0.62524E 00
13:48:01	1383.02	16.9706	0.7044	1.625	0.65360E 00
14:48:01	1443.02	16.9364	0.7386	1.704	0.68195E 00
15:48:01	1503.02	16.9105	0.7645	1.764	0.71031E 00
16:48:01	1563.02	16.8781	0.7969	1.838	0.73867E 00
17:48:01	1623.02	16.8531	0.8219	1.896	0.76702E 00
18:48:01	1683.02	16.8365	0.8385	1.934	0.79538E 00
19:48:01	1743.02	16.8642	0.8108	1.870	0.82373E 00
20:48:01	1803.02	16.8864	0.7886	1.819	0.85209E 00
21:48:01	1863.02	16.9022	0.7728	1.783	0.88044E 00
22:48:01	1923.02	16.9123	0.7627	1.759	0.90880E 00
23:48:01	1983.02	16.9179	0.7571	1.746	0.93715E 00
00:48:42	2043.70	16.9169	0.7581	1.749	0.96583E 00
01:48:41	2103.68	16.9197	0.7553	1.742	0.99418E 00
02:48:41	2163.68	16.9086	0.7664	1.768	0.10225E 01
03:48:41	2223.68	16.8949	0.7801	1.776	0.10509E 01
04:48:41	2283.68	16.8912	0.7838	1.785	0.10792E 01
05:48:41	2343.68	16.8903	0.7847	1.787	0.11076E 01
06:48:41	2403.68	16.8903	0.7847	1.787	0.11360E 01
07:48:41	2463.68	16.9049	0.7701	1.776	0.11643E 01
08:48:41	2523.68	16.9040	0.7710	1.779	0.11927E 01
09:48:41	2583.68	16.8994	0.7756	1.789	0.12211E 01
10:48:41	2643.68	16.8855	0.7895	1.821	0.12494E 01
11:48:41	2703.68	16.8633	0.8117	1.872	0.12777E 01
12:48:41	2763.68	16.8365	0.8385	1.934	0.13061E 01

PUMP TEST (DRAWDOWN PHASE)

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : P4?C
RADIUS (R) : 46.?? FEET
DISCHARGE (Q) : 12[illegible] GPM
STATIC PRESSURE : 17.675? PSI

PUMP STARTING DATE : JUL 17, 1984 TIME = 14:45:00
PUMP STOPPING DATE : JUL 20, 1984 TIME = 15:00:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	T/R**2 (MIN/SQFT)
(JUL 19, 1984)					
13:48:41	2823.68	16.8087	0.8663	1.998	0.13344E 01
14:48:41	2883.68	16.7782	0.8968	2.069	0.13628E 01
15:48:41	2943.68	16.7985	0.8765	2.022	0.13912E 01
16:48:41	3003.68	16.8050	0.8700	2.007	0.14195E 01
17:48:41	3063.68	16.7939	0.8811	2.033	0.14479E 01
18:48:41	3123.68	16.8022	0.8728	2.013	0.14762E 01
19:48:41	3183.68	16.8087	0.8663	1.998	0.15046E 01
20:48:41	3243.68	16.8133	0.8617	1.988	0.15329E 01
21:48:41	3303.68	16.8170	0.8580	1.979	0.15613E 01
22:48:41	3363.68	16.8189	0.8561	1.975	0.15896E 01
23:48:41	3423.68	16.8226	0.8524	1.966	0.16180E 01
00:48:41	3483.68	16.8198	0.8552	1.973	0.16464E 01
01:48:41	3543.68	16.8152	0.8598	1.983	0.16747E 01
02:48:41	3603.68	16.8097	0.8653	1.996	0.17031E 01
03:48:41	3663.68	16.8170	0.8580	1.979	0.17314E 01
04:48:41	3723.68	16.8152	0.8598	1.983	0.17598E 01
05:48:41	3783.68	16.8097	0.8653	1.996	0.17881E 01

APPENDIX E
SLUG TEST DATA TABLES

SLUG TEST

WELL NUMBER : [illegible]

CASING LENGTH	:	4.[illegible] FEET
CASING DIAMETER	:	[illegible] INCHES
CASING STICK-UP	:	1.17 FEET
DEPTH TO WATER	:	4.43 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 15:47:3[illegible]

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1984)				
15:48:[illegible]	[illegible]	3.72[illegible]	4.11[illegible]	[illegible]
15:48:3[illegible]	1.[illegible]0	3.51[illegible]	3.32[illegible]	[illegible]
15:49:3[illegible]	2.[illegible]0	0.78[illegible]	3.6[illegible]	[illegible]
15:51:3[illegible]	3.[illegible]0	1.11[illegible]	3.32[illegible]	[illegible]
15:55:3[illegible]	[illegible]	2.[illegible]0	2.39[illegible]	[illegible]
16:[illegible]:2[illegible]	13.[illegible]0	2.71[illegible]	1.72[illegible]	[illegible]
16:12:[illegible]	24.[illegible]0	[illegible]	[illegible]	[illegible]
16:22:[illegible]	35.[illegible]	[illegible]	[illegible]	[illegible]
16:34:4[illegible]	47.2[illegible]	4.19[illegible]	[illegible]	[illegible]

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

FILE NUMBER : T***A

PROJECT #[illegible]
PAGE # 1

CASING LENGTH	:	4.[illegible] FEET
CASING DIAMETER	:	2.[illegible] INCHES
CASING STICK-UP	:	1.[illegible]7 FEET
DEPTH TO WATER	:	4.43 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1[illegible]4 TIME = 15:47:3[illegible]

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (SPI*RC**/(11*EC*T))LN(DHO/DH)$$

HYDRAULIC CONDUCTIVITY = [illegible].2217E-05 FEET/SEC

SLUG TEST

FILL [illegible]

CASING LENGTH	:	[illegible] FEET
CASING DIAMETER	:	2.[illegible] INCHES
CASING STICK-UP	:	[illegible] FEET
DEPTH TO WATER	:	4.65 FEET

PROJECT [illegible]
PAGE [illegible]

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 16:[illegible]:3[illegible]

TIME	ELAPSED TIME (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1994)				
16:14:49	[illegible]	[illegible]	4.20[illegible]	[illegible]
16:15:[illegible]	[illegible]	[illegible]	4.25[illegible]	[illegible]
16:16:[illegible]	1.[illegible]	[illegible]	4.19[illegible]	[illegible]
16:16:[illegible]	2.[illegible]	[illegible]	4.12[illegible]	[illegible]
16:18:[illegible]	[illegible]	1.[illegible]	3.15[illegible]	[illegible]
16:24:[illegible]	[illegible]	2.[illegible]	2.36[illegible]	[illegible]
16:35:[illegible]	[illegible]	[illegible]	1.35[illegible]	[illegible]
16:17:[illegible]	1 [illegible]	4.42[illegible]	[illegible]	[illegible]

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : TA1S
CASING LENGTH : 5.85 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 0.25 FEET
DEPTH TO WATER : 4.65 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 16:24:30

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

K = (2PI*RC**2/(11*RC*T))LN(DHC/DH)

HYDRAULIC CONDUCTIVITY = 0.1342E-05 FEET/SEC

SLUG TEST

WELL NUMBER : T10A

PROJECT NO. [illegible]
PAGE NO. 1

CASING LENGTH	:	4.46 FEET
CASING DIAMETER	:	2.00 INCHES
CASING STICK-UP	:	1.15 FEET
DEPTH TO WATER	:	3.64 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 14:34:30

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1984)				
14:39:30	2.000	0.250	3.390	0.9313
14:40:30	4.000	0.450	3.190	0.8764
14:45:30	9.000	0.910	2.730	0.7500
14:55:30	19.000	1.610	2.030	0.5577
15:05:30	29.000	2.110	1.530	0.4203
15:15:30	39.000	2.480	1.160	0.3188
15:33:30	57.000	3.010	0.630	0.1731
15:52:00	75.500	3.200	0.440	0.1209
15:57:45	81.250	3.260	0.380	0.1044

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : T10A

CASING LENGTH	:	4.46 FEET
CASING DIAMETER	:	2.00 INCHES
CASING STICK-UP	:	1.15 FEET
DEPTH TO WATER	:	3.64 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 14:36:30

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (2FT*RC**/(11*RC*T))LN(DH0/DH)$$

HYDRAULIC CONDUCTIVITY = 0.9721E-06 FEET/SEC

SLUG TEST

[illegible]

[illegible]

WELL NUMBER : [illegible]

CASING LENGTH	:	[illegible] FEET
CASING DIAMETER	:	[illegible] INCHES
CASING STICK-UP	:	1.3[illegible] FEET
DEPTH TO WATER	:	4.[illegible] FEET

TEST METHOD : SLUG IN

TEST STARTING DATE : JUL 11, 19[illegible]4 TIME = 15:[illegible]:4[illegible]

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 19[illegible])				
15:52:3[illegible]	1[illegible].7[illegible]	[illegible]	3.[illegible]	[illegible]
16:27:3[illegible]	[illegible].7[illegible]	[illegible].[illegible]1[illegible]	3.1[illegible]	[illegible].7[illegible]7[illegible]
[illegible]:19:[illegible]	1[illegible]62.2[illegible]	[illegible].[illegible]1[illegible]	[illegible].19[illegible]	[illegible].[illegible]475

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : TIGH
CASING LENGTH : 9.79 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.33 FEET
DEPTH TO WATER : 4.10 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 15:36:45

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (2PI*RC**/(11*RC*T))LN(CHO/CH)$$

HYDRAULIC CONDUCTIVITY = 0.9590E-07 FEET/SEC

SLUG TEST

PROJECT [illegible]
PAGE #1

WELL NUMBER : TW4A
CASING LENGTH : 4.67 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 0.25 FEET
DEPTH TO WATER : 3.58 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 13:59:[illegible]

TIME	ELAPSED TIME T (MINUTES)	DTw (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1984)				
14:00:[illegible]	0.500	0.210	3.370	0.9418
14:00:30	1.000	0.420	3.160	0.8827
14:01:[illegible]	1.500	0.610	2.970	0.8296
14:01:30	2.000	0.750	2.830	0.7914
14:02:[illegible]	2.500	0.890	2.690	0.7514
14:03:[illegible]	3.500	1.180	2.400	0.6704
14:04:[illegible]	4.500	1.430	2.150	0.6006
14:05:[illegible]	5.500	1.670	1.910	0.5336
14:06:[illegible]	6.500	1.810	1.770	0.4944
14:07:[illegible]	7.500	2.030	1.550	0.4331
14:08:[illegible]	8.500	2.170	1.410	0.3939
14:10:[illegible]	10.500	2.420	1.160	0.3242
14:12:[illegible]	12.500	2.650	0.930	0.2598
14:17:[illegible]	17.500	3.000	0.580	0.1620
14:22:[illegible]	22.500	3.210	0.370	0.1034

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : T18A

CASING LENGTH	:	4.67 FEET
CASING DIAMETER	:	2.00 INCHES
CASING STICK-UP	:	0.25 FEET
DEPTH TO WATER	:	3.59 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 13:59:30

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (2^2I*RC**/(11*RC*T))LN(DH0/DH)$$

HYDRAULIC CONDUCTIVITY = 0.352RE-05 FEET/SEC

SLUG TEST

WELL NUMBER : T17B

PROJECT #[illegible]
PAGE #1

CASING LENGTH	:	9.35 FEET
CASING DIAMETER	:	2.00 INCHES
CASING STICK-UP	:	1.61 FEET
DEPTH TO WATER	:	4.26 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 14:31:00

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1994)				
15:48:45	77.750	0.580	3.68[illegible]	0.8638
16:26:30	115.500	0.760	3.50[illegible]	0.9216
09:20:[illegible]	1129.000	2.360	1.900	0.4460

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : T17P
CASING LENGTH : 9.25 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.41 FEET
DEPTH TO WATER : 4.26 FEET

PROJECT #
PAGE #

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 14:31:00

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

K = (2PI*RC**2/(11*RC*T))LN(DH0/DH)

HYDRAULIC CONDUCTIVITY = 0.2319E-07 FEET/SEC

SLUG TEST

WELL NUMBER : T21A
CASING LENGTH : 5.12 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.20 FEET
DEPTH TO WATER : 4.59 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 12:11:45

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1984)				
12:11:45	0.000	9.290	4.310	1.0000
12:12:15	0.500	9.330	4.260	0.9884
12:13:15	1.500	9.470	4.120	0.9565
12:14:15	2.500	9.580	4.010	0.9309
12:15:15	3.500	9.690	3.900	0.9048
12:31:15	19.500	2.050	2.540	0.5897
12:46:15	34.500	2.840	1.750	0.4061
13:01:15	49.500	3.390	1.200	0.2784
13:16:15	64.500	3.740	0.850	0.1972
13:31:15	79.500	4.020	0.570	0.1323
13:53:30	101.750	4.220	0.370	0.0858

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : TP1A
CASING LENGTH : 5.12 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.90 FEET
DEPTH TO WATER : 4.59 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 12:11:45

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

K = (2PI*RC**2/(11*RC*T))LN(DH0/DH)

HYDRAULIC CONDUCTIVITY = 0.8519E-05 FEET/SEC

SLUG TEST

WELL NUMBER : T[illegible]A
CASING LENGTH : 4.[illegible] FEET
CASING DIAMETER : 2.[illegible] INCHES
CASING STICK-UP : 1.50 FEET
DEPTH TO WATER : 3.64 FEET

PROJECT [illegible]
PAGE [illegible]

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 12:3[illegible]

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1984)				
13:35:00	60.[illegible]	0.120	3.52	0.967[illegible]
15:01:00	146.[illegible]	0.210	3.43[illegible]	0.9423
16:33:00	23[illegible].000	0.280	3.36[illegible]	0.9231
00:13:00	123[illegible].[illegible]	0.770	2.87[illegible]	0.7[illegible]

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : T22A

CASING LENGTH	:	4.[illegible] FEET
CASING DIAMETER	:	2.[illegible] INCHES
CASING STICK-UP	:	1.50 FEET
DEPTH TO WATER	:	3.64 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 12:35:[illegible]

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (2PI*RC**/(11*RC*T))LN(DH0/DH)$$

HYDRAULIC CONDUCTIVITY = 0.5733E-0[illegible] FEET/SEC

SLUG TEST

PROJECT #[illegible]
PAGE #1

WELL NUMBER : T[illegible]B
CASING LENGTH : 8.25 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.00 FEET
DEPTH TO WATER : 3.95 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 12:36:25

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1984)				
13:35:[illegible]0	59.083	0.210	3.64[illegible]	0.9455
15:00:45	144.333	0.500	3.35[illegible]	0.8701
16:32:11	235.767	0.790	3.06[illegible]	0.7948
09:13:30	1237.083	2.560	1.29[illegible]	0.3351

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

PROJECT #?????
PAGE #??

?ELL NUMBER : T??B

CASING LENGTH	:	?.25 FEET
CASING DIAMETER	:	2.?? INCHES
CASING STICK-UP	:	1.?? FEET
DEPTH TO WATER	:	3.?5 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 12:3?:25

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

K = (2PI*RC**/(11*RC*T))LN(DHO/DH)

HYDRAULIC CONDUCTIVITY = 0.2?46E-07 FEET/SEC

SLUG TEST

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : TOSA
CASING LENGTH : 4.25 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.24 FEET
DEPTH TO WATER : 3.03 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 12:41:45

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1994)				
13:36:15	54.500	0.560	2.470	0.8152
14:58:45	137.000	1.150	1.880	0.6205
16:29:30	227.750	1.530	1.500	0.4950
09:14:00	1232.250	2.790	0.240	0.0792

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : TOTA
CASING LENGTH : 4.25 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.24 FEET
DEPTH TO WATER : 3.03 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 12:41:45

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

K = (2PI*RC**/(11*RC*T))LN(DH0/DH)

HYDRAULIC CONDUCTIVITY = 0.7865E-07 FEET/SEC

SLUG TEST

WELL NUMBER : T37B
CASING LENGTH : 5.50 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.50 FEET
DEPTH TO WATER : 3.59 FEET

PROJECT #[illegible]
PAGE #1

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 12:41:50

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1994)				
13:36:00	55.167	0.060	3.53[illegible]	0.9[illegible]
13:59:15	78.417	0.060	3.53[illegible]	0.98[illegible]
16:30:30	229.667	0.120	3.47[illegible]	0.9666
09:14:45	1233.917	0.430	3.160	0.88[illegible]2

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

PROJECT #
PAGE #2

WELL NUMBER : T03B
CASING LENGTH : 8.30 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.60 FEET
DEPTH TO WATER : 3.59 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 12:4 :5

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

K = (2PI*RC**/(11*RC*T))LN(DH0/DH)

HYDRAULIC CONDUCTIVITY = 0.3178E-08 FEET/SEC

SLUG TEST

PROJECT #[illegible]
PAGE #[illegible]

WELL NUMBER : T[illegible]A
CASING LENGTH : 5.[illegible] FEET
CASING DIAMETER : 2.[illegible] INCHES
CASING STICK-UP : 1.14 FEET
DEPTH TO WATER : 3.92 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 11:57:[illegible]

TIME	ELAPSED TIME T (MINUTES)	DTN (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1994)				
11:57:15	0.250	0.270	3.65[illegible]	0.9311
11:57:45	0.750	0.870	3.05[illegible]	0.7781
11:58:15	1.250	1.490	2.43[illegible]	0.6199
11:58:45	1.750	1.970	1.95[illegible]	0.4974
11:59:15	2.250	2.340	1.58[illegible]	0.4031
11:59:45	2.750	2.630	1.29[illegible]	0.3291
12:00:15	3.250	2.870	1.05[illegible]	0.2679
12:01:15	4.250	3.210	0.71[illegible]	0.1811
12:02:15	5.250	3.510	0.42[illegible]	0.1071
12:03:15	6.250	3.580	0.340	0.0867

DTN ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : TT1A

PROJECT [illegible] 5
PAGE #1

CASING LENGTH	:	6.23 FEET
CASING DIAMETER	:	2.00 INCHES
CASING STICK-UP	:	1.14 FEET
DEPTH TO WATER	:	3.92 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 11:57:00

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (2PI*RC**/(11*RC*T))LN(DH0/DH)$$

HYDRAULIC CONDUCTIVITY = 7.1343E-04 FEET/SEC

SLUG TEST

WELL NUMBER : T20A

CASING LENGTH : 7.67 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 2.52 FEET
DEPTH TO WATER : 4.89 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 11:37:15

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1994)				
11:37:15	0.000	1.060	3.830	1.0000
11:38:15	1.000	3.060	1.830	0.4778
11:39:15	2.000	3.950	0.940	0.2454
11:40:15	3.000	4.420	0.470	0.1227
11:41:15	4.000	4.630	0.260	0.0679
11:42:15	5.000	4.780	0.110	0.0287

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

PROJECT NUMBER
PAGE # 2

WELL NUMBER : T20A
CASING LENGTH : 7.67 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 2.32 FEET
DEPTH TO WATER : 4.99 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 11:37:15

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (2PI*RC**/(11*RC*T))LN(DH0/DH)$$

HYDRAULIC CONDUCTIVITY = 0.2335E-04 FEET/SEC

SLUG TEST

WELL NUMBER : [illegible]
CASING LENGTH : 11.25 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 2.00 FEET
DEPTH TO WATER : 4.68 FEET

PROJECT [illegible]
PAGE [illegible]

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 11:44:15

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1994)				
11:44:15	0.000	0.170	4.510	1.0000
11:45:15	1.000	0.180	4.500	0.9978
11:50:15	6.000	0.200	4.480	0.9933
12:20:15	36.000	0.400	4.280	0.9489
13:20:15	96.000	0.720	3.960	0.8780
15:23:30	219.750	1.220	3.460	0.7672
16:10:30	246.250	1.410	3.270	0.7251
09:11:30	1286.750	3.580	1.100	0.2439

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : TIDP
CASING LENGTH : 11.25 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 2.00 FEET
DEPTH TO WATER : 4.68 FEET

PROJECT [illegible]
PAGE [illegible]

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 11:44:15

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

K = (2PI*RC**/(11*RC*T))LN(DH0/DH)

HYDRAULIC CONDUCTIVITY = 3.3378E-07 FEET/SEC

SLUG TEST

PROJECT #
PAGE #

WELL NUMBER : TTTA
CASING LENGTH : 4.07 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.58 FEET
DEPTH TO WATER : 3.07 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 10:45:30

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1994)				
10:45:30	0.000	0.580	3.291	1.0000
10:45:45	0.250	0.700	3.170	0.9635
10:46:00	0.500	0.810	2.960	0.8997
10:46:15	0.750	0.940	2.930	0.8906
10:46:30	1.000	1.150	2.720	0.8267
10:46:45	1.250	1.220	2.650	0.8055
10:47:00	1.500	1.320	2.550	0.7751
10:47:15	1.750	1.440	2.430	0.7386
10:47:30	2.000	1.500	2.370	0.7204
10:48:00	2.500	1.680	2.190	0.6657
10:49:00	3.500	1.910	1.960	0.5957
10:50:00	4.500	2.170	1.700	0.5167
10:51:00	5.500	2.400	1.470	0.4468
10:52:00	6.500	2.580	1.290	0.3921
10:53:00	7.500	2.760	1.120	0.3404
10:54:00	8.500	2.990	0.990	0.2979
10:55:00	9.500	3.620	0.250	0.0760
10:56:00	10.500	3.130	0.740	0.2249
10:57:00	11.500	3.290	0.590	0.1793
10:58:00	12.500	3.370	0.500	0.1520
11:00:00	14.500	3.450	0.420	0.1277
11:01:00	15.500	3.510	0.360	0.1094
11:04:00	18.500	3.570	0.300	0.0912

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : TP2A
PROJECT [illegible]
PAGE [illegible]

CASING LENGTH	:	4.37 FEET
CASING DIAMETER	:	2.0[illegible] INCHES
CASING STICK-UP	:	1.[illegible]9 FEET
DEPTH TO WATER	:	3.27 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 1[illegible]:45:30

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (2PI*RC**/(11*RC*T))LN(DHO/DH)$$

HYDRAULIC CONDUCTIVITY = 0.5204E-05 FEET/SEC

SLUG TEST

PROJECT #[illegible]
PAGE #1

WELL NUMBER : TTTP
CASING LENGTH : [illegible] FEET
CASING DIAMETER : [illegible] INCHES
CASING STICK-UP : 1.42 FEET
DEPTH TO WATER : 3.31 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1984 TIME = 11:15:15

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1984)				
11:15:15	[illegible]	0.160	3.75[illegible]	1.[illegible]
11:16:15	1.000	0.200	3.71[illegible]	0.9893
11:17:15	2.000	0.240	3.67[illegible]	0.9787
11:18:15	3.000	0.250	3.66[illegible]	0.9760
11:24:15	[illegible].000	0.410	3.50[illegible]	0.9333
11:54:15	39.000	1.030	2.880	0.7680
12:24:15	69.000	1.280	2.330	0.6213
13:24:15	129.[illegible]00	2.200	1.710	0.456[illegible]
14:25:00	190.750	2.580	1.330	0.3547
15:21:30	246.250	2.820	1.090	0.29[illegible]7
16:09:30	294.250	2.990	0.920	0.24[illegible]3
09:10:00	1314.750	3.830	0.080	0.0213

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : TEST
CASING LENGTH : 9.50 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.42 FEET
DEPTH TO WATER : 3.91 FEET

PROJECT #: [illegible]
PAGE #: 1

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 11:15:15

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

K = (2PI*RC**2/(11*RC*T))LN(DH0/DH)

HYDRAULIC CONDUCTIVITY = 0.1714E-06 FEET/SEC

SLUG TEST

PROJECT #93505
PAGE #01

WELL NUMBER : P41S

CASING LENGTH	:	10.00 FEET
CASING DIAMETER	:	2.00 INCHES
CASING STICK-UP	:	0.00 FEET
SCREEN LENGTH	:	10.00 FEET
GRAVEL PACK DIAMETER	:	2.00 INCHES
GRAVEL PACK POROSITY	:	0.3000
AQUIFER THICKNESS	:	65.40 FEET
DEPTH TO WATER	:	5. FEET
STATIC PRESSURE	:	4.1280 PSI

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 10, 1984 TIME = 11:14:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	DH/DH0
(JUL 10, 1984)					
11:14:00	0.000	4.7400	0.6120	1.412	1.0000
11:14:10	0.167	4.7355	0.6075	1.401	0.9926
11:14:20	0.333	4.7280	0.6000	1.384	0.9804
11:14:30	0.500	4.7175	0.5895	1.360	0.9632
11:14:40	0.667	4.7025	0.5745	1.325	0.9387
11:14:50	0.833	4.6905	0.5625	1.298	0.9191
11:15:00	1.000	4.6455	0.5175	1.194	0.8456
11:15:10	1.167	4.5675	0.4395	1.014	0.7181
11:15:20	1.333	4.4880	0.3600	0.830	0.5882
11:15:30	1.500	4.4250	0.2970	0.685	0.4853
11:15:40	1.667	4.3725	0.2445	0.564	0.3995
11:15:50	1.833	4.3305	0.2025	0.467	0.3309
11:16:00	2.000	4.3005	0.1725	0.398	0.2819
11:16:10	2.167	4.2780	0.1500	0.346	0.2451
11:16:20	2.333	4.2600	0.1320	0.304	0.2157
11:16:30	2.500	4.2450	0.1170	0.270	0.1912
11:16:40	2.667	4.2330	0.1050	0.242	0.1716
11:16:50	2.833	4.2255	0.0975	0.225	0.1593
11:17:00	3.000	4.2180	0.0900	0.208	0.1471
11:17:10	3.167	4.2105	0.0825	0.190	0.1348
11:17:20	3.333	4.2030	0.0750	0.173	0.1225
11:17:30	3.500	4.2000	0.0720	0.166	0.1176
11:17:40	3.667	4.1925	0.0645	0.149	0.1054
11:17:50	3.833	4.1895	0.0615	0.142	0.1005
11:18:00	4.000	4.1850	0.0570	0.132	0.0931
11:18:10	4.167	4.1805	0.0525	0.121	0.0858
11:18:20	4.333	4.1760	0.0480	0.111	0.0784
11:18:30	4.500	4.1700	0.0420	0.097	0.0686
11:18:40	4.667	4.1670	0.0390	0.090	0.0637
11:18:50	4.833	4.1640	0.0360	0.083	0.0588
11:19:00	5.000	4.1625	0.0345	0.080	0.0564
11:19:10	5.167	4.1595	0.0315	0.073	0.0515
11:19:20	5.333	4.1580	0.0300	0.069	0.0490
11:19:30	5.500	4.1550	0.0270	0.062	0.0441
11:19:40	5.667	4.1535	0.0255	0.059	0.0417
11:19:50	5.833	4.1520	0.0240	0.055	0.0392
11:20:00	6.000	4.1505	0.0225	0.052	0.0368
11:20:10	6.167	4.1490	0.0210	0.049	0.0343
11:20:20	6.333	4.1475	0.0195	0.045	0.0319
11:20:30	6.500	4.1460	0.0180	0.042	0.0294
11:20:40	6.667	4.1445	0.0165	0.038	0.0270
11:20:50	6.833	4.1430	0.0150	0.035	0.0245
11:21:00	7.000	4.1430	0.0150	0.035	0.0245

SLUG TEST

WELL NO. : E-10

CASING LENGTH	:	10.00 FEET
CASING DIAMETER	:	2.00 INCHES
CASING STICK-UP	:	3.00 FEET
SCREEN LENGTH	:	10.00 FEET
GRAVEL PACK DIAMETER	:	2.00 INCHES
GRAVEL PACK POROSITY	:	0.3000
AQUIFER THICKNESS	:	65.40 FEET
DEPTH TO WATER	:	5. FEET
STATIC PRESSURE	:	4.1290 PSI

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 10, 1984 TIME = 11:14:00

TIME	ELAPSED TIME T (MINUTES)	PRESSURE (PSI)	CHANGE IN PRESSURE (PSI)	CHANGE IN HEAD (FEET)	DH/DH0
(JUL 10, 1984)					
11:21:30	7.500	4.1355	0.0075	0.017	0.0123

SLUG TEST

WELL NUMBER : [illegible]

CASING LENGTH	:	[illegible] FEET
CASING DIAMETER	:	[illegible] INCHES
CASING STICK-UP	:	[illegible] FEET
SCREEN LENGTH	:	[illegible] FEET
GRAVEL PACK DIAMETER	:	2.00 INCHES
GRAVEL PACK POROSITY	:	[illegible]
AQUIFER THICKNESS	:	65.40 FEET
DEPTH TO WATER	:	5. FEET
STATIC PRESSURE	:	[illegible] PSI

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL [illegible], 1984 TIME = [illegible]

HYDRAULIC CONDUCTIVITY COMPUTATION

BOUWER & RICE (1976) METHOD

$$K = RC^{**}2/2L*LN(RE/RW)*(1/T)*LN(Y0/YT)$$

HYDRAULIC CONDUCTIVITY = [illegible] FEET/SEC
95% CONFIDENCE LIMIT : [illegible] --- [illegible] FEET/SEC

HVORSLEV (1951) METHOD

$$K = RC^{**}2/2L*(1/T)*LN(DH2/DH)$$

HYDRAULIC CONDUCTIVITY = [illegible] FEET/SEC
95% CONFIDENCE LIMIT : [illegible] --- [illegible] FEET/SEC

SLUG TEST

WELL NUMBER : P-41
CASING LENGTH : 14.83 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 0.27 FEET
DEPTH TO WATER : 4.13 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 11, 1994 TIME = 11:43:00

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 11, 1994)				
11:49:00	6.000	3.500	3.600	1.8781
11:57:00	14.000	1.190	2.920	1.7122
12:07:00	24.000	1.790	2.310	1.5674
12:22:00	39.000	2.410	1.690	1.4122
12:37:00	54.000	2.790	1.310	1.3175
13:11:00	88.000	3.190	0.720	1.1756
14:12:00	149.000	3.760	0.320	1.0783
14:43:00	180.000	3.881	0.220	1.0577
15:13:00	210.000	3.951	0.151	1.0456

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : S-41

CASING LENGTH	:	16.[illegible] FEET
CASING DIAMETER	:	2.[illegible] INCHES
CASING STICK-UP	:	[illegible].17 FEET
DEPTH TO WATER	:	4.1[illegible] FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 1[illegible], 1984 TIME = 11:4[illegible]

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

K = (2PI*RC**2/(11*RC*T))LN(DH0/DH)

HYDRAULIC CONDUCTIVITY = [illegible].65[illegible]E-06 FEET/SEC

SLUG TEST

WELL NUMBER : P-14
CASING LENGTH : 14.39 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 0.73 FEET
DEPTH TO WATER : 3.78 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 14, 1994 TIME = 15:47:10

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 14, 1994)				
15:48:10	1.00	3.420	2.350	1.0000
15:49:10	2.00	3.550	2.230	0.9561
15:50:10	3.00	3.760	2.620	1.8661
15:51:10	4.00	3.950	2.430	0.8209
15:52:10	5.00	4.160	2.320	0.7938
15:53:10	6.00	4.210	2.170	0.7331
15:54:10	7.00	4.390	2.000	0.6757
15:55:10	8.00	4.490	1.900	0.6385
15:56:10	9.00	4.610	1.770	0.5900
15:57:10	10.00	4.700	1.680	0.5576
15:58:10	11.00	4.820	1.560	0.5271
15:59:10	12.00	4.910	1.470	0.4966
16:00:10	13.00	5.020	1.360	0.4662
16:01:10	14.00	5.100	1.280	0.4724
16:02:10	15.00	5.240	1.140	0.3951
16:03:10	16.00	5.370	1.010	0.3410
16:04:10	17.00	5.500	0.880	0.2977
16:05:10	18.00	5.600	0.780	0.2635
16:06:10	19.00	5.700	0.680	0.2297
16:07:10	20.00	5.800	0.580	0.1962
16:08:10	21.00	5.900	0.480	0.1624
16:09:10	22.00	6.000	0.380	0.1284
16:10:10	23.00	6.100	0.280	0.0946

DTW = DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : B-14
CASING LENGTH : 16.58 FEET
CASING DIAMETER : 2.00 INCHES
CASING STICK-UP : 1.33 FEET
DEPTH TO WATER : 3.38 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 19, 1994 TIME = 15:47:00

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (2\pi \cdot RC^{**}/(11 \cdot RC \cdot T))LN(DH0/DH)$$

HYDRAULIC CONDUCTIVITY = 0.1378E-05 FEET/SEC

SLUG TEST

FILE NUMBER : W-[illegible]

CASING LENGTH	:	19.[illegible] FEET
CASING DIAMETER	:	4.[illegible] INCHES
CASING STICK-UP	:	2.30 FEET
SCREEN LENGTH	:	10.[illegible] FEET
GRAVEL PACK DIAMETER	:	4.00 INCHES
GRAVEL PACK POROSITY	:	0.3000
AQUIFER THICKNESS	:	67.50 FEET
DEPTH TO WATER	:	5. FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 12, 1984 TIME = 13:30:00

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 12, 1984)				
13:30:[illegible]	0.[illegible]	2.79[illegible]	2.[illegible]30	1.[illegible]
13:31:[illegible]0	1.[illegible]0	3.37[illegible]	1.450	0.7143
13:32:[illegible]0	2.[illegible]0	[illegible].[illegible]3[illegible]	1.[illegible]20	0.[illegible]25
13:33:[illegible]0	3.[illegible]0	4.[illegible]9[illegible]	0.73[illegible]	0.3[illegible]6
13:34:[illegible]0	4.[illegible]0	4.[illegible]3[illegible]	0.53[illegible]	0.26[illegible]1
13:35:[illegible]0	5.[illegible]0	4.42[illegible]	0.43[illegible]	0.19[illegible]
13:39:30	9.[illegible]0	4.[illegible]80	0.14[illegible]	0.[illegible]0
13:41:[illegible]0	11.[illegible]0	4.76[illegible]	0.[illegible]0	0.[illegible]96

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

PROJECT # [illegible]
PAGE #[illegible]2

WELL NUMBER : [illegible]

CASING LENGTH	:	[illegible] FEET
CASING DIAMETER	:	4.00 INCHES
CASING STICK-UP	:	2.30 FEET
SCREEN LENGTH	:	10.00 FEET
GRAVEL PACK DIAMETER	:	4.00 INCHES
GRAVEL PACK POROSITY	:	0.3000
AQUIFER THICKNESS	:	67.50 FEET
DEPTH TO WATER	:	5. FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 12, 1994 TIME = 13:[illegible]

HYDRAULIC CONDUCTIVITY COMPUTATION

BOUWER & RICE (1976) METHOD

K = RC**2/2L*LN(RE/RW)*(1/T)*LN(YO/YT)

HYDRAULIC CONDUCTIVITY = 0.2515E-04 FEET/SEC
95% CONFIDENCE LIMIT : 0.2355E-04 --- 0.2675E-04 FEET/SEC

HVORSLEV (1951) METHOD

K = RC**2/2L*(1/T)*LN(DHO/DH)

HYDRAULIC CONDUCTIVITY = 0.3953E-04 FEET/SEC
95% CONFIDENCE LIMIT : 0.3322E-04 --- 0.474[illegible]E-04 FEET/SEC

SLUG TEST

PROJECT #[illegible]
PAGE #1

WELL NUMBER : P-1A
CASING LENGTH : 10.53 FEET
CASING DIAMETER : 4.00 INCHES
CASING STICK-UP : 1.35 FEET
DEPTH TO WATER : 4.13 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 12, 1984 TIME = 16:02:00

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 12, 1984)				
16:02:00	0.000	2.120	2.010	1.0000
16:03:00	1.000	2.450	1.680	0.8359
16:04:00	2.000	2.720	1.410	0.7015
16:06:00	4.000	3.180	0.950	0.4726
16:08:00	6.000	3.500	0.630	0.3134
16:10:00	8.000	3.750	0.380	0.1891
16:12:00	10.000	3.910	0.220	0.1095

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

WELL NUMBER : P61A

CASING LENGTH	:	10.33 FEET
CASING DIAMETER	:	4.00 INCHES
CASING STICK-UP	:	1.35 FEET
DEPTH TO WATER	:	4.13 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 12, 1984 TIME = 16:12:00

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (2PI*RC**/(11*RC*T))LN(DH0/DH)$$

HYDRAULIC CONDUCTIVITY = 0.1364E-04 FEET/SEC

SLUG TEST

PROJECT #[illegible]
PAGE #1

WELL NUMBER : B4'P
CASING LENGTH : 4.[illegible] FEET
CASING DIAMETER : 4.[illegible] INCHES
CASING STICK-UP : 0.70 FEET
DEPTH TO WATER : 3.60 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 17, 1994 TIME = 15:55:[illegible]

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 17, 1994)				
15:55:[illegible]	[illegible].000	0.630	2.970	1.[illegible]
15:56:[illegible]	1.000	0.970	2.630	0.8855
15:57:[illegible]	2.000	1.270	2.330	0.7946
15:58:[illegible]	3.000	1.510	2.090	0.7037
15:59:[illegible]	4.000	1.770	1.830	0.6162
16:01:[illegible]	6.000	2.120	1.480	0.4993
16:02:30	7.500	2.360	1.240	0.4178
16:05:[illegible]	10.000	2.650	0.950	0.3199
16:07:[illegible]	12.000	2.840	0.760	0.2558
16:09:[illegible]	14.000	2.990	0.610	0.2054
16:11:[illegible]	16.000	3.120	0.480	0.1616
16:13:[illegible]	18.000	3.210	0.390	0.1313

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : B-13
CASING LENGTH : 4.00 FEET
CASING DIAMETER : 4.00 INCHES
CASING STICK-UP : 0.70 FEET
DEPTH TO WATER : 3.60 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 17, 1994 TIME = 15:55:00

HYDRAULIC CONDUCTIVITY COMPUTATION

HVORSLEV (1951) METHOD C

$$K = (2PI*RC**/(11*RC*T))LN(DH0/DH)$$

HYDRAULIC CONDUCTIVITY = 0.7600E-05 FEET/SEC

SLUG TEST

PROJECT #[illegible]
PAGE #1

WELL NUMBER : P4-2
CASING LENGTH : 10.50 FEET
CASING DIAMETER : 4.00 INCHES
CASING STICK-UP : 0.30 FEET
DEPTH TO WATER : 3.99 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 12, 1984 TIME = 16:18:00

TIME	ELAPSED TIME T (MINUTES)	DTW (FEET)	CHANGE IN HEAD (FEET)	
(JUL 12, 1984)				
16:19:00	1.000	0.660	3.33[illegible]	[illegible]8346
16:20:00	2.000	1.220	2.770	0.6942
16:21:00	3.000	1.610	2.380	0.5965
16:22:00	4.000	1.980	2.010	[illegible].5038
16:23:00	5.000	2.280	1.710	0.4286
16:24:00	6.000	2.490	1.500	0.3759
16:25:00	7.000	2.690	1.300	0.3259
16:26:00	8.000	2.860	1.130	0.2832
16:27:00	9.000	3.010	0.980	0.2456
16:29:00	11.000	3.230	0.760	0.1[illegible]5
16:31:00	13.000	3.420	0.570	0.1429

DTW ---- DEPTH TO WATER (IN FEET)

SLUG TEST

PROJECT [illegible]
PAGE [illegible]

WELL NUMBER : P4-2
CASING LENGTH : 10.40 FEET
CASING DIAMETER : 4.00 INCHES
CASING STICK-UP : 0.30 FEET
DEPTH TO WATER : 3.29 FEET

TEST METHOD : SLUG IN
TEST STARTING DATE : JUL 12, 1994 TIME = 16:10:00

HYDRAULIC CONDUCTIVITY COMPUTATION

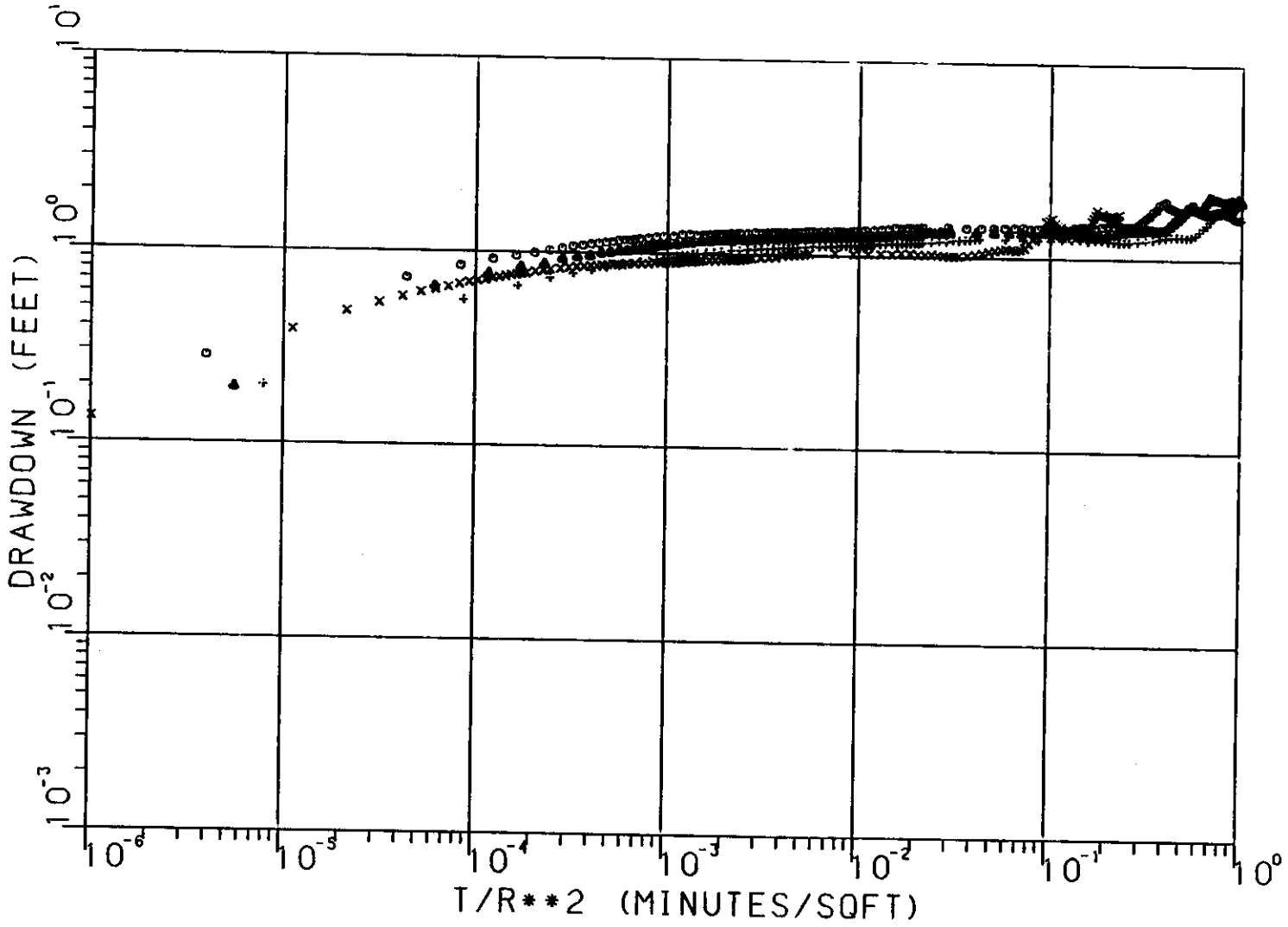
HVORSLEV (1951) METHOD C

$$K = (2PI*RC**/(11*RC*T))LN(DH0/DH)$$

HYDRAULIC CONDUCTIVITY = 0.1957E-04 FEET/SEC

APPENDIX F

AQUIFER PUMP TEST DRAWDOWN AND RECOVERY CURVES

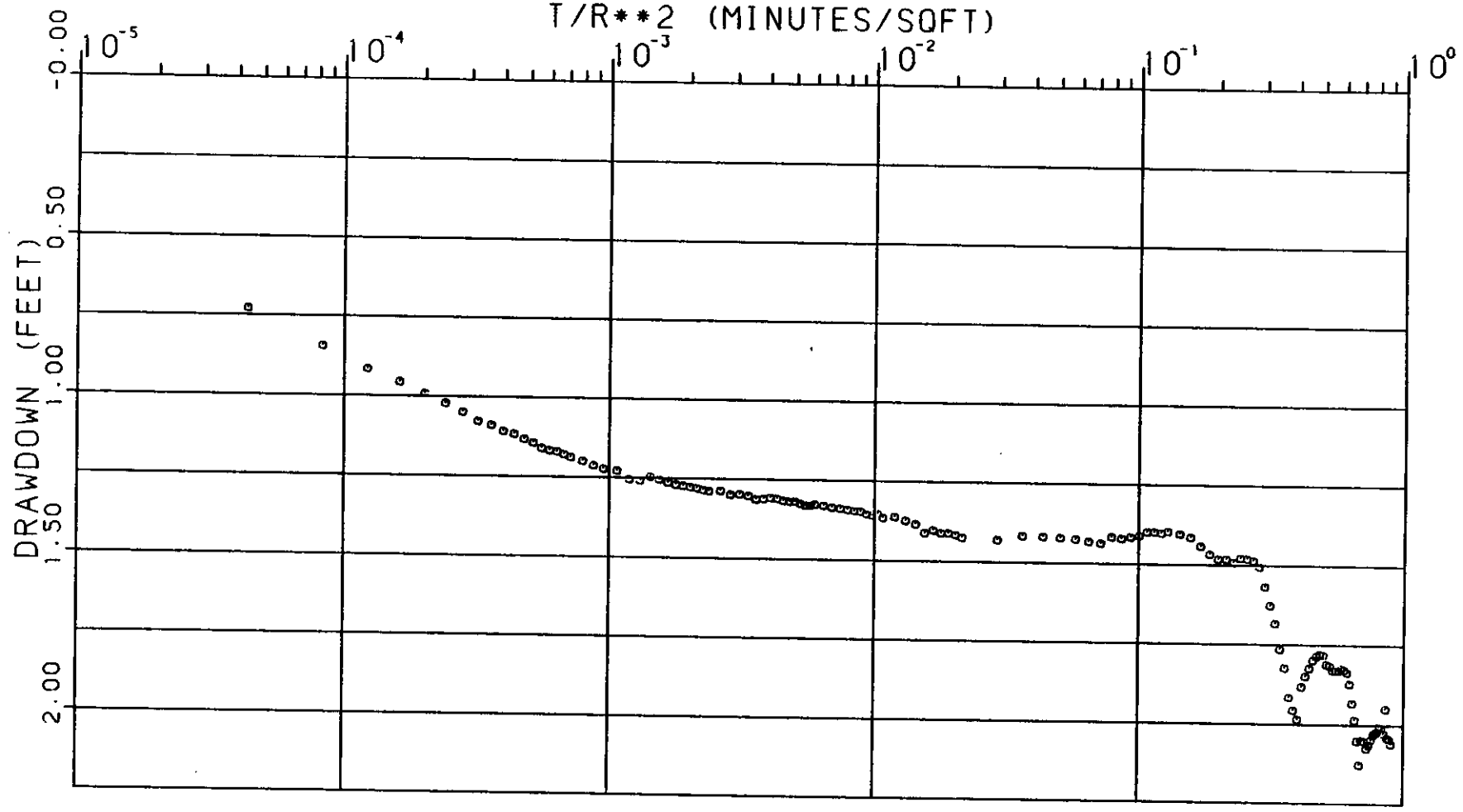


DRAWDOWN PHASE

PROJECT NO : 83505

⊖ --- M4-1 (RADIUS = 65.00 FEET)
▲ --- M4-2 (RADIUS = 55.00 FEET)
| --- M4-3 (RADIUS = 46.00 FEET)
× --- M4-4 (RADIUS = 128.00 FEET)

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00
DISCHARGE : 1280.00 GPM

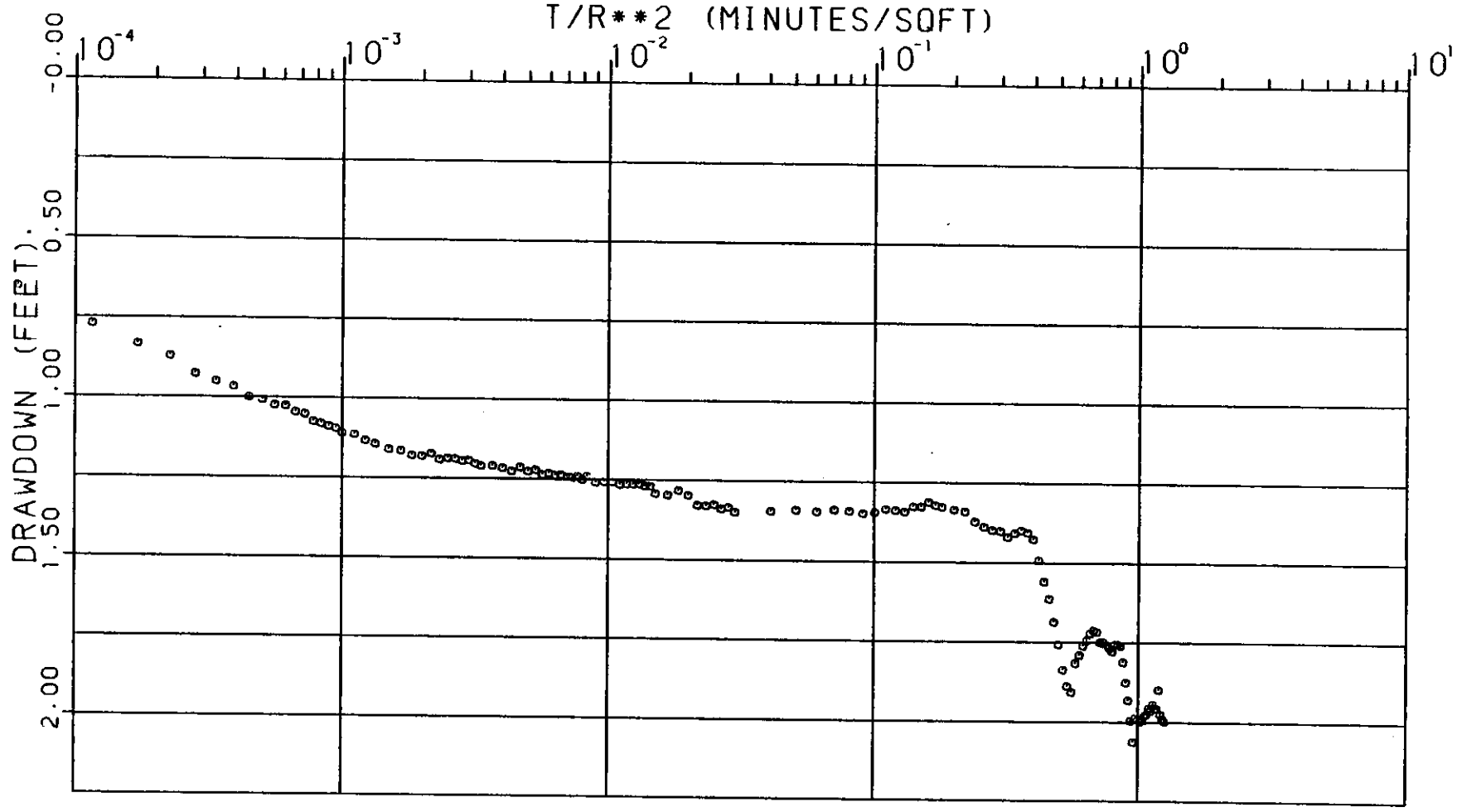


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-1
RADIUS : 65.00 FEET
DISCHARGE : 1280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

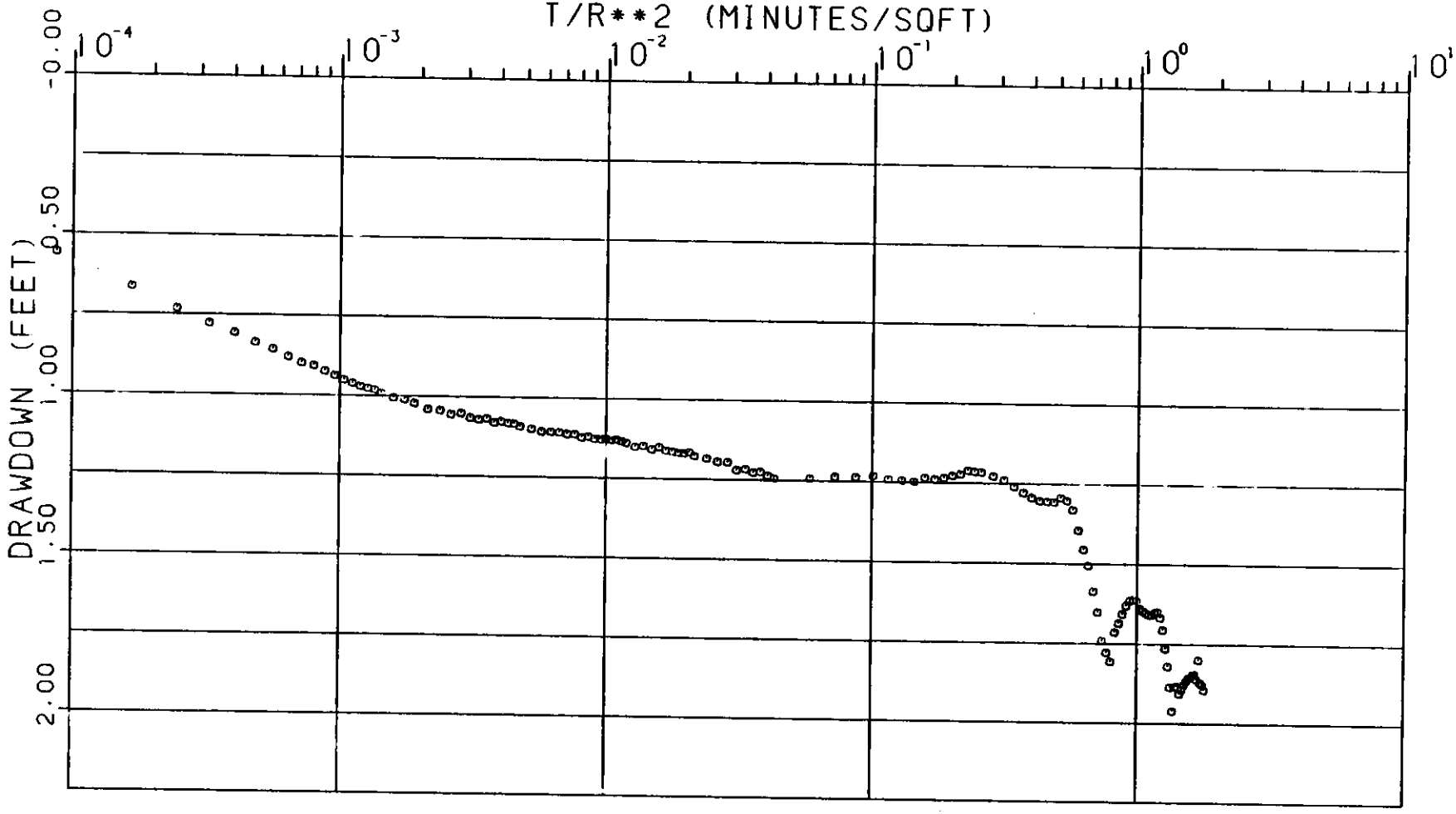


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-2
RADIUS : 55.00 FEET
DISCHARGE : 1280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

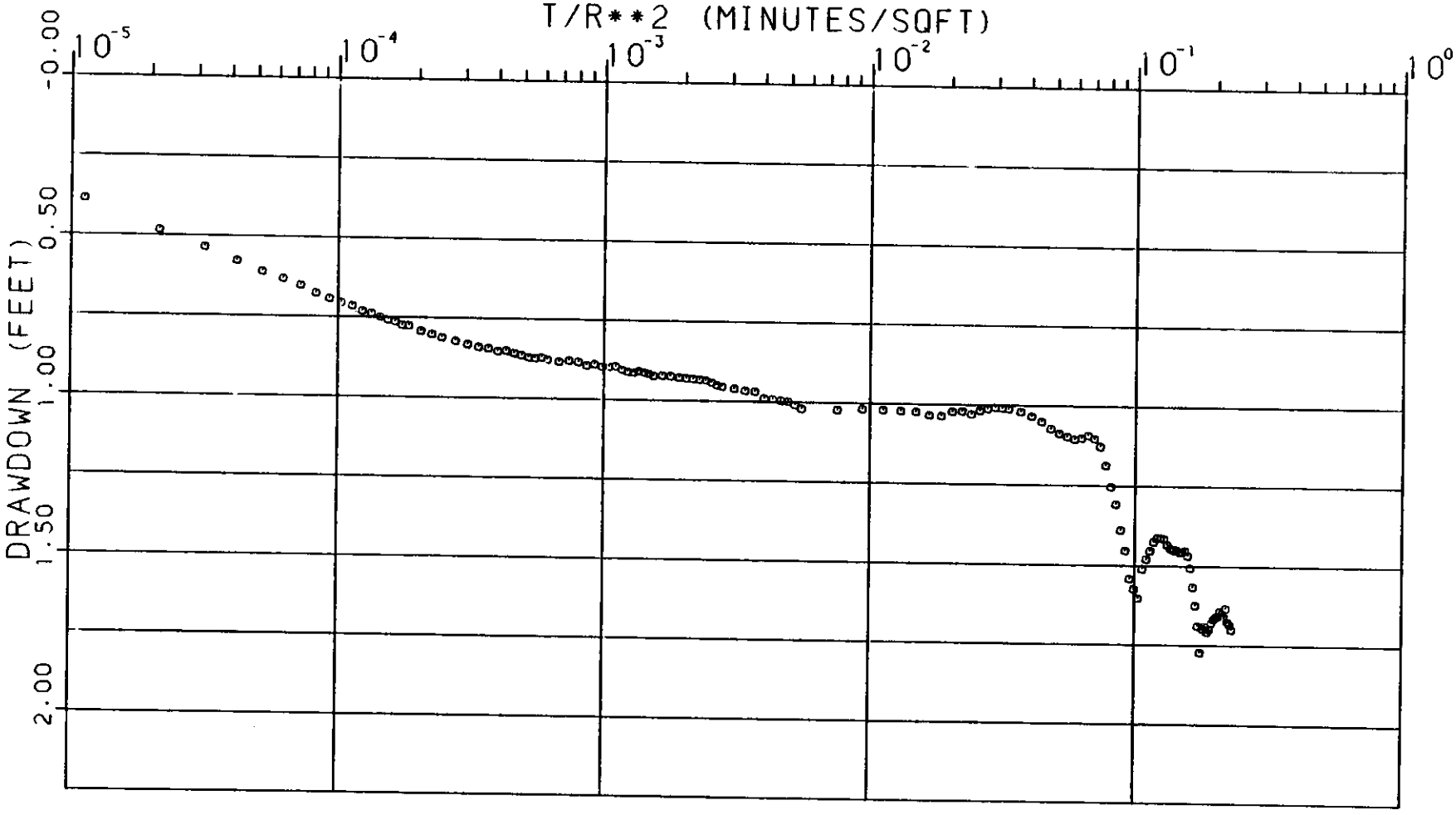


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-3
RADIUS : 46.00 FEET
DISCHARGE : 1280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

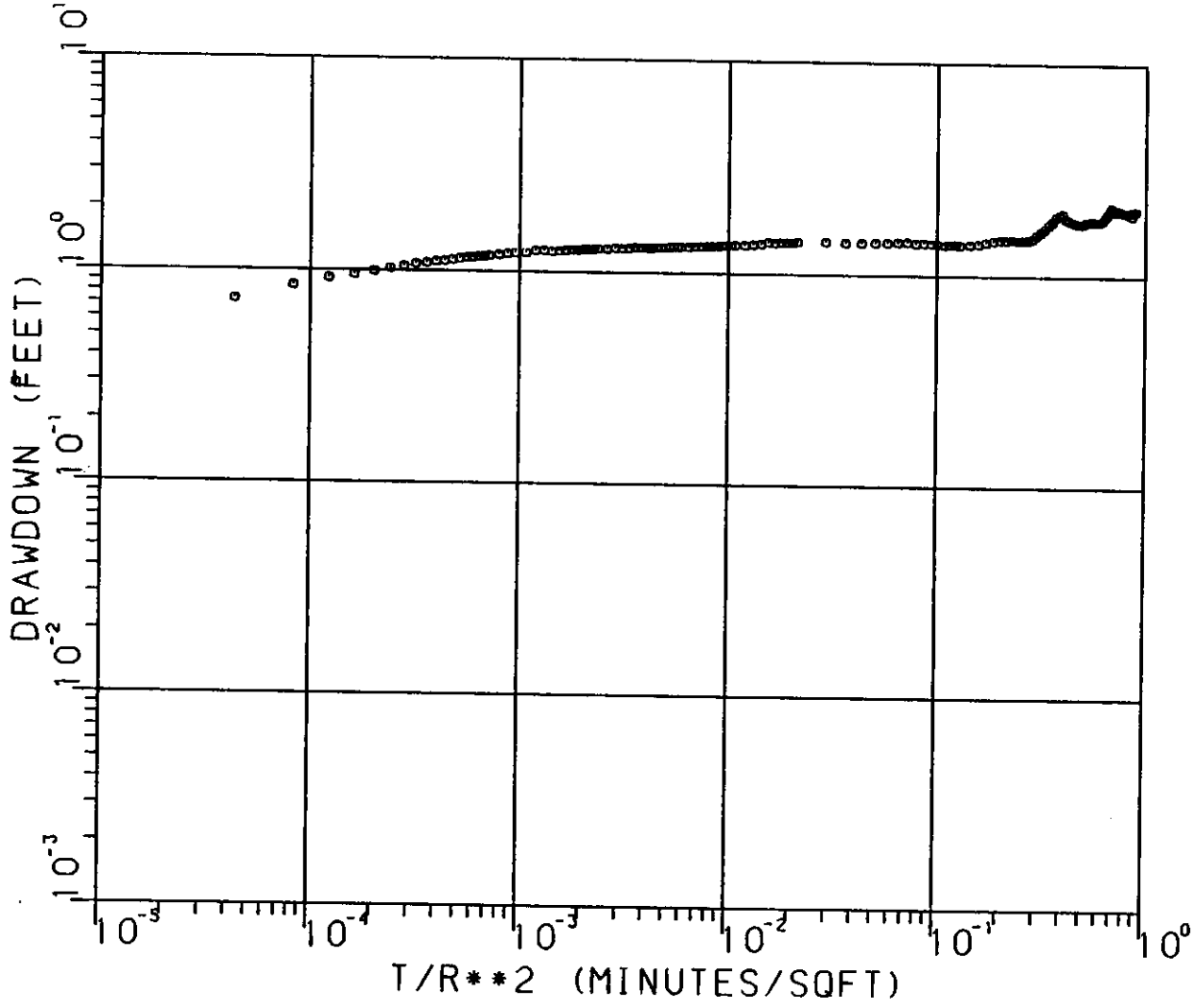


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-4
RADIUS : 128.00 FEET
DISCHARGE : 1280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

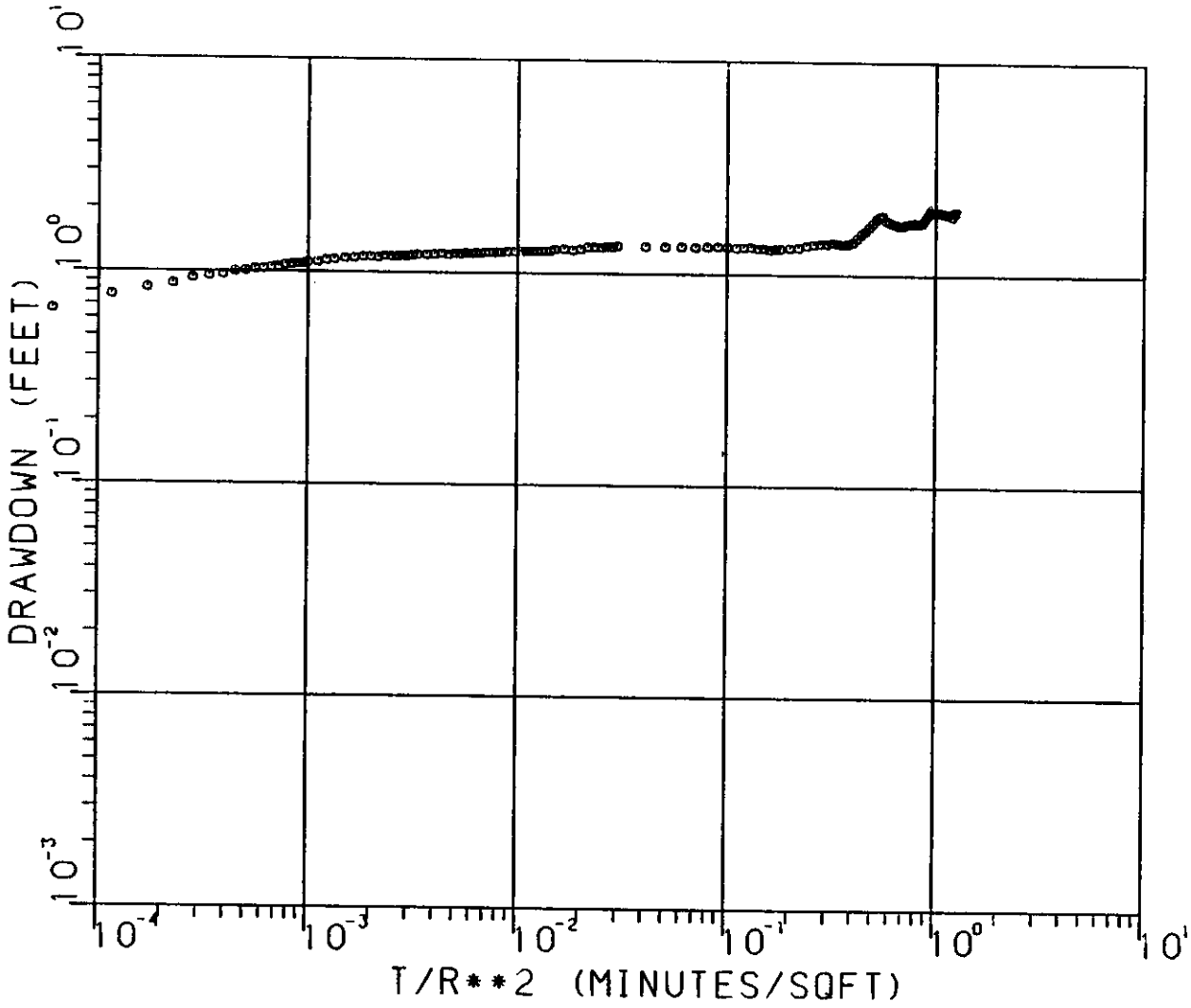


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-1
RADIUS : 65.00 FEET
DISCHARGE : 1280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

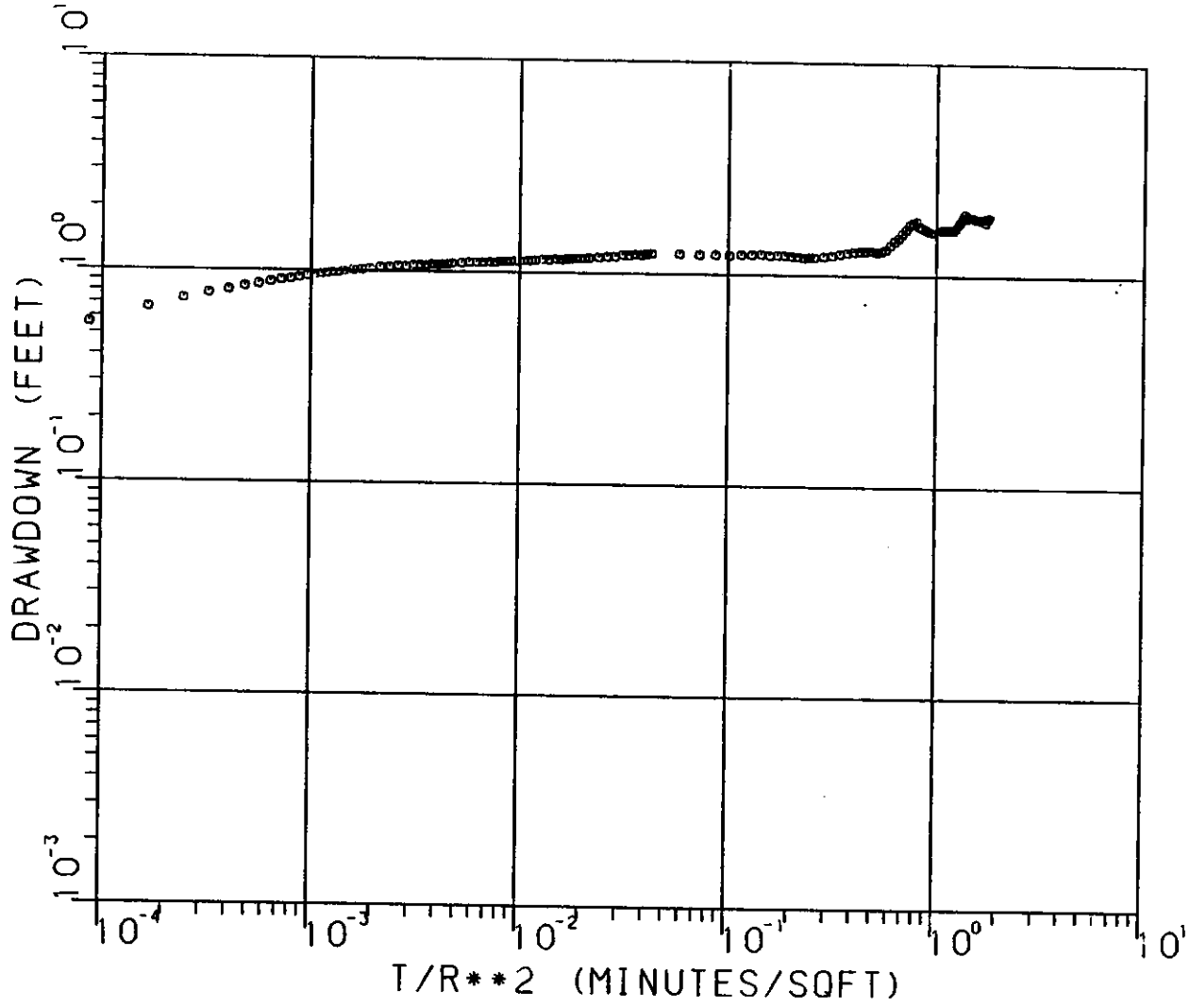


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-2
RADIUS : 55.00 FEET
DISCHARGE : 1280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

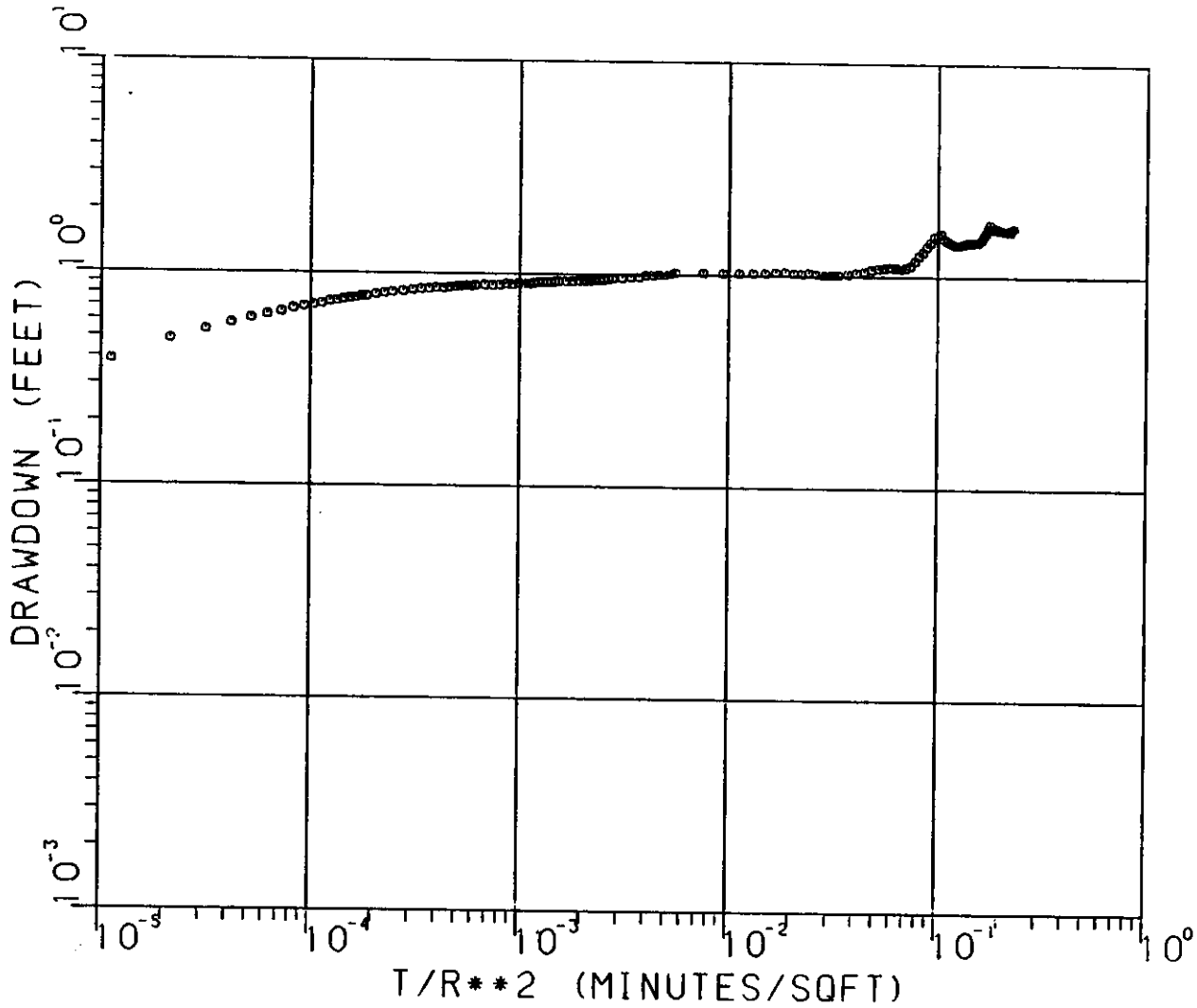


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-3
RADIUS : 46.00 FEET
DISCHARGE : 1280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

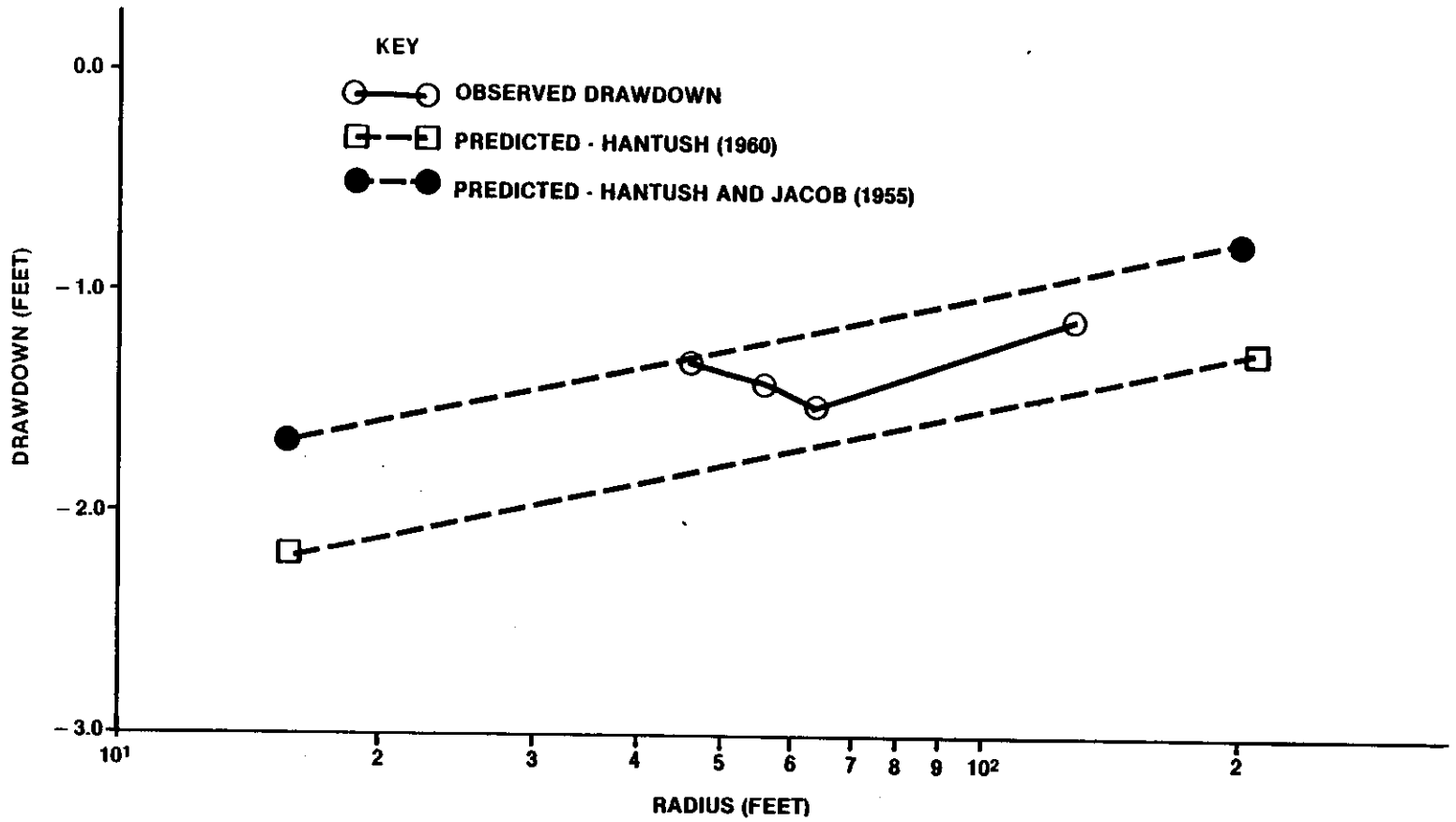


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-4
RADIUS : 128.00 FEET
DISCHARGE : 1280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

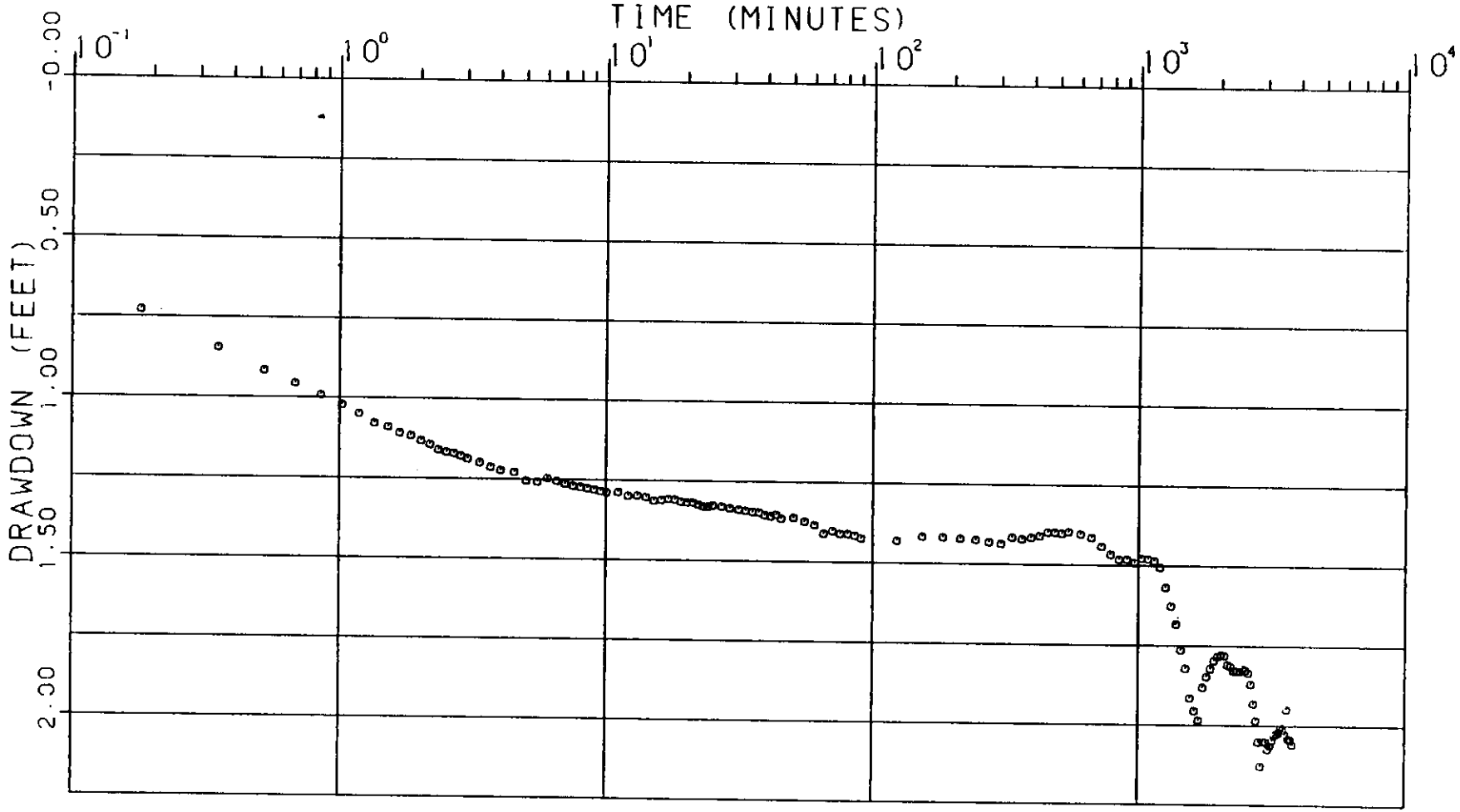


TIME = 1,023 MINUTES
FLOW RATE = 1,280 gpm

DISTANCE-DRAWDOWN PLOT, MONITOR WELLS 1, 2, 3, AND 4

SOURCE: ESE, 1985.

FLORIDA CITIES
WATER COMPANY

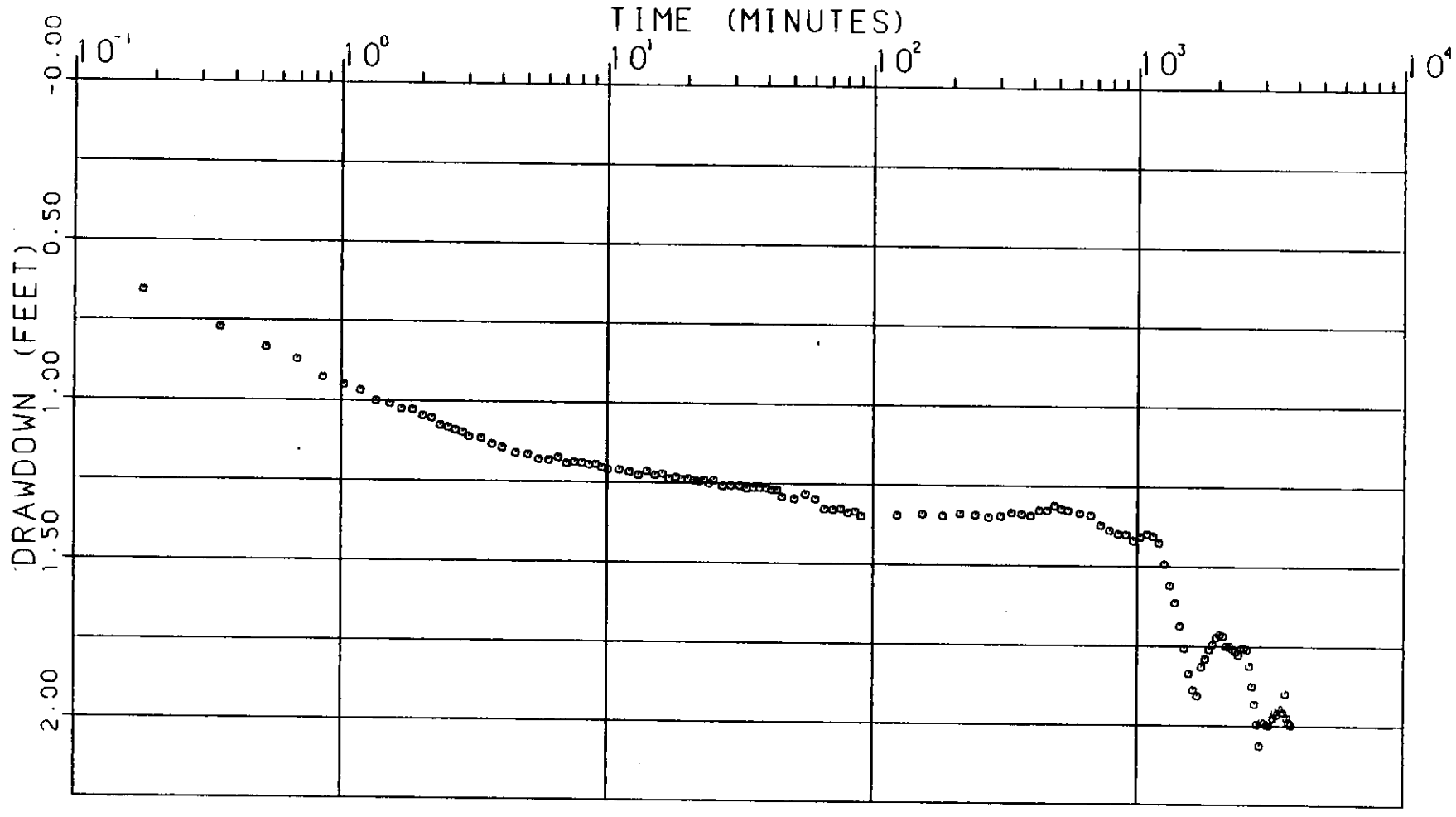


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-1
RADIUS : 65.00 FEET
DISCHARGE : 1,280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

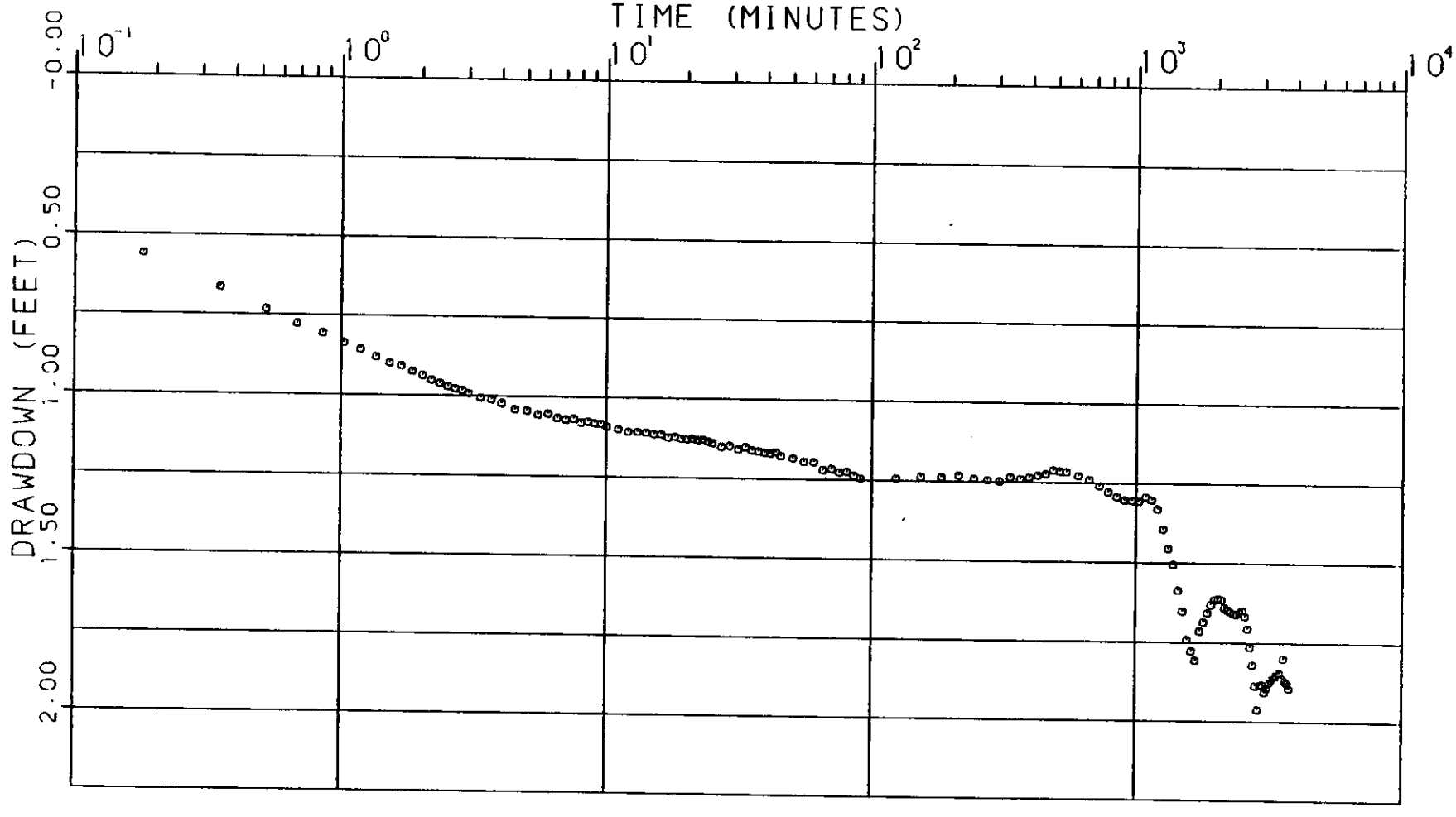


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-2
RADIUS : 55.00 FEET
DISCHARGE : 1,280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00

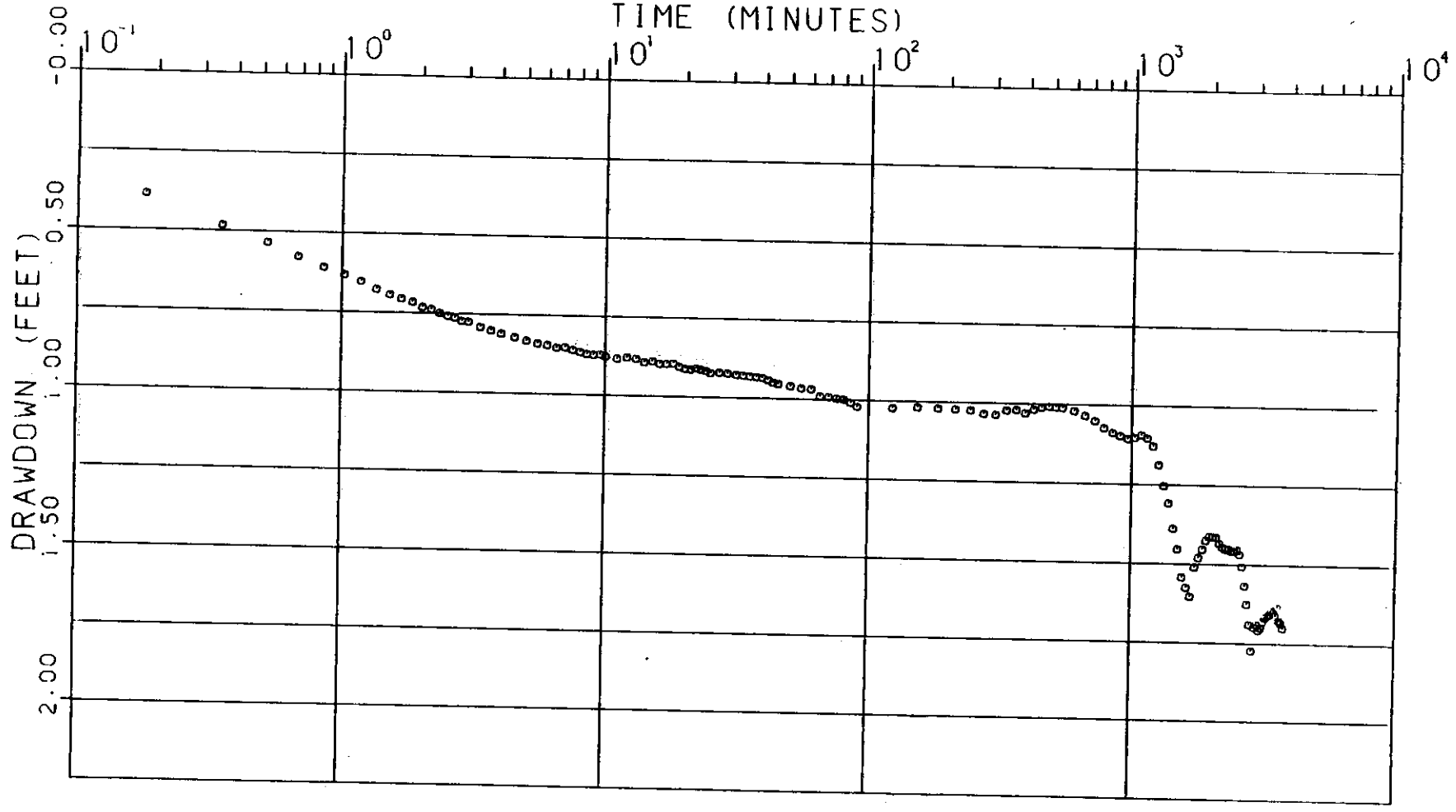


DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-3
RADIUS : 46.00 FEET
DISCHARGE : 1,280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00



DRAWDOWN PHASE

PROJECT NO : 83505

WELL NUMBER M4-4
RADIUS : 128.00 FEET
DISCHARGE : 1,280.00 GPM

PUMP STARTING DATE/TIME : JUL 17, 1984 / 14:45:00
PUMP STOPPING DATE/TIME : JUL 20, 1984 / 15:00:00