

MOBILE DRILL
LOG #10



Ben Meadows
1-800-241-6401
LEVEL BOOK
#101596

17874
17847
721/IPC

17848
L-60

17861
GATOP Slough

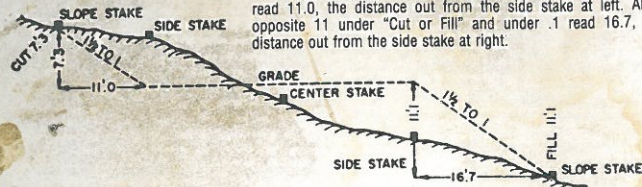
17862
Grades 17/27

17863
John Henry
Slough

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

SCOTTIES Marathon 743-9411

ACE Hardware Marathon

743-5131

ACE-MAR 82 664-8823

CALUSA Core Hdw. 664-4455
MAR 75

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

2878

1721/IPC

17848
L-60

17861
GARDEN Slough

17862
GARDEN 17/27

17863
John Henry Slough

[illegible]

ATLANTIC DRILLING - RN. ACK 800 535-7384
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4631-56, ENTER, OFF

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JENNIFER 671-2659

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CARLOS DELA ROSA

(941) 462-5288 X 3196

JIM BRIDGEMAN (561) 625-5714

LARRY WATERS - BARTON CREEK (941) 533-0777

HOLE #	DEPTH	WELL NAME	COUNTY	PAGE
252	17847/78.5	TRF-IPC	HI	1
253	17848/88	L-60	HI	4
254	17861/83.25	GATOR slough		9
255	17862/80.25	GLADEN 17/27	GL	15
256	17863/88	John Henry Slough		18
257	17874/61.5	St. Vincent NWR	FR	22
		25' 8" MW		
258	17875/68.5	Three Notch	SR	28
259	17876/49	Turkey Ck	SR	33
		30' MW		
260	17873/81.5	Twin Towers	LN	39
261	17876/89	Long Key	MO	44
		20' MW		
262	17877/118.5	Fossil Reef	MO	50
		26.35' MW		
263	17878/85.5	Cubby Hammock	MO	57
		19' 2" MW		
264	17881/94.5	Bahia Honda	MO	63
		14.45' MW		
265	17845/80	CHART NATURE PARK	GO	71
		NO. 100 MW		

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3/11/99

17847

700AM 1

721/IPC

CB JA

START

Lat

27°10'38" 23"

Lon

81°05'35" 51"

T

385

R

32 E

S @ 14 BD

0-2.5 PUSH. GREY FINE SAND W/ORG.

2.5-3.5 PUSH. GREY FINE SAND

3.5-6 SAMPLER, POOR REC. BEN FINE SAND,

6-8.5 POOR REC. BEN FINE SAND,

8.5-11 NO SAMPLE. BUMP NOSE OUT ONE NOTCH,

11-13.5 POOR REC. BEN FINE SAND

13.5-16 AS ABOVE

16-18.5 AS ABOVE

18.5-21 AS ABOVE. BOTTOM SOUPY

21-23.5 AS ABOVE. BOTTOM SOUPY

23.5-26 AS ABOVE. BOTTOM SOUPY. 3.5'

JUNK IN HOLE. PUMP CLEAN.

26-28.5 TAN FINE SAND. 3' ~~AND~~ JUNK

IN HOLE. PUMP CLEAN.

28.5-31.0 NO SAMPLE.

31-33.5 BAILED. TAN V.FINE SAND.

33.5-36 BAILED. TAN V.FINE SAND

17847

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721/IPC17848
1-6017861
Garro Slough17862
Slides 17/2717863
John Henry
Slough

- 36-38.5 BAILED. TAN V. FINE SAND,
 38.5-41 BAILED. TAN V. FINE SAND
 41-43.5 BAILED. AS ABOVE.
 43.5-46 BAILED. AS ABOVE.
 46-48.5 BAILED AS ABOVE.
 48.5-51 BAILED AS ABOVE
 51-53.5 BAILED. TAN FINE SAND GETTING
 A LITTLE COARSER.
 53.5-56 BAILED. AS ABOVE
 56-58.5 BAILED AS ABOVE. RUBBLY
 DRILLING.
 58.5-61 NO SAMPLE. SOFT DRILLING
 61-63.5 BAILED. GREY SAND W/
 SHELL FRAGS. SOFT DRILLING.
 63.5-66 BAILED AS ABOVE. PULLING
 STUFF INTO PIPE. NEED TO
 PUMP CLEAN. SHELL COLLECTED
 66.5-68.5 PUMPED. SHELL & PHOS. &
 CLAY.
 68.5-70.5 SAMPLER GREY PHOS CLAY
 w/ SHELL. PUMP CLEAN.
 70.5-71.5 PUMP. SHELL

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17847

3

71.5-73.5 GREY/GREEN, PITTS, STEEL CLAY

73.5-76 AS ABOVE

76-78.5 AS ABOVE.

TD. RUGGED OFF

BENTWITE GROUT 78.5-68.5.

NATURAL FILL TO GROUND SURFACE.

CLEAN UP & MOVE EQUIP.

END DAY 7:15 PM

3-12-99 OO JA

LEAVE FOR TX @ 8:00 AM

ARRIVE TX 2 PM

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Cat $27^{\circ} 19.475'$
Cm $81^{\circ} 14.782'$

17846

46

3-22-89 CB. MC. 7:00 AM - 1:00 PM
LEAVE FOR HIGHLANDS/GROVES
CO. STOP & GET LAT/LON FROM
621/C-41A. GO TO RIVERWOODS
WHERE RIG & TRAILER IS
STORED. FILL WATER TANK.
END DAY 5:15 PM

3-23-99 HAWKINS PONTIAC 7:00 AM rt
HAWKINS 525 1
KAT
KAT

ARRIVE @ SITE. NO GATE OR
LOCKED GATE TO ACCESS ALONG
HARVEY POND CANAL. WRONG SITE.
MOVE TO NEXT SITE

SITE L60

T	40S	R	33E	S	06 BA
Lat	27° 01.995'	60°	(27° 02' 00")		
Lon	81° 03.900'	54"			

178488

NEED:

1/4" WRENCH

17848

5

- 0-2.5 PUMP ORG. RICH SAND
2.5-5 PUSH AS ABOVE TO 4.0' 4-5'
BRN/GRAY CLAYEY SAND W/ LW
PEBBLES/CORALS.
5-7.5 SAMPLER
7.5-9 RUBBY @ 8.5' TAN F SAND
W/ SHELL & CORALS
9-11 AS ABOVE
11-14 V-FINE-FINE TAN SAND W/
SHELL FRAGS.
14-16.5 NO SAMPLE. DRILLED SOFT.
16.5-19 BAILED. DRILLED RUBBY. AS ABOVE
19-21.5 BAILED. V-FINE TAN SAND W/
SHELL FRAGS. PHOS?
21.5-24 DRILLED RUBBY. BAILED.
AS ABOVE.
24-26.5 RUBBY DRILLING. NO SAMPLE
PLUGGED OFF. PULL FLIGHT.
UNABLE TO UNPLUG. RUN HSA'S
BACK IN TO 26.5' PUMP
CLEAN

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NWR

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Three Notch

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Grades 17/27

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John Hume
5/10/94

26.5-29 DRILLED HARD. PUMP SAMPLE.
SHELL & LS & SS.

29-31.5 NO SAMPLE.

31.5-34.0 NO SAMPLE DRILLING DOWN 2.5'
BUT NO MATERIAL IN THE
PIPE. WILL TRY MORE FEED
PRESSURE.

34.0-36.5 PUMP. SHELL, LS & SS.

36.5-39 NO SAMPLE

END DAY 6:00 PM

3-24-99 6:45 AM START CAMP

39-41.5 NO SAMPLE

41.5-44 SAMPLER. U.FINE GRN

PITW SAND w/ SILEX FRAGS &
LS BOUNDER @ BOTTOM OF
Run

44-46.5 ALL ABOVE. 4" JUNK IN
HOLE. PUMP CLEAN. REG
IS MORE SAND THAN SILEX
BUT PUMPING CLEAN IS
MORE SHELL THAN SAND.

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46.5-49 4" REG SHELL. WILL
PUMP REST OF SAMPLES TO
49'.

49-51.5 SANDLOCKED! PULL HSA IN.
V-FINE-FINE SAND & SHELL.
TRIP BACK INTO 51.5. PUMP
COAST.

51.5-54 PUMP SHELL, SAND &
QTZ. REPERCUSS.

54-56.5 PUMP. AS ABOVE. PHOTOGRAPHED.

56.5-59 PUMP. AS ABOVE PHOTOGRAPHED

59-61.5 PUMP. AS ABOVE.

61.5-64 PUMP. AS ABOVE

64-66.5 BGR DRILLED SLOW & TIGHT.

ROCK? AS ABOVE PUMP

66.5-69 PUMP. AS ABOVE.

69-71.5 PUMP. SHELL & SAND.

71.5-74 PUMP. V-FINE SAND &
FINE SHELL FRAGS.

74-76.5 DRILLED. SAND & PHOS &
SHELL.

76.5-79 BAILED SAND & SHELL

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79-81.5 BAILED. SAND & STEEL
81.5-84. pump. STEEL, SAND CLAY
BLEDS

84-88.5 pump. AS ABOVE. BIT PLUGGED
TO OFF. PLUG FELL OUT.

PULL HSA'S NATURAL FILL
TO 2'. 1/2 BAG HAS PUG
NATURAL FILL MOVE UP.
CLEAN UP & MOVE EQUIP
TO RIVERWOODS.

END DAY 7:00 PM

3-25-99 START DAY 6:45 AM
RTN TO TLA.

END DAY

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510-84

* * *
 * NOTE: THREADS ON LOCKING
 AUGER FLIGHT ARE STRIPPED.
 THEY NEED TO BE REPLACED.

17861

9

4-12-99

START DAY

CB 6:45 MP 7:00

LEAVE TRH FOR GLADES C.

PICK UP RIG & TRAILER @

RIVERWINGS. MOVE TO SITE # 1

END DAY 8:00 PM

CB MP

4-13-99

CB MP BC 6:30 AM START

T 405 R 31E SBC # 11 BD

Cat 27° 00' 58" 30"

Cor 81° 11' 45" 27"

GATOR SLOUGH.

0-2.5 PUSH, GREY FINE SAND.

2.5-5.0 PUSH, LT BROWN SAND. WATER
 ~ 3.0' BGS

5.0-7.0 HSA - BRN. FINE SAND
 6" OF REC.

7.0-9.0 4" OF REC. TAN FINE SAND.

PUMP. SHOE OUT ONE NOTCH TO
 2ND NOTCH.

9.0-11.5 TAN-BROWN FINE SAND.

SAMPLER LOCKED OUT GIVE
 FREE. WILL DRILL NEXT INTERVAL

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NEED: TAPE MEASURE 25'

100'

LOCKING HOOKS FOR

WIRELINE.

ELECT. TAPE

3.5 HP PUMP

- PULL CORD BROKEN.
- TOP BOLT THAT HOLDS STARTER HOUSING BROKE. NEEDS TO BE DRILLED OUT & RE-THREADED.

17861

10

11.5-14 BAILED. BRN FINE SOUVY SAND.

14-16.5 BAILED. BRN. FINE SAND. INCREASING CLAY CONTENT.

16.5-19 BAILED. TAN FINE SAND SOME CLAY BLESS. PUMP. HOLE CLEAN.

19-21.5 BAILED. TAN FINE SAND PUMP HOLE CLEAN.

21.5-24.0 BAILED TAN FINE SAND. SOME CLAY BLESS. PUMP CLEAN.

24-26.5 BAILED. TAN FINE SAND w/ COARSER GRAINS. PUMP HOLE CLEAN.

26.5-29 BAILED. TAN FINE SAND. PUMPED. TAN COARSE SAND. SAND IS COARSENING DOWN THE HOLE.

29-31.5 BAILED. TAN FINE SAND - FINE/MED.

PUMP. TAN COARSE SAND TO PERBBLES.

31.5-34 DRILLED SOFTER. PUMP SHELL, PHOS PERBBLES, INTERM. MOLAS OF MOLUSKS (THE LACKESNAE?)

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34-36.5 PUMPED. PLUGGED OFF.
DALK UP $2\frac{1}{2}'$. DROP IN
SAMPLER

— PUMPED: AS ABOVE

— SAMPLER: GREY SAND (SLUFF)

36.5-39 SAMPLER. OLIVE SHELLY
CLAY W/ SAND & PHOS.

39-41.5 LT. GREY/GREEN CLAYEY SAND. ^{w/} SHELL

41.5-44 GREY MEDIUM PHOS SAND

44-45.5 DRILLING SLOW. GREY MED.
PHOS. SAND. 7% SHELL.

45.5-47.5 GREY MED., PHOS, CLAYEY SAND

47.5-49 AS ABOVE

49-51.5 GREY/GREEN CLAYEY SAND. DRY

51.5-54 SLOW DRILLING. GREY COARSE
SAND w/ PHOS & SHELL FRAGS.

~~DRILLING~~

54-54.5 RUSKLY DRILLING. GREY
CLAYEY SAND w/ RX

~~DRILLING~~ ~~DRILLING~~

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N.W.R.

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Turkey CK

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54.5-56.5 PULLED THROUGH RX
WITH LOW THROTTLE &
ROTATION " HWT FEED
PRESSURE. GREY CLAYEY
MED/CASE SAND W/ RX
& PHOS. PUMP CLEAN.

56.5-59 SAMPLE FEEL OUT OF SAMPLER.
REC'D 2 CHUNKS CS.

PUMP SAMPLE. GREY MED
SAND W/ PHOS. SANDLOCKED.
PULL HSA's.

59.61.5 TAN FINE SAND.

END DAY 9:30 PM

4-14-99 START DAY 6:30 PM
OB MP BE

GET SAMPLER UNSANDLOCKED
RUN HSA's BACK IN
TO 61.5'. PUMP
CLEAN

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61.5-64 BAICED. GREY FINE SAND W/
PHOS. PUMPED. COARSE
GREY SAND W/PHOS & CLAY
BLEBS

64-66.5. HIGH ROT. PRESS, DID NOT
FEEL LIKE CLAY. NOT.
AS ABOVE. FLAT SAND GRAINS.

66.5-69 PUMPED. GREY SAND W/
PHOS FINE-COARSE

69-71.5 pump. AS ABOVE W/ SHELL

71.5-74 ~~2~~ RUBBLY LENS @ 72.0 TO
72.5' ~~2~~ pump. RUBBLY LENS
= MUDSTONE? FINE-COARSE GREY
SAND W/ SHELL, PHOS & CLAY
BLEBS.

74-76.5 RUBBLY ZONE @ 75.0'. pump.
AS ABOVE

76.5-79 AS ABOVE. SAND GRAINS
ARE FINING. LESS PHOS.

~~80-81.5~~

79-83.25 pump. SAND, SANDY LS &
SHELL pumped.

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14

DRIVE TO LAKEPORT MUNICIPAL
WATER SUPPLY. JIMMY JACKSON.
GOT 250 gal. GROUT HERE FROM
BOTTOM UP.

5 BAGS OF BENTONITE GROUT
TO 3.0' GGS. 1 BAG
HOLE DUG @ 3.0' NATURAL
FILL TO LAND SURFACE.
CLEAN UP, PICK UP &
MOVE RIG TO RIVERWOODS
FOR NIGHT.

END DAY.

MP 7:30

CO 8:15 REPLACE SEAL IN
PUMP.

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4-15-99 GLADE 17/27 17862 15

CB DR

START DAY 6:30 AM

T 40S R 30E S 5 DA
Lat 27° 01.602' 36"
Lm 81° 20.579' 35"

0-3.5 POSTHOLE DIGGER. BEN LWA.
3.5-4.0 NO SAMPLE

4.0-6.5 SAMPLER: BEN SAND - GREY CLAY SAND
6.5-8.25 6" REC. ^{LT.} GREY/GREEN
CLAYEY SAND.

8.25-10.75 ^{LT.} GREY/GREEN CLAYEY SAND.
10.75-12.25 TAN MED SAND, CLAYEY
SAND IN SUE.

12.25-15.75 TAN FINE SAND.
15.75-18.25 PUMP. TAN FINE SAND
18.25-21.75 PUMP. AS ABOVE
20.75-23.25 PUMP NO SAMPLE

~~23.25-28.25~~
23.25-28.25 PUMP. TAN FINE
SAND W/ BEN CLAY
BLESS

17874
ST VINCENT
NW R

17875
Three Notch

17876
Turkey CK

17873
17862
GLADES 17/27

17863
John Henry
Slocum

28.25-30.75 PUMP. TAN FINE
SAND W/ BRN CLAY BLESS.

30.75-33.25 PUMP. TAN FINE
SAND W/ INCREASING %
BRN. CLAY BLESS.

33.25-35.75 PUMP. TAN FINE
SAND W/ BRN CLAY BLESS

35.75-38.25 PUMP. TAN FINE
SAND W/ CLAY BLESS

~~38.25-40.75~~

38.25-43.25 PUMP. AS ABOVE

43.25-48.25 PUMP. TAN FINE
SAND W/ OLIVE GREEN
CLAY BLESS.

48.25-50.75 NO SAMPLE

50.75-53.25 PUMPED. GRAY/GREEN
FINE SAND W/ OLIVE
CLAY BLESS

53.25-55.75 OLIVE CLAY BLESS
W/ SAND.

55.75-58.25 SAMPLER. NO
SAMPLE.

~~58.25-60.75~~ PUMP- GRAY FINE SAND W/
SANDY CLAY BLESS

17874
ST VINCENT
NW R

17875
Three North

17876
Turkey CK

17873
Win Towers

17917863
John Henry
S. 10-24

58.25-60.75 PUMP. GREY FINE
SAND W/ GREY SANDY
CLAY BLEBS.

60.75-63.25 PUMP. AS ABOVE.

63.25-65.75 PUMP. AS ABOVE.

65.75-68.25 PUMP. AS ABOVE.

68.25-70.75 PUMP NO SAMPLES.
DRILLED SOFT.

70.75-73.25 TAN FINE SAND
W/ BRN SANDY CLAY BLEBS.

73.25-78.25 PUMP. AS ABOVE

78.25-80.75 PUMP. TAN CLAY
W/ SAND. PLUGGED BIT

TO

PULL HSA'N

1 BAG HOLE PLUG @

11.0' 2 BAGS NEAR

CEMENT TO 2' @ND

NATURAL FILL ON TOP.

PILE CUTTING.

END DAY 7:00 PM

17874
ST VINCENT
NW R

17875
Three North

17876
Turkey CK

17873
Jim Towers

17917863
John Henry
5/10/94

17863
JOHN HENRY SLOUGH

18

OS MP RC
T HDS R 29E S O6 BA
Lat 27° 01.733' 44"
Lm 81° 27.33' 20"

6:15 AM
Start Day ~~0-3.5~~

0-3.5 PASSAGE DIGGERS 0-3.0'
GREY/ORN SAND. 3.0-3.5'
ORGANIC RICH SAND. WATER
TABLE @ 3.0'

3.5-4 NO SAMPLE

4-6 ORGANIC RICH SAND

6-8 AS ABOVE

8-10.5 AS ABOVE

10.5-13 AS ABOVE

13-15.5 AS ABOVE

15.5-18 BRN. FINE/MED SAND

18-20.5 AS ABOVE

20.5-23 BRN/GREY FINE/MED SAND.
LAST 6" GREY SANDY
CLAY.

17874
ST VINCENT
NW R

17875
Three Notch

17876
Turkey Cr

17873
Two Towers

17863
John Henry
SloUGH

- 23-25.5 DRILLED SOFT. GREY
SANDY CLAY/CLAYED SAND
- 25.5-28 GREY PLASTIC CLAY
- 28-30.5 AS ABOVE
- 30.5-33 GRN/MED SAND TO 31.5'
GREY PLASTIC CLAY TO 33.0'
- 33-35.5 AS ABOVE GRN MED
SAND FIRST PART OF R-1.
POSSIBLY SLURRY? GREY
PLASTIC SAND END OF RUN
- 35.5-38 GREY PLASTIC SAND
- 38-40 AS ABOVE
- 40-42 AS ABOVE
- 42-43 AS ABOVE
- 43-45 AS ABOVE
- 45-47 GREY/GREEN SANDY CLAY w/
SAND STRINGERS.
- 47-48 AS ABOVE
- 48-50 GREY/GREEN SANDY CLAY
- 50-51.5 ALMA GREY PLASTIC CLAY
- 51.5-53 GREY PLASTIC CLAY

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ST VINCENT
MUR17875
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Cin Towers17916
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53-55 GREY PLASTIC CLAY
 55-56.5 AS ABOVE
 56.5-58 AS ABOVE
 58-60. AS ABOVE
 60-61.5 AS ABOVE
 61.5-63 AS ABOVE
 63-65 AS ABOVE
 65-66.5 AS ABOVE
 66.5-68 AS ABOVE
 68-70.5 AS ABOVE
 70.5-73 AS ABOVE
 73-75.5 AS ABOVE
 75.5-78 75.5-77 AS ABOVE
 77-78 GREY CLAYDY

SAND

78-80.5 GREY PLASTIC CLAY
 80.5-82 REFUSE @ 82. Rubby
 DRILLING GREY PLASTIC
 CLAY. RT (MUDSTONE?)
 @ 82!

~~82-83~~ B

17874
ST VINCENT
N.W.R.

17875
Three North

17876
Turkey CK

17873
Jin Towers

17916
Long Key

82-83 Bump nose of sampler
up into notch. GOT THROUGH
Rn to the Rn AGAIN @
82.75'. OK GREY CLAY
+ Rn INTERESTING Rn
MUDSTONE? "

83-85 GREY PLASTIC CLAY
85.5-88 AT AGAIN
TO.

PULL HSA'S 1 BAG CEMENT
@ 6.0'. CLEAN UP &
HEAD OUT

END DAY 7³⁰ PM

4-17-99

RTN TO TCU OR MV
START DAY 7:00 AM
END DAY 2:00 PM

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ST VINCENT
NW R

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Three Notch

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Turkey CK

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Twin Towers

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Long Key

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20

4-27-99

CB SM

ST. VINCENTS

LEAVE TLM 11:00 AM AFTER
GETTING RIG FROM CAPITAL
HYDRAULICS FILL UP w/ H_2O
@ ST. VINCENTS WML MAIN
OFFICE IN APALACHICOLA. RT.
REAR TIRE ON TRAILER BLEWOUT
N $\frac{1}{4}$ MILE FROM SITE. CALLED
CINDY.

T 95 R 10W S 13
Lat $29^{\circ}42.108' 6''$
Lon $85^{\circ}11.883' 53''$

0-2.5 PUSH ROOF TO BEN FINE
SAND

2.5-5 PUSH BEN ORG. RICH FINE
SAND H_2O @ 2.0'

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23

5-2 HSA ORG. RICH SAND

7-9 AS ABOVE

9-11.5 AS ABOVE

11.5-14 BRN ORG FINE SAND

SAMPLER STICK COMING OUT.

SANDUCK MATERIAL. 5'

JUNK IN HOLE. PUMP.
CLEAN.

14-16.5 PUMP. BRN FINE SAND

16.5-19 PUMP AS ABOVE W/ MICA

19-21.5 PUMP. AS ABOVE.

END DAY 7:00 PM

4-28-99

CB SM

7:30 AM START.

THUNDERSTORMS ALL MORNING.
TO 7:30 AM.

STATIC 1/20 LEVEL

3'9" BGS

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- 21.5-24 pump AS ABOVE W/CLAY BOON
- 24-26.5 pump AS ABOVE W/ INCREASING
CLAY BED CONTENT.
- 26.5-29 SAMPLER BRN FINE SAND (SUFT?)
AT TOP OF RUN & CLAY
@ BOTTOM
- 29-31.5 GREY CLAY W/ SHELL &
SAND. DRILLED REAL SUFT.
- 31.5-34 GREY CLAY & SAND. POOR
REC.
- 34-36.5 GREY FINE SAND. POOR REC.
- 36.5-39 SS. BRN/GREY FINE SAND
POOR REC.
- 39-41.5 QUANTITIES OF SAMPLER S-T
ONE NOTED. BRN/GREY
FINE SAND JUNK IN HOLE,
PUMP CLEAN.
- 41.5-44 pump AS ABOVE.

CRAIG - CUT ON CHIN -

PENCIL DRIVE TO MARA-M.

EN. CRAIG REC. 8' STRIKE

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Fossil Reef

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Jim Towers

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Long Key

NEED: GARBAGE BAGS
C/P. WRENCH
ELECT. TAPE
PVC CAPS (DRILLED)?
BUG SPRAY

PVC EXTENSIONS FOR
RECIRCULATING SYSTEM

17874

25

GO BACK TO SITE. WEATHER
STILL REM. BAD. SUPPOSE TO
BE SOME WEATHER TOM.
CLEAN UP, PACK UP TAPE
BLOWN TRAILER TIRE AND
GO BACK TO THT

END DAY.

5-3-99 KC, M.P. 7 AM start
return to SEAWR site

STATIC WL 3.0' b/s
hole open to bottom

44'-47' - bailed upper part - slow
pumped remainder - sand, blk clay, bbs
47'-49' pumped spw? - maybe black
49'-51' pumped clayey sand in place
51'-53.5' pumped "
53.5'-56.75' pumped spl. br sdw
56.75'-58.5' organic floccs bbs
58.5'-66.5' TD WL SPL - sand/black
~1' sample recovered - dk br sl. chy
sl org rich? sand

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Creeky Ck

17873
Thin Towers

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Long Key

for mayno plumping

- 1) 1 1/4" 45° ~~EE~~ E1
- 1) 1 1/4" nipple 6" long
- 1) 1 1/4" nipple 4"
- 1) 1 1/4" T

(Now section hose 50' x 1 1/4"
King nipple both ends,
2 clamps and sealant

- 4 1 1/4" coupling
- 4 1" coupling
- 4 3/4" coupling
- 2 1 1/4 x 3/4 bushing or
ball red

1 1/4" King nipple - loose
20' of 1" or 1 1/4" pvc
for surge plug

4 hose clamps - 1 1/4" hose

pick up 1 1/4" F g.c.

17874
pull 3 1/4" ksa's
replace tire on trailer.

26

drill in 25' 6 5/8 ksa
end day 700 pm

5-4-99 7:20 stand

SET well Assy -

3' TP

5' SCN

17.5' CSG

makes up 3-4 inches above ls

poured 1 bag filter sand.
remainder formation fill to 14.5'

pumps ~ 2 gpm - dk bn clayey,
organic rich water. pump + surge

pumped 1 bag Quick Grout 14.5-9.5'
pump 2 bags problend

END DAY 700 pm

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27

5-5-99

7:45 START

STATIC W/L 2.5' BLS

set protective casing

depth (t.o.c.) 27' 8"

stickup height to T.O.C. 2.0'

MOVE TO BLACKWATER CB MP

ARRIVE @ 9:00 PM

END DAY

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Fossil Reef

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Three Notch

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Turkey Cr

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Two Towers

17916
Long Key

THREE NOTCH

17875

28

7:00 AM START

5-6-99.

OB MP

MEET w/ TOM SELVAGE & LOCATE
SITE.

T 5N R 27W S 34
Lat 30° 53' 54.962"
Lon 86° 55' 50.874"

0-2.5 PUSH BRN CLAYED SAND
TOP 6". YB CLAYED SAND

2.5-5 PUSH YB CLAYED SAND

5-7 HSA SAMPLE. BOTTOM OF RUN
REAL TIGHT. RB/YB SAND
MOTTLED SAND CLAY. WAS S.P.

DOT CORE CAPTURED SAND IN.

7-8.5 RB/YB SANDY CLAY

8.5-11 SSP. RB/YB MOTTLED CLAY

11-12.5 RB/YB/GRAY MOTTLED CLAY

12.5-16 SSP. CLAY

SANDY CLAY

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16-18.5 GRAY/YB SANDY CLAY

18.5-21 AS ABOVE

21-23.5 SSP. 21.0'-22.0' SANDY TONE
w/ WATER 22.0'-23.5' YB/GRAY
CLAYS.23.5-26 YB/GRAY SANDY CLAY →
YB/GRAY CLAYEY SANDS.26-28.5 GRAY SANDY CLAYS → CLAYEY
SANDS.28.5-31 SSP. GRAY CLAYEY SAND
1' or REC CLAYEY

31-33.5 GRAY FINE SAND

33.5-26 GRAY FINE SAND.

36-38.5 36.0-37.0 CLAYEY SAND

37.0-38.5 YB FINE SAND

NO WATER. DRY TO BOTTOM

38.5-41 SSP. YB FINE SANDS.

NO WATER41-43.5 YB FINE SAND. NO WATER

DRY

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Fossil Reef

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Turkey Hammer

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Long Key

43.5-46 BUMP NOSE OUT ONE NOTCH

TAN FINE SAND.

WATER @ 45.0' JUNK IN
HOLE. PUMPED ~100 GAL WATER
DOWN HOLE. NO RETURN.

SAMPLER DID DROP IN.

46-48.5 TAN FINE SAND

48.5-51 S.S.P. AS ABOVE. JUNK IN

HOLE. PUMP CLEAN. WON'T

PUMP CLEAN PULL BACK 5'

& DROP SAMPLER IN W/ NOSE ONE
NOTCH ABOVE CENTER. DRILL DOWN

TO 57.0' W/ NO FEED & HIGH

ROTATION. DRILL TO 52.5'

W/ HIGH FEED PRESSURE.

51-52.5 TAN FINE SAND. DIFFICULT
TIME REQUIRING SAMPLER.

JUNK IN HOLE. DRILL

DOWN UNTIL HIT SOMETHING

STICKIER, DRILL DOWN

TO 58.5'. SAME MATERIAL

STORMS COMING IN.

END DAY 7:00 PM

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Fossil Reef

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Turkey Hammer

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5-7-99

17875

OB NP 7:10 AM START 31

60' OF PIPE. 8.5' OF ^{SAND} ~~FOUR~~
 IN HOLE. ~~PREVIOUS~~ NO WATER
 IN HOLE. DRILLED TO 61.5'
 9' IN HOLE. TRY TO PUMP
 NO RETURN. NOW ONLY 3.5'
 OF MATERIAL IN HOLE. WATER
 PUSHED SAND BACK INTO
 FORMATION. 6' OF MATERIAL
 IN HOLE AFTER DRILLING TO
 63.5'. APPEARS TO BE
 SAME MATERIAL - SAND.

ALL DRILLING W/ NO FEED
 & HIGH ROT. PRESSURES.

DRILLED TO 68.5'. NO
 CHANGE IN PRESSURES THAT
 WOULD INDICATE CHANGE IN
 LITHOLOGY. 8' OF MATERIAL
 IN HOLE. WATER @ 54'.
 TRY BAILER.

52.5-68.5 BAILED. TAN FINE SAND.

JD BAILER WAS PICKING UP ALL
 THE WATER & LEAVING NONE IN
 THE HOLE. RECOVERED ~ 6"
 SAMPLE, BEFORE RUNNING OUT
 OF H₂O.

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Long Key

PULL H&A'S TO 43.5' /
 DAG BENTONITE TO 38.5'
 CONTINUE TO PULL H&A'S
 NATURAL FILL TO CANO
 SURFACE CLEAN UP. ARCK
 UP & PILE CUTTINGS.

LEAVE EQUIP @ BARGE
 #1 & LEAVE FORTH
 END DAY 4:30 PM

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Long Key

W - 17876

17876

TURKEY CREEK

33

5-12-99

CS SM 7⁰⁰AM START

T SN R 27W S 26 60

Lat: 30°52' 01.357" 21"

Lon: 86°54'34.362"

ELEV: ~140'

LEAVE TLM 7:00 AM FOR
BURSF. P/U RIG & TRAILER @
FOREST HQ. MEET W/ TOM
SERVING. GO TO SITE & SET
UP.

0-2.5 PUSH TAN-YB/GRY
CLAYEY SAND

2.5-5 PUSH SSP. RB/YB/GRY SANDY
CLAY. MOTTLED.

5-7 HSA'N BRN-7 YB/GRY CLAYEY
SAND / SANDY CLAY LAST 6"
DK GRY W/CH. RICH CLAY.

7-9 GRY/PK GRY ORG. RICH
PLASTIC CLAY. BUMP NOSE OUT.

9-11.5 SSP AS ABOVE.

11.5-14 BLACK ORG CLAY (PEAT) TO
13.25'. 13.25-14 TAN FINE
SAND.

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YB FINE SAND START 13.25'
END 29.5'

SCREEN 23'-28'

17876

54

14-16.5 DRILLING HARD. - AND CLOGGED
PULL HSA'S. GOT IT ALL
UNSTUCK & THUNDERSTORMS
ROLLED IN. TAN FINE SAND
W/ SOME ROOT. PUMP HOLE
CLEAN.

16.5-19 ~~PUMP~~ BAILED. YB FINE SAND W/
CLAY BUBBS. - MICA

19-21.5 BAILED. YB/ORANGE FINE/MED
SAND. W/MICA

21.5-24 BAILED & PUMP. AS ABOVE B.T
SAND COARSENING

24-26.5 NO SAMPLE - SAMPLER SAND
FELL OUT OF SAMPLER. SAW
MATERIAL & IT WAS THE
SAME AS ABOVE

26.5-29 SAMPLER LOST SAMPLE
AGAIN. BAILED REMAINING
SAMPLE. YB/ORANGE MED/
COARSE SAND W/MICA &
CLAY BUBBS.

17917
Fossil Reef

17918
Quarry Hammett

17921
Rabin Hand
Twin Towers

17916
Long Key

~~END~~ END DAY - GO SET UP CAMP
 @ BEAR LAKE. 7:30 PM

5-13-99 CB SM START DAY 7:30 AM
 STATIC

~~WATER~~ WATER TABLE IS @ GROUND
 SURFACE. HOLE CLEAN TO BOTTOM.

29-31.5 BAILED. PUMP 1/3 ORANGE
 MED/CORIE SAND w/ GREY SANDY
 CLAY/ROCK RUBBED OFF
 TOP 6" SAND. LAST 2' GREY/
 BLUE CLAY - PLASTIC. RAN
 AW ROD IN w/ SAMPLER TO
 GET SAMPLE OUT OF B-T.
 WORKED GOOD PROVE IN
 w/ DRILL HEAD. SAMPLER
 OPERATED IN w/ SAND

31.5-34 SAMPLER BLUE PLASTIC CLAY

34-36.5 SSP AS ABOVE

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 Fossil Reefs

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 Quarry Hammer

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 Rabin Hand
 Twin Towers

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 Long Key

365-39 BLUE SANDY CLAY

39-41.5 AS ABOVE

41.5-43 REFUSAL @ 43'. SSP.
NO RECOVERY

43-43.25 BUMP NOSE OF SAMPLER IN
ONE NOTCH DRILLING
RUBBLY. REFUSAL. BLUE
PLASTIC CLAY - 2 POORLY
LITHIFIED SANDSTONE.

43.25-433 REFUSAL. SANDY CLAY

BUMP NOSE IN ONE MORE NOTCH

43.3-44 SANDY CLAY - SOFT. W/
SANDSTONE CHUNKS.

44-46.5 poor REC. GREY SANDY
CLAY W/ SS CHUNKS

46.5-49 2" BRN SANDSTONE @
TOP OF RUN THEN GREY
SANDY CLAY TO 48.5'

TD

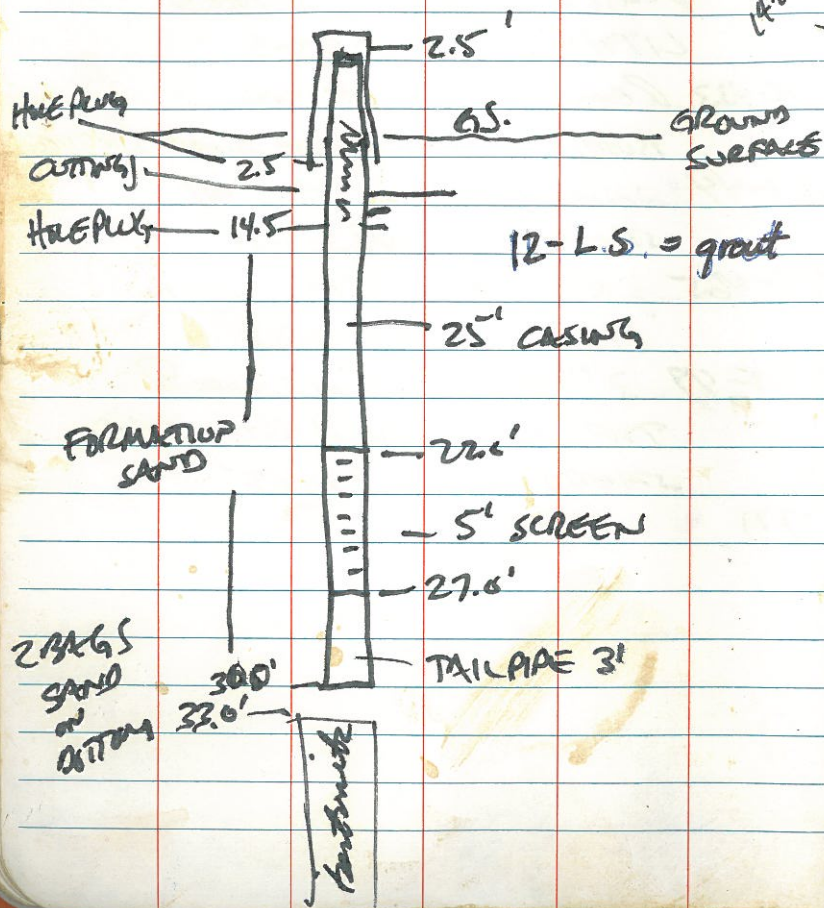
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Fossil Reef

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Quarry Hammett

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Rahin Road
Twin Towers

17916
Long Key

WHEN PUT IN CUELL, HOLE WAS F
OPEN TO 43.0' ADD 1 BAG
OF BENTONITE GROUT TO
33.0'



PULL HSA'S. HOLE REMAINED
OPEN TO 11.5' WATER @ 3.0'
RUN IN 6 5/8" AUGERS TO 31.0'
CONSTRUCT WELL & COVER BOTTOM
OF WELL @ 31.5' SCREEN 29.0' -
22.0' 2 BAGS SAND & FORMATION
FOR FILTER PACK. PULL TO 13'
SAND TO 14.5' ADD HOLE PLUG TO
SEAL OFF. PULL REST OF 6 5/8"
AUGERS. OPEN TO 11.0' CUTTING
TO 2.5' BGS. ADD HOLE PLUG.
DEVELOP. SET IN PROTECTIVE
CASING & 2 BAGS CEMENT. MAKE
PAD & END DAY @ 7:30 PM

5-14-99

CB SM

START DAY 8:00 AM

* NOTE: KC NOT SATISFIED
WITH HYDRAULIC SEAL. - WILL
REDO: - SEE NEXT PAGE
FOR FINAL GROUTING →

STATIC WATER LEVEL @ GROUND
SURFACE. 3' below top of csg

STICK UP - ~~26~~" 2' 1/2"
TOTAL WELL DEPTH 30.6"
TOTAL CASING ~~26~~' 32' 9"

SCREEN INT 22.5' - 27.6'

PUMPING ~~12.0~~ 12.0 GPM

CLEAN UP SITE & HEAD
FOR 2nd WELL NEEDS MORE
DEVELOPMENT.

END DAY

5-28-99 - remove pad & part. csg
drill in 12' csg to sta. pump
2 bags grout 12 ~ 3'
pump 6 bags bentonite/cement mix
4' to 15'

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Fossil Reef

17918
Quarry Hammer

17921
Rabbit Head

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Twin Towers

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Long Key

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17873

OB MP KC

89

2-19-99 TWIN TOWERS

T 15 R 1E S 5 CD

Lat 30° 25.602N 36"

Ln 84° 15.042W 3"

Elev ~ 165' (based on topo + fill)

0-2.5 push RB SANDY CLAY

2.5-5 push

4.5-7' WL spl - poor rec - ~1'
softer ~ 60m7-9.5' WL spl or clayey sd +
dk bn clayey sd.9.5-12 DK BRN SANDY CLAY TO
RB SANDY CLAY.

12-14.5 RB SANDY CLAY

14.5-17 RB SANDY CLAY TO RB
GREY DENSE CLAY

17-19.5 HYDRAPUNCH EXAMPLE.

buff + lt bn clay r - recommended
hydrapunch SCREEN

19.5-22' SAME

22-24.5' buff + lt bn sdy clay.

24.5-27' med bn. sdy clay

27-29.5' lt bn + yellow sd +
clayey sd17917
Fossil Reef17918
Quarry Hammock17921
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DEMO 1 31' ~~31.5'~~ TD
20-30 same to 26'
bentonite grout to -3'
pulled out string, grout
w bentonite grout to -3'
1 bag bentonite chips to
-1'

DEMO 2 17.5' ~~31.5'~~ TD
filter sand to 11'
bentonite grout to -3'
- pump bentonite grout
into casing - 39 to -3'
1 bag bentonite chips
to -1'

17873 40
29.5 - 32 - gl. bn chyd
32 - 34.5 - gray to gray chyd. gl. or
sand beneath 25' - 1st water gl. or
34.5 - 37 gl. or sl. cohesive sand

install 2 shallow demom monitor wells
grout in w. Cased 25% solids grout
End day 530

- drill in 37' hole w. 4" bit
37 - 39.5' or + gray mottled + laminated
clay
39.5 - 41.5' gray mottled clay
41.5 - 43.5' more gray clay
43.5 - 44.5' gl. & gl. or clay
44.5 - 46.5' gray + or mottled clay
46.5 - 48.5' or + gray clay
48.5 - 50.5' SAME - ~1.5" fine
sand at btm.
50.5 - 52.5' - 6" sand or above
remainder clay gl. + or. sdy clay
52.5 - 54.5' clayey sd + sdy clay,
gray w. bn laminations - appear
to be disturbed by drilling
54.5 - 56 - sdy clay or above - darker
at base
56.0 - 58.0' dk bn sdy clay harder

drill to 66' - conduct gravel dens
 - pulled core well, gravel up to ~~surface~~
 end day 445

~~S-21 8am Start~~

~~65.8' to bottom of hole.~~

~~66-67.5 good recor.~~

~~67.5-69.5~~

~~69.5-71.5~~

depths of

back to guy at base

58-59.5' gr bn + dk bn clay + sdy clay

59.5-60.5 exp section 1st 6" in core

remainder guy + bn mottled sdy clay

60.5-62 lt guy clay

62-64 mottled clay guy + lt bn

64-65.5 guy + gl. clay

65.5-67 same

67-69.5 clay + lb guy

69.5-71.5 clay, guy, mottled

S-21. 8AM START
 JS, DH, SM

71.5-73.5' same

73.5-76' grey clay upper 1/2
thin bl. sh. 3/4 & bot silty clay76-77 same - upper 1/2
remains it but hard clay?
calcium?

77-78.5' 25 SAME

78.25-79.5 - SAME

change over to WL red
depths above too deep
~ 74.5 - 75.5' silty clayey sd
75.5-80.5' SAME - softest to
bottom - ~ 3' recovered
80.5 - ~ 81.5' - poor recovery -
lost bottom - rock frag recovered
- blew pressure from to
swivel
- pull NQWL + bbl
clean up - end clay
4:45 pm

17917
Fossil Reef17918
Sunny Hammett17921
Bahia Honda17945
Nature Pt17916
Long Key

2-24 - 8 AM start - Kc, CB
 shot 9

pull KESAS

cut fill to 39'

3 base grit gravel 39-3'
 boulders chips to 6"
 cutting over top

Fossil Reef

Curry Hammet

Bahia Honda

NATURE

Long Key

17916 44
6-1-99 KL, CB, SM
7AM start - rig + 2943 to
Long Key. arrive 9.30 PM

6-2-99 7:30 start. meet w/
Kim Clouch (ASST mgr) at
site.

W# 17916

Long Key St. Rec Area

S 5 T 655 R 35E

LAT $24^{\circ}49.848$ ~~W~~ 51" EPE 42'

Lon $80^{\circ}49.274$ " 16" 3 min Avg

Elev 3'

0-1.5' fill - NO recovery

1.5-4' fill + muck NO recovery

4-4.5' muck - NO recovery - will
collect push core of muck

4.5-8' muck + some rock - top of
rock at 8'

8-9' white ls frag. then med br
lamin ls. duracrust.

9-12' - 1' recovered - drilled on
intermittent soft zone then hard

12-14' NO recovery

- 14-17' rubble ls. ~ 8" recovered
 17-19 - cuttings only v clayey
 19-20.5' cuttings only - very clayey -
 calcareous alb. w soft ls
 20.5-24.5' ~ 1.75' recovered - rubble recovery -
 calcareous matrix
 24.5-27 - SAME ~ 1' recovered
 27-29.5 - SAME ~ 6" recovered

have tried both regular +
 ext. shoes - neither consistently
 effective - matrix is calcareous
 or drops at bit

try short end shoe (3/8" ext +
 core catcher

- 29.5-32' rubble ~ 50% recovery
 matrix fine - surface - same
 32-34.5' SAME
 34.5-37' hard var vert. ls. some coral
 100% recovery
 37-39.5' SAME
 39.5-42' SAME. 2' recovered, more coral
 than other runs.
 42-44.5' - hd ls. as above, large soft
 zone not recovered. ~ 6" recovered

TRASH BAGS
tent stakes

ICE
hydraulic fluid
siphon
markers

17916 46
44.5 - 47' mixed hw + soft zones - ~1' recovered
47 - 49.5' soft ~1' recovered
49.5 - 54.5' - v soft upper 2' (no
recovery - ~1' recovered)
54.5 - 59.5' upper part soft - little
recovery. bot half mixed
~1' recovery
59.5 - 62' mostly hard rexl ls. common
cnid. 2' recovered
62 - 64.5' rexl coralline ls.
64.5 - 67 SAME
67 - 69.5' SAME
69.5 - 72 ls. NOT so rexl, ~2' rec
72 - 74.5' white fossiliferous ls.
some rexl coral ~1.5' recovered
END day 6:30 pm
6-3-99 7:15 start
STATIC WL 3.25' bLS
74.5 - 77' - plugged off at beginning
of run
77 - 79.5' no recovery
79.5 - 82' almost no recovery - a couple
of ppl sized chunks

82-84.5' N.R.

84.5-86 N R

86-88 N R

88-89.5' Almost no recovery -
cuttings frgs.89.5-92' N Recovery - pulled
drill string - bit plugged w spec
~ 6" worthpossibly all of these runs
that may have been the problem
- large all spec mat. 77-92'went back in w core bbl. +
10' rod - lost treated ends
slips did not bite - core bbl +
10' rod down hole- run retrieved tap on nr rod
finally picked it up - both
bbl + rod full of cuttings- drill in addl. 5' to SA - approx
1 ft into rock - place backbite
clip - top + btm + reset
core eye.

17916

48

START DRILLING in wireline rod
KE to MARATHON - per hyd. fluid.
end day 7:30 p.

6-4-99 700 A start

drill in NQWL to prev. TD
drill to 94.5' - no spec
recovered -

94.5 - 99.5' - spec in outer bbl
from upper part of run.

drilled remainder of rod w/o
inner bbl. - will attempt to
retrieve spec from O.B.

99.5' TD

pulled w/ rod to 46' - nat.

5th

4 bags

bentonite chips 46 - 21'

FILTER PACK 21.0' - 9.0'

1/2 BAG BENTONITE CHIPS

9.0 - 6.25'

pump 2 bags portland - stat 5'

End day 6:30

Fossil Reef

Queer Hammock

Bahia Honda

NATURE PARK

17916

49

6-5-99

portland set at 5' bLS
surge well, mobilize to
windley key site

Spencer mdr to develop
well pumping up to 12 $\pm$ 9pm
31. saline

4 94/50 BAGS CEMENT/BENTONITE
MIX FROM 5 1/4' TO 1' BGS

6-7-99 KC, CB, JM

MIX CEMENT + set manhole
cover, cut casing to 5'0"

WELL TD (TOC) -

static WL (TOC) -

Top of csg 2.5" below rim
of manhole cover

17917
Fossil Reef17918
Queer Hammett17921
Bahia Honda17945
Nature Park

W# 17917

50

^{aa}
6-5-84 Windley Key
set up rig ke to pu
CEMENT

S 23 T 635 R 37E ^{62'}
LAT 24° 57.00' ^{00"} 2mm
LON 80° 33.70' ^{43"} 40 sec Ang
Elev 12'

shortened N x B inner 66' ~ 3/32"

0-2.5' core at 15 fossiliferous
~ 100 to 1000

2.5-5.0 same - drill in 6 5/8 hsa

~ 15" to cut tube for marshall
column, set up recirc sys

6.0-7.5' fossiliferous ls. good me.

7.5-10' same

10-12.5 "

12.5-15 "

15-17.5 "

17.5-20 " lost circulation

(NO CASING in hole)

20-22.5' same

22.5-25 same - minor ssp gone
at bottom

17917
Fossil Reef

17918
Quarry Hammett

17921
Bahia Honda

17945
NATURES Park

25-27.5' rubble, soft zone
most spec dropped out into
outer barrel. - ran AW rod
to pulverize

27.5-27.75' packed up some of
pms. run + ~1/4 foot

27.75-30' ~ 80% TEL. highly REL.
coralline ls

30-32.5' ls + highly REL coral
~ 90% TEL

32.5-35 SAME - last 4" grey
calcareous?

35-37.5' grey calcareous poor re
(~6") lots of rattle in
drill string

END coring for day - return to long
key site to complete grouting

END DAY 700 pm

66-99 7AM START

STATIC WL 11.5' bLS

37.5-40' ~ 2' heavy fossiliferous
ls

Surge Plug 10x8 PVC

metal shears

PVC cutter

Socket + ratchet

enviro cap key

clean tap measure

hoses

17917

52

40-42.5' crumbly fossil ls, some coral

42.5-45' more crumbly - soft zone
in middle ~ 1' recovered

42.5-45' hard + soft zones - soft material
out. ~ 1.25' recovered

45-47.5' As above - more soft zone
up now recovering

47.5-50 - ~ 1' recovered - soft material
lost

50-52.5' crumbly ls w large ~ 1.5'
soft zone - calcite mud < 1' recd.

52.5-55' ~ 2' missing crumbly ls

55-56.75 ~ 8" recovered soft + crumbly
zone

56.75-60' soft porous ls, some soft
(calcite zone - good) recovery

60-62.5' harder - some coral &
ass. complete rec.

62.5-65' ~ 1.75' rec soft coralline ls.

65-67.5' - 1.5' recovery, biogenic
ls, some coral

67.5-70' same ~ 1' recovery

70-72.5' same, more rec'd coral 1.75' R.

72.5-75' same

75-77.5' 2' rec biogenic ls

17918
17921
17945
Queer Hammet Bahia Honda NATURAL Park

showed core to U.S. AIA.
field trip group

17917

53

77.5-80' biogenic ls., few coral
2' recovery

80-82.5 same, full recovery

82.5-85 biogenic ls. becoming harder
denser

85-87.5' same

87.5-90' same dense ls. biogenic
some repl. coral

90-92.5' ls. harder, oysters
repl. corals

92.5-95 same

95-97.5' same

97.5-98.25 ls. as above then soft

98.25-100 mostly soft ls.

100-102.5

102.5-105

105-107.5

107.5-110

110-112.5'

112' TD

pull NQWL string set up
to ream hole w/ 3 1/8" bit
and dry 545 pm

17918
Creevy Hammett

17921
Bahia Honda

17945
NATURES PARK

6-7-99

17917

34

8 AM 730 AM START

Hole filled/bridged at 46'

START REAMING

WASH

place bentonite chips 44-34'

ream 3 7/8 to 15'

cuttings 34-31.5'

washed in Bentonite chips 26-31.5'

install well aug

3' TP

5' .020 SCH

20' C19

28' w ~ 2' stickup (temp)

pour wash 26-30 filter sand
26 - 13.5'

pump + surge

TO. 26' 4 1/4" 16.35

WATER LEVEL 11' 7" BELOW
TOP OF CASING.TOP OF CASING 2 1/2' BELOW
MANHOLE RIM

Curry Hammett

Bahin House

NATURE PARK

17918

17921

17945

on
pig

- 15 2" x 10' ASTM CS9
- 1 trilob screen .020
- 1 ASTM screen .010
- 3 2 x 5' ASTM CS9
- 3 2 x 6' trilob CS9
- 1 2" x 2.5' ASTM CS9
- 1 Trilob pig X ASTM Box
- 2 male cap
- 1 fm. cap

NEED

- 1" x 50' suc hose
- new pump
- 2 manhole covers

- 5 core box bottoms
- 25 core box tops
- 10 liners
- hole plug
- JAWS for 24's
- JAWS for 18's
- ROUND WIRE
- BRUSHES

6-14-99

JA START 7 AM
 CS START 10 AM
 FROM KEY WEST.

JA. LOAD UP IN TRU & HEAD
 TO WINDLEY KEY. CS HEAD
 FROM KEY WEST & ARRIVE WINDLEY
 KEY ~ 1 AM. TALKED W/ KIM
 CROUCH @ LONG KEY SEA &
 MEANT W/ DAVID HUNT @
 CURRY HAMMOCK RTN TO WINDLEY
 & DEVELOP WINDLEY KEY WELL
 UNTIL 7:00 PM. JA ARRIVE 7 AM.
 MOVE EQUIP. TO LONG KEY SEA
 FOR NIGHT. END DAY. 8:30 PM

6-15-99

JA CS 6:45 AM START.

MOVE EQUIPMENT TO CURRY
 HAMMOCK.

Curry Hammock

Bahia Honda

NATURE PRK

17918

17921

17945

17918
CURRY HAMMOCK

57

T 66S R 30E S
Lat 24° 45.235' N 19"
Lon 80° 59.105 W 6"

W-17918

0-.75 POSTHOLE DIGGER BRN ORG.

SAND TO GREY/BRN SAND W/
LS CHUNKS IN IT

.75-2.5 1.0' REC. Foss. LS W/
GREY CLAY.

2.5-5 Foss. LS. 2.0' REC. NO
CIRCULATION. MOVE RIG A
FEW FT TO LEFT &
PUT IN SHALLOW SUPPLY
WELL

5-7.5 Foss. LS. VERY POROUS

7.5-10 AS ABOVE

10-12.5 AS ABOVE

12.5-15 AS ABOVE

15-17.5 AS ABOVE. MORE CORAL
FRAMEWORK

17918
Curry Hammock

17921
Bahia Honda

17945
Nature Park

17.5-20 PLUGGED. 6" REC.
AS ABOVE.

20-22.5 NO REC.

22.5-25 6" REC. FOSS LS

25.0-27.5 ~~NO REC.~~ NO REC. PLUGGED

BIT. PULL NO ROD +

UNPLUG BIT. PLUG WAS

FROM 25.8-27.0' INTERNAL.

27.5-30. NO REC.

30-32.5 FOSS. LS. 1.0' REC

32.5-35 AS ABOVE

35-37.5 AS ABOVE ORIBLY ORIBLY

37.5-40 AS ABOVE

40-45 FOSS LS

45-50 AS ABOVE

50-55 AS ABOVE L/ CALCITE

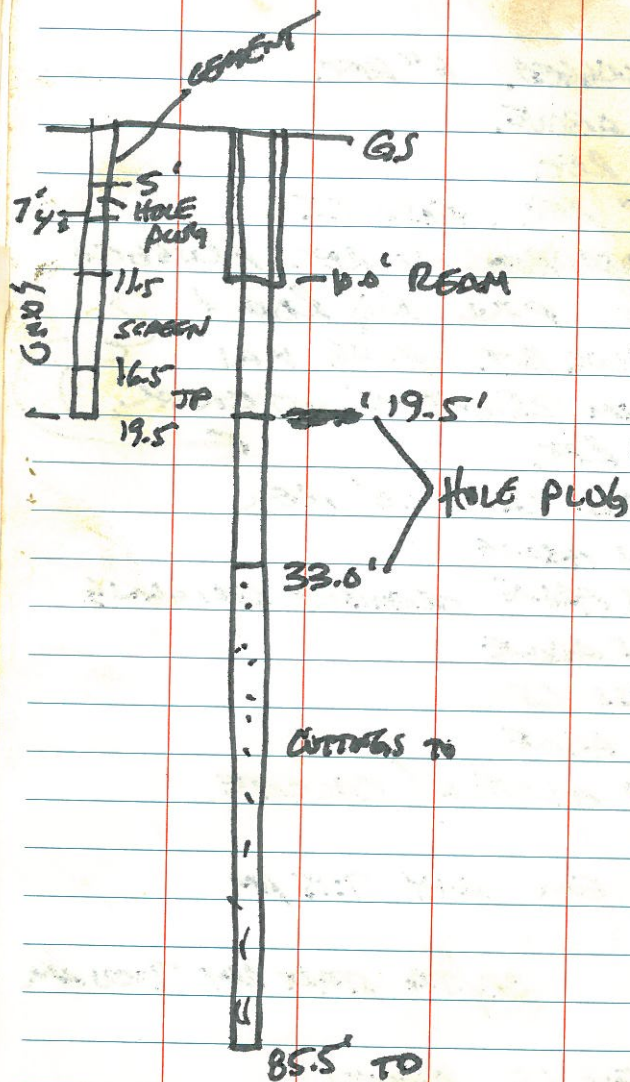
END DAY 7:15 AM

6-16-99

CR/JA START DAY 7:00 AM

55-57.5 FOSS LS. CHUNKS

57.5-60 FOSS LS. 6" REC.
CORK FRAMEWORK



17918 59

SWL 1.5' BGS

60-62.5 FOSS. LS. CORAL FRAMEWORK

62.5-65 AS ABOVE

65-67.5 NO SAMPLE

67.5-70 NO SAMPLE. PULL NQ. PWS FALLS OUT OF BOTTOM RUN NQ BACK IN TO 70.0'

70-72.5 AS ABOVE. FOSS. LS.

72.5-75 AS ABOVE

75-77.5 AS ABOVE. HARDER DRILLING

77.5-80 AS ABOVE

80-82.5 AS ABOVE

82.5-85 MORE DENSE FOSS. LS. w/ SAND. WATER COLOR CHANGES TO MILKY WHITE

85-87.5 AS ABOVE

TO.

PULL NQ. CUTTINGS TO 33' REAM HOLE TO 10.0' HOLE OPEN TO 33.0' HOLE PLUG 33.0 TO 33.0' 19.5

1.25 BAG HOLE PLUG

1 BAG SAND AT 7'4"

DEVELOP WELL

17921 Bahia Honda NATURAL PARK

17945

SUPPLY WELL WAS DRILLED
TO 17.0'.

1 BAG HOLE PLUG FROM
17.6' - 3.6' NEAR
CEMENT TO 6" BELOW
GROUND SURFACE. AIR
ON TOP.

17918

60

25 BAG HOLE PLUG TO
5.0' BAG

~~CEMENT TO 6" BELOW GROUND SURFACE~~
~~NEAR MANHOLE COVER~~
NEAR CEMENT TO 4.0'

END DAY 6:30 AM

6-17-99 CB/JA START 7:00 AM

BRING CEMENT TO
GROUND SURFACE & SET
MANHOLE COVER

CONTINUE DEVELOPING

CASING TOTAL DEPTH 19' 2"
WATER LEVEL 1.5' BELOW

TOP OF CASING

TOP OF CASING 2.5' BELOW
MANHOLE COVER

YIELD 10 gpm

END DAY 3:00 PM

17921
Bahin House

17945
NATURE PARK

6-18-99 08/24 7:00AM START

MEET W/ BOB FRANKS (305)
872-2239 ABOUT NO NAME
KEY SITE. HE HAD SOME
CONCERNS ABOUT GETTING EQUIPMENT
IN THERE W/OUT DAMAGING
PLANTS. WENT & LOOKED @
SITE, BUT SITE WAS TOO LOW
ANYWAY. LOOKED FOR ADDITIONAL
SITES. CONTACT EARLY MORNING
(@ BAHIA STATE PARK. CANT
START UNTIL NEXT WEEK
LEAVE EQUIPMENT THERE.
CONTACT FORT ZACHARY, MANAGER
HOME FOR DAY. WILL CONTACT
@ 8:00 AM 6-19-99 LOOK
@ ADDITIONAL SITES IN NO
NAME KEY. END DAY 5 PM

6-19-99 6:30AM START. DRIVE 08/24
TO COYAH HILLS TO DOWNWAS
MOUNTAIN EQUIP. OFF KEY &
MINE TO TLR

HAVE IN RIB:

- 13 2" x 10' ~~WOOD~~ ASTM
- 1 MUD SCREEN
- 1 2" x 5' ~~WOOD~~ ASTM. LONG
- 1 MUD CAP
- 5 CEMENT
- 3 SAND

NEED: 2 2" x 5 SCREEN

2 2" x 5 CASING

✓ 1 MUD CAP

✓ 1 FEM CAP

Q LOAN 2 2" x 2.5 CASING

✓ SAND

✓ HOLES AWAY

Q B'OOM CONTACT RISK
Q FORT ZACHARY TO DISCUSS
POSSIBLE SITES. SHE SAYS
NOTHING OUT FILL EVERYWHERE
+ IDEAL GND POTENTIALITY OR
CONTAMINATION. STAY BACK
FOR THE BIG ACCIDENT
4 HR DELAY.

ARRIVE THT 1:30 AM 6-20-99

W-1792/

Bahia Honda St Pk

SEC 25 AC T 66 S 9" R 30 E

LAT 24° 40' 15.5" 19 MIN

LONG 81° 15.064' 4" AVG

Elev

EPE 239'

drilled 20' supply well -
 collapsed at ~11'

HSA sampling at top

0-^{2.0} push spc

0-2.0- mod. rock frag.

rd. fine fill upper 1-1.5'

~1.5-4.5' carbonate muddy sd.

4.5-6 HSA spl + broken

same,

6-8' same

8-9' same

9-10.5' same - + shell

10.5-13' sand (packed)

top of rock at ~13'

13-15.75' - NO recovery

15.75-17 mod hard, highly bored
+ filled ls.

17921

Bahia Honda

17945

Nature Park

17921

64

pulled HSA's ~~15.5~~ ^{15.0} ran back in
w 3 1/4" to ~~15.5~~ ^{15.0}, drilled in
NGWC to 17'
pulled back HSA's 1 foot &
flushed w fresh H₂O then
worked poured bentonite chips in
to 15.0' for seal at btm of
HSA's

START DAY 7:30 A / end 7:00 P

6-24-99 7:30 AM Start.

blew out top window against
tree limb while backing up to
connect trailer (forgot window
was up) tore up frame on
wall. spent a while cleaning
up glass from campground.

pushed HSA's to btm of
hole & drilled out bentonite

17-18.75' same as last at top
then softer, porous ls.

18.75 - 22' bored & filled ls &
coral.

22- 24.3' mostly porous crumbly ls,
hard up zone at ~ 22.5'

24.5. ~ 25.5' porous bored ls, burrowed,

some dark organics. soft at ~ 25.25

25.5 - 29.5' soft zone continues to
at least 29.5' - pushed splr.

- no recovery - either washed
or empty cavity. - water sk org. b'n

29.5 - ^{34.3} cavity bottom at 29.75'

cavity fill is dark bn organics
(trace recovered in ext. shot)

- more cavity only a little rock
within thin bed or float.

34.5 minor organics + shell measured

34.5-39' - pushed + drilled up water
soft org at top - crumbly Rock
last 1/2 - 1'

37-39.5' rubblely highly burrowed/bored
rock w organic infilling ~ 50%
recovery

39.5-42' more soft stuff than
relatively hard rock last foot.

only small quantity of org. measured

42-44.5' rubblely at top. soft ~ 1' in
middle - hard coral ls at b'n

17921

66

44.5 - 47 - hd ls + med coral

47 - 49.5' porous granular ls + med. coral

49.5 - 52 as above - soft zone last
~ 1' above blm

52 - 54.5' rubbly + coralline ls

54.5 - 57. mostly soft granular
ls

57 - 59.5' SAME

59.5 - 62' med. coral + crumbly ls

62 - 64.5' med. coralline ls.

64.5 - 66 same - less coral

66 - 69.5' softer rubbly ls.

69.5 - 72' hard ls.

72 - 74.5' rubbly ls. some coral.
~ 50% med.

74.5 - 76' med. coral ls 1.5' med

* 76 - 77.5' same ~ 6" med

77.5 - 79.5' 6" med

79.5 - 81.5' ~ 1' med

* lots of dull string chatter
rock seems hard enough that
it should core - will try drl.
mud - see if that smokes things
out

81.5 - 84.5' All poor recovery

84.5 - 87

87 - 88.25

17945
NATURE PARK

ch
9/12
377 9342

17921

67

88.25 - 89.5' ~ 1' moving
mud to N88 helping
89.5 - 94.5' ~ 2' moved
94.5' TD

Drill string chatter has gotten
worse - now chatter even
w/ sent rotation (bit N88 on bottom)

we need to get cuttings out
of the hole so rods rotate
free !!

- more csg?
- mud from start?

pulled NQWC + bbl.
Cleanup + lock up
End day 6:45 pm

6-25-99 7:30 start

Static WL 1.25' BLS
hole filled to 38' (cavity)
wash in 3 1/2 bags bentonite
chips 37 - 14.5'

17945
NATURE PARK

17921

68

install well casing

3' tp

2.5' x 10 SCREEN

10' CSS. w ~ 1' stickup

pump + surge to start development

starting yield ~ 1 gpm

After surging + surging ~ 3 hr
yield 4 gpmMix 4 bags portland/bentonite
grout.

~ 3 bags for core well

remainder for supply well

Formation drill to -5.5'

bentonite/portland to ~ 1' b/w

well depth 14' 5.5" 14.45'

static wc (to c) 24' below

stickup 2.5" below

mantle cover rim

2.5'
SCREEN

screen int.

8.95' - 11.45'

yield ~ 4 gpm

17945
NATURE PARK

17921 69
6-26-99 final cleanup of well
site, drop off rig at LK
Kissimmee St. Pk, return TLH
7:30 - 10:30 pm

7-29-99

OS 7:00 AM START

TURKEY CREEK

TOTAL DEPTH : 20'6"

TOTAL CASING : 32'9"

WATER TABLE : 1'11" FROM TOP

OF CASING - STICK UP IS

2'3" ABOVE GROUND LEVEL

WATER TABLE IS 4"

ABOVE GROUND LEVEL

GPM :

Kim
Chas
Spencer Mitchell

17945

71

8-24-99

KC, CB prep for drill trip
go up thru to Chatahoochee
7AM START

W# 17945

Chatahoochee Nature Park

S33ac T4N R6W

LAT 30°41.906 (54")

LONG 84°50.944 (51") ^{2.45 min} AUG.

ELEV 150 EPE 98'

site is at west end of
gravel park area adj.
to trail to river

0-4.25' pink spls - red + y.
mottled clay sd

4.75-5.5' red clay

5.5-8' ssp. poor recovery -
need to ext. splr near

8-10^{3/4} orange clay sd + sd

10-12.5' br to lt ol. gn sd +
plastic clay

12.5-15' lt gn + or plastic clay

15-17' ssp. lt gn plastic
clay - 1st WATER

17945
NATURE PARK

17945

72

17-19 1799 gn ss - poorly lith,
rock chunky, no organic
structures

19-21' as above - harder at top
1/4 ft. gn

21-22 ss. harder - 1/4 gn
getting calcareous? penetration ref.

22-23 push spec nose back

1" clay as above then
rock - sandy mod - well ind.
end drilling - start change
over to diamond drill

End day!

8-2599 CB SM 7:00 AM START
CONTINUE CHANGE OVER TO DIAMOND
DRILL. CHANGE INNER BARREL.

23-245 LT. GRAY CALC SANDSTONE IN
GREEN CLAY GOOD REC
DRILLED SLOW. DIFFICULT
TIME GETTING SAMPLE OUT
OF INNER BARREL

24.5-27 HARD, HARD, SLOW DRILL-
ING. 100% RECOVERY THOUGH
WATER PRESS - 150 PSI @ 300
PSI FEED & ROTATION. TOOK
ABOUT 30 MIN. TO DRILL
GREY DOLOMIT TO A DENSE
CALC. CLAY. REAL HARD

27-29.5 GOOD REC. AS ABOVE

29.5-32 GOOD REC. AS ABOVE.
SAMPLE A LITTLE LESS
CONSOLIDATED.

* TRANSMISSION WAS LEAKING
FLUID OUT OF CAP ON
TOP. I TIGHTENED BUSH
TO SEE IF THAT
WOULD HELP.

STILL LEAKING

17945 73
32-34.5 GOOD REC. CREAM DOLOMITE -
LS. TO 33.6' GREY DOLOMITE -
LS W/ CREAM CLASTS TO 32.5.
CLEAR CHANGE @ 32.5 TO
BLUE/GREY DOLOMITE / LS MUDSTONE

34.5-37 GOOD REC. BLUE/GREY MUDSTONE

37-39.5 GOOD REC. LT GREY / BLUE
MUDSTONE / CLAY BLESS

39.5-42 AS ABOVE

42-44.5 AS ABOVE

44.5-47 AS ABOVE

47-49.5 AS ABOVE

49.5-51 AS ABOVE

SLOW
DRILLING

END OF LOG

8-26-99 KC, Sm 7AM start
load bentonite, pu cement
thru to site - fix leaking TRANS
SEAL. Attp. loc leak at
hgd. Jctn.

* ALSO TAKE LEAK IN MAIN
VALVE BLOCK

54-54.75' - drill down pipe

54.75⁷⁵ - 57.75⁷⁵ As above, slightly softer
clay btm 1/2. only 1' measured -
remainder in hole - ran core
bbl back in over the stub
- drilled ~ 6" last w/o water -
recovered entire section.

57.75' - 59.75' blue gn clayey carb.?
As above - btm 2" gn clay w
calcite x L

59.75' - 62.75' blue + tan
mottled clay. - w clasts. brown
ol. bn at base

62.75' - 64.75' med bn clay?

64.75' - 69.75' bluish gy sdy calc.
clay. 100% rec.

69.75' - 72.75' fl. gn + tan clayey ls?
w tan blebs, stringers etc
som dk ol. laminae

72.75' - 74.75' - sample not recovered,
ran back in w inner bbl. - drilled
ahead

74.75' - 76.75' - drilled last 3" w/o
water - NO recovery - stub
still attached can split back
in drilled ahead w/o water
full recovery

17945

75

76.75 - 79.75' - full recovery
 called Sandra Barnett re Abd.
 Pull NQ string, pump 5
 bags portland cement - cement
 down to ~ 15'

clean up site have site 6:30 p

8-27-99 KC, ERIC H

at 2:00 pm complete grouting
 (grout setup 5' below
 pump 2 add. bags portland)

clean up site, return full well 5:30 p

40 4" x 10" CS9

6 ~~10~~ 4" x 10" ~~CS9~~ SCN

6 4 x 5' ~~CS9~~ SCN

6 8 x 12 manhole cover

↪ sealed bolt down lid

12 Auger bolts - 3 1/4" dielectric

Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.	Angle	Sin.	Tan.	Sec.	Cosec.	Cotg.	Cosin.
32	.5299	.6249	1.1792	1.887	1.600	.84805	58	.6293	.8098	1.2868	1.589	1.235	.77715
10	.5324	.6289	1.1813	1.878	1.590	.84650	50	.6316	.8146	1.2898	1.583	1.228	.77531
20	.5348	.6330	1.1835	1.870	1.580	.84495	40	.6338	.8195	1.2929	1.578	1.220	.77347
30	.5373	.6371	1.1857	1.861	1.570	.84339	30	.6361	.8243	1.2959	1.572	1.213	.77162
40	.5398	.6412	1.1879	1.853	1.560	.84182	20	.6383	.8292	1.2991	1.567	1.206	.76977
50	.5422	.6453	1.1901	1.844	1.550	.84025	10	.6406	.8342	1.3022	1.561	1.199	.76791
33	.5446	.6494	1.1924	1.836	1.540	.83867	57	.6428	.8391	1.3054	1.556	1.192	.76604
10	.5471	.6536	1.1946	1.828	1.530	.83708	50	.6450	.8441	1.3086	1.550	1.185	.76417
20	.5495	.6577	1.1969	1.820	1.520	.83549	40	.6472	.8491	1.3118	1.545	1.178	.76229
30	.5519	.6619	1.1992	1.812	1.511	.83389	30	.6494	.8541	1.3151	1.540	1.171	.76041
40	.5544	.6661	1.2015	1.804	1.501	.83228	20	.6517	.8591	1.3184	1.535	1.164	.75851
50	.5568	.6703	1.2039	1.796	1.492	.83066	10	.6539	.8642	1.3217	1.529	1.157	.75661
34	.5592	.6745	1.2062	1.788	1.483	.82904	56	.6561	.8693	1.3251	1.524	1.150	.75471
10	.5616	.6787	1.2086	1.781	1.473	.82741	50	.6583	.8744	1.3284	1.519	1.144	.75280
20	.5640	.6830	1.2110	1.773	1.464	.82577	40	.6604	.8796	1.3318	1.514	1.137	.75088
30	.5664	.6873	1.2134	1.766	1.455	.82413	30	.6626	.8847	1.3352	1.509	1.130	.74896
40	.5688	.6916	1.2158	1.758	1.446	.82248	20	.6648	.8899	1.3386	1.504	1.124	.74703
50	.5712	.6959	1.2183	1.751	1.437	.82082	10	.6670	.8952	1.3421	1.499	1.117	.74509
35	.5736	.7002	1.2208	1.743	1.428	.81915	55	.6691	.9004	1.3456	1.494	1.111	.74314
10	.5760	.7046	1.2233	1.736	1.419	.81748	50	.6713	.9057	1.3492	1.490	1.104	.74120
20	.5783	.7089	1.2258	1.729	1.411	.81580	40	.6734	.9110	1.3527	1.485	1.098	.73924
30	.5807	.7133	1.2283	1.722	1.402	.81412	30	.6756	.9163	1.3563	1.480	1.091	.73728
40	.5831	.7177	1.2309	1.715	1.393	.81242	20	.6777	.9217	1.3600	1.476	1.085	.73531
50	.5854	.7221	1.2335	1.708	1.385	.81072	10	.6799	.9271	1.3636	1.471	1.079	.73333
36	.5878	.7265	1.2361	1.701	1.376	.80902	54	.6820	.9325	1.3673	1.466	1.072	.73135
10	.5901	.7310	1.2387	1.695	1.368	.80730	50	.6841	.9380	1.3711	1.462	1.066	.72937
20	.5925	.7355	1.2413	1.688	1.360	.80558	40	.6862	.9435	1.3748	1.457	1.060	.72737
30	.5948	.7400	1.2440	1.681	1.351	.80386	30	.6884	.9490	1.3786	1.453	1.054	.72537
40	.5972	.7445	1.2466	1.675	1.343	.80212	20	.6905	.9545	1.3824	1.448	1.048	.72337
50	.5995	.7490	1.2494	1.668	1.335	.80038	10	.6926	.9601	1.3863	1.444	1.042	.72136
37	.6018	.7536	1.2521	1.662	1.327	.79864	53	.6947	.9657	1.3902	1.440	1.036	.71934
10	.6041	.7581	1.2549	1.655	1.319	.79688	50	.6967	.9713	1.3941	1.435	1.030	.71732
20	.6065	.7627	1.2577	1.649	1.311	.79512	40	.6988	.9770	1.3980	1.431	1.024	.71529
30	.6088	.7673	1.2605	1.643	1.303	.79335	30	.7009	.9827	1.4020	1.427	1.018	.71325
40	.6111	.7720	1.2633	1.636	1.295	.79158	20	.7030	.9884	1.4061	1.422	1.012	.71121
50	.6134	.7766	1.2661	1.630	1.288	.78980	10	.7050	.9942	1.4101	1.418	1.006	.70916
38	.6157	.7813	1.2690	1.624	1.280	.78801	52	.7071	1.	1.414	1.414	1.	.70711
10	.6180	.7860	1.2719	1.618	1.272	.78622	50						
20	.6202	.7907	1.2748	1.612	1.265	.78442	40						
30	.6225	.7954	1.2778	1.606	1.257	.78261	30						
40	.6248	.8002	1.2808	1.601	1.250	.78079	20						
50	.6271	.8050	1.2838	1.595	1.242	.77897	10						
Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle							Cosin. Cotg. Cosec. Sec. Tan. Sin. Angle						

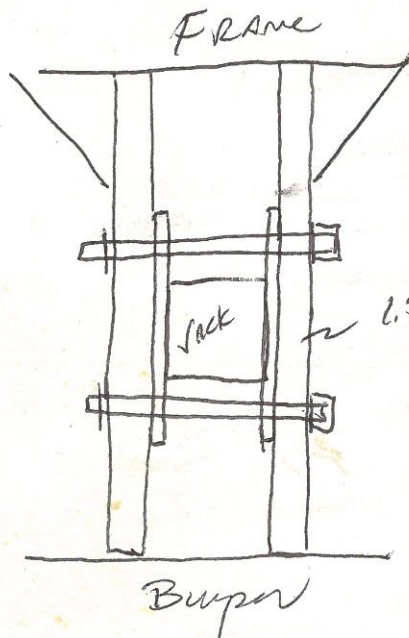
EXIT 22 COLONIAL

DAD @ WORK

332 0457

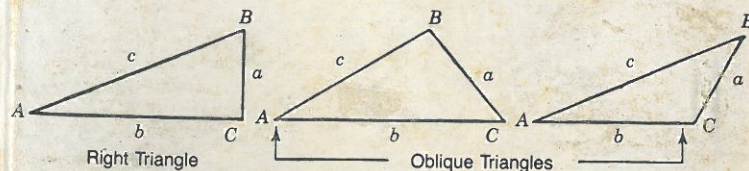
210 3420 CELL #

262 73 8912 HATS
891 0020



use bushing in disc
end of pump instead of
coupler + reducer

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

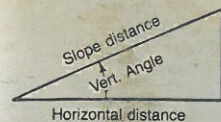
For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\csc = \frac{c}{a}$

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 $(1 - \cos \text{ of vertical angle})$. 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.

