APT ANALYSIS

SITE: SO_SHORE   South Shore Blvd Site

Section _15_   Township _44_ S   Range _41_ E

REPORT: _____

GEOLOGIC DATA: pg. ____, _____

WELL NUMBER OF WELL DESCRIBED: _____

DEPTH (LSD)	LITHOLOGY
0-20	Sand, small limestone fragments
20-30	sand, 70% fine, trace of white shell frag.
30-50	sand v'fine to f, white shell frag. unconsolidated
50-62	sand, v fine to f, white shell frag. trace phosphate sand
62-68	limestone w/ micrite, + white shell
68-79	limestone, pelecypod + gastropod frag; well lithified
79-95	limestone same as above, no gastropod and more dense
95-110	limestone, pelecypod + gastropod frag. micrite
110-120	limestone w/ micrite, shell + silty white clay
120-130	silty clay, lime mud, sand grayish white, trace of phosphate

Producing zone interval: _50-91_ (lsd)   _16.09_ (msl)

Aquifer name: _Surficial_

Static Water Level at the site is approximately _____ ft. msl.

WELL DESCRIPTIONS:

Well	Diam. (in)	Total Depth	Cased Depth	Scr/Open Intervl	Slot Size	Radius
PW	6	91	50	Scr		
I-1	2	77	67	Scr		29
S-1	2	32	27	Scr		30
SS-1	2	17	12	Scr		29
I-2	2	74	64	Scr		90
S-2	2	33	28	Scr		89
I-3	2	76	66	Scr		200
S-3	2	32	27	Scr		199
D-4	6/2	112	107	Scr		48

INFLUENCING FACTORS:

_____

_____

_____

_____

<u>APT</u>: pg. ___1___

Started: _9/16/1987_____

Duration: _44.2_____

Discharge: _4 92 gpm_____

Recovery: _5.3 hrs_____

Comments:

1) _____

_____

2) _____

_____

3) _____

_____

<u>CONSULTANT'S ANALYSIS</u>: pg. _____

Method: _Neuman_____
Results:

Well	Transmissivity (GPD/FT)	S or Sy	Leakance ( )
OB I-3	46,000	.0006	
OB I-2	28,500	.0008	
OB S-4	32,000	.004	
OB I 4	18,500		

Comments: _____

Method: _Neuman_____
Results:

Well	Transmissivity (GPD/FT)	S or Sy	Leakance ( )
OB D-4	24,000	.0015	
OBS-1	10,500	.006	
OB I-1	18,800	.0017	
OBS-3			

Comments: _____

Method: _Jacob_____
Results:

Well	Transmissivity (GPD/FT)	S or Sy	Leakance ( )
OB I-3	62		
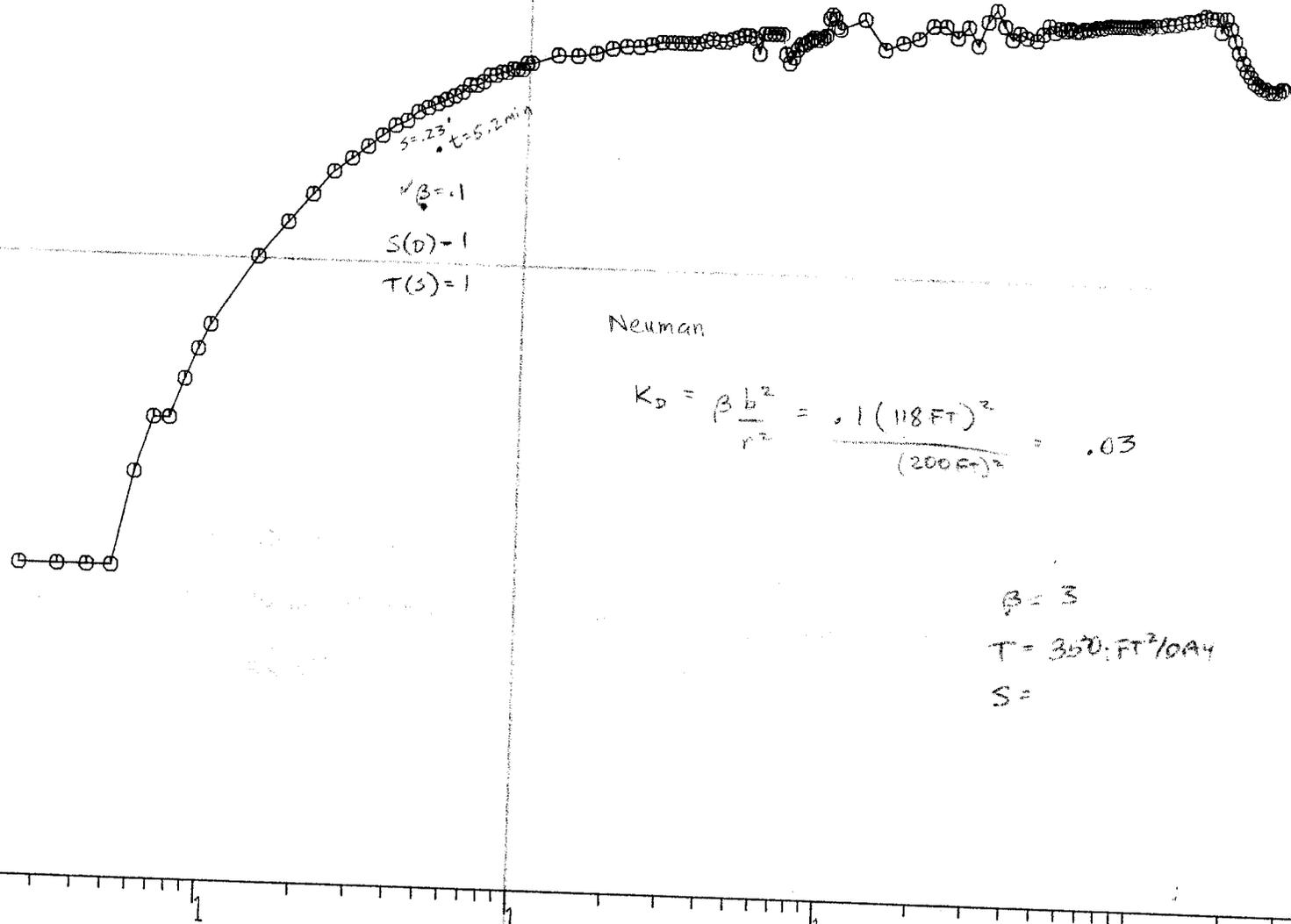
$$T = \frac{S(s)Q}{4\pi s} = \frac{(1) \text{ 90 GPM}}{4\pi (.23 \text{ FT})} = 46,000 \text{ GPD/FT}$$

$$= 6100 \text{ FT}^2/\text{DAY}$$

(1) β=3
S=4.1
b=1.4 min²

$$S = \frac{Tt}{T(s)r^2} = \frac{(6100 \text{ FT}^2/\text{DAY})(5.2 \text{ min})}{(1)(200 \text{ FT})^2} = .0006$$

DRAWDOWN IN FEET

TENTHS · HUNDREDTHS · THOUSANDTHS

s=.23' · t=5.2 min

β=.1

S(D)=1

T(s)=1

Neuman

$$K_D = \frac{\beta b^2}{r^2} = \frac{.1(118 \text{ FT})^2}{(200 \text{ FT})^2} = .03$$

β = 3

T = 350 FT²/DAY

S =

TENTHS · TENS · HUNDREDS · THOUSANDS

TIME IN MINUTES

SOUTH SHORE APT. DRAWDOWN

OBSERVATION WELL: I-2
R= 90   Q= 92

SOUTH SHORE APT   DRAWDOWN

Plot axis labels (left): DRAWDOWN IN FEET — TENTHS, HUNDREDTHS, THOUSANDTHS

Top axis labels: TENTHS, TENS, HUNDREDS, THOUSANDS

Bottom axis labels: TENTHS, TENS, HUNDREDS, THOUSANDS

Right axis labels: TENTHS, HUNDREDTHS, THOUSANDTHS
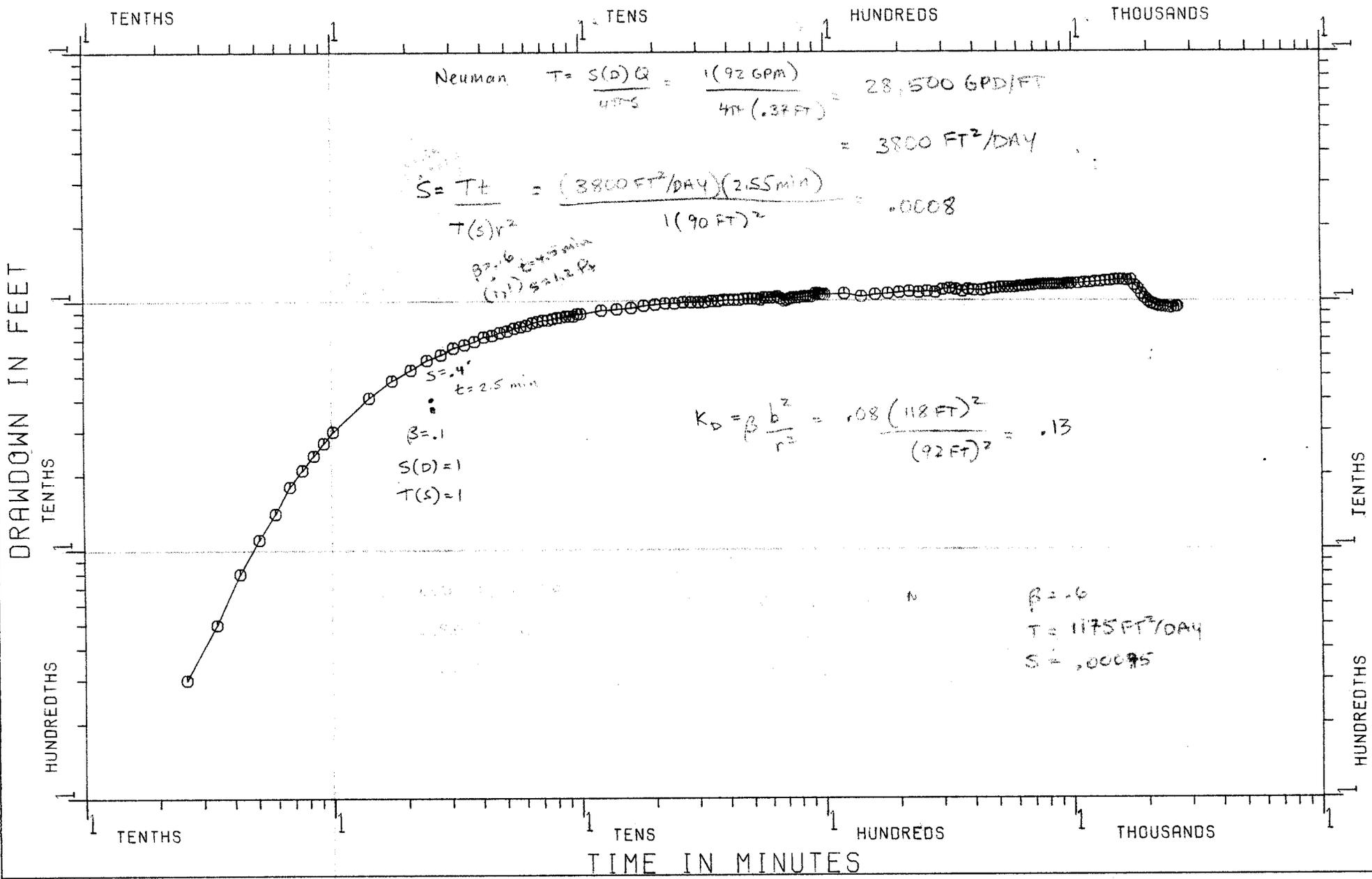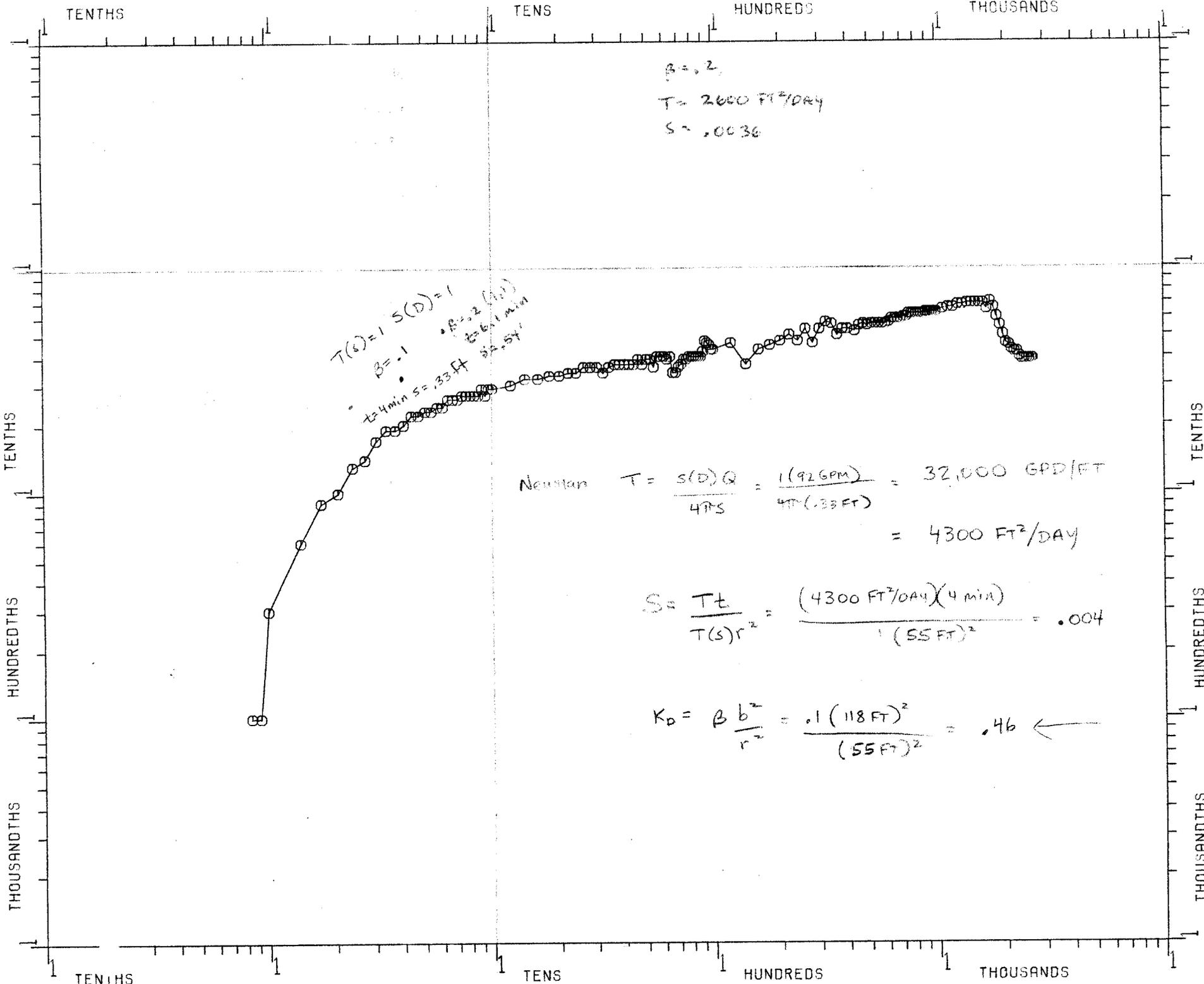
$\beta = .2$

$T = 2600 \ FT^2/DAY$

$S \approx .0036$

$T(S) = 1 \quad S(D) = 1$

$\beta = .1 \qquad \beta = .2 \ (1/u)$

$t = 4min \ s = .33 \ Ft \quad t = 6.1 min$

$32.5 t$

Newton $\quad T = \dfrac{s(D) \, Q}{4\pi s} = \dfrac{1 (926pm)}{4\pi (.33 FT)} = 32,000 \ GPD/FT$

$= 4300 \ FT^2/DAY$

$S = \dfrac{Tt}{T(s) r^2} = \dfrac{(4300 \ FT^2/DAY)(4 \, min)}{1 \, (55 FT)^2} = .004$

$K_D = \beta \dfrac{b^2}{r^2} = \dfrac{.1 \, (118 FT)^2}{(55 FT)^2} = .46 \ \leftarrow$

Neuman $T = \dfrac{S(D)Q}{4\pi s} = \dfrac{(1)(92GPM)}{4\pi(.56FT)} = 18,800\ GPD/FT$

$= 2500\ FT^2/DAY$

$B = .06$ $S = .56$
$T(S) = 1$ $S(D=1)\ t = .84\ min$

$S = \dfrac{Tt}{T(S)r^2} = \dfrac{2500\ FT^2/DAY\,(.84min)}{1\,(29\,FT)^2} = .0017$

$K_D = \beta\dfrac{b^2}{r^2} = \dfrac{.06\,(118\,FT)^2}{(29\,FT)^2} = 1 \quad\text{---}\times$

HUNDREDTHS   TENTHS   TENS   HUNDREDS   THOUSANDS

TIME IN MINUTES

SOUTH SHORE OBT   DROWDOWN
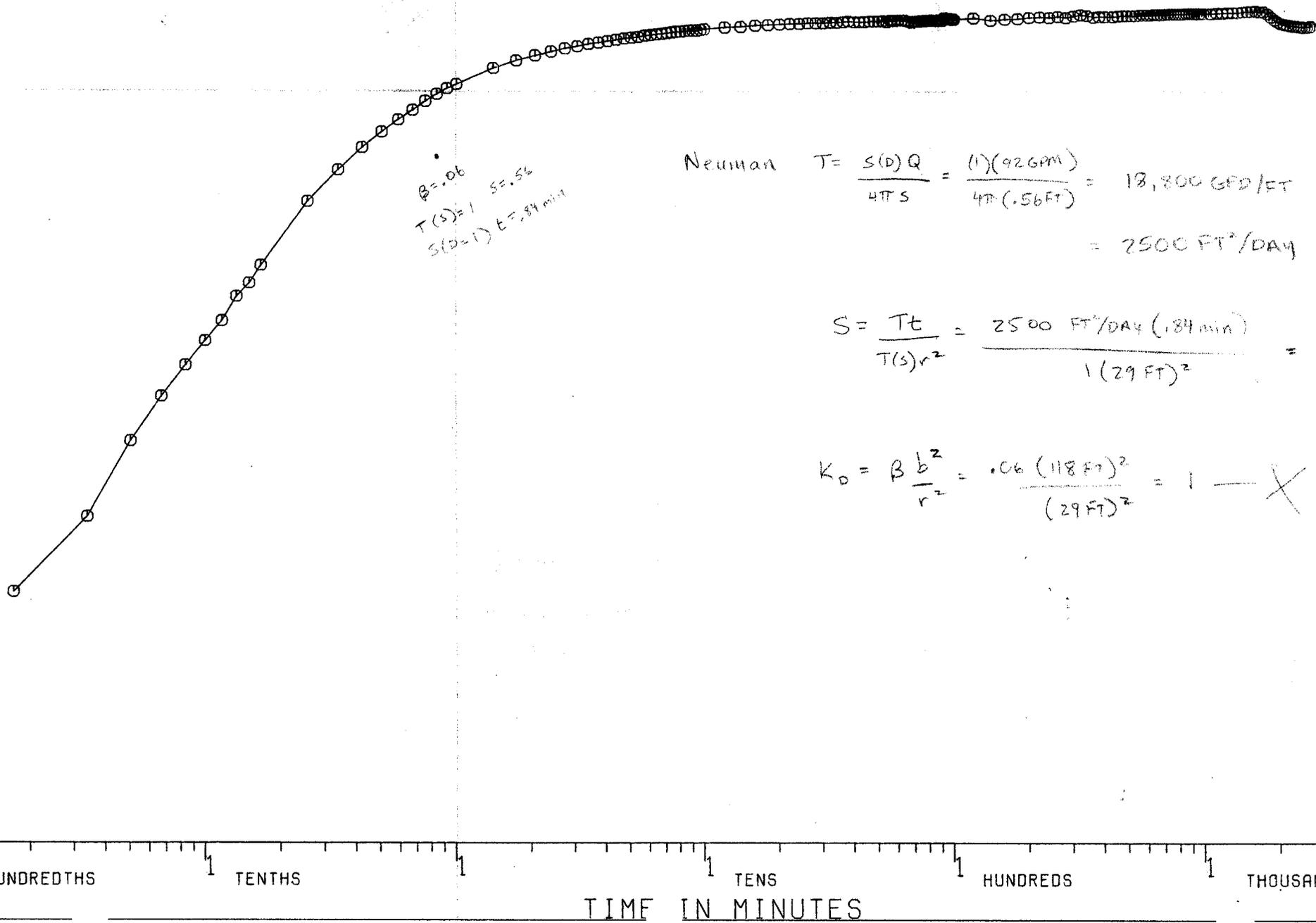
OBSERVATION WELL: I-4

R= 51   Q= 92

TENTHS ... TENS ... HUNDREDS ... THOUSANDS

DRAWDOWN IN FEET

$$T = \frac{S(D)\,Q}{4\pi S} = \frac{1(92\,GPM)}{4\pi(.5)} = 21,000\ GPD/FT$$

$$= 2800\ FT^2/DAY$$

$$S = \frac{Tt}{T(s)r^2} = \frac{(2800\ FT^2/DAY)(1.33\,min)}{1(51)^2} = .001$$

$$K_D = \beta \frac{b^2}{r^2} = .08 \frac{(118')^2}{(51')^2} = .43$$

β=.2
T= 1800 FT²/DAY
S= .0005

t=1.16
t=1.14 min
s=.57
β=.1

(1,1)

√ β=.1

TENTHS

TENTHS ... 1 ... TENS ... HUNDREDS ... THOUSANDS

TIME IN MINUTES

SOUTH SHORE APT   DRAWDOWN

TENTHS ... TENS   HUNDREDS   THOUSANDS

DRAWDOWN IN FEET
TENTHS   HUNDREDTHS   THOUSANDTHS

$\beta = .2$
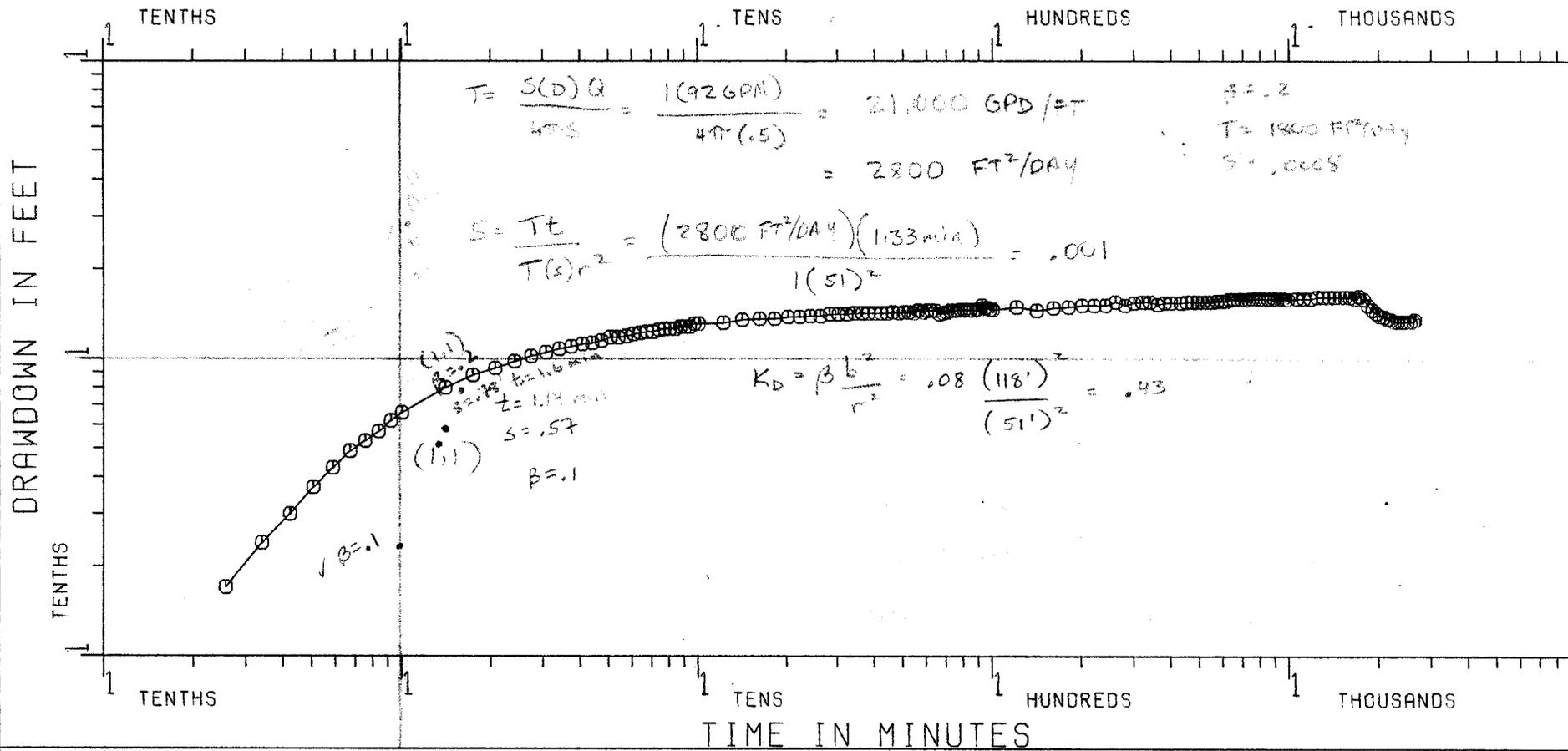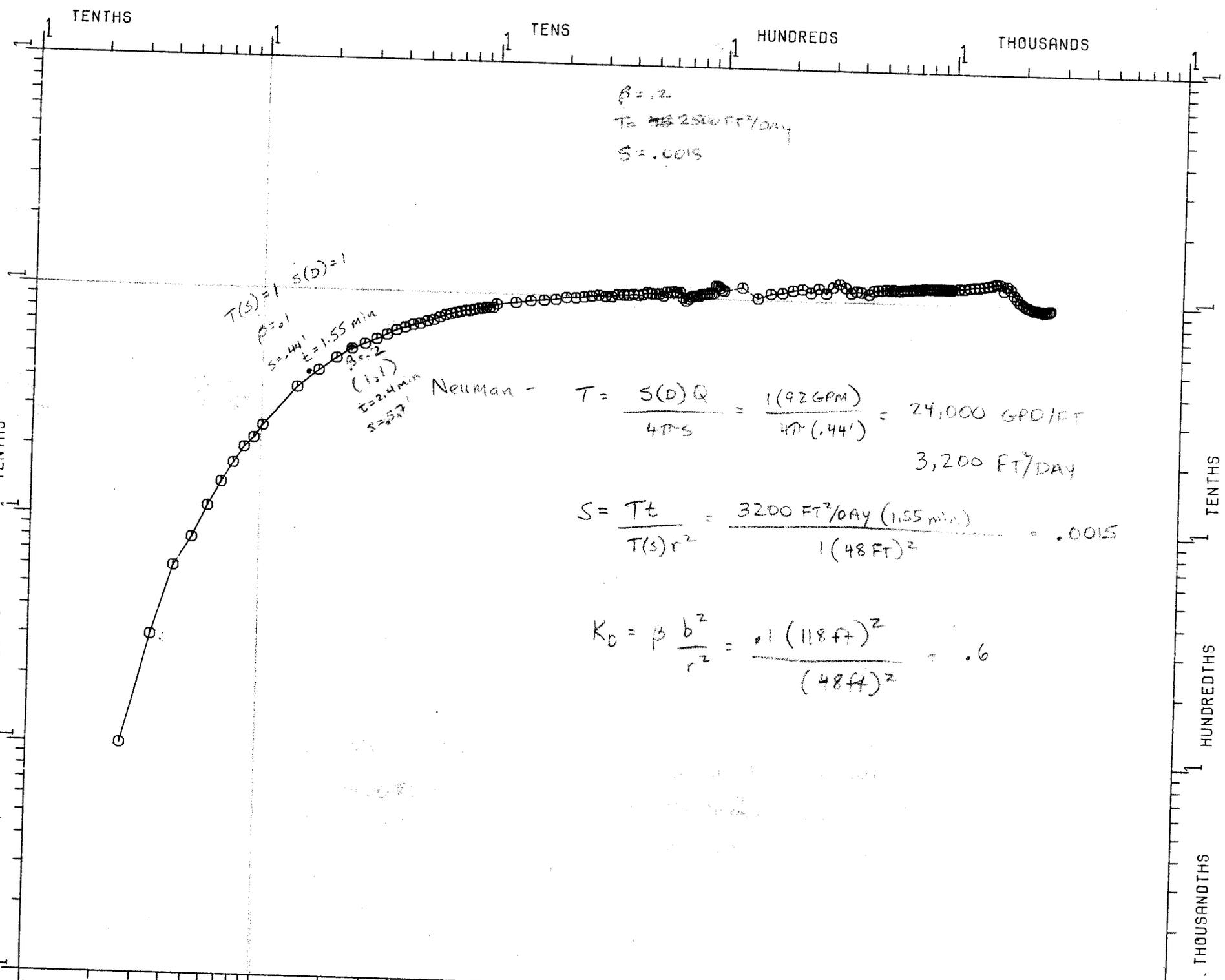
$T = 3250 \, FT^2/DAY$

$S = .0015$

$T(S) = 1 \quad S(D) = 1$

$\beta = .01$

$S = .44'$ $t = 1.55 \, min$

$\beta = .2$

$(1,1)$

$t = 2.4 \, min$

$S = .57'$

Neuman —

$$T = \frac{S(D) \, Q}{4\pi s} = \frac{1(92 \, GPM)}{4\pi (.44')} = 24,000 \, GPD/FT$$

$$3,200 \, FT^2/DAY$$

$$S = \frac{Tt}{T(s) \, r^2} = \frac{3200 \, FT^2/DAY \, (1.55 \, min)}{1 \, (48 \, FT)^2} = .0015$$

$$K_D = \beta \, \frac{b^2}{r^2} = \frac{.1 \, (118 \, ft)^2}{(48 \, ft)^2} = .6$$

TENTHS   HUNDREDTHS   THOUSANDTHS

R= 30   Q= 92

THS   TENS   HUNDREDS   THOUSANDS

DRAWDOWN IN FEET

TENTHS   HUNDREDTHS   THOUSANDTHS

$\beta = .06$

$T = 4150 \ FT^2/DAY$

$S = .0058$

$S(b) = 1 \quad T(s) = 1$

$\beta = .4$

$\beta = .06$

$S = .34$

$t = 1.8 \ min$

Newman: $T = \dfrac{S(b) \ Q}{4\pi s} = \dfrac{(1)(92 \ GPM)}{4\pi (1ft)}$ 10,500 GPD/FT

$1410 \ ft^2/DAY$

$S = \dfrac{Tt}{T(s) r^2} = \dfrac{(1410 \ FT^2/DAY)(5.2 \ min)}{(1)(30 ft)^2} = .006$

$K_D = \beta \dfrac{b^2}{r^2} = \dfrac{.4 (118 FT)^2}{(30 ft)^2} = 6.2$ N

$t_s = \dfrac{5.4 \times 10^5 \left((.5 FT)^2 - (.33 ft)^2 \right)}{10,500 \ GPD/FT} = 7.25 \ min$

Site map showing Big Blue Trace, wells D-3/S-3, D-2/S-2, D-1/S-1, PW, and Test Hole with distances: 300', 110', 60', 30', 1650', 530'
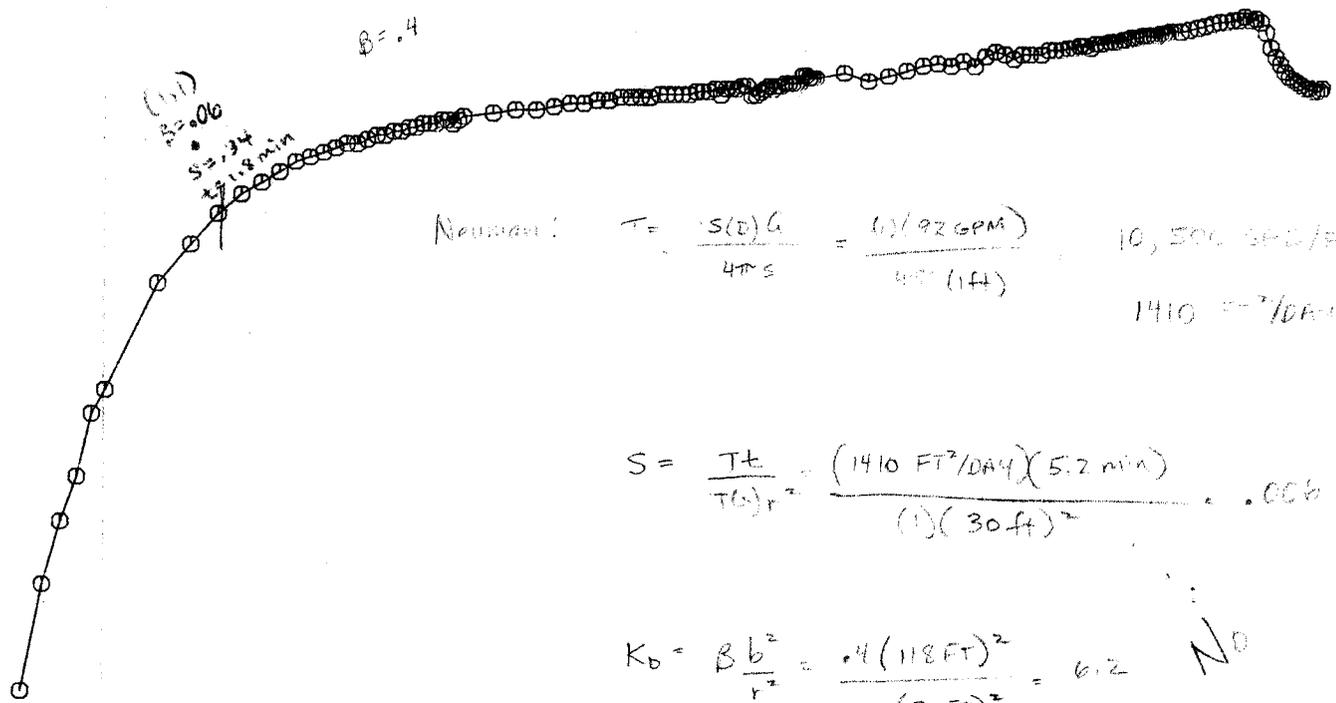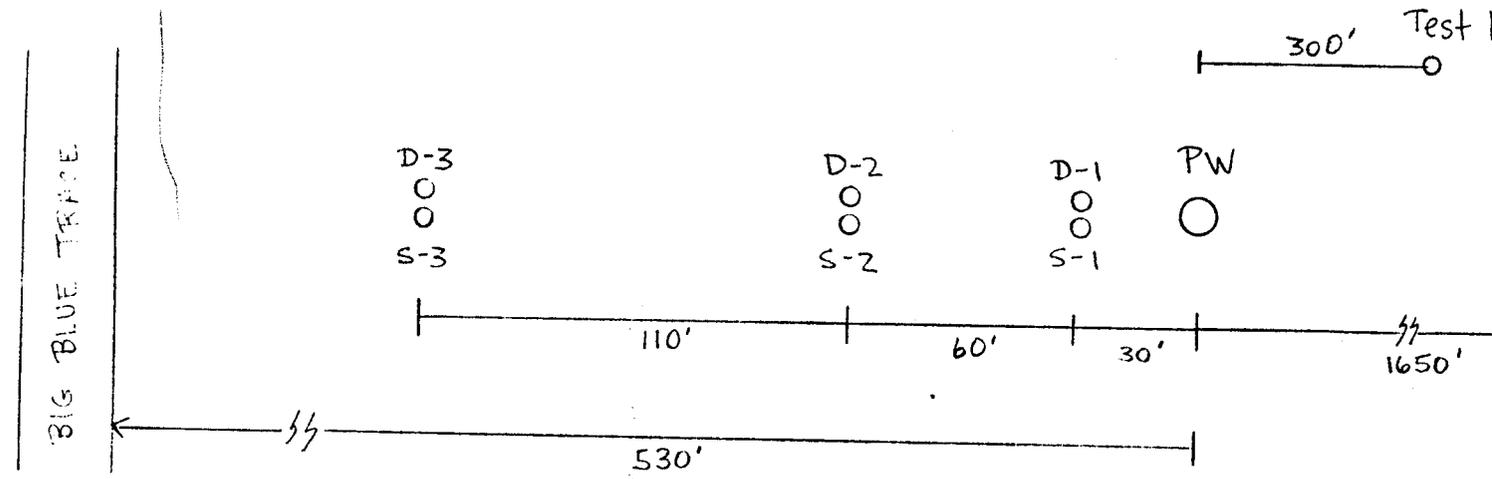
Well Descriptions:

Well	Type	Diam. (in)	* Total Depth	* Cased Depth	* Screen Inter
PW	Pumping	6	250'	20'	40'-2
D-1	Observation	2	105'	100'	100'-1
S-1	"	2	35'	30'	40'-5
D-2	"	2	105'	100'	100'-1
S-2	"	2	35'	30'	40' 3
D-3	"	2	105'	100'	100'-1
S-3	"	2	35'	30'	40'-5
M-1	"	2	35'	30'	40'-3

* ... ... approximations based on presently available data. The production well ... ... to the ... of the Surficial Aquifer. The depths of the observation wells will d ... ... found when the pumping well is drilled.

Well Construction - The wells will have PVC casing and PVC slotted screen. There will be ... gravel pack around the screen and 2" of cement grout around the ...

TABLE 1. SOUTH SHORE WELL DESCRIPTIONS

Well	r (ft.)	*Diam. (in.)	Total Depth (ft.)	Cased Depth (ft.)	Screen/ Open	Elev. (ft. NGVD)
I-1	29	2	77	67	screen	16.03
S-1	30	2	32	27	screen	15.88
SS-1	29	2	17	12	screen	15.69
I-2	90	2	74	64	screen	15.64
S-2	89	2	33	28	screen	15.82
I-3	200	2	76	66	screen	16.03
S-3	199	2	32	27	screen	16.02
D-4	48	6/2	117	107	screen	15.92
I-4	51	2	70	60	screen	15.88
S-4	55	2	32	27	screen	15.65
M-1	1260	2	36	31	screen	16.34
PW		6	91	50	screen	16.09

*Where X/Y denotes casing telescoping from X to Y.

	Well	Beta	T (ft²/day)	S	K_z/K_h
Random K_D	I-1	.06	2,500	.0017	1
	I-2	.1	3,800	.0008	.13
	I-3	.1	6,100	.0006	.03
	I-4	.1	2,800	.001	.43
	S-1	.4	1,410	.006	6.2
	S-4	.1	4,300	.004	.46
	D-4	.1	3,200	.0015	.6
$K_D = .1$	I-1	.006	5,900	.0025	.1
	I-2	.06	4,550	.0009	.1
	I-3	.3	3,450	.0004	.1
	I-4	.02	5,050	.0014	.1
	S-1	.006	5,050	.0013	.1
	S-4	.02	5,650	.0020	.1
	D-4	.02	4,000	.0006	.1
$K_D = .01$	I-1	.0006	— NM	—	—
	I-2	.006	10,850	.0011	.01
	I-3	.03	10,000	.00085	.01
	I-4	.002	10,500	.0011	.01
	S-1	.0006	5,200	.0001	.01
	S-4	.002	6,400	.0003	.01
	D-4	.002	4,550	8×10^{-6}	.01
$K_D = 1$	I-1	.06	2,500	.0017	1
	I-2	.6	1,175	.0005	1
	I-3	.3	350	.000009	1
	I-4	.2	1,800	.0008	1
	S-1	.06	4,150	.0058	1
	S-4	.2	2,600	.0036	1
	D-4	.2	2,500	.0018	1

Based on $K_D = .1$ results:

Average T = 4,800 FT²/DAY
Average S = .001
Average K = 40 FT/DAY

WELL CONSTRUCTION

Well No. Test Well #13 (TW-13)   Location: Acme Improvement District

Driller: Alsay-Pippin   Recorded by: GR

Samples: Cuttings_____, Core_____   Date Drilled: July 28, 1980

Casing: Depth 130 filled to 100 feet   Screen: Depth 60-130 feet

Diameter 2 inches   Diameter 2 inches

Material Schedule 40 PVC   Material Schedule 40 PVC #40 Slo

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
0-20	Sand-silica, brown, fine grained, abundant white pelecypods and gastropods, some small limestone fragments, unconsolidated.
20-30	Sand-silica, light brown, fine to medium grained, 70 percent fines, trace of white shell fragments, unconsolidated.
30-50	Sand-silica, very fine to fine grained, light brown, trace of white shell fragments, unconsolidated.
50-62	Sand-silica, very fine to fine grained, light brown, off white shell fragments, unconsolidated, trace of very fine grained phosphate sand.
62-68	Limestone-phosphatic intrabiosparite with lenses of micrite, dark gray to very light brown, some recrystalization and trace of white shell fragments, lithified.
68-79	Limestone-phosphatic intrabiosparite, dark gray abundant recrystalization, abundant pelecypod and gastropod fragments, well lithified.
79-95	Limestone-same as above, but no gastropods and more dense.
95-110	Limestone-phosphatic intrabiosparite, dark gray, abundant recrystalization, abundant pelecypod and gastropod fragments, well lithified, with lens of micrite (3') at 100 feet and an increase in recrystallization of pelecypods.

WELL CONSTRUCTION

Well No. Test Well 13 (TW-13)

Driller: Alsay-Pippin

Samples: Cuttings_____, Core_____

Casing: Depth 130 filled to 100 feet

Diameter 2 inches

Material Schedule 40 PVC

Location: Acme Improvement Distri

Recorded by: GR

Date Drilled: July 28, 1980

Screen: Depth 60-130 feet

Diameter 2-inches

Material Schedule 40 PVC

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
110-120	Limestone-dark gray intrabiosparite interbedded with micrite, abundant shell and silty white clay, barnacle fragments, coral polyps and Echinoderm spines.
120-130	Silty clay, lime mud, carbonate sand, grayish white, trace of phosphate particles with some sparite and micrite.

80-196