

AQUIFER ANALYSIS

AREA 10 FIVE SPOT TEST

OSHOTO RESERVOIR

CROOK COUNTY, WYOMING

Memorandum
December 20, 1979

GEOLOGY OF PHASE II WELL FIELD

Location:

Phase II wells are in the southern portion of the area designated as 10A. Located in the SW,SW,NW quarter of section 18, T53N, R67W, access is gained by the cut-across road to Oshoto, Crook County, Wyoming.

Sedimentology:

Host sands in area 10A are divisible into upper and lower genetic sand units. Sedimentary sequences are deposited by one process (or group of processes acting concurrently) with spacial positioning processes remaining relatively fixed in this area. Deposition by a fluvial system represents the framework of processes present when these sediments were layed down.

Isopachs of the upper and lower sand units, associated mineralization and phase II well field layout are represented on plates 1 & 2.

In fluvial sequences, there are three types of deposits - these are:

- 1) Channel deposits-including: Channel lag, point bar, channel bar, and channel fill deposits. Sediments deposited are a result of the main activity of river channels.
- 2) Bank deposits: Included are levee and crevasse splay deposits. Often these deposits cannot be distinguished from channel sediments. Sediments deposited in this group result from periods of overbank flooding.
- 3) Flood Plain Deposits: These are fine-grained sediments deposited by suspension from flood waters. Organic material derived from existing flora also contributes to the flood plain deposits. Included are both flood plain and marsh deposits.

Core from SP27Y represents a fining upward fluvial sequence (See plate 3 and attached discription). The lower sand unit is predominate in area 10A. The geometry of this unit in area 10 proper is as follows:

- 1) Geographic position and trend:
The overall trend of the lower genetic sand unit is north and south. The mappable limits extend eastward to the outcrop and extend out of the study area on the remaining three compass points.
- 2) Vertical position:
From outcrop the unit extends downdip to depths of 490' in 10B, 570' in phase II well field and in 10A North, 700'.
- 3) Thickness:
Unit thickness is variable for two reasons. Depositional thinning

occurs from 90' in the west to 30' centrally. In eastern and southern portions of the Oshoto area, thinning is erosional and highly undulatory. As the upper sand unit scours into this unit thickness ranges ^{from} 70' to 40' in relatively short distances.

4) Boundaries:

The lower contact is generally abrupt, as demonstrated by the electric log of SP27Y (Plate 3). A shale pebble conglomerate or clean sand disconformably overlies marine sand and shale beds. The upper contact is a gradational fining upward sequence which is truncated by the overlying channel deposits of the upper sand unit. Where the upper unit cuts into the lower unit, the fining upward sequence and channel deposits may be missing or substantially thinned.

Organics:

Organic matter in the mineralized host sequence occurs in four physical categories:

- 1) Coalified woody fragments: Stems, branches, and woody fragments are generally sparsely scattered throughout the channel interval. Size ranges from a few millimeters to several centimeters in diameter.
- 2) Coalified root casts: Found in proximity to shale sequences of flood plain and bank deposits, root casts are generally found near the top of the fluvial sequence. They constitute only a minor fraction of the combined organic content of the host sand sequence.
- 3) Liquid organics: Brown liquids can occasionally be observed "bleeding" from fresh core. Commonly this occurrence is associated with organic rich shales and laminated sands and silts. Rarely the brown liquid can be found emanating from a clean sand with only sparse detrital organic woody material. This ~~liquid~~ is thought to be mobile humic acids. Humic acids are found to be a chemical constituent of all types organic material from area 10. (Personal communications with Dr. Leventhal, USGS).
- 4) Interlaminated fine organics: Fine coalified leafy material can be found interlaminated with sand and silt laminae. Horizontallly laminated units from 1 cm to 15 cm can be found throughout the channel deposits (See plate 3). These are thought to be deposited as channel fill or swale fill on point bars. These beds are thin and highly discontinuous, making correlation from cores to surrounding exploration holes very difficult.

Mineralization:

Mineralization found in the lower fluvial sequence is thick and continuous in area 10A. The mineralized front is 3600' long and as much as 300' wide. Intercepts of 40.5' of .041 eU₃₀₈ and 45.5' of .038 eU₃₀₈ can be found along the ore roll.

Mineralization in the upper sand sequence is not well developed in the area of Phase II.

Channel deposits in the fluvial sequence form the host sands for ore roll formation (See plate 3). The host sand is generally massive with an occasional interlaminated sand and organic rich bed. Associated with these thin discontinuous beds, uranium mineralization may or may not occur (See plate 3 for occurrence of organic rich laminae associated with mineralization). *approximately 6.4% of the*

Summary:

In area 10A, two genetic fluvial sand sequences exist. The predominant lower sand unit exhibits a complete fining upward sequence typical of a fluvial system. Trending north-south, this unit disconformably overlies marine sediments of the Fox Hills and fines upward gradation until truncated by the overlying upper sand unit. Thickness of the lower unit in area 10A varies from 80' to 90' thick.

Organic material is divisible into four physical categories; coalified woody fragments, coalified root casts, liquid organics and finely laminated coalified leafy material.

Mineralization in area 10A has been traced continuously for 3600' long and as much as 300' wide along the eastern edge of the front. Intercepts in the nose of the ore roll can be in excess of 40' thick with grades of .04% U_3O_8 not uncommon. Mineralization within a channel deposit may be associated with thin discontinuous organic rich laminae. This type of mineral occurrence, however, accounts for only a very small portion of total ore reserves for area 10A. The vast majority of 10A fills and consequently the majority of 10A reserves occurs in clean sands of the channel deposits.

Respectfully submitted,

Mike Buswell

Mike Buswell

Enclosures
MB/jrb

PAUL A. MANERA

REGISTERED GEOLOGIST
CERTIFIED PROFESSIONAL GEOLOGIST

5251 N. 16th Street
Suite 302
Phoenix, AZ 85016

CONSULTING HYDROLOGIST

June 5, 1978

Nuclear Dynamics
P. O. Box 20766
Phoenix, AZ 85036

Attention: Mr. Kelsey Boltz

Re: Area 10 Five Spot Test

Gentlemen:

The enclosed report answers the questions asked in Mr. Dan Herlihy's memo dated February 17, 1978, except for question v.

Inasmuch as water from the "B" aquifer will be injected into the buffer wells and the oxidizing solution will be injected into the injection wells, the injected volumes will exceed the withdrawal, thereby forming a mound of injection of "B" aquifer water. Constant monitoring of the injection water and the monitoring wells will allow an understanding of the excursion of waters from the buffer wells when it occurs. Thus, question v. is practically insignificant.

The isolation of Wells SP 5X and SP 75X may indicate the need for an additional monitoring well. If such is the case a well site which should be hydrologically connected to the wells south of the negative boundary is at the intersection of coordinates 248,005 N and 202,195 E.

If there are any additional questions, call me.

Sincerely,



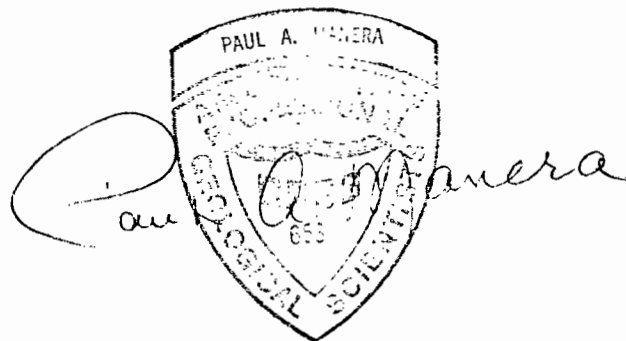
Paul A. Manera

PAM/aw

AQUIFER ANALYSIS
AREA 10 FIVE SPOT TEST
OSHOTO RESERVOIR
CROOK COUNTY, WYOMING

for
Nuclear Dynamics, Inc.

by
Paul A. Manera
Consultant in Groundwater Resources



June 5, 1978

TABLE OF CONTENTS

	<u>Page</u>
Summary	i
Introduction	1
Purpose and Scope	1
Location.	1
Field Work.	2
Previous Work	2
Wells Utilized.	2
Water Levels.	2
Aquifer Test Procedure.	2
Data Analysis	3
Appendix, Field Data	

FIGURES AND PLATE

Map of the wells in the Area 10 Five Spot Test. . . . .	.Plate 1 (in pocket)
Location Map. . . . .	.Figure 1
Generalized Area of Area 10 Five Spot Test. . . . .	.Figure 2
Well SP 3X . . . . .	.Figures 3 & 4
Well SP 4X . . . . .	.Figures 5 & 6
Well SP 6X . . . . .	.Figure 7
Well SP 11X . . . . .	.Figures 8 & 9
Well SP 12X . . . . .	.Figures 10 & 11
Well SP 19X . . . . .	.Figures 12 & 13
Well SP 78X . . . . .	.Figures 14 & 15
Well SP 7X . . . . .	.Figure 16

TABLES

Comparison of Aquifer "B" Parameters.Table 1
Water Levels, Pumping Well SP 75X a 4 gpmTable 2 (page 5)
Arrival Time of the Cone of Depression.Table 3 (page 6)

Summary

The Area 10 Five Spot Test was pump tested during the period May 23-24, 1978. Pumping at the constant rate of 10 gallons per minute, the computed range of transmissivity of the ore zone of the "B" aquifer was 96 to 220 gallons per day per foot with an average T of 131. This compares to an average T of 138 computed from the data obtained in the initial aquifer test of August 1977. The coefficient of storage ranged from 4.5×10^{-5} to 8.3×10^{-5} with an average of 5.8×10^{-5} . The average S obtained from the August 1977 test was 1.4×10^{-4} .

Measurement of the water level of the "A" aquifer while pumping the "B" aquifer indicated no connection between the two aquifers. This reinforces the observation of no leakage between the aquifers obtained in the August 1977 aquifer test.

Wells SP 5X and SP 75X are hydrologically isolated from the remainder of the Area 10 Five Spot Test wells. This is probably the result of a lateral discontinuity in the ore bearing sand of the "B" aquifer. Other than these two wells, all the wells completed as of May 24, 1978, SP 3X, SP 4X, SP 6X, SP 11X, SP 12X, SP 19X, SP 20X, and SP 78X, are hydrologically connected.

The preferred direction of flow in order of priority is

1. east of Well SP 19X,
2. west of Well SP 19X,
3. south of Well SP 19X,
4. north of Well SP 19X.

Use of buffer wells eliminates the cone of depression outside the buffer well zone. Thus, there is no effect of a bleed stream.

Introduction

This study represents the second in a series of studies to determine the aquifer parameters of the "B" aquifer of the Lance-Fox Hill formations. Nuclear Dynamics, Inc. is developing this data as part of an "In Situ" mining operation of uranium found in a portion of the "B" aquifer.

Purpose and Scope

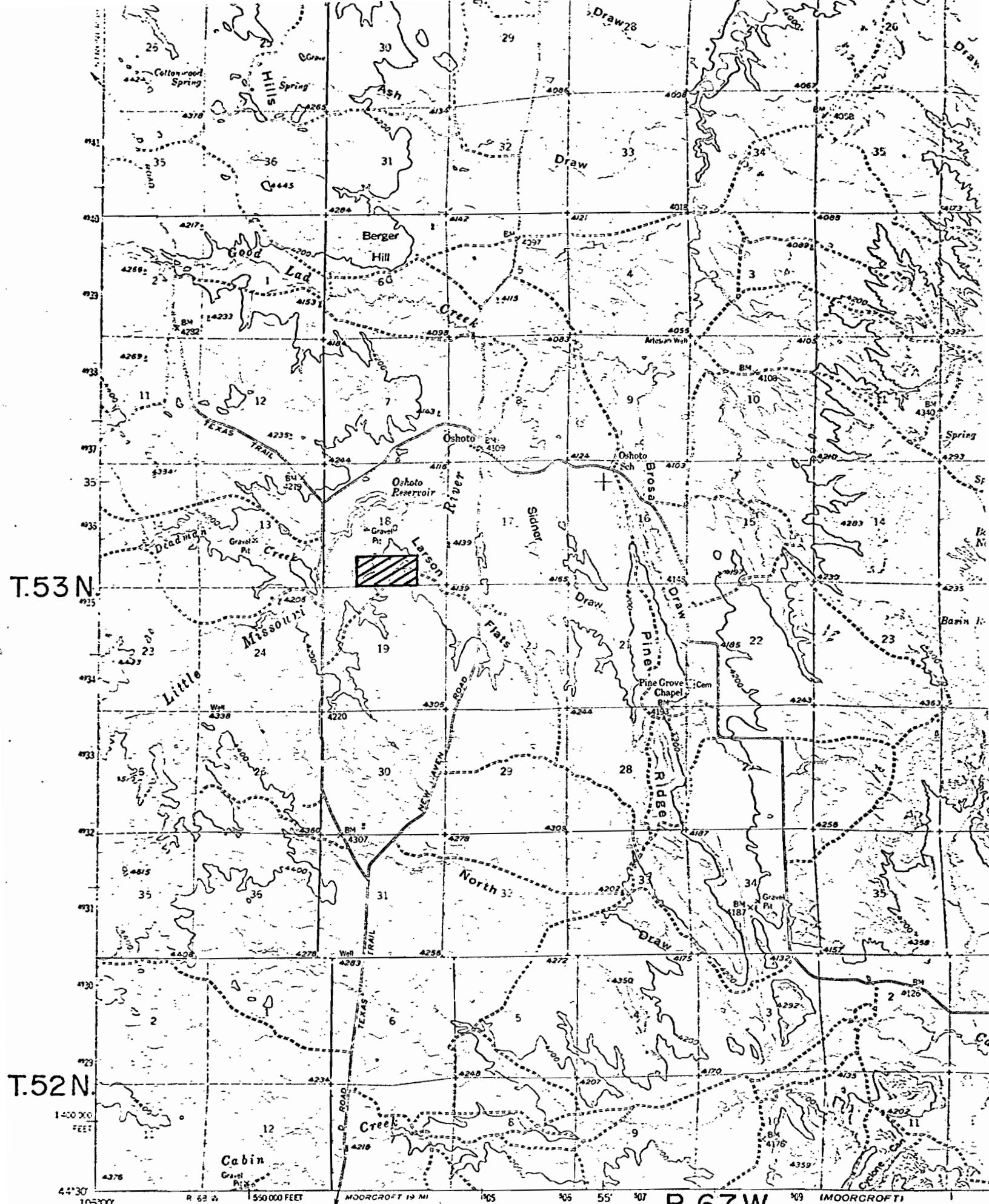
The purpose of the aquifer analysis of the Area 10 Five Spot Test was to answer the specific questions:

1. The extent of the hydraulic connection between aquifers.
2. The presence and location of hydraulic boundaries.
3. The verification of the hydraulic connection between the production area and the monitoring wells.
4. The direction of preferred flows in the production aquifer.
5. A determination of the effective radius of the cone of depression created by the aquifer bleed stream as a function of time if a bleed stream is to be used.

Additionally, confirmation of the parameters determined from the initial aquifer test conducted in August 1977 (Report dated September 6, 1977, revised November 22, 1977) was expected.

Location

The Area 10 Five Spot Test is located in the $S\frac{1}{2}$ $S\frac{1}{2}$ of Section 18, T. 53 N., R. 67 W., Kansas Nebraska Boundary Base and Sixth Principal Meridian, near Oshoto Reservoir, Crook County, Wyoming. The area of the aquifer analysis is shown on Figure 1. Figure 2 shows the locations of the initial aquifer analysis and the Area 10 Five Spot Test.



T.53N

T.52N

1:40,000 FEET

44°30'

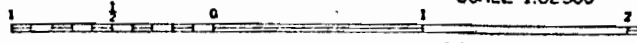
Mapped, edited, and published by the Geological Survey
Control by USGS, USC&GS, and Shell Oil Co.

Topography from 1:24,000-scale map of Missouri Buttes
7.5 minute quadrangle, surveyed 1954; and from aerial

R.67W.

SCALE 1:62500

FIGURE 1



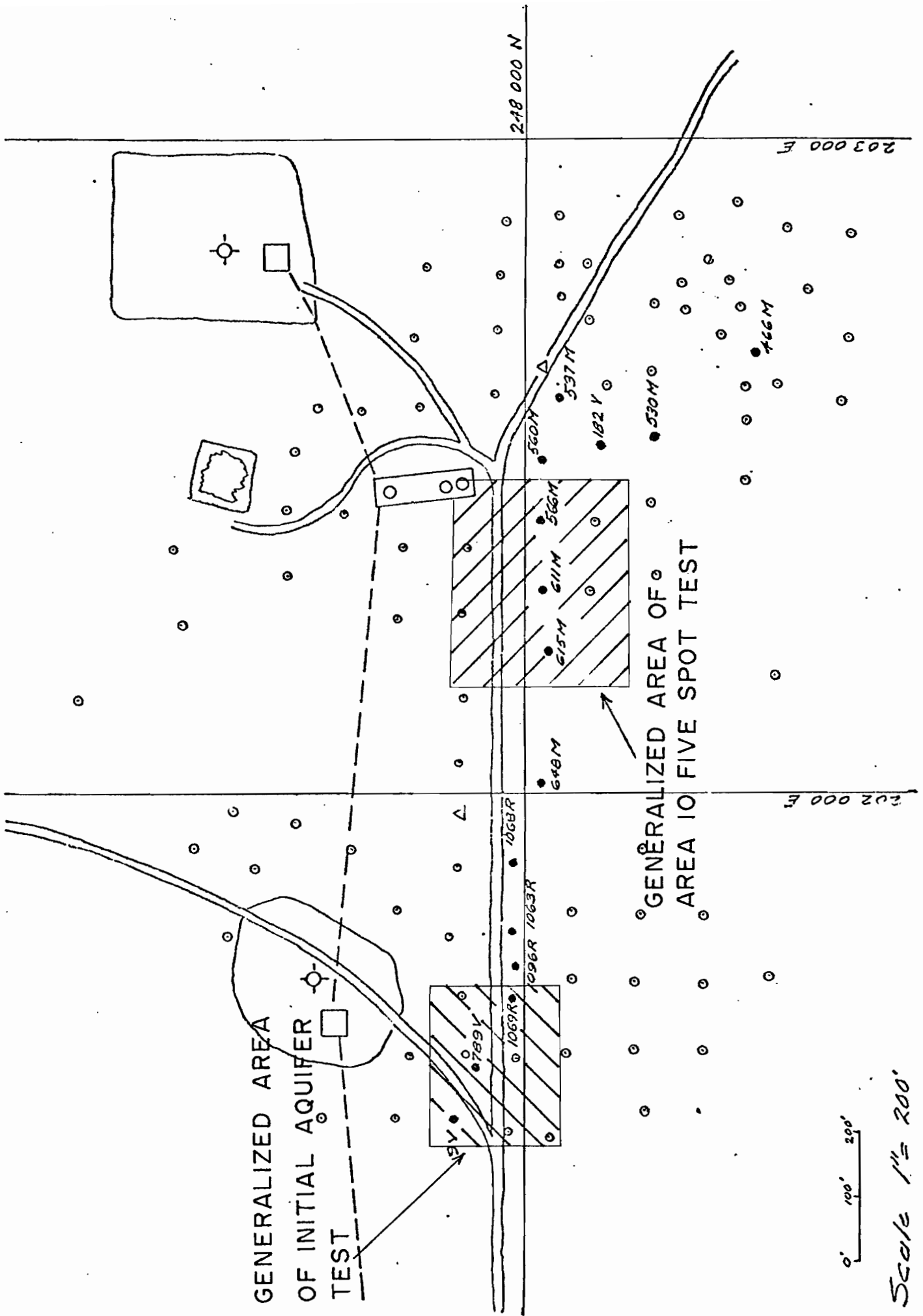


FIGURE 2

Field Work

The field work for this study included the construction and development of the wells in the "Five Spot" test and the pumping test conducted on May 23-24, 1978, and the short test conducted on Well SP 75X on May 25, 1978.

Previous Work

The report dated September 6, 1977, Revised November 22, 1977, details the analysis of the aquifers and pumping test data obtained in August 1977. This report assumes the availability of that data and analysis.

Wells Utilized

The wells monitored during the pumping test of May 23-24, 1978, were:

Pumped Well	SP 19X
Injection Well	SP 20X
Buffer Wells	SP 3X, SP 4X, SP 75X, SP 78X
Monitoring Wells	SP 5X, SP 6X, SP 11X, SP 12X

all of which were perforated in the ore zone of the "B" aquifer and Well SP 7X perforated only in the "A" aquifer. The locations and relationships of these wells are shown on Plate 1.

Water Levels

Prior to initiation of pumping, the piezometric head of the "A" aquifer was 8.25 feet higher than the piezometric head of the "B" aquifer. The depth to water was 137.58 feet in Well SP 7X and 145.83 feet in Well SP 19X, the collars of which are approximately the same altitude.

Aquifer Test Procedure

Water level measurements were made prior to initiation of pumping.

Pumping was initiated at 1215 hours, May 23, 1978, and terminated at 1410 hours on May 24, 1978. The rate of discharge was 10 gallons per minute measured by a Badger flow meter. Minor fluctuations in the rate of production

occurred during the pumping period. Total pumpage was 15,500 gallons in 1540 minutes for an average production of 10.06 gallons per minute. A pumping rate of 10 gpm was utilized in the analysis of data. Measurement of the recovery of the water levels was made from 1410 hours to 1700 hours, May 24, 1978. All measurements were made by electric sounder.

The water level in the "A" aquifer (Well SP 7X) was monitored periodically before, during and after the pumping test.

Periodic measurement of the water levels will continue through time.

Data Analysis

The test data from each of the wells perforated against the "B" aquifer were analyzed by the Jacob method for both the drawdown and recovery data to allow a comparison of results.

(A) Jacob Method - Drawdown Data

In the Jacob Method the temporal distribution of the drawdown for each observation well or the production well is illustrated on semi-logarithmic paper. A straight line fit of the data gives a slope which can be used to solve the following equations in determining T and S.

$$T = \frac{264Q}{\Delta s} \quad (1)$$

$$S = \frac{0.3 T t_0}{r^2} \quad (2)$$

where:

- T = transmissivity in gallons per day per foot
- Q = discharge in gallons per minute
- Δs = drawdown per log cycle in feet
- S = storage coefficient (dimensionless)
- t_0 = time at zero drawdown in days
- r = distance between pumping well and observation well in feet

(B) Residual Drawdown Curve

The residual drawdown versus t/t' plotted on semi-logarithmic paper gives a straight line plot which can be used to satisfy Equation 1 to determine T, where:

- t = time since pumping started in minutes
- t' = time since pumping stopped in minutes
- Δs = residual drawdown per log cycle in feet

Figures 3 - 15 illustrate the results of the data analysis based on these two methods for each of the wells monitored except Wells SP 5X, SP 20X and SP 75X. Table 1 compares the values of the aquifer parameters T and S of each well. The T ranges from 96 to 220 gallons per day per foot with an average T of 131 gpd/ft. The value of S ranges from 4.5×10^{-5} to 8.3×10^{-5} with an average of 5.8×10^{-5} . Comparison of these parameter values with the initial aquifer test shows a good correlation. The comparative parameter values are:

	<u>Initial Test</u>	<u>5 Spot Test</u>
T (average)	138 gpd/ft	131 gpd/ft
S (average)	1.4×10^{-4}	5.8×10^{-5}

The observation well data collected from Wells SP 5X, SP 20X, and SP 75X did not conform to data obtained from the pumped well and the remaining seven observations wells. Wells SP 3X, SP 4X, SP 6X, SP 11X, SP 12X, and SP 78X, used as observation wells, and the pumped well, SP 19X, indicate normal drawdown and recovery curves in an infinite aquifer. Well SP 75X was not affected during the pumping test and Well SP 5X was affected at 465± minutes into the test and indicated a total drawdown of only 1.92 feet at the conclusion of the test period. Well SP 20X was measured with a sounder that was incorrectly marked, therefore some of the readings are off by 17 feet. Although the data was corrected on the field data sheet, it was not graphed.

3x Unavailable

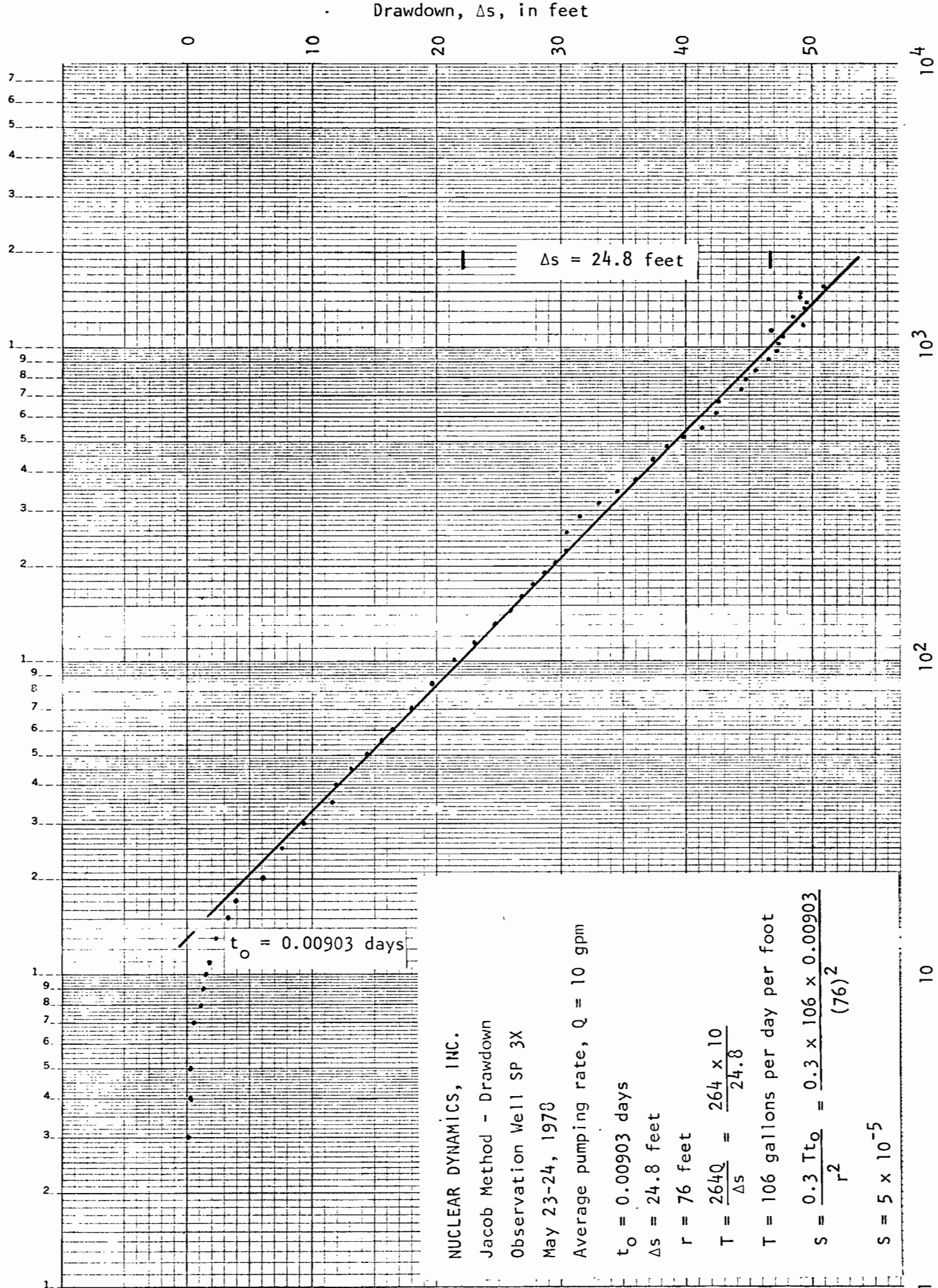


FIGURE 3

Time since pumping started, in minutes

3: 100001
46 6012

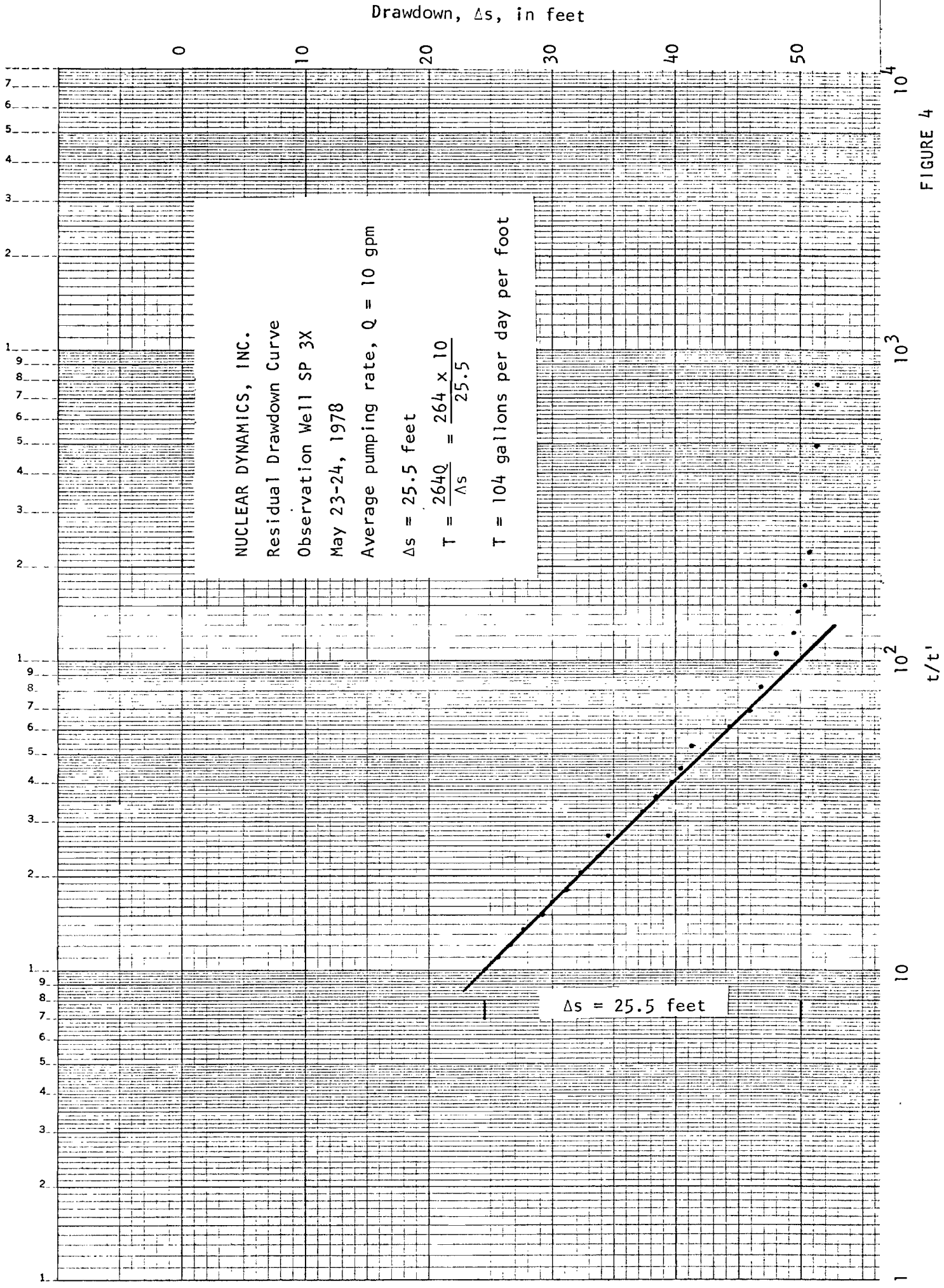
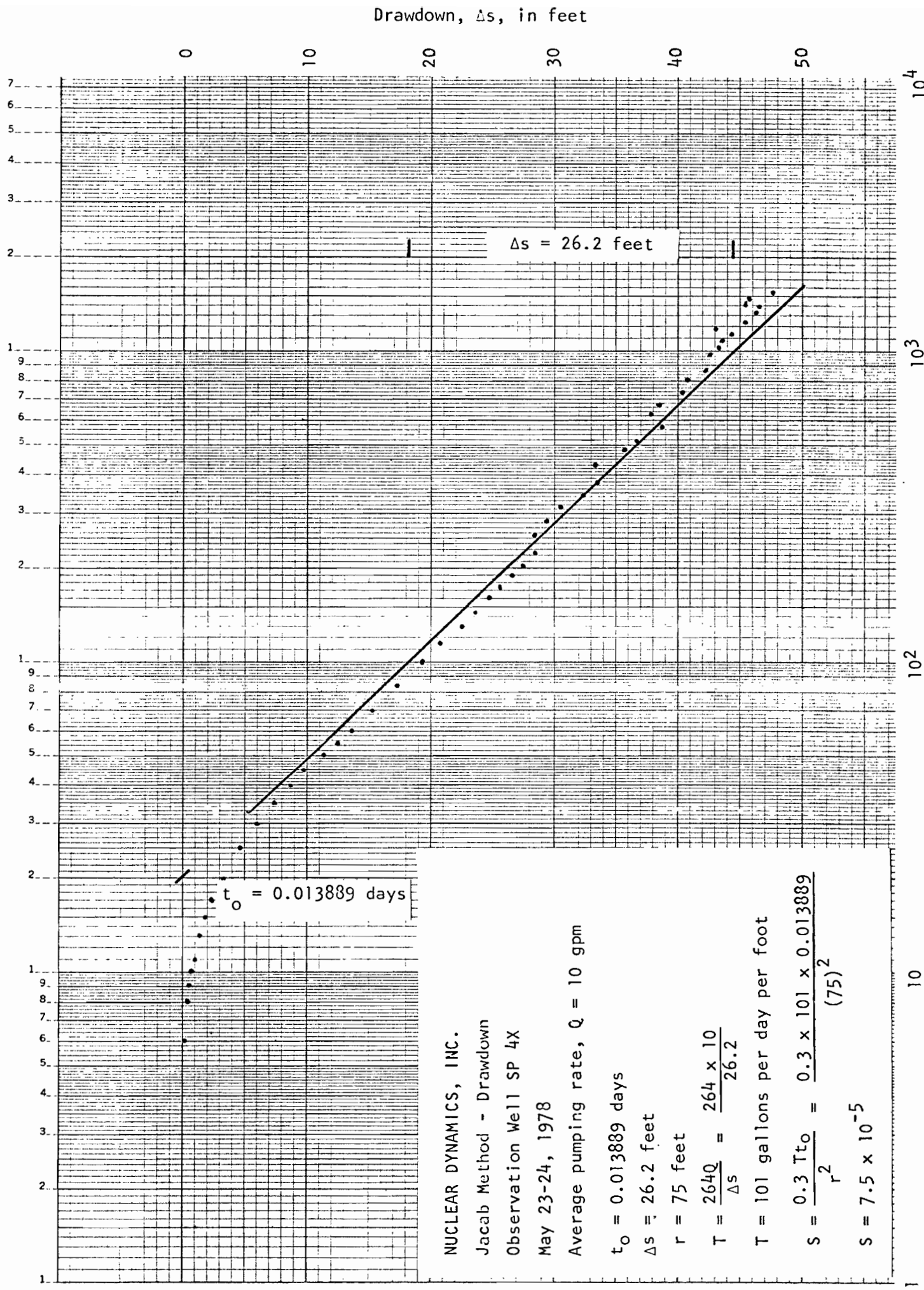


FIGURE 4



NUCLEAR DYNAMICS, INC.

Jacob Method - Drawdown

Observation Well SP 4X

May 23-24, 1978

Average pumping rate, $Q = 10$ gpm

$t_0 = 0.013889$ days

$\Delta s = 26.2$ feet

$r = 75$ feet

$$T = \frac{264Q}{\Delta s} = \frac{264 \times 10}{26.2}$$

$T = 101$ gallons per day per foot

$$S = \frac{0.3 T t_0}{r^2} = \frac{0.3 \times 101 \times 0.013889}{(75)^2}$$

$$S = 7.5 \times 10^{-5}$$

Time since pumping started, in minutes

FIGURE 5

4 x 70 div. /

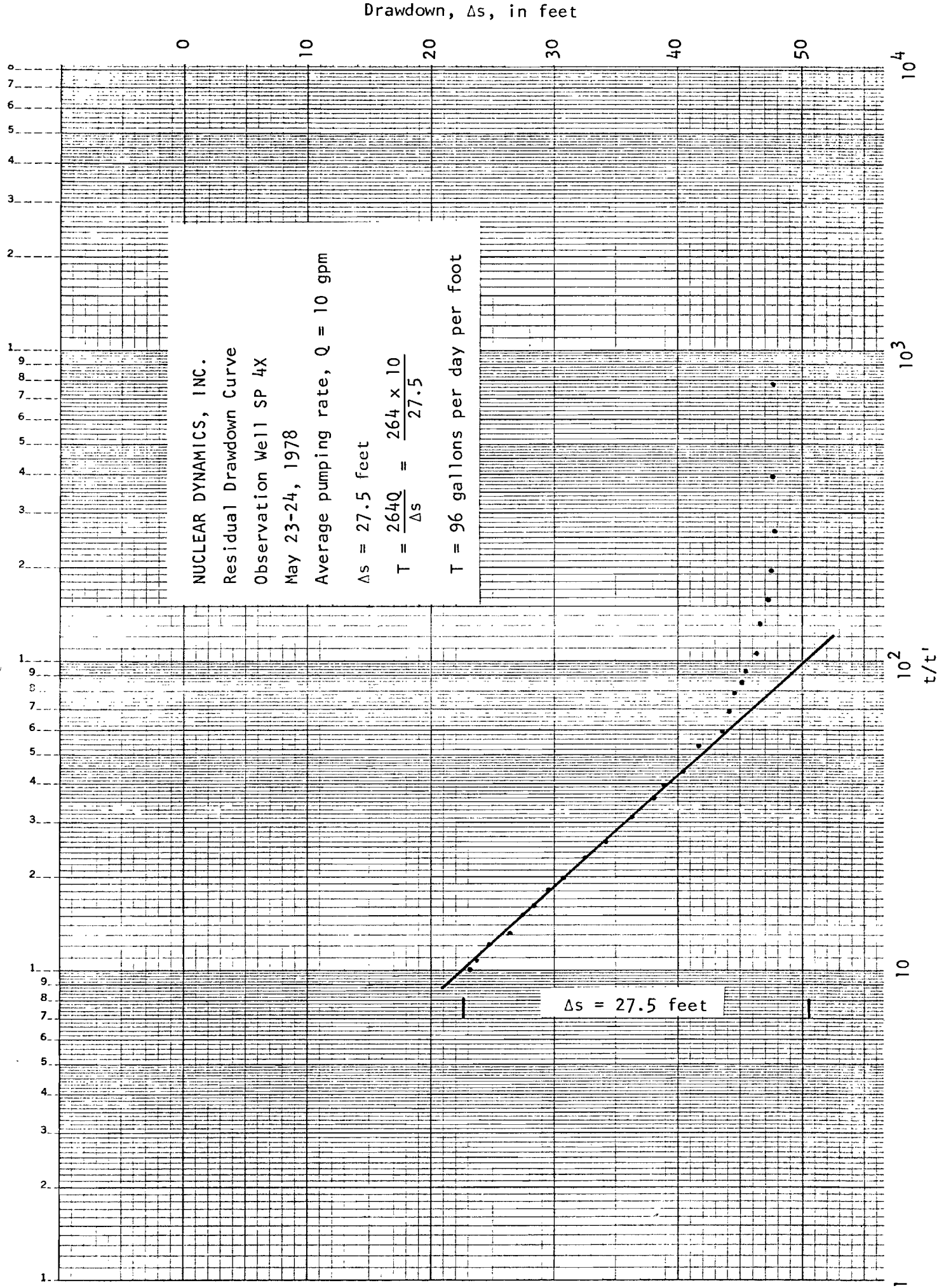


FIGURE 6

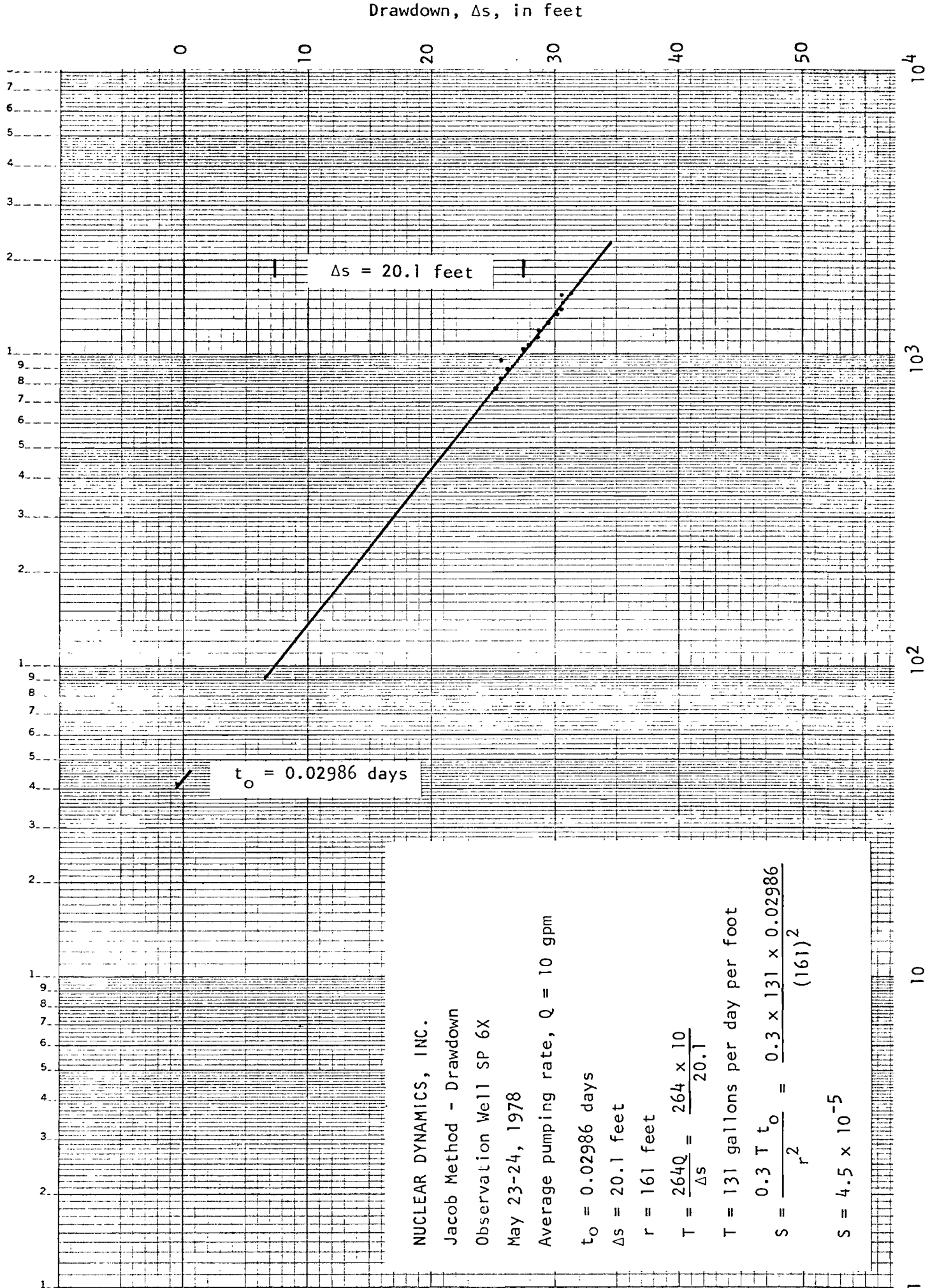
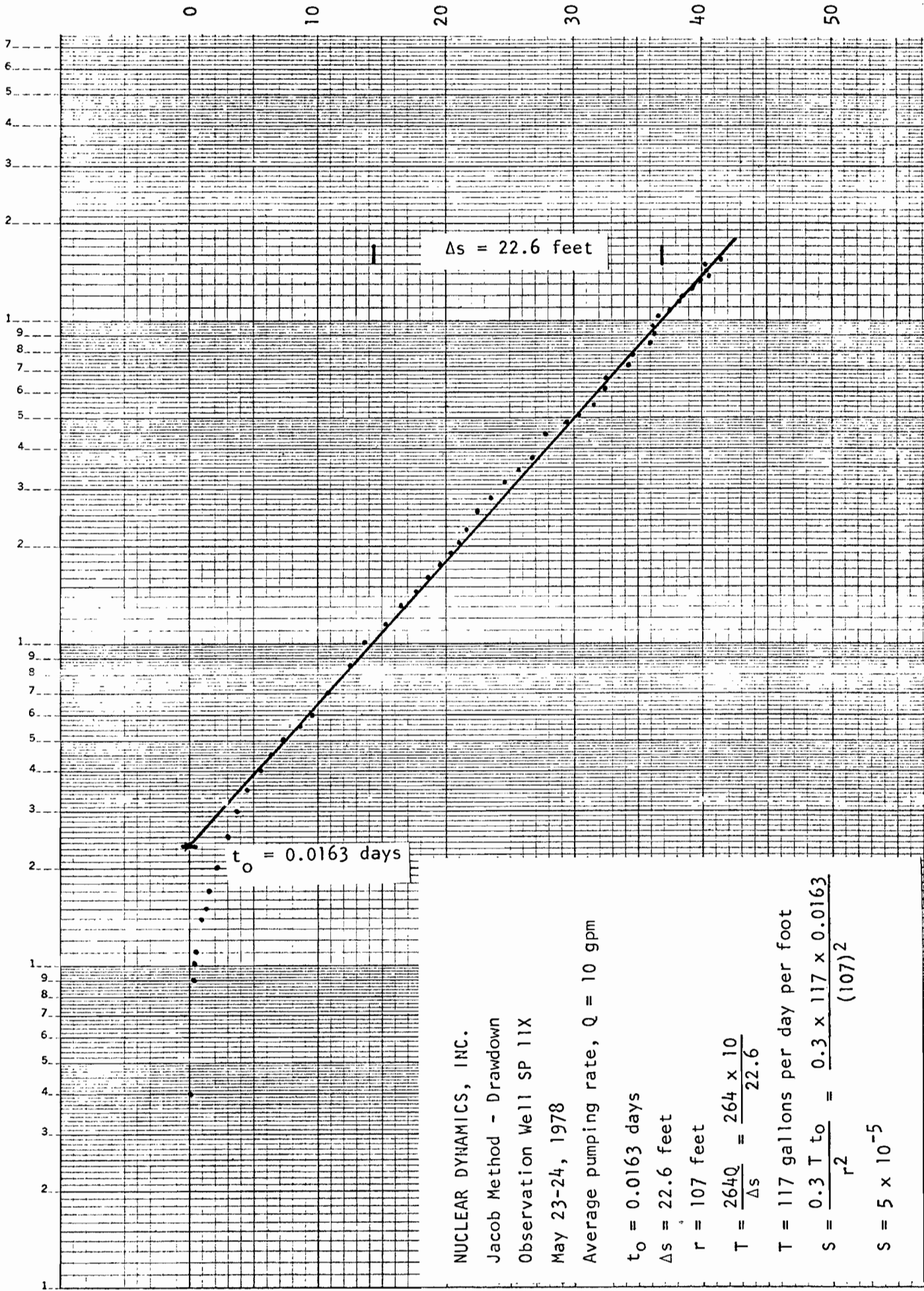


FIGURE 7

11 X W/ans d u/v

Drawdown, Δs , in feet



NUCLEAR DYNAMICS, INC.

Jacob Method - Drawdown

Observation Well SP 11X

May 23-24, 1978

Average pumping rate, $Q = 10$ gpm

$t_0 = 0.0163$ days

$\Delta s = 22.6$ feet

$r = 107$ feet

$$T = \frac{264Q}{\Delta s} = \frac{264 \times 10}{22.6}$$

$T = 117$ gallons per day per foot

$$S = \frac{0.3 T t_0}{r^2} = \frac{0.3 \times 117 \times 0.0163}{(107)^2}$$

$S = 5 \times 10^{-5}$

10

10²

10³

10⁴

Time since pumping started, in minutes

FIGURE 8

11/1 Recovery

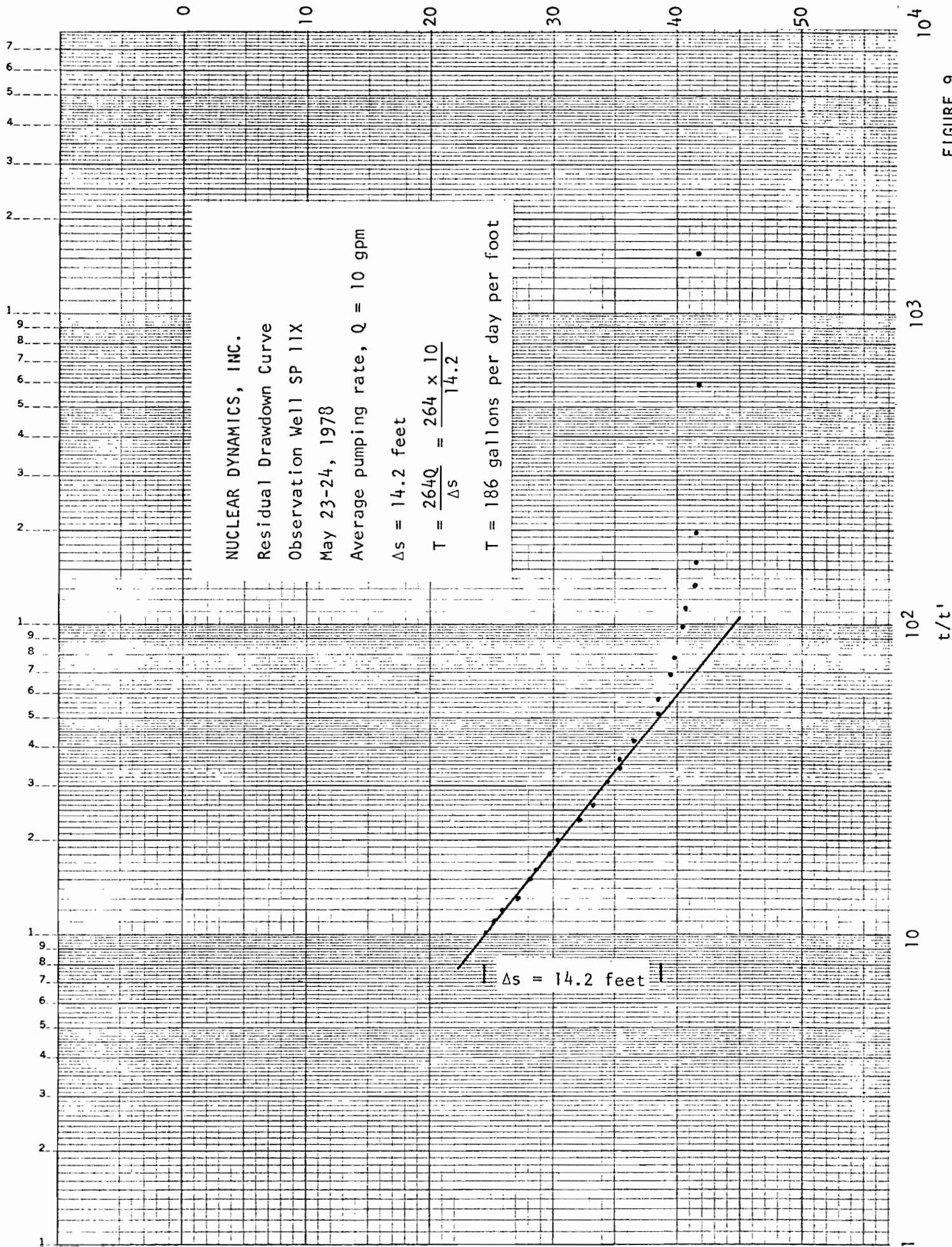
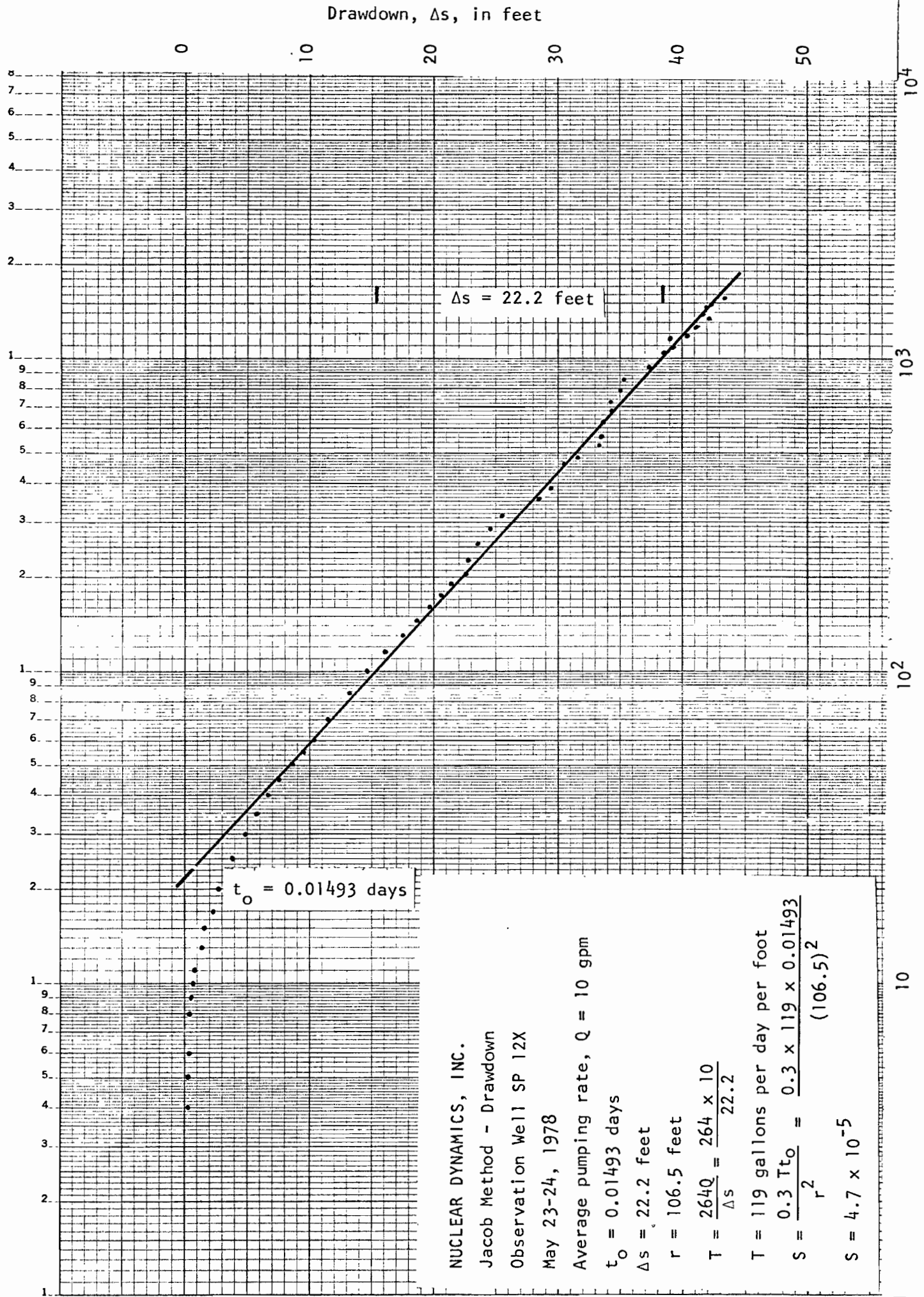


FIGURE 9



NUCLEAR DYNAMICS, INC.

Jacob Method - Drawdown

Observation Well SP 12X

May 23-24, 1978

Average pumping rate, $Q = 10$ gpm

$t_0 = 0.01493$ days

$\Delta s = 22.2$ feet

$r = 106.5$ feet

$$T = \frac{264Q}{\Delta s} = \frac{264 \times 10}{22.2}$$

$T = 119$ gallons per day per foot

$$S = \frac{0.3 T t_0}{r^2} = \frac{0.3 \times 119 \times 0.01493}{(106.5)^2}$$

$S = 4.7 \times 10^{-5}$

FIGURE 10

12 X 18 1/2

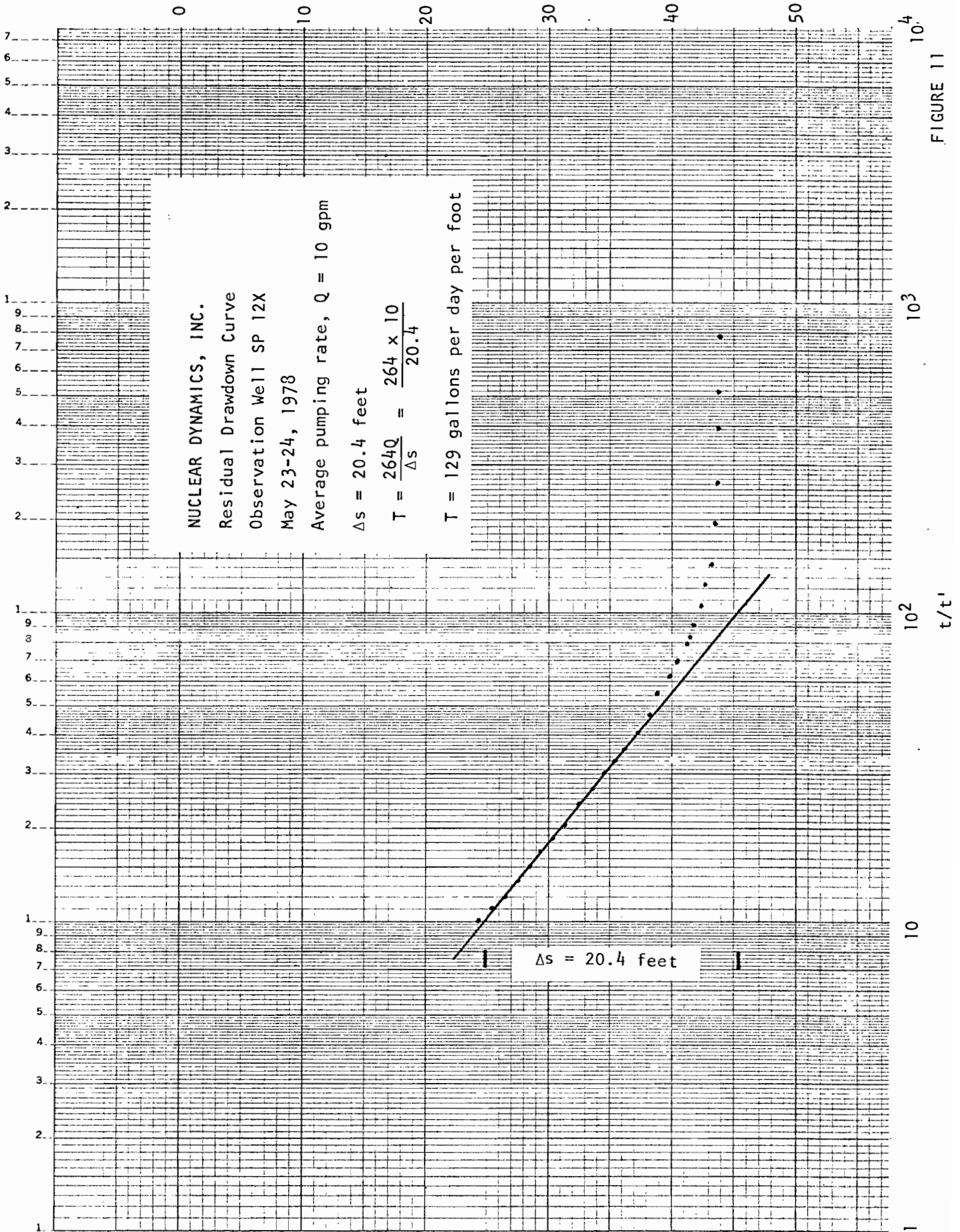


FIGURE 11

19X Drawdown

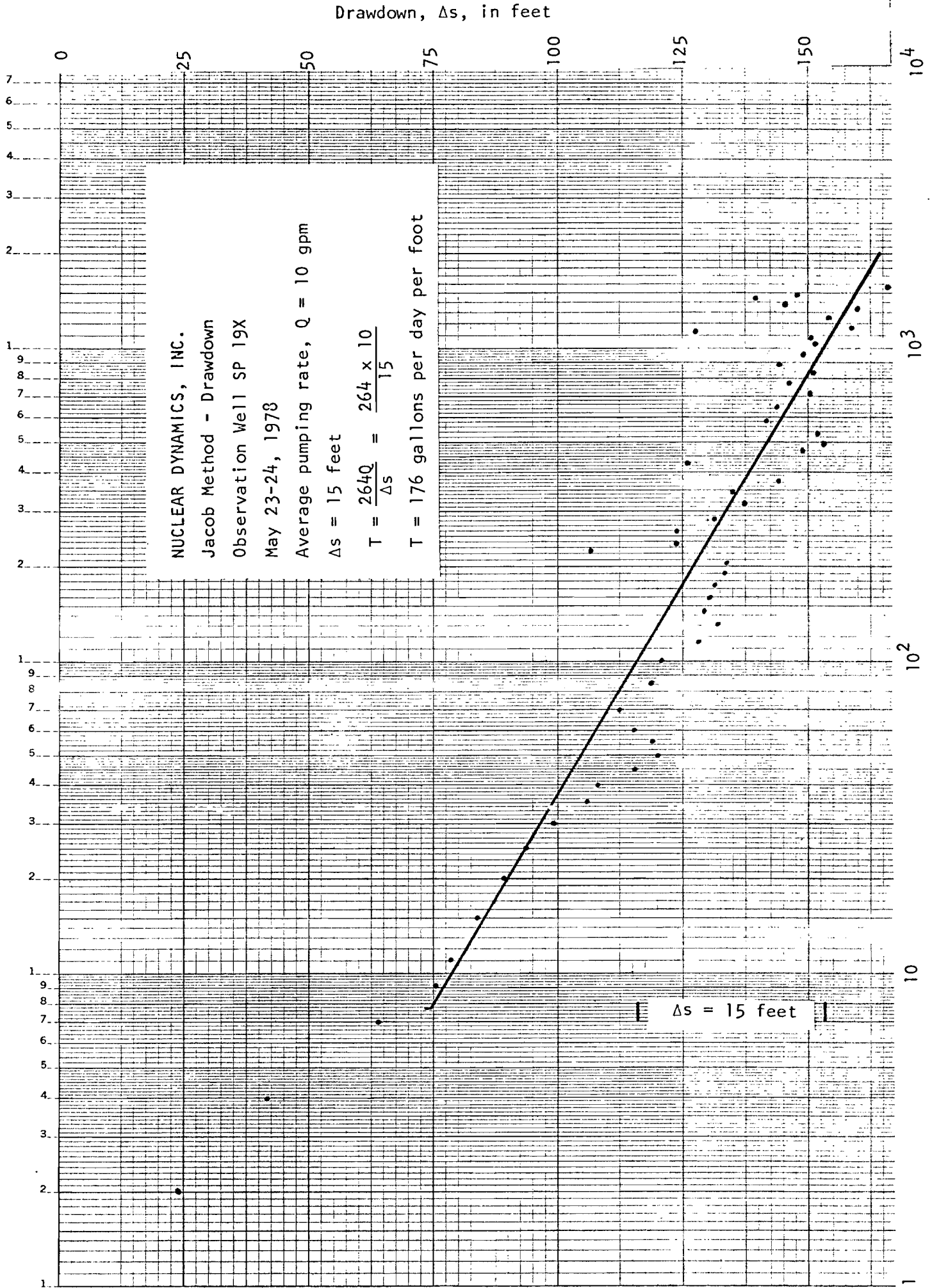
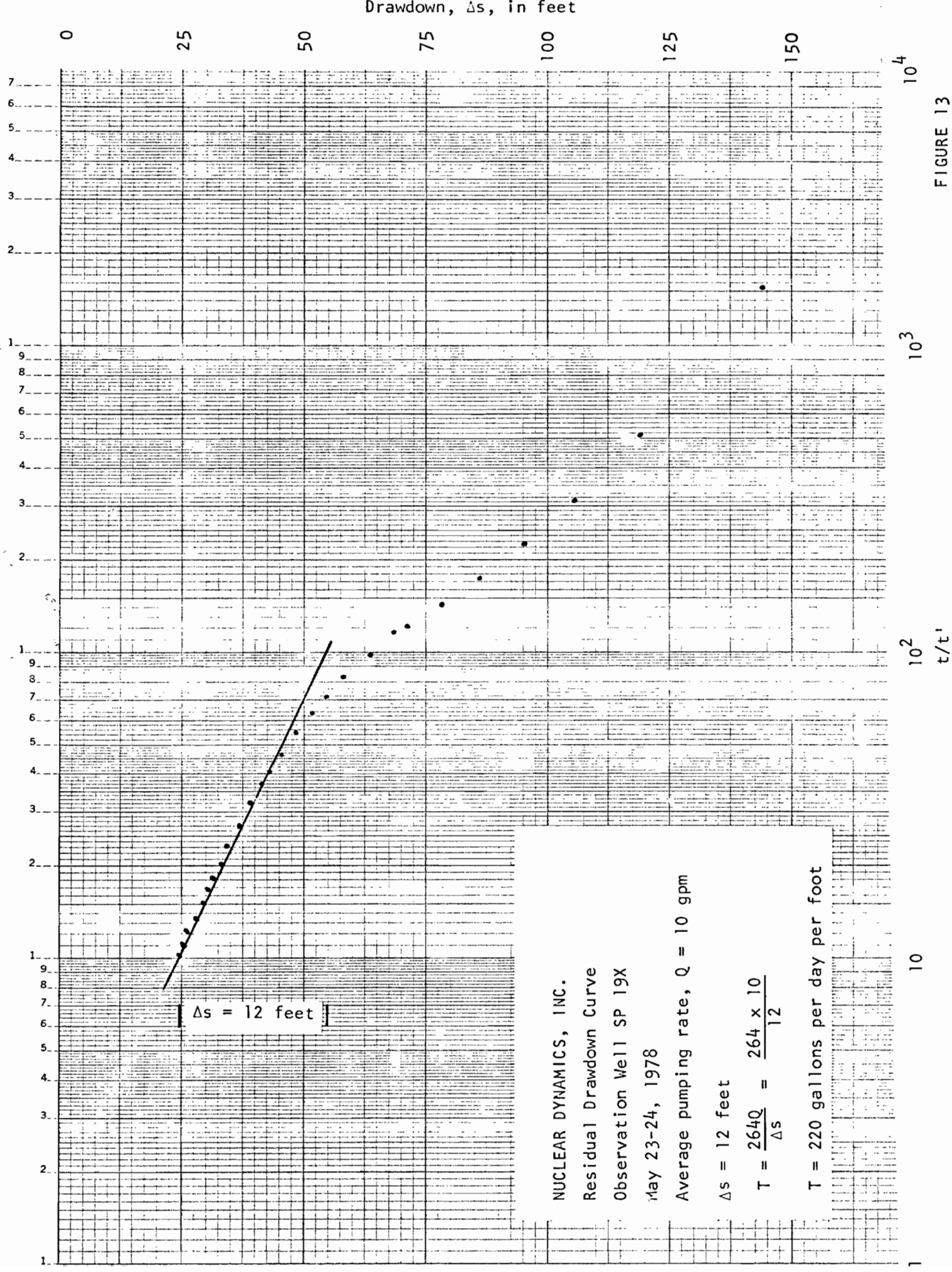


FIGURE 12

19X Reserve
46 6012



NUCLEAR DYNAMICS, INC.

Residual Drawdown Curve

Observation Well SP 19X

May 23-24, 1978

Average pumping rate, $Q = 10$ gpm

$\Delta s = 12$ feet

$$T = \frac{264Q}{\Delta s} = \frac{264 \times 10}{12}$$

$T = 220$ gallons per day per foot

FIGURE 13

78X
Drawdown
46 6012

Drawdown, Δs , in feet

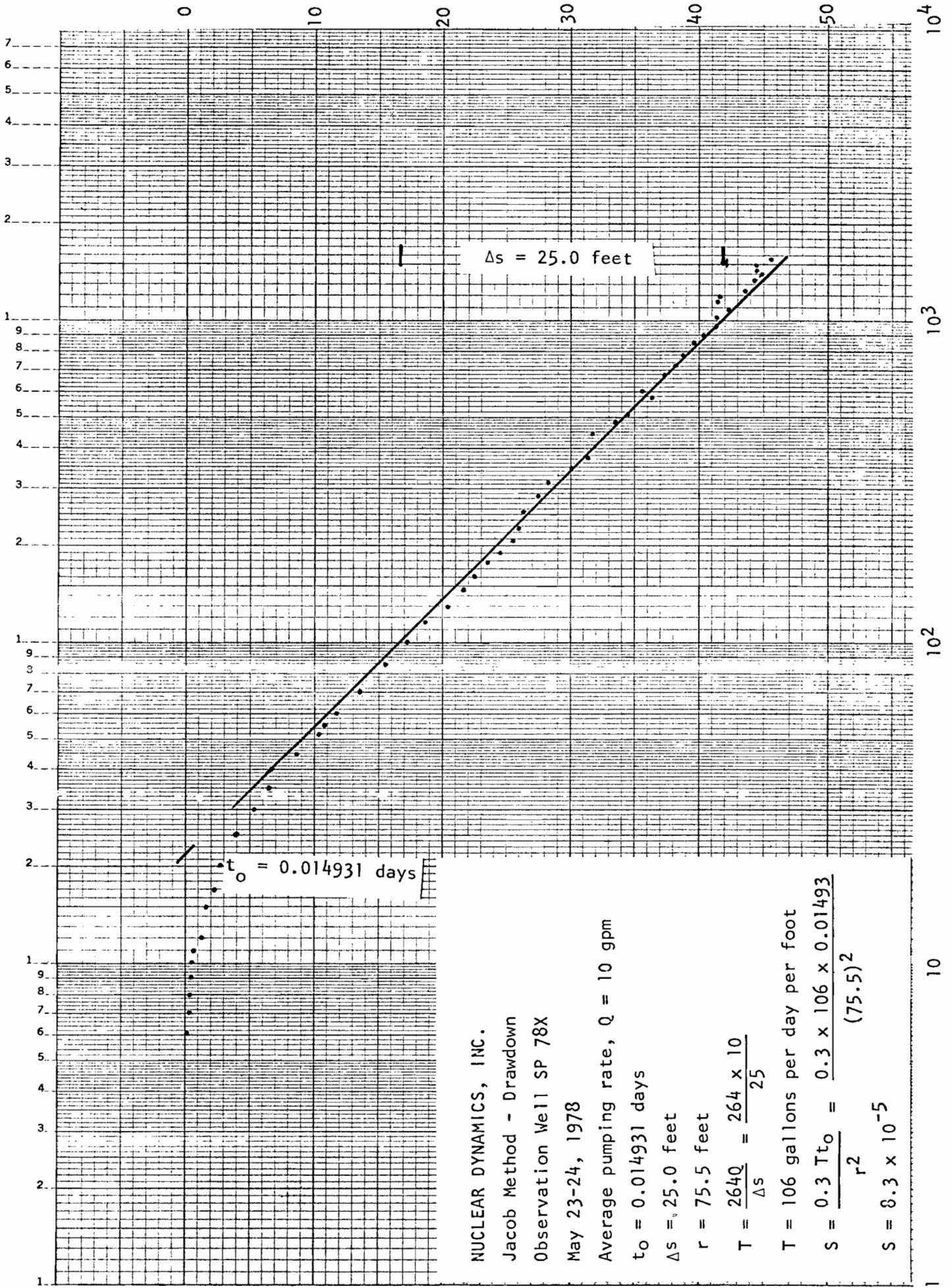


FIGURE 14

Time since pumping started, in minutes

78 X
curve /
46 6012

Drawdown, Δs , in feet

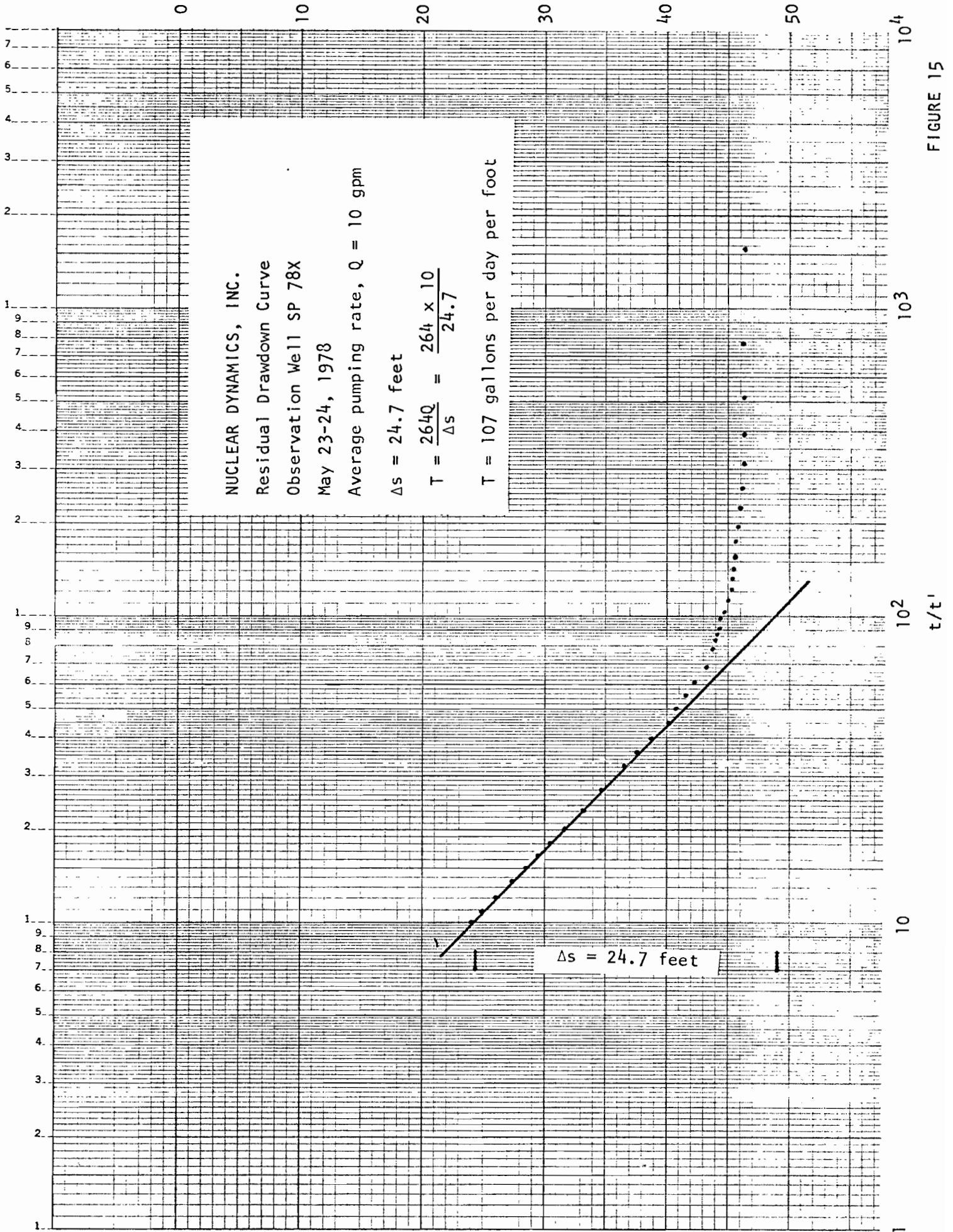


FIGURE 15

TABLE 1
 COMPARISON OF AQUIFER "B" PARAMETERS
 Discharge - 10 gpm

Well	T gpd/ft	S Dimensionless
SP 19X Pumped Well		
Drawdown - Jacob method	176	--
Recovery	220	--
SP 3X		
Drawdown - Jacob method	106	5×10^{-5}
Recovery	104	--
SP 4X		
Drawdown - Jacob method	101	7.5×10^{-5}
Recovery	96	--
SP 6X		
Drawdown - Jacob method	131	4.5×10^{-5}
Recovery	--	--
SP 11X		
Drawdown - Jacob method	117	5×10^{-5}
Recovery	186	--
SP 12X		
Drawdown - Jacob method	119	4.7×10^{-5}
Recovery	129	--
SP 78X		
Drawdown - Jacob method	106	8.3×10^{-5}
Recovery	107	--
Range	96-220	$4.5-8.3 \times 10^{-5}$
Average	131	5.8×10^{-5}

On May 25, 1978, Well SP 75X was pumped at the rate of 4 gallons per minute from 1000 hours to 1500 hours to verify that the well was developed. Wells SP 20X, SP 5X and SP 12X were monitored to determine if connections were present. The observations in the various wells are shown in Table 2.

TABLE 2
Water Levels, Pumping Well SP 75X at 4 gpm

<u>Well</u>	<u>Time</u>	<u>Water Level, feet</u>	<u>Drawdown</u>
SP 75X	1000	149	-0-
	1400	208.17	59.17
SP 5X	1003	143.08	-0-
	1502	149.25	6.17
SP 12X	1003	159.25	-0-
	1508	157.67	-1.58
SP 20X	1002	146.08	-0-
	1505	144.58	-1.50

The connection between Wells SP 5X and SP 75X and the lack of connection of these two wells and the wells to the south and east indicate a negative hydrologic boundary which trends northeast-southwest across the northwestern portion of the Area 10 Five Spot Test. The exact location of the negative hydrologic boundary cannot be determined as there are no definitive reflections in the observation well data south of the boundary. The general location of the negative hydrologic boundary is north of Wells SP 12X, SP 20X and SP 4X and south of SP 75X and SP 5X.

The exact type of boundary has not been determined. The two alternatives are a fault forming the negative hydrologic boundary or a negative hydrologic boundary caused by changing permeabilities within the formation, i.e., a clay lens interfingering into the ore zone of the "B" aquifer, or some such discontinuity. The latter is the more likely, as 1) the perforated lineal coverage is relatively small covering only the ore zone in the "B" aquifer, and 2) there is no ore in Wells SP 75X and SP 5X, thus the sands which form the ore zone in the "B" aquifer could have a lateral discontinuity which isolates Wells SP 5X and SP 75X from the remaining wells. Correlation of the logs shows that Pierre Shale and the aquiclude between Aquifers "A" and "B" have no

vertical displacement between Wells SP 75X and SP 19X. However, the sands which normally carry the ore in the "B" aquifer could not be traced between these same two wells, lending additional credence to the concept of the hydrologic boundary occurring as a difference in permeability.

The preferred direction of flow within the "B" aquifer was determined by the arrival of the edge of the cone of depression from the time pumping started. The results are shown in Table 3.

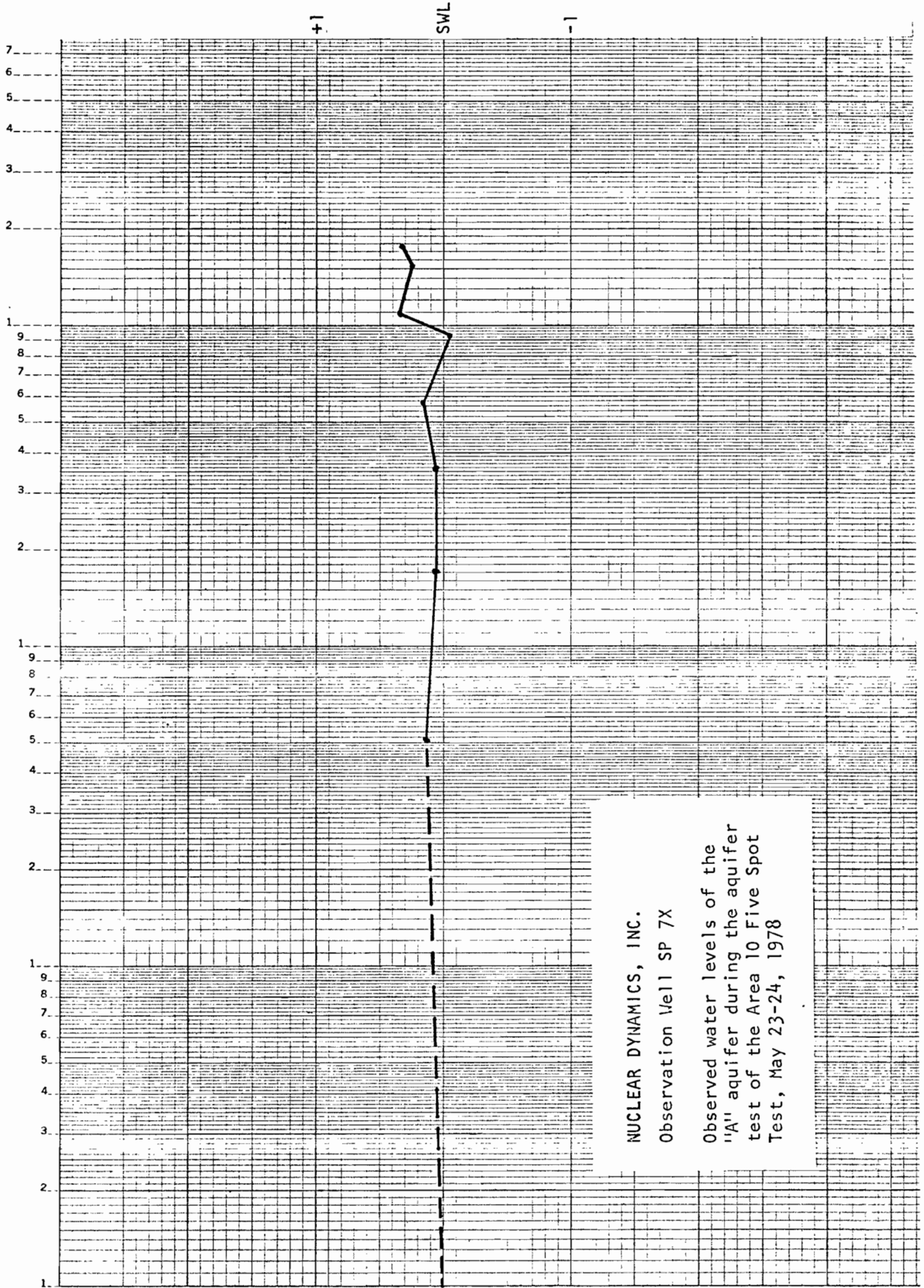
TABLE 3
Arrival Time of the Cone of Depression

Well	Distance from pumped well, in feet	Time since pumping started, in minutes
SP 20X	40	3
SP 3X	76	3
SP 4X	76	5-6
SP 78X	76	6
SP 11X	106	4
SP 12X	106	4
SP 6X	161	20

Table 3 indicates that the order of the preferred directions of flow is first to the east, then to the west, then to the south and north. Thus, the developed cone of depression is elliptical.

Well SP 7X was monitored during the pumping test to determine changes in the water level of the "A" aquifer. Well SP 7X perforated only in the "A" aquifer was located 19 feet from the pumped well SP 19X. During the period of the aquifer test and recovery when the water level in the "B" aquifer was lowered 166 feet in Well SP 19X, the water level in the "A" aquifer measured in Well SP 7X varied only through a range of -0.05 to +0.33 feet as shown on Figure 16. This indicates that the clay layer separating the "A" and the "B" aquifers is an aquiclude. This further confirms the result of the initial pumping test conducted in August 1977 in which the Theis curves of the observation well data closely matched the Theis type curve for a non-leaky artesian aquifer indicating no leakage between the "A" and "B" aquifers.

Changes in water level, in feet



NUCLEAR DYNAMICS, INC.

Observation Well SP 7X

Observed water levels of the
"A" aquifer during the aquifer
test of the Area 10 Five Spot
Test, May 23-24, 1978

APPENDIX

FIELD DATA

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics IncWell No. 3XT. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ B & MSWL 148.67 feet Measuring Point _____ which is_____ feet above ground surface Date May 23-24, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 528-541Data collected by: PAM E'NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78									
1130			148.67	0					SWL
1215						-0-			Start pump
1216						1			
1217						2			
1218				0.04		3			
1219				0.21		4			
1220				0.42		5			
1221						6			
1222				0.88		7			
1223				1.08		8			
1224				1.29		9			
1225				1.54		10			
1226				1.92		11			
1227				2.33		13			
1230				3.42		15			
1232				4.00		17			

Owner NDIWELL NUMBER 3X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1235				6.08		20			
1240				7.83		25			
1245				9.25		30			
1250				11.75		35			
1255				12.00		40			
1300				13.08		45			
1305				14.42		50			
1310				15.50		55			
1315				16.50		60			
1325				18.00		70			
1340				19.75		85			
1355				21.42		100			
1410				23.00		115			
1425				24.67		130			
1440				26.00		145			
1455				26.92		160			
1510				27.83		175			
1525				28.83		190			
1540				29.67		205			
1600				30.17		225			
1630				30.42		255			
1700				31.58		285			
1730				33.00		315			
1800				34.67		345			
1830				36.00		375			TAPE

Owner NDI

WELL NUMBER 3X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1940				37.33		445			
2010				38.42		475			
2039				39.92		504			
2120				41.33		545			
2222				42.25		607			
2321				42.58		666			
5/24/78 0022				44.25		727			
0126				44.75		791			
0224				45.58		849			
0322				46.50		907			
0420				47.08		965			
0520				47.17		1025			
0613				47.83		1078			
0712				46.92		1137			
0805				49.08		1190			
0908				48.41		1253			
1007				49.33		1312			
1108				49.58		1373			
1209				49.0		1434			
1305				49.0		1490			
1400				51.0		1545			
1410				51.33		1555	0		Stopped Pump
1412				51.33		1557	2	779	
1414				51.33		1559	4	390	
1417				50.83		1562	7	223	

Owner NDIWELL NUMBER 3X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1419				50.41		1564	9	174	
1421				49.91		1566	11	142	
1423				49.41		1568	13	121	
1425				48.00		1570	15	105	
1429				46.91		1574	19	83	
1433				46.00		1578	23	69	
1436				44.33		1581	26	61	
1440				41.16		1585	30	53	
1445				40.50		1590	35	45	
1450				39.91		1595	40	40	
1455				38.66		1600	45	36	
1500				37.33		1605	50	32	
1510				35.41		1615	60	27	
1520				33.83		1625	70	23	
1530				32.41		1635	80	20.5	
1540				31.25		1645	90	18.0	
1550				30.00		1655	100	16.5	
1600				29.16		1665	110	15.0	
1615				27.91		1680	125	13.5	
1630				26.75		1695	140	12.0	
1645				25.83		1710	155	11.0	
1700				24.91		1725	170	10.0	

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics IncWell No. 4X

T. _____ N S

R. _____

E W

Section _____

 $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

B & M

SWL 138.83 feetMeasuring Point top of casing which is0.42

feet above ground surface

Date May 23-24, 1978

Discharge Diameter _____ inches

Orifice _____

inches

Other Measuring Device _____

Perforated Interval 515.5-533Data collected by: PAM & NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78									
1215						- 0 -			start pump
1216						1			
1217						2			
1218						3			
1219						4			
1220				—		5			
1221				0.08		6			
1222				—		7			
1223				0.33		8			
1224				0.50		9			
1225				0.75		10			
1226				1.00		11			
1228				1.42		13			
1230				1.92		15			
1232				2.42		17			

Owner NDI

WELL NUMBER 4X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
				3.33		20			
				4.75		25			
1245				6.00		30			
				7.33		35			
				8.75		40			
				9.92		45			
				11.33		50			
				12.33		55			
1315				13.48		60			
				15.33		70			
				17.33		85			
1355				19.08		100			
				20.75		115			
1425				22.48		130			
1440				23.75		145			
1455				24.83		160			
1510				25.67		175			
1525				26.58		190			
1540				27.42		205			
1600				28.17		225			
1630				28.33		255			
1700				29.42		285			
1730				30.58		315			
1800				32.17		345			
1830				33.33		375			TAPE

Owner NDI

WELL NUMBER 4X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1930				33.08		435			
2015				35.67		480			
2038				36.75		503			
2140				38.92		565			
2240				37.92		625			TAPE
2328				38.50		673			
5/24/78 0032				40.33		737			
0137				40.75		802			
0247			180.5	42.17		872			
0338			180.92	42.58		923			
0429			181.33	43.17		974			
0528			181.67	43.50		1033			
0600			182.5	44.08		1065			
0718			181.42	43.00		1145			
0812			183.58	45.17		1197			
0921			184.42	45.59		1266			
1017			185.17	46.34		1322			
1118			185.33	46.50		1383			
1218			184.42	45.59		1443			
1314			184.67	45.84		1499			
1406			186.58	47.75		1551			
1410						1555	0		Pump Off
1412			186.65	47.82		1557	2	779	
1414			186.65	47.82		1559	4	390	
1416			186.8	47.97		1561	6	260	

Owner NDIWELL NUMBER 4X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1418			186.33	47.50		1563	8	195	
1420			186.05	47.22		1565	10	157	
1422			185.69	46.86		1567	12	131	
1425			185.0	46.17		1570	15	105	
1427			184.43	45.60		1572	17	92	
1428			184.2	45.37		1573	18	87	
1430			183.65	44.82		1575	20	79	
1433			182.86	44.03		1578	23	69	
1436			181.68	42.85		1581	27	59	
1439			180.79	41.96		1584	30	53	
1445			179.16	40.33		1590	36	44	
1450			177.80	38.97		1595	41	39	
1455			176.94	38.11		1599	45	36	
1502			175.25	36.42		1606	52	31	
1512			173.13	34.30		1616	62	26	
1522			171.35	32.52		1626	72	23	
1533			169.75	30.92		1627	83	19.5	
1542			168.30	29.47		1636	92	18.0	
1552			167.35	28.52		1646	102	16.0	
1602			166.30	27.47		1656	112	15.0	
1616			165.03	26.20		1666	126	13.0	
1630			163.68	24.85		1680	140	12.0	
1648			162.55	23.72		1698	158	10.75	
1700			161.84	23.01		1710	170	10.0	

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics IncWell No. 5XT. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ B & MSWL 141.5 feet Measuring Point _____ which is0.42 feet above ground surface Date May 23-24, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 509-550Data collected by: PAM & NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78									
1110			141.5	0					SWL
1215						- 0 -			start pump
1216						1			
1217						2			
1218				0		3			
1219						4			
1220				0		5			
1221						6			
1222				0		7			
1223						8			
1224				0		9			
1225						10			
1226				0		11			
1227						12			
1230				0		15			
1232						17			

Owner NDI

WELL NUMBER 5X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
				0		18			
				.04		21			
				.04		26			
				.08		31			
				.08		36			
				.08		41			
				.08		46			
				.08		51			
				.08		56			
				.13		61			
				.13		71			
				.13		86			
				.13		101			
				.13		116			
				.13		131			
				.13		146			
				.13		161			
				.13		175			
				.13		190			
				.08		205			
				.08		255			
1700				0		285			
				-.04		315			
				-.13		345			Tape
1830				-.13		375			

Owner NDI

WELL NUMBER 5X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1930				0		435			
2007				.17		472			
2038				.17		503			
2115				.25		540			
2210				.33		595			
2312				.50		657			
5/24/78 0012				.50		717			
0108				.67		773			
0213				.67		838			
0306				.67		891			
0410				.83		955			
0506				1.0		1011			
0607				1.0		1072			
0700				1.08		1125			
0816				1.17		1201			
0915				1.33		1260			
1021				1.42		1326			
1117				1.5		1382			
1222				1.58		1447			
1313				1.67		1498			
1715				1.92		1740			

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics IncWell No. SP 6XT. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ B & MSWL 135.5 feet Measuring Point top of casing which is_____ feet above ground surface Date May 23-24, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 509.5 - 550Data collected by: PAM & NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78									
11:3			135.5	-0-					SWL
1215			135.5	-0-		-0-			Start pump
1216				-0-		1			
1217				-0-		2			
1218				-0-		3			
1219				-0-		4			
1220				-0-		5			
1221				-0-		6			
1222				-0-		7			
1223				-0-		8			
1224				-0-		9			
1225				-0-		10			
1226				-0-		11			
1227				-0-		12			
1230				-0-		15			
1232				-0-		17			

Owner Nuclear Dynamics Inc

WELL NUMBER

SP 6 X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1235				0.08		20			
1240				0.25		25			
1245				0.45		30			
1250				0.67		35			
1255				0.97		40			
1300				1.17		45			
1305				1.42		50			
1310				1.75		55			
1315				2.00		60			
325				2.58		70			
1340				3.50		85			
1355				4.33		100			
1410				5.25		115			
1425				5.92		130			
1440				6.75		145			
1455				7.33		160			
1510				8.00		175			
1525				8.50		190			
1540				9.08		205			
1630				10.42		255			
1700				11.17		285			
1730				11.60		315			
1800				12.42		345			
1830				13.08		375			
1930				14.08		435			

Owner Nuclear Dynamics IncWELL NUMBER SP 6X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
2005				14.67		470			
2034				15.25		499			
2112				16.17		537			
2206				17.16		591			
2307				17.50		652			
5/24/78									
0006				18.17		711			
0112			160.67	25.17		777			
0206			161.17	25.67		831			
310			161.67	26.17		895			
0407			161.33	25.83		952			
0509			163.00	27.50		1014			
0604			163.50	28.00		1069			
0704			164.17	28.67		1129			
0813			164.25	28.75		1198			
0922			165.00	29.50		1267			
1018			165.58	30.08		1323			
1120			166.00	30.50		1385			
1219			166.25	30.75		1444			
1316			166.17	30.67		1501			
1407			166.75	31.25		1552			
1410						1555	0		Pump off
1413			166.92	31.42		1558	3	519	
1414			166.58	31.08		1559	4	390	
1415			166.50	31.00		1560	5	312	

Owner Nuclear Dynamics IncWELL NUMBER SP 6X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1416			166.46			1561	6		
1417			166.33			1562	7		
1418			166.25			1563	8		
1419			166.17			1564	9		
1420			166.08			1565	10		
1421			166.00			1566	11		
1422			165.95			1567	12		
1423			165.67			1568	13		
440						1585	30		
1444				24.92		1589	34	47	
1445				24.83		1590	35	45	
1446				24.77		1591	36	44	
1448				24.67		1593	38	42	
1450				24.54		1595	40	40	
1455				24.08		1600	45	36	
1500				23.75		1605	50	32	
1510				23.25		1615	60	27	
1520				22.67		1625	70	23	
1530				22.08		1635	80	20	
1540				21.58		1645	90	18	
1550				21.00		1655	100	16.5	
1600				20.58		1665	110	15.0	
1615				19.92		1680	125	13.5	
1630				19.17		1695	140	12.0	

Owner Nuclear Dynamics Inc

WELL NUMBER SP 6X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1645				18.58		1710	155	11.0	
1700				18.17		1725	170	10.0	

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics Inc

Well No. SP 7X

T. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ B & M

SWL 137.58 feet Measuring Point top of casing which is
0.58 feet above ground surface Date May 23 - 24, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 420-445 Data collected by: PAM e' NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78									
1045			137.58						
1215						-0-			Pump On
1305			137.46	+0.12		50			
1505			137.50	+0.08		170			
1810			137.50	+0.08		355			
2145			137.42	+0.16		570			
5/24/78									
0345			137.63	-0.05		930			
0620			137.25	+0.33		1085			
1325			137.33	+0.25		1510			
1410									Pump off
1705			137.25	+0.33		1730			

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics IncWell No. 11 XT. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ B & MSWL 146.92 feet Measuring Point top of casing which is0.33 feet above ground surface Date May 23-24, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 509-550Data collected by: PAM & NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78									
1105			146.92	0					SWL
1215				0		-0-			Start pump
1216				0		1			
1217				0		2			
1218				0		3			
1219				0.125		4			
1220				-		5			
1221				-		6			
1222				-		7			
1223				-		8			
1224				0.333		9			
1225				0.417		10			
1226				0.667		11			
1229				1.00		14			
1230				1.25		15			
1232				1.62		17			

Owner NDIWELL NUMBER 11X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1235				2.08		20			
1240				3.00		25			
1245				3.83		30			
1250				4.71		35			
1255				5.54		40			
1300				6.25		45			
1305				7.25		50			
1310				8.92		55			
1315				9.58		60			
325				10.96		70			
1340				12.46		85			
1355				13.88		100			
1410				15.08		115			
1425				16.67		130			
1440				17.75		145			
1455				18.66		160			
1510				19.42		175			
1525				20.08		190			
1540				21.0		205			
1602				21.67		227			
1630				22.33		255			
1700				23.41		285			
1730				24.66		315			
1800				25.83		345			
1830				26.92		375			

Owner NDIWELL NUMBER 11X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1940				27.75		445			
2012				29.25		477			
2043				30.25		508			
2123				31.83		548			
2220				32.33		605			
2316				31.75		661			Rechecked at 2319
2319				32.5		664			
5/24/78 0020				34.08		725			
0122				34.5		787			
0222				36.0		847			
0317			182.42	36.33		902			
0417			183	36.08		962			
0517			183.67	36.92		1022			
0612			184.42	37.5		1077			
0715			184	37.08		1140			
0803			185.17	38.25		1188			
0906			186.08	39.17		1251			
1005			186.92	40.0		1310			
1107			187.5	40.58		1372			
1205			187.33	40.41		1430			
1304			187.25	40.33		1483			
1359			188.42	41.50		1544			
1410			188.83	41.91		1555	0		Stopped Pump
1411			188.83	41.91		1556	1	1556	
1413			188.83	41.91		1558	3	519	

Owner NDIWELL NUMBER 11X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1418			188.58	41.66		1563	8	195	
1420			188.5	41.58		1565	10	157	
1422			188.25	41.33		1567	12	131	
1424			187.83	40.91		1569	14	112	
1426			187.25	40.33		1571	16	98	
1430			186.67	39.75		1575	20	79	
1433			186.33	39.41		1578	23	69	
1438			185.33	38.41		1583	28	57	
1441			185.25	38.33		1586	31	51	
1448			183.75	36.83		1593	38	42	
1453			182.25	35.33		1598	43	37	
1457			182.17	35.25		1602	47	34	
1502			181.33	34.41		1607	52	31	
1512			180.0	33.08		1617	62	26	
1521			179.0	32.08		1626	71	23	
1531			177.83	30.16		1636	81	20	
1541			176.83	29.91		1646	91	18	
1552			175.83	28.91		1657	102	16	
1602			175.0	28.08		1667	112	15.0	
1617			174.0	27.08		1682	127	13.0	
1632			172.92	26.00		1697	142	12.0	
1647			172.08	25.16		1712	157	11.0	
1702			171.33	24.41		1727	172	10.0	

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics IncWell No. 12XT. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____
B & MSWL 148.17 feet Measuring Point top of casing which is0.58 feet above ground surface Date May 23-24, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 509-550Data collected by: PAM & NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78									
1055			148.17	0					SWL
1215				0		-0-			start pump
1216				0		1			
1217				0		2			
1218				0		3			
1219				0.08		4			
1220				0.16		5			
1221				0.25		6			
1222				—		7			
1223				0.40		8			
1224				0.58		9			
1225				0.75		10			
1226				0.92		11			
1228				1.33		13			
1230				1.67		15			
1232				2.16		17			

Owner NDIWELL NUMBER 12X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1235				2.75		20			
1240				3.92		25			
1245				4.92		30			
1250				5.85		35			
1255				6.75		40			
1300				7.66		45			
1305				8.58		50			
1310				9.50		55			
1315				10.33		60			
1325				11.50		70			
1340				13.16		85			
1355				14.67		100			
1410				16.0		115			
1425				17.5		130			
1440				18.75		145			
1455				19.75		160			
1510				20.67		175			
1525				21.40		190			
1540				22.67		205			
1600				22.92		225			
1630				23.5		255			
1700			172.75	24.5		285			
1730			173.83	25.58		315			
1810			176.75	28.5		355			
1835				29.42		380			TAPE

Owner NDIWELL NUMBER 12X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1950			177.33	30.33		455			
2008				31.75		473			
2046				33.33		511			
2135				33.5		560			
2230				33.67		615			
2325				34.08		670			
5/24/78 0020				34.16		725			
0130				35.0		795			
0228				35.12		853			
3326			186	37.82		911			
0425				37.25		970			
0522			186.83	38.67		1027			
0614			187.67	39.50		1079			
0713			187.17	39.0		1138			
0810			188.75	40.58		1195			
0910			189.42	41.25		1255			
1013			190.33	42.33		1318			
1110			190.58	41.91		1375			
1215			190.17	42.0		1440			
1306			190.33	42.16		1491			
1401			191.83	43.66		1546			
1410						1555	0		Pump Off
1411			192.0	43.83		1556	1	1556	
1412			192.17	44.0		1557	2	779	
1413			192.08	43.91		1558	3	519	

Owner NDIWELL NUMBER 12X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1414			192.08	43.91		1559	4	390	
1415			192.0	43.83		1560	5	312	
1416			191.96	43.79		1561	6	260	
1417			191.83	43.66		1562	7	223	
1418			191.83	43.66		1563	8	195	
1419			191.54	43.37		1564	9	174	
1420			191.46	43.27		1565	10	156	
1421			191.21	43.04		1566	11	142	
1422			191.13	42.96		1567	12	131	
1423			190.92	42.75		1568	13	121	
1424			190.67	42.50		1569	14	112	
1425			190.46	42.27		1570	15	105	
1426			190.21	42.04		1571	16	98	
1427			190.0	41.83		1572	17	92	
1428			189.08	41.66		1573	18	87	
1429			189.58	41.41		1574	19	83	
1430			189.33	41.16		1575	20	79	
1433			188.58	40.41		1578	23	69	
1436			188.0	39.83		1581	26	61	
1439			187.08	38.91		1584	29	55	
1444			186.33	38.16		1589	34	47	
1449			185.25	37.08		1594	39	41	
1454			184.25	36.08		1599	44	36	
1459			183.58	35.41		1604	49	33	
1504			182.75	34.58		1609	54	30	

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics Inc

Well No. SP19X

T. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ B & M

SWL 145.83 feet Measuring Point Top of tubing which is
.75 feet above ground surface Date May 23-24, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device Badger flow meter

Perforated Interval 520-535 Data collected by: PAM & NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78									
0900			145.83	- 0 -					SWL
1215						- 0 -			start pump
1216		10				1			
1217		}	170	24.17		2			
1218						3			
1219			187.5	41.67		4			
1220						5			
1221						6			
1222			210	64.17		7			
1223						8			
1224			221.25	75.42		9			
1225						10			
1226			223.75	77.92		11			
1227					12				
1230		229.67	83.84		15				
1232					17				

Owner NDIWELL NUMBER SP 19 X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1235		10	235	89.17		20			T 12°C
1240			240	94.17		25			
1245			245.58	99.75		30			
1250			252.08	106.25		35			
1255			253.67	107.84		40			
1300			261	115.17		45			
1305			265.83	120.00		50			
1310			265	119.17		55			
1315			261	115.17		60			
1325			258.33	112.50		70			
1340		10	265	119.17		85			
1355			266.50	120.67		100			
1410			273.58	127.75		115			
1425			278	132.17		130			
1440			275.33	129.50		145			
1455			276.25	130.42		160			
1510			277.67	131.84		175			
1525			278.83	133.00		190			
1540			279.67	133.84		205			
1600			252.58	106.75		225			
1610		10	269.67	123.84		235			
1630			269.67	123.84		255			
1700			277.50	131.67		285			
1730			288.33	142.50		315			
1800			286.25	140.42		345			

Owner NDI

WELL NUMBER SP 19X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1830		10	290	144.17		375			
1900		}				405			
1920			271.50	125.67		425			Read just after hail storm
2000			295.17	149.34		465			
2030			299	153.17		495			
2105			297.92	152.09		530			
2200			288.04	142.21		585			
2300			289.25	143.42		645			
5/24/78 0000			296	150.17		705			
105			292.50	146.67		770			
202	10		297	151.17		827			
304		290.33	144.50		889				
402		295.08	149.25		947				
501		297.83	152.00		1006				
600		296.58	150.75		1065				
700		273.33	127.50		1125				
0800		304.83	159.00		1185				
0900		297.83	152.00		1245				
1000	10	305.83	160.00		1305				
1103		291.0	145.17		1368				
1201		285.50	139.67		1426				
1301		293.50	147.67		1486			Temp 13°C	
1355		311.83	166.00		1540			Total gallons pumped 15500	
1410					1555	0		Pump Off	

Owner N D IWELL NUMBER SP 19X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1411			290.67	144.84		1556	1	1556	
1413			264.65	118.82		1558	3	519.33	
1415			251.68	105.85		1560	5	312.0	
1417			240.94	95.11		1562	7	223.14	
1419			231.60	85.77		1564	9	173.78	
1421			223.78	77.95		1566	11	142.36	
1423			217.0	71.17		1568	13	120.62	
1423 30secs.			213.61	67.78		1568.5	13.5	116.19	
1426			209.5	63.67		1571	16	98.19	
429			204.53	58.70		1574	19	82.84	
1432			200.48	54.65		1577	22	71.68	
1435			197.53	51.70		1580	25	63.20	
1439			194.07	48.24		1584	29	54.62	
1444			191.10	45.27		1589	34	46.74	
1449			188.67	42.84		1594	39	40.87	
1453			187.23	41.40		1598	43	37.16	
1500			184.88	39.05		1605	50	32.10	
1509			182.62	36.79		1614	59	27.36	
1520			180.32	34.49		1625	70	23.21	
1530			178.60	32.77		1635	80	20.44	
1540			177.35	31.52		1645	90	18.28	
1550			176.10	30.27		1655	100	16.55	
1600			175.0	29.17		1665	110	15.14	
1615			173.6	27.77		1680	125	13.44	
1629			172.3	26.47		1694	139	12.19	

Owner NDI

WELL NUMBER SP 19X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1645			171.3	25.47		1710	155	11.03	
1659			170.42	24.59		1724	169	10.20	

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics IncWell No. SP 20X

T. _____ N S

R. _____ E W

Section _____

 $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$

B & M

SWL 139.58 feetMeasuring Point top of casing which is0.50 feet above ground surfaceDate May 23-24, 1978

Discharge Diameter _____ inches

Orifice _____ inches

Other Measuring Device _____

Perforated Interval 526-538Data collected by: PAM & NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78			139.58	-0-					
1215				-0-		-0-			Start pump
1216				-0-		1			
1217				-0-		2			
1218				0.17		3			
1219				0.42		4			
1220				1.08		5			
1221				1.67		6			
1222						7			
1223				2.17		8			
1224				2.83		9			
1225				3.58		10			
1226				4.42		11			
1227				5.33		12			
1230				6.50		15			
1232				8.67		17			

Owner Nuclear Dynamics IncWELL NUMBER SP 20X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1235				11.00		20			
1240				14.00		25			
1245				22.00		30			
1250				28.00		35			
1255				30.17		40			
1300				34.33		45			
1305				36.83		50			
1310				38.50		55			
1315				40.33		60			
1325				42.42		70			
1340				44.42		85			
1355				46.83		100			
1410				48.92		115			
1425				51.00		130			
1440				53.00		145			
1455				54.25		160			
1510				55.58		175			
1525				56.58		190			
1540				57.67		205			
1600				57.75		225			
1630				57.00		255			
1700				58.33		285			
1750				60.33		335			
1800				61.83		345			
1850				63.50		395			

Owner Nuclear Dynamics

WELL NUMBER SP 20X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1935				^{41.17} 64.17		440			
2017				^{18.42} 65.42		482			
2048				^{60.58} 67.58		513			
2130				^{68.92} 68.92		555			
2230				^{52.83} 69.83		615			
2337				^{71.08} 71.08		682			
5/24/78									
0027				^{56.58} 73.58		732			
0132				^{73.00} 73.00		797			
0138				^{74.75} 74.75		863			
0328				^{59.84} 59.84		913			
0428				^{60.42} 60.42		973			
0525				^{59.42} 59.42		1030			
0616				^{60.67} 60.67		1081			
0706				^{59.42} 59.42		1131			
0904				^{61.92} 61.92		1249			
1015				^{63.75} 63.75		1320			
1116				^{62.67} 62.67		1381			
1210				^{60.92} 60.92		1435			
1311				^{61.75} 61.75		1496			
1404				^{65.59} 65.59		1549			
1410						1555	-0-		Pumps off
1411				^{65.59} 65.59		1556	1	1556	
412				^{65.51} 65.51		1557	2	778	
1473				^{65.43} 65.43		1558	3	579	

Owner Nuclear Dynamics Inc

WELL NUMBER SP 20X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1414				65.26		1559	4	390	
1415				65.09		1560	5	312	
1416				64.42		1561	6	260	
1417				64.09		1562	7	223	
1418				63.59		1563	8	195	
1419				62.84		1564	9	174	
1420				62.42		1565	10	157	
1421				61.84		1566	11	142	
1422				61.34		1567	12	131	
1423				60.84		1568	13	121	
1424				60.34		1569	14	112	
1425				59.67		1570	15	105	
1426				58.76		1571	16	98	
1432				56.76		1577	22	72	
1435				54.92		1580	25	63	
1438				53.09		1583	28	57	
1441				51.42		1586	31	51	
1445				49.92		1590	35	45	
1450				46.67		1595	40	40	
1455				44.34		1600	45	36	
1500				42.01		1605	50	32	
1510				38.51		1615	60	27	
1520				35.59		1625	70	23	
1530				30.26		1635	80	20.5	
1540				28.59		1645	90	18.0	

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics IncWell No. 75XT. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ B & MSWL 148.67 feet Measuring Point top of casing which is0.5 feet above ground surface Date May 23-24, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 525-539Data collected by: PAM & NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78									
10 47			148.67						SWL
1215						- 0 -			Start pump
1216				0		1			
1217				0		2			
1218				0		3			
1219				0		4			
1220				0		5			
1221				0		6			
1222				0		7			
1223				0		8			
1224				0		9			
1225				0		10			
1226				0		11			
1227				0		12			
1230				0		15			
1232				0		17			

Owner NDI

WELL NUMBER 75X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1233						18			
1234						19			
1235			148.67	0		20			
1240				-0.04		25			
1245				-0.08		30			
1250				-0.25		35			
1255				-0.13		40			
1300				-0.13		45			
1305				-0.13		50			
1310				-0.13		55			
1315				-0.13		60			
1325				-0.17		70			
1340						85			Change Recorder
1355			146.17	-2.5		100			
1410			146.25	-2.42		115			
1425			146.25	-2.42		130			
1440				-2.42		145			
1455				-2.42		160			
1510				-2.42		175			
1525				-2.42		190			
1540				-2.42		205			
1600				-2.42		225			
1630				-2.42		255			
1700			146.25	-2.42		285			
1730			146.25	-2.42		315			

Owner NDI

WELL NUMBER 75X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q ÷ S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1800			146.33	-2.42		345			
1836				-2.42		375			
1935				-2.42					
2020				-2.42					
2050				-2.42					
2130				-2.42					
2245				-2.42					
2340			146.67	-2.17					
5/24/78 0335			147	1.67					
0732			147.42	1.25					
0806			147.42	1.25					
0912			147.33	1.34					
1009			147.42	1.25					
1114			147.5	1.17					
1212			147.67	1.0					
1309			147.58	1.09					
1710			147.75	0.92					

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics IncWell No. SP 78XT. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ B & MSWL 144.67 feet Measuring Point top of casing which is_____ feet above ground surface Date May 23-24, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 525-537Data collected by: PAM & NDI

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity $Q \div S$	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/23/78									
1050			144.67	-0-					
1215				-0-		-0-			start pump
1216				-0-		1			
1217				-0-		2			
1218				-0-		3			
1219				-0-		4			
1220				-0-		5			
1221				0.08		6			
1222				0.25		7			
1223				0.33		8			
1224				0.50		9			
1225				0.66		10			
1226				0.83		11			
1227				1.08		12			
1230				1.75		15			
1232				2.17		17			

Owner Nuclear Dynamics IncWELL NUMBER 5P 78X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1235				2.83		20			
1240				4.00		25			
1245				5.33		30			
1250				6.42		35			
1255				6.67		40			
1300				8.75		45			
1307				10.16		52			
1310				10.83		55			
1315				11.83		60			
1325				13.50		70			
1340				15.50		85			
1355				17.08		100			
1410				18.66		115			
1425				20.17		130			
1440				21.58		145			
1455				22.45		160			
1512				23.42		177			
1525				24.33		190			
1540				25.16		205			
1600				26.00		225			
1630				26.33		255			
1700				27.42		285			
1730				28.50		315			
1800				30.00		345			
1830				31.16		375			

Owner Nuclear Dynamics IncWELL NUMBER SP 78X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1935				31.58		440			
2015				33.50		480			
2040				34.66		505			
2145				36.42		570			
2215				36.66		600			
2345				37.17		690			
5/24/78									
0015				38.08		720			
0117				38.83		782			
218				39.75		843			
0314				40.33		899			
0414				41.08		959			
0510			186.00	41.33		1015			
0610				42.16		1075			
0705			186.00	41.33		1130			
0801			186.33	41.66		1186			
0900			188.33	43.66		1245			
1003			189.00	44.33		1308			
1105			189.58	44.91		1370			
1204			189.25	44.58		1429			
1303			189.00	44.33		1488			
1357			190.33	45.66		1542			
1410						1555	-0-		Pump off
1411			190.83	46.16		1556	1	1556	
1412			190.83	46.16		1557	2	778	

Owner Nuclear Dynamics IncWELL NUMBER SP 78X

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
1413			190.83	46.16		1558	3	519	
1414			190.79	46.12		1559	4	390	
1415			190.79	46.12		1560	5	312	
1416			190.75	46.08		1561	6	260	
1417			190.67	46.00		1562	7	223	
1418			190.58	45.91		1563	8	195	
1419			190.50	45.83		1564	9	174	
1420			190.33	45.66		1565	10	157	
1421			190.17	45.50		1566	11	142	
1422			190.00	45.33		1567	12	131	
1423			189.83	45.16		1568	13	121	
1424			189.67	45.00		1569	14	112	
1425			189.50	44.83		1570	15	105	
1426			189.17	44.50		1571	16	98	
1427			189.00	44.33		1572	17	92	
1428			188.83	44.16		1573	18	87	
1429			188.67	44.00		1574	19	83	
1430			188.50	43.83		1575	20	79	
1433			187.75	43.08		1577	23	69	
1436			187.00	42.33		1581	26	61	
1439			186.17	41.50		1584	29	55	
1442			185.5	40.83		1587	32	50	
1445			184.92	40.25		1590	35	45	
1450			183.58	38.91		1595	40	40	
1455			182.42	37.75		1600	45	36	

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics, Inc.

Well No. 5X

T. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ B & M

SWL 143.08 feet Measuring Point _____ which is _____ feet above ground surface Date May 25, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 509-550 Data collected by: _____

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/25/78									
0958			143.08	0		0			
1003			143.08	0		0			START
1015			144.33	1.25		12			
1032			144.25	1.17		29			
1104			145.83	2.75		61			
1132			146.83	3.75		89			
1203			147.42	4.34		120			
1302			148.25	5.17		179			
1402			148.92	5.84		239			
1502			149.25	6.17		299			See Note 75X Sheet

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics, Inc.

Well No. 12X

T. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____
B & M

SWL 158.33 feet Measuring Point _____ which is _____ feet above ground surface Date May 25, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 509-550 Data collected by: _____

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/25/78									
1002			158.33			0			
1003			158.33	0		0			START
1018			158.08	-0.25		15			
1037			158.0	-0.33		34			
1107			157.83	-0.50		64			
1135			157.67	-0.66		92			
1205			157.75	-0.58		122			
1305			157.08	-1.25		182			
1405			157.0	-1.33		242			
1508			156.75	-1.58		305			See Note 75X sheet

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics, Inc.

Well No. 20X

T. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____ $\frac{1}{4}$ _____
 B & M

SWL 145.17 feet Measuring Point _____ which is

_____ feet above ground surface Date May 25, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 526-538 Data collected by: _____

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/25/78									
1000			145.17			0			
1003			145.17	0		0			START
1017			145.0	-0.17		14			
1035			144.92	-0.25		32			
1106			144.71	-0.46		63			
1134			144.58	-0.59		91			
1204			144.46	-0.71		121			
1304			144.17	-1.0		181			
1404			144.08	-1.09		241			
1505			143.71	-1.46		302			See Note 75X sheet

AQUIFER TEST

WELL _____

Owner Nuclear Dynamics, Inc.

Well No. 75X

T. _____ N S R. _____ E W Section _____ $\frac{1}{4}$ $\frac{1}{4}$ $\frac{1}{4}$ _____ B & M

SWL 149.0 feet Measuring Point _____ which is _____ feet above ground surface Date May 25, 1978

Discharge Diameter _____ inches Orifice _____ inches

Other Measuring Device _____

Perforated Interval 525-539 Data collected by: _____

Date & Time	Reading Orifice or Other	Discharge Q in gpm	Pumping Level P.L. Feet	Residual Draw Down S Feet	Specific Capacity Q + S	Time Since Pumping Started t Minutes	Time Since Pumping Stopped t' Minutes	t/t'	Remarks
5/25/78									
1003			149.0						151.5' by Probe (minus pump & hose)
1003		5.2	149.0	0					START
1010			189.42	40.42					
1020		4.6	200.0	51.0					
1030		4.3	203.0	54.0					
1045		4.3	204.75	55.75					
1100		4.1	205.58	56.58					
1130		4.0	206.33	57.33					
1200		4.0	207.0	58.0					
1300		3.9	207.33	58.33					
1400		3.9	208.17	59.17					
1500		No Reading Available							Pump off \approx 4min just before 1500 reading