APT ANALYSIS

SITE: USGS Site 15

750300
946150

Section 3 Township 41 S Range 41 E

REPORT: Draft data from USGS

GEOLOGIC DATA: pg. ____, _____

WELL NUMBER OF WELL DESCRIBED: PB 1546

DEPTH (LSD)	LITHOLOGY
0-5	sand
5-13	carbonate sand, quartz, sand & silt
13-18	sand w/some carbonate, silt
18-60	carbonate sand & shell w/some limestone
60-76	carbonate sand with quartz sand & limestone
76-90	limestone with carbonate, sand, & shell
90-136	shelly sand w/trace of limestone
136-156	sand, quartz w/trace of carbonates
156-166	sand w/trace of silt
166-170	sand & carbonate silt

Producing zone interval: 60-136 (lsd) _____ (msl)

Aquifer name: _____

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

WELL DESCRIPTIONS:

Well	Diam. (in)	Total Depth	Cased Depth	Scr/Open Interval	Slot Size	Radius
PB 1547	6"	115	75		scr	0
PB 1546	2"	120	80		scr	40

INFLUENCING FACTORS: - Don Padgett

1) Aquifer is semiconfined 2) Authors feel main producing zone is only 40' thick (75-115') ∴ they believe they are pumping the full thickness of the zone. It is possible the main producing zone may be as much as 76' thick in which case the production well is only open to 53% of the main production zone

3) Wells are within 45' of a shallow canal

APT: pg. _____

Started: 7/16/86

Duration: 504 minutes = 8.4 hours

Discharge: 214 gpm - probably to adj. canal

Recovery: none

Comments:

1) Observation well PB1546 was 40' from production well while the canal was only 45' from production well

2) The semi-confined nature of the aquifer may have prevented early time influences of canal on drawdowns. No shallow wells present to confirm this.

3) _____

CONSULTANT'S ANALYSIS: pg. _____

Method: Jacob

Results:

Well	Transmissivity (GPD/FT)	S or Sy	Leakance ( )
PB1547	46,800		
PB1546	50,800		

Don Padgett- Comments: Jacob straight line estimates done on wrong part of curve. Theis conditions only present in curve prior to 4 minutes. Effects of canal probably lent a more logarithmic component to semi-log drawdown plot causing authors to be misled in applying Jacob method interpretations.

Method:

Results:

Well	Transmissivity (GPD/FT)	S or Sy	Leakance ( )

Comments: _____

Method: _____

Results:

Well	Transmissivity (GPD/FT)	S or Sy	Leakance ( )

Comments: _____

REANALYSIS: - Don Padgett

Method: Jacob

Results:

Well	Transmissivity (GPD/FT)	S or Sy	Leakance ( )
PB1546	18,500	9.2×10^{-4}	

Comments: Unfortunately the data does not meet the limiting conditions for the Jacob Method
Not enough early time data was available for reliable curve matching techniques.

Method:

Results:

Well	Transmissivity (GPD/FT)	S or Sy	Leakance ( )

Comments:

RECOMMENDED VALUES:

Transmissivity (GPD/FT)	Specific Yield or Storage	Leakance

REFERENCES:

SITE 15

AQUIFER-TEST REPORT

I. SUMMARY

A. Location Palm Beach County, Florida

B. Date July 16, 1986

C. Well Development 1 hour with air; 2 hours pumping

D. Length of Test 504 minutes of pumping

E. Discharge 214 gallons per minute

F. Hydraulic Coefficients Transmissivity is 6,800 square feet per day from observation well data.

G. Analytical Model Cooper-Jacob straight line

H. Preparer Leo J. Swayze

I. Reviewer Subdistrict Ground Water Specialist

J. Remarks The transmissivity represents the section of the aquifer between 75 and 115 feet below land surface.

II. NARRATIVE

A. Introduction

1. Test purpose To provide water managers with hydraulic parameters for ground-water modeling.

2. Personnel The test was conducted by personnel (Wayne Sonntag and Jeff Christian) of the U.S. Geological Survey, Water Resources Division, Miami subdistrict.

B. Physical Conditions

1. Aquifer description The main water-bearing zone of the surficial aquifer consists primarily of about 60 feet of sandy-shelly limestones interbedded with unconsolidated layers of sand and shell. This is overlain by about 76 feet of a moderately sorted, very fine to coase sand and shelly marl of comparatively lower permeability. The overlying sands and shelly marls act as a confining layer for short periods of pumping. On a long-term pumping basis, the aquifer should be considered as "water table." The base of the surficial aquifer is 166 feet below land surface.

2. Site location The test site is in northern Palm Beach County, Florida (see location map).

Latitude is 26°56'06" Longitude is 80°13'55"

3. Well descriptions A geologic test well (PB-1546) was drilled to the base of the aquifer. The section to be tested was then determined by field observation of drill cuttings. The borehole was then backfilled to 120 feet. An observation well was established by screening the interval between 80 and 120 feet. A 9-inch borehole was drilled 40 feet from the observation well. A pumping well (PB-1547) was created by installing 6-inch PVC casing and screening the interval between 75 and 115 feet with 6-inch 10 slot PVC screen (see enclosed construction schedule).

4. Pump The well was pumped with a 40-horsepower 4-inch Rupp self-priming centrifugal pump.

5. Drawdown measurements Measurements were made with a chalked tape in both the pumping and observation wells.

6. Discharge Discharge was measured using the "free discharge pipe oriface" method as described in the Bureau of Reclamation's Ground Water Manual. A 10-foot length of 12-inch diameter PVC pipe fitted with a 6-inch PVC pipe riser was used to vent H_2S gas before discharge through the oriface was measured. Discharge was 214 gallons per minute.

7. Computations Computations are shown on the semilog graph of drawdown versus time. Method of analysis is based on the Cooper-Jacob straight line method as described by Lohman (1972) and Kruseman and DeRidder (1976).

C. Results

1. A reasonable comparison existed between transmissivity calculated from pumping well drawdown data, 6,300 square feet per day, and observation well drawdown data, 6,800 square feet per day. Drawdown data from the pumping well show some scatter. This was probably due to small fluctuation in the pumping rate, and surging caused by hydrogen sulfide gas release from the pumped ground water in the stand pipe. Drawdown data from the observation well approached a horizontal line after about 300 minutes of pumping. This probably does not represent an equilibrium situation but represents a transition from a confined system to a water-table system. This transition is due to the permeability contrast between the overlying surficial sands and the sandy and shelly limestones in the pumping zone. Grain-size analysis of the sands yielded a horizontal permeability value of about 25 feet per day (Lappala, 1978). Vertical permeabilities

could be 2 to 10 times lower (Weeks, 1976). This is about 60 times less than the horizontal permeability of the tested zone (about 163 feet per day). Based on this physical model of the system, aquifer characteristics were calculated using the Cooper-Jacob straight line method applied to the early drawdown data.

2. Transmissivity Aquifer transmissivity is about 6,800 square feet per day for geologic materials between 75 and 115 feet below land surface.

3. Storage coefficient Not applicable

4. Other activities in the area None

5. References

Kruseman, G.P., and DeRidder, N.A., 1976, Analysis and evaluation of pumping test data: International Institute for Land Reclamation and Improvement/ILRI, Wageningen, The Netherlands, 200 p.

Lappala, E.G., 1978, Quantitative hydrogeology of the Upper Republican Natural Resource District, southwest Nebraska: U.S. Geological Survey Water-Resources Investigations Report 78-38, 200 p.

Lohman, S.W., 1972, Ground-water hydraulics: U.S. Geological Survey Professional Paper 708, 70 p.

Weeks, E.P., 1978, Aquifer tests - the state of the art in hydrology: Invitational well-testing symposium proceedings, Lawrence-Berkley Report LBC-7027, Lawrence-Berkley Laboratory, University of California, 26 p.

D. Figures

1. Map of Palm Beach County with site location.

2. Calculations

Semilog graph of time versus drawdown for pumping well and observation well.

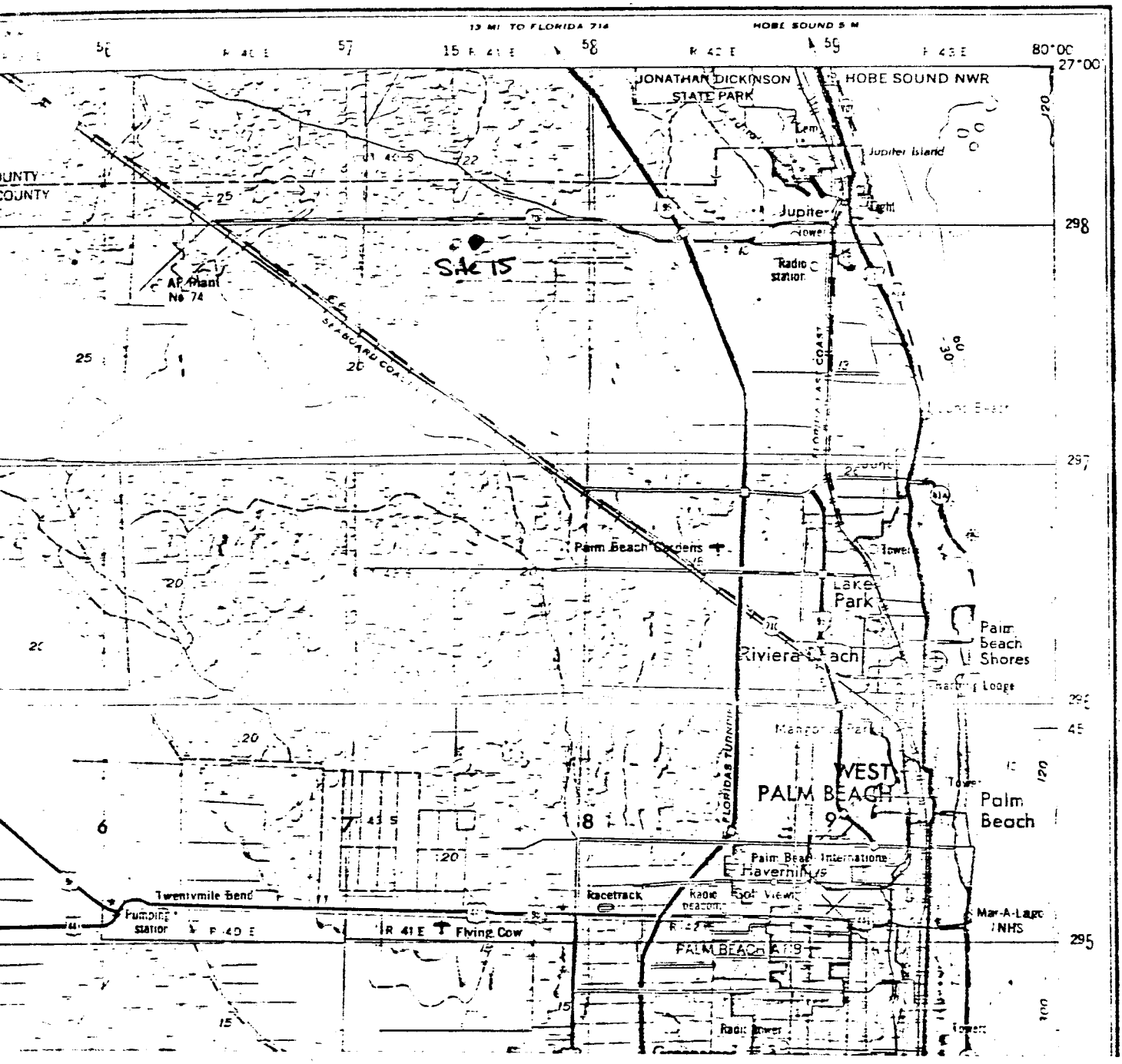
3. Generalized geologic column.

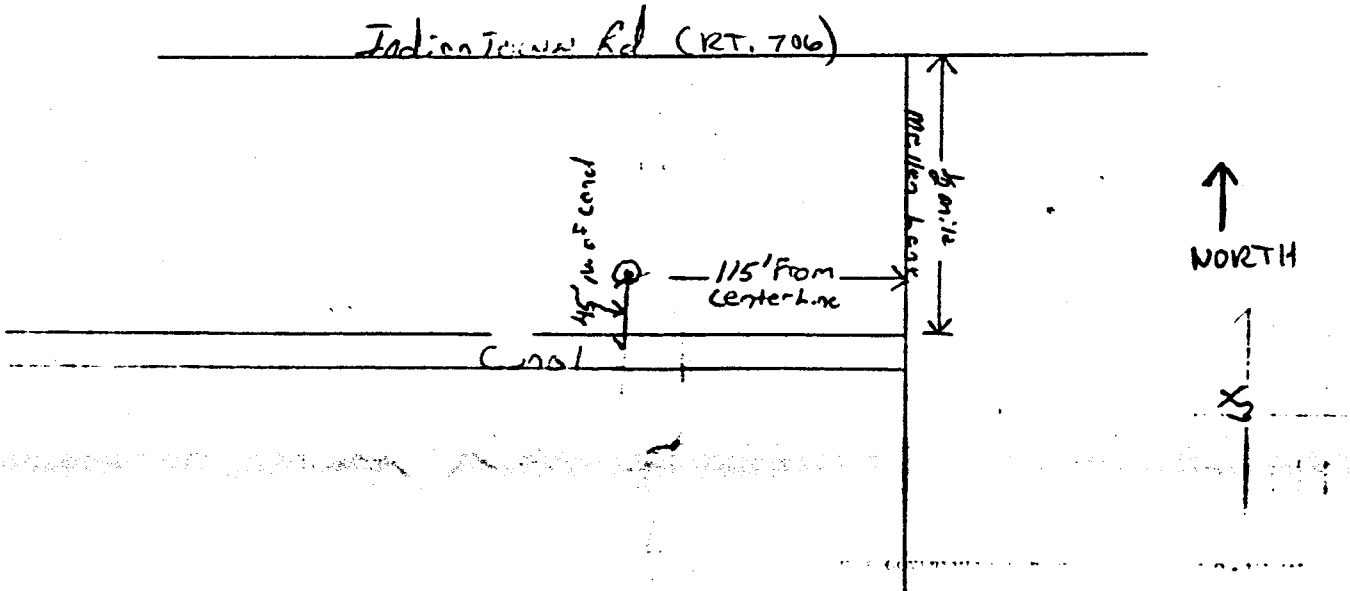
4. Drawing of well construction.

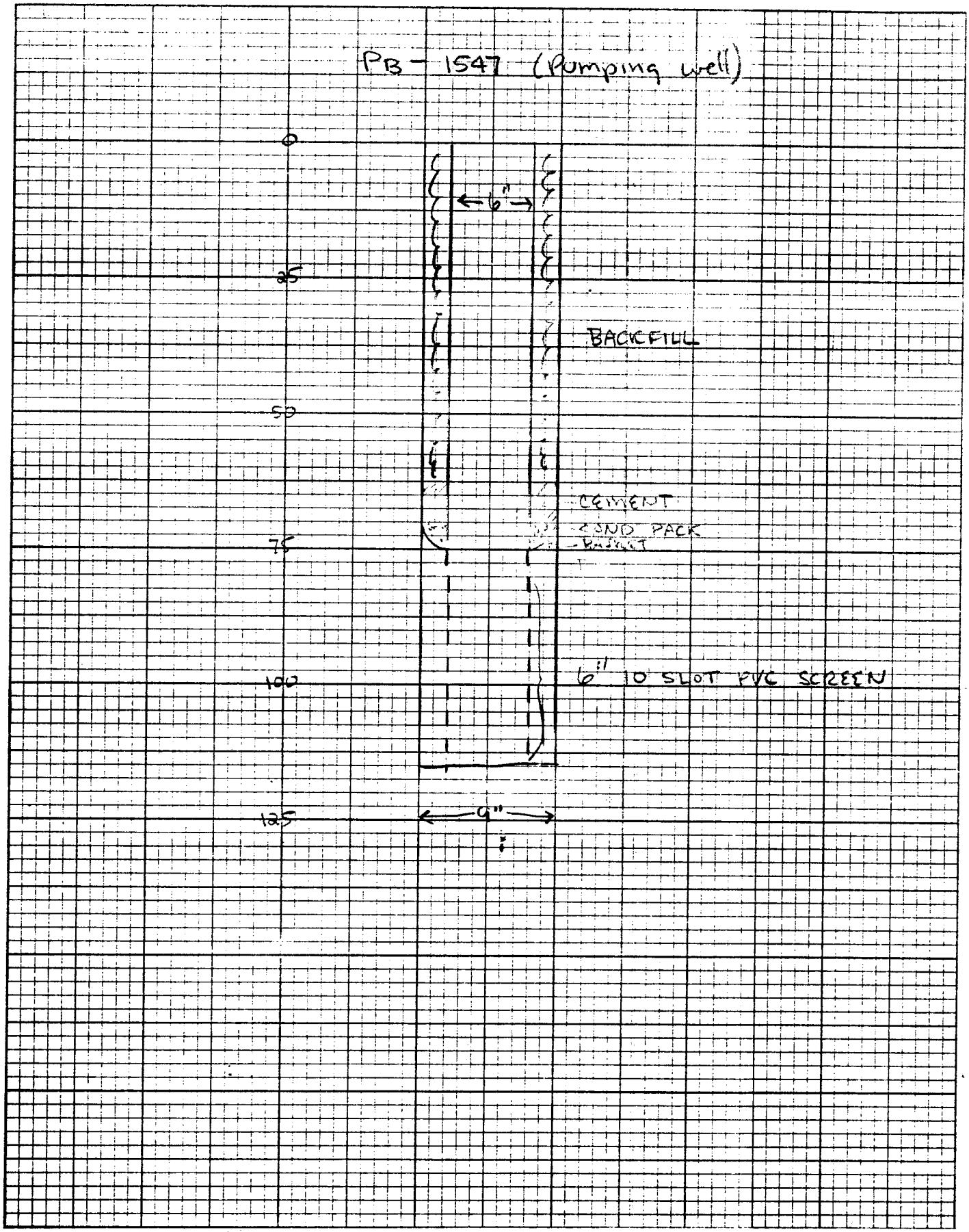
Tables

1. Lithologic log of test well (observation well).

2. Tabulation of field data.


13 MI. TO FLORIDA 714
HOBE SOUND 5 M
JONATHAN DICKINSON STATE PARK
HOBE SOUND NWR
Jupiter Island
Jupiter
Light
Tower
Radio station
SITE 15
AP Plant No 74
INTRACOASTAL WATERWAY
Palm Beach Gardens
Lake Park
Riviera Beach
Palm Beach Shores
Lodge
FLORIDA'S TURNPIKE
WEST PALM BEACH
Palm Beach
Palm Beach International
Haverhill
Twentymile Bend
Pumping Station
Racetrack
Radio beacon
Flying Cow
PALM BEACH A.F.B.
Mar-A-Lago NHS
Radio Tower
80°00
27°00
298
297
295
45
120
100
30


Indiantown Rd (RT. 706)
McCoy Lane
45' N of Canal
115' From Centerline
Canal
NORTH



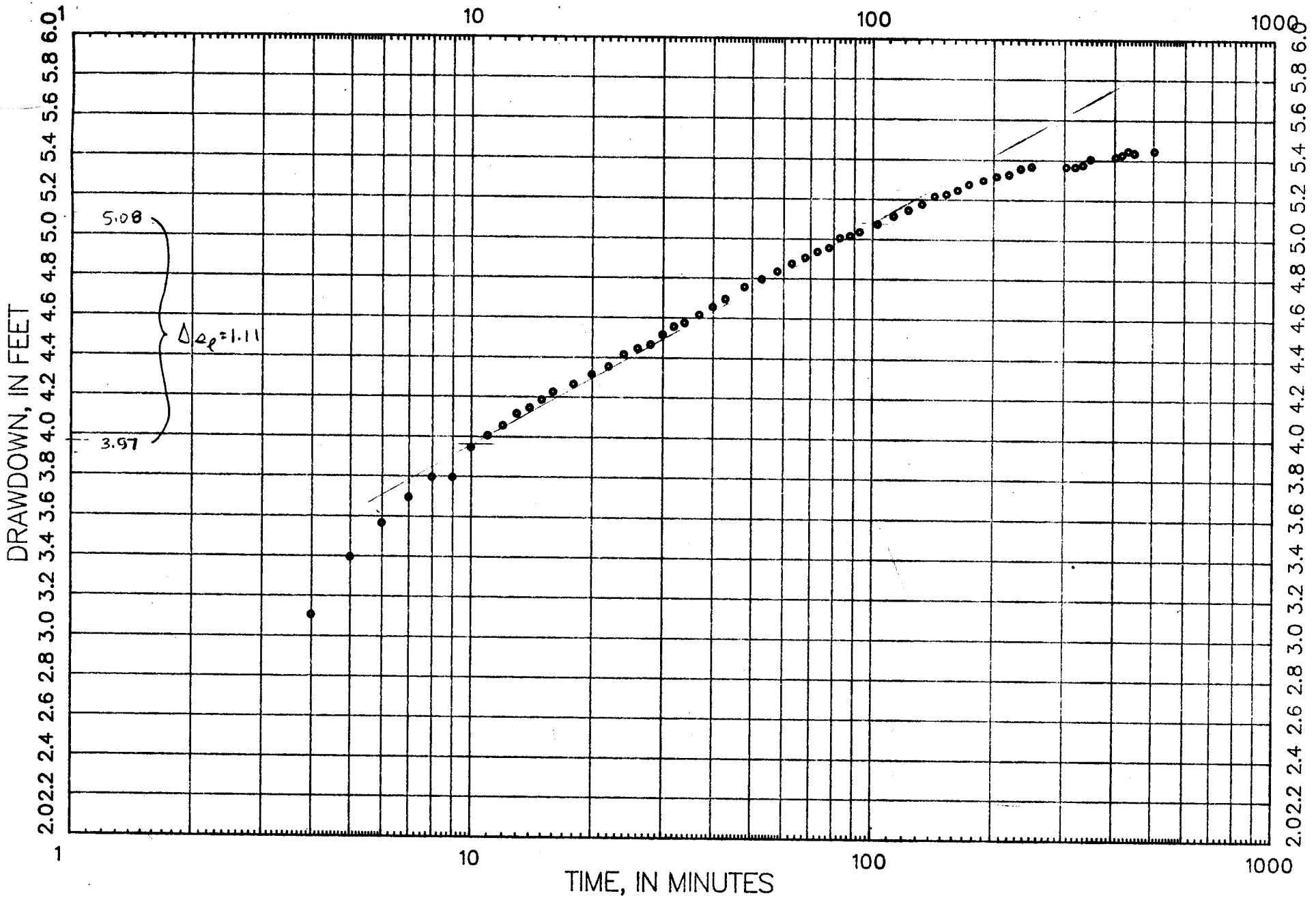
Well Construction: A 9-inch hole was drilled to 120 feet. A 6-inch PVC casing was then lowered to the bottom of the hole inside the 9-inch steel casing. The steel casing was then pulled back to 60 feet which allowed the basket to open. The open hole was then sand packed and cemented. The rest of the 9-inch steel casing was then removed. The open hole was then back-filled with sand and cuttings.

PS-1545

TIME	STW	DISCHARGE	RADIUS
0.000	6.510	41192	40.0
5.000	6.510		
6.000	6.510		
7.000	6.510		
9.000	6.511		
10.000	6.511		
11.0000	6.5220		
12.0000	6.5700		
13.000	6.610		
15.000	6.700		
16.0000	6.7400		
18.000	6.780		
30.000	7.030		
32.0000	7.0700		
34.000	7.099		
37.0000	7.1300		
40.000	7.170		
70.000	7.440		
80.000	7.530		
88.0000	7.5500		
93.0000	7.5500		
103.000	7.5500		
113.000	7.560		
123.000	7.600		
133.000	7.640		
143.000	7.680		
153.000	7.720		
163.000	7.760		
174.0000	7.7900		
189.0000	7.8100		
204.000	7.810		
219.000	7.810		
234.000	7.810		
249.000	7.810		
304.000	7.810		
320.000	7.810		
334.000	7.810		
349.000	7.810		
404.000	7.810		
419.000	7.810		
434.000	7.810		
449.000	7.810		
450.000	7.810		
504.000	7.810		

DRAWDOWN VS. TIME

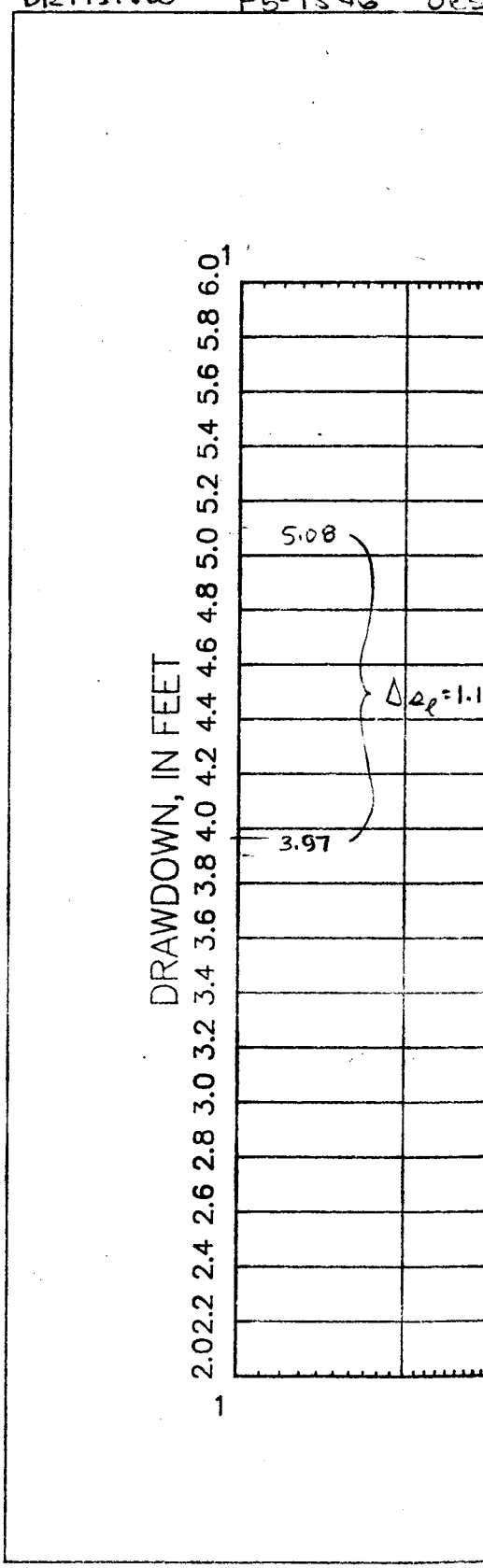
COOPER–JACOB METHOD



$kD = (2.3)(Q) / 4\pi \Delta s_\ell$

$= (2.3)(41192) / (4\pi)(1.11)$

$= 6795 \ ft^2/day$

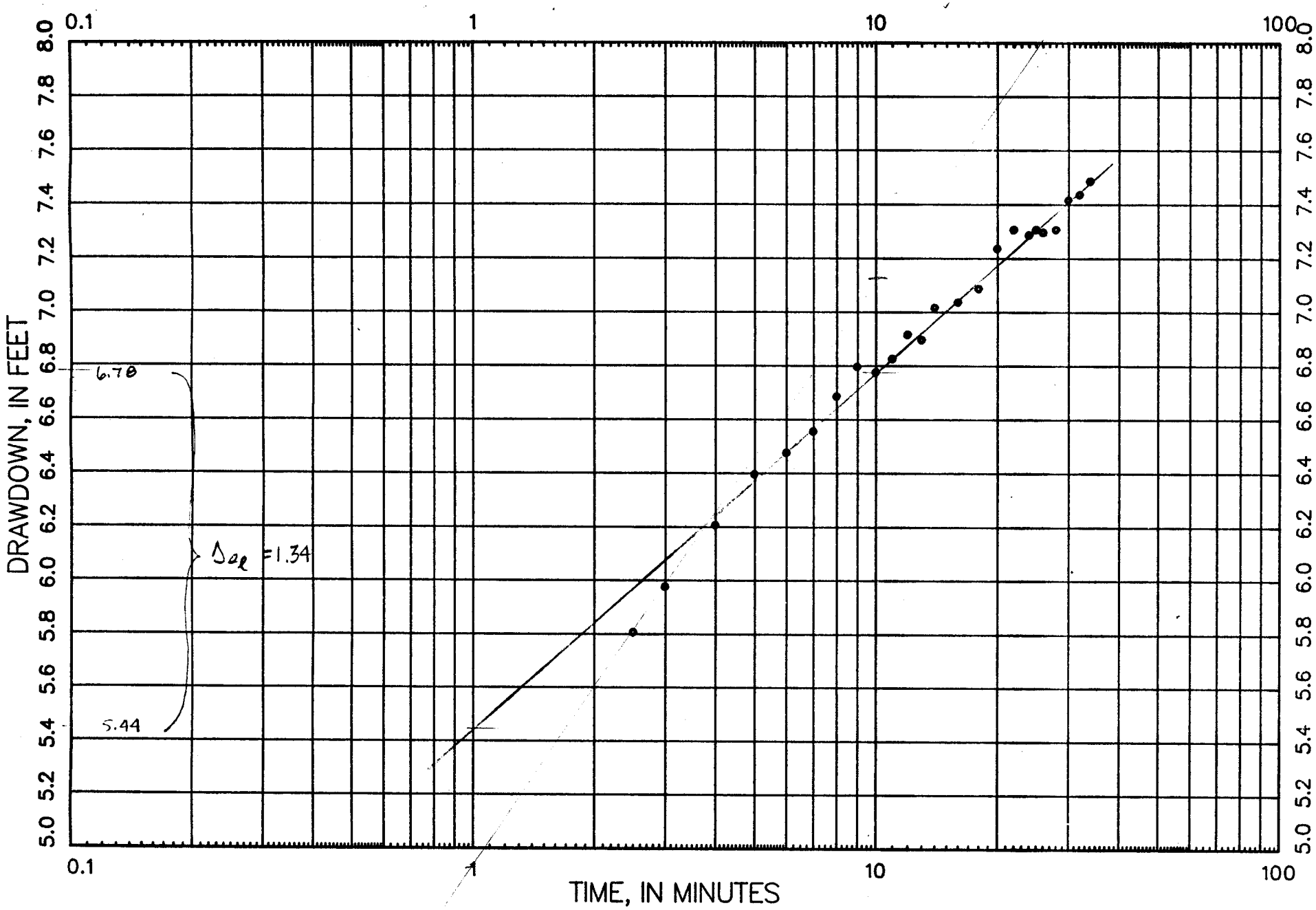


P3-1547

TIME	DTW	DISCHARGE	RADIUS
0.	8.470	45615	0
5.	9.		
6.	9.		
7.	9.		
8.	10.		
9.	10.		
10.	10.		
11.	10.		
12.	10.		
13.	10.		
14.	10.490		
16.	10.510		
18.	10.		
24.	10.		
30.	10.		
42.	10.		
54.	10.		

DRAWDOWN VS. TIME

COOPER–JACOB METHOD

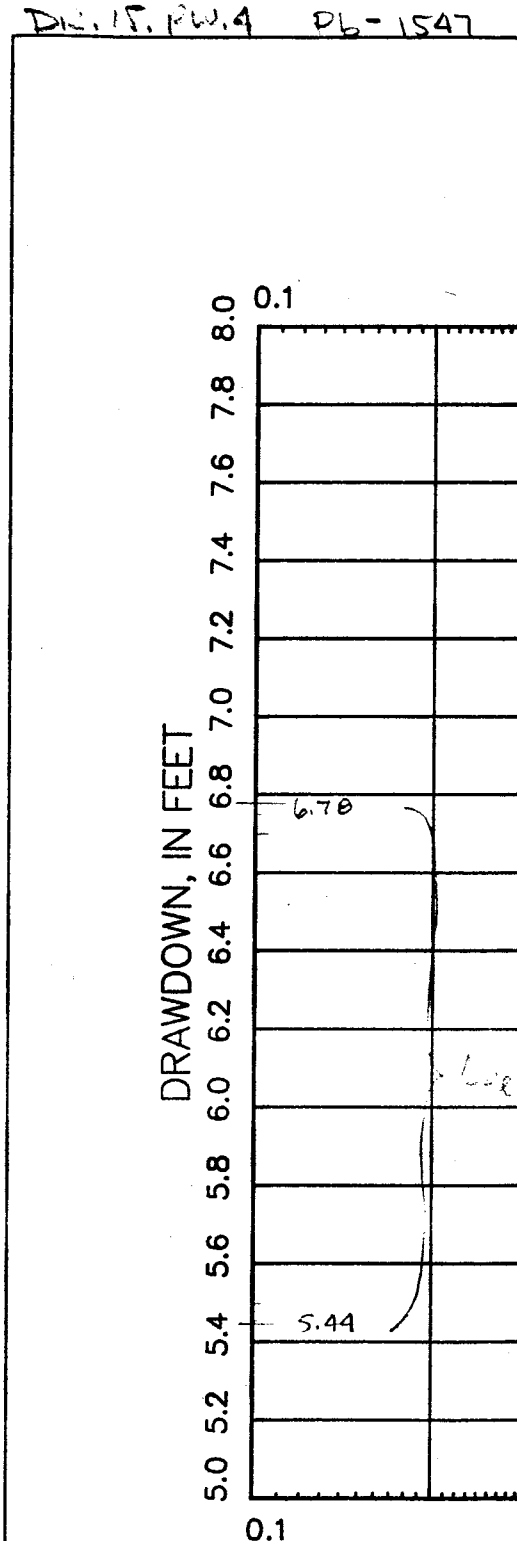


$kD = (2.3)(Q) / 4\pi\Delta s$

$= (2.3)(45815) / (4)(3.14)(1.34)$

$= 6261 \ ft^2/day$

DW. 15. PW.4 PG - 1547



Lithologic Log of Well PB-1546 Site 15

Description	Thickness (feet)	Depth (feet below land surface)
Sand, dark-brown to medium-brown; 40 to 45 percent quartzose, moderately sorted, medium to coarse, subrounded to subangular; 1 to 3 percent heavy minerals, fine to very fine, subrounded to rounded, well sorted; 5 to 10 percent shell fragments; 10 to 15 percent organics; 20 to 25 percent calcite; grades down to lime mud marl.	5	0 - 5
Marl, bluish-gray; 20 to 25 percent quartzose, fine to very fine, moderately sorted, subrounded to rounded; 10 to 15 percent shell fragments, abundant bivalvia, Venus; 1 to 3 percent heavy minerals, fine to very fine, rounded to subrounded, well sorted; 45 to 50 percent calcite crystals and lime mud; semi-impermeable.	5	5 - 10
Marl, bluish-gray to brownish-gray; quartzose, silt to very fine, moderately sorted, subrounded to rounded; 5 to 10 percent shell fragments; 1 to 3 percent heavy minerals as above; 20 to 25 percent carbonates; semi-impermeable.	3	10 - 13
Sandy marl, brownish-gray to bluish-gray; quartzose, very fine to fine, well sorted, subrounded to rounded; 3 to 5 percent heavy minerals, very fine, subrounded to subangular, well sorted; 1 to 3 shell fragments; 5 to 10 percent carbonates; semi-impermeable.	3	13 - 16
Sandy marl as above.	2	16 - 18
Shelly sand, brownish-gray; quartzose, fine to very fine, moderately sorted, subrounded to rounded; 1 to 3 percent heavy minerals, very fine, well sorted, subrounded to rounded; 40 to 45 percent shells, abundant bivalvia.	2	18 - 20
Carbonate sand, brownish-gray; 45 to 50 percent detrital carbonates, fine to very fine, subangular to angular, moderately sorted; 10 to 15 percent heavy minerals, very fine, well sorted, rounded; 25 to 30 percent shell fragments, abundant bivalvia; interbedded with 10 to 15 percent limestone, brownish-gray to bluish-gray; packed biomicrite to sparse biosparite.	3	20 - 23

Lithologic Log of Well PB-1546--Continued

Description	Thickness (feet)	Depth (feet below land surface)
Limestone, dark-brownish-gray to medium-brownish-gray; fossiliferous intramicrite; 1 to 3 percent bivalvia; 5 to 10 percent calcite intraclast, fine to very fine, moderately sorted, subrounded to subangular; 3 to 5 percent heavy minerals, fine to very fine, well sorted, subrounded to rounded; very well cemented; very porous.	3	23 - 26
Carbonate sand, medium-brownish-gray; detrital calcite crystals, medium to fine, subrounded to angular, poorly sorted; 30 to 35 percent shell fragments; 10 to 15 percent heavy minerals, fine to very fine, subangular to rounded, poorly sorted.	4	26 - 30
Carbonate sand, medium-brownish-gray; detrital calcite crystals as above; 40 to 45 percent shell fragments, abundant bivalvia; 10 to 15 percent heavy minerals as above.	3	30 - 33
Carbonate sand as above.	3	33 - 36
Carbonate sand, dark-gray to medium-gray; detrital carbonates, coarse to fine, angular to rounded, poorly sorted; 40 to 45 percent shell fragments as above; 10 to 15 percent heavy minerals as above.	4	36 - 40
Carbonate sand as above.	3	40 - 43
Carbonate sand, dark-gray to medium-gray; detrital carbonates, very fine to medium, angular to subrounded, poorly sorted; 40 to 45 percent shell fragments, bivalvia; 5 to 10 percent heavy minerals, fine to very fine, rounded, well sorted.	3	43 - 46
Carbonate sand as above; Galeodea	4	46 - 50
Carbonate sand, dark-gray to medium-gray; detrital carbonates, very fine to medium, subangular to subrounded, poorly sorted; 3 to 5 percent heavy minerals, fine to very fine, rounded to subrounded, moderately sorted; 35 to 40 percent shell fragments, bivalvia, Mya.	3	50 - 53

Lithologic Log of Well PB-1546--Continued

Description	Thickness (feet)	Depth (feet below land surface)
Carbonate sand, dark-gray to medium-gray; detrital carbonates, fine to very fine, subrounded to subangular, moderately sorted; 5 to 10 percent heavy minerals as above; 35 to 40 percent shell fragments, Mya, Anadora, gastropods.	3	53 - 56
Carbonate sand, dark-gray to medium-gray to grayish-brown; detrital carbonates, very fine to medium, subrounded to subangular, moderately sorted; 3 to 5 percent heavy minerals, fine to very fine, rounded to subrounded; 40 to 45 percent shell fragments, Turritella, Anadora, Mya, Glycymeris, worms, others; about 20 to 30 percent cemented into sandstone and limestone nodules, quartzose, fine to very fine, subrounded to rounded, moderately sorted.		56 - 60
Carbonate sand interbedded with 25 percent limestone, dark-gray to medium-gray to grayish-brown; detrital carbonate, very fine to very coarse, angular to rounded, poorly sorted; 40 to 45 percent shell fragments, gastropods, Viviporus, bivalves as above, barnacles, worms; fossiliferous limestone; poorly washed biosparite to sorted biosparite; quartzose, fine to very fine, rounded to subrounded; carbonates as above; 10 to 15 percent heavy minerals, fine to very fine, rounded to subrounded; abundant gastropod molds; very porous.	3	60 - 63
Carbonate sand interbedded with 10 percent limestone, medium-gray to grayish-green; detrital carbonates, fine to very fine, subrounded to rounded, well sorted; 25 to 30 percent microscopic shell fragments; 5 to 10 percent heavy minerals, fine to very fine, rounded to subrounded, well sorted; cemented in places to intrasparite limestone; semi-impermeable.	3	63 - 66
Carbonate sand with interbedded limestone as above.	4	66 - 70
Carbonate sand with interbedded limestone, medium-gray to brownish-gray; about 50 percent detrital carbonates and shell fragments, bivalves, gastropods, barnacles; 10 to 15 percent heavy minerals, fine to very fine, rounded to subrounded, some phosphates and elongate gypsum crystals; 25 to 30 percent limestone; intrasparite to sparse biosparite.	3	70 - 73

Lithologic Log of Well PB-1546--Continued

Description	Thickness (feet)	Depth (feet below land surface)
Carbonate sand with interbedded sandy limestone; medium-gray to brownish-gray; detrital carbonates and shell fragments as above; 10 to 15 percent heavy minerals as above; about 5 to 10 percent sandy limestone, intrasparite; 25 to 30 percent quartzose, fine to very fine.	3	73 - 76
Sandy limestone, medium-gray to brownish-gray; poorly washed biosparite; 25 to 30 percent quartzose, fine to medium, subrounded to subangular; 10 to 15 percent heavy minerals, fine to very fine, rounded to subsubrounded; 25 to 30 percent shell fragments, Anadora, others, gastropods; moldic, vugs, very porous; about 25 to 30 percent loose detrital carbonate and shell fragments.	4	76 - 80
Sandy, calcareous limestone; packed biosparite; medium-gray to brownish-gray; quartzose as above; 5 to 10 percent heavy minerals, very fine, rounded, well sorted; 35 to 40 percent shell fragemnts, scallops, other bivalves, gastropods, Turritella; moldic, vugs, very porous; moderately cemented; 25 to 30 percent loose detrital carbonates and shell fragments.		80 - 83
Sandy, calcareous limestone as above, medium-gray to olive-gray to brownish-gray.		83 - 86
Sandy, calcareous limestone, medium-gray; packed biosparite to coquina in places; 20 to 25 percent quartzose, fine to very fine, subanguar to subrounded, well sorted; 3 to 5 percent heavy minerals, very fine, rounded, well sorted; abundant bivalvia, scallops; moldic, vugs; moderately cemented; porous; 25 to 30 percent loose detrital carbonates and shell fragments.		86 - 90
Carbonate sand interbedded with limestone, medium-gray to brownish-gray; 20 to 25 percent quartzose, fine to very fine, subangular to subrounded, well sorted; 5 to 10 percent heavy minerals and phosphates, very fine to medium, well rounded, well sorted (fine); 30 to 35 percent shell fragments, abundant bivalvia, gastropods; about 10 to 15 percent limestone; sandy, packed biosparite; moldic, vugs; poorly to moderately cemented; porous.	3	90 - 93

Lithologic Log of Well PB-1546--Continued

Description	Thickness (feet)	Depth (feet below land surface)
Calcareous sand, medium-gray to brownish-gray; 10 to 15 percent quartzose as above; 5 to 10 percent heavy minerals as above; 45 to 50 percent shell fragments, Neptunea, Terebra, Glycimeris; about 5 to 10 percent loosely cemented nodules.	3	93 - 96
Sandy shell, medium-gray to brownish-gray; 20 to 25 percent detrital carbonates, fine to coarse, angular to rounded, poorly sorted; 5 to 10 percent heavy minerals as above; abundant gastropods, Turritella, Conus, Terebra, Olivella, Clathrodrilla, bivalvia, Cerastoderma, Lirophora, scallops, chlorophyta (algae).		96 - 100
Sandy shell as above, dark-gray to medium-gray; Cypraea and other shell fragments as above; 5 to 10 percent cemented as nodules.	3	100 - 103
Sandy shell, dark-gray to medium-gray to brownish-gray; 10 to 15 percent quartzose, very fine to medium, subrounded to angular, poorly sorted; 3 to 5 percent heavy minerals, very fine, rounded, well sorted; 25 to 30 percent detrital carbonates; shell fragments, Turritella (abundant), other gastropods and bivalves, barnacles, algae.	3	103 - 106
Sandy shell as above; shell fragments, abundant Turritella, Oliva, Cypraea, oysters, and clams, Glycymeris bryzoan, conopeum.	4	106 - 110
Sandy shell, dark-gray to medium-gray; 20 to 25 percent quartzose, fine to medium, subrounded to angular, moderately sorted; 3 to 5 percent heavy minerals, very fine to medium, rounded to subangular, moderately sorted; 5 to 10 percent cemented as coquina; shell fragments as above, coral, Septastrea.		110 - 113
Sandy shell as above; not cemented.	3	113 - 116
Sandy shell, dark-gray to medium-gray to brownish-gray; 15 to 20 percent quartzose, very fine to medium, subrounded to angular, poorly sorted; 3 to 5 percent heavy minerals, rounded to subrounded, fine to very fine, moderately sorted; 20 to 25 percent detrital carbonates; shell fragments, abundant gastropods, Turritella, Conus, Oliva, Chione, coral.	4	116 - 120

Lithologic Log of Well PB-1546--Continued

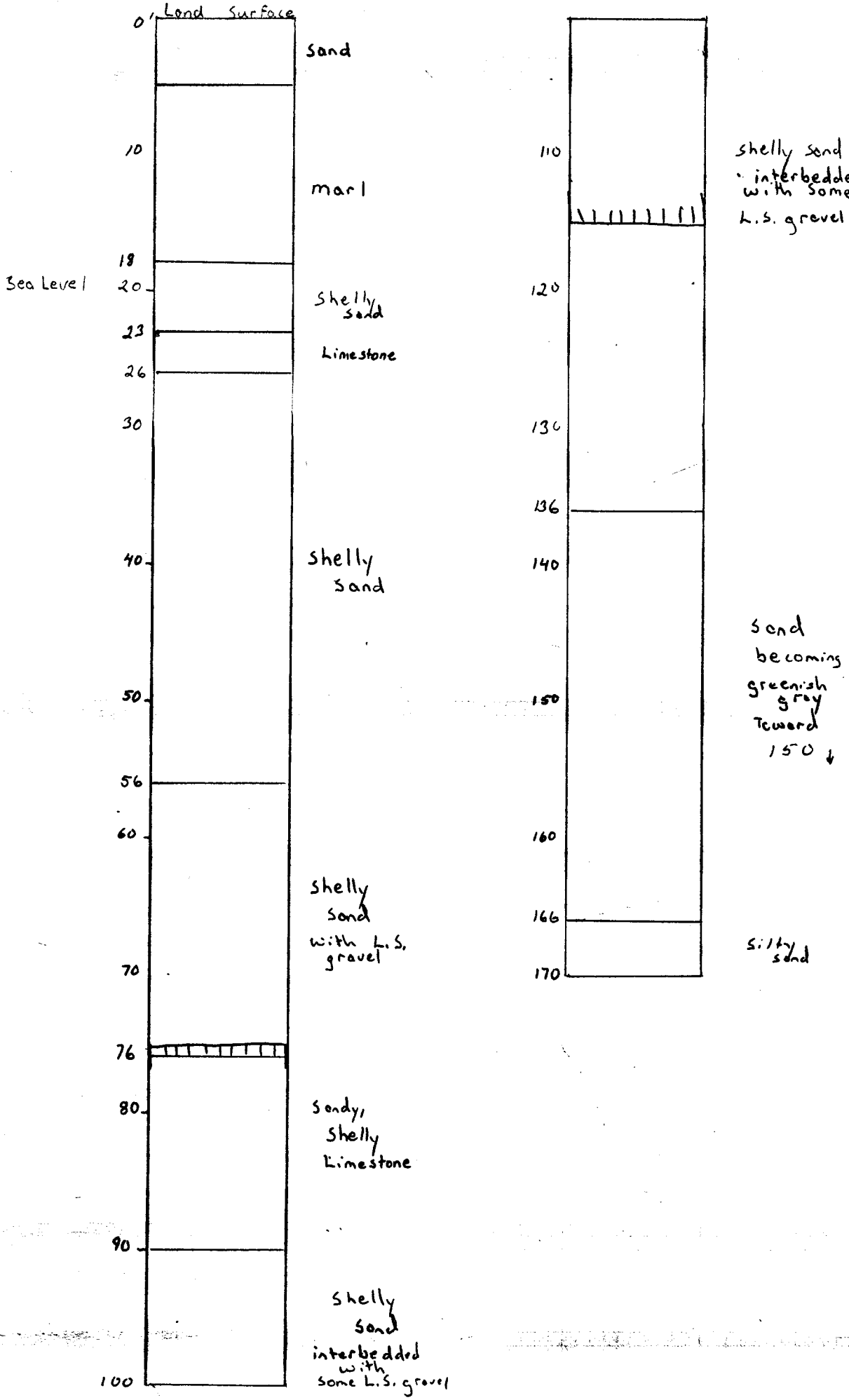
Description	Thickness (feet)	Depth (feet below land surface)
Sandy shell as above; about 5 to 10 percent partially cemented.	3	120 - 123
Shelly sand, medium-gray to beige-gray; quartzose, very fine to medium, moderately sorted, subrounded to angular; 5 to 10 percent heavy minerals, very fine to fine, rounded to subrounded, well sorted, 40 to 45 percent detrital carbonates and shell fragments; 5 to 10 percent loosely cemented as coquina.	3	123 - 126
Shelly sand interbedded with coquina, medium-gray to beige-gray; quartzose, very fine to coarse, subrounded to angular, poorly sorted; 3 to 5 percent heavy minerals and phosphates, very fine to fine, rounded to subrounded, well sorted; 40 to 45 percent detrital carbonates and shell fragments; interbedded with 20 to 25 percent coquina.	4	126 - 130
Shelly sand, medium-gray to beige-gray; quartzose, fine to coarse, subrounded to angular, poorly sorted; 5 to 10 percent heavy minerals, very fine to medium, rounded to subangular, poorly sorted; 40 to 45 percent detrital carbonates and shell fragments, bivalvia, barnacles, worms, spines; loosely consolidated.	3	130 - 133
Shelly sand with interbedded limestone, medium-gray to beige-gray; quartzose, very fine to medium, angular to subrounded, moderately sorted; 5 to 10 percent heavy minerals, very fine to fine, rounded to subrounded, moderately sorted; 30 to 35 percent shell fragments and detrital carbonates; 20 to 25 percent loosely cemented limestone; sparse biosparite.	3	133 - 136
Sand, medium-gray to light-gray; quartzose, fine to medium, subangular to angular, well sorted; 3 to 5 percent heavy minerals, fine to very fine, rounded to subrounded, moderately sorted; 5 to 10 percent detrital carbonates and shell fragments.	4	136 - 140
Sand as above.	3	140 - 143
Sand, medium-gray to light-gray; quartzose, fine to medium, subrounded to angular, moderately sorted; 5 to 10 percent heavy minerals as in 135 to 140 feet; 1 to 3 percent phosphates; 5 to 10 percent detrital carbonates and shell fragments.	3	143 - 146

Lithologic Log of Well FB-1546--Continued

Description	Thickness (feet)	Depth (feet below land surface)
Sand, medium-gray to light-gray; quartzose, fine to medium, subrounded to angular, moderately sorted; 5 to 10 percent heavy minerals, rounded to subrounded, well sorted, 1 to 3 percent phosphates; 3 to 5 percent detrital carbonates and shell fragments.	4	146 - 150
Sand interbedded with sandstone, medium-gray to grayish-green; quartzose, fine to very fine, angular to subrounded, moderately sorted; 5 to 10 percent heavy minerals, fine to very fine, rounded to angular, moderately sorted; 1 to 3 percent detrital carbonates; 1 to 3 percent phosphates; 5 to 10 percent loosely cemented quartz sandstone.	3	150 - 153
Sand as above.	3	153 - 156
Sand, grayish-green to olive-green; quartzose, silt size to fine, subrounded to angular, well sorted; 3 to 5 percent heavy minerals, fine to very fine, rounded to subrounded, well sorted; 3 to 5 percent phosphates; 1 to 3 percent detrital carbonates.	4	156 - 160
Sand interbedded with sandstone, grayish-green to olive-green; quartzose as above; 5 to 10 percent heavy minerals, fine to very fine, rounded to subrounded, well sorted; 5 to 10 percent phosphates; 5 to 10 percent loosely cemented sandstone with micritic matrix.	3	160 - 163
Sand, olive-green; quartzose, very fine to fine, subrounded to angular, moderately sorted; 3 to 5 percent heavy minerals as above; 5 to 10 percent phosphate; 3 to 5 percent detrital carbonates.	3	163 - 166
Sand, dark-greenish-gray to olive-green; quartzose, silt size to fine, rounded to subrounded, well sorted; 3 to 5 percent heavy minerals, rounded to subangular, silt to fine; 5 to 10 percent phosphates, 10 to 15 percent detrital carbonates and micritic mud.	4	166 - 170

Site 13 PB-1546

R. Kane



Scale 1" = 10'

$t_o = .38$ min

$$\frac{264\,Q}{\Delta s} = T$$

$$\frac{264\,(214)}{3.05'} = 18{,}523\ GPD/Ft$$

$$= 2476\ Ft^2/day$$

$$S = \frac{2.25\,T\,t_o}{r^2} = \frac{2.25(2476\ Ft^2/day)(.38)}{}$$

$$= \frac{2.25(2476\ Ft^2/day)(.38\,min)}{(40\ Ft)^2\,(1440\ min/day)}$$

$$= 0.00092$$

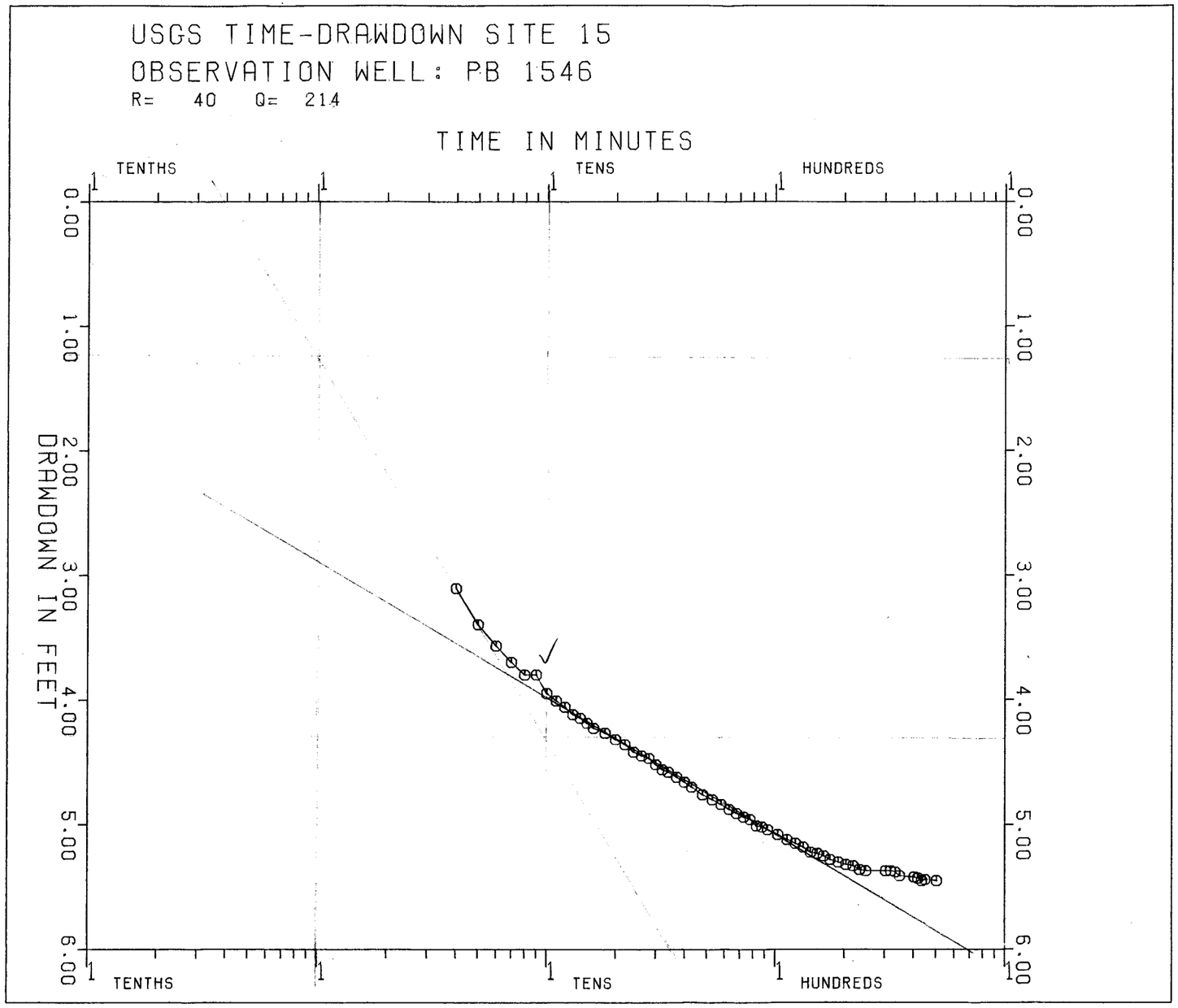
For $u \le 0.01$

$$t > \frac{100\,r^2 S}{4T}$$

$$> \frac{100\,(1600\ Ft^2)(.00092)}{4(2476\ Ft^2/day)}$$

$> .014$ day

> 21.4 min NO!



WMD TAPENO 6442 PLOT NO 0010
USER NO SHINE DATE 87/08/24 TIME 10:16

WMD TAPENO 6442 PLOT NO 0007
USER NO SHINE DATE 87/08/24 TIME 10:15