Shell

## Recharge Test Data Record

Core Boring Number CB-RS-XX-1

Date Of Test 10-29-99

Test Performed by Nathan Bryan

Ground Water Level 1.33 ft. bgs

Casing Size 3.0 in

Casing Depth 97 ft. bgs

Hole Diameter at point of test 3.0 in

| | | | | A | B | | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|
| From Depth Elevation | To Depth Elevation | Time Start | Time Stop | Total Time | Depth to Ground Water before test | Depth to Ground Water after test | Stickup above Ground | Total Head | Total Water Injected | Gallons Per Minute |
| Feet (bgs) | Feet (bgs) | Min | Min | Min | Feet (bgs) | Feet (bgs) | Feet | Feet G+C | Gal | GPM E/A |
| 97 | 102 | 0 | 5:0 | 5.0 | 1'4" | 11½" | 5.0 | 6'4" | 47 | 9.4 |

NOTES:
1. Record water lake with the water maintained at the top of casing.
2. Water depth must be measured immediately before the recharge test.
3. Water depth shall be recorded after test, and noted if changed.
4. Typical test time is 5 minutes.

* The recharge test was in accordance w/ CESF delivery order dated 29 october 1999. see note @ bottom of order.



ENG-4

DRILLING LOG — Project: SAD — Hole No. CB-RS-XX-1

| | |
|---|---|
| Project | CSF "XX" |
| Location | SR XX |
| Drilling Agency | Mid-Atlantic Drilling |
| Hole No. | CB-RS-XX-1 |
| Driller | Jeff Stewart |
| Orientation | X Vertical ☐ Inclined ____ deg. from vert. |
| Thickness of Overburden Sediments | 29 ft |
| Thickness Drilled into Rock | 73 ft |
| Total Depth of Hole | 102 bgs |
| Location | Jacksonville Airport |
| Sheet | 1 of 1 sheets |
| Drilling Method | D-25 Track Rig |
| Total No. of Overburden Samples | 2 |
| Total No. Rock Cores | 6 |
| Elevation Ground Water | 14'11" bgs |
| Date Hole Started | 10/26/99 |
| Date Hole Completed | 10/29/99 |
| Elevation Top of Hole | 0 |
| Total Core Recovery for Rock | 44.5' = 72% |
| Logged By | Nate A Rogers |

| Elevation | Depth | Legend | Classification of Materials | Sample Type & No. | Rock Core Sample No. | Remarks | Blow Counts |
|---|---|---|---|---|---|---|---|
| | 1.5 | | LIMESTONE, medium hard, some silty sand, white to tan, fine grass. water @ 1.0' bgs. | 5" SS 1 | | | 4 4 13 |
| | 3.0 | | LIMESTONE, Weak, shelly, numerous sand filled solution holes, gray to tan. Rec. = 30"/50% RQD = 15% | 6" SS 2 | | coring 3-4 - 0.35 min 4-5 - 3.00 " 5-6 - 1.45 " 6-7 - 2.35 " 7-8 - 1.50 " | 15 |
| | 4.5 | | | | | | |
| | 6.0 | | | | | | |
| | 7.5 | | | | | 8-9 - 0.10 min | |
| | 9.0 | | Rec. = 42"/70% RQD = 24% | | | 9-10 - 0.40 " 10-11 - 2.0 " 11-12 - 4.0 " | |
| | 10.5 | | | | | 12-13 - 2.0 " the bottom three inches of core sample is too porous. lost circulation @ 11' bgs | |
| | 12.0 | | LIMESTONE, Medium hard, little shells + shell frags, some solution holes while | | | 13-14 - 2.0 min 14-15 - 1.0 min 15-16 - 1.10 " 16-17 - 2.50 " 17-18 - 0.13 " still losing circulation. | |
| | 13.5 | | Rec. = 27"/45% RQD = 25% | | | | |
| | 15.0 | | | | | | |
| | 16.5 | | | | | | |
| | 18.0 | | LIMESTONE | | | | |
| | 19.5 | | Rec. = 48"/80% RQD = 41% | | | 18-19 - 2.0 min 19-20 - 2.30 " 20-21 - 5.0 " | |
| | 21.0 | | | | | | |

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT CSF "XX" SHEET 1 of 1

DRILLING LOG (Cont Sheet) | Hole No. CB-XX-1

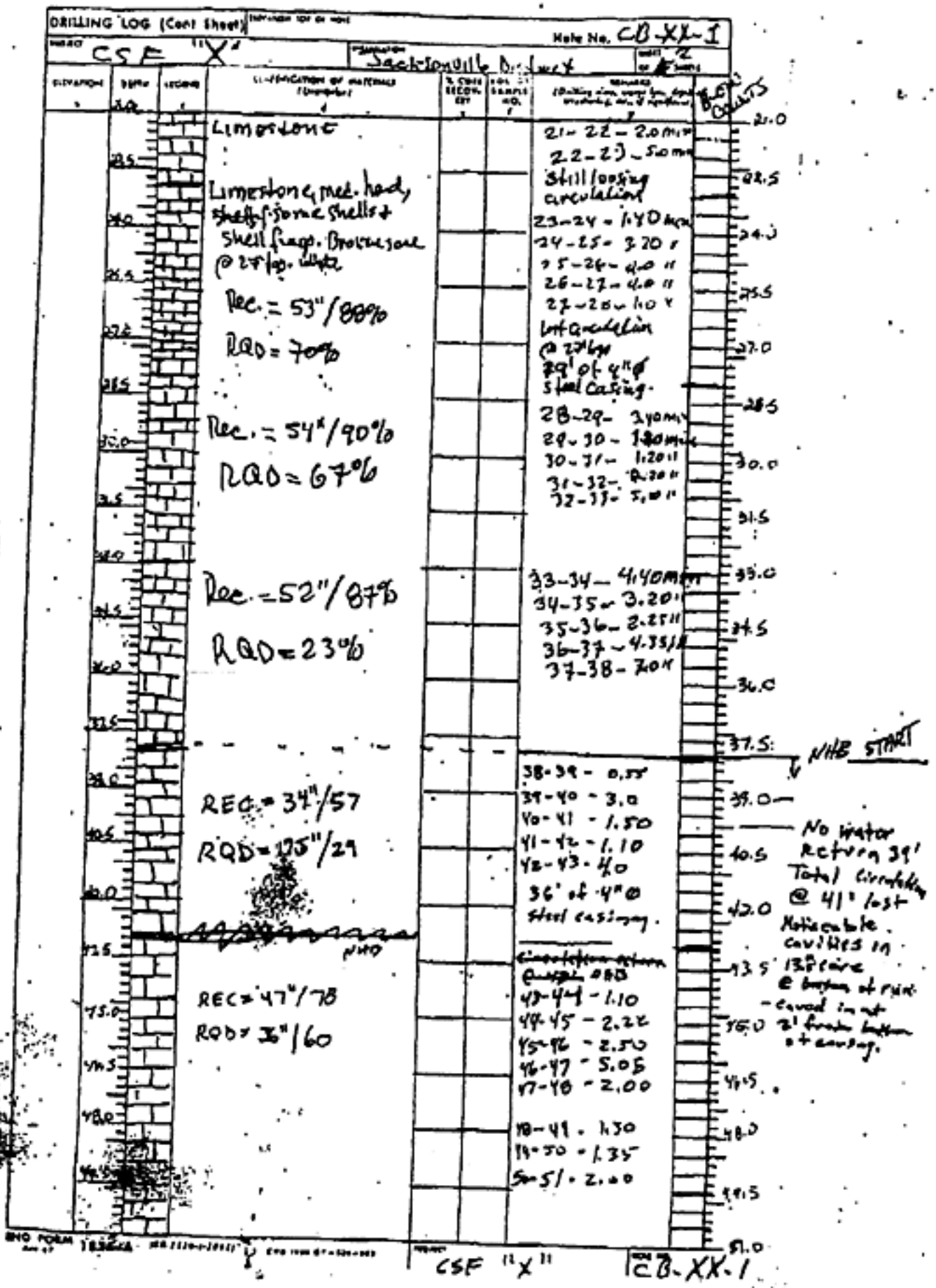
Project: CSF "X" | Location: Jacksonville Bridge | Sheet 2 of 4 Sheets

| Elevation | Depth | Legend | Classification of Materials (Description) | % Core Recovery | Box or Sample No. | Remarks (Drilling time, water loss, depth of weathering, etc., if significant) | Blow Counts |
|---|---|---|---|---|---|---|---|
| | 21.0 | | Limestone | | | 21-22 - 2.0 min<br>22-23 - 5.0 min<br>Still loosing circulation | 21.0 |
| | 22.5 | | Limestone, med. hard, ~~shelf~~ some shells + shell frags. Brown zone @ 27 top. white | | | 23-24 - 1.40 min<br>24-25 - 3.20 "<br>25-26 - 4.0 "<br>26-27 - 4.0 "<br>27-28 - 1.0 " | 22.5 |
| | 24.0 | | | | | | 24.0 |
| | 25.5 | | Rec. = 53"/88%<br>RQD = 70% | | | Lost circulation @ 27' bgs<br>29' of 4"Ø steel casing. | 25.5 |
| | 27.0 | | | | | | 27.0 |
| | 28.5 | | Rec. = 54"/90%<br>RQD = 67% | | | 28-29 - 3.40 min<br>29-30 - 1.30 min<br>30-31 - 1.20 "<br>31-32 - 2.20 "<br>32-33 - 5.0 " | 28.5 |
| | 30.0 | | | | | | 30.0 |
| | 31.5 | | | | | | 31.5 |
| | 33.0 | | Rec. = 52"/87%<br>RQD = 23% | | | 33-34 - 4.40 min<br>34-35 - 3.20 "<br>35-36 - 2.25 "<br>36-37 - 4.35 "<br>37-38 - 7.0 " | 33.0 |
| | 34.5 | | | | | | 34.5 |
| | 36.0 | | | | | | 36.0 |
| | 37.5 | | | | | | 37.5 NHB START |
| | 38.0 | | REC = 34"/57<br>RQD = 25"/29 | | | 38-39 - 0.55<br>39-40 - 3.0<br>40-41 - 1.50<br>41-42 - 1.10<br>42-43 - 4.0<br>36' of 4"Ø steel casing. | 39.0 |
| | 40.5 | | | | | | 40.5 |
| | 42.0 | | | | | | 42.0 |
| | 43.5 | | NHB<br>REC = 47"/78<br>RQD = 36"/60 | | | ~~Circulation return @ 43'~~ NHB<br>43-44 - 1.10<br>44-45 - 2.22<br>45-46 - 2.50<br>46-47 - 5.05<br>47-48 - 2.00 | 43.5 |
| | 45.0 | | | | | | 45.0 |
| | 46.5 | | | | | | 46.5 |
| | 48.0 | | | | | 48-49 - 1.30<br>49-50 - 1.35<br>50-51 - 2.00 | 48.0 |
| | 49.5 | | | | | | 49.5 |
| | | | | | | | 51.0 |

No water return 39'
Total circulation @ 41' lost
Noticeable cavities in 13.5' core @ bottom of run - caved in at 2' from bottom of casing.

ENG FORM 1836-A

Project: CSF "X" | Hole No. CB-XX-1



DRILLING LOG (Cont Sheet)

CSF "X" | Jacksonville District | Hole No. CB-RS-XX-1

| ELEVATION | DEPTH | LEGEND | Classification of materials (Description) | % CORE RECOVERY | LOG OF SAMPLE NO. | Remarks (Drilling time, water loss, depth of weathering, etc. if significant) | Blows per 6 in |
|---|---|---|---|---|---|---|---|
| 79.5 | | | | | | | |
| | 51.0 | | - see previous page | | | | |
| | | | 51-52 - 1.30 | | | still loosing circulation | |
| | 52.5 | | 52-53 - 2.00 | | | | |
| | | | REC = 57"/95 | | | | |
| | | | RQD = 45"/75 | | | | |
| | 54.0 | | 53-54 - 1.30 | | | | |
| | | | 54-55 - 1.50 | | | | |
| | 55.5 | | 55-56 - 1.45 | | | | |
| | | | 56-57 - 0.45 | | | | |
| | | | 57-58 - 5.20 | | | | |
| | 57.0 | | REC = 38"/63 | | | | |
| | | | RQD = 22"/37 | | | | |
| | 58.5 | | 58-59 - 3.00 | | | | |
| | | | 59-60 - 2.00 | | | | |
| | 60.0 | | 60-61 - 2.05 | | | | |
| | | | 61-62 - 2.30 | | | | |
| | 61.5 | | 62-63 - 0.25 | | | | |
| | | | REC = 52"/87 | | | Last 8" of run was weathered | |
| | 63.0 | | RQD = 40"/67 | | | | |
| | | NO RECOVERY | 63-64 - 2.30 | | | | |
| | 64.5 | | 64-65 - 1.45 | | | | |
| | | | 65-66 - 0.35 | | | SEE Remark Above | |
| | 66.0 | | 66-67 - 3.10 | | | | |
| | | | 67-68 - 3.30 | | | | |
| | 67.5 | | REC = 0% | | | | |
| | | | RQD = 0% | | | | |
| | 69.0 | | 68-69 - 0.15 | | | | |
| | | | 69-70 - 0.25 | | | | |
| | 70.5 | | 70-71 - 0.18 | | | | |
| | | | 71-72 - 0.10 | | | | |
| | 72.0 | | 72-73 - 0.15 | | | | |
| | | | REC = 0% | | | | |
| | | | RQD = 0% | | | | |
| | 73.5 | | SAND, white-grey, medium to coarse shell fragments, trace silt. | 9.5" / 42 | 3 | | 4 8 11 |
| | 75.0 | | SAND, silty, trace fine shell fragments | 8" / 44 | 4 | | 11 16 12 |
| | 76.5 | | SAND, white grey, medium to coarse shell fragments, trace silt | 10" / 56 | 5 | | 7 11 13 |
| | 78.0 | | | 15" / 83 | 6 | | 7 7 11 |
| | 79.5 | | | | | see following pg | 6 |

ENG FORM 1836-A (FR 11-84-1) and obsolete editions

CSF "X"

CB-RS-XX-1

** TOTAL DEPTH OF **

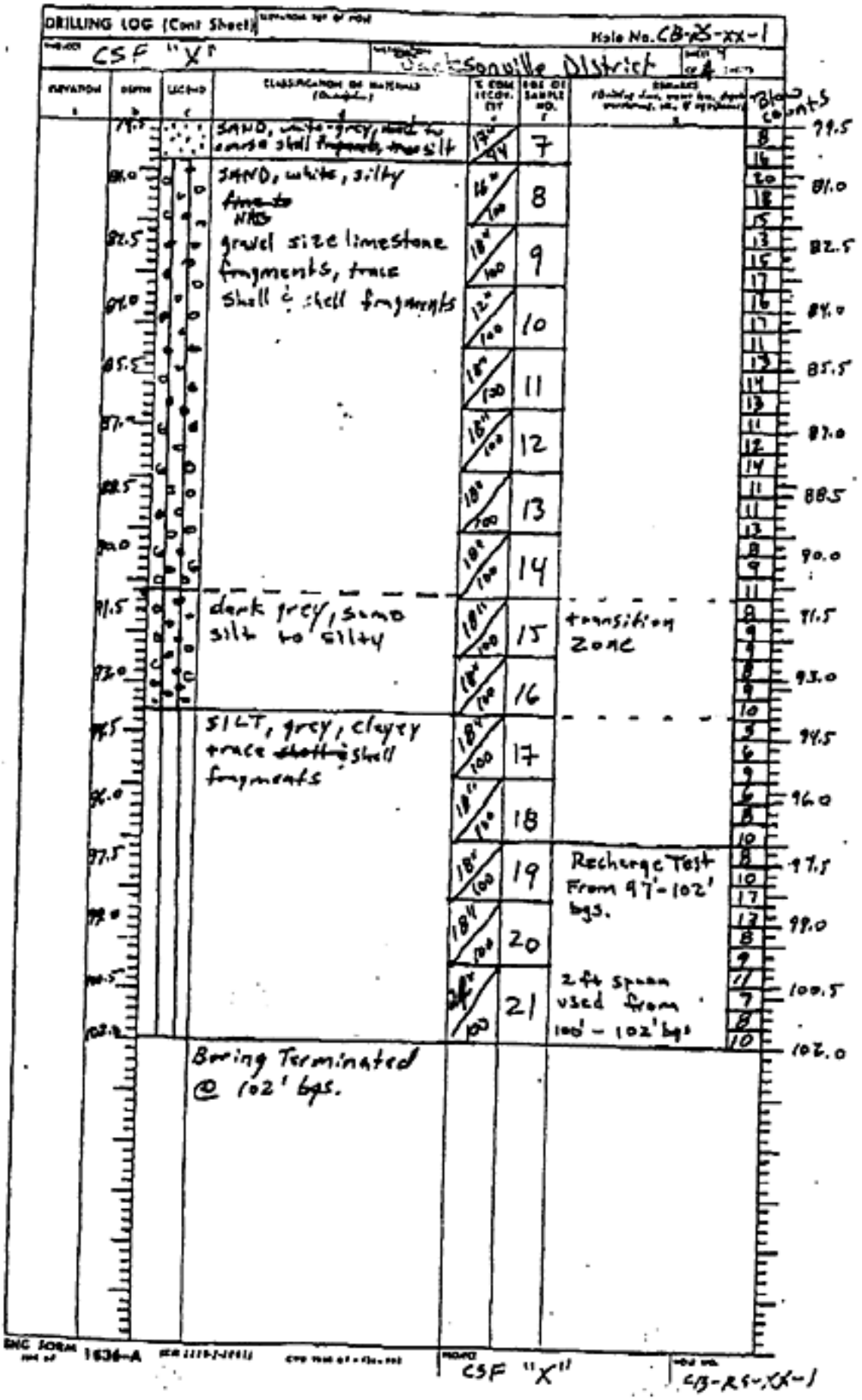
**DRILLING LOG (Cont Sheet)** Hole No. CB-RS-XX-1

Project: CSF "X" Location: Jacksonville District Sheet 4 of 4

| Elevation | Depth | Classification of Materials | % Core Recov. | Box of Sample No. | Remarks | Blow Counts |
|---|---|---|---|---|---|---|
| | 79.5 | SAND, white-grey, med to coarse shell fragments, trace silt | 17"/44 | 7 | | 8, 16 |
| | 81.0 | SAND, white, silty ~~fine to~~ NRG gravel size limestone fragments, trace shell & shell fragments | 16"/100 | 8 | | 20, 18, 15 |
| | 82.5 | | 18"/100 | 9 | | 13, 15, 17 |
| | 84.0 | | 12"/100 | 10 | | 16, 17, 11 |
| | 85.5 | | 18"/100 | 11 | | 13, 14, 13 |
| | 87.0 | | 18"/100 | 12 | | 11, 12, 14 |
| | 88.5 | | 18"/100 | 13 | | 11, 11, 13 |
| | 90.0 | | 18"/100 | 14 | | 8, 9, 11 |
| | 91.5 | dark grey, some silt to silty | 18"/100 | 15 | transition zone | 8, 9, 9 |
| | 93.0 | | 18"/100 | 16 | | 8, 9, 10 |
| | 94.5 | SILT, grey, clayey trace ~~shell~~ & shell fragments | 18"/100 | 17 | | 5, 6, 9 |
| | 96.0 | | 18"/100 | 18 | | 6, 8, 10 |
| | 97.5 | | 18"/100 | 19 | Recharge Test From 97'-102' bgs. | 8, 10, 17 |
| | 99.0 | | 18"/100 | 20 | | 13, 8, 9 |
| | 100.5 | | 24"/100 | 21 | 2 ft spoon used from 100' - 102' bgs | 11, 7, 8, 10 |
| | 102.0 | Boring Terminated @ 102' bgs. | | | | |

ENG FORM 1836-A

Project: CSF "X" Hole No. CB-RS-XX-1



Sheet1

**Recharge Test Data Record**

Core Boring Number CB-RS-XX-2

Date Of Test 11-4-99

Test Performed by Nathan Bryan

Ground Water Level 1'3" bgs

Casing Size 75' of 4" + 95.5' of 3" (bgs)

Casing Depth 95.5' bgs

Hole Diameter at point of test 2 7/8"

| | | | | A | B | | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|
| From Depth Elevation | To Depth Elevation | Time Start | Time Stop | Total Time | Depth to Ground Water before test | Depth to Ground Water after test | Stickup above Ground | Total Head | Total Water Injected | Gallons Per Minute |
| Feet (bgs) | Feet (bgs) | Min | Min | Min | Feet (bgs) | Feet (bgs) | Feet | Feet B+C | Gal | GPM E/A |
| 95.5 | 100.5 | 0 | 5.0 | 5.0 | 1'3". | 1'6.5" | 5.0 | 6'3" | 0.12 | 0.02 |

NOTES: 1. Record water take with the water maintained at the top of casing.
2. Water depth must be measured immediately before the recharge test.
3. Water depth shall be recorded after test, and noted if changed.
4. Typical test time is 5 minutes.

* The recharge test was in accordance w/ CDSF delivery order dated 29 october 1999. See note @ bottom of order.



ENG-4

Hole No. CB-RS-XX-Z

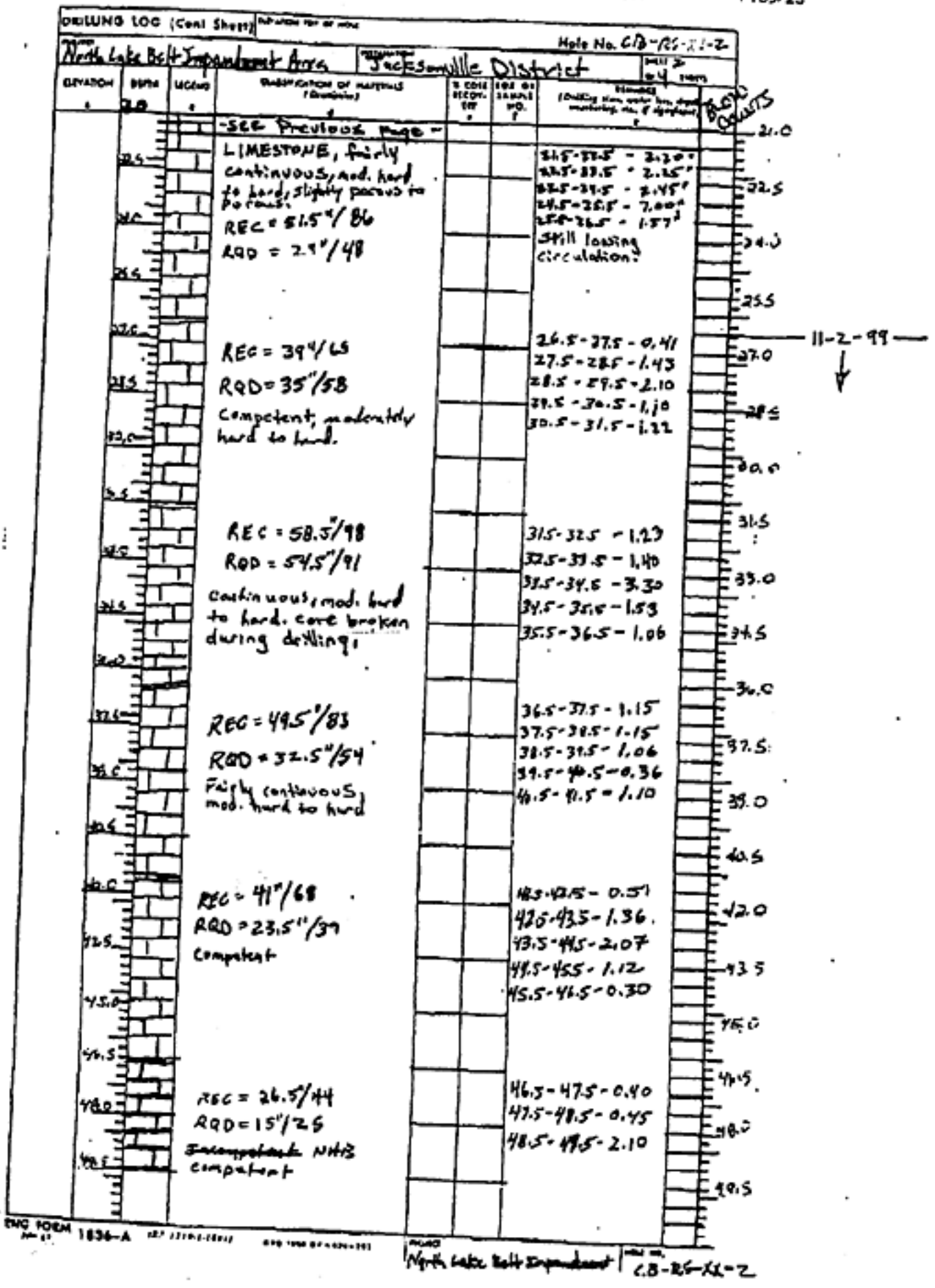
| | |
|---|---|
| DRILLING LOG | DIVISION: SAD |
| 1. PROJECT: North Lake Belt Impoundment Area | INSTALLATION: Jacksonville District |
| 2. LOCATION (Coordinates or Station): OPA Locke West Airport CSF "X" | SHEET 1 OF 4 SHEETS |
| 3. DRILLING AGENCY: Mid-Atlantic Drilling | 10. SIZE AND TYPE OF BIT: 3 7/8 in / 4 in Casing |
| 4. HOLE NO. (As shown on drawing title and file number): CB-RS-XX-Z | 11. DATUM FOR ELEVATION SHOWN (TBM or MSL): No Information |
| 5. NAME OF DRILLER: Jeffrey A. Stewart | 12. MANUFACTURER'S DESIGNATION OF DRILL: D-25 Track Rig |
| 6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT. | 13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 19 / UNDISTURBED 1 |
| 7. THICKNESS OF OVERBURDEN: 30.0-ft | 14. TOTAL NUMBER CORE BOXES |
| 8. DEPTH DRILLED INTO ROCK: 70.5-ft | 15. ELEVATION GROUND WATER: 1' 3" bgs |
| 9. TOTAL DEPTH OF HOLE: 100.5-ft | 16. DATE HOLE: STARTED 11-1-99 / COMPLETED 11-4-99 |
| | 17. ELEVATION TOP OF HOLE: No Information |
| | 18. TOTAL CORE RECOVERY FOR BORING: 67 % |
| | 19. SIGNATURE OF INSPECTOR: Nathan H. Berg |

| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS (Description) | % CORE RECOVERY | BOX OR SAMPLE NO. | REMARKS (Drilling time, water loss, depth weathering, etc., if significant) | Blow counts |
|---|---|---|---|---|---|---|---|
| | | | TOPSOIL (2-in.) | 4" / 22 | 1 | 1.5-2.5 - 0.48" | 2 |
| | 1.5 | | SAND, gravel size limestone fragments, small rocks, fine to medium | | | 2.5-3.5 - 0.52" | 25 |
| | | | | | | 3.5-4.5 - 2.53" | 50/3 |
| | | | | | | 4.5-5.5 - 1.00" | |
| | | | | | | 5.5-6.5 - 4.10" | |
| | 3.0 | | CONCRETE / Grout (8-in) | | | | |
| | | | LIMESTONE, mod. Hard to hard, competent, small voids, trace clayey silt | | | Trace clayey silt in limestone voids. | |
| | 4.5 | | CONCRETE / Grout (2-in) | | | | |
| | 6.0 | | REC = 31"/58<br>RQD = 15.5"/26 | | | | |
| | 7.5 | | REC = 29"/48<br>RQD = 26"/43<br>competent | | | 6.5-7.5 - 1.42"<br>7.5-8.5 - 2.11"<br>8.5-9.5 - 1.24"<br>9.5-10.5 - 0.20"<br>10.5-11.5 - 2.35" | |
| | 9.0 | | | | | | |
| | 10.5 | | | | | 10' of 4 in Ø casing installed | |
| | 12.0 | | | | | 11.5-12.5 - 3.30"<br>12.5-13.5 - 2.00"<br>13.5-14.5 - 2.10"<br>14.5-15.5 - 1.10"<br>15.5-16.5 - 2.56"<br>Circulation Lost Between 12.5'-13.5' bgs. | |
| | 13.5 | | REC = 35"/58<br>RQD = 21.5"/36<br>Competent | | | | |
| | 15.0 | | | | | | |
| | 16.5 | | ~~competent~~ NGB | | | 16.5-17.5 - 2.50"<br>17.5-18.5 - 2.30"<br>18.5-19.5 - 1.54"<br>19.5-20.5 - 1.50"<br>20.5-21.5 - 3.50" | |
| | 18.0 | | REC = 53"/88<br>RQD = 46"/77<br>Fairly continuous | | | | |
| | 19.5 | | | | | | |
| | 21.0 | | | | | | |

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE.

PROJECT: North Lake Impoundment Area

HOLE NO. CB-RS-XX-Z


DRILLING LOG (Cont Sheet)
Hole No. CB-RC-XL-2
North Lake Belt Impoundment Area
Jacksonville District
-SEE Previous Page-
LIMESTONE, fairly continuous, mod. hard to hard, slightly porous to porous.
REC = 51.5"/86
RQD = 2.9"/48
REC = 39"/65
RQD = 35"/58
Competent, moderately hard to hard.
REC = 58.5"/98
RQD = 54.5"/91
Continuous, mod. hard to hard. core broken during drilling!
REC = 49.5"/83
RQD = 32.5"/54
Fairly continuous, mod. hard to hard
REC = 41"/68
RQD = 23.5"/39
Competent
REC = 26.5/44
RQD = 15"/25
Incompetent NHR competent
Still loosing circulation!
11-2-99
ENG FORM 1836-A
North Lake Belt Impoundment
CB-RC-XL-2

DRILLING LOG (Cont Sheet) | Hole No. CB-RS-XI-2

Project: North Lake Belt Impoundment Area | Jacksonville District | Sheet 3 of 4 sheets

| Elevation | Depth | Legend | Classification of Materials (Description) | % Core Recovery | Box or Sample No. | Remarks (Drilling time, water loss, depth of weathering, etc., if significant) | Blow Count |
|---|---|---|---|---|---|---|---|
| | 49.5 | | LIMESTONE, competent, moderately hard to hard, slightly porous to porous | | | Coring<br>49.5-50.5 - 1.15"<br>50.5-51.5 - 0.55"<br>Caved to 49.5' bgs.<br>51-ft of 4" ø casing installed | 49.5 — still losing circulation. |
| | 52.0 | | | | | | 51.0 |
| | 52.5 | | | | | | 52.5 |
| | 54.0 | | REC = 10.5'/17.5<br>RQD = 0%<br>Incompetent | | | 51.5-52.5 - 0.55"<br>52.5-53.5 - 1.05"<br>53.5-54.5 - 1.05"<br>54.5-55.5 - 0.41<br>55.5-56.5 - 0.58 | 54.0 |
| | 55.5 | | | | | | 55.5 |
| | 57.0 | | | | | 56.5-57.5 - 0.31"<br>57.5-58.5 - 1.30"<br>58.5-59.5 - 1.46"<br>59.5-60.5 - 1.79"<br>60.5-61.5 - 1.25"<br>Caved to 59.5' bgs. | 11-3-99 |
| | 58.5 | | REC = 38'/63<br>RQD = 29"/48<br>competent | | | | 57.0 |
| | 60.0 | | | | | | 58.5 — approx. 1/2 of the circulation lost between 58.5 & 61.5 |
| | 61.5 | | | | | circulation lost @ 61.5<br>61.5-62.5 - 1.25"<br>62.5-63.5 - 1.16"<br>63.5-64.5 - 0.37"<br>64.5-65.5 - 0.58<br>65.5-66.5 - 0.11 | 60.0 |
| | 63.0 | | REC = 31.5'/53<br>RQD = 85"/14<br>competent | | | | 61.5 |
| | 64.5 | | | | | | 63.0 |
| | 66.0 | | | | | 66.5-67.5 - 0.15"<br>67.5-68.5 - 0.30"<br>68.5-69.5 - 0.20"<br>69.5-70.5 - 0.23"<br>70.5-71.5 - 0.21" | 64.5 |
| | 67.5 | | REC = 14"/23<br>RQD = 0%<br>Incompetent | | | | 66.0 |
| | 69.0 | | | | | | 67.5 |
| | 70.5 | | | | | | 69.0 |
| | 72.0 | | SAND, white-grey, fine to medium. Trace gravel size limestone fragments, silty | 75"/42 | 2 | 71' of 4-in diameter casing installed. Water return @ 71.5' bgs. | 70.5 |
| | 73.5 | | | 18"/100 | 3 | | 72.0 |
| | 75.0 | | | 8"/44 | 4 | | 73.5 |
| | 76.5 | | | 18"/100 | 5 | | 75.0 |
| | 78.0 | | | 85"/47 | 6 | | 76.5 |
| | 79.5 | | | | | | 78.0 |
| | | | | | | | 11-4-99 |
| | | | | | | | 79.5 |

→ see following page

N. Lake Belt Impoundment Area

ENG FORM 1836-A

DRILLING LOG (Cont Sheet) Hole No. CB-BS-XY-2

N. Lake Belt Impoundment Area — Jacksonville District

| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS | % CORE RECOV. | SOIL SAMPLE NO. | REMARKS | BLOW COUNTS |
|---|---|---|---|---|---|---|---|
| | 79.0 | | Same as previous 71.5' to 79.5' | 18"/100 | 7 | 76-ft of 4-in diameter casing installed. | 5 5 7 8 10 |
| | 81.0 | | SILT, grey, clayey, trace sand-fine | 18"/100 | 8 | | |
| | 82.5 | | SAND, silty, grey medium size limestone fragments. -see remarks- | 18"/100 | 9 | Probable silt w/ trace fine sand from 82' to 82.5'. Fluff from drilling entered spoon. | 5 8 9 9 6 |
| | 84.0 | | | 18"/100 | 10 | | |
| | 85.5 | | | 13"/72 | 11 | Hole Re-Washed | 6 4 5 8 10 |
| | 87.0 | | | 19"/94 | 12 | | 7 8 5 6 9 |
| | 88.5 | | | 15"/64 | 13 | | |
| | 90.0 | | | 11"/61 | 14 | | 8 12 14 6 7 |
| | 91.5 | | Transition zone from Sand to Silt | 18"/100 | 15 | | |
| | 92.0 | | SILT, light grey, some medium to fine shell fragments | 18"/100 | 16 | | 7 4 4 5 6 |
| | 93.5 | | | 18"/100 | 17 | | 8 10 |
| | 96.0 | 4D TUBE | | | | 3" Shelby Tube from 95.5' to 97.5' bgs. | |
| | 97.5 | | some fine sand to Sandy from 97.5' to a. 100.5' bgs. | 16"/100 | 18 | Recharge Test from 95.5' to 100.5' bgs. (0.02 GPM) | 4 6 10 7 9 |
| | 99.0 | | | 15"/100 | 19 | | 11 |
| | 100.5 | | Boring Terminated @ 100.5-ft bgs | | | 95-ft of 3-in casing installed. Boring drilled to 100.5 ft bgs. 2 7/8" hole from 97.5' to 100.5' | |

ENG FORM 1836-A (ER 1110-1-1803)

L = 5'
R = 3"

$$K = \frac{q}{2\pi L h} \ln\left(\frac{L}{r}\right)$$

q = 0.02 gpm
= 4 ft³/day
0.4 ft/day

$$K = \frac{4}{2.3.14 \cdot 5(6.2)} \ln(\quad)$$

$K_N$ = 0.06 ft/day

Sheet1

**Recharge Test Data Record**

Core Boring Number CB-RS-XX-3

Date Of Test 11-12-99

Test Performed by Nathan Bryan / Kwabena Ofori-Awuah

Ground Water Level 3' 11.5"

Casing Size 3-in

Casing Depth 90 ft. bgs

Hole Diameter at point of test 3.5/8"

| | | | | A | B | | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|
| From Depth Elevation | To Depth Elevation | Time Start | Time Stop | Total Time | Depth to Ground Water before test | Depth to Ground Water after test | Stickup above Ground | Total Head | Total Water Injected | Gallons Per Minute |
| Feet (bgs) | Feet (bgs) | Min | Min | Min | Feet (bgs) | Feet (bgs) | Feet | Feet B+C | Gal | GPM E/A |
| 90.0 | 95.0 | 0 | 5.0 | 5.0 | 3'11.5" | 3'11.5" | 5.0 | 8'11.5" | 685 | 13.7 |

NOTES: 1. Record water take with the water maintained at the top of casing.
2. Water depth must be measured immediately before the recharge test.
3. Water depth shall be recorded after test, and noted if changed.
4. Typical test time is 5 minutes.

Note: The recharge test was in accordance w/ CESF delivery order dated 29 October 1999. See note @ bottom of order.



ENC-4

NOV 12 1999 11:08 FR LAW-MIAMI 305 826 1759 TO RSRESTOS P.06/06

Hole No. CB-RS-XX-3

| DRILLING LOG | DIVISION SAD | INSTALLATION Jacksonville District | SHEET 1 OF 4 SHEETS |
|---|---|---|---|
| 1. PROJECT North Lake Belt Impoundment Area | | 10. SIZE AND TYPE OF BIT 2 3/8" bit - 3" casing | |
| 2. LOCATION (Coordinates or station) C-9 Canal (1.5 mile from US 27) | | 11. DATUM FOR ELEVATION SHOWN (TBM or MSL) | |
| 3. DRILLING AGENCY U.S. Drilling | | 12. MANUFACTURER'S DESIGNATION OF DRILL CME-55 Truck Mounted | |
| 4. HOLE NO. (Refer to drawing and specimen index) CB-RS-XX-3 | | 13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN: DISTURBED 11 | UNDISTURBED 0 |
| 5. NAME OF DRILLER J.C. Moffett | | 14. TOTAL NUMBER CORE BOXES | |
| 6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT. | | 15. ELEVATION GROUND WATER 3' 0" | |
| 7. THICKNESS OF OVERBURDEN 22 ft | | 16. DATE HOLE: STARTED 11-10-99 | COMPLETED 11-11-99 |
| 8. DEPTH DRILLED INTO ROCK 23 ft (see log) | | 17. ELEVATION TOP OF HOLE | |
| 9. TOTAL DEPTH OF HOLE 95 ft | | 18. TOTAL CORE RECOVERY FOR BORING 61 | |
| | | 19. SIGNATURE OF INSPECTOR [signature] | |

| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS (Description) | % CORE RECOVERY | BOX OR SAMPLE NO. | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) |
|---|---|---|---|---|---|---|
| | 1.5 | | LIMESTONE, incompetent moderately hard to hard, porous<br>REC = 17"/28<br>RQD = 0 | | | Casing<br>0-1 - 0.05"<br>1-2 - 0.05"<br>2-3 - 0.05"<br>3-4 - 0.05"<br>4-5 - 0.05"<br>5' of 3" ø casing installed.<br>5-6 - 2.30"<br>6-7 - 2.25"<br>7-8 - 2.31"<br>8-9 - 2.23"<br>8' of 3" ø casing installed.<br>9-10 - 2.22"<br>10-11 - 0.15"<br>11-12 - 16.12"<br>12-13 - 1.55"<br>12' of 3" ø casing installed.<br>13-14 - 0.02"<br>14-15 - 0.02"<br>15-16 - 0.02"<br>16-17 - 0.02"<br>17-18 - 0.02"<br>18' of 3" ø casing installed.<br>18-19 - 0.04"<br>19-20 - 0.04"<br>20-21 - 0.04" |
| | 2.0 | | | | | |
| | 4.5 | | | | | |
| | 6.0 | | REC = 30"/63<br>RQD = 0<br>moderately hard to hard, porous, dark brown organic clay invoids between 5'-7' bgs. (≈ 4"-6") competent. | | | |
| | 7.5 | | | | | |
| | 9.0 | | REC = 32"/67<br>RQD = 0<br>moderately hard to hard, competent, slightly porous. | | | |
| | 10.5 | | | | | |
| | 12.0 | | SILT, light grey, sandy, med to coarse limestone fragments (4") | | | |
| | 13.5 | | LIMESTONE, moderately hard to hard, incompetent, sand filled solution holes between 15.5'-17.5' bgs. (white silty sand ≈ 4")<br>REC = 22"/37<br>RQD = 0 | | | |
| | 15.0 | | | | | |
| | 16.5 | | | | | |
| | 18.0 | | SILT, dark grey, clayey (4") | | | |
| | 19.5 | | LIMESTONE, hard to very hard, porous.<br>REC = 13"/22<br>RQD = 9"/15 | | | |
| | 21.0 | | (continued) | | | |

Circulation lost @ 1.0' bgs. Casing installed to prevent water loss.

Boring caved 1-ft between 8'-9' bgs.

Possible rock wedged @ bit.

DRILLING LOG (Cont Sheet)

Hole No. CB-RS-XX-3

Project: North Lake Belt Impoundment Area

Location: Jacksonville District

Sheet 3 of 4 sheets

| Elevation | Depth | Legend | Classification of materials (Description) | % Core recovery | Box or sample no. | Remarks (Drilling time, water loss, depth of weathering, etc., if significant) |
|---|---|---|---|---|---|---|
| | 48.0 | | LIMESTONE<br>REC=28/47%<br>RQD=6/10% | | | 48-49 - 0.04"<br>49-50 - 2.38"<br>50-51 - 2.42"<br>51-52 - 0.04"<br>52-53 - 0.21"<br>48' of 3" casing installed. |
| | 49.5 | | | | | |
| | 51.0 | | | | | |
| | 52.5 | | | | | |
| | 54.0 | | REC = 38"/63<br>RQD= 10"/16<br>competent, porous | | | 53-54 - 0.12"<br>54-55 - 0.36"<br>55-56 - 0.09"<br>56-57 - 0.10"<br>57-58 - 0.59"<br>53' of 3" casing installed. |
| | 55.5 | | | | | |
| | 57.0 | | | | | |
| | 58.5 | | REC= 20"/33<br>RQD= 0%<br>incompetent, porous | | | 58-59 - 0.14"<br>59-60 - 0.18"<br>60-61 - 0.06"<br>61-62 - 0.13"<br>62-63 - 0.09"<br>58' of 3" casing installed. |
| | 60.0 | | | | | |
| | 61.5 | | | | | |
| | 63.0 | | | | | |
| | 64.5 | | REC= 41"/68<br>RQD= 12"/20<br>few sand filled solution holes, grey-silty. | | | 63-64 - 0.03"<br>64-65 - 0.25"<br>65-66 - 1.43"<br>66-67 - 1.15"<br>67-68 - 3.30"<br>63' of 3" casing installed |
| | 66.0 | | | | | |
| | 67.5 | | | | | |
| | 69.0 | | REC= 41"/68<br>RQD= 22"/37<br>competent, porous | | | 68-69 - 0.58"<br>69-70 - 1.13"<br>70-71 - 1.44"<br>71-72 - 0.18"<br>72-73 - 0.15"<br>68' of 3" casing installed. |
| | 70.5 | | | | | |
| | 72.0 | | | | | |
| | 73.5 | | SAND, no recovery, probable same as 78'-79.5'. grave size limestone fragments recovered.<br>REC= 3"/5<br>RQD= 0 | | | 73-74 - 0.06"<br>74-75 - 0.10"<br>75-76 - 0.10"<br>76-77 - 0.16" |
| | 75.0 | | | | | |
| | 76.5 | | | | | |

48.0 — still loosing circulation

49.5

51.0

52.5 — 11-11-99

54.0

55.5

57.0

58.5

60.0

61.5

63.0

64.5

66.0

67.5

69.0

70.5

72.0

73.5 — coring, no actual recovery of sand. washed from core barrel. (73'-78')

75.0

76.5

ENG FORM 1836-A

Project: N. Lake Belt Impoundment Area

Hole No. CB-RS-XX-3

DRILLING LOG (Cont Sheet)

Hole No. CB-RS-XX-3

N. Lake Belt Impoundment Area | Jacksonville District | Sheet 4 of 4

| Elevation | Depth | Classification of Materials | % Core Recovery | Sample No. | Remarks | Blow counts |
|---|---|---|---|---|---|---|
| | 77.0 | - see previous description | | | 77-78 = 0.09" | 77.0 |
| | 78.5 | SAND, white, grey, some silt, gravel size limestone fragments (SM). | 18"/100 | 1 | | 78.5 |
| | 80.0 | | 18"/100 | 2 | | 80.0 |
| | 81.5 | | 18"/100 | 3 | | 81.5 |
| | 83.0 | | 18"/100 | 4 | | 83.0 |
| | 84.5 | Transition zone from sand to silt. | 18"/100 | 5 | | 84.5 |
| | 86.0 | | 18"/100 | 6 | last 2" of spoon was SILT. | 86.0 |
| | 87.5 | SILT, little fine to medium sand. Dark grey, clayey | 18"/100 | 7 | | 87.5 |
| | 89.0 | SILT, grey, sandy - medium to coarse. | 17"/94 | 8 | | 89.0 |
| | 90.5 | SILT, trace medium to coarse sand, clayey, grey. | 18"/100 | 9 | Recharge Test from 90'-95' bgs. | 90.5 |
| | 92.0 | | 18"/100 | 10 | | 92.0 |
| | 93.5 | | 18"/100 | 11 | 2-ft spoon from 93'-95' | 93.5 |
| | 95.0 | Boring Terminated @ 95' bgs. | | | | 95.0 |

Note: Boring offset ≈ 10-ft from original location due to track rig being vandalized. Possible metal objects in hole.

ENG FORM 1836-A

N. Lake Belt Impoundment Area | CB-RS-XX-3

Sheet1

| Recharge Test Data Record | XX4 | | | | | |
|---|---|---|---|---|---|---|
| Core Boring Number | XX4 | | | | | |
| Date Of Test | 10/17/99 | | | | | |
| Test Performed by | R. Beine | | | | | |
| Ground Water Level | 4'-7" | | | | | |
| Casing Size | 3" | | | | | |
| Casing Depth | 125' | | | | | |
| Hole Diameter at point of test | 3" | | | | | |

| | | | | A | B | | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|
| From Depth | To Depth | Time Start | Time Stop | Total Time | Depth to Ground Water before test | Depth to Ground Water after test | Stickup above Ground | Total Head | Total Water Injected | Gallons Per Minute |
| Feet | Feet | Min | Min | Min | Feet | Feet | Feet | Feet B+C | Gal | GPM E/A |
| 125 | 130 | 0 | 10 | 10 | 1.6 | 1.6 | 5 | 6.6 | 116 | 11.6 |

NOTES:
1. Record water take with the water maintained at the top of casing.
2. Water depth must be measured immediately before the recharge test.
3. Water depth shall be recorded after test, and noted if changed.
4. Typical test time is 5 minutes.



Encl - 11

DRILLING LOG — Division: SAD — Jacksonville District — Sheet 1 of 5 sheets

1. Project: CSF
2. Location: SR 5 (US 17) XX
3. Drilling Agency: Law Engineering
4. Hole No. for this boring: CB4X-4
5. Name of Driller: Wilson Candelaria
6. Size of Boring: ☒ Solid ☐ Hollow ____ dia. Rock Core
7. Thickness of Overburden: Alligator 3'9"
8. Depth Drilled into Rock: 126'3"
9. Total Depth of Hole: 130'
10. Geological Log Classification of Drill: CHE-55
11. Total Depth of Boring: 130' Undisturbed: 0
12. Total Number Core Holes: 6
13. Depth to Ground Water: Depths = 1.5'
14. Date Hole: Started 10/11/99 Completed 10/17/99
15. Elevation Top of Hole:
16. Total Core Recovery for Boring: 87.3% / 67.2%
17. Signature of Inspector: Erik S. Urch

| Elevation | Depth | Legend | Classification of Materials | Sample No. / Type / Recovery | Remarks | Blows/6" |
|---|---|---|---|---|---|---|
| WT ▼ | 1.5 | | SAND, med to coarse, calcareous, gravelly (up to 1") limestone fragments, shelly, brown to tan, some clay (brown) | 1 — 18"/100% | split-spoon | 0 — 12, 12, 8 |
| | 3.0 | | PEAT - organic, dk. brown | 2 — 11"/35% | | 1.5 — 3, 1 |
| | 4.5 | | LIMESTONE fragments, angular, sandy, shelly, tan to light brown to white; frags. up to 1.5", silty. | 3 — 18"/100% | | 3.0 — 6, 7, 15 |
| | 6.0 | | | 4 — 18"/100% | | 4.5 — 5, 5, 17 |
| | 7.5 | | | 5 — 18"/100% | | 6.0 — 12, 17, 21 |
| | 9.0 | | SILT, sandy, some shell fragments, gray | 6 — 10"/46% | | 7.5 — 14, 7, 21 |
| | 10.5 | | LIMESTONE fragments, angular, sandy, shelly, tan to gray, silty. | 7 — 7"/39% | | 9.0 — 3, 3, 18 |
| | 12.0 | | | 8 — 6"/35% | | 10.5 — 2, 2, 7 |
| | 13.5 | | | 9 — 16"/89% | | 12.0 — 2, 2, 21 |
| | 15.0 | | LIMESTONE, porous, shelly, sand-filled solution cavities, tan to white; some subangular to subrounded fragments grey to white. REC: RQD: | — — — | | 13.5 — 37, 30 (53) 2" refusal at 13'4" |
| | 16.5 | | | 42"/70% — | Timed drilling (SA): 13 0:00; 14 1:05; 15 1:40; 16 1:55 | 15.0 |
| | 18.0 | | | 9"/15% — | 17 2:15; 18 2:52 (SA) | 16.5 |
| | 19.5 | | | — — | 19 3:15 | 18.0 |
| | 21.0 | | Same Very hard, dense grey limestone REC: RQD: | 59"/98% — | 20 2:40; 21 11:18 | 19.5 |
| | 22.5 | | | 39"/65% — | 22 2:10; 23 3:05 | 21.0 |
| | | | | | | 22.5 |

ENG FORM 1836 — PREVIOUS EDITIONS ARE OBSOLETE. — PROJECT: CSF — HOLE NO.: CB-XX-4

DRILLING LOG (Core Sheet) Hole No. CB-XX-4

Project: CSF | Location: Jacksonville District | Sheet 2 of 2 sheets

| Elevation | Depth | Core | Classification of materials (Description) | % Cored Recov. Per | Core Run & Sample No. | Notes (Drilling time, water loss, depth of weathering, etc. of significant) | Blows/Count |
|---|---|---|---|---|---|---|---|
| | 23 | | | | | 23 | 22.5 |
| | 24.0 | | LIMESTONE, porous, shelly, sand-filled solution cavities, tan to white; some subangular to subrounded fragments gray to white. | | | 24 2:20 (SH) | 24.0 |
| | 25.5 | | | | | 25 1:30 | 25.5 |
| | 27.0 | | | 24" 48% REC: | | 26 2:05 27 2:30 | 27.0 |
| | 28.5 | | | 11" 18% RUN | | 28 1:35 | 28.5 |
| | 30.0 | | | | | 29 1:05 30 1:15 | 30.0 |
| | 31.5 | | | 42" 78% REC: | | 31 3:05 | 31.5 |
| | 33.0 | | | 15" 25% RUN | | 32 6:05 33 5:50 | 33.0 |
| | 34.5 | | | | | 34 1:00 35 0:50 | 34.5 |
| | 36.0 | | | 38" 63% REC: | | 36 0:45 | 36.0 |
| | 37.5 | | | 17" 28% RUN | | 37 ~~0:40~~ 0:30 38 0:40 | 37.5 |
| | 39.0 | | LIMESTONE fragments, subangular to angular sandy, shelly; tan to white silty | 10" 56% | 10 | Split spoon | 5 36 12 7 8 |
| | 40.5 | | | 6" 50% | 11 | 48 50/2" | 39.0 31' sample 40.5 50/2" refusal at 40.5' |
| | 42.0 | | LIMESTONE, porous shelly, sand-filled solution cavities, REC tan to white; some subangular fragments grey to white. | 8" 13% | | 40.5 Mud 0:00 41.5 0:50 42.5 0:05 43.5 0:15 44.5 0:32 45.5 0:30 | 42.0 |
| | 43.5 | | | | | | 43.5 |
| | 45.0 | | | 0" 0% RUN | | | 45.0 |
| | 46.5 | | LIMESTONE, fragments, subangular shelly, sandy; tan to white silty | 7" 58% | 12 | Split spoon | 13 7 20 73 |
| | 48.0 | | | 18" 100% | 13 | 48 | 46.5 31' sample 48. refusal at 93' |
| | 49.5 | | LIMESTONE, porous, shelly, sand-filled solution cavities; tan to white, some subrounded to subangular fragments, grey to white. | | | 48 Mud 0:00 49 1:45 50 1:50 (cont. next page) | 49.5 50.0 |
| | | | | | | ↳ dropped 8" suddenly → cavity expected | |

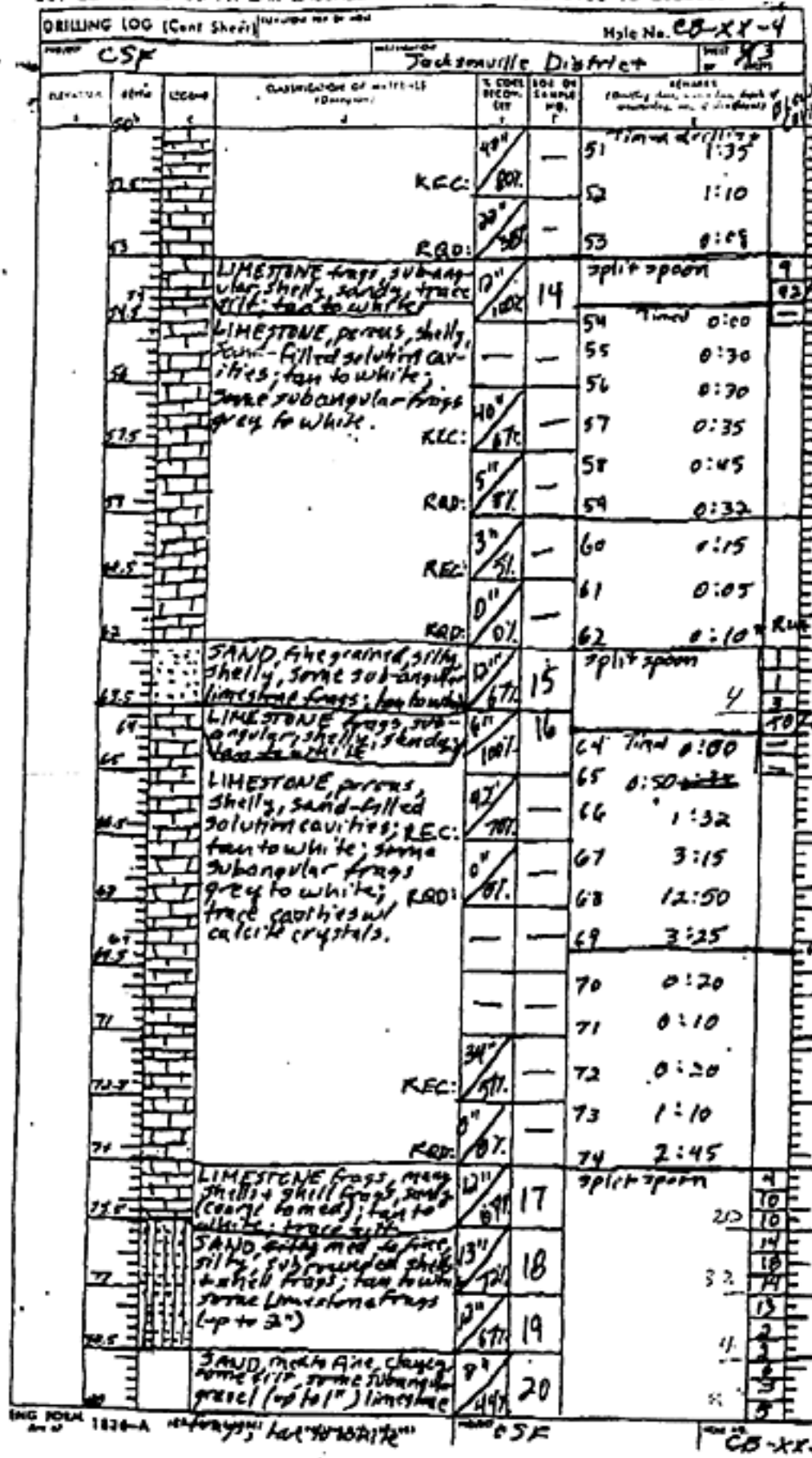
ENG FORM 1836-A (Rev. 11-88) CSF CB-XX-4

DRILLING LOG (Cont Sheet) Hole No. CB-XX-4

PROJECT: CSF | INSTALLATION: Jacksonville District | SHEET 3 OF 3

| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS (Description) | % CORE RECOVERY | BOX OR SAMPLE NO. | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) | BLOW COUNT |
|---|---|---|---|---|---|---|---|
| | 50 | | | | | | 50 |
| | 51.5 | | REC: | 40"/80% | — | 51 Timed drilling 1:35 | |
| | | | | | | 52 1:10 | 51.5 |
| | 53 | | RQD: | 22"/38% | — | 53 0:08 | 53 |
| | 54 | | LIMESTONE frags, subangular, shelly, sandy, trace silt; tan to white | 12"/100% | 14 | split spoon | 9 / 42 / — 6" refusal at 54' |
| | 54.5 | | LIMESTONE, porous, shelly, sand-filled solution cavities; tan to white; some subangular frags grey to white. | — | — | 54 Timed 0:00 | 54.5 |
| | | | | | | 55 0:30 | |
| | 56 | | | | | 56 0:30 | 56 |
| | 57.5 | | REC: | 40"/67% | — | 57 0:35 | 57.5 |
| | | | | | | 58 0:45 | |
| | 59 | | RQD: | 5"/8% | — | 59 0:32 | 59 |
| | 60.5 | | REC: | 3"/5% | — | 60 0:15 | 60.5 |
| | | | | | | 61 0:05 | |
| | 62 | | RQD: | 0"/0% | — | 62 0:10 Run stopped at 3' due to soft material, core dropped quickly. | 62 |
| | 63.5 | | SAND, fine grained, silty, shelly, some sub-angular limestone frags; tan to white | 12"/67% | 15 | split spoon | 1 / 1 / 3 / 50 / 4" refusal at 64' |
| | 64 | | LIMESTONE frags, subangular, shelly, sandy; tan to white | 6"/100% | 16 | 64 Timed 0:00 | 63.5 |
| | 65 | | LIMESTONE, porous, shelly, sand-filled solution cavities; tan to white; some subangular frags grey to white; trace cavities w/ calcite crystals. | | | 65 0:50 | 65 |
| | 66.5 | | REC: | 42"/70% | — | 66 1:32 | 66.5 |
| | 68 | | RQD: | 0"/0% | — | 67 3:15 | 68 |
| | | | | | | 68 12:50 | |
| | 69 | | | — | — | 69 3:25 | 69 |
| | 69.5 | | | | | 70 0:20 | 69.5 |
| | 71 | | | — | — | 71 0:10 | 71 |
| | 72.5 | | REC: | 34"/57% | — | 72 0:20 | 72.5 |
| | 74 | | RQD: | 0"/0% | — | 73 1:10 | 74 |
| | | | | | | 74 2:45 | |
| | 75.5 | | LIMESTONE frags, many shells + shell frags, sandy (coarse to med); tan to white; trace silt | 12"/67% | 17 | split spoon | 4 / 10 / 10 / 20 / 75.5 |
| | 77 | | SAND, silty med to fine, silty, subrounded shells + shell frags; tan to white; some limestone frags (up to 2") | 13"/72% | 18 | | 14 / 18 / 14 / 32 / 77 |
| | 78.5 | | | 12"/67% | 19 | | 13 / 2 / 2 / 4 / 78.5 |
| | 80 | | SAND, med to fine, clayey, some silt, some subangular gravel (up to 1") limestone frags; tan to white | 8"/44% | 20 | | 6 / 3 / 5 / 80 |

ENG FORM 1836-A | PROJECT: CSF | HOLE NO. CB-XX-4



DRILLING LOG (Cont Sheet) Hole No. CB-XX-4

PROJECT CSF LOCATION Jacksonville District SHEET 4 of 5 Sheets

| ELEVATION | DEPTH | GRAPHIC LOG | CLASSIFICATION OF MATERIALS | % CORE RECOVERY | BLOWS ON SAMPLER | REMARKS | BLOW COUNT |
|---|---|---|---|---|---|---|---|
| | 21.5 | | SILT, med to fine sandy, some coarse to fine sand-sized shell frags, trace clay; tan to white; little black med sand-sized shell frags. | 18"/100% | 21 | Split Spoon | 21.5 |
| | 23 | | | 18"/100% | 22 | | 23 |
| | 24.5 | | | 3"/17% | 25 | | 24.5 |
| | 26 | | | 18"/100% | 24 | | 26 |
| | 27.5 | | No Recovery | — | — | | 27.5 |
| | 29 | | SILT, clayey, some med to fine sand, some coarse to med sand-sized sub-angular shell frags; dark green to grey | 18"/100% | 25 | | 29 |
| | 30.5 | | | 18"/100% | 26 | | 30.5 |
| | 32 | | No Recovery | — | — | | 32 |
| | 33.5 | | less shell frags | 18"/100% | 27 | | 33.5 |
| | 35 | | | 18"/100% | 28 | | 35 |
| | 36.5 | | | 18"/100% | 29 | | 36.5 |
| | 38 | | | 18"/100% | 30 | | 38 |
| | 39.5 | | | 18"/100% | 31 | | 39.5 |
| | 41 | | No Recovery | — | — | | 41 |
| | 42.5 | | | 18"/100% | 32 | | 42.5 |
| | 44 | | SILT, sandy-med to fine, little clay, trace coarse formed sand-sized subangular shell frags, trace gravel-sized shell frags-up to 0.5"; dk. green | 18"/100% | 33 | | 44 |
| | 45.5 | | | 18"/100% | 34 | | 45.5 |
| | 47 | | | 18"/100% | 35 | | 47 |
| | 48.5 | | | 18"/100% | 36 | | 48.5 |
| | 50 | | | 18"/100% | 37 | | 50 |

ENG FORM 1836-A FOR USACE/NAVFAC/AFCEC USE ONLY

CSF

CB-XX-4

DRILLING LOG (Cont Sheet) Hole No. CB-xx-4

Project: C&F | Location: Jacksonville District | Sheet 3 of 5 sheets

| Elevation | Depth | Legend | Classification of Materials (Description) | % Core Recovery | Box or Sample No. | Remarks (Drilling time, water loss, depth of weathering, etc., if significant) |
|---|---|---|---|---|---|---|
| 110' | | | SAND, fine quartz, trace of silt, trace of shells up to 1/4-in size, greenish gray (SP) | 18" | 38 | Split spoon 2-ft x 1-3/8" |
| 111.5' | | | | 10" | 39 | Soft drilling from 110' to 130' |
| 113' | | | | 18" | 40 | |
| 114.5' | | | | 13" | 41 | |
| 116' | | | | 10" | 42 | |
| 117.5' | | | | 9" | 43 | |
| 119' | | | | 10" | 44 | |
| 120.5' | | | | 10" | 45 | |
| 122' | | | | 9" | 46 | |
| 123.5' | | | | 10" | 47 | |
| 125' | | | LIMESTONE, soft, some shells up to 1/4-in size, some sand filled solution holes, greenish gray. (LS) | 10" | 48 | |
| 126.5' | | | | 10" | 49 | |
| 128' | | | | 6" | 50 | |
| 130' | | | Note: 3" NW casing [illegible] to bottom of hole | | | Boring terminated @ 130' |

Blow Count: 5, 6, 6, 2, 6, 7, 2, 6, 6, 2, 5, 7, 3, 7, 10, 3, 5, 7, 4, 5, 6, 5, 5, 6, 4, 8, 10, 7, 8, 12, 20, 26, 25, 23, 26, 44, 10, 30, 32, 18

ENG FORM 1836 PREVIOUS EDITIONS ARE OBSOLETE. PROJECT | HOLE NO.

ENG FORM 1836-A

Sheet1

| Recharge Test Data Record | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Core Boring Number | CB-S-4 | | | | | | | | | |
| Date Of Test | 10/19/99 | | | | | | | | | |
| Test Performed by | R. Poncivasso | | | | | | | | | |
| Ground Water Level | 1.8' | | | | | | | | | |
| Casing Size | 2" | | | | | | | | | |
| Casing Depth | 130' | | | | | | | | | |
| Hole Diameter at point of test | 6" | | | | | | | | | |
| | | | | A | B | | C | D | E | F |
| From Depth Elevation | To Depth Elevation | Time Start | Time Stop | Total Time | Depth to Ground Water before test | Depth to Ground Water after test | Stickup above Ground | Total Head | Total Water Injected | Gallons Per Minute |
| Feet | Feet | Min | Min | Min | Feet | Feet | Feet | Feet B+C | Gal | GPM E/A |
| 125 | 130 | 12:20 | 12:30 | 10 | 1.8 | 2.30 | 4.0 | 5.8 | 0.1 | 0.01 |

NOTES:
1. Record water take with the water maintained at the top of casing.
2. Water depth must be measured immediately before the recharge test.
3. Water depth shall be recorded after test, and noted if changed.
4. Typical test time is 5 minutes.

= Periods of Heavy rain.



Enr - 11

DRILLING LOG (Coal Sheet) Hole No. CB-S-4

PROJECT CSF | Jacksonville District | SHEET 2 OF 5 SHEETS

| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS (Description) | % CORE RECOV. | SOIL OR Sample NO. | REMARKS (Drilling rate, water loss, depth weathering, etc. If variable) | BLOW COUNTS |
|---|---|---|---|---|---|---|---|
| | 22 | | LIMESTONE, Weak Rec - 26"/43%. RQD = 8% | | | COMMS Lost 1ft | 21.0 |
| | 22.5 | | | | | | 22.5 |
| | 23 | | | | | | 23 |
| | 23.5 | | LIMESTONE, Medium hard, little shell frags numerous sand filled solution holes. | | 11 | 23-24' - 1:06 min<br>24-25 - 1:14 " | 24.0 |
| | 24.5 | | | | | Lost Drilling Mud @ 25.0', core barrel got Clogged | 25.5 |
| | 25.5 | | | | | 25.0-26.0 - 1:20<br>26.0-27.0 - 1:30<br>27.0-28.0 - 0:30 | 27.0 |
| | 26.0 | | Rec = 36"/60% | | | Using 6" Bucket Casing/Clutter recovered | 28.0 |
| | 27.5 | | RQD = 47% | | | 28-29 - 0:35 min | 28.5 |
| | 28.0 | | | | 12 | 29-30 - 1:21 "<br>30-31 - 3:21 " | 30.0 |
| | 28.5 | | Rec = 12"/20% | | | 31-32 - 2:20 "<br>32-33 - 3:00 " | 31.5 |
| | 30.0 | | RQD = 5"/60" = 8% | | | Using creeper Jack drill bit | 33.0 |
| | 31.5 | | | | 13 | 33-34 - 1:45 min<br>34-35 - 0:15 "<br>35-36 - 2:00 " | 34.5 |
| | 32.0 | | Rec = 38"/63% | | | 36-37 - 0:47 "<br>37-38 - 0:30 " | 36.0 |
| | 33.5 | | RQD = (4")+(5")+(5")/60" | | | | 37.5 |
| | 34.0 | | RQD = 23% | | | | 38.0 |
| | 34.5 | | LIMESTONE, Hard, littleshell (up to 1") and shell frags. Numerous sand filled solution holes white to light tan brown | | 14 | 38-39 - 1:15 min<br>39-40 - 1:25 "<br>40-41 - 3:30 " | 39.0 |
| | 35.5 | | | | | 41-42 - 2:03 "<br>42-43 - 1:00 " | 40.5 |
| | 36.0 | | Rec = 48"/80% | | | Broke Jack @ 39' bgl | 42.0 |
| | 37.5 | | RQD = 83% | | | | 43.0 |
| | 38.0 | | | | | | 43.5 |
| | 38.5 | | Rec. = 42"/70% | | 15 | 43-44 - 1:02 min<br>44-45 - 0:18 " | 45.0 |
| | 40.0 | | RQD = 57% | | | 45-46 - 5.04 "<br>46-47 - 0:50 "<br>47-48 - 1:19 " | 46.5 |
| | 41.5 | | | | | | 48.0 |
| | 43.0 | | | | | | |
| | 43.5 | | LIMESTONE, Weak little shell frags. Numerous sand filled solution holes. | | 16 | 0:50 min<br>48-49 - 20<br>49-50 - 1:06 " | 49.5 |
| | 44.5 | | | | | 50-51 - 9:38 "<br>51-52 - 4:10 "<br>52-53 - 3:10 | |
| | | | Rec = 14"/23%; RQD = 0 | | | | |

DRILLING LOG (Coal Sheet) Hole No. CB-S-4

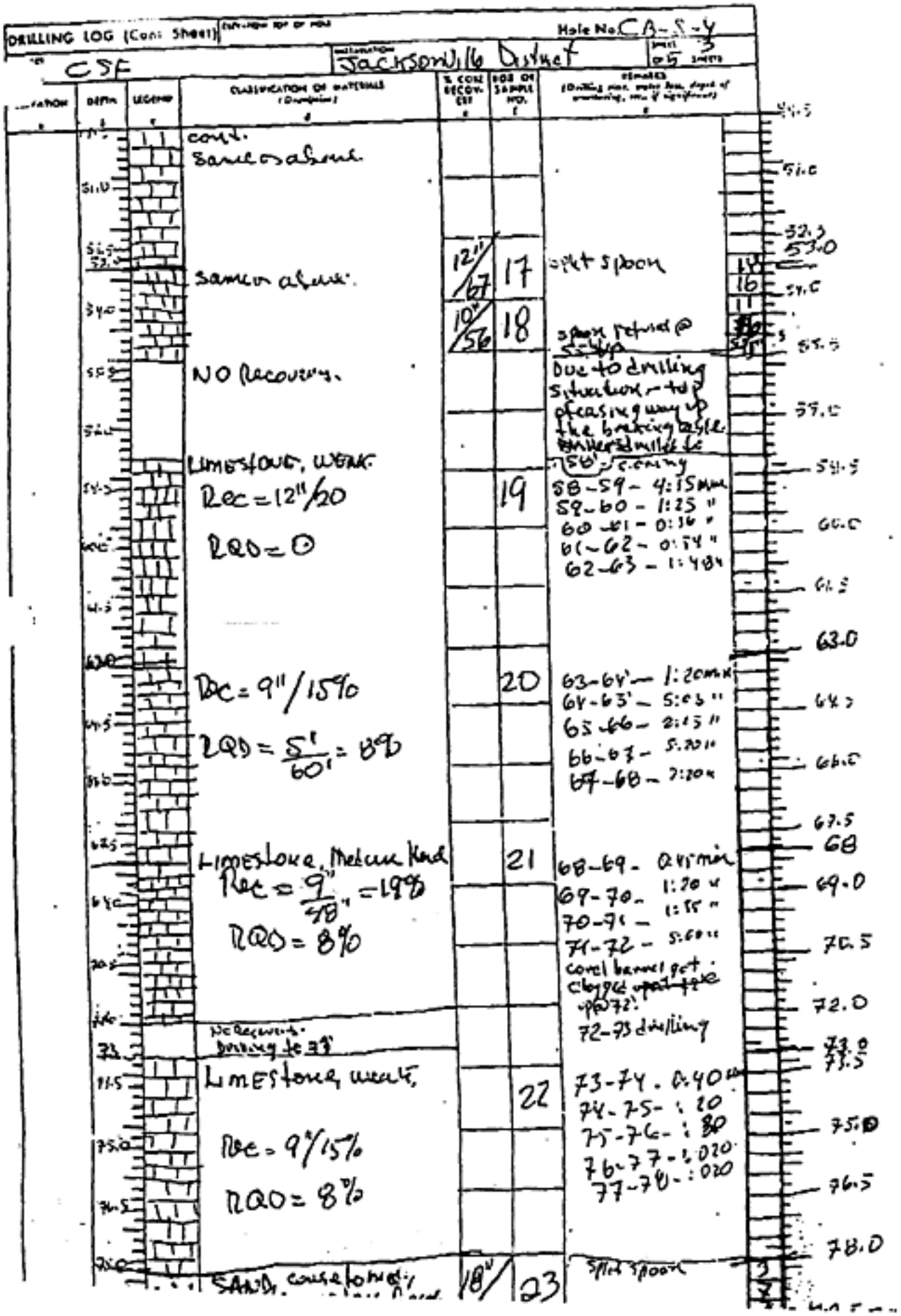
PROJECT CSF | Jacksonville District | SHEET 2 OF 5 SHEETS

| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS (Description) | % CORE RECOV. | SOIL OR Sample NO. | REMARKS (Drilling rate, water loss, depth weathering, etc. If variable) | BLOW COUNTS |
|---|---|---|---|---|---|---|---|
| | 22 | | LIMESTONE, Weak Rec - 26"/43%. RQD = 8% | | | COMMS Lost 1ft | 21.0 |
| | 22.5 | | | | | | 22.5 |
| | 23 | | | | | | 23 |
| | 23.5 | | LIMESTONE, Medium hard, little shell frags numerous sand filled solution holes. | | 11 | 23-24' - 1:06 min<br>24-25 - 1:14 " | 24.0 |
| | 24.5 | | | | | Lost Drilling Mud @ 25.0', core barrel got Clogged | 25.5 |
| | 25.5 | | | | | 25.0-26.0 - 1:20<br>26.0-27.0 - 1:30<br>27.0-28.0 - 0:30 | 27.0 |
| | 26.0 | | Rec = 36"/60% | | | Using 6" Bucket Casing/Clutter recovered | 28.0 |
| | 27.5 | | RQD = 47% | | | 28-29 - 0:35 min | 28.5 |
| | 28.0 | | | | 12 | 29-30 - 1:21 "<br>30-31 - 3:21 " | 30.0 |
| | 28.5 | | Rec = 12"/20% | | | 31-32 - 2:20 "<br>32-33 - 3:00 " | 31.5 |
| | 30.0 | | RQD = 5"/60" = 8% | | | Using creeper Jack drill bit | 33.0 |
| | 31.5 | | | | 13 | 33-34 - 1:45 min<br>34-35 - 0:15 "<br>35-36 - 2:00 " | 34.5 |
| | 32.0 | | Rec = 38"/63% | | | 36-37 - 0:47 "<br>37-38 - 0:30 " | 36.0 |
| | 33.5 | | RQD = (4")+(5")+(5")/60" | | | | 37.5 |
| | 34.0 | | RQD = 23% | | | | 38.0 |
| | 34.5 | | LIMESTONE, Hard, littleshell (up to 1") and shell frags. Numerous sand filled solution holes white to light tan brown | | 14 | 38-39 - 1:15 min<br>39-40 - 1:25 "<br>40-41 - 3:30 " | 39.0 |
| | 35.5 | | | | | 41-42 - 2:03 "<br>42-43 - 1:00 " | 40.5 |
| | 36.0 | | Rec = 48"/80% | | | Broke Jack @ 39' bgl | 42.0 |
| | 37.5 | | RQD = 83% | | | | 43.0 |
| | 38.0 | | | | | | 43.5 |
| | 38.5 | | Rec. = 42"/70% | | 15 | 43-44 - 1:02 min<br>44-45 - 0:18 " | 45.0 |
| | 40.0 | | RQD = 57% | | | 45-46 - 5.04 "<br>46-47 - 0:50 "<br>47-48 - 1:19 " | 46.5 |
| | 41.5 | | | | | | 48.0 |
| | 43.0 | | | | | | |
| | 43.5 | | LIMESTONE, Weak little shell frags. Numerous sand filled solution holes. | | 16 | 0:50 min<br>48-49 - 20<br>49-50 - 1:06 " | 49.5 |
| | 44.5 | | | | | 50-51 - 9:38 "<br>51-52 - 4:10 "<br>52-53 - 3:10 | |
| | | | Rec = 14"/23%; RQD = 0 | | | | |

DRILLING LOG (Cont. Sheet) | Elevation top of hole | Hole No. CB-S-4

CSF | Installation: Jacksonville District | Sheet 3 of 5 sheets

| Elevation | Depth | Legend | Classification of Materials (Description) | % Core Recovery | Box or Sample No. | Remarks (Drilling time, water loss, depth of weathering, etc., if significant) |
|---|---|---|---|---|---|---|
| | | | cont. Same as above | | | |
| | 51.0 | | | | | |
| | 52.5 | | | | | |
| | 53.0 | | Same as above. | 12"/67 | 17 | split spoon |
| | 54.0 | | | 10"/56 | 18 | spoon refused @ 55' bgs |
| | 55.5 | | NO Recovery. | | | Due to drilling situation - top of casing way up the braking cable. Drillers drilled to 58' - coring |
| | 57.0 | | | | | |
| | 58.5 | | LIMESTONE, WEAK. Rec = 12"/20 RQD = 0 | | 19 | 58-59 - 4:15 min<br>59-60 - 1:25 "<br>60-61 - 0:36 "<br>61-62 - 0:54 "<br>62-63 - 1:48 " |
| | 60.0 | | | | | |
| | 61.5 | | | | | |
| | 63.0 | | Rec = 9"/15% RQD = 5'/60' = 8% | | 20 | 63-64' - 1:20 min<br>64-65' - 5:05 "<br>65-66 - 2:15 "<br>66-67 - 5:20 "<br>67-68 - 7:20 " |
| | 64.5 | | | | | |
| | 66.0 | | | | | |
| | 67.5 | | | | | |
| | 68 | | Limestone, Medium Hard Rec = 9"/48" = 19% RQD = 8% | | 21 | 68-69 - 0:45 min<br>69-70 - 1:20 "<br>70-71 - 1:55 "<br>71-72 - 5:60 "<br>Core barrel got clogged up @ 72'. 72-73 drilling |
| | 69.0 | | | | | |
| | 70.5 | | | | | |
| | 72.0 | | | | | |
| | 73.0 | | No Recovery. Drilling to 73' | | | |
| | 73.5 | | Limestone, weak. Rec = 9"/15% RQD = 8% | | 22 | 73-74 - 0:40 min<br>74-75 - 1:20<br>75-76 - 1:80<br>76-77 - 1:020<br>77-78 - 1:020 |
| | 75.0 | | | | | |
| | 76.5 | | | | | |
| | 78.0 | | SAND, coarse to med., [illegible] | 18"/ | 23 | Split spoon |



DRILLING LOG (Cont Sheet) | Hole No. CB-S-4

PROJECT CSF "S" | LOCATION Jackson Ville Destin | SHEET 2 of 2 SHEETS

| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS (Description) | % CORE RECOVERY | SOIL SAMPLE NO. | REMARKS | BLOW COUNTS |
|---|---|---|---|---|---|---|---|
| | 79.5 | | | | | | time: 79.5 |
| | 81.0 | | SAND, Med to fine, trace limestone frags., trace s.lt. (SP) | 14"/76 | 24 | Drilling Portdve 6" ϕ steel casing Vibrated W/ 5 3/6" Rollen b.t. | 6 8 11 |
| | 82.5 | | little shell frags. trace clay (SP) | 18"/100 | 25 | | 5 6 5 |
| | 84 | | | 14"/78 | 26 | | 10 11 3 |
| | 85.5 | | some coarse to gravel size shell frags. (SP) | 18/100 | 27 | | 4 6 8 |
| | 87.0 | | (SP) | 16"/89 | 28 | | 8 8 10 |
| | 88.5 | | SAND, coarse to Med. little clay, little shell frags. trace limestone frags. (SC) | 18"/100 | 24 | | 6 9 12 |
| | 90.0 | | | 8"/44 | 30 | | 6 8 11 |
| | 91.5 | | (SC) | 15"/83 | 31 | | 8 14 16 |
| | 93.0 | | (SC) same | 6"/33 | 32 | | 12 14 16 |
| | 94.5 | | SILT, little med. to fine, Little Clay, Little coarse to gravel size shell frags | 18"/100 | 33 | | 10 11 16 |
| | 96.0 | | | 12"/67 | 34 | WH - weight of Hammer | WH WH WH |
| | 97.5 | | | 18"/100 | 35 | | 8 9 9 |
| | 99.0 | | SAND, med to fine, little coarse to gravel size shell frags. (SP) | 18"/100 | 36 | WH - weight of Hammer | WH WH WH |
| | 100.5 | | (SP) | 9"/50 | 37 | | 4 4 5 |
| | 102.0 | | (SP) | 4"/33 | 38 | | 6 7 6 |
| | 103.5 | | (SP) | 7"/39 | 39 | | 3 1 5 |
| | 105 | | (SP) | 18"/100 | 40 | | 5 6 7 |
| | 106.5 | | (SP) | 15"/83 | 41 | | 7 8 13 |
| | 108 | | (SP) | 15"/83 | 42 | | 5 9 13 |
| | | | | | | | 108.0 |

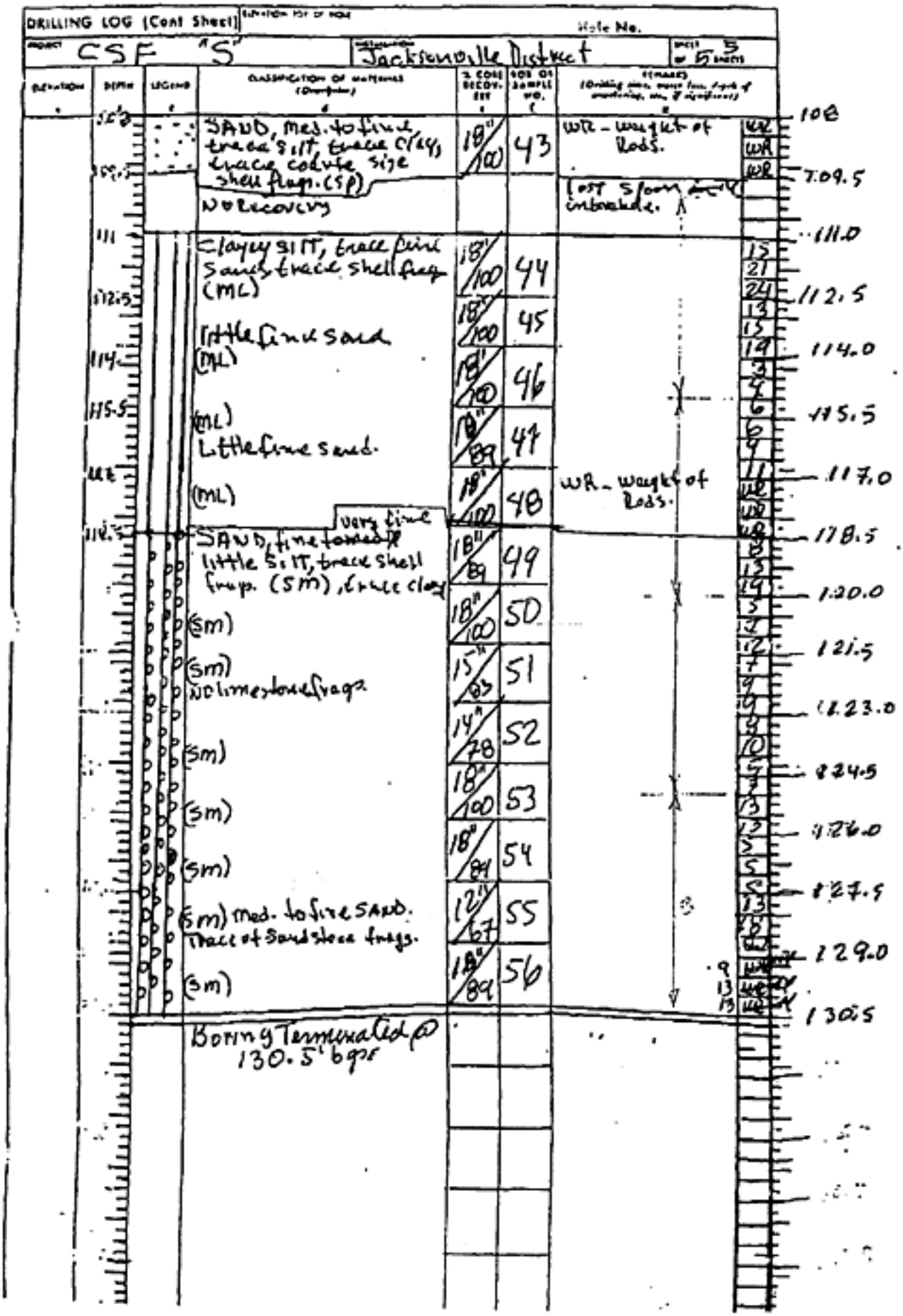
** TOTAL PAGE.07 **

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No.

PROJECT: CSF "S" | INSTALLATION: Jacksonville District | SHEET 5 OF 5 SHEETS

| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS (Description) | % CORE RECOVERY | BOX OR SAMPLE NO. | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) | |
|---|---|---|---|---|---|---|---|
| | 108 | | SAND, med. to fine, trace silt, trace clay, trace coarse size shell frags. (SP) | 18"/100 | 43 | WR - weight of Rods. | WR WR WR |
| | 109.5 | | No Recovery | | | Lost spoon in borehole. | |
| | 111 | | Clayey silt, trace fine sand, trace shell frag (ML) | 18"/100 | 44 | | 15 21 24 |
| | 112.5 | | little fine sand (ML) | 18"/100 | 45 | | 13 15 19 |
| | 114 | | (ML) | 18"/100 | 46 | | 3 4 6 |
| | 115.5 | | Little fine sand. (ML) | 18"/89 | 47 | | 6 9 11 |
| | 117 | | (ML) | 18"/100 | 48 | WR - weight of Rods. | WR WR WR |
| | 118.5 | | SAND, fine very fine little silt, trace shell frags. (SM), trace clay | 18"/89 | 49 | | 8 13 19 |
| | | | (SM) | 18"/100 | 50 | | 5 7 12 |
| | | | (SM) No limestone frags. | 15"/83 | 51 | | 7 9 19 |
| | | | (SM) | 14"/78 | 52 | | 8 10 5 |
| | | | (SM) | 18"/100 | 53 | | 7 13 13 |
| | | | (SM) | 18"/89 | 54 | | 5 5 5 |
| | | | (SM) med. to fine SAND. Trace of Sandstone frags. | 12"/67 | 55 | | 13 18 |
| | | | (SM) | 18"/89 | 56 | | 9 13 13 |
| | | | Boring Terminated @ 130.5' bgs | | | | |

108 — 109.5 — 111.0 — 112.5 — 114.0 — 115.5 — 117.0 — 118.5 — 120.0 — 121.5 — 123.0 — 124.5 — 126.0 — 127.5 — 129.0 — 130.5



Sheet1

## Recharge Test Data Record

Core Boring Number CB-RS-XX-5

Date Of Test 11-17-99

Test Performed by Nathan Bryan

Ground Water Level 4.0-ft

Casing Size 2.0-in

Casing Depth 125' of 2" PVC, 5' of 2" PVC Screen (0.10 Screen)

Hole Diameter at point of test 2 5/8" hole w/ sand (620 & 3065)

| From Depth Elevation Feet (bgs) | To Depth Elevation Feet (bgs) | Time Start Min | Time Stop Min | A Total Time Min | B Depth to Ground Water before test Feet (bgs) | Depth to Ground Water after test Feet (bgs) | C Stickup above Ground Feet | D Total Head Feet B+C | E Total Water Injected Gal | F Gallons Per Minute GPM E/A |
|---|---|---|---|---|---|---|---|---|---|---|
| 125.0 | 130.0 | 0 | 5.0 | 5.0 | 4.0 | 4.2 | 5.0 | 9.0 | 0.14 | 0.03 |

NOTES:
1. Record water take with the water maintained at the top of casing.
2. Water depth must be measured immediately before the recharge test.
3. Water depth shall be recorded after test, and noted if changed.
4. Typical test time is 5 minutes.

The confining layer was not reached. The recharge test was in silty, slightly clayey fine sand.



L 12 '99 14:25 9042321619 PAGE.02
** TOTAL PAGE.02 **
** TOTAL PAGE.23 **

Enj-4

DRILLING LOG — SAD

1. PROJECT: North Lake Belt Impoundment Area
2. LOCATION: C-9 Camp
3. DRILLING AGENCY: U.S. Drilling
4. HOLE NO. (FOR MULTIPLE HOLES): CBRS-XX-5
5. NAME OF DRILLER: J.C. Moffett
6. DIRECTION OF HOLE: ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: 35-ft
8. DEPTH DRILLED INTO ROCK: 95-ft
9. TOTAL DEPTH OF HOLE: 130-ft

10. DISTRICT: Jacksonville District — SHEET 1 OF 5 SHEETS
11. SIZE AND TYPE OF BIT: 2-7/8" bit - 3" casing
12. MANUFACTURER'S DESIGNATION OF DRILL: CME-55 Truck Mounted
13. TOTAL NO. OF OVERBURDEN SAMPLES: 23 — UNDISTURBED: 1
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER: 4'9" 3.19 M
16. DATE HOLE: STARTED 11-15-99 — COMPLETED 11-17-99
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING: 61 %
19. SIGNATURE OF INSPECTOR: Mike H. Bryan

| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS (Description) | % CORE RECOV. | TYPE OF SAMPLE | REMARKS (Drilling time, water loss, depth of weathering, voids, etc.) |
|---|---|---|---|---|---|---|
| | 0 | | LIMESTONE, porous, incompetent, hard. | | | Casing<br>0-1 - 0.02"<br>1-2 - 0.02"<br>2-3 - 0.02"<br>3-4 - 0.02" |
| | 15 | | REC = 9"/19 | | | |
| | 20 | | RQD = 0% | | | |
| | 25 | | competent, porous, hard. | | | 4-5 - 0.07"<br>5-6 - 0.35" |
| | 30 | | REC = 24"/50 | | | 6-7 - 0.54" |
| | 40 | | RQD = 6.5"/14 | | | 7-8 - 0.28" |
| | 45 | | gray fine to medium sand, silty, clayey between 7'-8' ± 2"-3". (in voids). | | | 4' of 3" ϕ casing installed. |
| | 90 | | competent, porous, hard. | | | 8-9 - 0.16"<br>9-10 - 1.35" |
| | 95 | | REC = 24"/40 | | | 10-11 - 0.54"<br>11-12 - 0.45" |
| | 120 | | RQD = 12"/20 | | | 12-13 - 7.30" |
| | 125 | | Sandy silt fossil voids between 12'-14' ± 2"-4" medium sand. | | | 8' of 3" ϕ casing installed. |
| | 150 | | REC = 44"/73 | | | 13-14 - 8.54"<br>14-15 - 0.87" |
| | 155 | | RQD = 26"/43 | | | 15-16 - 0.22"<br>16-17 - 0.23" |
| | 160 | | fairly continuous, slightly porous, moderately hard. | | | 17-18 - 2.20" |
| | 180 | | competent, porous, mod. hard. | | | 13' of 3" ϕ casing installed. |
| | 185 | | REC = 24"/40 | | | 18-19 - 1.15"<br>19-20 - 0.20" |
| | 200 | | RQD = 0% | | | 20-21 - 0.13"<br>21-22 - 0.38" |
| | 225 | | (continued) | | | 22-23 - 0.07" |
| | | | | | | 18' of 3" ϕ casing installed. |

0 — circulation lost
1.5 — casing installed for circulation return.
4.5
6.0
7.5
9.0
10.5
12.0 — hard layer from 12'-14' bgs.
13.5
15.0
16.5
18.0
19.5
21.0

CHG FORM 1836 PREVIOUS EDITION ARE OBSOLETE.

PROJECT: N. Lake Belt Impoundment Area — HOLE NO. CB-25-XX-5

DRILLING LOG (Cont Sheet)

Hole No. CB-RS-86-5

Lake Belt Impoundment Area — Jacksonville District

| Elevation | Depth | Classification of Materials | % Core Recovery | Box or Sample No. | Remarks |
|---|---|---|---|---|---|
| | 21.0 | LIMESTONE - see previous 18'-23', pg. 1. | | | |
| | 22.5 | REC = 51"/85<br>RQD = 34.5"/58<br>fairly continuous, moderately hard, slightly porous. | | | 23-24 - 0.49"<br>24-25 - 1.15"<br>25-26 - 1.07"<br>26-27 - 0.25"<br>27-28 - 0.52"<br>23' of 3" ø casing installed. |
| | 24.0 | | | | |
| | 25.5 | | | | |
| | 27.0 | | | | |
| | 28.5 | REC = 29"/48<br>RQD = 11.5"/19<br>competent, hard, porous. | | | 28-29 - 0.40"<br>29-30 - 0.10"<br>30-31 - 0.20"<br>31-32 - 0.12"<br>32-33 - 0.08"<br>28' of 3" ø casing installed. |
| | 30.0 | | | | |
| | 31.5 | | | | |
| | 33.0 | | | | |
| | 34.5 | REC = 58"/97<br>RQD = 48"/80<br>~~fairly~~ continuous, moderately hard, slightly porous. | | | 33-34 - 0.58"<br>34-35 - 0.58"<br>35-36 - 1.15"<br>36-37 - 0.46"<br>37-38 - 1.06"<br>38' of 3" ø casing installed. |
| | 36.0 | | | | |
| | 37.5 | | | | |
| | 39.0 | REC = 58.5"/98<br>RQD = 28.5"/48<br>~~fairly~~ continuous, moderately hard, slightly porous. | | | 38-39 - 0.56"<br>39-40 - 0.40"<br>40-41 - 0.47"<br>41-42 - 0.31"<br>42-43 - 0.30"<br>38' of 3" ø casing installed. |
| | 40.5 | | | | |
| | 42.0 | | | | |
| | 43.5 | REC = 51"/85<br>RQD = 42"/70<br>fairly continuous, moderately hard, slightly porous. | | | 43-44 - 0.58"<br>44-45 - 0.57"<br>45-46 - 0.55"<br>46-47 - 0.43"<br>47-48 - 0.24"<br>43' of 3" ø casing installed |
| | 45.0 | | | | |
| | 46.5 | | | | |
| | 48.0 | REC = 13"/22<br>RQD = 0%<br>Incompetent hard, porous.<br>(continued) | | | 48-49 - 3.15"<br>49-50 - 3.00 |
| | 49.5 | | | | |

Blow counts: 21.0, 22.5, 24.0, 25.5, 27.0, 28.5, 30.0, 31.5, 33.0, 34.5, 36.0, 37.5, 39.0, 40.5, 42.0, 43.5, 45.0, 46.5, 48.0, 49.5

still loosing water 11-15-99

1-ft drop of core barrel between 40'-42' for 1 sec.

hard layer @ 48' bgs - 49' bgs, & @ 49'-50' bgs

ENG FORM 1836-A

Project: N. Lake Belt Impoundment Area — Hole No. CB-RS-86-5

DRILLING LOG (Cont Sheet)

Hole No. CB-RS-XX-5

Project: N. Lake Belt Impoundment Area

Jacksonville District

Sheet 3 of 5 sheets

| Elevation | Depth | Legend | Classification of Materials (Description) | % Core Recovery | RQD or Sample No. | Remarks (Drilling time, water loss, depth of weathering, etc., if significant) |
|---|---|---|---|---|---|---|
| | 49.5 | | LIMESTONE, same as previous 48'-50' bgs. | | | 50-51 - 0.07" |
| | 51.0 | | | | | 51-52 - 0.02" |
| | | | | | | 52-53 - 0.02" |
| | 52.5 | | | | | 48' of 3" ø casing installed. |
| | | | competent, hard, porous. | | | |
| | 54.0 | | REC = 29"/40 | | | 53-54 - 0.90" |
| | | | RQD = 4"/6 | | | 54-55 - 0.28" |
| | 55.5 | | Sand filled solution holes between 57.5'-58' bgs. (Trace silty fine sand) | | | 55-56 - 0.15" |
| | | | | | | 56-57 - 0.22" |
| | | | | | | 57-58 - 0.31" |
| | 57.0 | | | | | 53' of 3" ø casing installed. |
| | 58.5 | | REC = 9"/15 | | | 58'-59 - 0.05" |
| | | | RQD = 0% | | | 59-60 - 0.02" |
| | 60.0 | | very hard cemented sandy rounded fragments from 62.5-64.0 ft. bgs. | | | 60-61 - 0.06" |
| | | | | | | 61-62 - 0.03" |
| | 61.5 | | Incompetent, hard, porous. | | | 62-63 - 0.27" |
| | | | | | | 58' of 3" ø casing installed. |
| | 63.0 | | REC = 15"/25 | | | 63-64 - 0.19" |
| | | | RQD = 8"/13 | | | 64-65 - 0.03" |
| | 64.5 | | Incompetent, hard, porous. | | | 65-66 - 0.02" |
| | | | | | | 66-67 - 0.02" |
| | 66.0 | | | | | 67-68 - 0.23" |
| | | | | | | 63' of 3" casing installed. |
| | 67.5 | | | | | 68'-69 - 0.29" |
| | 69.0 | | REC = 58"/97 | | | 69-70 - 0.34" |
| | | | RQD = 18"/30 | | | 70-71 - 0.21" |
| | 70.5 | | ~~fairly~~ NHD continuous, moderately hard, slightly porous. | | | 71-72 - 0.30" |
| | | | | | | 72-73 - 0.12" |
| | 72.0 | | | | | 68' of 3" ø casing installed. |
| | 73.5 | | competent, hard to moderately hard, porous. Very hard from 75'-78' bgs. | | | 73-74 - 0.02" |
| | | | | | | 74-75 - 0.21" |
| | 75.0 | | REC = 29"/40 | | | 75-76 - 6.30" |
| | | | RQD = 0% | | | 76-77 - 3.08" |
| | | | | | | 77-78 - 4.20" |
| | 76.5 | | fine to coarse silty sand filled holes from 77'-78' bgs. (continued) | | | 78' of 3" ø casing installed. |
| | | | | | | ~~78-79 - 0.30"~~ NHD |
| | 78.0 | | | | | ~~79-80 - 0.32"~~ NHD |
| | 79.5 | | | | | |

49.5 still loosing circulation

51.0

52.5

54.0

55.5

57.0

58.5

60.0

61.5

63.0

64.5

66.0

67.5

69.0

70.5

72.0

73.5

75.0 very zone hard layer @ 75'-78' bgs.

76.5

78.0

79.5

ENG FORM 1836-A

Hole No. CB-10-XX-5

N. Lake Belt Impoundment Area | Jacksonville District | Sheet 4 of 5

| Elevation | Depth | Legend | Classification of materials (Description) | % Core recovery | Box or sample no. | Remarks (Drilling time, water loss, depth of weathering, etc., if significant) | Blow counts |
|---|---|---|---|---|---|---|---|
| | 78.0 | | LIMESTONE, continuous, moderately hard, slightly porous. | | | Coring | 78.0 |
| | 79.5 | | REC = 57"/95 | | | 78-79 - 0.30" | 79.5 |
| | 81.0 | | RQD = 31"/52 | | | 79-80 - 0.52" | 81.0 |
| | 82.5 | | | | | 80-81 - 0.33" | 82.5 |
| | 84.0 | | Incompetent, hard, porous | | | 81-82 - 0.15" | 84.0 |
| | 85.5 | | REC = 20"/33 | | | 82-83 - 0.38" | 85.5 |
| | 87.0 | | RQD = 17"/28 | | | 78' of 3" ø casing installed. | 87.0 |
| | 88.5 | | LIMESTONE, gravel size recovery, trace fine to med. silty sand. | 6"/33 | 1 | Split spoon see note! → | 88.5 |
| | 90.0 | | | 4"/22 | 2 | | 90.0 |
| | 92.5 | NO RECOVERY | Rollerbit overdrill - No Recovery | | | | 92.5 |
| | 93.0 | | REC = 10"/33 | | | Coring | 93.0 |
| | 94.5 | | RQD = 0% | | | 93-94 - 0.21" | 94.5 |
| | 96.0 | | Incompetent, porous, hard. | | | 94-95 - 0.21" | 96.0 |
| | 97.5 | | SAND, white, silty, large gravel size limestone fragments. fine to med. shell fragments & limestone fragments | 4"/50 | 3 | 95-95.5 - 0.10" | 97.5 |
| | 99.0 | | | 35"/19 | 4 | | 99.0 |
| | 100.5 | | No large gravel size limestone fragments from 98.5'-104.5' bgs. | 12"/66 | 5 | 98' of 3" ø casing installed. | 100.5 |
| | 102.0 | | | 17"/94 | 6 | | 102.0 |
| | 103.5 | | | 10"/56 | 7 | NRB caved from 101.5'-103' bgs. | 103.5 |
| | 105.0 | | | 0.5"/3 | 8 | 103' of 3" ø casing installed. | 105.0 |
| | | | SAND, silty, dark grey, fine sand. | 18"/100 | 9 | | |
| | | | (continued) | | | | |

Initially thought to be sand. Probable large cavity or sand layer. No sand recovery.

11-16-99

Note: Spoon did not refuse, very poor recovery w/ spoon. Driller decided to core from 93' for better recovery based on experience.

Coring stopped @ 95.5'. Probable sand.

Probable SAND, white, silty.

END of RUN

ENG FORM 1836-A

N. Lake Belt Impoundment Area | CB-RS-XX-5

TOTAL PAGE 03

N. Lake Belt Impoundment Area — Jacksonville District

SAND, grey-dark grey, silty, clayey. fine sand.

Trace shell & shell fragments.

Tube bent ~ 2"-3" @ end. cut before sealing.

Boring Terminated @ 130' bgs.

| Depth | Recovery / % | Sample No. | Remarks | Blow counts |
|---|---|---|---|---|
| 106.0–107.5 | 15" / 83 | 10 | | 6, 8, 10 |
| 107.5–109.0 | 18" / 100 | 11 | | 9, 8, 10 |
| 109.0–110.5 | 18" / 100 | 12 | | 5, 6, 10 |
| 110.5–112.0 | 18" / 100 | 13 | | 8, 2, 4 |
| 112.0–113.5 | 18" / 100 | 14 | | 4, 4, 6 |
| 113.5–115.0 | 8" / 44 | 15 | | 2, 2, 2 |
| 115.0–116.5 | 18" / 100 | 16 | | 3, 3, 5 |
| 116.5–118.0 | 18" / 100 | 17 | | 1, 2, 2 |
| 118.0–119.5 | 18" / 100 | 18 | | 1, 2, 4 |
| 119.5–121.0 | 18" / 100 | 19 | | 1, 1, 1 |
| 121.0–122.5 | 18" / 100 | 20 | | 2, 3, [illegible] |
| 122.5–124.0 | 18" / 100 | 21 | | 2, 3, 3 |
| 124.0–125.5 | 18" / 100 | 22 | Recharge Test from 125'-130' bgs. | 8, 14, 21 |
| 125.5–127.5 | 24" / 100 | 23 | 2-ft spoon from 125.5'-127.5' bgs. | 2, 3, 8, 10 |
| 127.5–130.0 | NO TUBE | | | |

122.5 — 11-17-99 (water level)



N. Lake Belt Impoundment Area — Hole No. CB-RS-XY-5

Sheet1

| Recharge Test Data Record | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Core Boring Number CB-RS-5-5 | | | | | | | | | | |
| Date Of Test 10/27/99 | | | | | | | | | | |
| Test Performed by Nathan Bryan | | | | | | | | | | |
| Ground Water Level 3.08 - ft. bgs | | | | | | | | | | |
| Casing Size 3.0-inches | | | | | | | | | | |
| Casing Depth 125.0 - ft. | | | | | | | | | | |
| Hole Diameter at point of test 3.0 - inches | | | | | | | | | | |
| | | | | A | B | | C | D | E | F |
| From Depth Elevation | To Depth Elevation | Time Start | Time Stop | Total Time | Depth to Ground Water before test | Depth to Ground Water after test | Stickup above Ground | Total Head | Total Water Injected | Gallons Per Minute |
| Feet (bgs) | Feet (bgs) | Min | Min | Min | Feet | Feet | Feet | Feet B+C | Gal | GPM E/A |
| 125.0 | 130.0 | 0 | 5 | 5 | 3'1" | 3'5" | 5.0 | 8'1" | 60 | 12 |

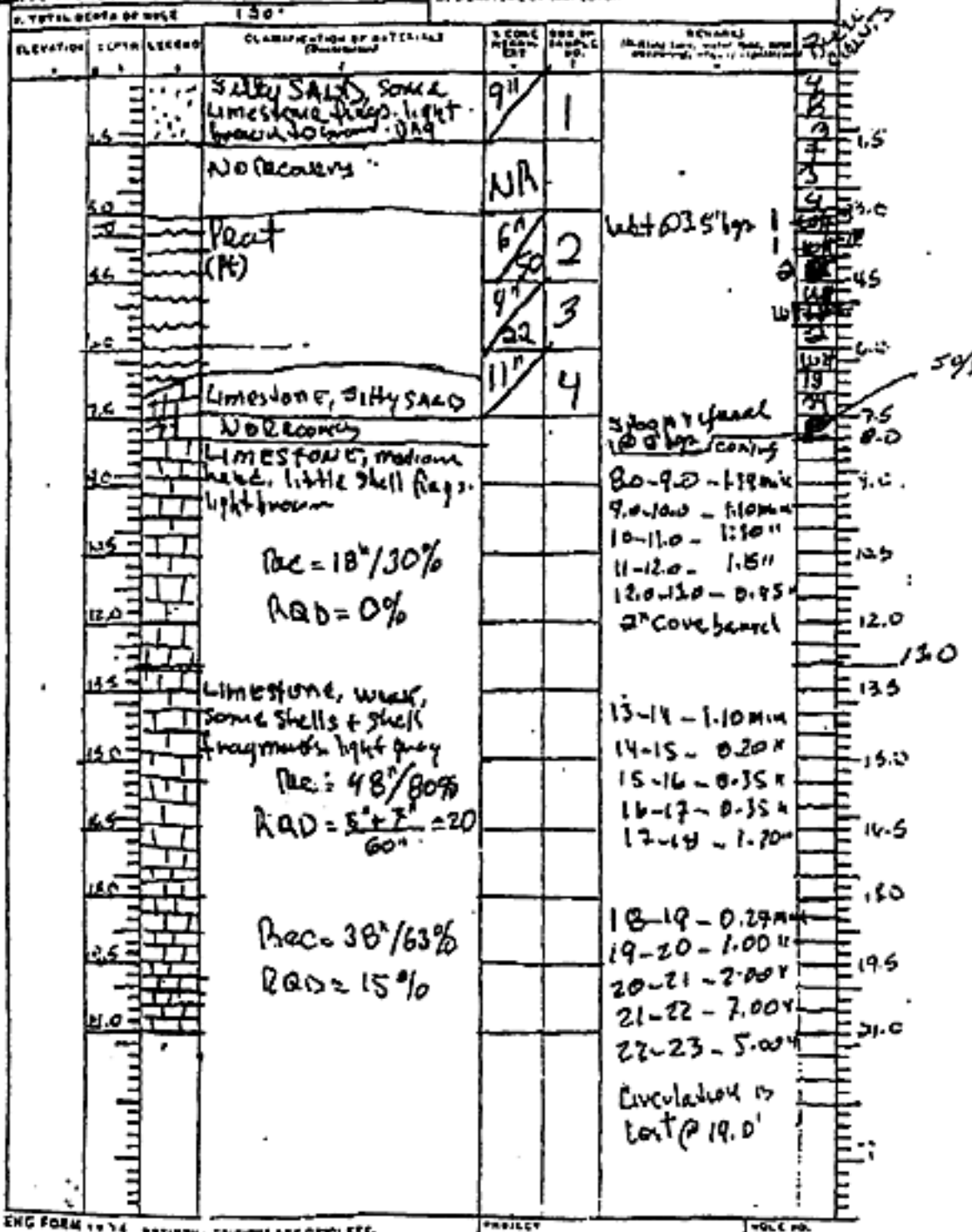
NOTES:
1. Record water take with the water maimained at the top of casing.
2. Water depth must be measured immediately before the recharge test.
3. Water depth shall be recorded after test, and noted if changed.
4. Typical test time is 5 minutes.



Encl - 11

**DRILLING LOG**

| | |
|---|---|
| 1. PROJECT | CSE "S" |
| 2. LOCATION (Coordinates or Station) | |
| 3. DRILLING AGENCY | Law Engineering / U.S. Drilling |
| 4. HOLE NO. (As shown on drawing title and file number) | CB-5-5 |
| 5. NAME OF DRILLER | W. Candelaria |
| 6. DIRECTION OF HOLE | ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT. |
| 7. THICKNESS OF OVERBURDEN | 3.5 |
| 8. DEPTH DRILLED INTO ROCK | |
| 9. TOTAL DEPTH OF HOLE | 130' |
| 10. INSTALLATION | Jacksonville District |
| 11. SIZE AND TYPE OF BIT | |
| 12. DATUM FOR ELEVATION SHOWN (TBM or MSL) | |
| 13. MANUFACTURER'S DESIGNATION OF DRILL | CME-55 |
| 14. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN | DISTURBED / UNDISTURBED |
| 15. TOTAL NUMBER CORE BOXES | |
| 16. ELEVATION GROUND WATER | |
| 17. DATE HOLE | STARTED 10/21/99 COMPLETED |
| 18. ELEVATION TOP OF HOLE | |
| 19. TOTAL CORE RECOVERY FOR BORING | % |
| 20. SIGNATURE OF INSPECTOR | |



| ELEVATION | DEPTH | LEGEND | CLASSIFICATION OF MATERIALS (Description) | % CORE RECOVERY | BOX OR SAMPLE NO. | REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) | Blows/6 in. |
|---|---|---|---|---|---|---|---|
| | 1.5 | | Silty SAND, some limestone frags. light brown to brown. DRY | 9" | 1 | | 4, 8, 3 |
| | 5.0 | | No Recovery | NR | | | 7, 3, 4 |
| | 6.0 | | Peat (Pt) | 6"/50 | 2 | Wet @ 3.5' bgs | 1, 1, 2, 10 |
| | 6.5 | | | 9"/22 | 3 | | 10, 12, 10 |
| | 7.5 | | Limestone, silty SAND | 11" | 4 | | 19, 24 |
| | | | No Recovery | | | Stopped refusal @ 8' bgs / coring | |
| | 9.0 | | LIMESTONE, medium hard, little shell frags. light brown | | | 8.0-9.0 - 1.19 min<br>9.0-10.0 - 1.10 min<br>10-11.0 - 1.30"<br>11-12.0 - 1.15"<br>12.0-13.0 - 0.45"<br>2" Core barrel | |
| | 10.5 | | Rec = 18"/30%<br>RQD = 0% | | | | |
| | 12.0 | | | | | | |
| | 13.5 | | Limestone, weak, some shells + shell fragments, light gray | | | 13-14 - 1.10 min<br>14-15 - 0.20"<br>15-16 - 0.35"<br>16-17 - 0.35"<br>17-18 - 1.70" | |
| | 15.0 | | Rec = 48"/80%<br>RQD = $\frac{5"+7"}{60"}$ = 20 | | | | |
| | 16.5 | | | | | | |
| | 18.0 | | Rec = 38"/63%<br>RQD = 15% | | | 18-19 - 0.29 min<br>19-20 - 1.00"<br>20-21 - 2.00"<br>21-22 - 7.00"<br>22-23 - 5.00" | |
| | 19.5 | | | | | | |
| | 21.0 | | | | | Circulation is lost @ 19.0' | |

50/6"

13.0

ENG FORM 1836 PROJECT HOLE NO.

DRILLING LOG (Core Sheet) Hole No. CB-S-5

CSF "S" Jacksonville Outpost

Limestone, weak, sand filled solution holes, light brown to white, some shells + shell frags.

Rec = 26"/43%
RQD = 0%

Rec = 48"/80%
RQD = 33%

Rec = 48"
RQD = 17%

Rec. = 36"/60
RQD = 0%

RQD = ~~0%~~ 57%
Rec. = 7"/
Limestone, weak.

Rec. = 8"/
RQD = 0%

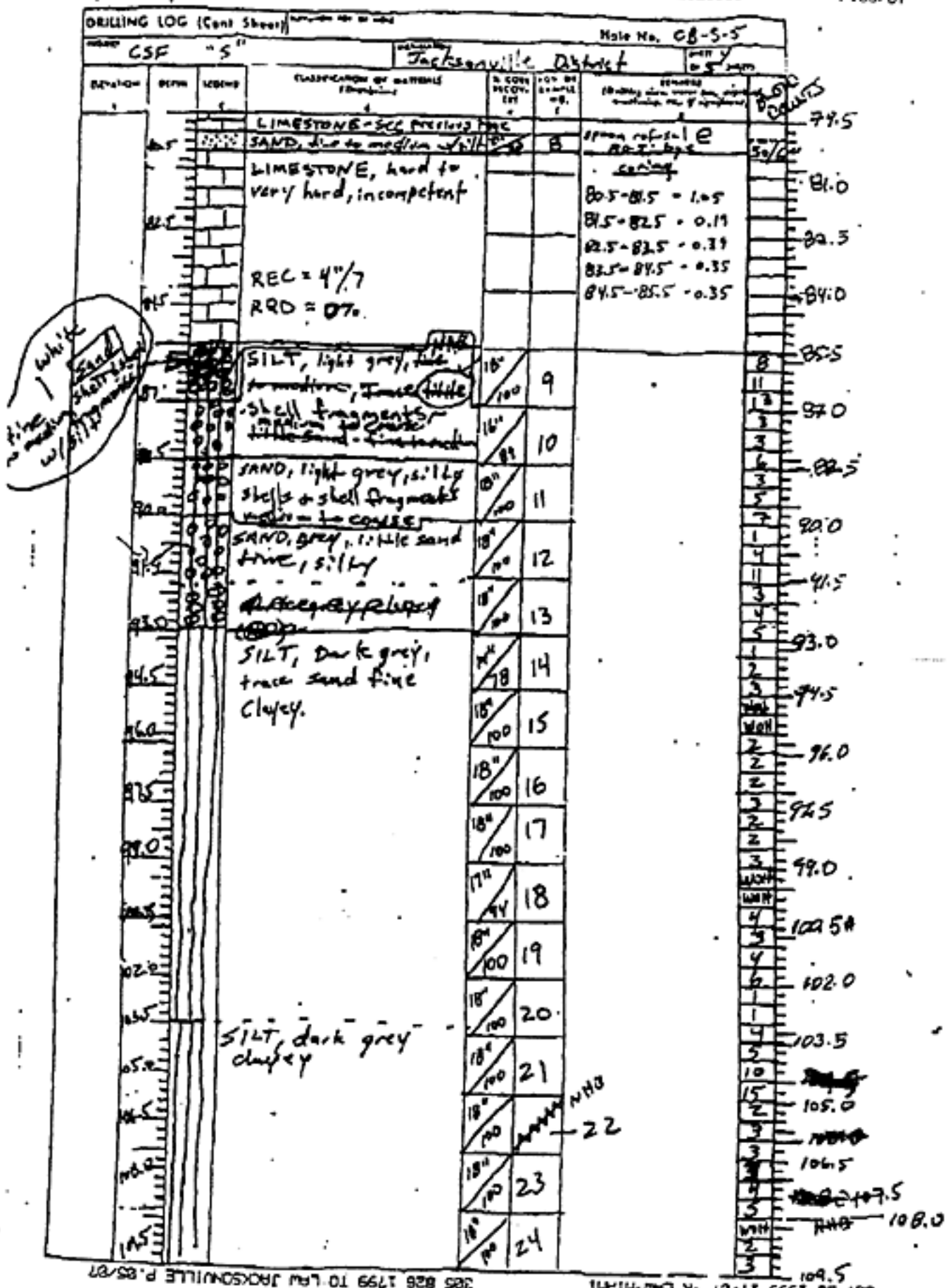
| | |
|---|---|
| 23-24 | 1.95 min |
| 24-25 | 1.30 " |
| 25-26 | 1.00 " |
| 26-27 | 0.20 " |
| 27-28 | 1.10 " |
| 28-29 | 1.30 min |
| 29-30 | 1.00 " |
| 30-31 | 1.00 " |
| 31-32 | 8.20 " |
| 32-33 | 1.10 " |
| 33-34 | 1.95 min |
| 34-35 | 1.0 " |
| 35-36 | 2.20 " |
| 36-37 | 7.0 " |
| 37-38 | 3.0 " |
| 38-39 | 1.5 min |
| 39-40 | 0.0 " |
| 40-41 | 8.20 " |
| 41-42 | 1.40 " |
| 42-43 | 0.20 " |
| 43-44 | 2.40 min |
| 44-45 | 1.20 " |
| 45-46 | 0.20 " |
| 46-47 | 0.10 " |
| 47-48 | 0.10 " |
| 48-49 | 0.20 " |
| 49-50 | 1.80 min |
| 50-51 | 0.20 " |
| 51-52 | 0.20 " |
| 52-53 | 1.20 " |

DRILLING LOG (Cont Sheet) Hole No. CB-5-5

CSF "S" Jacksonville District

| ELEVATION | DEPTH | LEGEND | DESCRIPTION OF MATERIALS | % CORE RECOVERY | SOIL OR SAMPLE NO. | REMARKS |
|---|---|---|---|---|---|---|
| 49.5 | | | | | | |
| 49.0 | | | LIMESTONE, weak | | | |
| | | | | | | |
| 52.5 | | | | | | |
| | | | SAND, fine to medium | 12"/67 | 5 | split spoon spoon refusal @ 54' bgs. |
| 54.0 | | | | | | 9 15 |
| | | | LIMESTONE, moderately hard, fairly continuous. some shells & shell fragments. REC = 37"/77% RQD = 20.5"/43% | | | Coring 54-55 - 0.40 55-56 - 0.40 56-57 - 0.30 57-58 - 1.23 |
| 59.5 | | | Competent REC = 34"/57% RQD = 16"/27% | | | 58-59 - 1.23 59-60 - 1.22 60-61 - 0.31 61-62 - 0.26 62-63 - 0.29 |
| 61.5 | | | | | | |
| 63.0 | | | SAND, (SM), fine to medium, light grey, some limestone fragments | 10"/56 3"/30 | 6 7 | split spoon spoon refusal @ 65' bgs 8 9 11 20/3" |
| 64.5 | | | | | | |
| 66.0 | | | LIMESTONE, moderately hard, competent REC = 39"/65 RQD = 23.5/39 | | | 65-66 - 0.38 66-67 - 1.11 67-68 - 1.38 68-69 - 1.30 69-70 - 1.32 |
| 67.5 | | | | | | |
| 69.0 | | | moderately hard, competent, shelly w/ cavity at 72-73 bgs & 74-76 bgs REC = 23"/34 RQD = 4.25"/7 | | | 70-71 - 1.43 71-72 - 1.20 72-73 - 0.13 73-74 - 0.60 74-75 - 0.10 |
| 70.5 | | | | | | |
| 72.0 | | | | | | |
| 73.5 | | | | | | |
| 75.0 | | | Incompetent REC = 15"/25 RQD = 0% | | | 75-76 - 0.31 76-77 - 0.32 77-78 - 0.53 78-79 - 1.08 79-80 - 1.02 |
| 76.5 | | | | | | |
| 78.0 | | | | | | |
| 79.5 | | | | | | |

NHB START 10-25-99



DRILLING LOG (Cont Sheet) Hole No. CB-5-5

CSF "5" Jacksonville District

| Elevation | Depth | Classification of Materials | % Core Recovery | Log of Sample No. | Remarks | Blow Counts |
|---|---|---|---|---|---|---|
| | | LIMESTONE - see previous page | | | | 79.5 |
| | 80.5 | SAND, fine to medium w/silt | 18" / 100 | 8 | spoon refusal @ 80.5' bgs | 50/6" |
| | | LIMESTONE, hard to very hard, incompetent | | | coring | 81.0 |
| | 82.5 | | | | 80.5-81.5 = 1.05 | |
| | | | | | 81.5-82.5 = 0.19 | 82.5 |
| | | | | | 82.5-83.5 = 0.39 | |
| | | REC = 4"/7 | | | 83.5-84.5 = 0.35 | |
| | 84.5 | RQD = 0% | | | 84.5-85.5 = 0.35 | 84.0 |
| | | SILT, light grey, ~~fine to medium~~, ~~Trace~~ little shell fragments ~~medium to coarse~~ ~~little sand - fine to medium~~ | 18" / 100 | 9 | | 85.5 |
| | 87.0 | | 16" / 89 | 10 | | 87.0 |
| | 88.5 | SAND, light grey, silty shells & shell fragments medium to coarse | 18" / 100 | 11 | | 88.5 |
| | 90.0 | SAND, grey, little sand fine, silty | 18" / 100 | 12 | | 90.0 |
| | 91.5 | ~~Dark grey clayey~~ | 18" / 100 | 13 | | 91.5 |
| | 93.0 | SILT, Dark grey, trace sand fine Clayey. | 14" / 78 | 14 | | 93.0 |
| | 94.5 | | 18" / 100 | 15 | | 94.5 |
| | 96.0 | | 18" / 100 | 16 | | 96.0 |
| | 97.5 | | 18" / 100 | 17 | | 97.5 |
| | 99.0 | | 17" / 94 | 18 | | 99.0 |
| | 100.5 | | 18" / 100 | 19 | | 100.5 |
| | 102.0 | | 18" / 100 | 20 | | 102.0 |
| | 103.5 | SILT, dark grey clayey | 18" / 100 | 21 | | 103.5 |
| | 105.0 | | 18" / 100 | NHB 22 | | 105.0 |
| | 106.5 | | 18" / 100 | 23 | | 106.5 |
| | 108.0 | | 18" / 100 | 24 | | 107.5 |
| | 109.5 | | | | | 108.0 |

white fine to medium sand shell fragments w/silt

DRILLING LOG (Cont Sheet) Hole No. CB-5-5

Project CSF "5" Jacksonville District

| Elevation | Depth | Classification of Materials | % Core Recovery | RQD or Sample No. | Remarks | Blow Counts |
|---|---|---|---|---|---|---|
| | | See previous page | | | | 108.0 see previous page |
| | 108.5 | SILT, dark grey, clayey | 18"/100 | 25 | | 109.5 |
| | 111.0 | SAND, fine quartz, silty light grey (SM) | 18"/100 | 26 | | 111.0 |
| | 112.5 | | 18"/100 | 27 | | 112.5 |
| | 114.0 | | 12.5"/69 | 28 | | 114.0 |
| | 115.5 | | 10"/56 | 29 | | 115.5 |
| | 117.0 | SILT, little sand fine, grey, clayey | 4"/22 | 30 | | 117.0 |
| | 118.5 | | 18"/100 | 31 | | 118.5 |
| | 120.0 | | 24"/100 | 32 | NHB | 120.0 No water return |
| | 121.5 | | | | | 121.5 Rods Fell Penetrated 3-ft |
| | 123.0 | shell Fragments medium trace | 18"/100 | 33 | | 123.0 2-ft spoon recovered |
| | 124.5 | SILT, medium to gravel size limestone light grey cementous | 17"/94 | 34 | | 124.5 |
| | 126.0 | | 15"/83 | 35 | | 126.0 |
| | 127.5 | | 17"/94 | 36 | | 127.5 |
| | 129.0 | LIMESTONE, fairly continuous, moderately hard | | | coring 129-130 - 1.02 | 129.0 |
| | 130.5 | NHB REC = 10"/83 RQD = 5"/42 Boring Terminated at 130' | | | | 130.5 |

Silt, grey