

Mobile Drill Log Book # 7



Ben Meadows

1-800-241-6401

LEVEL BOOK

#101596

MAY - 97 / APR 98

STATE MAP '97

AMBIENT 97

AMBIENT 98

STATE MAP 98

W[#]s 17514 / 17668

17253
VERNA well fld

17521
see Ridge

17519
DCA-1

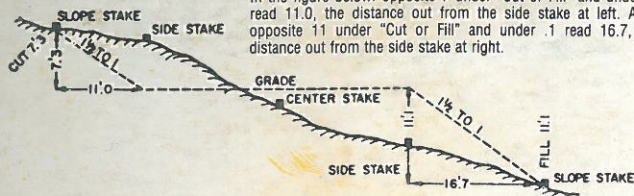
17522
S-72

17524
Mile Bend

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	Distance out from Side or Shoulder Stake										Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

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810-3468

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 Mobile Drill (317) 787-6371
 Toney Drilling (800) 432-6193
 Atlantic Drilling (800) 752-9416
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 (Polly)

FAKA LOCATE 800-638-4097 phone
 407-826-9063 FAX

Sonitrol 4631-56, ENTER, off

U.S.G.S. Miami 305-526-2885

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The paper in this book is
 made of 50% high grade rag stock with
 a WATER RESISTING surface sizing.

SWFWMD (800) 423-1476

Lee Booth - Site INV. 904 (M6L)

Toney Drilling - 508-9897

17253
 VERA well FID

17521
 RYE Ridge

17519
 DCA-1

17522
 S-72

17524
 HILE Bend

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17523

SEC 3 b T36S, R10E

CAT 27° 22' 56"

CON 82° 17' 19"

Elev ~ 75'

5-19-97 Verna Wellfield

Leave where at 7:00 AM - begin drilling in
Saratoga Co. @ 4:00 PM - 1st day 11.

Static water level at 2'2" below land surface.

0-3.0 - Sand w/ some organics (light brown).
4'5' samples taken off auger bit - clayey,
organic sand.

5'-7.3' - as above.

7.3-8.5' - Very clayey sand - light gray-brown.

8.5-11.0' - Some lost sample - sand w/ some
silty organics. - Begin pumping on 5-20-97.

5-20-97 - 3.5' of sand in hole - water level @ 2.2'

11-13.5' - Pumped sample - coarse sand.

13.5-16.0' - Pumped sample - " "

16-21.0' - " " "

21-22' - as above.

22-26.5' - Pumped sample - phosphatic sand
& gravel present. Gray green clayey sand.

Sand locked @ 26.5 - TD.

Abandoned 5-20-97

Formation fill to 4.0' BLS.
2 bags bentonite & cuttings to
land surface.

17523
VERNA Wellfield

17521
off Ridge

17519
DCA-1

17522
S-72

17524
White Bend

SEC 3 ~~ceda~~ T37S, R 19E

LAT 27° 17' 27"

LONG 82° 22' 42"

E/W ~ 27'

W # 17521

5-21-97

Bee Ridge Landfill

2

DJ, JB, RG

0-1' organic rich sand. Push core.

1-2.8' - Cleaner, medium sand w/ some clay. Push.

2.8-7.3 - clayey sands - color varies - mostly brown.

Push to 7.0'.

7.3-8.5' - clayey sands - gray.

8.5-11.0 - Poor recovery - as above. Water table

@ 11.0'. Begin pumping samples.

11.0-13.5 - shell w/ sand & phosphatic sand & gravel.
some large phosphatized bone fragments present.
Pumped sample.

13.5-16.0 - as above w/ finer shell & phosphates. Pumped.

16-18.5 - Pumped sample. as above w/ gray-green
clay present (blebs).

18.5-20 - gray-green sandy clay w/ & phosphatic sand.

20-24.5 - green clay w/ ~~for~~ sand & phosphate grains -
stringers of white calcareous material present.

24.5-27.2 - ~~are~~ light green clays; otherwise as above.
w/ no stringers

27.2-28 - Soupy - ~~clay~~ green clays w/ phosphatic
material & sand.

28-32 - No recovery.

32-33 - green clay w/ large phosphatic gravel.

17528
Kings Ranch

17521
Bee Ridge

17519
OCA-1

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White Bend

33-35.3 - Phosphatic material is finer (in general).
Large phosphatized (bone?) fragment
impaled on sample tube. Really neat.

35.3-36.5 - Plastic, tight green clay w/ very
little sand or phosphate. Stop here
for day.

5-22-97 water at 9' bbls.

36.5-47.5 - Peace River green clays w/
phosphatic sands & gravel - some lenses
of clean clay present.

47.5-52.5 - Very slow drilling - lime cemented
phosphatic sands & shelly material w/ carbonate
mud of same composition. 6" runs w/
sampler. Pumped sample of limestone
fragments at 51'. TD @ 52.5'.

3 bags bentonite from 52.5 -
48'. Formation fill to 7.0' -

~~3 bags bentonite & cuttings to 5'~~

~~then added 5-22-97. 3 bags sand~~

~~and 20' cutting to fill hole~~

7' - 0' filled w/ 3 bags
bentonite, w/ 3 bags sand &
some cuttings.

?
Which?
?

17528
Kings Ranch

17540
Campbell Rd

17519
WCA-1

17522
S-72

17528
17524
White Bend

W ~~157~~ 17519
WCA-1/PS6

NO TRS ENTRY

~~9-6 fill
6-12.8 WDC
12.8-12~~

shiny

6-2-97 KC, JBS, + DJ
to Paumotu Co. 7AM start
Met CAROL milliner - set up rig
at site - 6:30 end day
core drill thru lower fill 0' - 6'
~~6-2-97~~ peat below - recovered ~ 6'

6-3-97 7AM start
- go stand to drill in 3/4 hsa
as csg + to spec peat

LAT 26° 28.424' (25")
+ 300"
Lon 80° 26.742' (43")

10-11.5 gn gy marl below dusty bn mk
top of rock at ~ 10.5' - 11'

11.5 - 12.75 - grey marl + rock -
drill 13.5' hsa in as temp
csg - chg over to NQ sys

12.75 - 15.1' grey pecker chgs ls
underlying mucky ls.

15.1 - 20.1' 2 runs white + gy
sfb shelly ls. then hard, grey ls.

sfb. 3rd run at ~ 19'

20.1 - 22.5 - dk grey, fhd + sfb ls.

22.5 - 25.1' - predominantly sfb.
sticks - no recovery - washed

25.1 - 27.6' grey br ls. well ind⁵
at top laminated then rubbly to
btm. this soft goes throughout
- washed out (or pushed thru)

27.6' - 30.1' - hard rubbly ls -
no recovery? -

30.1' - 32.6' - bdgy + br ls -
inner bbl mismatch - pull
rods to next spc

32.6 - 35.1 mostly rubbly ls -
softer toward bottom - poor
recovery

35.1 - 37.6' rubbly ls the hard
excl. zone ~ 8" diameter? at top
also some orange brown fill
no retn circ.

37.6 - 40.1' - no retn circ. grey
+ br porous ls

40.1 - 42.6' hard grey + br ls - interspersed
soft zones.

42.6 - 45.1 soft zone at top ~ 1/2
the grey porous ls. - Chex. br porous
ls last 2"

45.1 - 47.8' br ls as above
than harder grey ls.

17528
Kings Ranch

17540
Campbell Rd.

17543
NASA

17522
S-72

17524
HUE Bend

47.6 - 50.1' - mostly soft - lost - ~~lost~~⁶ top
~6' new.

50.1 - 52.6' upper part soft -
washed - then hard rubbery ls.

52.6 - 55.1 dk gy dragnite ls.
prob runny, - bottom most part
of sample - clayey - sandy (gyg)

55.1 - 57.6' - sand w shell +
ls frag. - sand locked in
hole - got WL rod freed up
- pulled 7.5' - sand flowing
in to 50' blsd.

- decide to TD hole - only
way to get through sand would
be w mud - want to
ble MW good.

- will wash in bentonite to
46'

END DAY 7:00 PM

6-4-97 7AM start -

drill in addl 5' hsa - 18.5'

- wash out hole w WL rod

- pump well + surge to pull
cuttings - hole fills in to
40'

17528
Kins Ranch

17540
Campbell Rd.
NASA

17543
17552
17526
S-72

17558
17524
MUE Bend

~~Cement~~
~~posts~~
100' tape

NE Animaz Hosp 893-5636
9:30 AM

2843 pm

- Load turn signal flasher

- ck front axle

pm

ck on new rot. rope

7

install 30' casg
10' scw
2 1/4' tp

wash in 20-30 sand - pump
+ surge - to 22' bwd
30-65 sand to 20' bwd
4" fine bentonite

- pulled hsa's - full cylinder -
ran hsa's back in - pump
6 bags portland cement in
4 hrs hsa or tremie -
pulling hsa or cement filled
portland cement 20' - 2'
End day 6:30 pm

6-5-77

7 AM START

STATIC WL 7'4" below top of
casig

casg 3' sticking above fill
surface

well depth 40.85' from top of
casig ∴ 37.85' depth from
fill surface

pumps clear grayish water at
30 gpm

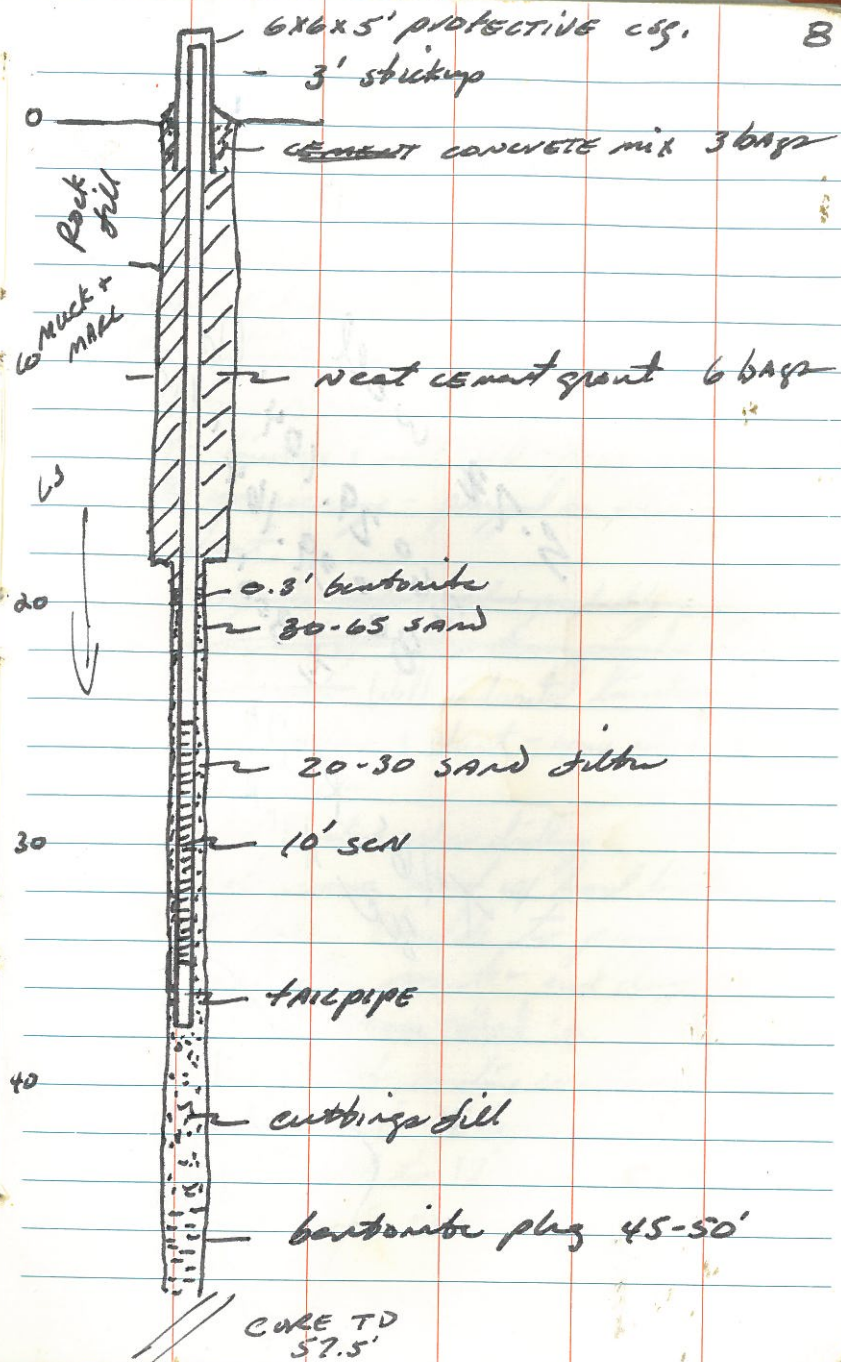
17528
Kings Ranch

17540
Campbell Rd.

17543
NASA

17552
S-72

17550
17524
Hill Bend



17528
Kings Ranch

17540
Campbell Rch.
17543
N.A.S.A.

17552
17522
S-72

17558
17524
Mile Bend

W 17522

South of
Keelanta Road

S-7Z well
Elev ~ 19'
26° 29' 104" (6")
80° 39' 164" (10")
± 300'

T465, R 37E
sec 41RR

26° 29' 03"
80° 39' 11"
plotted on xyl

W-17522

6-16-97

S-7Z

Lat N26 29.103
Lon W80 39.186 ± 300'

Begin 7 AM DJ & JBS - Reached Palm
Beach Co. @ ~ 4:30 - located new site -
end day @ 6:30.

6-17-97 - Met Carol @ 9:00 AM for site
placement & began drilling. Wireline to 9.5'

0-4.5 - limestone & organic mud fill -
poor recovery.

4.5-7.0 - limestone & mud fill - poor recovery.

7.0-9.0 - no recovery - plugged on piece of
chert.

9.0-10 - ~~organic rich mud probably core~~
~~recovered w/ hollow stem sampler - bit~~
~~hard rock.~~ Well indurated limestone.

10-11.5 - hard limestone & chert - some polier chips.

11.5-14.5 - as above

14.5-15.5 - solid limestone - slow drilling

15.5-17 - calcareous mud w/ hard limestone
at base. Unable to progress
past this point - end day
@ 6:50, storm rolled in.

6-18-97 - Bit off of wireline core barrel.
Abandoned hole - 30' logs cement -
formation fill to 12' - rest cement
to top. Begin new hole @ 12:00 Noon.

17528
King Ranch

17540
Campbell Rd.

17543
NASA

17552
S-7Z

17558
White Bend

S-77

10

- 17.0-19.5 - limestone - alternating hard & rubbly sections.
- 19.5-22 - poor recovery in shell bed (19.5-21.5) 21.5-22 hard limestone.
- 22-24 - carbonate mud w/ limestone fragments.
- 24-25.5 - weathered, fossiliferous limestone - rubbly.
- 25.5-27 - poor recovery - carbonate mud w/ some small limestone fragments.
- 27-30.5 - very fossiliferous, weathered limestone - possibly dolomitic, Gray-dark gray.
- 30.5-32 - No recovery
- 32.5-34 - No recovery
- 34-38 - "
- 38-41 - poor recovery - dark gray shelly dolomitic limestone.
- 41-43 - fossiliferous (possibly phosphatic) dolomitic limestone.
- 43-44 - fossiliferous, possibly dolomitic limestone.
- 44-46 - poor recovery - as above.
- 46-48 - No recovery TD.
- Pulled ~~the section to 43.5'~~ 2 w/ rods & have formation fill to 43.5' - begin pouring bentonite - bentonite to 40.5'.
- End day @ 8:00.

17528
Kins Ranch

17540
Campbell Rd.

17343
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17552
E.H. Miller

17538
6 Mile Bend
17524

6-19-97

11

Begin @ 7 AM. ~~Begin~~ Cuttings from 40.5-35'
Set casing - bottom casing @ 35' - no
tailpipe - 10' screen (34.5-24.5'). Coarse
sand from 35-24', fine sand from
24-22.5'. Pull auger & get formation fill
to 7' b/s. Bentonite to 5.5' (One bag). 2
bags cement to 2' b/s. End day @ 7 PM.
Static water level @ 14' b/s.

NOTES to DENNIS +
JENNIFER

in situation like this
want cement ^{bentonite} into good rock
unless 5.5-7' is a confiner



17528
KING Ranch

17540
Campbell Rd.

17543
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17552
E.H. MILLER

17558
17524
6 Mile Bend

6-24-97

KE + SM. - 7AM start, head
to Clewiston - pu rig & went
Carol re site loc.

Alternator on 2943 out - drains
battery - Mtr. part was suppose
to have fixed it.

- repl. Alt. change battery
in Tampa - 4 hr down time.
- to ROYAL PALM - too late
to pu rig in Clewiston
end day 8:00 pm

6-25-97 7AM start - meet
Carol visit site then to
Clewiston, pu rig, go
up etc
arrive site ~ 9:30 AM

W#

Six Mile Bend (34")
LAT 26° 38.563' (34") p.d.p.
LON 80° 34.802' (48") 3.5
S T R

Elev ~ 15' site appear to be
1-2' above natural grade

W 17524

T445 R38E
SEC 186C

- 0-3' rubble + marl - fill
 3-4.5' rock - fill
 4.5-6.25' muck
 6.25-7.5' bn gy ls w muck
 seam + fill
 7.5-9.5' - hd + soft ls - poor
 recovery
 9.5-12.5' calcarenite
 12.5-14.5' ~ 1' recovered, rubbly
 some shell
 14.5-17' hard bn ls. some FW
 some marine
 drill in 14 1/4' HSA
 12.0-18' hd + then shelly
 then bn foss. ls. only 50%
 recovery.
 19-22.5' rubbly ls w soft zone
 - ~ 50% recovery.
 22.5-25.5' - soft - no recovery.
 25-28.5' small amt of ls at
 top then VF sd (qtz + carb.
 - no recovery ~ 26-28.5'
 28.5' - 30' sd + shell - pyrocl
 etc - lost in wt vad.

Kings Ranch

17528

Campbell Rch.

17540

NASA

17543

E.H. Miller

17552

Akey Joe

17558

30-32.5' SAND micrite & shell - piped spc
32.5-34.0' AS above
- hit rock at last 9" (33.25')
piped spc - segregated
bottom 9"

- pu. Auger ~ 8" - pour
bentonite to btm of HSA for
SEAL formation

to 5-72 well site -
INSTALL protective csg
retw mobil 10:00 pm

6-26-97

7:15 start - home depot
run - then to site

34-37.25' bn ls at top
btm 2' + softer - sand,
shell + micrite - cohesive
37.25' - 39.5' - EXT shoe - ~~no~~ pour
spc. piped cuttings
39.5 - 42' fine sd + carbonate w
shell - cohesive

~ 8" —
remainder is
cuttings

17528
Kins Ranch

17540
Campbell Rd.

17543
NASA

17552
E.H. Miller

17558
Akey Joe

~~Fast orange~~
~~myrat's acid~~
~~portland cement~~
~~concrete mix~~
~~throw away tools~~
~~slide film~~
~~2" PVC cap~~

2 concrete mix
 40 20-30 SAND
 2 30-65 SAND
 5 portland cement
 fill 0-3.6
 Muck 3.5-6.3
 ls- 6.3-14.5 tight confian
 < 14.5-25.8 ls. porous
 < 25.8-33.25 sd, shell +
 fine carbonate + ls. uncon
 solidated
 33.5-43.5 bn ls.
 38-42 f. sd + carbonate
 cohesive tight
 42-TD ls.

15
 42-44.5' gray rubble, shells ls
 44.5-46.75' on shore
 46.75-49.5' hard, dkgy mollusc rich ls
 49.5-52.5' TD dkgy shelly ls - poor rec.

back fill hole with cuttings to 41'
 back fill with bentonite to 37'

SET 25' CSG
 10' SCV
 3' TP

- tremmied in filter sand -
- pups < 39pm - v muddy -
- "screened area in holding pen
- more mud than I expected
- from sampler.

pulled well up 10' - SCREEN
 at 15-25' -

initially pups ~ 39pm

filter sand to 12'
 30-65 SAND to 11'
 then NATURAL fill to 9.5'
 bentonite 9.5-4.5'
 Allow bentonite to
 hydrate over nite

END day 8:00 PM

17528
 Kings Ranch

17540
 Campbell Rch.

17543
 NASA

17552
 E.H. Miller

17558
 Akey Joe

Clemson Inn
Executive Royal Inn
West Express Inn
Roland Martin's Motel

NTR PODZ

Elec sys check
rot + bal tires
ck sup. etc - wandering
on road

well depth 31.0 from
top of casing
3.0' stickup

Well depth - land surface 28'
SCREEN 15-25'
STATIC WL 5.9' below LSO
(8.9' from top of cas)

pumped + surged at
~ 5.5 gpm - well
clear up 9N-bw filtered
water

17528
Kins Ranch

17340
Campbell Rch.

17343
NASA

17552
E.H. Miller

17558
Mey Joe

1-8-97

W 17528

"King Ranch"

~~the S. of Okla.~~

KC, DT 7AM start

T455, R 36E sec 14 cdb

SITE appear to be ~ 3'
above NAT. grd surface

0-6' is fill rock

6-7.5 soft. peat + marl

hard surface at 7.5'

7.5-9' - rubble + soft - no recovery
- impure spt

9-11 gray marl

~~11-11.25 marl soft - lost~~

~~11.25~~

11-11.25 hd ls

11.25-12.7 soft thin hd ls

12.7-14.9 hd ls thin soft

14.9-17.4' soft

17.4-19.75' gray shelly more calc for
last 6-8" - bn + lt tan ls. hard

19.75-~23.5' lt tan hd to soft

calcite + shelly ls.

23.55-24.75' lt gy to dk gy hd, shelly
ls/ss. - dist. litho break at top of
thin unit.

12.5
4.7
17.2

End day 7-8 at 9:00 pm

18

7-9-97 7AM start

Drill in 12.5 hrs as csq.

24.75-27' grey + bn shelly rock

27-32 mottled bn + grey rock - some
few pebbles etc. - 2 runs both
w/ v poor recovery - soft material
washing out.

32-34.2 coral then grey calcareous
~50% matrix.

34.2-36.5' red grey shelly ls.

~~last 4" less porous than above~~

36.5-39.2' hard grey + bn ls
then rubbly grey ls.

39.2-44.2' rubbly ls as above 1st
fossil then with soft + red-

- dk grey clayey, shelly sand.

purged spec

44.2-46.7' sand, dk grey clay matrix
shelly - bailed sample

46.7-49.5' - upper part as above -
lowermost lower part w/ rock
strigera - spec plugged on rock

COARSE LAG

17570
N of Snakehead
Lake

17540
Campbell Rd.

17543
NASA

17552
E.H. Miller

17558
Akey Joe

Note: make jetting nozzle
from ~~1 1/4~~ coupling.

Rinker Mat.

561-996-5249

SR 715 + Ferry Belle Glade

Seminole Supply Co. (561) 996-2041

407 S MAIN Belle Glade

Glades Wholesale Co.

1417 SW Ave A Belle Glade

561-996-2169

Drill Research Engineering

983-9983

Atlantic Drilling Supl. 561-533-3912

E to 95 - S - 2 exits

10th Ave N, go W to

Bairdwell Rd - go L go L on

7th Ave N, 1st RT - White

Bldg -

19
49.5-52' dk gray hd ss int w

soft zone - washed out. -

poor recovery

52-54.5' AS ABOVE

54.5'

END day 900 pm

7-10-97 START 700A - to site

pull 20' NQ - make run to

Atlantic Drilling Sup. per bentonite

60-30 SAND well csg + prob csg.

to Home depot per problem cement.

- pull place fill sand to 41' mostly

NATURAL fill. - place bentonite to 38'

pump + drill to wash out cuttings

- getting ~2' cuttings in btm

when pull first rod.

- install ~35' well casing.

10' SEN - no tailpipe done

17370
NOT SMOKEHOUSE
LAKE

17340
Campbell Rd.

17343
NASA

17352
E.H. MILLER

17350
KEY JOE

make jetting tool
w/ pm repair for rig

20
to screen placement constraints -
black silt below bentonite -
caliche above ~ 25'
washed in filter sand to
12 1/2' - hole would stay open
to place bentonite.
dredge back in - use from
on terrace - place 4 bags
portland cement 0-12.5'
set protective log
end day 8:15 pm
thunderstorm hold up work ~ 1.5 hr

7-11-97

6" tail pipe
Well depth (top of csq) 36' 2.5"
SWC (top of csq) 8' 2"
CSQ stickup 3.0'
well yield 139 pm
26° 34.438' (26") p.d. 2.8
80° 42.617' (37") ± 300'

~~0-23.25' CSQ~~
~~23.25-33.25' SCREEN~~

0 - 22.75 CSQ
22.75 - 32.75' SCREEN
32.75 - 33.25 tail pipe

17370
N of Snodgrass
LAKE

17340
Campbell Rd.

17343
NASA

17372
17352
E.H. Miller

17358
Akey Joe

Jim 941-763-1901
S. home

W-17540

Podson
(912) 762-7267

Cell Phone # 561-595-7722

21

Campbell Ranch

✓ Jim Fowler 561-464-5977

- plan's to drill next week July 21
- is stake still up?
- any utilities present?
- ok for crew to camp on site?

Elev
74'

T30SR 34E 631aad

DJ, JB, FR 7-21-97 Campbell Ranch

8: AM Start - pick-up rig @ 4:30
(Kissimmee St. PK) - Jim Fowler unable to
meet us - end day @ 6 PM.

7-22-97

Begin day @ 7 AM.

Met Jim Fowler @ site.

0-5' - push core - silty sand - clayey
from 4-5'.

No recovery 5-6'.

6-7.5 split spoon sample - organic rich
sand.

7.5-8.5' silty, clayey sand. ^{poor} recovery
from 8.5'-9.5' - clayey sand.

9.5-11.5 - clayey sand, light brown. Organic
rich near base of interval.

17370
N of Snodgrass
Lake
17340
Campbell Rch.
17343
NASA
17326
E.H. Miller
17352
Akey Joe
17358

- 11.5-13.5 - organic rich clayey sand.
 13.5-15.2 - clayey sand.
 15.2-15.5 - clean sand. Pulled 2' of sand into pipe - pumped out to 2' past bottom.
 15.5-17.5 - No sample.
 17.5-20.5 - Pumped - clean ^{fine-med.} sand - no fines visible in pumped water.
 20.5-24 - pumped sample - clean ^{fine-med.} sand. Few fines & very small clay blebs (light brown) present.
 24-28.5 - Pumped - clean sand.
 28.5-30.5 - Pumped - some fines - medium sand.
 30.5-34.5 - as above w/ slightly more fines. small clay blebs present. Pumped.
 34.5-36.5 - Pumped - water is dark gray-green - more heavies & fines in sample. Medium sand.
 36.5-37.5 - as above.
 37.5-39.5 - as above
 39.5-45.0 - more fines present. Gray-green clayey in water. Pumped sample. Fine-Medium sand.
 45-50.5 - dark gray-green ^{in water} fines - coarser sand. Pumped
 50.5-53.75 - Pumped - clayey (dk. green) shelly sand. Formation contact?
 53.75-56 - Ran sampler in - shelly - clayey sand. unable to get sampler in 2nd time.

17570
N of Smokehouse
Lake17573
N of Smokehouse
Lake17543
NASA17576
17552
E.H. Miller17558
Key 106

56-57.25 - Pumped, ~~strat~~ Sandy shell bed - most^{23'}
fines lost. TD here.

Pulled augers & hole closed to 4' bls. End
day at 6:30 PM.

7-23-97

Begin @ 7 AM - start running big
augers in. Go ~~33~~ 33' & place (install)
well in pipe. Casing pulled up 2'
w/ augers - Total well depth at 30.5'
bls. Screen from 27.5 - 17.5 bls.
2.75' stickup. 5 bags cement
used for neat grout. End day
@ 6:00 PM.

7-24-97

Begin @ 7 AM

develop & install protective casing.

Lat: 27° 49.763 N

Lon: 80° 57.565 W (+1000 ft)

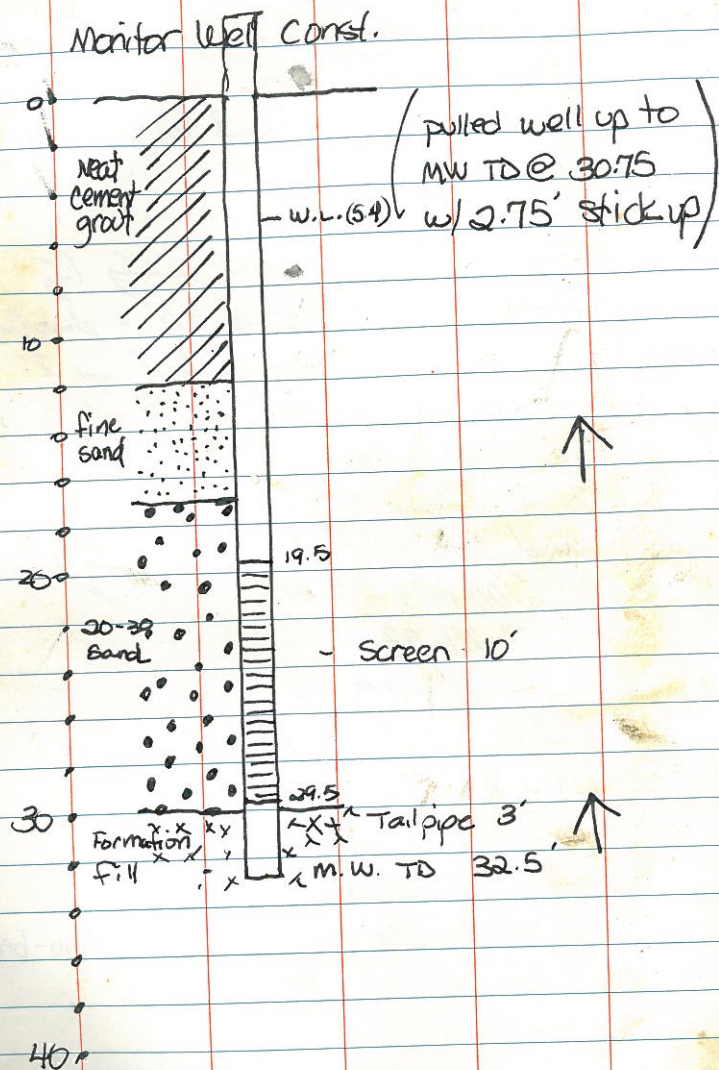
GPM - 30 (water qual. cloudy yellow-brn.)

17570
N of Smokehouse
Lake

17573
17343
NASA

17576
17552
E.H. Miller

17558
Akey Joe



Well constr. - 10 bags 20-30
3 bags fine (play)
5 bags grout
+1 for pad.

17543

24

NASA - MIGOR Shiloh. Rd

T 19S, R35E sec

8-4-97 KC, SM, FRR 7AM

start - Meet DEAN VO (NASA)

go to site, arrange for
pumper etc. then to OAK hill
VEB for water.

set up rig -

0-2.5' push spr

2.5-5.0 push spr

5.0-6.5' ssp - push spr

end day 5:00 pm - T.S.

8-5-97 KC 7AM start

FR, SM 8:00 AM start

6.5-8.5' mbl w.z. spr - sand

8.5-11' - y.l. sd

11-12.5' ssp. - w.t. at

~ mid pt. this run n l' covered

12.5-15' - shelly sd, lt grey

suby sd

15-16.5'

CAT Lon
 p.d. 2.5
 28° 49.210 (13")
 80° 50.216 (13")

16.5 - 18' ssp - gray sd.

sl. clay, shelly

18.20 purged spr tan shell

20 - 21.75' purged tan shell

as above

21.75 - 24.5' - f sd, ol. gr silt/
clay matrix, shelly. micaceous

25 - 26 1/2' as above

26.5 - 29' as above to / cut
ford then soft rot + fd.

upper part shelly, then
pur. int. ol. gr clay
w. shell (lowest) / f.d.

29 - 31' ol. gr clay

31 - 32.5' ssp ol. gr silty
shelly sd

32.5 - 34.0' SAME

34.0 - 36.5' SAME

36.5 - 38.5 ssp - SAME - somewhat
shellier

38.5 - shell pulling in freely
spr w/out lath

38.5 - 41' shell bed

41 - 43.5' purged
sl. clay shelly sd

43.5 - 46' as above - purged

46 - 49' gray f. sd, sl. shelly

17570
N of Smokehouse
Lake

17573
STANDARD SAND
DANMARK

17576
17552
E.H. MILLER

17558
KEY JOE

49-51.5' - ²⁶ prepared spec
 51.5-54' bl. gn clay, sandy shelly
 ~1' ea cohesive clay blocks
 51.5-54' Med. dlt. wet - ol. gn clay
 lower shelly + sdy? w depth
 54-55.5 ssp. ol. gn clay
 55.5-~~58~~ 58.5 No sm (?)
 58 ~~58.5~~ 59-60.5' ol. gn clay tight
 60.5-63' ol. gn clay tight
 63-64.5 23 ssp ol. gn clay w
 shell
 64.25-66.75' - ol. gn clay
 shelly
 66.75'-68.5 - A. gn shelly
 clay
 68.5-70' ssp - SAME
 70-72.5' Lt bl. gn clay - shelly
 END DAY 7:00 pm
 8-5 rig mileage 97213
 2943 end mileage 84657

SWL 15.975' bl top of clay
 - 3.0 striking
 12.75' blsd - hole gun (HSA's)
 to 72'

17570
 N of Smokehouse
 Lake
 17573
 The Bluff

17575
 STRAUBAD SAND
 DUNE-10002

17576
 17552
 E.H. MILLER

17558
 Key Joe

0-12.5 sd

12.5 - ~22 shell +
shelly sd

22 - fg silty shelly sd.

26.5 - clayey shell

29-31 clay

31 - 38.5" silty clayey
shelly sd

poss
int? ← 38.5 - 46 shelly sd - sl.
silty

cond. ↓ 46 → clay, silty sd +
shelly clay:
75+

KC Started 700

sync 1:30

PRR 8:00

27

72.5 - 73.75' - on drive

73.75 - 75.25' ssp 3 AM

75.25 - 76.75' AS above

TD 76.75'

pull hsa's - back fill w
cuttings to 32' LSD -
1 bag bentonite 29-32'
pull remaining 3/4 hsa's

drill in 6 5/8 hsa 26.5'

~ 2 hr t.s. delay

set well only

20' csg, 5' scN, 3' tp

~ 1.5' stuckup (~26.25' depth)

Ann. collapse to ~17'

Bentonite ~17-14'

end day 8:45 PM

Rig end mileage 87302

2943 end mileage 84771

17570
N of Smokehouse
Lake
17573
17575
STANDARD SAND
DAVENPORT
E.H. MILLER
17576
17552
17558
KEY JOE

~~type material~~
~~1/4" cable~~

~~brush~~

~~wire brush~~

~~3/8" poly rope~~

GEL bore hole

0 ~ 100' sd, sill + skull
1st rock layer at ~ 100'
htn 120 ± 15, phosphorus
~ 128 top of ls

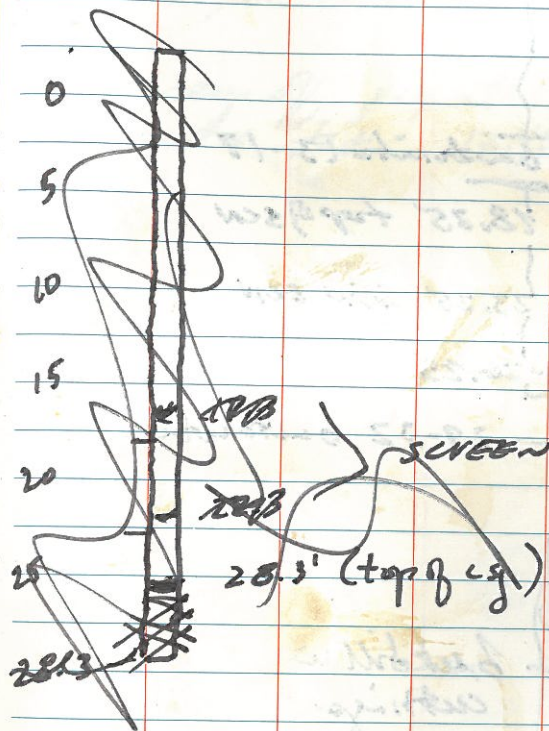
~~25 14~~

~~4" PVC comp. coupling~~

28

well depth 27.4 (top of csq)
+ 14' suc

well depth 28.3' (top of csq)
STATIC WL 15.3'



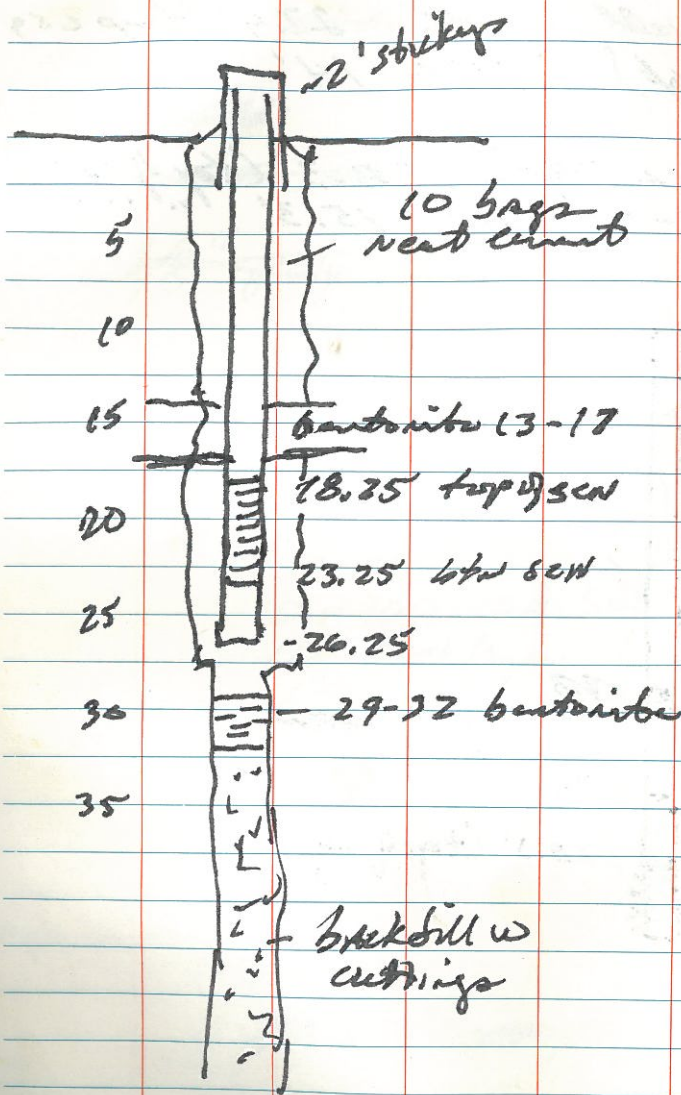
17570
N of Smokehouse
Lake

17573
the Bluff

17575
STANDARD SAND
DUMMERT

17576
17552
E.H. MILLER

17558
Akey Joe



covered
~~72.5~~ 26.75'

Wailer -

MAIN RAILS $3 \times 5 \times \frac{1}{4}$ L

side rails $2 \times 2 \times \frac{1}{4}$ L

tailgate slot $2 \times 3 \times \frac{1}{4}$ L

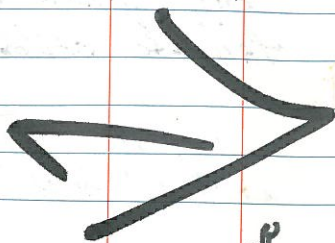
80" inside to inside on rails

tailgate bottom $1\frac{1}{2} \times 3 \times \frac{1}{4}$ channel

Drop off rig to STRWMD
 with FM 12:45 $\pm$ AM 8-8

Lat/Lon - Battery low?

29 37. 90° 1' N. > check.
81 41. 468 W.



TDS, R 26E, 4E 1500
29037' 54" 41' 28"
81°

E.H. Miller School

30

8-11 Tam Start W-17552

meet Gody Lee @ 11:30am

J.B.S., Bill Warts, Craig

Start setting up @ site ~ 12pm

push core first 5' - organic sand

5-7.5 easy push, organic sand

7.5-9 hard, slow push - hard sand

9-10.5 hard, slow push - " " S.sp.

10.5-12 hard, med push good recov.

12-14.5 medium push - sand

14.5-17 " " sand good recov.

17-18.5 split sp., medium push, good recov.

↑ all of above - brown color

18.5-21 easy drilling - sampler sand

locks, get free

21-23.5 same as above. - fine sand

23.5-25.5 decide to pump - fine sand

25.5-27 sp sp. easy run + return

27-28.5 push 1.5' easy run - sand

28.5-31 easy run - sand - fine

31-33.5 easy, getting silty, fine

↑ good recovery

33.5-36 silty - good recovery

36-37.25 sp. sp - sand locked
try pumping water down, while
pulling up on hoist. Hoist eventually
breaks retrieval assembly, cable
clip. Trip out and get locking
assembly + bit piece apart.
END DAY @ 8:45pm

8-12 7am start
Trip back in to 37',
sample by pumping

37-39 no sample. (washed out)
39-46 pumped sample mostly fine
sand w/ clay blebs.

TD

Trip out - prepare to
drill in w/ big augers to set
casing.

interval from 25-32 looks
cleanest for screen.

17570
N of Smokehouse
Lake

17573
17575
STANDARD SAND
DUNEDON

17576
TRAPPED SAND
Voshua

17558
Shakey Joe

Well materials used:

1 6" end cap

1 2 1/2' tail pipe

1 5' screen

2 10' casing

1 5' casing

33' assembly w/ 1.5' stick
up. (will add extension piece.)

- pulled augers while adding 1 bag of sand + water (3' of sand) per flite sand to 18', no fine sand, so add extra bag of coarse. - sand to 16' total 6 bags sand

- Add 1/2 bag bentonite seal starting @ 16'.

Get bentonite plug @ 12' (into augers)
push out w/ steel 1 1/4" pipes - works ok

- Grout thru augers from 12' to 2' below ground. 4 bags
Clean up / lock up.

END DAY @ 7:50pm

17570
N of Smokehouse
Lake17573
the Bluff17575
STANDARD SAND
DAVENPORT17576
TRAPPAED SAND
VOSHUA17558
Shakey Joe

- need more grease for slide
- fine sand

GPM - 25

33

8/13 7am Start

check grout depth
 TD - get Lat/Lon
 Water level

water level 4.7' from top of casing

stick up 3.3'

MW TD 34.7' from top of casing

Return to TLH @ 5:30pm

17570
N of Snakehouse
Lake

17573
The Bluffs

17575
Strained Sand
Davenport

17576
Strained sand
Voshua

17558
Shaley loc

9-2-97

KC, VBS + CB to
Washington Co. 7 AM start
W# 17558

Shakey Joe Branch

LAT 30° 37. ~~065~~ 084 + 300'LON 85° 49. ~~552~~ 566 Pkwp 2.5

S34Cdd T 3N R 16W

Elev 30'

0-2.5' push. - lt gy + lg yl sd

2.5-5.0 as above to 4.0'

4.0-5' yl. or sl. clay sd

5.0-6.5 ssp. top half or
above lower lt. gy clay sd6.5-9.0' lt. gy clay - orange +
bn mottling at top.

9.0-11.5' gy + bn clayey sand.

11.5-13' ssp. gy bn sd +
clayey sand13-15.5 lt. yl. bn clayey sand w
gr2 plus15.5-17 lt. yl. bn clay + sdy clay
sd/sb

17-18.5' As above

18.4
5.5
12.9

17570
N of Smokehouse
Lake17573
The Bluff17575
STANDARD SAND
DUNROD17576
STANDARD SAND
Joshua17558
Shakey Joe

18.5-20 clayey sd w/ ls
fragments. ls at btm.

20-21.8' clayey sand/sdy clay
top - orange sd + ls frak;
greenish block clay

21.8-23.8' qv bn clay +
ls at btm.

End day 6:30 pm

9-3-97 Static H₂O level 8' 4" from ground
KCJB:HM surface.

Start 7:00 am

RE Assb. Mhz drill sampling sys

23.8-25' ltyl. gy & cream ls
- soft crumbly. also collected
coarse purpl. spec

25-26.5' ssp. Attapulgite - ~ 4"
recovered

26.5-29' ls as above 1st 1 ft
remainder soft. - no retro when

~~29~~ - tried to pump spec for hsa
(29-30 - soft. 1st 4" then powder
- poor recovery - 29.4-30" failed
sample

30-32.5' (30-30.5) 2 runs - no pull spec
nose in white soft ls. calcite
matrix

no retro when
pumping

17570
N of Smokehouse
LATE
ONE BLUFF

17575
THUNDER SAND
DAVENPORT
VOSHUA

17576
THUNDER SAND
17633
ICE BUDD WMA

drilled down to, 33.75' w/o splr 36
32.5 - ~~at 33.75~~ pumped sand from
h.s.a. ls, qtz pbl., rounded ls
pbls, grey clay blebs
- collected coarse pumped spec
32.5'

33.75 - 36.5' drilled & spec pumped -
ls, clay blebs, qtz pbls & grey calcilitic
36.5 - 39' - v. lg gy ls. - soft,
calcilitic

39 - 40.25' As above

40.25 - 40.5' as above - more splr
nose in

40.5 - 41.0' - pumped spec

41 - 44.5' - as above - no spec
in 42.5 - 44.5'

44.5 - 46' ls, gy, calcilitic
as above

46 - 48.5' clean from ls, w

qtz pbls w calcilitic matrix

48.5 - 51' pumped spec

51 - 53.5' as above

and drilling - out of water

retre T&H 6:15 pm

17510
N of Smokehouse
Lake
17513
the Bluff

17575
truncated sand
Davenport

17576
truncated sand
Joshua

17633
be Budd wash

0-5 sd
5-11.5 clay
11.5-23 - silty clay/clay
sd
top of rock 23'

30-40' - possible - appears
to be connected to cavity
in " 25-28' range.

other option 2" well -
60' + in 1st coherent ls.

9-4-77 KC, CB, SM,
7AM START - per part. log
Cmt + SAND at ENR Nfg.
Full WATER BANK at venon

STATIC WL 8' b/wd
hole to 53.5'
3' sd in hsa

CLEANOUT HSA. run spl
53.5-55.25 - ls as above - poor rec -
~~55.25~~ 57.75 purged most of spl
55.25-57.75 ls as above
57.75-60.25' ls as above - hard
layer at v bottom
60.25-60.5 ls. soft crumbly -
stops penetration - pull spec
nose in
60.5-62.5' ls. rubbly - no
recovery - purged spl - collected
only large fragments
62.5-65.5 - ls. - poor recovery
purged spec
65.5' TD

pulled 3 1/4 hsa's, drill in
43.5' 6 5/8 hsa w plastic
plug

17570 N of Smokehouse
LAKE
17573 NE Bluff
17575 TRAPPED SAND
DAVENPORT
17576 TRAPPED SAND
VOSHUA
17633 NE Budd WMA

9-8-97
KC, VBS, CB 700 start

to interpose head submer,
to chase per trailer

INSTALL 423' ASSY

30' CS

10' SCN

3' TP

TREMIE 12 bags 20-30 SAND

to 24.5' BLSD

start development - pump + surge
at ~ 12 9pm 1.5 hr.

TREMIE 1 bag 30-65 SAND

24.5-23' BLSD

2 bags bentonite 23-~~24~~ 20'
BLSD

pump 5 bags portland cement
END DAY ~ 7:30 pm

9-9 VBS, CB - return to
develop + complete grouting
- pump 8 bags portland

17570
N of Smokehouse
LAKE

17573
the bluff

17575
TRUMPED SAND
DAVENPORT

17576
TRUMPED SAND
YOSHUA

17633
DE BUDS WASH

9-11. KL, CB, return to
SHAKY Joe BRANCH

- grout settled to - 2'
surged + purged well,

purged 5 bags portland
to complete grouting & make
surface pad. - mix $\frac{1}{3}$
bag portland + 2 bags sand
into surface pad, set
protective casing

- static WL ~ 8.5' GUSD
- well yield 10 gpm
- well TD 45' 9" top of casing
- stickup height 2.05' above
pad level
- completion date 9-11-97
move rig to next site -
North of Smokehouse Lake
Wilton Co

17570
N of Smokehouse
Lake

17573
the Bluff

17575
THUNDER SAND
DAVENPORT

17576
THUNDER SAND
VOSHUA

17633
10 E Budd WMA

W 17570

40

N of Smokehouse Lake

T 2S, R 18W, sec 11cc b
LAT 30° 25.298 (18s) + - 300'
Lon 86° 00.956 (51s) pdap 3.0
Elev 20'

0-2.5' push

2.5-4' ssp. push

4-4.75' push

4.75-6.5' wL spt - no recovery

6.5-8' ssp. sd - poor recovery

8-9 1/4' yL or SL. clay sd

9 1/4-11' orange sand grading to
1 ft orange sand

End day -

Jennifer - 14.5' pipe in
ground - ~ 2' sediment needs
to be pumped out
split spoon sample due

17570
N of Smokehouse
Lake

17573
the Bluff

17575
THUNDER SAND
PAVED ROAD

17576
THUNDER SAND
Joshua

17633
of Bluff with

9/12.

41

7am start JBS + HM.

arrive at site ~ 10AM

Last sample to 11', 3' sand
in bottom. Pump sample clean.
Run in split spoon from 11-12.5'
no sample.

pump sample - fine sand.
Run in regular sampler 12.5-14'
no sample, drill 1.5' more.

pump sample - red fine sand
3' up inside augers. settling
back in fast.

15.5-17.5 (decide to drill without
trying sampler.) pumped - red fine
sand, orange colored water.
sand settling in fast.

17.5-20 - pumped sample

20 - 22.5 ran sampler - sand locked
lost sample.

22.5-23.5 pumped sample.

interval is (20-23.5)

increased clay content
in sand. More red in color
sand is coarse.

1634
GARCIA Point

17573
Pue Bluff

17575
THUNDER SAND
DUNEPORT

17576
THUNDER SAND
Voshua

17633
of Budd WMA

23.5 - 26 pumped sample mostly large grain sand w/ clay blebs - white - gray colored clay.

26 - 28 pumped sample. Sand is fine, light gray. Easy drilling

28 - 31 pumped sample - Coarser sand, light gray - heavy mins? sand still settling in. will wait for consolidated zone to try sampler again.

31 - 34 same as above, rubble

34 - 36.5 pumped sample. Blew out 2.5 ft. passed bottom. Hit Gray clayey zone. Very coarse quartz pebbles, gray clay blebs. easy drilling. sample to 39.

36.5 - ~~40~~ 41 (actually 2' run) Clay. Clay squeezed up 2' into flights. Tried to pump out. Have to pull flights.

Run back in w/ pilot bit in place (4:00pm)

Back Down to 41' pilot bit sand locked.

17634

GARCON Point

17573

Pine Bluff

17575

TRAUNED Sand

DUEWIDET

17576

TRAUNED Sand

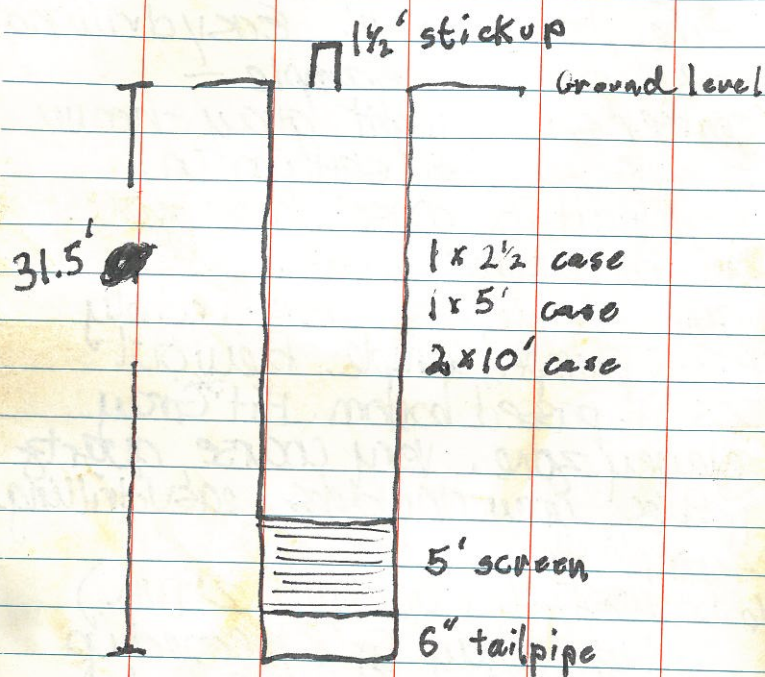
Voshua

17633

DE Budd with

11/11/11
11

545-8073



4:45 pm. ran out of water.
cable broke at retrieval top.
End of Day.

9-17-97 Leave Tally @ 7:00 am.
GB & HM Arrive on sight at 10:00 am
Static H₂O level ~ 4 ft b/s.

Drilled big auger flights
to 34'. 6" tailpipe & 5'
screen. 27 1/2' casing.

Tried to pump hole clean
3 times - stuff settled to
bottom ~ 4' ± of stuff in
auger flights. Set casing.
Formation collapsed to ~ 4' b/s.
1/4 bag bentonite - 2 bags of
portland. End day 7:00 pm.

9-18-97 Arrive on sight ~ 7:45.
Static H₂O level ~ 4 ft b/s.
Pumps 25 gpm. Mix one
& 1/2 bags cement w 2 bags
of sand & set protective
casing. Develop well until
1:00 pm. Clean up & leave
site at

43

17634
GACON Point
Pine Bluff
17573

17575
THUNDER SAND
DUNBAR

17576
THUNDER SAND
Voshua

17633
of Budd WMA

44
To Do At North of Smokehouse
Lake site

ck S.W.C.

EXACT stickups

EXACT well depth

drill locking tabs on arot. cog

pump + surge well

lock w district ~~key~~ lock

17684
GARCON Point

17573
Pine Bluff

17575
STANDARD SAND
DAVENPORT

17576
STANDARD SAND
Joshua

17633
De Budd WMA

W-17573

Location -
T1n R 27w S 29 cc

Lat 30° 33.79' 47"

Lon 86° 58.88' 53"

Elev ~ 4'

W-17573

Pine Bluff

9-23-97 Tam start.

J.B.S., C.B. 1:30pm arrival
(Fill up water tanks @ Bagdad.)

- 0-2.5 Push core. good recov. coarse sand, some clay.?
- 2.5-5 push core. good recov. coarse sand, more clay.?
- 5-6.5 Core sample. Plugged on large root. Not much recov.
- 6.5-8 split sp. sample fell out bottom. (light push. 500 lbs psi) Hit water
- 8-10.5 Core. good recov. Hard push - 1000 lbs. coarse sand.
- 10.5-13 core. okay recov. sample is soupy, fell part way out. gray, ~~stuffy~~ sand. w/ some clay
- 13-15.5 core. good recov. coarse gray sand w/ some clay.
- 15.5-18 core. ~ (good recov, same).
- 18-20 Split sp. No recovery. sample in pipe. (off 6") pump sample. Gray, coarse sand.

End Day @ 6pm

17634
GARCON Point

17573
Pine Bluff

17575
STANDARD SAND
DAVENPORT

17576
STANDARD SAND
VOSHUA

17633
DE BOLD WMA

9-24-97

7:30 am start, J.B.S., C.B.

*note - Craig injured right, second toe this morning. Thinks it is poss. broken?

@ 20'. 2.5 ft sand in pipe. Pump. will pump next few runs.

20-21.5 pumped sample. finer grained sand. gray color. Organic (wood pieces) at end of interval.

21.5-23.5 pumped sample. much more coarse: quartz pebbles. Some clay blobs.

23.5-25.5 pumped sample. Unclear as to what lithology is; big wood chip or root stopped up pipe for several minutes.

25.5-28 pumped sample. coarse sand, quartz pebbles, some clay. gray blebs + white blebs.

28-29.5 same. pumped
SAMPLER IN!

29.5-31.5 core. bad recov.

not
work

46

17634
GARCON Point
17642
Bendwell Bay
17575
STANDARD Sand
DAVENPORT
17576
THUNDER sand
Joshua
17633
be Budd WMA

31.5-33 pumped sample. retrieved more wood chips. (Probably has been wedged in bit for 7 feet!)
 got more sample out after wood plug; coarse gray sand, quartz pebbles, phosphate pebbles?
 Pumped out 1.5', passed bottom.

33-36 pumped sample. Still have wood piece in bottom of bit. Sample same as above. Sampler won't go in.

36-38 pumped sample. Hit clay @ ~37'. gray plastic clay. Can not pump Augers clean - TD

Pull flights. hole closed to ~7'.
 Drill in w/ big Augers to set casing.

Looks like 21-26 screen
 or 22-27'

Had same problem w/ wedge of wood in bit. (Broke plug in half!)

Casing at ~27' below L.S.
 5' of screen.

formation fill until ~~20~~¹⁹ ft.
 added 1 bag blasting sand

48
Formation fill to 7' Filled in
to 5' - cavity.
3 bags cement.

developed well for 2 hrs.
before grouting. Very clayey
~ 4 gpm.

End Day @ 8:00 pm.

9-25-97 J.B.S., C.B.
7am start

develop well + construct concrete pad

~~good~~ develop method - pump + surge.
Pumps ~ 4 gpm. Takes 5 min.
to recharge.

After pumping to the point of
draw down, reversed pumps and
pumped water down into formation.
(in order to clear out clay.) Well
is pumping out some fines - mica.

This will not be a good well!

17634
GARCON Point
17642
Bradwell Bay
17575
STANPAED Sand
DUNEPORT
17576
STANPAED Sand
Voshua
17633
de Budd with

2-11-98 - note to deep -

well maint ~ 3gpm at start
pump + surge + pulling some sand
static WL 1.4' b/s

pumped + surged at ~ 3.5gpm
for 2 1/2 hr

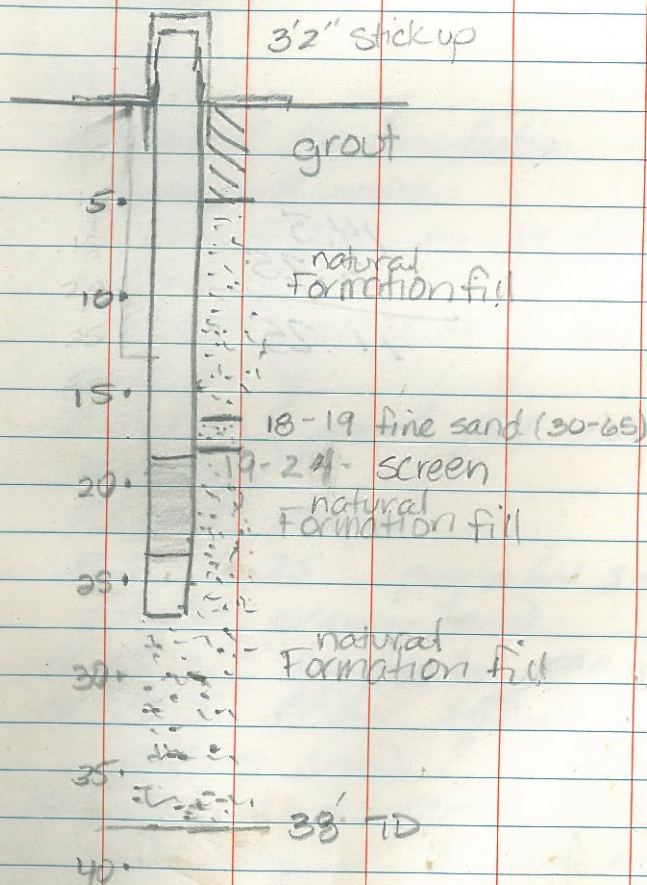
major prod made - still cloudy
end day 630 KC, JBS
600 CB

49

well maintains itself at 3gpm.
Any more than that, draw down
occurs.

Water is not clearing up at all.
developed for 4.5 hours.

Return to FGS warehouse @ 4:00pm



17634
GARCON Point
17642
Baldwell Bay
17575
STAMPED SAND
DANEBROOK
17576
STAMPED SAND
VOSHUA
17633
10E BULL WASH

4.25
2.90
1.35

14.5
3.25
11.25

10-6-97 KC + CB TAM started 50

turnpk to 27 then to
(N of Harrison City) Hwy 547
Sanderson Rd
to dayport to
17/92 W to std
sand

MARC hurst
941' 422' 117'
941' 295' 2917'

W 17575

Standard sand + silica
Dayport mine

T 26 S, R 27 E, sec 34 db
Elw 115'

28°10'50" 81°35'38" (plotted)

0-2.5
2.5-5.0 } push sps - sand
5.0-7.5

7.5-8.5' Norm

8.5-11.25' gy + bn sand.
stair clayey sand

11.25-14' bn + gy bn var clay sd
14-16.5' lt bn soft wet, sl
clayey sand.

16.5-19' As above

end day w 2' sand in h 500

END day ~ 7:15

17634
GARCON Point
17642
Bardwell Bay
17575
Standard sand
Dayport
17576
Standard sand
Joshua
17633
DE Beld with

10-7-97

7 AM start - sand water
pump out sand19-20' ~~mass~~ - thin watered silt20-21.5' lb to mod bn
sand w thin clayey layers
at base21.5-24' lb bn sand - clayey
than above

24-26.5' lt bn sl clay sd

26.5-28' lt bn sl clay sd - clayey
at base

28-30.5' - lt creamy bn clayey sd

30.5-33' lt creamy gray, clayey sd.

33-36 lt gy clayey sand. some
faint lamination

36-38.5 same

38.5-40.75' same

40.75-~~42.25~~ 43 or above43-~44.5 - sand then light
clay - sampler locked inpulled b/s as - spec still
locked - run extra bit in
wash into to base - over
run depth (lost combs)

NO SM

17634

GARCON Point

17642

Bradwell Bay

17648

right near #2

17576

STANDARD sand

17633

De Budd with

52.75 - 55.25 - white chyd⁵²
14 bn sand - pushed w drill head
55.25 - 57.25' TD - driven
w hammer - same as above
but firmer

hole filled to 19' - poured
1 bag quick grout - washed
grout & poured 1 bag
quick grout.
filled last 5' w cuttings

end day 745 pm

17634
GARCON POINT
17642
Bradwell Bay
17648
right near #2
17576
STANDARD SAND
Voshua
17633
DE Budd WMA

Indian River Canyon
422-2978

Kendall
941-324-4190

sample's sgs still
sand locked
drive's sampler
w/hammer

✓ James E Sanford welding
~ 2 mi W of Haver City
on 17/92 w
422-3680

End Day 10-8 - 700pm

10-8-97 W 17576

53

KE, CB, Kendall Fountain
Standard sand + silica
Joshua mine site

7 AM START

T 265, R 26E, sec 26 bac
elm 145'

28°11'30" 81°41'12" (plotted)

0-2.5 push - dk-lt gy sd

2.5-5.0 push lt gy sd then lt bn
5.0-7.0 vlt bn sand.

7-8.5 - poss caving - plugged on road

8.5-10.25 - cypress head top
stiff clayey sand

10.25-11.5 variegated stiff clayey sd

11.5-13.0 red oak + cypress stiff
clayey sand.

13.0-15.5 ; 15.5-17.25 ; 17.25-18.

red oak + cypress stiff clayey sd

18-20.5 20.5-23.0 lt bn + cypress
x bedded (?) clayey sd.

23-24.5 24.5-27 - vlt bn sand

cypress, v. little clay

27-29.5 white clayey sand,

29.5-30.75 No sm (washed part)

30.75-33.25 white clayey sand

All above driven - must do 18" blow

17634
GARCIA Point
17642
Bardwell Bay
17648
right flow #2
17576
Standard sand
of Budd WMA
17633

to do

Cable (hoist) weight
MALT shearer - pins, bracket

1
50 9
2 6

53.5

54

33.25 - 35.75 ; 35.75 - 38.25 - 38.25
~~40.75~~ 40.75 ; 43.25, 45.75
white clay sand

pushed sps

17634
Garcon Point

17642
Bendwell Bay

17648
right hand #2

17668
right hand #3

17633
Jot Budd WMA

~~17540~~

17540

17633

30° 29.020'
84° 31.239'

IN 3W SECT 15

Tom picks (KC 8-11-98)
0-19.25' BuddSC
19.25-42' Mica(?)
42'-TD Tork

JOE BUDD Site

SS

2-3-98 2:45 pm Start

KC, JBS, CD

push sps 0-5' lt. bn sd

push sps 5-7' lt. bn sd

2-4-98 SAME CREW - 7AM Start

7-9' WL sample ✓ lt. bn sd

9-11.5' WL spl - 1st soft sand on
down thru dk bn clayey/organic
SAND

11.5-13.25 SAME

13.25-14.25' ssp.

14.25-17.25' on shore - becoming
lighter

17.25-19.25' dark sd, lighter w depth

19.25-21.5' ssp. - to 21.5' bedded.

21.5-23.5' ssp.

23.5-25' CRS gray bn sand.

25-27' gy bn. sd. - becoming clayey

27-28.5 SAME

28.5-31' SAME - becoming lighter + clayey

31-32.5' ssp.

32.5-35' lt bn dy sd,

35-37.5 - white, lt. cream grs sd
still clayey

17634
SARCON Point

17642
Bradwell Bay

17648
right near #2

17668
right near #3

17633
Joe Budd WMA

Hilltop

needed for rig

- 2500-3000 lb liquid filled
ggs - rot pen - back
e int 3 1/4 pipe
- 0-100 lb ggs - outside
1/8 pipe back int.
- Auger o rings
- Rubber dipped gloves
- diff sizes?
longer?

37.5-40' NOSM ?

40-42' NOSM

42-42.5' bailed sample - lt d. gn sandy clay
soft plastic

42.5-45' lt d. gn sdy clay w orange
mottling

45-47 same

and dry ~ 445 - KC to lower
pr sand + to q.s.
KC END 600 pr

2-5-98 same crew, 7AM start

47 STATIC WLC 28.25' b.s.

48-48.5' ssp ol. gn plastic clay

48.5-50 d. gn clay - denser than
above

50-52' ol. gn clay

52-53.5' ol. gn chsd - li frg
in bottom of int.

53.5-55' - chsd + li frg.

55-56.5'

56.5-58' grey sdy clay w li frg.
+ minor shell

~~Cement~~
~~silica scales~~

58-58.5' ol. gy clay ls
58.5-66' TD 1" gy clayey ls + lime
cemented clay sd

-pulled 3 1/4 HSA's to 39' - most of
tube filled naturally. -pumped
bentonite grout 40-42'
pulled remaining HSA's

drilled in 38' HSA (6 5/8")
initiated 30' clay. 5' sand
5' tp.

washed in 10 bags filter
sand to 22.5 bcsd

End day 6:00 pm

2-6-98 KC CB - you cement
then to Joe Budd. 7AM START

static w/ outside well csg (in HSA)
11'9" bcs

bottom of hole at 22' bcs

start dorp. - pump + surge

- only pump ~ 1/3 - 1/2 gpm

place wash in 1 bag bentonite
chips to 20.5'

- ~~SEAL WATER TANK~~
- ~~press ground sheet~~
- mt pool — ck out rembk starter
- mt pool — ck out starter drive
- repl. pull cord on pump
- ~~pu protective casing~~

- weld 1 1/4" nipple to
hail AW coupling
pu gas at filling
~~silicone sealer~~
calibrated buckets

gas can
prob. csg

hardwone cloth

12.4
2.4
14.8

pump 1 bag quick grout (~13.5-20.5')

2-9-98 KC, CB 1 AM start
static WC 12.4' bL

top of bentonite grout at 13'
pump 8 bags probland cement
13' - 0'

2.5' above nat. grd level
2' 4" sticking up over top of
pad
well depth 40' 5" from
top of casing

17634

GARCON Point
SANTA ROSA Co

59

7-10-98 KC, VBS, CB - 7AM Start
ARRIVE ON SITE - get pu + trailer
struck - pull out w rig
get rig struck - send DBS to
Bagdad for WATER

SEL T 15 R 28W
LAT 30° 31.15 Lon 87° 04.67

0-5' pushed sampler - 1st foot
dk arg. rich sand. then gl. bn
& red & grey clayey sand
5-7' ssp - dk grey clay
7-8' dk grey clay
8-10' ssp - pushed - dk grey clay
10-12' soft dk grey clay - 15 or 55
Frags in bpm 4"
12-13.5' ssp dk grey plastic clay
13.5-15.5' soft dk grey clay
15.5-17.5' dk grey clay - carb & sand w
gbs pbls
17.5-19' - ssp - NO recovery - bailed
small sample

17634
GARCON Point17642
Bradwell Bay17648
right near #217668
right near #3

44.5
3.15
40.15

- 19-20.5 ssp 60
20.5-22.5' dk gy clayey sand
22.5-24' dk gy ol ch sd. organic
rich at bot
24-25.5' ssp spr. dk gy sand
pushed ~ 4' into hsa - jump hsa
clear - fine sand w/ clay matrix +
Abd. wood fragments
25.5-26.5' pushed ol. gy clay + sd clay
26.5-28.5' same
28.5-29 stiff clayey sand
29-31' alt. greenish clay + sandy
green
31-32.5' mottled blue green +
orange clay

End day 600 pm

2-11-98 730 AM start

STATIC WL 17.3' BLS (hole to 32.5')

- 32.5-34' clay as above
34-36' " "
36-38.25' dk. gy plastic clay
38.25-40.75' " " "
40.75-42.75' " " "
42.75-44.25' ssp

17642
Bradwell Bay

1764B
right tower #2

1766B
right tower #3

0-5' sd & clay sd.
 5-~19' porosity filled
 clay & shaly clay
 17-~22.5' clayey sand.
 22.5-25 dark organic clayey
 sand
 25-28 clay.
 28-~53' clay
 ~53- grey fine sand

61

44.25- ~~46.25~~^N46.0 clay, some wood frag.
 46.25- ~~47.5~~^N47.5
 47.5-49' grey clay - minor root frag.
 49-50.5' ssp grey clay w wood
 fragments in btm
 50.5-52.5' grey clay - wood at top
 52.5-54' grey clay thin grey
 fine sand
 54-56' fine sand - bailed spl
 clayey at btm
 56-57' grey clay - bailed sample
 57-59' wt. spl
 TD 59'

Called Tom Pratt - decision
 not to set well due to no
 suitable horizon for screen
 - pull back - natural fill
 to 25'
 pump 1 bag bentonite grout
 25-15'
 natural fill to 5'
 fill top 5' with cuttings

17642
Bradwell Bay

17648
right near #2

17668
right near #3

to do - Rig

- MR. POOL
- STARTER DRIVE
 - REMOTE IGN
 - CARB - runs rich - backfire on
shut down

get bantamite out of lead fuel
fix catches on safety hooks

holley - gages - rubbers - boots - Craig

62

move to Pine Bluff site to
continue well development
SEE p. 48

END DAY CB 600

KC JBS 630

2-12-78 return Pine Bluff start 7am

JBS + CB deep well

KC to Blackwater River St. Just.
meet w Tony C + Mary P. re
sites

return to T.H.

17642
Bradwell Bay

17648
right near #2

7668
right near #3

till 8-98
 0-36' WSC
 36' - TD Tonnage

3-3-98

63

Pick up Rig at motor pool
 After New motor, clutch, starter
 carb etc.

KC + CB 7am start - to
 Bradwell Bay Ambient site

W# 17642

Bradwell Bay Ambient site

SIC 14 SW SE T 45 " R 4W

LAT 30° 07.888⁵³ pdop 4.9

Lon 84° 36.26¹⁶

Elev 52' ±

0-2.5' push

2.5-5' push

5-6.5' SSP - NO recovery

6.5-8.5' bn humate cemented
SAND

8.5-10' SSP. dk sand

10.0-12.5' DARK fine sand

SWC in LISA 6' 9" 6LS

12.5-13.5' dk humate sand

13.5-15' purple coarse grt sd + grms
 w organics

17642
Bradwell Bay

17648
right tower #2

7668
right tower #3

64

15-16' ssp - poor rce sand
 16-18.25' sd - 1st foot 4th ol. gr sdy ch
 18.25-19.75' ssp ol. gr clay plastic
 19.75-21.25' ol. gr clayey sand
 21.75-24.25' ol. gr sd. sl. ch - poor rce
 24.25-25.75' ssp NO recovery - soft rot
 and feed
 25.75-28.25' ssp - sim ANT br sand
 recovered - easy push + rotation
 27.25-28.75' ext. splr not again
 mostly just pushed - net 2' splr
 28.75-29.75' washed out
 No sample
 29.75-31' braced sample fine
 grey sand
 31-33.25' - easy drill - no sampler
 in place - pushed spl.
 salt & pepper grey fine sand
 End day 530 pm

3-4-98, KC, CB 7AM START

65

STATIC WL 3.5' b/s

33.25 - 36 purple silt - SALT + purple
sand

36 - 39.5 blue gray - clayey sand

38.25 - ~ 39.25 ssp - ran out of
penetrator - last 2" HARD
dry cream. clay - (weathered ls?)

39.25 - 39.5 calc. clay

39.5 - 40.0 " "

40.0 - 40.75 " "

40.75 - 41.25 " "

change over to NQWL

41.25 - 44.9' gray clay + clayey ss

44.9 - 48.1 bluish green ss

48.1 - 51.75' gray li. + clay

end day 5:10 PM

3-5-98 KC, CB, JBS

7AM start KC+CB 800 JBS

STATIC WL 4.0' b/s

51.25 - 52.75' TO - gray clay

1764B
Bright Hour #2
766B
Bright Hour #3

all thread + nuts
metric sockets
oil
4x4
post hole digger

66

plugged back corehole to 42' w bentonite
chips
set 38' well away in 6 1/2
5' son 3' tank pipe

washed in 11 bags 20-30 sand
to 26'

1 bag play sand 25.5
bentonite chips to 24.5

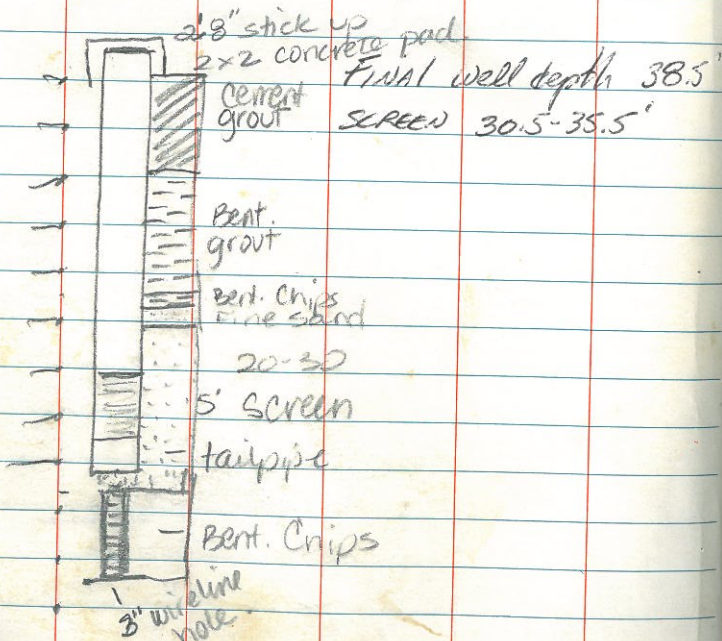
pugged + surged at ~ 12 gpm

17648
Bright Hour #2
7668
Bright Hour #3

Monitor Well Construction

0-9 neat cement grout
 9-23 bentonite grout
 23-24.5 bentonite chips - plug
 24.5-25.5 fine sand
 20-30 sand

42-52.75 Bentonite chips
 52.75 TD



Fri 3-5 Tam start

Bentonite plug @ 23' bis
 Mix 1 bag bent. grout, pump (Tremmie)
 down hole then pull 1 flight.
 Mix 2nd bag grout - tremmie
 in.

Grout @ ~ 9' bis.
 Tremmie in 3 bags cement
 cement grout @ land surface.
 Use 1 bag cement for concrete pad.

Water Quality - water has
 cleared to where surging + pumping
 does not cloud water at all.

GPM ~ 13

NEED: stick up height 3'-2" 8"
 59' : SWL (top of csg)
 41' 1" : well depth (top of casing)
 63' : distance from edge of road
 16' : DISTANCE FROM EDGE OF POND

W17648

3.75
2.6
6.25

~~Garcon Pt - 2 @ S. 191~~ ^{Hwy} 68
~~T R S~~
~~Lat Lon~~
W17648

Bright Hour Ranch #2

KC + CB TAN - start

T 385, R 26E sec 18

Lat 27° 10.33' N

Lon 81° 44.64' W ± 300'

0 - 2.5' push - dk to lt br sd w/arg
2.5 - 4.5' push dk to lt br sd w/arg
4.5 - 6.25' ~ 50% recovery - dark
br sand w/arg.

6.25 - 8' - ~ 6" recovery med br sl. dy
sand

8 - 9' lt gl. br sand, fine

9 - 11 mostly clear showing S. sd

End day - nd water

- KC end 700 PM CB end 6:30

3-24-98

KC start 6:45

CB start 700

- pump tank full of
WATER

17648
Bright Hour #2
7668
Bright Hour #3

6' sand in hss w/ 4.2 below
~~top of hss~~ 2.5' bls

11-13.25' wht. fine sand w minor grey
 clay matrix - some clay blebs -
 purple spl.

13.25-17.25' - purple spl - f. sand
 w clay blebs + phos? harder granular

17.25-19' purple spl - as above

19-20.25' clay - ol. gn sticky, plastic
 - plugged hsa.

- pull hsa 1.25' try to un-
 plug. - boiled out/washed out.

19.5-22.25' ol. gy clay - phos
 rubble at top. - sandy at btm

22.25-23.75' ol. gn phosphatic
 sd. clay

23.75-25.25' ol. gn clayey sand
 a clay.

25.25-27' ol. gn clay.

27-28.75' ol. gn clay - variably sd.
 last 6" v phosphatic

28.75-30.5' v phos sd. clay at
 top. then clay, ls/dol chnks
 in btm

30.5 - 31.75' ol. gy dolomite? in

top 4' then ol. gy clay

31.75 - 33.5' ol. gy clay - two to
stringer in top & ~ middle of run.
phosphate sandy clay bot 3"

33.5 - 35.5' ol. gn + gy br phosphatic
clay + clay sd

35.5 - 37.0' ol. gy clayey phosphatic sd

37.0 - 38.25' ol. gn clay + clay sd

38.25 - 40.5' ol. gy phosphatic clay sd
w ol. gn bed clay

40.5 - 42.25' ol. gn phos clayey sd

42.25 - 43.5' - 1.25' run - 1/2' dissep.
beds end depth & last 2 run int.

43.5' - 45.5' ol. gn phosphatic clay sd
+ clay

45.5 - 47.25' ol. gn clay - phos + gtz sh

47.25 - 48.25' ol. gn clay sd
sl. phosphatic

48.5 - 50.5' ol. gn clay sd. trace
remains delicate shell (white
clay/carbonate)

50.5 - 52.5' ol. gn phos clayey
sand, more fine shell

52.5 - 52.75' - bit refusal at

52.75' - 53.5' pulled spec nose in
2" - rubblely driller's - oyster shell,

clay etc

53.5 - 55.5' bluish clay sd, clay, w
thin carbonate stringer

55.5 - 57 same

57 - 58.25' same

58.5 - 60'

60 - 63.5' ol. sd clay

63.5 - 65 " "

65 - 66.75 same

66.75 - 68.5' ol. sd clay w shell +
rock stringer.

- sampler bulged - locked,
cable broke - pull hsa's to
retr. splr.

end day w 20' hsa still in
hole

end day 7:00 pm

Notes: from ~ 52' only making
1/2' runs but getting sampler
full. drilled w v little feed
pressure to minimize this

: KC injured rt. eye -
hematoma (blood under cornea
outside corner - went to
emergency room in arcadia
to check out - (Dr. Nuber
in not a problem - occurs

spontaneously - does not
need treatment

72

7-25-98

7 AM START

continue to pull TSA's + freeze
sampler

hole filled in to ~ 3' bcs
fremium 1 bag quite good or
15-8' after jitting down to that
level

cleaning site + return T.H. -
eyes have gotten worse -

return T.H. 8:00 pm

W17668

W17668

73

3-30-98 CB JBS

Bright Hour Racket #3

T 38s R 276 SEC 15 dab

LAT 27° 10' 608' N

LONG 81° 36' 039' W

ELW ~ 10'

7am Start from Tall - Le 3, to
Reach site @ 8:30 (Rowdy)

Set up @ 4:30 pm
push core S

0-2.5 Fine-med. gr. Tan-Bm. } HARD
2.5-5 " " }
5-7 " " } PUSH.
7-8.5 HSA SAMPLER Fine gray
sand, sandy. 50% recovery.

Decide to pump next interval.
6:45 pm - End Work.

End Day @ 7:30 pm

3-31-98 7am Start

Drill HSA to 12.5' + pump sample
8.5-12.5 Fine gray sand.
11.5-14 pumped sample as above
14-16 sampler in, good recov.
Sampler acts plugged. (no rotation press.)

W17668
Bright Hour #3

16-17.5 500psi - 74 750psi
1st 1/2 easy push → harder
No sample.

Bumped out nose.

17.5-18.75 fine sand w/ green blue clay

18.75-21.0 med grain sand w/ phosphate +
some clay. HARD PUSH.

21.-23. fine-med. sand w/ phosphate
(normal run.)

23-24.5 med. sand gray w/ lots of phos.

24.5-26.5 Same.

26.5-28.5 Same until ~27.5.

lighten color, more clay,
Some limestone. easy drill.

28.5-30 Same (Carbonate med?)

30-32 Same } lt. gray clay
32-33.5 Same } w/ phosphate +
33.5-35.5 Same } some shell.

35.5-37.5 Same

37.5-39.5 Same as above but
more shell frags.

39.5-42.5 Same as above

42.5-44.25 Same.

44.25-46.25 Same. Harder to drill.
(more sand present)

- chunk of coquina(?) present.

46.25 - 48.25 shelly phosphatic clay.
grey. (Same.) Taking
high rotation, 500 psi.

-- sediment is filling pipe at end
of every run - having to pump clean.

48.25 - 50' HARD, SLOW DRILL. Retriever
will not latch → pump water
to clean out any sand.

Run is shell bed (we washed out
fines?) Gray + buff shell frags.

50 - 52. gray fine-med sand, shell frags,
clay. Formation is loose -
pulling sed into pipe. (6 ft)
easy drilling.

52 - 54 same.

54 - 56 same. Have problems w/ cable
jumping the track. 1/2 hr. down.

56 - 57 same as above. Last 6 inches
very hard drilling. Sampler
acts plugged. Sampler
locked or bowed in hole.

1/2 hr. to retrieve. Material appears
to be no different - lost some?
end day @ 8 pm.

4-1-98 Tam start.

12' of fill in pipe. pump + clear.

57-58 gray quartz cemented shell frags
w/ some phosphate (sampler)

58-60 pumped sample. gray sand
cemented shell frags. w/ some
phosphate

pumped sample.
60-61.5 gray coarser quartz sand.
+ sand cemented shell, shell
frags. Some (few) small clay
blebs - gray/green.

61.5-63 pumped sample. same.

63-64 Regular run.avings from
above and green-gray sandy
clay. (mod rotation, no press.)

64-65 green-gray sand clay.
some shell frags.

65-66.5 green-gray sandy clay.
clay squeezing up in pipe.
(full sample for 1.5')

66.5-68 same.

68-70.5 same as above.

70.5-72. same as above.

72-73.5 same as above but seems deeper/darker green, more clay. Tiny spots of phosphate seen w/ hand lens.

73.5-75.75 same. ~~no~~
no problems retrieving

75.75-77.25 same as above.
no problems retrieving
(full sampler though)

77.25-78.75 same.

78.75-79. same material.

problem s w/ cable "bird nesting." Solved problem temporarily by re-rodling.

(Full 2.5' sample for 1.5'⁷⁸)
79-80.5 Top ~ 1' is sandy,
lighter in color w/ phosphate
bottom 1.5' is gray green
clayey sand w/ some specs
of phosphate, occasional shell.
Sample drills easy.

80.5-82. same gray-green sandy
clay/clay/sand(?) easy drilling

82-83.5 same with clay content
~~increasing at bottom~~

83.5-84.25 same with clay content
increasing at bottom of int.

84.25-86.75 same with clay content
increasing at bottom of int.

(all intervals have filled
sampler A full 2.5 ft.)

85.75-87.25 same green-gray, interval
gets more sandy than above.

87.25

92.25 TD

pull Augers to 60' BLS
Grout w/ Bent grt. from 75'-60'
(2 bags)

~~Temp. ID to be con't by
KE + DH.~~

Standing P.O.'s ~~7~~ '97

ENV. Mfg ~~790507~~ ~~820164~~ 832024

Lowes 4506/440510 820147

Am Pump 790514 820156

Mid Am ~~790513~~ 820159

Toney Drl 440515 820160

ATI DAL 790516 820157

Holley ~~790518~~ 820276

TCH WLD 790504 820148

GORMAN 790512 820277

L+C MACH 790504

Connie Lisa Auto 820146

CHRISTENSEN-BOYLE 820158

904-235-7626

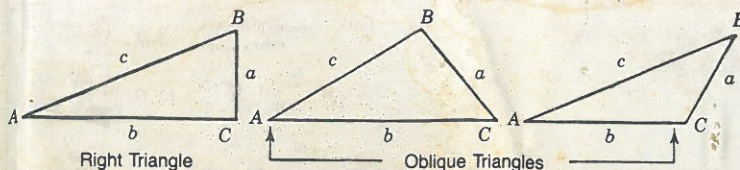
Orlando

407 222-7626

River Townville 269-5900
511 Garden St.

5000th 3275 Garden St. 269-8218

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

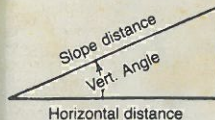
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\csc = \frac{c}{a}$

Given a, b	Required A, B, c	$\tan A = \frac{a}{b} = \cot B$, $c = \sqrt{a^2 + b^2} = a \sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B$, $b = \sqrt{(c+a)(c-a)} = c \sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90^\circ - A$, $b = a \cot A$, $c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90^\circ - A$, $a = b \tan A$, $c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90^\circ - A$, $a = c \sin A$, $b = c \cos A$

Solution of Oblique Triangles

Given A, B, a	Required b, c, C	$b = \frac{a \sin B}{\sin A}$, $C = 180^\circ - (A + B)$, $c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}$, $C = 180^\circ - (A + B)$, $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, c	$A + B = 180^\circ - C$, $\tan \frac{1}{2}(A - B) = \frac{(a - b) \tan \frac{1}{2}(A + B)}{a + b}$ $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a + b + c}{2}$, $\sin \frac{1}{2} A = \sqrt{\frac{(s - b)(s - c)}{bc}}$ $\sin \frac{1}{2} B = \sqrt{\frac{(s - a)(s - c)}{ac}}$, $C = 180^\circ - (A + B)$
a, b, c	Area	$s = \frac{a + b + c}{2}$, $\text{area} = \sqrt{s(s - a)(s - b)(s - c)}$
A, b, c	Area	$\text{area} = \frac{b c \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL



Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = $5^\circ 10'$. From Table, Page IX. $\cos 5^\circ 10' = .9959$. Horizontal distance = $319.4 \times .9959 = 318.09$ ft.

Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. $\cos 5^\circ 10' = .9959$. $1 - .9959 = .0041$. $319.4 \times .0041 = 1.31$. $319.4 - 1.31 = 318.09$ ft.

When the rise is known, the horizontal distance is approximately: - the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance = $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.



Bible #3
1568