Appendix 1. Detailed Lithologic Descriptions

G–3877 Test Corehole	
Depth Interval (feet below land surface)	**Described by Kevin Cunningham** [Visual estimates of permeability are based on comparison of lithofacies and pore classes to 276 air-permeability permeameter measurements (Cunningham and others, 2006b), and lattice Boltzmann permeability calculations (Cunningham and others, 2009, 2012; Cunningham and Sukop, 2011]
0–4.70	No core recovery.
4.70–9.50	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid grainstone and minor packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Abundant *Ophiomorpha* **Carbonate grains:** Mainly peloid, broken and unbroken pelecypods, other skeletal particles **Accessory grains:** 15–30% quartz grains fine to medium sand size, subangular quartz grains **Porosity and permeability:** Variable, ranging from 15–30% moldic porosity and 40% vugs (*Ophiomorpha* megaporous macro-ichnofabric and irregular vugs); relatively high permeability **Comments:** Cycle top at 4.70 feet
9.50–9.75	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid packstone and grainstone **Color:** Very pale orange (10YR 8/2), grayish orange 10YR 7/4 grayish orange, dark yellowish orange 10YR 6/6, moderate yellowish brown 10YR 5/4 **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric 5. *Ophiomorpha* common **Carbonate grains:** Peloids, miliolids, disarticulated broken pelecypods, biserial foraminifera, *Halimeda*, articulated ostracods, coated quartz grains **Accessory grains:** Minor quartz grains, very fine to medium sand size **Porosity and permeability:** 10–15% vugs (thalassinidean and/or thalassinidean-like crustacean megaporous macro-ichnofabric and irregular vugs), minor microporosity; relatively high permeability **Comments:** Cycle top at 9.50 feet
9.75–17.65	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Heavily burrowed peloid grainstone and packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Peloids, miliolids, disarticulated broken pelecypods, biserial foraminifera, articulated ostracods **Accessory grains:** 15–20% quartz grains, very fine to medium sand size **Porosity and permeability:** Variable, ranging from 15–30% moldic porosity and 40% vugs (thalassinidean and/or thalassinidean-like crustacean megaporous macro-ichnofabric and irregular vugs); relatively high permeability **Comments:** Interval interpreted from core rubble and digital optical image
17.65–18.22	**Lithofacies:** Conglomerate **Depositional texture:** Conglomerate with pedogenic overprint **Color:** Burrow mottled very pale orange (10YR 8/2), grayish orange (10YR 7/4), and light gray (N7) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** None observed **Carbonate grains:** Breccia with clasts consisting of peloid skeletal wackestone; sediment infill between clasts consisting of peloidal molluscan intraclastic packstone **Accessory grains:** 10% quartz grains in the rock matrix and 30% quartz grains in sediment that infills vugs **Porosity and permeability:** <1% vuggy porosity; moldic porosity ranges from 5% within breccia clasts to 15% in sediment infill; relatively low permeability **Comments:** Rare gastropods, interval has been subaerially exposed and calcretized. Calcrete layers with up to 1.5 inches of vertical relief; reworked calcrete layers occur as clasts; vugs have a quartz-rich fill. Cycle top at 17.65 feet

G–3877 Test Corehole—Continued	
18.22–18.43	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated calcrete **Sedimentary structures/textures:** Thinly laminated **Porosity and permeability:** Minor vuggy porosity; relatively moderate permeability **Comments:** Laminated calcrete and abundant calcified rhizoliths in interval below indicate a cycle top at 18.40 feet
18.43–19.60	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal mud-dominated packstone with sediment filling in cavities up to 4 inches across **Color:** Burrow-mottled very pale orange (10YR 8/2) and grayish orange (10YR 7/4), with lesser amounts of light gray (N7) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric 4–5. Heavily burrowed, small rhizoliths common **Carbonate grains:** Skeletal fragments, peloids, unidentified benthic foraminifera, archaiasinids, gastropods **Accessory grains:** 5% quartz grains, very fine to coarse sand size, angular to subrounded **Porosity and permeability:** 10–15% vuggy porosity and 20% moldic porosity; 5–10% moldic porosity in sediment infill; relatively moderate permeability **Comments:** Friable quartz sand (N7) infills some large vugs
19.60–20.90	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with peloid, pelecypod packstone matrix **Color:** Mainly grayish orange (10YR 7/4) with lesser amounts of very pale orange (10YR 8/2) and light gray (N7) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric 4. *Ophiomorpha* present **Carbonate grains:** Pelecypod fragments, peloids, archaiasinids, miliolids, unidentified benthic foraminifera, gastropods **Accessory grains:** 2% quartz grains, very fine to coarse sand size, angular to subrounded. Less than 1% dark mineral grains **Porosity and permeability:** 30% moldic porosity after the dissolution of peloids and mollusk shells; 5% vuggy porosity; relatively moderate permeability **Comments:** None
20.90–21.85	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with small *Manicina* heads **Color:** Predominantly white (N9), with lesser amounts of light gray (N7) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Borings into corals **Carbonate grains:** Pelecypods, skeletal fragments, small coral heads (*Manicina*), peloids, and rare mollusks **Accessory grains:** Minor quartz grains, very fine to medium sand size, angular to subrounded **Porosity and permeability:** 10–15% vuggy porosity, 35% intraparticle porosity (within a large coral specimen); relatively moderate permeability **Comments:** All of the corals are most likely *Manicina*; one large vug is filled with pure quartz sand
21.85–22.20	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Pelecypod quartz sandstone **Sedimentary structures/textures:** Part of the very thickly bedded interval **Color:** Very pale orange (10YR 8/2) **Porosity and permeability:** 20% moldic and minor irregular vug porosity; relatively moderate permeability **Comments:** Sharp contact with overlying subunit
22.20–22.205	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated calcrete **Color:** grayish orange (10YR 7/4) **Sedimentary structures/textures:** Thinly laminated **Ichnofabrics:** Ichnofabric 3. *Ophiomorpha* **Carbonate grains:** Pelecypods (some large and not disarticulated, as well as disarticulated, broken valves), other skeletal particles **Accessory grains:** Minor quartz grains, very fine to medium sand size, angular to subrounded **Porosity and permeability:** 5% vuggy porosity; 3% moldic porosity; relatively low permeability **Comments:** Sharp contact with underlying subunit. Cycle top at 22.20 feet

G–3877 Test Corehole—Continued	
22.205–22.65	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Arenaceous lime mudstone grading to wackestone **Color:** Very light gray (N8) to white (N9), with minor amount of very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows, minor vertical rhizoliths **Carbonate grains:** Small gastropods (common) and mollusk fragments (rare) **Accessory grains:** 15–30% quartz grains **Porosity and permeability:** 5% moldic porosity and minor irregular vugs; relatively low permeability **Comments:** One of the least permeable units in this core
22.65–24.65	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal packstone and grainstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 4–5. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Peloids, pelecypods, large benthic foraminifera large discoid benthic foraminifera, gastropods, echinoid fragments **Accessory grains:** 10–15% quartz grains, very fine to coarse sand size, angular to subrounded **Porosity and permeability:** 25% interparticle and moldic mesopores and 15% vuggy macropores which most likely have touching vugs; relatively moderate permeability **Comments:** None
24.65–25.60	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Skeletal, peloid grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 3–5. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Pelecypods, large benthic foraminifera large discoid benthic foraminifera, peloids, gastropods, echinoid fragments **Accessory grains:** 10% quartz grains, very fine to coarse sand size, subrounded to rounded **Porosity and permeability:** 30% moldic porosity and 5–10% irregular vugs; relatively moderate permeability **Comments:** None
25.60–27.50	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with peloid grainstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 3–4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows, possible rhizoliths **Carbonate grains:** Pelecypods, peloids, large discoid benthic foraminifera (including archaiasinids), gastropods, echinoid fragments, miliolids, echinoid spines, ostracods **Accessory grains:** 15–20% quartz grains, very fine to coarse sand size, angular to subrounded **Porosity and permeability:** 20% moldic porosity and 10% irregular vugs; relatively moderate permeability **Comments:** None
27.50–28.00	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Molluscan floatstone and rudstone with peloid packstone and grainstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 3. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows, minor rhizoliths **Carbonate grains:** Pelecypods (including *Chione*), peloids, gastropods, large discoid benthic foraminifera (including archaiasinids), skeletal fragments **Accessory grains:** 10–15% quartz grains, very fine to very coarse sand size, angular to subrounded **Porosity and permeability:** 10–15% irregular vugs, 20% molds; relatively moderate permeability **Comments:** None

G–3877 Test Corehole—Continued	
28.00–29.85	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Skeletal, peloid packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows, minor rhizoliths **Carbonate grains:** Pelecypods, skeletal fragments, peloids, large discoid benthic foraminifera (including archaiasinids and peneroplids), minor gastropods **Accessory grains:** 20% quartz grains, very fine to coarse sand size, angular to subrounded. 1% dark mineral grains **Porosity and permeability:** 25–30% moldic pores, 2% irregular vugs; relatively moderate permeability **Comments:** Shell fragments are more common than large valves
29.85–33.35	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with peloid packstone and grainstone matrix **Color:** Very pale orange (10YR 8/2) with minor amount of light gray (N7) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows, minor rhizoliths **Carbonate grains:** Principally pelecypods (whole and disarticulated valves), skeletal fragments, gastropods, peloids, large discoid benthic foraminifera (including archaiasinids and peneroplids) **Accessory grains:** 15–20% quartz grains, very fine to coarse sand size, angular to subrounded. 1% dark minerals **Porosity and permeability:** Intraparticle, moldic, and vuggy porosity; relatively moderate permeability **Comments:** None
33.35–34.00	**Lithofacies:** Gastropod floatstone and rudstone **Depositional texture:** *Turritella* rudstone with a skeletal and peloid packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** None observed **Carbonate grains:** Gastropods (mainly *Turritella*), pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), peloids, serpulid tubes **Accessory grains:** 5% quartz grains, angular to subrounded **Porosity and permeability:** Fossil moldic 20% (within gastropods and pelecypods), 5% intraparticle, 10% irregular vugs, and 1% shelter porosity beneath large pelecypods; relatively moderate permeability **Comments:** None
34.00–37.12	**Lithofacies:** Gastropod floatstone and rudstone **Depositional texture:** *Turritella* rudstone with skeletal and peloid packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Uncommon *Ophiomorpha* and *Favreina* **Carbonate grains:** Gastropods (mainly *Turritella*), pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), peloids, serpulid tubes, *Sideastrea* (small head coral), large pebble-sized lithoclast of pedogenic limestone from interval between 37.12 and 37.95 feet **Accessory grains:** 3% quartz grains, very fine to fine sand size **Porosity and permeability:** Fossil moldic 15% (within gastropods and pelecypods), intraparticle 5%, 10% irregular vugs; relatively moderate permeability **Comments:** None
37.12–37.121	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated calcrete **Porosity and permeability:** Mostly microporosity and irregular vugs; relatively low permeability **Comments:** Exposure surface and cycle top at 37.12 feet

G–3877 Test Corehole—Continued	
37.121–37.60	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcretized skeletal sandstone **Color:** **Color** is between very pale orange (10YR 8/2) and pale yellowish brown (10YR 6/2) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 4–5. Uncommon *Ophiomorpha* and semivertical rhizoliths lined with concentric micrite and microspar **Carbonate grains:** Skeletal fragments, minor pelecypod fragments **Accessory grains:** 85% quartz grains, very fine to medium sand size (mostly fine), angular to subrounded **Porosity and permeability:** 5% moldic porosity; less than 1% vuggy porosity; relatively low permeability **Comments:** Slightly chalky, calcretized interparticle micrite
37.60–37.95	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal, peloid wackestone and packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 4–5. Abundant thalassinidean and/or thalassinidean-like crustacean produced burrows **Carbonate grains:** Skeletal fragments, benthonic foraminifera (including archaiasinids), minor pelecypods with most broken, miliolids, *Elphidium*, echinoid fragments and spines **Accessory grains:** 15% quartz grains, very fine to medium sand size (mostly fine), angular to subrounded **Porosity and permeability:** 5% moldic porosity; 1–5% irregular vugs; relatively low permeability **Comments:** None
37.95–39.90	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal, peloid wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 3–4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows, minor rhizoliths **Carbonate grains:** Pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), gastropods, miliolids, peloids, ostracods **Accessory grains:** 15–20% quartz grains, very fine to fine sand size, angular to subrounded **Porosity and permeability:** 20% moldic porosity, 10% irregular vugs; relatively low permeability **Comments:** None
39.90–41.75	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with molluscan-fragment packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 3–4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows, minor rhizoliths **Carbonate grains:** Pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), gastropods, miliolids, peloids **Accessory grains:** 15–20% quartz grains, very fine to fine sand size (mostly fine) **Porosity and permeability:** 15–20% moldic porosity and 5% vuggy; relatively moderate permeability **Comments:** None
41.75–42.30	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Pelecypod floatstone with peloid molluscan packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** None observed **Carbonate grains:** Pelecypod fragments, gastropods, miliolids, peloids **Accessory grains:** 85% quartz grains, very fine to fine sand size **Porosity and permeability:** 10% interparticle and 5% vugs related to burrows; relatively low permeability **Comments:** Minor core at base recovered from this interval, likely a large vug fill

G–3877 Test Corehole—Continued	
42.30–43.62	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with peloid molluscan packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), gastropods, miliolids, peloids **Accessory grains:** 15–20% quartz grains, very fine to fine sand grains **Porosity and permeability:** 15% fossil moldic, 10% irregular vugs; relatively moderate permeability **Comments:** A single large cavity at the top of this subunit is filled with a quartz sandstone fill in unit from 41.70 to 42.30 feet. About 0.5 feet of relief on upper surface. Upper bounding surface likely the floor of a karst cavity
43.62–45.20	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal, peloid, molluscan wackestone and packstone molluscan packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 3–4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Skeletal fragments, pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), gastropods, miliolids, peloids **Accessory grains:** 25–30% quartz grains, very fine to medium sand size **Porosity and permeability:** 8% fossil moldic and 10% irregular vugs; relatively low permeability **Comments:** Probable cycle boundary at top (43.62 feet) , but probably marks the top of a quartz sandstone fill of a karst cavity with the sandstone that has a slightly chalky, calcretized micrite matrix
45.20–46.00	**Lithofacies:** Possible Pelecypod floatstone and/or rudstone with abundant *Schizoporella* **Porosity and permeability:** 10% fossil moldic and 10% irregular vugs; relatively moderate permeability **Comments:** No core recovered, observations based on digital optical image
46.00–47.40	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with peloid pelecypod packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), gastropods, miliolids, peloids **Accessory grains:** 20% quartz grains, very fine to coarse sand size, poorly sorted **Porosity and permeability:** 20% fossil moldic and 5% irregular vugs and one bedding plane vug; relatively moderate permeability **Comments:** None
47.40–47.86	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal, peloid, molluscan wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single bed that is thickly bedded **Ichnofabrics:** Ichnofabric index 4. *Entobia* (borings) extend downward from uppermost surface Ichnofacies: *Trypanites* Ichnofacies caps interval **Carbonate grains:** Skeletal fragments, broken pelecypods, gastropods, peloids, ostracods **Accessory grains:** 8–10% quartz grains, very fine to medium sand size **Porosity and permeability:** 5% moldic and 5% vuggy porosity; relatively low permeability **Comments:** Hardground at 47.40 feet with abrupt facies shift at same depth

G–3877 Test Corehole—Continued	
47.86–49.35	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone and rudstone with skeletal wackestone matrix **Color:** Very pale orange (10YR 8/2) with minor amount of light gray (N7) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 2–4. *Entobia* (borings) and minor rhizoliths Ichnofacies: *Trypanites* Ichnofacies caps interval **Carbonate grains:** Gastropods (*Planorbella*), pelecypods, and a few ostracods **Accessory grains:** 2% quartz grains, very fine to fine sand size, except for vugs that contain a sediment-fill of 50–60% quartz grains, very fine to fine sand size **Porosity and permeability:** 3% intraparticle porosity; 5% moldic porosity, and 2–3% irregular vugs; relatively low permeability **Comments:** Freshwater limestone. Minor microkarstic dissolution with allochthonous quartz sand and quartz sand-rich skeletal fill. Cycle top at 47.86 feet
49.35–50.20	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal, peloid packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 3–4. Rhizoliths **Carbonate grains:** Skeletal fragments, peloids, minor mollusks, *Manicina* coral **Accessory grains:** 25% quartz grains, very fine to medium sand size **Porosity and permeability:** 35% fossil moldic, 10% intraparticle, and 5% irregular vugs; relatively moderate permeability **Comments:** Irregular vugs filled with allochthonous quartz sand
50.20–52.00	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with peloid packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Burrowed **Carbonate grains:** Pelecypods, skeletal fragments, peloids, *Manicina* and *Porites porites* coral, sand-dollar echinoids, large discoid benthic foraminifera (including archaiasinids) miliolids, ostracods, gastropods **Accessory grains:** 20% quartz grains, very fine to coarse sand size, poorly sorted **Porosity and permeability:** 10% intraparticle, 20% fossil moldic, and 20% irregular vugs; relatively high permeability **Comments:** Observed a single occurrence of *Manicina* observed. Karstic vugs filled with allochthonous sediment
52.00–53.40	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal wackestone and/or packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Burrowed, possible rhizoliths **Carbonate grains:** Skeletal fragments, peloids, pelecypods, gastropods, large discoid benthic foraminifera (including archaiasinids) **Accessory grains:** 30% quartz grains, very fine to medium sand size **Porosity and permeability:** 10% fossil moldic, 25% irregular vugs; relatively high permeability **Comments:** None
53.40–55.00	**Lithofacies:** Coral boundstone (*Porites porites* dominant) **Depositional texture:** *Porites porites* floatstone and rudstone with a peloid packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 3. Minor rhizoliths with an approximate 0.02 inch inner diameter present **Carbonate grains:** Branching stick-shaped *Porites porites* corals, peloids, pelecypods, large discoid benthic foraminifera (including archaiasinids, peneroplids, and soritids) miliolids, peloids, ostracods, gastropods **Accessory grains:** 15–20% quartz grains, very fine to fine sand size **Porosity and permeability:** 15% irregular vugs and 20% fossil moldic; relatively high permeability **Comments:** Much of the interiors of coral branches have been dissolved

G–3877 Test Corehole—Continued	
55.00–57.02	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous peloid wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Mollusks, peloids, and minor ostracods and gastropods (*Turritella*), and large discoid foraminifera **Accessory grains:** 25% quartz grains, very fine to fine sand size **Porosity and permeability:** 3% fossil moldic and 20–35% irregular vugs; relatively high permeability **Comments:** None
57.02–57.60	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone and skeletal packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods, peloids, echinoids, gastropods, bryozoans **Accessory grains:** 10% fine- and medium-grained quartz grains **Porosity and permeability:** 2–20% fossil moldic and 30% irregular vugs; relatively high permeability **Comments:** Porosity is high (15–20% moldic) in the sediment-filled cavity, and only 2–3% moldic in the rock matrix. Karsted cycle top with irregular microtopography at 57.02 feet
57.60–59.80	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Molluscan quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 4–5. Rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods, skeletal fragments, peloids, gastropods **Accessory grains:** 5–70% quartz grains, very fine to fine sand size **Porosity and permeability:** 10–15% fossil moldic and 15% irregular vugs; relatively high permeability **Comments:** Small zones of sediment filling karst cavities
59.80–61.62	No recovery. Large irregular vugs common
61.62–62.40	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Mollusk quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 4 **Carbonate grains:** Pelecypods, gastropods, peloids, large discoid foraminifera **Accessory grains:** 20–70% quartz grains, very fine to fine sand size **Porosity and permeability:** no core recovered, mainly interparticle porosity? Relatively permeability uncertain **Comments:** Interval of core rubble
62.40–64.00	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal, peloid packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 4 **Carbonate grains:** Pelecypods, peloids, gastropods, miliolids, benthic foraminifera including archaiasinids **Accessory grains:** 20–35% quartz grains, very fine to fine sand size, and as much as 85% quartz grains in carbonate filling vugs **Porosity and permeability:** 15% moldic and 10% irregular vugs; relatively moderate permeability **Comments:** Karstic cavities filled with allochthonous skeletal quartz sandstone, but probably related to exposure surface above 62.40 feet, since not correlated updip

G–3877 Test Corehole—Continued	
64.00–65.26	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone and rudstone with peloid, skeletal packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 3–4 **Carbonate grains:** Pelecypods, large discoid benthonic foraminifera (including archaiasinids, peneroplids, and soritids), *Ammonia*, gastropods, echinoid fragments and spines, serpulid tubes, *Porites porites*, *Manicina* **Accessory grains:** 20–30% quartz grains, very fine to medium sand size **Porosity and permeability:** 25% fossil moldic and 15% irregular vugs; relatively moderate permeability **Comments:** None
65.26–68.40	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod packstone and wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 2–3 **Carbonate grains:** Pelecypods, peloids, discoid benthic foraminifera including archaiasinids, dasycladacean algae **Accessory grains:** 1–5% quartz grains, very fine to fine sand size **Porosity and permeability:** 10–15% moldic and 2% irregular vugs; relatively low permeability **Comments:** Sharp contact at walls of solution pipes. Upper bounding surface is an abrupt contact and a facies shift occurs across the surface. Abrupt contact at 65.25 feet
68.40–69.17	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with skeletal, peloid packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric 4. Minor *Ophiomorpha* **Carbonate grains:** Pelecypods (articulated, but mostly disarticulated and broken), gastropods, ostracods, minor large discoid benthic foraminifera (including archaiasinids), *Manicina* **Accessory grains:** 10–15% quartz grains, very fine to fine sand size **Porosity and permeability:** 15% moldic, 5% intraparticle, and 10% irregular vugs and bedding-plane vug at base; relatively moderate permeability **Comments:** None
69.17–69.60	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Lime mudstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single medium thick bed **Ichnofabrics:** Ichnofabric index 4. Abundant semivertical rhizoliths **Carbonate grains:** A few *Planorbella* and a few thin skeletal fragments **Accessory grains:** 15% quartz grains, very fine to fine sand size (mostly fine) **Porosity and permeability:** 1–2% moldic porosity, 5% irregular vugs; relatively low permeability **Comments:** An open vertical solution pipe one inch in diameter cuts through this interval. Brackish-water limestone and cycle top at 69.17 feet
69.60–71.30	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Skeletal grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows, some rhizoliths with 0.02 inch inner diameters **Carbonate grains:** Skeletal fragments, peloids, pelecypods, gastropods, discoid benthic foraminifera, miliolids **Accessory grains:** 20–25% quartz grains, very fine and fine sand size **Porosity and permeability:** 15% moldic and 15–40% vugs (thalassinidean and/or thalassinidean-like crustacean megaporous macro-ichnofabric); relatively high permeability **Comments:** Vugs appear to be connected

G–3877 Test Corehole—Continued	
71.30 – 73.15	**Lithofacies:** Probably same lithofacies as unit above **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index likely 5 with mainly thalassinidean produced ichnofabrics **Porosity and permeability:** 15% moldic and 15–30% vugs (thalassinidean and/or thalassinidean-like crustacean megaporous macro-ichnofabric); relatively high permeability **Comments:** No core recovery, description based on digital optical image
73.15–75.60	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Skeletal grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Skeletal fragments, peloids, pelecypods, discoid benthic foraminifera, red algae, miliolids, gastropods, serpulid tubes **Accessory grains:** 15–20% quartz grains, very fine to fine-grained **Porosity and permeability:** 10% moldic and 10–30% vugs (thalassinidean and/or thalassinidean-like crustacean megaporous macro-ichnofabric); relatively high permeability **Comments:** None
75.60 – 78.00	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Burrowed skeletal grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 4. Minor *Ophiomorpha* and thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Skeletal fragments, peloids, pelecypods (most in fragments), discoid benthic foraminifera (including archaiasinids, peneroplids, amphisteginids), miliolids, pink barnacle (*Balanus*) fragments, minor small branching coralline red algae, bryozoan **Accessory grains:** 10–20% quartz grains, very fine to fine **Porosity and permeability:** 15–20% moldic porosity; 2% irregular vugs and vertical solution pipe from 75.60 to 81.20 feet; relatively moderate horizontal permeability and relatively high vertical permeability **Comments:** Upper 1 foot of unit is mud-dominated packstone. Unit fines upward and becomes more micrite-rich upward. Major approximate 8 inches wide vertical solution pipe extending downward from upper bounding surface. Possible karstic exposure surface and cycle top at 75.60 feet
78.00–82.05	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Burrowed skeletal grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 4. Minor *Ophiomorpha* and thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Skeletal fragments, peloids, pelecypods (most in fragments), discoid benthic foraminifera (including archaiasinids, peneroplids, amphisteginids), miliolids, pink barnacle (*Balanus*) fragments, minor small branching and encrusting coralline red algae, bryozoan **Accessory grains:** 10–20% quartz grains, very fine to fine sand size **Porosity and permeability:** 15–20% moldic porosity, 5% irregular vugs and vertical solution pipe from 75.60 to 81.20 feet; relatively moderate horizontal permeability and relatively high vertical permeability **Comments:** None
82.05–85.25	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal packstone and grainstone **Color:** Very pale orange (10YR 8/2) and yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric 4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Skeletal fragments, pelecypods, discoid benthic foraminifera, miliolids, minor red algae **Accessory grains:** 15–25% quartz grains, very fine to very coarse sand size **Porosity and permeability:** 15–20% moldic and 2% vugs related to burrows; relatively high permeability **Comments:** Light gray allochthonous marine sediment-infill in a semivertical solution pipe about 1.2 inches across

G–3877 Test Corehole—Continued	
85.25–90.56	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod wackestone and packstone **Color:** Very pale orange (10YR 8/2) and yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric 4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Skeletal, pelecypods, peloids, echinoid plates, amphisteginids, coralline red algae, bryozoans **Accessory grains:** 10–20% quartz grains, very fine to medium sand size **Porosity and permeability:** 15–20% moldic and 2–20% vugs (between 90.00 and 90.90 feet most vuggy porosity is thalassinidean and/or thalassinidean-like crustacean megaporosity related to the macro-ichnofabric); relatively high permeability **Comments:** Lower 3 feet contains lithoclasts from the Tamiami Formation and suggest Tamiami Formation sequence boundary is just below unit
90.56–90.82	**Lithofacies:** Pedogenic limestone **Depositional texture:** Skeletal grain-dominated packstone and grainstone with minor calcified rhizoliths, laminated calcrete, and calcretized grains **Color:** **Color** between very pale orange 10YR 8/2 and pale yellowish brown 10YR 6/2 **Sedimentary structures/textures:** Thin lamination **Ichnofabrics:** Minor calcified rhizoliths with concentric microspar **Carbonate grains:** Pelecypod fragments, other skeletal fragments **Accessory grains:** 5–20% quartz grains, very fine to fine sand size **Comments:** Top Tamiami Formation and Pinecrest Sand Member of the Tamiami Formation at 90.56 feet. Skeletal grain-dominated packstone and grainstone that occurs along an abrupt contact and fills irregular solution pits (up to 0.4 inch deep and 0.2 inch wide) along the abrupt contact at 90.56 feet. Minor calcified rhizoliths, very discontinuous laminated calcrete (about 0.008 inch thick), and calcretized grains that have slightly chalky appearance
90.82–91.65	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric 4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows **Carbonate grains:** Pelecypod fragments, echinoid spines **Accessory grains:** 85% quartz grains, very fine to fine sand size **Porosity and permeability:** 1–2% moldic porosity and 25% vugs (thalassinidean and/or thalassinidean-like crustacean megaporous macro-ichnofabric); relatively high permeability **Comments:** Top Tamiami Formation and Pinecrest Sand Member of the Tamiami Formation at 90.92 feet
91.65–91.90	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric 4. Thalassinidean and/or thalassinidean-like crustacean produced most of burrows. *Ophiomorpha* with one specimen containing *Favreina* in the interior of the burrow **Carbonate grains:** Minor skeletal fragments, pelecypod fragments, and barnacle (*Balanus*) fragments **Accessory grains:** 85% quartz grains, very fine to fine sand size **Porosity and permeability:** 2% moldic and 5% vugs related to burrowing; relatively moderate permeability **Comments:** Abundant calcite concretions associated with **Ichnofabrics** and possibly more
91.90–94.50	**Lithofacies:** Skeletal quartz sandstone **Sedimentary structures/textures:** Very thickly bedded interval **Ichnofabrics:** Ichnofabric 4. *Ophiomorpha* in air-lift samples that may correlate with semivertical *Ophiomorpha* shafts between 93 and 98 feet on digital optical borehole wall image **Porosity and permeability:** 15% intergranular and 5% vugs related to burrowing; relatively low permeability **Comments:** No core recovery over this interval. All observations based on digital optical image

G–3877 Test Corehole—Continued	
94.50–97.50	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Skeletal quartz sand **Color:** Very pale orange (10YR 8/2) and yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thickly bedded interval **Ichnofabrics:** Ichnofabric 4. *Ophiomorpha* in air-lift samples that may correlate with semivertical *Ophiomorpha* shafts between 93 and 98 feet on digital optical borehole wall image. Nodular hypoburrow cementation around and in *Ophiomorpha* is common **Carbonate grains:** Minor skeletal fragments, pelecypod fragments, and barnacle (*Balanus*) fragments **Accessory grains:** 85% quartz grains, very fine to very coarse sand size, angular to subrounded, poorly sorted **Porosity and permeability:** 5–10% intergranular porosity; relatively low permeability **Comments:** None
97.50–100.92	No recovery
100.92–102.45	**Lithofacies:** Mix of skeletal quartz sandstone and skeletal quartz sand **Depositional texture:** Pelecypod quartz sandstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 3–4. Burrows **Carbonate grains:** 10–15% Pelecypods, gastropods, other skeletal particles **Accessory grains:** 85–90% quartz grains, very fine to medium sand size **Porosity and permeability:** 10–15% intergranular; relatively low permeability **Comments:** Very friable sandstone
102.45–106.00 TD	**Lithofacies:** Mix of skeletal quartz sandstone and skeletal quartz sand **Depositional texture:** Pelecypod quartz sandstone **Sedimentary structures/textures:** Massive unit **Carbonate grains:** Very large pelecypods common **Porosity and permeability:** 10–15% intergranular; relatively low permeability **Comments:** No core recovery over this interval. All observations based on digital optical image

G–3878 Test Corehole	
Depth Interval (feet below land surface)	**Described by Kevin Cunningham** [Visual estimates of permeability are based on comparison of lithofacies and pore classes to 276 air-permeability permeameter measurements (Cunningham and others, 2006b), and lattice Boltzmann permeability calculations (Cunningham and others, 2009, 2012; Cunningham and Sukop, 2011]
0–3.50	No core recovery, only unconsolidated sand
3.50–6.20	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid packstone and grainstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Abundant *Ophiomorpha* and rhizoliths with inner wall lined with concentric micrite and microspar **Carbonate grains:** Peloids, coated grains (typically quartz sand), broken and unbroken disarticulated pelecypods, gastropods, skeletal fragments **Accessory grains:** 10% quartz grains, very fine to medium sand size, rounded to angular quartz grains. 10–15% allochthonous quartz sand filling some vugs **Porosity and permeability:** 10% moldic, 20–25% vuggy (*Ophiomorpha* megaporous macro-ichnofabric and irregular vugs); relatively high permeability **Comments:** Core rubble recovered over this zone.
6.20–14.05	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid packstone and grainstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/3) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Abundant *Thalassinoides*, and minor *Favreina* and rhizoliths with inner wall lined with concentric micrite and microspar **Carbonate grains:** Peloids, miliolids, disarticulated broken pelecypods, biserial foraminifera, *Halimeda*, articulated ostracods, coated quartz grains **Accessory grains:** 5–15% quartz grains, very fine to medium sand size, subrounded to angular **Porosity and permeability:** 10% moldic, 20–30% vuggy (*Thalassinoides* megaporous macro-ichnofabric and irregular vugs); relatively high permeability **Comments:** Abrupt contact and cycle boundary at 6.20 feet with shift from grain-dominated packstone and grainstone above and mud-dominated wackestone and packstone below
14.05–15.90	**Lithofacies:** Peloid wackestone and packstone **Depositional texture:** Peloid wackestone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Thickly bedded single bed **Ichnofabrics:** Ichnofabric index 5. Abundant *Thalassinoides* and thalassinidean produced ichnofabrics, rhizoliths with inner wall lined with concentric micrite and microspar **Carbonate grains:** Peloids, broken pelecypods, miliolids, archaiasinids, unidentified benthic foraminifera **Accessory grains:** 3–7% quartz grains, very fine- to fine sand size, subrounded to angular **Porosity and permeability:** 5% moldic, 10% irregular vugs; relatively moderate permeability **Comments:** None
15.90–16.17	**Lithofacies:** Floatstone **Sedimentary structures/textures:** Massive single unit **Carbonate grains:** Large pebble-sized unidentified allochems **Porosity and permeability:** Moldic minor vuggy porosity; relatively moderate permeability **Comments:** No core recovered. Description based on digital optical image

G–3878 Test Corehole	
16.17–18.50	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Skeletal, peloidal mud- and grain-dominated packstone and skeletal, peloidal grainstone **Color:** Grayish orange (10YR 7/3) and very pale orange (10YR 8/2 **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans. Minor rhizoliths with inner wall lined with concentric micrite and microspar at and near the upper surface of interval **Carbonate grains:** Pelecypod fragments, peloids, archaiasinids, miliolids, unidentified benthic foraminifera, gastropods **Accessory grains:** 5–30% quartz grains, very fine to coarse sand size, subrounded to angular. Less than 1% dark mineral grains **Porosity and permeability:** 20–30% moldic, 5% irregular vugs; relatively moderate permeability **Comments:** Cycle top at 16.17 feet. Very irregular paleomicrotopography on upper bounding surface of about 0.15 feet. Abrupt facies change across upper bounding surface. Strong iron-staining which decreases downward, but very prominent at and just below uppermost surface
18.50–20.17	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with skeletal, peloidal wackestone and packstone matrix **Color:** Grayish orange (10YR 7/3) and very pale orange (10YR 8/2 **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypod fragments, peloids, archaiasinids, miliolids, unidentified benthic foraminifera, gastropods, and coral fragments which include *Manicina* and *Montastrea* **Accessory grains:** 3% quartz grains, very fine- to coarse-grained sand size, subrounded to angular. Less than 1% dark mineral grains **Porosity and permeability:** 30% moldic, 5% vuggy porosity; relatively moderate permeability **Comments:** Strong iron-staining which decreases downward
20.17–20.80	**Lithofacies:** Pedogenic limestone **Depositional texture:** Boulder/cobble calcrete (Wright and Tucker, 1991) with a calcrete or lime mudstone to wackestone matrix and rhizoliths **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/3) **Sedimentary structures/textures:** Medium thick bed **Ichnofabrics:** Ichnofabric index 2. Rhizoliths with inner wall lined with concentric micrite and microspar **Carbonate grains:** Lithoclasts of mudstone and/or wackestone common to the uppermost Fort Thompson Formation common, lithoclasts of thick laminated calcrete **Accessory grains:** 15% quartz grains, very fine to coarse sand size, subrounded to angular **Porosity and permeability:** 5% moldic, 5% interparticle, 10% small irregular vugs; relatively low permeability **Comments:** Common iron-staining. Cycle boundary at 20.17 feet
20.80–22.80	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal grain-dominated packstone and grainstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/3) **Sedimentary structures/textures:** Medium-thick bed from 20.80 to 21.60 feet and the underlying interval is part of a single thick bed **Ichnofabrics:** Ichnofabric index 5. Well developed elongate tubular rhizoliths (up to 0.4 inch in diameter) **Carbonate grains:** Peloids, pelecypods, large benthic foraminifera, large discoid benthic foraminifera, gastropods, echinoid fragments, one *Porites porites*, two clasts of broken unidentified coral head, one very broken amphisteginid **Accessory grains:** 35–50% quartz grains, very fine to coarse size, subrounded to angular **Porosity and permeability:** 10–15% moldic, 5% interparticle, 10% small irregular vugs, 2% bedding plane vug; relatively moderate permeability **Comments:** Common iron-staining in allochthonous fill of karst voids in host limestone. Bedding plane vugs at 21.06 feet

G–3878 Test Corehole	
22.80–27.42	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with skeletal mud- to grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium-thick bed from 22.80 to 23.35 feet and the underlying interval is part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 4–5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypods, peloids, large discoid benthic foraminifera (including archaiasinids), gastropods, echinoid fragments, miliolids, echinoid spines, ostracods **Accessory grains:** 20–50% quartz grains, very fine to coarse sand size, subrounded to angular **Porosity and permeability:** 15% moldic, 5–7% irregular vugs; relatively moderate permeability **Comments:** Uncommon iron-staining which increases upward
27.42–27.98	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod rudstone with a matrix of pelecypod, peloid mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index probably 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypods (including *Chione*), peloids, gastropods, large discoid benthic foraminifera (including archaiasinids), skeletal fragments **Accessory grains:** 15–20% quartz grains, very fine to very coarse sand size, subrounded to angular **Porosity and permeability:** 25% moldic, 5% irregular vugs; relatively moderate permeability **Comments:** Top of interval is top of a vertical upward fining trend
27.98–29.25	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous peloidal pelecypod packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypods, skeletal fragments, peloids, large discoid benthic foraminifera (including archaiasinids and peneroplids), minor gastropods **Accessory grains:** 30–50% quartz grains, very fine to coarse sand size, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 25% moldic, 10% irregular vugs; relatively moderate permeability **Comments:** Late-stage calcite cement (grayish orange, 10YR 7/4) partially fills some vugs
29.25–30.92	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with a arenaceous skeletal mud- to grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index probably 5. Most ichnofabrics may be produced by thalassinideans **Carbonate grains:** Pelecypods, skeletal fragments, gastropods, peloids, large discoid benthic foraminifera (including archaiasinids and peneroplids) **Accessory grains:** 30–50% quartz grains, very fine to coarse sand size, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 30% moldic, 10–15% irregular vugs; relatively moderate permeability **Comments:** None
30.92–31.30	**Lithofacies:** Arenaceous touching-vug pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with a arenaceous skeletal mud- to grain-dominated packstone matrix **Porosity and permeability:** 30% moldic, 10–15% irregular vugs; relatively moderate permeability **Comments:** No recovery of core. Digital optical image suggests same lithology as between 30.92 and 31.30 foot interval. Porosity and permeability mostly related to fossil (pelecypods) moldic porosity

G–3878 Test Corehole	
31.30–32.70	**Lithofacies:** Gastropod floatstone and rudstone **Depositional texture:** *Turritella* rudstone with arenaceous skeletal grainstone matrix **Color:** Very pale orange (10YR 8/2) and light gray (N7) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index uncertain **Carbonate grains:** Gastropods (mainly *Turritella*), pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), peloids, serpulid tubes, *Schizoporella* **Accessory grains:** 15–25% quartz grains, very fine to fine sand size, subrounded to angular. 2% dark mineral grains **Porosity and permeability:** 35% fossil (*Turritella* gastropod) moldic, 30% vuggy porosity; relatively high permeability **Comments:** None
32.70–33.03	**Lithofacies:** Gastropod floatstone and rudstone **Comments:** Probably same lithofacies as above based on digital optical borehole image. Porosity and permeability related to fossil (*Turritella* gastropod) moldic and irregular vuggy porosity; relatively high permeability
33.03–33.50	**Lithofacies:** Arenaceous pedogenic limestone **Depositional texture:** Arenaceous pedotubule calcrete **Color:** Very pale orange (10YR 8/2), and pale yellowish brown (10YR 6/2) to dark yellowish orange (10YR 6/6) rhizoliths **Sedimentary structures/textures:** Very irregular base on unit that fills in underlying karsted surface **Ichnofabrics:** Ichnofabric index 3. Well-developed vertical rhizoliths with inner lining of concentric bands of micrite and microspar, especially in the upper half of this subunit; **Carbonate grains:** Skeletal fragments, benthonic foraminifera (including archaiasinids), minor pelecypods with most broken, miliolids, *Elphidium*, echinoid fragments and spines, *Schizoporella* **Accessory grains:** 30–50% quartz grains, very fine to coarse sand size, subrounded to angular. 1% dark mineral grains that includes 1% phosphorite grains, trace feldspar grains **Porosity and permeability:** 10–15% irregular vugs; relatively low permeability **Comments:** Exposure surface and cycle top at 33.03 feet
33.50–40.00	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone **Color:** Very pale orange (10YR 8/2) and pale yellowish brown (10YR 6/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. *Ophiomorpha*. Most ichnofabrics probably produced by thalassinideans and semivertical rhizoliths **Carbonate grains:** Pelecypod fragments, skeletal fragments, benthonic foramininfera (including archaiasinids), gastropods, *Schizoporella*, rare small coral heads (*Manicina*) and globular planktic foraminifera **Accessory grains:** 60% quartz grains, very fine to fine sand size. 1% dark mineral grains **Porosity and permeability:** 7% moldic, 10–15% irregular vugs; relatively moderate permeability **Comments:** Upper bounding surface is part of a deeply karsted cycle with the top at 33.03 feet. Karst extends downward from upper bounding surface to a depth of about 38 feet. The karst is filled with allochthonous marine arenaceous skeletal grainstone or in more deep parts a marine skeletal quartz sand
40.00–41.58	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), gastropods, miliolids, peloids, ostracods, red algae, very uncommon *Halimeda* **Accessory grains:** 20% quartz grains, very fine to fine sand size. 1% dark mineral grains **Porosity and permeability:** 15–20% moldic, 20% irregular vugs; relatively moderate permeability **Comments:** None

G–3878 Test Corehole	
41.58–42.00	**Lithofacies:** Arenaceous conglomerate **Depositional texture:** Arenaceous limestone conglomerate with pebble to small cobble size mudstone and wackestone intraclasts **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), gastropods, miliolids, peloids, ostracods, red algae, very uncommon *Halimeda*, large pebble-size intraclasts of lime mudstone and wackestone that form a conglomerate **Accessory grains:** 20% quartz grains, very fine to fine sand size. 1% dark mineral grains **Porosity and permeability:** 15–20% moldic, 20% irregular vugs; relatively moderate permeability **Comments:** Lower half foot is a pelecypod rudstone, intraclasts of mudstone and wackestone are brackish-water limestone from a nearby island or shoreline (see adjacent cores) and related to a cycle top at 42.00 feet
42.00–43.83	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypod fragments, large discoid benthic foraminifera (including archaiasinids), gastropods, miliolids, peloids, ostracods, red algae, very uncommon *Halimeda* **Accessory grains:** 20% quartz grains, very fine to fine sand size. 1% dark mineral grains **Porosity and permeability:** 15–20% moldic, 20% irregular vugs; relatively moderate permeability **Comments:** None
43.83–44.32	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Molluscan wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single medium-thick bed **Ichnofabrics:** Ichnofabric index 2. *Entobia* (borings) extend downward from uppermost surface Ichnofacies: *Trypanites* Ichnofacies caps interval **Carbonate grains:** Broken pelecypods, gastropods, peloids, ostracods **Accessory grains:** 1–10% quartz grains, very fine to medium sand size, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 5% moldic, 5% irregular vugs; low permeability **Comments:** Exposure surface and hardground at 43.83 feet with abrupt facies shift at same depth. Minor very discontinuous, very thin (0.04 inch thick) laminated calcrete at uppermost surface
44.32–45.10	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone **Color:** Light gray (N7) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thinly bedded single bed **Ichnofabrics:** Ichnofabric index 2–4. *Entobia* (borings) and minor rhizoliths Ichnofacies: *Trypanites* **Carbonate grains:** Peloids, pelecypods, gastropods (mainly *Planorbella*), ostracods **Accessory grains:** 3–5% quartz grains, very fine to fine sand size. Less than 1% dark mineral grains **Porosity and permeability:** 2–3% moldic, 15% irregular vugs and minor bedding plane vugs; relatively low permeability **Comments:** Freshwater limestone. Minor microkarstic dissolution with allochthonous quartz sand and quartz sand-rich skeletal fill. Top of cycle picked at 44.32 feet
45.10–45.70	**Lithofacies:** Peloid wackestone and packstone **Depositional texture:** Peloid wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single medium-thick bed **Ichnofabrics:** Ichnofabric index 2–3. Vertical and less common horizontal rhizoliths **Carbonate grains:** Peloids, pelecypods, gastropods (mainly *Planorbella*) **Accessory grains:** 3–5% fine-grained quartz grains. Less than 1% dark mineral grains **Porosity and permeability:** 2–3% moldic, 15% irregular vugs; relatively low permeability **Comments:** Brackish limestone. Minor microkarstic dissolution with allochthonous quartz sand and quartz sand-rich skeletal fill

G–3878 Test Corehole	
45.70–47.07	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal mud-dominated packstone **Color:** Very pale orange (10YR 8/2) and very light gray (N8) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. **Carbonate grains:** Peloids, pelecypods, gastropods, large discoid benthic foraminifera (including archaiasinids), *Porites porites* **Accessory grains:** 3–40% quartz grains, very fine- to coarse sand size, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 5–10% moldic, 15–25% irregular vugs; relatively moderate permeability **Comments:** Abrupt contact and facies shift on upper bounding surface
47.07–47.90	**Lithofacies:** Pelecypod floatstone and rudstone **Porosity and permeability:** 30–40% moldic, 10% irregular vugs; relatively high permeability **Comments:** No core recovery. Lithology based on digital optical borehole image
47.90–50.52	**Lithofacies:** Arenaceous coral boundstone (*Porites porites* dominant) **Depositional texture:** Arenaceous *Porites porites*, pelecypod bafflestone (floatstone and rudstone) with pelecypod foraminiferal mud- to grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Peloids, stick-shaped coral (*Porites porites*) and small coral heads (*Manicina*), pelecypods, large discoid benthic foraminifera (including archaiasinids, peneroplids, and soritids) miliolids, peloids, ostracods, gastropods **Accessory grains:** 15–45% quartz grains, very fine to fine-medium sand size, angular to angular. 3–5% dark mineral grains (including 1% phosphorite) **Porosity and permeability:** 15–20% moldic, 10% irregular vugs; relatively moderate permeability **Comments:** Interior patch reef
50.52–51.779	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal sandstone **Color:** Very light gray (N8) **Sedimentary structures/textures:** Single thick bed **Porosity and permeability:** Probably mostly intergranular, but uncertain; probably relatively low permeability but uncertain **Comments:** Lithology based on minor rubble and digital optical borehole image
51.779–51.78	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated calcrete **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** About 0.04 inch thick and discontinuous **Porosity and permeability:** Mostly microporosity; relatively low permeability **Comments:** Exposure surface and cycle top at 51.779 feet
51.78–52.25	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** *Ostrea* floatstone with arenaceous skeletal mud-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) with large pale yellowish brown pelecypods (10YR 6/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 4–5 **Carbonate grains:** *Ostrea* common, large discoid benthic foraminifera, *Elphidium*, uncommon amphisteginids **Accessory grains:** 35–50% quartz grains, very fine to coarse sand size (mostly fine), angular to subrounded. 3% dark mineral grains (including 1% phosphorite grains) **Porosity and permeability:** 5% moldic, 10% irregular vugs, and less than 1% boring porosity; relatively low permeability **Comments:** Large *Ostrea* are medium gray (N5) colored. Calcrete layer caps the top of this interval. Probable coastal estuary. Upper part of unit appears calcretized to a calcified soil (Wright and Tucker, 1991)

G–3878 Test Corehole	
52.25–55.50	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypods, gastropods, uncommon large discoid foraminifera **Accessory grains:** 55–75% quartz grains, very fine- to medium sand size, subrounded to angular. 3–4% dark minerals (including 1–2% phosphorite grains) **Porosity and permeability:** 10–15% moldic, 10–20% vugs related to burrows, 5% irregular vugs; relatively moderate permeability **Comments:** None
55.50–57.00	No recovery. Based on digital optical borehole image, the lithology is probably quartz sandstone and quartz sand. Porosity and permeability probably related to intergranular porosity, but based only on image. Permeability probably relatively moderate
57.00–60.88	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone with mud-dominated packstone **Color:** Very pale orange (10YR 8/2), burrow mottled **Sedimentary structures/textures:** Thick bedding **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypods, large discoid benthonic foraminifera (including archaiasinids, peneroplids, and soritids), *Ammonia*, gastropods, echinoid fragments and spines, uncommon *Ostrea*, serpulid tubes **Accessory grains:** 20–40% quartz grains, very fine to medium sand size. 2–3% dark mineral grains (including 1% phosphorite grains) **Porosity and permeability:** 10–20% moldic, 15% irregular vugs; relatively moderate permeability **Comments:** Possibly large irregular vugs filled with allochthonous marine skeletal quartz sand just below top of upper bounding surface. Possible karsted upper bounding surface and cycle top at 57.00 feet
60.88–63.68	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypods (mostly broken), large discoid benthic foraminifera (archaiasinids, peneroplids), gastropods, ostracods **Accessory grains:** 15% quartz grains, very fine to fine sand size, subrounded to angular; moderately sorted. Less than 1% dark mineral grains **Porosity and permeability:** 5–10% moldic, 1–5% vuggy porosity; relatively low permeability **Comments:** None
63.68–64.42	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone and rudstone with arenaceous pelecypod fragment mud-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded unit **Ichnofabrics:** Ichnofabric index 4–5? **Carbonate grains:** Pelecypods (articulated, but mostly disarticulated and broken), gastropods, ostracods, minor large discoid benthic foraminifera (including archaiasinids) **Accessory grains:** 15–20% quartz grains, very fine to medium sand size, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 25% fossil (pelecypod) moldic, 5–20% irregular vugs; relatively high permeability **Comments:** None

G–3878 Test Corehole	
64.42–65.00	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Skeletal mudstone, wackestone, and packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single medium-thick bed **Ichnofabrics:** Ichnofabric index 2–3. Common vertical rhizoliths that are less than 0.04 inch in diameter **Carbonate grains:** Gastropods (including *Planorbella*), ostracods, *Ostrea*, *Elphidium*, peloids **Accessory grains:** 1–2% quartz grains, very fine to medium sand size, subrounded to angular. Less than 1% to 2% dark mineral grains (including less than 1% to 1% phosphorite grains) **Porosity and permeability:** 3–5% moldic,15% irregular vugs and vertically oriented vugs; relatively low horizontal permeability, but may have relatively high vertical permeability **Comments:** Brackish coastal margin. Exposure surface and cycle top at 64.42 feet
65.00–66.00	No core recovery, but based on digital optical image, probably same lithology as interval below 67.00–68.20 feet
66.00–72.17	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Washed out, rubbly interval **Ichnofabrics:** Ichnofabric index probably 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Skeletal fragments, broken pelecypods, broken echinoids, peloids, benthic foraminifera (including miliolids) **Accessory grains:** 10–40% quartz grains, very fine to fine sand size. 3–4% dark minerals (including 1–2% phosphorite grains) **Porosity and permeability:** 10–15% moldic, 15–35% vugs related to thalassinidean and/or thalassinidean-like crustacean megaporous macro-ichnofabric and some porosity of uncertain origin; relatively high permeability **Comments:** Core at the top, but generally poor recovery in this interval, but some rubble recovered
72.17–75.06	**Lithofacies:** Coral boundstone (*Acropora cervicornis* dominant) **Depositional texture:** *Acropora cervicornis* bafflestone (floatstone and rudstone) with skeletal grain-dominated and grainstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans. A few well defined *Ophiomorpha* **Carbonate grains:** Broken pelecypods (minor articulated pelecypods), peloids, corals (mainly *Acropora cervicornis*), discoid benthic foraminifera (archaiasinids and peneroplids), red algae, miliolids, amphisteginids, gastropods, serpulid tubes, one *Manicina* **Accessory grains:** 3–30% quartz grains, very fine to medium sand size, subrounded to angular **Porosity and permeability:** 5–20% fossil (coral) moldic, 10–15% interparticle, and 5% irregular vugs; relatively moderate permeability **Comments:** Interior patch reef. Lower part of interval more micrite rich and matrix is a skeletal packstone
75.06–77.90	**Lithofacies:** Coral boundstone (*Montastrea annularis* dominant) **Depositional texture:** *Montastrea annularis* framestone with pelecypod wackestone and mud-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5? **Carbonate grains:** Pelecypods (mostly broken), peloids, serpulid worm tubes, pink barnacles (*Balanus*), cheilostome bryozoans **Accessory grains:** 3–10% quartz grains, very fine- to coarse sand size, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 40% fossil (coral) moldic; 10–30% irregular vugs; relatively high permeability **Comments:** Interior patch reef

G–3878 Test Corehole	
77.90–80.60	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans **Carbonate grains:** Pelecypods, pink and white barnacles (*Balanus*), peloids, miliolids, gastropods, minor small light green mudstone lithoclasts **Accessory grains:** 10–30% quartz grains, very fine- to very coarse sand size, rounded to angular. 1% dark minerals (including less than 1% phosphorite grains) **Porosity and permeability:** 5–10% moldic; 2–25% irregular vugs; relatively moderate permeability **Comments:** Very irregular possibly vertically connected vugs. At upper bounding surface at 77.90 feet is abrupt facies shift from heterozoan particle assemblage below to chlorozoan particle assemblage above, a possible irregular paleotopography on a karsted surface with irregular karst vugs below. Possibly an exposure surface and cycle top
80.60–86.40	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal mud- and grain-dominated packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thick and massive bed **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans. Also, rhizoliths with reddish brown concentric micrite or microspar on inner wall **Carbonate grains:** Pelecypods, gastropods, echinoid fragments and spines, miliolids, *Elphidium*, amphisteginids, globular planktic foraminifera, pink barnacles (*Balanus*), green mudstone and other types of greenish lithoclasts, and greenish sandstone lithoclasts containing abundant rhizoliths lined with concentric micrite and microspar indicative of erosion from an exposure surface **Accessory grains:** 15–25% quartz grains, fine to coarse sand size, angular to subrounded. 1% dark minerals **Porosity and permeability:** 10–15% moldic, 10–20% vuggy porosity associated with thalassinidean and/or thalassinidean-like crustacean shaft-and-tunnel macro-ichnofabric; relatively high permeability **Comments:** Calcified rhizoliths and green lime mudstone in lithoclasts suggest erosion of an exposure surface that must be present below this interval
86.40–87.60	No core recovery, but digital optical borehole image suggest interval of highly bioturbated, skeletal quartz sand and sandstone with common carbonate cemented macro-ichnofabrics. Above 86.40 feet are rhizoliths lined with concentric micrite and microspar bearing lithoclasts in rubble and green Tamiami Formation lime mudstone lithoclasts. Possible unconformity and top Tamiami Formation at 86.40 feet
87.60–89.73	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous, skeletal quartz sandstone **Color:** Very light gray (N6) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans and/or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, benthic foraminifera (including *Elphidium* and miliolids), skeletal fragments, gastropods, amphisteginids, echinoid plates and spines **Accessory grains:** 60–75% fine quartz grains, very fine to medium sand size (mostly very fine to fine), angular to subangular. 2–3% dark minerals (including 1–2% phosphorite grains) **Porosity and permeability:** 2% fossil moldic, 10–30% vugs related to burrows; relatively moderate permeability **Comments:** Mainly a core rubble zone and zone of no recovery. Micrite commonly occludes intergranular pore volume

G–3878 Test Corehole	
89.73–93.00	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Pelecypod quartz sand **Color:** Light greenish gray 5GY 8/1 **Sedimentary structures/textures:** Very thick single bed **Ichnofabrics:** Ichnofabric index 5. *Ophiomorpha*. Nodular hypoburrow cementation occurs associated with some large burrows, such as *Ophiomorpha* Ichnofacies: *Cruziana* **Carbonate grains:** Pelecypod fragments common and unidentified skeletal fragments **Accessory grains:** 85% quartz sand, very fine to medium sand size (mostly very fine to fine), well sorted. 5–7% dark minerals **Porosity and permeability:** 20–25% intergranular porosity; relatively moderate permeability **Comments:** Friable. Nodular hypoburrow cementation occurs associated with some large burrows, such as *Ophiomorpha*. Possibly deposited in a marginally marine bay that experienced some salinity variation, as suggested by low diversity in large fauna. Large *Ophiomorpha* suggestive of periods of open marine conditions. One J-shaped burrow may have been formed by a crab
93.00–96.20	No core recovery, but digital optical borehole image suggest interval of highly bioturbated, skeletal quartz sand and sandstone that contains much more limestone than intervals above and below. Likely relatively low permeability
96.20–103.30	**Lithofacies:** Skeletal quartz sand and skeletal quartz sandstone **Depositional texture:** Pelecypod-bearing quartz sand and sandstone **Color:** Light greenish gray 5GY 8/1 **Sedimentary structures/textures:** Thickly to very thickly bedded **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** 25% pelecypods (mostly disarticulated and fragmented), gastropods (including *Turritella*), echinoid plates, amphisteginids, *Ostrea*, miliolids, globular planktic foraminifera, echinoid spines, bryozoans **Accessory grains:** 70% quartz grains, very fine to medium sand size (mostly fine to medium), subrounded to angular, well sorted. 3–5% dark minerals **Porosity and permeability:** 10–15% intergranular porosity; relatively low permeability **Comments:** Friable in part. Much of interval is a zone of no recovery. Three possible fining upward cycles occur with tops at 99.90, 97.76, and 103.30 feet. The top of this interval may be a firmground with underlying *Glossifungites* Ichnofacies and thus a cycle top may be present at 103.30 feet
103.30–106.80 TD	No core recovery, but digital optical borehole image suggest interval of highly bioturbated, skeletal quartz sand and sandstone. Interval is likely relatively low permeability. Some very large pebble-size to possibly small cobble-size pelecypods are included in this interval. Ichnofabric index is 5. *Ophiomorpha* is highly suggested in the borehole image. Most ichnofabrics probably produced by thalassinideans and/or thalassinidean-like crustaceans. The depth of 103.30 feet may be an intra-Tamiami cycle top. Likely relatively low permeability

G–3879 Test Corehole	
Depth Interval (feet below land surface)	**Described by Kevin Cunningham** [Visual estimates of permeability are based on comparison of lithofacies and pore classes to 276 air-permeability permeameter measurements (Cunningham and others, 2006b), and lattice Boltzmann permeability calculations (Cunningham and others, 2009, 2012; Cunningham and Sukop, 2011]
0–6.08	No core recovery. Digital optical image indicates lithofacies between 2.50 and 6.60 feet is same as lithofacies in interval below
6.08–8.15	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10 YR 7/4) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Abundant *Ophiomorpha*. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Peloids, large discoid benthic foraminifera (including archaiasinids), miliolids, pelecypods, ostracods **Accessory grains:** 10–20% very fine- to medium-grained (minor coarse grained) quartz grains, sub to angular **Porosity and permeability:** 15% pelmoldic and minor fossil moldic, 30% *Ophiomorpha* megaporous macro-ichnofabric and vertical solution pipe from 6.08 to 10.70 feet; relatively high permeability **Comments:** Wide solution pipe observed between 6.4 and 10.7 foot depth on digital optical borehole image log
8.15–15.85	**Comments:** No core recovery, but based on digital optical borehole image most likely same peloid packstone and grainstone lithofacies as in 6.60 to 8.15 foot interval
15.85–16.25	**Lithofacies:** Peloid wackestone and packstone **Depositional texture:** Peloidal pelecypod wackestone and packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Abundant *Thalaissinoides*. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Peloids, large discoid benthic foraminifera (including archaiasinids), miliolids, pelecypods, *Schizoporella*, *Halimeda*, ostracods **Accessory grains:** 20% very fine- to medium-grained quartz grains, sub to angular **Porosity and permeability:** 5% moldic, 5% *Ophiomorpha* megaporous macro-ichnofabric and vertical solution pipe from 13.60 to 16.25 feet; relatively high permeability **Comments:** Zone of core rubble recovery
16.25–16.85	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated calcrete at top underlain by arenaceous peloid, foraminiferal packstone and wackestone with an overprint of abundant rhizoliths **Color:** Grayish orange (10YR 7/4) and grayish orange pink (5YR 7/2) **Sedimentary structures/textures:** Pinkish areas are interpreted as clasts in a pseudo-breccia. Massive unit **Ichnofabrics:** Ichnofabric index 3. Abundant rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Large discoid benthic foraminifera (including archaiasinids and peneroplids), pelecypods, peloids **Accessory grains:** 25% very fine- to medium-grained quartz grains, subrounded to angular **Porosity and permeability:** 5–7% moldic, 5% irregular vugs; relatively low permeability **Comments:** Laminated calcrete at upper bounding surface is up to 0.16 inch thick. Upper bounding surface is a cycle cap

G–3879 Test Corehole	
16.85–19.00	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Very minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods, discoid benthic foraminifera (including archaiasinids, peneroplids, and soritids), peloids, miliolids, gastropods, echinoid fragments, *Elphidium*, ostracods **Accessory grains:** 5–20% very fine- to medium-grained quartz grains, subrounded to angular **Porosity and permeability:** 15–20% moldic, 3–5% irregular vugs; relatively low permeability **Comments:** None
19.00–20.20	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal mud- and grain-dominated packstone and grainstone, pelecypod floatstone, and skeletal grainstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Very minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods, discoid benthic foraminifera (including archaiasinids and soritids), peloids, miliolids, gastropods, echinoid fragments, *Elphidium*, ostracods **Accessory grains:** 5–20% very fine- to medium-grained quartz grains, subrounded to angular **Porosity and permeability:** 15–20% moldic, 5% interparticle, 3–5% irregular vugs; relatively moderate permeability **Comments:** None
20.20–22.60	**Lithofacies:** Arenaceous mudstone and wackestone **Depositional texture:** Arenaceous wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single bed **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, gastropods, echinoid plates and spines, *Elphidium*, ostracods **Accessory grains:** 20–30% very fine- to medium-grained quartz grains, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 10–15% moldic, 15% vuggy; relatively low permeability **Comments:** Lithoclast of laminated calcrete suggests an exposure surface on top of unit at 20.80 feet—thus the interval (20.20–22.8+0 feet) is probably a transgressive basal unit of a high-frequency cycle
22.60–20.80	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single bed **Ichnofabrics:** Ichnofabric index uncertain **Carbonate grains:** Skeletal fragments **Accessory grains:** 50–75% very fine- to medium-grained quartz grains, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 5% moldic, 5% interparticle, 10% irregular vugs and bedding plane vugs; relatively moderate permeability **Comments:** None

G–3879 Test Corehole	
20.80–22.30	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal grain-dominated packstone **Color:** Grayish orange (10YR 7/4) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Very minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Skeletal fragments, peloids, large discoid benthic foraminifera, echinoid plates and spines, *Elphidium* **Accessory grains:** 10–45% very fine to coarse grained quartz grains, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 15% moldic, 3% intraparticle, 5% interparticle, and 10% irregular vugs; relatively moderate permeability **Comments:** Possible exposure surface and cycle cap at top unit based on presence of rhizoliths and laminated calcrete in 20.20 to 20.60 foot unit
22.30–23.50	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with arenaceous skeletal grain-dominated packstone matrix **Color:** Grayish orange (10YR 7/4) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Minor rhizoliths with pale yellowish brown (10YR 6/2) concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods, peloids, small coral heads (*Manicina*?), large discoid benthic foraminifera (including archaiasinids and peneroplids), miliolids, echinoid plates, bryozoans **Accessory grains:** 25–45% very fine and coarse-grained quartz grains, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 20% fossil (bivalve) moldic, 5% interparticle, 35% irregular vugs; relatively high permeability **Comments:** None
23.50–26.60	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with arenaceous skeletal mud- to grain-dominated packstone and grainstone matrix **Color:** Grayish orange (10YR 7/4) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, peloids, large discoid benthic foraminifera (including archaiasinids, peneroplids, and soritids), miliolids, gastropods, echinoid plates, *Elphidium*, lithoclasts **Accessory grains:** 25–50% very fine and very coarse-grained quartz grains, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 20% moldic, 5% interparticle, 35% irregular vugs; relatively moderate permeability with relatively high permeability at the base of the interval **Comments:** None
26.60–26.92	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with arenaceous skeletal mud- to grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods (including *Chione*), gastropods, peloids, large discoid benthic foraminifera (including archaiasinids), echinoid plates, *Elphidium* **Accessory grains:** 20–50% very fine- and very coarse-grained quartz grains, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 25 % fossil moldic, 5% interparticle, 10% irregular vugs; relatively high permeability **Comments:** None

G–3879 Test Corehole	
26.92–29.80	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous mud- to grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, peloids, large discoid benthic foraminifera (including archaiasinids), gastropods, miliolids, echinoid plates, *Elphidium* **Accessory grains:** 20–35% very fine- to very coarse-grained quartz grains, sub to angular. 1% dark mineral grains (including less than 1% phosphorite grains) **Porosity and permeability:** 25% fossil moldic; 10–15% irregular vugs; relatively moderate permeability **Comments:** Cycle cap at top with autobrecciation and thin semivertical solution pipes extending downward from upper bounding surface
29.80–32.90	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with arenaceous skeletal mud- to grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods (including *Chione*), gastropods, peloids, large discoid benthic foraminifera (including archaiasinids), echinoid plates, *Elphidium*, *Manicina* coral head **Accessory grains:** 20–50% very fine- and very coarse-grained quartz grains, subrounded to angular. 1% dark mineral grains (including less than 1% phosphorite grains) **Porosity and permeability:** 20–35% fossil moldic, 5% interparticle, 15% irregular vugs; relatively high permeabililty **Comments:** None
32.90–33.30	**Lithofacies:** Arenaceous pedogenic limestone **Depositional texture:** Arenaceous root-mold limestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single unit **Ichnofabrics:** Ichnofabric index 5. Abundant rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods, peloids, large discoid benthic foraminifera (including archaiasinids), *Schizoporella* **Accessory grains:** 45% very fine- to coarse grained quartz grains, subrounded to angular. 3% dark mineral grains (including 1% phosphorite grains) **Porosity and permeability:** 20% moldic; 15% irregular vugs; relatively moderate permeability **Comments:** Subaerial exposure surface with thin semivertical solution pipes in the lithofacies unit below. Cycle cap at upper bounding surface
33.30–34.70	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone with subordinate arenaceous skeletal mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Very minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods (including *Chione*), peloids, large discoid benthic foraminifera (including archaiasinids), echinoid plates, *Schizoporella* **Accessory grains:** 40–70% very fine- to coarse grained quartz grains, subrounded to angular. 4% dark mineral grains (including 2% phosphorite grains) **Porosity and permeability:** 15% moldic; 10% interparticle, 15% irregular vugs; relatively moderate permeability **Comments:** Thin semivertical solution pipes observed from top to bottom of interval. Some pipes filled with allochthonous sediment and rhizoliths. These pipes relate to exposure surface at 32.90 feet

G–3879 Test Corehole	
34.70–35.20	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with arenaceous skeletal mud- to grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods (including *Chione*), gastropods, peloids, large discoid benthic foraminifera (including archaiasinids), echinoid plates, *Schizoporella* **Accessory grains:** 20–50% very fine- and very coarse-grained quartz grains, subrounded to angular. 1% dark mineral grains (including 1% phosphorite grains) **Porosity and permeability:** 25–30% fossil moldic, 5% interparticle, 15% irregular vugs; relatively high permeability **Comments:** None
35.20–40.20	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone with subordinate arenaceous mud- and grain-dominated packstone **Color:** Mottled yellowish gray (5Y 8/1), very pale orange (10YR 8/2), and very light gray (N8) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall to a depth of about 36.00 feet **Carbonate grains:** Pelecypods, large discoid benthic foraminifera (including archaiasinids), miliolids, peloids, echinoid plates and spines, *Elphidium*, bryozoan **Accessory grains:** 40–70% fine- to coarse (minor very fine and very coarse grained) grained quartz grains, subrounded to angular. 2% dark mineral grains (including 1% phosphorite grains) **Porosity and permeability:** 5% moldic, 5% interparticle, 10% irregular vugs and minor vugs related to burrows; relatively moderate permeability **Comments:** Upper 1 foot has multiple solution cavities that contain the rhizoliths in this unit and are also filled with an allochthonous marine carbonate and related to exposure surface above. *Schizoporella* at base of unit, suggesting they may be related to basal flooding stage of cycle
40.20–41.50	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone **Color:** Very light gray (N8) to white (N9) **Sedimentary structures/textures:** Single thick bed **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypod fragments, benthic foraminifera, echinoid spines **Accessory grains:** 92% fine- to medium (minor very fine and coarse grained) grained quartz grains, subrounded to angular. 2% dark mineral grains, trace feldspar **Porosity and permeability:** 10% fossil (bivalve) moldic, 5% interparticle, 5–20% irregular vugs (one large vug vertically oriented); relatively moderate horizontal permeability and relatively high vertical permeability **Comments:** None
41.50–41.75	**Lithofacies:** Conglomerate **Depositional texture:** Limestone conglomerate with pebble to small cobble size mudstone and wackestone intraclasts **Color:** Very pale orange (10YR 8/2) mudstone and yellowish gray (5Y 8/1) arenaceous matrix **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index uncertain **Carbonate grains:** Gastropods (including minor *Planorbella*) and ostracods **Accessory grains:** 20% very fine- to medium-grained quartz grains, subrounded to angular **Porosity and permeability:** 15% moldic, 4% interparticle, 10% irregular vugs; relatively moderate permeability **Comments:** Skeletal sandstone fills from interval (40.20–41.50 feet) above fills in area around intraclasts of mudstone and wackestone—indicative of a brackish depositional environment. Coastal brackish zone and probable shoreline nearby. Represents subtidal expression of cycle top at 41.75 feet

G–3879 Test Corehole	
41.75–43.60	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with arenaceous skeletal mud- to grain-dominated packstone matrix **Color:** Mottled very pale orange (10YR 8/2) and yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. **Carbonate grains:** Pelecypods, gastropods, peloids, large discoid benthic foraminifera, *Porites porites*, fragments, barnacles (*Balanus*) **Accessory grains:** 5–20% very fine- and medium-grained quartz grains, subrounded to angular. Less than 1% dark mineral grains **Porosity and permeability:** 20 % moldic, 5% interparticle, 15% irregular vugs and minor bedding plane vugs; relatively moderate permeability **Comments:** *Porites porites* may be related to flooding of underlying cycle top. Some karstic solution piping extends downward into this interval and pipes can be filled with allochthonous skeletal quartz sand from 40.20–41.50 foot interval
43.60–44.34	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod wackestone and packstone **Color:** Mottled very pale orange (10YR 8/2) to very light gray (N8) **Sedimentary structures/textures:** Single bed **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, gastropods, archaiasinids, miliolids, *Ammonia*, ostracods, peloids **Accessory grains:** 10–15% quartz silt to medium quartz grains, subrounded to angular **Porosity and permeability:** 5–10% moldic, 5–10 irregular vugs; relatively low permeability **Comments:** Transgressive condensed unit, possible maximum flooding surface at upper bounding surface
44.34–44.95	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone and rudstone with molluscan wackestone and mud-dominated packstone matrix **Color:** Medium light gray (N6) matrix with (pale yellowish brown (10YR 6/2) fill in rhizoliths **Sedimentary structures/textures:** Single bed **Ichnofabrics:** Ichnofabric index 2. Vertical rhizoliths without any calcification **Carbonate grains:** Pelecypods, gastropods (mainly *Planorbella*), peloids, ostracods **Accessory grains:** 1–5% very fine- to medium-grained quartz grains, subrounded to angular **Porosity and permeability:** 10% moldic, 15% irregular vugs and a thin vertical solution pipe; relatively low permeability **Comments:** Freshwater limestone. Diffuse boundary with underlying unit. Laminated calcrete lines some of the rhizoliths. All rhizoliths filled with a marine skeletal sandstone that overlies laminated calcrete or a calcified sandstone that underlies the laminate calcrete
44.95–45.40	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Mudstone and foraminiferal wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single bed **Ichnofabrics:** Ichnofabric index 2. Vertical rhizoliths **Carbonate grains:** *Elphidium*, archaiasinids, *Ammonia*, gastropods (including *Planorbella*), ostracods **Accessory grains:** 15% very fine- to coarse-grained; subrounded to angular **Porosity and permeability:** 10% moldic, 5–10 irregular and vertically oriented vugs; relatively low permeability **Comments:** Brackish water limestone. Minor microkarstic vugs with marine allochthonous fill. Some vugs partly lined with laminated calcrete.

G–3879 Test Corehole	
45.40–47.10	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal mud-dominated packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. **Carbonate grains:** Pelecypods, large discoid benthic foraminifera including archaiasinids and peneroplids), *Ammonia*, miliolids, gastropods, *Porites porites*, *Manicina* **Accessory grains:** 15–20% very fine- to medium-grained quartz grains, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 10–15% fossil (bivalve) moldic porosity, 10% Thalassinidean or Thalassinidean-like crustacean megaporous macro-ichnofabric; relatively moderate permeability in the upper half of the interval and relatively high permeability in lower half of interval **Comments:** None
47.10 – 47.40	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Mudstone and foraminiferal wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single bed **Ichnofabrics:** Ichnofabric index uncertain **Carbonate grains:** Pelecypods, *Ammonia*, *Elphidium*, gastropods, miliolids, ostracods **Accessory grains:** 15% very fine- to coarse-grained; subrounded to angular **Porosity and permeability:** 10% moldic, 10–35% irregular vugs; relatively moderate permeability **Comments:** Description based on core rubble and digital optical borehole image. Upper bounding surface has irregular microtopography and abrupt facies shift across it. Probable firmground. Restricted marginal marine
47.40–47.64	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal grain-dominated packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Thin rubbly unit on digital optical borehole image **Ichnofabrics:** Ichnofabric index 3. Abundant rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods, large discoid benthic foraminifera, *Ostrea*, skeletal fragments **Accessory grains:** 15–20% very fine- to medium-grained quartz grains, subrounded to angular, Less than 1% dark mineral grains **Porosity and permeability:** 5–20% moldic, 1% root-mold porosity, 10–25% irregular vugs; relatively moderate permeability **Comments:** None
47.64–49.90	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal mud- and grain-dominated packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods, large discoid benthonic foraminifera (including archaiasinids and peneroplids), gastropods, miliolids **Accessory grains:** 20–45% fine- to medium-grained (minor very fine and coarse grained) quartz sand, subrounded to angular. 1% dark mineral grains **Porosity and permeability:** 5–10% moldic, 3% interparticle, 1–2% irregular vugs and possibly vugs related to burrows; relatively moderate permeability **Comments:** Solution pipes extend downward from upper surface and filled with allochthonous fill that includes rhizoliths, but is similar lithology to allochthonous fill in interval from 45.40–47.10 feet, so likely related to same exposure surface at 44.34 feet. *Porites porites* and a few *Manicina* in the lower half of unit
49.90–51.41	**Comments:** No core recovery over this unit. Based on digital optical image and underlying lithology, this zone is likely a marine, skeletal quartz sandstone that is somewhat friable

G–3879 Test Corehole	
51.41–51.60	**Lithofacies:** Quartz sandstone **Depositional texture:** Quartz sandstone **Color:** Light gray (N7) and yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 4–5 **Carbonate grains:** Pelecypods (including *Ostrea*), benthonic foraminifera **Accessory grains:** 60–80% fine-grained quartz sand, subrounded to angular, well sorted. 2% dark mineral grains (less than 1% phosphorite grains) **Porosity and permeability:** 15% moldic, 50% vertical solution pipe and irregular vugs; relatively high permeability **Comments:** Abundant micrite matrix that has a microcrystalline calcrete-look to it. Thin section at 51.42 feet includes tubes lined with concentric or irregularly distributed micrite and microspar indicative of calcification in rhizoliths. Suggests associated exposure surface and cycle cap at top of interval
51.60–52.74	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 4–5. Very minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods (including *Ostrea*), benthic foraminifera, echinoid plates and spines **Accessory grains:** 60–70% fine-grained quartz sand, subrounded to angular, well sorted. 2% dark mineral grains (less than 1% phosphorite grains) **Porosity and permeability:** 15% moldic; 50% vertical solution pipe and irregular vugs; relatively high permeability **Comments:** Abundant micrite matrix
52.74–56.10	**Comments:** No core recovery over this unit. Based on digital optical image and underlying lithology, this zone is likely a marine, skeletal quartz sandstone that is somewhat friable, especially in the lower half of the unit
56.10–60.40	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone and rudstone with arenaceous mud- to grain-dominated packstone **Color:** Yellowish gray (5Y 8/1) and light gray (N7) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, large discoid benthonic foraminifera (including archaiasinids and peneroplids), echinoid plates and spines, *Elphidium*, peloids, miliolids, small benthic foraminifera, *Ammonia*, *Halimeda*, one *Porites porites* **Accessory grains:** 10–40% fine- to coarse grained (minor very fine grained) quartz grains, subrounded to angular; 1–3% dark mineral grains (including less than 1% to 1% phosphorite grains) **Porosity and permeability:** 10–15% moldic, 3% interparticle, 2–20% irregular vugs; relatively moderate permeability **Comments:** Upper 2.3 feet has large irregular vugs filled with allochthonous marine, skeletal sandstone. Probable karst high-frequency cycle top
60.40–63.60	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal wackestone and mud-dominated packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, large discoid benthonic foraminifera (including archaiasinids), echinoid plates and spines, peloids, miliolids, small benthic foraminifera, *Halimeda*, *Elphidium*, *Ammonia* **Accessory grains:** 10–25% fine- to medium-grained (minor very fine and coarse grained) quartz grains, subrounded to angular. 1–3% dark minerals (including less than 1% and up to 1% phosphorite grains) **Porosity and permeability:** 5–10% moldic, 3–5% irregular vugs; relatively low permeability **Comments:** None

G–3879 Test Corehole	
63.60–64.40	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone and rudstone with skeletal wackestone and mud-dominated packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, large discoid benthonic foraminifera (including archaiasinids), echinoid plates and spines, peloids, miliolids, small benthic foraminifera, *Elphidium*, *Ammonia* **Accessory grains:** 10–25% fine- to medium-grained (minor very fine and coarse grained) quartz grains, subrounded to angular. 1–3% dark minerals (including less than 1% and up to 1% phosphorite grains) **Porosity and permeability:** 5–20% fossil (bivalve) moldic, 10–25% irregular vugs; relatively high permeability **Comments:** None
64.40–64.90	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Mudstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single thin bed **Ichnofabrics:** Ichnofabric index 2–3. Abundant very thin vertical to semivertical rhizoliths filled with allochthonous marine quartz sand, areas of micrite, and calcite cement **Carbonate grains:** Ostracods, very small skeletal fragments, gastropods, *Elphidium*? **Accessory grains:** 1–3% quartz grains, very fine- to fine sand size, subrounded to rounded **Porosity and permeability:** 3% microporosity, 3% moldic, 4% small vertical solution pipes; relatively low permeability **Comments:** Marginal-marine brackish limestone. Very low permeability unit. Vertical solution pipe observed on digital optical image
64.90–66.20	No core recovered. Lithology uncertain
66.20–67.47	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal mud-dominated packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, large discoid benthonic foraminifera (including archaiasinids), echinoid plates and spines, peloids **Accessory grains:** 10–35% quartz grains, very fine to medium sand size (minor very fine and coarse grained), subrounded to angular. 1–3% dark minerals (including less than 1–3% and up to 1% phosphorite grains) **Porosity and permeability:** 5–10% moldic, 10–20% vuggy (vuggy porosity and relatively high permeability associated with thalassinidean or thalassinidean-like crustacean shaft-and-tunnel macrofabric); relatively high permeability **Comments:** None
67.47–69.97	No core recovered. Based on digital optical borehole image interval is most likely a similar lithology to interval above
69.97–70.57	No core recovered. Digital optical borehole image shows an uncertain lithology
70.57–71.40	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Skeletal packstone and grainstone **Color:** Very pale orange 10YR 8/2 and yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Thickly bedded **Carbonate grains:** Unidentified skeletal fragments, pelecypods, coralline red algae **Accessory grains:** 1–4% quartz grains, very fine- to medium sand size (mostly fine to medium), subrounded to angular **Porosity and permeability:** 5% moldic porosity, 25% vuggy (vuggy porosity and relatively high permeability associated with thalassinidean or thalassinidean-like crustacean shaft-and-tunnel macrofabric); relatively high permeability **Comments:** Lithology in interval is based on core samples that are rubble. Some rubble samples have uncommon rhizoliths lined with concentric micrite and microspar

G–3879 Test Corehole	
71.40–72.40	No core recovery. Based on digital optical borehole image interval is most likely a similar lithology to interval above
72.40–74.66	**Lithofacies:** Coral boundstone (*Acropora cervicornis* dominant) **Depositional texture:** *Acropora cervicornis* floatstone with skeletal wackestone to mud-dominated packstone matrix **Color:** Light gray (N7) and yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 4. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall in uppermost part of unit **Carbonate grains:** *Acropora cervicornis*, pelecypods, large discoid benthonic foraminifera (including archaiasinids), serpulid tubes, gastropods, miliolids, planktonic foraminifera, ostracods, bryozoans, *Montastrea annularis*, small benthic foraminifera, *Pyrgo*?, amphisteginids **Accessory grains:** 1–4% quartz grains, very fine- to medium sand size (mostly fine to medium), subrounded to angular **Porosity and permeability:** 15–20% fossil (coral) moldic porosity, 10–15% vuggy (vuggy porosity and relatively high permeability associated with thalassinidean or thalassinidean-like crustacean shaft-and-tunnel macrofabric); relatively high permeability **Comments:** Laminated calcrete lines vugs and rhizoliths extending downward from upper bounding surface to a depth of about 74.99 feet. Vugs and rhizolith filled or partly filled with marine, skeletal sandstone or marine, arenaceous grain-dominated skeletal packstone. Zoned pendant cements line the roofs of some vugs. Large *Montastrea annularis* head near top of unit. Subaerial exposure features probably related to the interval 69.97 to 70.57 feet on digital optical image that appears to be a calcrete and top of cycle that contains this coral reef
74.66–76.00	No core recovery. Based on digital optical borehole image interval is most likely a similar lithology to interval above
76.00–77.58	**Lithofacies:** Coral boundstone (*Acropora cervicornis* dominant) **Depositional texture:** *Acropora cervicornis* floatstone with skeletal wackestone to mud-dominated packstone matrix **Color:** Light gray (N7) and yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 4. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall in uppermost part of unit **Carbonate grains:** *Acropora cervicornis*, pelecypods, large discoid benthonic foraminifera (including archaiasinids), serpulid tubes, gastropods, miliolids, planktonic foraminifera, ostracods, bryozoans, *Montastrea annularis*, small benthic foraminifera, *Pyrgo*?, amphisteginids **Accessory grains:** 1–4% quartz grains, very fine- to medium sand size (mostly fine to medium), subrounded to angular **Porosity and permeability:** 15–20% moldic porosity; 1–15% irregular vugs; relatively moderate permeability **Comments:** None
77.58–82.10	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal mud- and grain-dominated packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, echinoid plates and spines, large discoid benthonic foraminifera (including archaiasinids and soritids), miliolids, planktonic foraminifera, ostracods, small benthic foraminifera, peloids, cheilostome bryozoans, barnacles (*Balanus*), amphisteginids, *Elphidium*, *Pyrgo*?, *Ostrea*, *Ammonia* **Accessory grains:** 10–35% quartz grains, very fine- to coarse sand size, subrounded to rounded. 1–3% dark minerals (including less than 1% to 1% phosphatic grains) **Porosity and permeability:** 5–20% moldic, 4–10% irregular vugs; relatively low permeability **Comments:** None

G–3879 Test Corehole	
82.10–84.75	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with arenaceous skeletal mud- and grain-dominated packstone matrix **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, echinoid plates and spines, gastropods, miliolids, large discoid benthic foraminifera (including peneroplids), barnacles (*Balanus*), lithoclasts (mainly green mudstone), cheilostome bryozoans, amphisteginids, *Pyrgo*? **Accessory grains:** 20–30% quartz grains, very fine- to very coarse sand size, subrounded to angular. 3% dark minerals (including less than 1% to 1% phosphatic grains) **Porosity and permeability:** 10–25% moldic, 3% interparticle, 5% vugs; relatively moderate permeability **Comments:** None
84.75–84.84	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated calcrete **Color:** Very pale orange 10YR 8/2 **Porosity and permeability:** 20% irregular vugs, 10% fossil (bivalve) moldic; relatively low permeability **Comments:** About 0.20 feet of paleorelief on exposure surface. Top of interval is top of Pinecrest Sand Member of the Tamiami Formation
84.84–85.38	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with arenaceous skeletal mud- and grain-dominated packstone matrix **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, echinoid plates and spines, gastropods, miliolids, large discoid benthic foraminifera (including peneroplids), barnacles (*Balanus*), lithoclasts (mainly green mudstone), cheilostome bryozoans, amphisteginids, *Pyrgo*? **Accessory grains:** 20–30% quartz grains, very fine- to very coarse sand size, subrounded to angular. 3% dark minerals (including less than 1% to 1% phosphatic grains) **Porosity and permeability:** 20% moldic, 3% interparticle, 5–20% irregular vugs; relatively high permeability **Comments:** None
85.38–85.75	No core recovery. Based on digital optical borehole image interval from 85.38 to 85.60 feet is similar to lithology above and from 85.60 to 85.75 feet is similar to lithology below.
85.75–86.42	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Probable abundant *Ophiomorpha* observed on digital optical borehole image **Carbonate grains:** Pelecypod fragments, cheilostome bryozoans, barnacles (*Balanus*), gastropods, miliolids, mudstone lithoclasts **Accessory grains:** Quartz sand, very fine-grained (minor fine to medium grained), subrounded to angular, moderately sorted **Porosity and permeability:** 20% interparticle porosity; relatively low permeability **Comments:** None
86.42–92.60	No core recovery. Based on digital optical borehole image interval from 86.42 to 89.00 feet is similar to lithology above and from 89.00 to 92.60 feet is probably friable quartz sand

G–3879 Test Corehole	
92.60–93.02	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. **Carbonate grains:** Pelecypod fragments, cheilostome bryozoans, barnacles (*Balanus*), gastropods, miliolids, mudstone lithoclasts **Accessory grains:** Quartz sand, very fine-grained (minor fine to medium grained), subrounded to angular, moderately sorted **Porosity and permeability:** 20% interparticle porosity; relatively low permeability **Comments:** None
93.02–95.75	No core recovery. Based on digital optical borehole image interval is most likely a similar lithology to interval above
95.75–96.08	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal wackestone and mud-dominated packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Probable abundant *Ophiomorpha* observed on digital optical borehole image **Carbonate grains:** Pelecypod fragments, cheilostome bryozoans, barnacles (*Balanus*), gastropods, echinoid plates and spines, amphisteginids, small benthic foraminifera (including biserials), miliolids, globular planktic foraminifera, *Pyrgo*?, *Elphidium*, mudstone lithoclasts **Accessory grains:** Quartz sand, very fine to coarse sand size (mostly very fine to fine), subrounded to angular, moderately sorted. 2–4% dark mineral (including 1% phosphorite grains) **Porosity and permeability:** 20% interparticle porosity; relatively low permeability **Comments:** Very minor rubble recovered only. A cautionary note: lithofacies description based on those rubble samples
96.08–96.60	No core recovery. Based on digital optical borehole image interval is most likely a similar lithology to interval above
96.60–99.10	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Molluscan quartz sand **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. **Carbonate grains:** Pelecypod fragments, cheilostome bryozoans, barnacles (*Balanus*), gastropods (including *Turritella*), echinoid plates and spines, amphisteginids, small benthic foraminifera (including biserials), miliolids, globular planktic foraminifera, *Pyrgo*?, *Elphidium*, mudstone lithoclasts **Accessory grains:** Quartz sand, very fine to coarse sand size (mostly very fine to fine), subrounded to angular, moderately sorted. 2–4% dark mineral (including 1% phosphorite grains) **Porosity and permeability:** 20% interparticle porosity; relatively low permeability **Comments:** Very minor rubble recovered only
99.10–100.75	No core recovery and no digital borehole image for this interval

G–3880 Test Corehole	
Depth Interval (feet below land surface)	**Described by Kevin Cunningham** [Visual estimates of permeability are based on comparison of lithofacies and pore classes to 276 air-permeability permeameter measurements (Cunningham and others, 2006b), and lattice Boltzmann permeability calculations (Cunningham and others, 2009, 2012; Cunningham and Sukop, 2011]
0–8.10	No core recovery. Top of Miami Limestone (HFC 5) at 4.00 feet. Digital optical image indicates a burrowed peloid grainstone and packstone lithofacies between 4.94 and 8.10 feet
8.10–9.60	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid grainstone and minor grain- and mud-dominated packstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Ichnofabrics:** Ichnofabric index 5. *Ophiomorpha*. Small rhizoliths with typically less than 0.04 inch inner diameter (pedotubule calcrete) **Carbonate grains:** Peloids dominant with minor pelecypods **Accessory grains:** 20% quartz grains, very fine to coarse sand size; trace of dark minerals **Porosity and permeability:** 10–12% moldic, 15% vugs related to burrows, 50% vertical solution pipe from about 4.0 to 16.00 feet; relatively high horizontal permeability and relatively very high vertical permeability **Comments:** In some cases, rhizoliths line the walls of burrows and almost fill them
9.60–11.05	No recovery. Top of HFC 4 at 10.80 feet
11.05–12.84	**Lithofacies:** Peloid wackestone and packstone **Depositional texture:** Peloidal wackestone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Ichnofabrics:** Ichnofabric index 5. *Thalassinoides*. Common rhizoliths that have a less than 0.04 inch diameter inner wall with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall (forms a pedotubule calcrete) **Carbonate grains:** Peloids dominant with minor benthic foraminifers (including archaiasinids, miliolids), pelecypod fragments, dasycladacean algae, *Schizoporella*, *Favreina*, stick-shaped *Porites* **Accessory grains:** 15–35% quartz grains, fine to medium sand size; <1% dark minerals **Porosity and permeability:** 3% moldic, 15% vugs related to burrows, 50% vertical solution pipe from about 4.0 to 16.00 feet; relatively high horizontal permeability and relatively very high vertical permeability **Comments:** None
12.84–17.00	No recovery
17.00–17.33	**Lithofacies:** Peloid wackestone and packstone **Depositional texture:** Peloidal, *Halimeda* wackestone and mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Ichnofabrics:** Ichnofabric index 5. Common rhizoliths that have a less than 0.04 inch diameter inner wall with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall (forms a pedotubule calcrete) **Carbonate grains:** Peloids dominant with minor *Halimeda*, pelecypod fragments, benthic foraminifers (including archaiasinids), *Schizoporella* **Accessory grains:** 15–20% quartz grains, fine to medium sand size; 3% dark minerals **Porosity and permeability:** 10% moldic, 15% irregular vugs and vugs related to burrows; relatively moderate permeability **Comments:** None
17.33–20.92	No recovery. Top of HFC 3b at about 20 feet
20.92–21.50	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Skeletal mud- and grain-dominated packstone with abundant pedotubule calcrete **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. Common rhizoliths that have a less than 0.04 inch diameter inner wall with concentric microspar or micrite calcification of inner wall (forms a pedotubule calcrete) **Carbonate grains:** Benthic foraminifers (archaiasinids, miliolids, peneroplids), pelecypod fragments, peloids, gastropods **Accessory grains:** 15–20% quartz grains, fine to coarse sand size; <1% dark minerals **Porosity and permeability:** 5% microporosity, 15% irregular vugs; relatively low permeability **Comments:** Below an exposure surface with abundant calcified rhizocretions indicating an exposure surface above the top of this interval and presumably at about 20 feet at the top of HFC 3b

G–3880 Test Corehole	
21.50–22.50	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone with skeletal wackestone and mud-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Gastropods (including *Planorbella*), pelecypod fragments, ostracods, peloids, one lithoclast of a calcrete **Accessory grains:** 10–15% quartz grains, fine to medium sand size; <1% dark minerals **Porosity and permeability:** 10–15% moldic, 15% irregular vugs; relatively low permeability **Comments:** Brackish high-frequency cycle cap. Top HFC 3a at 21.50 feet
22.50–29.17	No recovery
29.17–30.42	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with skeletal packstone matrix **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Burrows; root structures; sediment-filled cavities **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Peloids, pelecypods, minor gastropods, coralline red algae (including rhodoliths—one is large pebble size) **Accessory grains:** 15% quartz grains, fine to medium sand size **Porosity and permeability:** 5% moldic, 15–20% vuggy **Comments:** Fine-grained size predominates over medium
30.42–31.67	No core recovery, but based on digital optical borehole image most likely same lithofacies as in interval above
31.67–33.30	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with an arenaceous skeletal grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Geopetal structures **Ichnofabrics:** Ichnofabric index 5, common ichnofabrics probably produced by thalassinideans or thalassinide-an-like crustaceans occur within rock matrix **Carbonate grains:** Pelecypods, peloids, gastropods **Accessory grains:** 30–35% quartz grains, fine to coarse sand size; traces of dark minerals **Porosity and permeability:** 10–15% moldic, 15–20% irregular vugs; relatively moderate permeability **Comments:** None
33.30–35.37	No core recovery, but based on digital optical borehole image most likely same lithofacies between 33.30 and 34.96 feet as in interval above, and same lithofacies between 34.96 and 35.37 feet as in interval below. Top of HFC 2 at 34.96 feet with .24 feet of paleotopographic relief on surface
35.37–36.78	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. Common ichnofabrics probably produced by thalassinideans or thalassinide-an-like crustaceans occur within rock matrix. In the upper part of interval are uncommon rhizoliths that have a less than 0.04 inch diameter inner wall with concentric microspar or micrite calcification of inner wall and in some cases an alveolar septal fabric is present within tubules **Carbonate grains:** Pelecypods, benthic foraminifers (including *Elphidium*, miliolids, archaiasinids), echinoid spines and plates, **Accessory grains:** 60–80% quartz grains, fine to coarse sand size, angular to subrounded; <1% dark minerals **Porosity and permeability:** 15% moldic, 15–30% irregular vugs; relatively moderate permeability **Comments:** Rhizoliths related to subaerial exposure surface at 34.96 feet (top of HFC 2 cycle)
36.78–37.95	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. Common ichnofabrics probably produced by thalassinideans or thalassinide-an-like crustaceans occur within rock matrix **Carbonate grains:** Pelecypods, benthic foraminifers (including archaiasinids), gastropods **Accessory grains:** 25–30% quartz grains, fine to medium sand size, angular to subrounded; 2% dark minerals **Porosity and permeability:** 10–15% moldic, 15–20% irregular vugs; relatively moderate permeability **Comments:** None
37.95–40.77	No core recovery, but based on digital optical borehole image most likely similar lithofacies as in interval below

G–3880 Test Corehole	
40.77–42.40	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Arenaceous peloidal pelecypod wackestone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. Common ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans occur within rock matrix **Carbonate grains:** Pelecypods, benthic foraminifers (including archaiasinids), gastropods **Accessory grains:** 60–80% quartz grains, fine to medium sand size; <1% dark minerals **Porosity and permeability:** 15% moldic, 15% vugs related to burrows and irregular vugs; relatively moderate permeability **Comments:** None
42.40–43.42	No core recovery, but based on digital optical borehole image most likely similar, but more arenaceous lithofacies as in interval above
43.42–43.90	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Arenaceous peloidal pelecypod wackestone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. Common ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans occur within rock matrix **Carbonate grains:** Pelecypods, benthic foraminifers (including archaiasinids), gastropods **Accessory grains:** 60–80% quartz grains, fine to medium sand size; <1% dark minerals **Porosity and permeability:** 15% moldic, 35% irregular vugs; relatively high permeability **Comments:** None
43.90–44.10	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone with skeletal wackestone and mud-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Gastropods (mainly *Planorbella*), **Accessory grains:** 20–25% quartz grains, fine to medium sand size; 2% dark minerals **Porosity and permeability:** 10–15% moldic, 15% irregular vugs; relatively moderate permeability **Comments:** Forms a local fresh-to-brackish high-frequency cycle cap at 43.90 feet
44.10–44.50	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. Common ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans occur within rock matrix **Carbonate grains:** Pelecypods, large discoid benthic foraminifers (including archaiasinids), peloids, miliolids, *Elphidium*, gastropods, ostracods, dasycladacean algae **Accessory grains:** 25–30% quartz grains, fine to medium sand sized, angular to subrounded quartz grains, moderately sorted; 2% dark minerals, trace feldspar grains **Porosity and permeability:** 10–15% moldic, 15–25% vugs related to burrows; relatively high permeability **Comments:** None
44.50–45.56	No core recovery, but based on digital optical borehole image most likely similar lithofacies as in interval above
45.56–45.64	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. Common ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans occur within rock matrix **Carbonate grains:** Pelecypods, large discoid benthic foraminifers (including archaiasinids), peloids, miliolids, *Elphidium*, gastropods, ostracods, dasycladacean algae **Accessory grains:** 25–30% quartz grains, fine to medium sand sized, angular to subrounded quartz grains, moderately sorted; 2% dark minerals, trace feldspar grains **Porosity and permeability:** 10–15% moldic, 15–25% vugs related to burrows; relatively high permeability **Comments:** None

G–3880 Test Corehole	
45.64–46.70	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod, benthic foram wackestone and mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single medium-thick bed **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods (mostly fragmented), large benthic foraminifers (including miliolids, archaiasinids, peneroplids, soritids), peloids, gastropods **Accessory grains:** 15% quartz grains, very fine to medium sand size, angular to subrounded, moderately sorted; <1% dark minerals **Porosity and permeability:** 10–15% moldic, 15% irregular vugs and bedding plane vugs at base of interval; relatively low permeability **Comments:** Condensed marine unit, but not a high-frequency cycle
46.70–47.75	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone and rudstone with skeletal mudstone and wackestone matrix **Color:** Light gray (N7) **Sedimentary structures/textures:** Medium thick bedding **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Gastropods (mostly *Planorbella*), peloids, ostracods, pelecypods **Accessory grains:** 1–10% quartz grains, fine to medium sand size; <1% dark minerals **Porosity and permeability:** 5–10% moldic, 15% irregular vugs; relatively low permeability **Comments:** Draping laminated calcrete lines some karst vugs near the top of the interval, indicating subaerial exposure. Top of a high-frequency cycle at 46.70 feet
47.75–49.18	No core recovery, but based on digital optical borehole image probably a very arenaceous lithofacies
49.18–49.51	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with an arenaceous skeletal mud-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Single medium-thick bed **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, peloids, gastropods, discoidal large benthic foraminifers **Accessory grains:** 25–45% quartz grains, fine to medium sand size, angular to subangular; <1% dark minerals **Porosity and permeability:** 20% moldic, 20% irregular vugs; relatively moderate permeability **Comments:** Top of interval is an abrupt contact
49.51–49.95	No core recovery, but based on digital optical borehole image most likely similar lithofacies as in interval above
49.95–52.62	**Lithofacies:** Coral boundstone (*Porites porites* dominant) **Depositional texture:** *Porites porites* bafflestone with arenaceous skeletal mud- and grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** *Porites porites*, large benthic foraminifers (including archaiasinids, miliolids, peneroplids, *Elphidium*), peloids, pelecypods, gastropods, ostracods **Accessory grains:** 30–45% quartz grains, fine to medium sand size, angular to subrounded, well sorted; <1% dark minerals, trace feldspar **Porosity and permeability:** 25% moldic, 5–20% irregular vugs; relatively moderate permeability **Comments:** Top of patch reef is an abrupt contact
52.62–53.60	No core recovery. Based on digital optical borehole image most likely similar, but more arenaceous lithofacies as in interval above

G–3880 Test Corehole	
53.60–54.23	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous, skeletal quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium thick bedding **Ichnofabrics:** Ichnofabric index 5. Interval contains abundant calcified rhizoliths lined with concentric micrite and microspar **Carbonate grains:** Pelecypod fragments, benthic foraminifers, peloids **Accessory grains:** 85% quartz grains, fine to medium sand size, angular to subrounded; 2% dark minerals **Porosity and permeability:** 1–2% moldic, 15–35% irregular vugs; relatively moderate permeability **Comments:** Cycle boundary at top of interval at 53.60 feet. Intergranular volume mostly occluded with micrite or calcite cement
54.23–55.00	No core recovery, but based on digital optical borehole image most likely similar lithofacies as in interval above
55.00–55.41	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous, skeletal quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium thick bedding **Ichnofabrics:** Ichnofabric index 5. Interval contains abundant rhizoliths lined with concentric micrite and microspar **Carbonate grains:** Pelecypod fragments, benthic foraminifers, peloids **Accessory grains:** 85% quartz grains, fine to medium sand size, angular to subrounded, well sorted; 2% dark minerals **Porosity and permeability:** 1–2% moldic, 15–20% irregular vugs; relatively moderate permeability **Comments:** Intergranular volume mostly occluded with micrite or calcite cement
55.41–56.01	No core recovery, but based on digital optical borehole image most likely similar lithofacies as in interval above
56.01–57.18	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod-bearing quartz sandstone **Color:** Light gray (N7) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, gastropods, benthic foraminifers, white-colored barnacles (*Balanus*) **Accessory grains:** 60–80% quartz grains, very fine to medium sand size (mostly fine), moderate sorting, angular to subangular; 3% dark minerals **Porosity and permeability:** 20% moldic, 35% vugs related to burrows and irregular vugs; relatively high permeability **Comments:** None
57.18–58.76	No core recovery, but based on digital optical borehole image most likely similar lithofacies as in interval above
58.76–60.50	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with skeletal wackestone to mud-dominated packstone matrix or skeletal quartz sand matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Trace rhizoliths lined with concentric micrite and microspar laminations **Carbonate grains:** Pelecypods, gastropods, large benthic foraminifers (including archaiasinids), serpulids, ostracods **Accessory grains:** 15–65% quartz grains, very fine to medium sand size (mostly fine), angular to subangular, moderate to well sorted; 2% dark minerals; trace feldspar and phosphorite grains **Porosity and permeability:** 15% moldic, 20% irregular vugs and vugs related to burrows; relatively moderate permeability **Comments:** Rhizoliths likely related to exposure surface at 53.60 feet
60.50–60.75	No core recovery, but based on digital optical borehole image most likely similar lithofacies as in interval above

G–3880 Test Corehole	
60.75–62.91	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with skeletal grainstone and grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium to thickly bedded **Ichnofabrics:** Ichnofabric index 5. Trace rhizoliths lined with concentric micrite and microspar laminations **Carbonate grains:** Pelecypods, gastropods, benthic foraminifers **Accessory grains:** 15–20% quartz grains, very fine to medium sand size (mostly fine), angular to subrounded, well sorted; 2% dark minerals **Porosity and permeability:** 10–15% moldic, 15–20% irregular vugs and vugs related to burrows; relatively moderate permeability **Comments:** Rhizoliths likely related to exposure surface at 53.60 feet
62.91–65.60	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone, and arenaceous skeletal wackestone and packstone **Depositional texture:** Pelecypod floatstone with arenaceous skeletal mud-dominated packstone matrix. And arenaceous skeletal mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. *Thalassinoides*? **Carbonate grains:** Pelecypods (trace *Chione*), peloids, large benthic foraminifers (including archaiasinids, miliolids), ostracods, echinoderm plates **Accessory grains:** 15–35% quartz grains, very fine to medium sand size (mostly fine), angular to subrounded, well sorted; 2% dark minerals, 1% phosphorite grains, trace feldspar **Porosity and permeability:** 5–7% moldic, 15% irregular vugs; relatively low permeability **Comments:** None
65.60–66.04	No core recovery. Based on digital optical borehole image most likely similar lithofacies as in interval below
66.04–66.51	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod rudstone with skeletal mud-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Poorly bedded. Crumbly appearance **Ichnofabrics:** Ichnofabric index 5? **Carbonate grains:** Pelecypods, *Manicina* **Accessory grains:** 15–20% quartz grains, very fine to medium sand size (mostly fine), angular to subangular, well sorted **Porosity and permeability:** 10–15% moldic, 15–45% irregular vugs and vugs related to burrows; relatively high permeability **Comments:** Rubbly zone
66.51–66.89	No core recovery. Based on digital optical borehole image most likely similar lithofacies as in interval above
66.89–67.56	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Ostracod mudstone and wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5. Thin semivertical rhizoliths create a poorly distributed autobreccia **Carbonate grains:** Ostracods, skeletal fragments, *Ammonia* **Accessory grains:** 3–5% quartz grains, very fine to fine (mostly upper fine), angular to subangular, well sorted; <1% dark minerals **Porosity and permeability:** 3% moldic, 1–5% irregular vugs; relatively low permeability **Comments:** Top of interval at 66.89 feet is a high-frequency cycle top. Below top of this interval is a mostly a heterozoan particle association and above is mainly chlorozoan
67.56–71.04	No core recovery. Based on digital optical borehole image this interval may be mostly quartz sand

G–3880 Test Corehole	
71.04–71.87	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Skeletal fragments, pelecypods **Accessory grains:** 20–35% fine-grained quartz grains; 1–4% dark minerals **Porosity and permeability:** 5% moldic, 15–40% irregular vugs, vugs related to burrows, and vertical solution pipe; relatively high horizontal permeability and very high vertical permeability **Comments:** None
71.87–73.20	No core recovery. Based on digital optical borehole image this interval may be mostly quartz sand
73.20–73.87	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. *Thalassinoides* **Carbonate grains:** Pelecypods, miliolids, fragments of stick-like coralline red algal **Accessory grains:** 10% quartz grains, very fine to medium sand size (mostly fine), angular to subangular, well sorted; 1–2% dark minerals **Porosity and permeability:** 10–15% moldic, 20–40% irregular vugs, vugs related to burrows and vertical solution pipes; relatively high horizontal permeability and very high vertical permeability **Comments:** None
73.87–77.40	No core recovery. Based on digital optical borehole image this interval may possibly be quartz sand rich, but is rubbly
77.40–78.50	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded, but with a rubbly appearance **Ichnofabrics:** Ichnofabric index 5. *Thalassinoides* **Carbonate grains:** Pelecypods, pink- and white-colored barnacles (*Balanus*), gastropods **Accessory grains:** 10% quartz grains, very fine to coarse sand size (mostly fine to medium), angular to subangular, poorly sorted; 1–2% dark minerals **Porosity and permeability:** 10–15% moldic, 20–40% irregular vugs and vugs related to burrows; relatively high permeability **Comments:** None
78.50–80.90	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with arenaceous skeletal mud-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Ichnofacies: Possible *Glossifungites* ichnofacies in uppermost part of interval **Carbonate grains:** Pelecypods, gastropods, echinoid plates and spines, miliolids, ostracods, *Elphidium* **Accessory grains:** 20–40% quartz grains, very fine- to very coarse sand size (mostly fine to medium), angular to subrounded, poorly sorted; <1% dark minerals, trace phosphorite grains **Porosity and permeability:** 10% moldic, 5–25% irregular vugs; relatively high permeability in the upper 0.5 foot and the remainder of the interval has relatively low permeability **Comments:** Possible firmground and cycle top at 78.50 feet. Below top of this interval is a entirely a heterozoan particle association
80.90–81.04	No core recovery. Based on digital optical borehole image most likely similar lithofacies as in interval above

G–3880 Test Corehole	
81.04–83.20	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with arenaceous pelecypod fragment mud-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Common fecal pellets that are coarse sand size (crustacean produced?) **Carbonate grains:** Pelecypods, echinoid plates and spines, gastropods, amphisteginid fragments, cheilostome bryozoan, miliolids, up to large pebble-size, lime mudstone and skeletal grainstone lithoclasts with a yellowish-gray 5Y 7/2 color, white-colored barnacles (*Balanus*) **Accessory grains:** 25–35% quartz grains, fine sand size to granule size (mostly fine to medium), angular to subrounded, poorly sorted; 1–2% dark minerals, 1–3% phosphorite grains, trace feldspar **Porosity and permeability:** 5–20% moldic, 5% irregular vugs; relative permeability decreases upward from moderated to low **Comments:** Rudstone concentrated in lower part of interval and floatstone in upper part
83.20–83.60	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with arenaceous pelecypod fragment mud-dominated packstone matrix and skeletal quartz sand matrix **Color:** Yellowish gray (8Y 8/1) **Sedimentary structures/textures:** Irregular, slightly rubbly, thickly bedded **Ichnofabrics:** Ichnofabric index 5. Rhizoliths lined with concentric micrite and microspar **Carbonate grains:** Pelecypods (including *Ostrea* and *Chione*), pink-colored barnacles (*Balanus*), echinoid spines, up to large pebble-size lithoclasts **Accessory grains:** 25–35% quartz grains, fine to medium sand size (mostly fine), angular to subrounded, poorly sorted; 1–3% dark minerals **Porosity and permeability:** 15–40% moldic, 15% irregular vugs; relatively high permeability **Comments:** Top of Tamiami Formation (or top of Pinecrest Sand Member of the Tamiami Formation) at 83.46 feet based on digital optical image and rubbly core specimens. Rhizoliths, color change in interval from 83.46 to 83.60 feet
83.60–86.04	No core recovery. Based on digital optical borehole image most likely similar lithofacies as in interval above, but more arenaceous. Most ichnofabrics observed on digital optical borehole image probably produced by thalassinideans or thalassinidean-like crustaceans. Air-lifted samples suggest some are *Ophiomorpha nodosa*. Possible unconformity in digital optical borehole image at 85.91 feet. Top Tamiami Formation at 85.91 ft. Common vugs related to burrows; relatively high permeability. Lithoclasts above unconformity
86.04–87.21	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous, skeletal quartz sandstone **Color:** Burrow mottled very light to light gray (N8–N7) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Irregular, slightly rubbly with exposed wide burrow shafts and tunnels, thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics observed on digital optical borehole image probably produced by thalassinideans or thalassinidean-like crustaceans. Air-lifted samples suggest some are *Ophiomorpha nodosa*. Common fecal pellets that are coarse to very coarse sand size (crustacean produced?) **Carbonate grains:** Pelecypod fragments, peloids, echinoid spines, *Elphidium* **Accessory grains:** 80% quartz sand, very fine to medium sand size, angular to subangular, well sorted; 2–3% dark minerals, 5% phosphorite grains **Porosity and permeability:** 5% interparticle, 5% moldic, 15–45% vugs related to thalassinidean or thalassinidean-like crustacean megaporous macro-ichnofabric; relatively high permeability **Comments:** Mixed well cemented sandstone and quartz sand. Much of the interparticle pore volume is occluded with micrite and microspar
87.21–88.40	No core recovery. Based on digital optical borehole image most likely similar lithofacies as in interval above, but more arenaceous. Most ichnofabrics observed on digital optical borehole image probably produced by thalassinideans or thalassinidean-like crustaceans. Air-lifted samples suggest some are *Ophiomorpha nodosa*. 15–45% vugs related to thalassinidean or thalassinidean-like crustacean megaporous macro-ichnofabric; relatively high permeability

G–3880 Test Corehole	
88.40–88.73	**Lithofacies:** Quartz sand and quartz sandstone **Depositional texture:** Calcareous quartz sand and quartz sandstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** 5–10% pelecypod fragments, skeletal fragments **Accessory grains:** 85–90% quartz grains, very fine to fine sand size, angular to subangular, well sorted; 3–5% dark minerals **Porosity and permeability:** 30% intergranular; relatively low permeability **Comments:** None
88.73–90.05	No core recovery. Based on digital optical borehole image most likely similar lithofacies as in interval above
90.05–93.30	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Calcareous skeletal quartz sand **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. *Ophiomorpha*. Minor preferred tube cementation and nodular hypoburrow cementation involving *Ophiomorpha* Ichnofacies: *Cruziana* **Carbonate grains:** 5–20% pelecypod fragments, gastropods (including *Turritella*), lithoclasts, echinoid spines, uncommon benthic foraminifers (including miliolids) and bryozoans **Accessory grains:** 70–85% quartz grains, very fine to coarse sand size, angular to subrounded, poorly sorted; 8% dark minerals, 1–2% phosphorite grains, trace feldspar **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Abundant lithoclasts above firmground and *Glossifungites* ichnofacies below is suggestive of a transgressive lag above an submarine erosional surface
93.30–100.55	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Calcareous, pelecypod quartz sand **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Possible ichnofabrics produced by thalassinideans or thalassinidean-like crustaceans associated with a possible *Glossifungites* ichnofacies in uppermost part of interval Ichnofacies: Possible *Glossifungites* in uppermost part of interval **Carbonate grains:** Pelecypods (including disarticulated pelecypods and pelecypod fragments, some valves very large), gastropods (including *Turritella*), echinoid spines, small benthic foraminifers, large benthic foraminifers (including amphisteginid fragments, miliolids, *Ammonia*), uncommon globular planktic foraminifers **Accessory grains:** 65–90% quartz grains. Two types of quartz sands very fine to fine and the other is coarse. Very fine to fine quartz sands are range from very fine to coarse sand size (mostly upper very fine to lower fine), well sorted, angular to subangular; 8% dark minerals, 2% phosphorite grains, trace feldspar. Coarse sands are very fine sand size to granule size (mostly fine to medium), angular to subrounded, poorly sorted; 3–6% dark minerals, 1% phosphorite grains, trace feldspar grains **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Possible firmground and cycle top at top of interval at 93.30 feet with underlying *Glossifungites* ichnofacies (based on core and digital optical borehole image)
100.55–107 TD	No core recovery. Based on digital optical borehole image most likely similar lithofacies as in interval above, but displays several *Ophiomorpha* in borehole image, which likely contributed *Ophiomorpha nodosa* specimens captured by air-lifting this section. Mostly intergranular porosity; relatively low permeability

G–3881 Test Corehole	
Depth Interval (feet below land surface)	**Described by Kevin Cunningham** [Visual estimates of permeability are based on comparison of lithofacies and pore classes to 276 air-permeability permeameter measurements (Cunningham and others, 2006b), and lattice Boltzmann permeability calculations (Cunningham and others, 2009, 2012; Cunningham and Sukop, 2011]
0–5.00	No core recovery---Top of Miami Limestone at 3.75 feet
5.00–6.35	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid, ooid grain-dominated packstone and grainstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Abundant *Ophiomorpha*. Minor *Favreina*. Rhizoliths near top of interval with concentric micrite lining inner wall **Carbonate grains:** Peloids, ooid, pelecypods, miliolids, *Halimeda*, **Accessory grains:** 5–10% quartz grains, very fine to medium sand size (mostly fine to medium); subrounded to angular, moderately sorted. Less than 1% dark grains **Porosity and permeability:** 15% pelmoldic and oomoldic, 15–20% *Ophiomorpha*-megaporous macro-ichnofabric (vuggy); relatively high permeability **Comments:** Some ooids have a quartz, skeletal grain or peloid core. Cycle top at 3.75 feet
6.35–16.50	**Lithofacies:** Arenaceous peloid wackestone and packstone **Depositional texture:** Arenaceous peloid pelecypod wackestone and mud-dominated packstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Abundant *Thalassinoides*. Common rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Peloids, pelecypods, miliolids, gastropods, biserial foraminifera, ostracods **Accessory grains:** 10–40% quartz grains, very fine to medium sand size (mostly fine to medium); subrounded to angular, moderately sorted. Less than 1% dark grains **Porosity and permeability:** 15% moldic; 30% *Thalassinoides*-megaporous macro-ichnofabric (vuggy), 5–20% vertical solution pipe; relatively high horizontal permeability and relatively very high vertical permeability **Comments:** Very poor core recovery over this interval. Much of description based on core, thin section and digital optical image. Cycle top at 6.35 feet
16.50–19.50	**Lithofacies:** Pedogenic limestone **Depositional texture:** Autobreccia dominated by mudstone clasts and root-mold limestone overprint on a arenaceous skeletal wackestone and mud-dominated packstone matrix **Color:** Medium gray (N5) mudstone clasts, and grayish orange (10YR 7/4) and very pale orange 10YR 8/2 matrix **Sedimentary structures/textures:** Massive unit. Brecciated **Ichnofabrics:** Ichnofabric index 3–4. Common rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Clasts of gray mudstone than contain gastropods. Matrix has peloids, pelecypods, unidentified benthic foraminifera, *Elphidium*, *Ammonia* **Accessory grains:** 30–50% quartz grains, very fine to coarse sand size (mostly fine to medium); subrounded to angular, moderately sorted. Less than 1% dark grains **Porosity and permeability:** 5% moldic, 2–3% irregular vugs; relatively low permeability **Comments:** Clasts of gray mudstone are freshwater limestone. Pedogenic autobrecciated unit

G–3881 Test Corehole	
19.50–21.48	**Lithofacies:** Pedogenic limestone **Depositional texture:** Autobreccia dominated by root-mold limestone overprint on a arenaceous skeletal wackestone and mud- and grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 4. Common ichnofabrics probably produced by thalassinideans occur within rock matrix. Common rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Peloids, pelecypods, gastropods, large discoid benthic foraminifera (including archaiasinids and peneroplids), echinoid plates, miliolids, ostracods, very uncommon *Elphidium* and *Ammonia* **Accessory grains:** 30–50% quartz grains, very fine to coarse sand size (mostly fine to medium); subrounded to angular, moderately sorted. Less than 1% dark grains **Porosity and permeability:** 20% moldic; 10% vugs related to burrows and irregular vugs; relatively low to moderate permeability **Comments:** Pedogenic autobrecciated unit
21.48–26.00	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal mud- and grain-dominated packstone **Color:** Grayish orange (10YR 7/4) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans. Minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Pelecypods, gastropods, large discoid benthic foraminifera (including archaiasinids and peneroplids), echinoid plates, peloids, miliolids, ostracods **Accessory grains:** 40–50% quartz grains, very fine to coarse sand size (mostly fine to medium); subrounded to angular, moderately sorted. Less than 1% dark grains **Porosity and permeability:** 15% moldic, 10% interparticle, 10–20% vugs related to burrows and irregular vugs; relatively moderate permeability **Comments:** None
26.00–31.00	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with arenaceous skeletal mud- and grain-dominated packstone matrix **Color:** Grayish orange (10YR 7/4) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 4–5. Common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, large discoid benthic foraminifera (including archaiasinids, peneroplids, and soritids), echinoid plates, peloids, miliolids, ostracods, serpulid tubes, bryozoans **Accessory grains:** 20–50% quartz grains, very fine to coarse sand size (mostly fine to medium); subrounded to angular, moderately sorted. Less than 1% dark grains **Porosity and permeability:** 15% moldic (mostly fossil moldic), 10–30% vugs related to burrows and irregular vugs; upper part of interval has relatively moderate permeability and lower part of interval has relatively high permeability **Comments:** None

G–3881 Test Corehole	
31.00–31.50	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Pelecypod rudstone with arenaceous skeletal grain-dominated packstone and arenaceous skeletal grainstone matrix **Color:** Grayish orange (10YR 7/4) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 4–5. Common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, large discoid benthic foraminifera (including archaiasinids, peneroplids, and soritids), echinoid plates, peloids, miliolids, ostracods **Accessory grains:** 20–50% quartz grains, very fine to coarse sand size (mostly fine to medium); subrounded to angular, moderately sorted. 2% dark grains **Porosity and permeability:** 20% moldic (mostly fossil moldic), 10% interparticle, 10–20% vugs related to burrows and irregular vugs; relatively high permeability **Comments:** No core recovery over lower part of unit
31.50–34.00	**Comments:** No core recovery. Between 31.50 and 32.80 feet is similar lithology as interval above (31.00–31.50 feet) based on digital optical borehole wall image. Top of MIS 11 at 32.84 feet based on digital optical borehole image and underlying lithology, appears to be a pedogenic unit representing a major subaerial exposure. Irregular, semivertical fractures extend downward from upper bounding surface for about 1.5 feet. Common fossil moldic porosity
34.00–35.20	**Lithofacies:** Quartz sand **Depositional texture:** Quartz sand **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index uncertain. Possible vertical rhizoliths **Carbonate grains:** Skeletal fragments, pelecypod fragments **Accessory grains:** 90% quartz grains, very fine to coarse sand size (mostly fine to medium); subrounded to angular, moderately sorted. 2% dark grains **Porosity and permeability:** 22% interparticle, relatively moderate permeability **Comments:** Friable sand. Possible marine sand cavity fill
35.20–36.70	**Comments:** No core recovery. Based on digital optical borehole image and underlying lithology, appears to be same quartz sand lithology as 34.00 to 35.20 feet to a depth of 36.00 feet. Between 36.00 and 36.70 feet appears to be similar lithology as interval between 36.79 and 42.00 feet
36.70–42.00	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Skeletal fragments, pelecypod fragments, miliolids, unidentified small benthic foraminifera and possible large discoid benthic foraminifera **Accessory grains:** 85% quartz grains, very fine to coarse sand size (mostly fine), subrounded to angular, and moderately sorted. 3% dark grains **Porosity and permeability:** 1% moldic, 3% interparticle, 5–10% 10–20% vugs related to burrows and irregular vugs; relatively moderate permeability **Comments:** Only minor core rubble recovered for this unit. Calcite cement common

G–3881 Test Corehole	
42.00–43.82	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal mud-dominated packstone **Color:** Very pale orange (10YR 8/2) and light gray (N7) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, large discoid benthic foraminifera (including archaiasinids, miliolids), ostracods **Accessory grains:** 5–7% quartz grains, very fine to coarse sand size (mostly fine to medium), subrounded to angular, and well sorted. 3% dark grains **Porosity and permeability:** 15% fossil moldic, 20% vugs related to burrows and irregular vugs; relatively moderate permeability **Comments:** Unit contains a minor zone of no recovery of core
43.82–44.45	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone and mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, peloids, benthic foraminifera (including archaiasinids, miliolids, peneroplids), gastropods, ostracods **Accessory grains:** 25% quartz grains, very fine- to medium sand size, poorly sorted. <1% dark grains **Porosity and permeability:** 15% moldic; 5% irregular vugs; relatively low permeability **Comments:** None
44.45–45.80	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** Brecciated *Planorbella* floatstone with skeletal packstone matrix **Color:** Medium gray (N5) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Local brecciated texture **Ichnofabrics:** Ichnofabric index 5, digital optical image show probable *Gastrochaenolites* boring ichnotaxa on upper bounding surface Ichnofacies: *Trypanites* at upper bounding surface **Carbonate grains:** *Planorbella*, other gastropods, pelecypods **Accessory grains:** 12% quartz grains, very fine to medium sand size, subrounded quartz grains, poorly sorted. 2% dark grains **Porosity and permeability:** 10–15% moldic; 5–10% irregular vugs; relatively low permeability **Comments:** Gastropod fauna contains small species of *Planorbella*; coarse late-stage calcite cements (colored light olive gray 5Y 5/2) partially fill vugs; thin encrustations of red algae (white N9) coat some breccia clasts. *Trypanites* is suggestive of upper bounding surface is a hardground and very irregular brecciated base to unit suggests in this core this is a transgressive freshwater limestone
45.80–48.19	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal wackestone and packstone **Color:** Very pale orange (10YR 8/2) and light gray (N7) **Sedimentary structures/textures:** Sediment-filled channels; minor brecciation near the top of this interval **Ichnofabrics:** Ichnofabric index 5, thalassinidean-like burrows; **Carbonate grains:** Pelecypods, peloids, gastropods **Accessory grains:** 15–20% quartz grains, very fine to fine sand size, moderate sorting. 1–2% dark grains **Porosity and permeability:** 10–15% moldic; 10% irregular vugs; relatively moderate permeability **Comments:** None

G–3881 Test Corehole	
48.19–49.48	**Lithofacies:** Coral boundstone (*Porites porites* dominant) **Depositional texture:** *Porites porites* bafflestone (floatstone and rudstone) with arenaceous pelecypod packstone matrix **Color:** Very pale orange (10YR 8/2) and light gray (N7) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, peloids, gastropods, stick-shaped *Porites*, and benthonic foraminifera **Accessory grains:** 35–40% quartz grains, very fine to fine sand size, subangular to subrounded, moderate sorting. 1–2% dark grains **Porosity and permeability:** 10–15% moldic; 5–10% irregular vugs; relatively moderate permeability **Comments:** Laminated calcrete and pedotubule calcrete extends downward from upper bounding surface and suggests this is a cycle top or calcrete related to karsted surface the underlies *Planorbella* floatstone between 44.45 and 45.80 feet
49.48–51.06	No recovery, porosity is mainly irregular vugs and relatively high permeability
51.06–51.67	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous quartz sandstone **Color:** Very pale orange (10YR 8/2) and light gray (N7) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** 15% peloids, pelecypods, skeletal fragments **Accessory grains:** 85% quartz grains, very fine to fine sand size, subangular to subrounded; moderate to well sorted. 2–3% dark grains **Porosity and permeability:** 10–15% intergranular; 3% moldic; 5–10% irregular vugs; relatively high permeability **Comments:** None
51.67–52.10	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous quartz sandstone **Color:** Very pale orange (10YR 8/2) and light gray (N7) **Ichnofabrics:** Ichnofabric index 5, rhizoliths with less than 0.04 inch inner diameter and inner walls lined with micrite and/or microspar **Carbonate grains:** 15% pelecypods, benthic foraminifera (including *Elphidium*, *Ammonia*) **Accessory grains:** 85% quartz grains, very fine to fine sand size, subangular to subrounded; moderate to well sorted. 2–3% dark grains **Porosity and permeability:** 10–15% intergranular; 3% moldic; 5–10% irregular vugs; relatively moderate permeability **Comments:** Abrupt upper boundary with 0.5 feet of paleotopography and rhizoliths extending downward from upper bounding surface is indicative of a subaerial exposure and cycle top
52.10–52.86	No core recovery.
52.86–55.15	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Geopetal structure **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods including oysters, peloids **Accessory grains:** 35–45% quartz grains, very fine to medium sand size, poorly sorted. 2% dark grains **Porosity and permeability:** 20% moldic; 10% irregular vugs; relatively moderate permeability **Comments:** Small oyster colony of several shells
55.15–56.25	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with skeletal mud- and grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Sand-filled cavities **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, gastropods, benthic foraminifera (including archaiasinids), echinoid plates, ostracods **Accessory grains:** 20% quartz grains, very fine to medium sand size, poorly sorted. 1% dark grains **Porosity and permeability:** 25–35% moldic (mostly fossil moldic); 15–20% irregular vugs; relatively moderate to high permeability **Comments:** None

G–3881 Test Corehole	
56.25–56.95	No core recovery.
56.95–58.15	**Lithofacies:** Pelecypod floatstone **Depositional texture:** Pelecypod floatstone with skeletal mud- and grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Geopetal structures; sand-filled cavities **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, gastropods, encrusting red algae, benthic foraminifera (including archaiasinids), echinoid plates **Accessory grains:** 20–25% quartz grains, very fine to medium sand size, poorly sorted; 1% dark grains **Porosity and permeability:** 15% moldic; 5–10% irregular vugs; relatively moderate permeability **Comments:** Red algae encrusts bivalves
58.15–60.15	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod wackestone and packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, peloids, benthic foraminifera (including archaiasinids), gastropods, echinoid spines and plates **Accessory grains:** 20% quartz grains, very fine to fine sand size, moderate sorting. <1% dark grains **Porosity and permeability:** 15% moldic; 10–20% irregular vugs and bedding plane vugs at top of interval; relatively moderate permeability **Comments:** Chalky (possibly related to incipient calcification of a cycle top and subaerial exposure)
60.15–63.80	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Skeletal packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, peloids, gastropods, benthonic foraminifera (including archaiasinids, miliolids), echinoid plates, dasycladacean algae **Accessory grains:** 15% quartz grains, very fine to fine sand size, moderate sorting. 1% dark grains **Porosity and permeability:** 10% moldic; 5% irregular vugs; relatively low permeability **Comments:** Massive and thick bedding
63.80–64.85	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with skeletal mud- and grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, echinoids (sand dollar shaped, spines, plates), gastropods, benthic foraminifera including (miliolids, archaiasinids, soritids) **Accessory grains:** 15% quartz grains, very fine to fine sand size, moderate sorting. 1% dark grains **Porosity and permeability:** 20–30% moldic; 5–40% irregular vugs and bedding plane vugs at base of interval; relatively moderate permeability **Comments:** None
64.85–65.37	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Ostracod, gastropod mudstone and wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium thick single bed **Ichnofabrics:** Ichnofabric index 5, less than 0.04 inch inner diameter rhizoliths with some inner walls lined with micrite and/or microspar and some filled with allochthonous quartz-rich limestone **Carbonate grains:** Ostracods, gastropods (including minor *Planorbella*), small pelecypod fragments **Accessory grains:** 2–3% quartz grains, very fine sand size, moderate sorting. 1% dark grains **Porosity and permeability:** 2% moldic; 30% vertical solution pipes and irregular vugs; relatively low horizontal permeability and relatively high vertical permeability **Comments:** Skew plane cracks with some filled with allochthonous sediment. Abrupt upper bounding contact and facies shift. Rhizoliths with calcification along inner walls. Autobrecciation along base of interval. All indicative of subaerial exposure with upper bounding surface a high-frequency cycle boundary and brackish mudstone cap

G–3881 Test Corehole	
65.37–68.15	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Sand-filled cavities **Ichnofabrics:** Ichnofabric index 5, common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, peloids, gastropods, echinoid plates, large discoid benthic foraminifera **Accessory grains:** 20–25% quartz grains, very fine to fine sand size, subangular to subrounded, poor to moderate sorting. 1–2% dark grains **Porosity and permeability:** 15–20% moldic (mostly fossil moldic); 20–45% mostly irregular vugs; relatively high permeability **Comments:** None
68.15–68.70	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with a skeletal mud- and grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, small *Ophiomorpha*, common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, peloids, large discoid benthic foraminifera, echinoid plates **Accessory grains:** 20% quartz grains, very fine to fine sand size, subangular to subrounded, moderate sorting, evenly disseminated. 1% dark grains **Porosity and permeability:** 15% moldic (mostly fossil moldic); 10% irregular vugs and vugs related to burrows; relatively moderate permeability **Comments:** None
68.70–69.77	No recovery
69.77–72.61	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone with skeletal packstone matrix **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, peloids, large discoid benthic foraminifera **Accessory grains:** 25% quartz grains, very fine to fine sand size, subrounded, moderate sorting. 1% dark grains **Porosity and permeability:** 15% moldic (mostly fossil moldic); 15–20% irregular vugs and vugs related to thalassinidean or thalassinidean-like crustacean megaporous macro-ichnofabric; relatively high permeability **Comments:** None
72.61–73.50	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, rhizoliths with typically less than 0.04 inch inner diameter with inner wall lined with micrite and/or microspar **Carbonate grains:** Peloids, pelecypod fragments, small rhodoliths, branching coralline red algae, benthic foraminifera (including archaiasinids, miliolids, minor amphisteginids), ostracods, **Accessory grains:** 15% quartz grains, very fine to medium sand size (mostly very fine to fine), subrounded, poorly sorted. 1% dark grains **Porosity and permeability:** 12% moldic; 5–15% irregular vugs; relatively low permeability **Comments:** Cycle top and exposure surface at 72.61 feet based on presence of allochthonous fill of karsted surface and calcified rhizoliths lined with concentric micrite beneath surface

G–3881 Test Corehole	
73.50–75.75	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Pelecypod mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans, minor *Ophiomorpha* **Carbonate grains:** Pelecypods, discoid large benthic foraminifera, peloids, small rhodoliths, very minor stick-like *Porites porites*, miliolids, fragments of pink barnacles (*Balanus*) **Accessory grains:** 10% quartz grain, very fine to medium sand size, subangular to subrounded, poorly sorted. <1% dark grains **Porosity and permeability:** 10–15% moldic, 10% intergranular, 5–15% vugs related to burrows and irregular vugs; relatively moderate permeability **Comments:** None
75.75–76.57	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod wackestone and packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, peloids, minor small rhodoliths **Accessory grains:** 15% quartz grains, very fine to coarse quartz grains, subangular to subrounded, poorly sorted; 1% dark grains **Porosity and permeability:** 15% moldic; 30–35% vugs related to burrows and irregular vugs; relatively low permeability **Comments:** Core rubble zone
76.57–77.57	No core recovery.
77.57–78.20	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, peloids, minor small rhodoliths **Accessory grains:** 15% quartz grains, very fine to coarse sand size, subangular to subrounded, poorly sorted. <1% dark grains **Porosity and permeability:** 15% moldic; 3–25% vugs related to burrows and irregular vugs; relatively moderate permeability **Comments:** Massive and thick bedding
78.20–80.00	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, peloids, gastropods, echinoid spines and plates, minor small rhodoliths, miliolids, light olive gray 5Y 6/1 lime mudstone lithoclasts (ripup clasts of limestone from the Tamiami Formation) **Accessory grains:** 25% quartz grains, very fine to coarse sand size, subangular to subrounded, poorly sorted. 1% dark grains **Porosity and permeability:** 25% moldic; 5–20% irregular vugs; relatively low permeability **Comments:** Larger quartz grains range in color from light to dark gray.
80.00–80.90	No core recovery.

G–3881 Test Corehole	
80.90–85.00	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with a skeletal mud- and grain-dominated packstone matrix **Color:** Yellowish gray (5Y 8/1)) **Ichnofabrics:** Ichnofabric index 5, uncommon *Ophiomorpha*? **Carbonate grains:** Pelecypods, peloids, gastropods, ostracods, rhodoliths, amphisteginids, echinoid plates and spines, sand-dollar shaped echinoids, light olive gray 5Y 6/1 lime mudstone lithoclasts (lithoclasts of limestone from the Tamiami Formation) **Accessory grains:** 20% quartz grains, very fine to coarse sand size, subangular to subrounded, poorly sorted. <1% dark grains **Porosity and permeability:** 5–7% moldic (mostly fossil moldic); 15–20% burrow related vugs and irregular vugs; relatively high permeability **Comments:** None
85.00–86.30	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone and packstone **Color:** Yellowish gray (5Y 8/1) **Ichnofabrics:** Ichnofabric index 5, common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, peloids, fragments of barnacles (*Balanus*), minor *Ostrea*, light olive gray 5Y 6/1 lime mudstone lithoclasts (lithoclasts of limestone from the Tamiami Formation) **Accessory grains:** 25% quartz grains, very fine to medium sand size, subangular to subrounded, poor to moderate sorting. 1% dark grains **Porosity and permeability:** 10–15% moldic (mostly fossil moldic); 15–40% mostly vugs related to thalassinidean or thalassinidean-like crustacean megaporous macro-ichnofabric; relatively high permeability **Comments:** None
86.30–88.50	No recovery---abrupt contact and facies shift at 87.80 feet and possible calcretized lithology based on digital optical image. Also, lithoclasts of Tamiami Formation lithology above. Possible top of Tamiami Formation at 86.30 feet
88.50–88.66	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Yellowish gray (5Y 8/1) **Ichnofabrics:** Ichnofabric index 5, common *Ophiomorpha*? **Carbonate grains:** Dominated by pelecypod fragments, minor gastropods **Accessory grains:** 90% quartz grains, very fine to fine sand size, subangular to subrounded, moderate sorting. 1% dark grains **Porosity and permeability:** 25% intergranular; 1–10% vugs related to burrows; relatively low permeability **Comments:** None
88.66–89.30	No core recovery.
89.30–90.00	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Yellowish gray (5Y 8/1) **Ichnofabrics:** Ichnofabric index 5, common *Ophiomorpha*? **Carbonate grains:** Pelecypods, peloids **Accessory grains:** 85–90% quartz grains, very fine to medium sand size, subangular to subrounded, moderate sorting. 1% dark grains **Porosity and permeability:** 5% moldic, 15% intergranular; 15–20% vugs related to burrows; relatively low permeability **Comments:** None
90.00–90.40	No recovery

G–3881 Test Corehole	
90.40–90.80	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone and packstone **Color:** Yellowish gray (5Y 8/1) **Ichnofabrics:** Ichnofabric index 5, common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, peloids **Accessory grains:** 25% quartz grains, very fine to medium sand size, subangular to subrounded, poor to moderate sorting. 1–2% dark grains **Porosity and permeability:** 15–20% moldic, 15% intergranular, 5–15% vugs related to burrows; relatively low permeability **Comments:** Core pieces have a light bulk density
90.80–91.85	No recovery
91.85–94.25	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone and packstone **Color:** Yellowish gray (5Y 8/1) **Ichnofabrics:** Ichnofabric index 5, common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Dominated by pelecypod fragments **Accessory grains:** 30% quartz grains, very fine to coarse sand size, subangular to subrounded, poorly sorted; 1% dark grains **Porosity and permeability:** 20% moldic, 10% intergranular; 15–20% of vugs related to burrows; relatively moderate permeability **Comments:** None
94.25–95.80	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Medium light greenish gray (5YG 7/1) **Ichnofabrics:** Ichnofabric index 5, common burrows probably mostly by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, peloids **Accessory grains:** 35–40% quartz grains, very fine to coarse sand size, subangular to subrounded, poorly sorted. <1% dark grains **Porosity and permeability:** 3% moldic; 15% vugs related to burrows; relatively moderate permeability **Comments:** Quartz sand fills cavities; larger quartz grains are subrounded to rounded
95.80–99.25	No recovery
99.25–100.23	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Calcareous quartz sand **Color:** Medium light greenish gray (5YG 7/1) **Ichnofabrics:** Ichnofabric index 5, common *Ophiomorpha* and *Thalassinoides*? **Carbonate grains:** Dominated by pelecypod fragments with minor gastropods, echinoid spines and plates, ostracods **Accessory grains:** 85% quartz grains, very fine to fine sand size, subangular to subrounded, moderate to well sorted. 3% dark grains **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Massive bedded
100.23–102.55	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Calcareous quartz sand **Color:** Medium light greenish gray (5YG 7/1) **Ichnofabrics:** Ichnofabric index 5, common *Ophiomorpha* and *Thalassinoides*? **Carbonate grains:** Dominated by pelecypod fragments with minor echinoid spines and plates, amphisteginids **Accessory grains:** 95% quartz grains, very fine to fine sand size, subangular to subrounded quartz, moderate to well sorted. 3% dark grains **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Massive bedded

G–3881 Test Corehole	
102.55–108.25 TD	No recovery. Description below inferred from digital optical borehole wall image: **Depositional texture:** Calcareous pelecypod quartz sand? **Color:** Lighter color than overlying interval **Ichnofabrics:** Ichnofabric index 5, common *Ophiomorpha* **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Massive and very thick bedding. Possible firmground at 102.55 feet and *Glossifungites* ichnofacies at and below 102.55 feet

G–3882 Test Corehole	
Depth Interval (feet below land surface)	**Described by Kevin Cunningham** [Visual estimates of permeability are based on comparison of lithofacies and pore classes to 276 air-permeability permeameter measurements (Cunningham and others, 2006b), and lattice Boltzmann permeability calculations (Cunningham and others, 2009, 2012; Cunningham and Sukop, 2011]
0–6.90	**Comments:** No core recovery and no digital optical image for this interval. Top of Miami Limestone at 2.75 feet
6.90–10.00	**Lithofacies:** Ooid packstone and grainstone **Depositional texture:** Ooid, peloid grain-dominated packstone and grainstone **Color:** Very pale orange (10YR 8/2) fresh color with a medium gray (N5) color that lines most vugs **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Abundant *Ophiomorpha* and minor *Favreina* **Carbonate grains:** Ooids, peloids, pelecypods, *Halimeda*, miliolids **Accessory grains:** 5–10% quartz grains, very fine to fine sand size, subrounded to angular, well sorted **Porosity and permeability:** 25% ooid, peloid and fossil moldic; 35% vuggy porosity (mostly *Ophiomorpha* megaporous macro-ichnofabric and vertical solution pipe vertical solution pipe starts at about 13 feet and extends to about 19.50 feet); relatively high permeability **Comments:** Some ooids have an either quartz or peloid core
10.00–15.50	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal wackestone and mud- and grain- dominated packstone **Color:** Very pale orange (10YR 8/2) fresh color with a medium gray (N5) color that lines most vugs **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Abundant *Ophiomorpha* **Carbonate grains:** Pelecypods, peloids, *Halimeda*, miliolids, large discoid benthic foraminifera **Accessory grains:** 5–25% quartz grains, very fine to coarse sand size (mostly fine to medium), subrounded to angular, and moderately sorted. Less than 1% dark grains **Porosity and permeability:** 25% fossil and peloid moldic, 25% vuggy porosity (mostly *Ophiomorpha* megaporous macro-ichnofabric and vertical solution pipe vertical solution pipe starts at about 13 feet and extends to about 19.50 feet); relatively high horizontal permeability and very high vertical permeability **Comments:** None
15.50–19.50	**Lithofacies:** Ooid packstone and grainstone **Depositional texture:** Ooid, peloid grain-dominated packstone and grainstone **Color:** Very pale orange (10YR 8/2) fresh color with a medium gray (N5) color that lines most vugs **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5. Abundant *Ophiomorpha* and minor *Favreina* **Carbonate grains:** Ooids, peloids, *Halimeda*, pelecypods, miliolids, *Schizoporella*, lithoclasts **Accessory grains:** 5–10% quartz grains, very fine to fine sand size, subrounded to angular, well sorted **Porosity and permeability:** 25% ooid, peloid and fossil moldic; 25% vuggy porosity (mostly *Ophiomorpha* megaporous macro-ichnofabric and vertical solution pipe vertical solution pipe starts at about 13 feet and extends to about 19.50 feet); relatively high horizontal permeability and very high vertical permeability **Comments:** Lithoclasts are eroded mudstone from the top of the Fort Thompson Formation, suggesting that this unit overlies the Fort Thompson Formation
19.50–20.15	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Arenaceous benthic-foraminifera wackestone **Color:** Mottled grayish orange (10YR 7/4) and very pale orange 10YR 8/2 **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 5 suggested by mottled coloration. Probable very thin rhizoliths. Minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite calcification of inner wall **Carbonate grains:** Peloids, large discoid benthic foraminifera **Carbonate grains:** Large discoid benthic foraminifera, peloids, pelecypods **Accessory grains:** 5–20% quartz grains, very fine to coarse sand size (mostly fine to medium), subrounded to angular, and moderately sorted. Less than 1% dark grains **Porosity and permeability:** 3% fossil moldic, 1–2% irregular vugs; relatively low permeability **Comments:** Rhizoliths with calcified inner walls may be from uppermost bounding surface, suggesting subaerial exposure at the top of this unit

G–3882 Test Corehole	
20.15–25.90	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal wackestone and mud- and grain-dominated packstone **Color:** Grayish orange (10YR 7/4) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Massive unit **Ichnofabrics:** Ichnofabric index 2–3 **Carbonate grains:** Pelecypods, large discoid benthic foraminifera (including archaiasinids and peneroplids), gastropods **Accessory grains:** 15–20% quartz grains, very fine to medium sand size, poor to moderate sorting. <1% heavy minerals **Porosity and permeability:** 10% moldic, 15–20% vugs related to burrows and irregular to vertical vugs; relatively moderate permeability **Comments:** Vertical rhizoliths up to 10 inched in length and ½ inch wide. Thin-section at 23.00 shows a calcite-cemented quartz sandstone (grains are fine- and medium-grained, subrounded, poor sorting), with large benthic foraminifera (peneroplids and miliolids), pelecypods (mostly moldic, some replaced)
25.90–28.10	**Lithofacies:** Skeletal sandstone **Depositional texture:** Calcareous quartz pelecypod–fragment sandstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Burrowed; root structures **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, benthic foraminifera (including archaiasinids, soritids), gastropods **Accessory grains:** 55% quartz grains, very fine to coarse sand size, poor sorting. 1% heavy minerals **Porosity and permeability:** 5–10% moldic; 5–20% vugs related to burrows and irregular vugs; relatively moderate permeability **Comments:** None
28.10–31.90	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, large gastropods, solitary corals (three leached *Manicina* specimens), benthic foraminifera **Accessory grains:** 45% quartz grains, very fine to coarse sand size, poor sorting. 1–2% heavy minerals **Porosity and permeability:** 15–25% moldic; 5% irregular vugs; relatively moderate permeability **Comments:** None
31.90–33.22	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous quartz pelecypod-fragment sandstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows; minor semivertical, thin (0.04 inch-scale widths) rhizoliths with concentric micrite lining the many of the interiors **Carbonate grains:** Pelecypods **Accessory grains:** 75% quartz grains, very fine and medium sand size, moderate sorting. 2% heavy minerals **Porosity and permeability:** 10–12% moldic, 5% intergranular, 20% vugs related to burrows and irregular to vertical vugs; relatively moderate permeability **Comments:** Abrupt contact and facies shift, underlying rhizoliths, and karstic solution cavities extending downward from upper bounding surface indicate subaerial exposure and cycle top at 31.90 feet
33.22–33.75	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod rudstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods **Accessory grains:** 25% quartz grains, very fine and medium sand size, moderate sorting. 2% heavy minerals **Porosity and permeability:** 10–12% moldic; 20% vuggy **Comments:** None

G–3882 Test Corehole	
33.75–37.50	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous quartz pelecypod-fragment sandstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, benthic foraminifera (including archaiasinids), echinoid plates, gastropods, peloids **Accessory grains:** 85% quartz grains, very fine to coarse sand size, poor sorting. 1–2% heavy minerals **Porosity and permeability:** 5–30% moldic, 5% intergranular, 5% irregular vugs; relatively moderate permeability **Comments:** Digital optical borehole image is suggestive of a cycle cap at upper bounding surface and *Glossifungites* ichnofacies occurring in uppermost 0.5 feet of cycle with a cycle top at 33.75 feet
37.50–38.21	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod packstone and floatstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, rare gastropods **Accessory grains:** 30% quartz grains, very fine to fine sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 10–12% moldic; 15% irregular vugs and vugs related to burrows; relatively moderate permeability **Comments:** None
38.21–39.82	No recovery – based of observation of digital optical borehole image, most of the porosity over this interval is vuggy porosity related to thalassinidean or thalassinidean-like crustacean megaporous macro-ichnofabric. Porosity probably dominated by thalassinidean or thalassinidean-like crustacean megaporous macro-ichnofabric and has a relatively high permeability
39.82–41.25	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, rare benthic foraminifera **Accessory grains:** 15–25% quartz grains, very fine to coarse sand size, poor sorting; <1% heavy minerals **Porosity and permeability:** 10–15% moldic; 10–50% vugs related to burrows and irregular vugs; relatively moderate to high permeability **Comments:** None
41.25–41.98	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** *Schizoporella* pelecypod rudstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Geopetal structures with late-stage fillings of calcite cement **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** *Schizoporella*, pelecypods **Accessory grains:** 15%quartz grains, very fine to medium sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 25–30% moldic; 10–45% irregular vugs and vugs related to burrows; moderate to high permeability **Comments:** None
41.98–42.28	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, ramose bryozoa, gastropods **Accessory grains:** 25% quartz grains, very fine to fine sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic; 15–40% irregular vugs; relatively moderate permeability and possibly high **Comments:** Core rubble zone

G–3882 Test Corehole	
42.28–42.82	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, ramose bryozoa, gastropods **Accessory grains:** 15–20% quartz grains, very fine to medium sand size, poor to moderate sorting. 1% heavy minerals **Porosity and permeability:** 5–10% moldic; 15–20% irregular vugs; relatively moderate permeability **Comments:** None
42.82–43.32	No recovery
43.32–43.82	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, ramose bryozoa, gastropods **Accessory grains:** 15–20% quartz grains, very fine to medium sand size, poor to moderate sorting. 1% heavy minerals **Porosity and permeability:** 5–10% moldic; 15–20% vugs related to burrows and irregular vugs; relatively moderate permeability **Comments:** None
43.82–45.02	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone with an ostracod wackestone matrix **Color:** Very pale orange (10YR 8/2) and light gray (N7) **Sedimentary structures/textures:** Sand-filled vertical channels **Ichnofabrics:** Ichnofabric index 5, rhizoliths that in some cases contain alveolar septal fabric **Carbonate grains:** Ostracods, pelecypods, *Planorbella* **Accessory grains:** 15% quartz grains, very fine to medium sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 3% moldic; 5% irregular vugs; relatively low permeability **Comments:** Rhizoliths with alveolar fabric and presence of irregular karst solution cavities extending downward from upper bounding surface is indicative of subaerial exposure at top of interval. Fresh-to-brackish water limestone high-frequency cycle cap with top of cycle at 43.82 feet
45.02–45.72	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrowed **Carbonate grains:** Pelecypods, benthic foraminifera (including archaiasinids, peneroplids, miliolids), encrusting red algae **Accessory grains:** 25% quartz grains, very fine to fine sand size, poor to moderate sorting. 1–2% heavy minerals **Porosity and permeability:** 7% fossil molds; 15–20% mostly irregular vugs and minor vugs related to burrows; relatively moderate permeability **Comments:** None
45.72–46.21	No recovery
46.21–47.44	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrowed **Carbonate grains:** Pelecypods, benthic foraminifera (including archaiasinids, peneroplids, miliolids), encrusting red algae **Accessory grains:** 25% quartz grains, very fine to fine sand size, poor to moderate sorting. 1–2% heavy minerals **Porosity and permeability:** 7% fossil molds; 15–20% irregular vugs; relatively high permeability **Comments:** None

G–3882 Test Corehole	
47.44–47.75	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, skeletal fragments **Accessory grains:** 30% quartz grains, very fine to medium sand size, poor sorting. 1% heavy minerals **Porosity and permeability:** 15% moldic; 20% irregular vugs; relatively moderate permeability **Comments:** Abrupt contact at the top of the interval
47.75–48.20	**Lithofacies:** Coral boundstone (*Porites porites* dominant) **Depositional texture:** *Porites porites* bafflestone (floatstone and rudstone) **Porosity and permeability:** 20% moldic; 15% irregular vugs; relatively moderate permeability **Comments:** Platform interior patch reef
48.20–50.78	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod rudstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, gastropods, minor red algae, rare ramose bryozoa **Accessory grains:** 25–30% quartz grains, very fine to medium sand size, moderate sorting. 1% heavy minerals **Porosity and permeability:** 15–25% moldic; 15–25% vugs related to burrows and irregular vugs; relatively high permeability **Comments:** A coquina of mainly unbroken pelecypod valves
50.78–51.10	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous quartz pelecypod-bearing sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Geopetal structures **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods **Accessory grains:** 45–65% quartz grains, very fine to coarse sand size, poor sorting. 3% heavy minerals **Porosity and permeability:** 10–20% moldic, 10% intergranular, 15% irregular vugs; relatively moderate permeability **Comments:** Abrupt contact and facies shift at upper bounding surface. Base of quartz sandstone at 51.75 feet
51.10–51.75	No recovery
51.75–53.85	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous quartz pelecypod-bearing sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Geopetal structures **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods **Accessory grains:** 45–65% quartz grains, very fine to coarse sand size, poor sorting. 3% heavy minerals **Porosity and permeability:** 10–20% moldic, 10% intergranular, 15–25% vuggy; relatively moderate permeability **Comments:** None
53.85–56.21	No recovery
56.21–56.91	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, benthic foraminifera (including archaiasinids, peneroplids, miliolids) **Accessory grains:** 30% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic; 15% irregular vugs; relatively moderate permeability **Comments:** Thin-section at 56.84 feet shows 20–40% quartz grains, fine-grained to coarse-grained, poor sorting, subangular to subrounded
56.91–57.40	No recovery

G–3882 Test Corehole	
57.40–57.90	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod gastropod floatstone with a skeletal packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Sand-filled cavities **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, common to abundant gastropods **Accessory grains:** 5–10% quartz grains, very fine to medium sand size, poor sorting. 2% heavy minerals **Porosity and permeability:** 15% moldic; 15–20% irregular vugs and vugs related to burrows; relatively moderate permeability **Comments:** None
57.90–58.61	No recovery
58.61–61.00	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod packstone and wackestone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, benthic foraminifera (including archaiasinids, peneroplids), gastropods, ostracods **Accessory grains:** 35–40% quartz grains, very fine to medium sand size, poor to moderate sorting. 1% heavy minerals **Porosity and permeability:** 1–15% moldic; 2–25% irregular vugs; relatively low to moderate permeability **Comments:** Thin-section at 59.50 feet shows an calcareous quartz sandstone (fine- to coarse grained, poor sorting, subangular to subrounded) with abundant micrite between quartz grains
61.00–63.00	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone with a skeletal packstone matrix **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrows **Carbonate grains:** Pelecypods, rare benthic foraminifera **Accessory grains:** 45% quartz grains, very fine to coarse sand size, poor to moderate sorting. <1% heavy minerals **Porosity and permeability:** 15% fossil molds; 5% irregular vugs **Comments:** None
63.00–64.50	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Karsted pelecypod floatstone with skeletal packstone matrix **Color:** Very pale orange 10YR floatstone with a light colored pale yellowish brown 10YR 6/2 sandstone and light gray (N7) to very light gray (N8) sandstone **Sedimentary structures/textures:** Karstic infilled cavities **Ichnofabrics:** Ichnofabric index 5, probable less than 0.04 inch diameter rhizoliths with concentric micrite laminations lining inner walls **Carbonate grains:** Pelecypods, skeletal fragments, archaiasinids, gastropods **Accessory grains:** 65% quartz grains, very fine to fine sand size, moderate sorting. 3% heavy minerals **Porosity and permeability:** 5–25% fossil molds; 2–30% irregular vugs; relatively moderate to high permeability **Comments:** Upper bounding surface is a karsted cycle cap. Two generations of sandstone fill karst cavities in a pelecypod floatstone with skeletal packstone matrix host rock
64.50–66.00	No recovery
66.00–68.50	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod-bearing quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Geopetal fills; sand-filled cavities **Ichnofabrics:** Ichnofabric index 5, minor small *Ophiomorpha* **Carbonate grains:** Pelecypods, peloids, benthic foraminifera (including archaiasinids), echinoid spines **Accessory grains:** 60% quartz grains, very fine to fine sand size, moderate sorting. 1% heavy minerals **Porosity and permeability:** 5–20% moldic, 10% intergranular, 10% irregular vugs and small fractures; relatively moderate permeability **Comments:** Thin-section at 66.50 feet shows a fossiliferous quartz sandstone (60% fine- to medium-grained, moderate sorting, subangular to subrounded)

G–3882 Test Corehole	
68.50–69.80	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Yellowish gray (5Y 8/1) **Sedimentary structures/textures:** Sand-filled cavities **Ichnofabrics:** Ichnofabric index 5, burrowed **Carbonate grains:** Pelecypods, echinoid fragments **Accessory grains:** 45% quartz grains, very fine to medium sand size, moderate sorting. 2% heavy minerals **Porosity and permeability:** 10–25% moldic; 5–15% irregular vugs; relatively moderate permeability **Comments:** None
69.80–71.00	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod-bearing quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Jagged karsted upper bounding surface **Ichnofabrics:** Ichnofabric index 5, rare less than 0.04 inch diameter rhizoliths with concentric micrite laminations lining inner walls **Carbonate grains:** 20% pelecypods, other skeletal grains **Accessory grains:** 80% quartz grains, very fine to medium sand size, poor to moderate sorting. 1% heavy minerals **Porosity and permeability:** 10% moldic, 10% intergranular, 5–50% vuggy; relatively moderate to high permeability **Comments:** Sharp, irregular and jagged paleotopography (up to 0.25 feet of paleorelief) at the very top of this interval, abrupt facies shift. Overlying lithofacies fills small karst cavities to a depth of about 0.6 feet below upper bounding surface. Indicators of a karsted upper bounding surface
71.00–73.20	No recovery, porosity is mainly irregular vugs and vugs related to thalassinidean or thalassinidean-like crustacean megaporous macro-ichnofabric; relatively high permeability
73.20–74.20	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrowed **Carbonate grains:** Pelecypods, ostracods, red algal fragments **Accessory grains:** 20% quartz grains, very fine to medium sand size, poor to moderate sorting. <1% heavy minerals **Porosity and permeability:** 10% moldic; 15–20% irregular vugs and vugs related to thalassinidean or thalassinidean-like crustacean megaporous macro-ichnofabric; relatively high permeability **Comments:** Local occurrences of coarse late-stage calcite cements, filling or almost filling vugs
74.20–75.99	No recovery, relatively moderate permeability
75.99–76.18	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrowed **Carbonate grains:** Pelecypods, skeletal fragments, *Acropora cervicornis*, amphisteginid in thin section at 76.00 feet **Accessory grains:** 15–20% quartz grains, very fine to coarse sand size, poor sorting. 2% heavy minerals **Porosity and permeability:** 7% moldic; 10–20% irregular vugs; relatively moderate permeability **Comments:** None
76.18–78.20	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrowed **Carbonate grains:** Pelecypods, *Acropora cervicornis* **Accessory grains:** 35% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 20% moldic; 5–15% irregular vugs; relatively low permeability **Comments:** Bored holes into pelecypods are lined with encrusting red algae

G–3882 Test Corehole	
78.20–79.90	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, minor *Ophiomorpha* **Carbonate grains:** Pelecypods, *Acropora cervicornis* **Accessory grains:** 45% quartz grains, very fine to very coarse sand size, poor sorting. 1% heavy minerals **Porosity and permeability:** 5–15% moldic; 5–15% irregular vugs; relatively low permeability **Comments:** None
79.90–80.87	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, minor *Ophiomorpha* **Carbonate grains:** Pelecypods, peloids, echinoid spines and plates **Accessory grains:** 45% quartz grains, very fine to coarse sand size, poor to moderate sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic; 5% irregular vugs; relatively moderate permeability **Comments:** Thin-section at 80.25 feet shows an arenaceous pelecypod mud-lean packstone (with fine- to very coarse-grained, poor sorting, subangular to subrounded quartz grains)
80.87–82.27	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2), light olive gray 5Y 6/1 lime mudstone lithoclasts **Ichnofabrics:** Ichnofabric index 5, burrowed **Carbonate grains:** Pelecypods, amphisteginids, minor lithoclasts of greenish colored lime mudstone from the underlying Tamiami Formation **Accessory grains:** 35–40% quartz grains, very fine to medium sand size, poor to moderate sorting. 1–2% heavy minerals **Porosity and permeability:** 20–25% moldic; 5–15% irregular vugs; relatively moderate permeability **Comments:** Red algal encrustations occur on an oyster fragment; light olive gray (5Y 6/1) rock fragment, 1 inch in diameter
82.27–83.00	No recovery, porosity is mainly fossil moldic
83.00–83.30	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone with a skeletal packstone matrix **Color:** Yellowish gray (5Y 8/1) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Sand-filled cavities **Ichnofabrics:** Ichnofabric index 5, probable less than 0.04 inch diameter rhizoliths with concentric micrite laminations lining inner walls that forms a very sparse pedotubule calcrete **Carbonate grains:** Dominated by pelecypods with minor gastropods and echinoid plates and spines **Accessory grains:** 25% quartz grains, very fine to medium sand size, poor to moderate sorting. 1% heavy minerals **Porosity and permeability:** 5–15% fossils molds; 5% irregular vugs; relatively moderate permeability **Comments:** Subaerial exposure at the upper bounding surface indicated by pedotubule calcrete, abrupt contact and facies shift across upper surface at 83.00 feet. Top Tamiami Formation at 83.00 feet
83.30–84.42	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone and rudstone with a grain-dominated skeletal packstone matrix **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5, burrowed **Carbonate grains:** Dominated by pelecypods with minor gastropods, peloids, amphisteginids, coralline red algae, bryozoans, rhodoliths **Accessory grains:** 40% quartz grains, very fine to coarse sand size, poor to moderate sorting. 2% heavy minerals **Porosity and permeability:** 10–25% moldic; 5–15% vuggy; relatively moderate permeability **Comments:** Thin-section at 83.33 feet shows quartz grains vary from 20–60% fine- to coarse-grained quartz grains, poorly sorted, subangular to subrounded

G–3882 Test Corehole	
84.42–87.10	No recovery—based on digital optical borehole wall image, this is likely a quartz-sand-rich interval and from 84.40 to 85.00 feet contains vuggy porosity related to thalassinidean or thalassinidean-like crustacean mega-porous macro-ichnofabric; relatively high permeability
87.10–87.52	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Very light gray (N8) **Ichnofabrics:** Ichnofabric index 5, burrowed (*Thalassinoides*?) **Carbonate grains:** Dominated by pelecypods with uncommon amphisteginids **Accessory grains:** 98% quartz grains, very fine to medium sand size, poor to moderate sorting. 1% heavy minerals **Porosity and permeability:** 3% moldic, 15% intergranular, 15% vugs related to burrows; relatively low permeability **Comments:** Weakly cemented by calcite
87.52–88.95	No recovery
88.95–89.90	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Light gray (N7) **Ichnofabrics:** Ichnofabric index 5, *Thalassinoides*? **Carbonate grains:** <2% pelecypods with gastropods, echinoid plates and spines **Accessory grains:** 98% quartz grains, very fine to coarse sand size, poor sorting. 1–2% heavy minerals **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Friable
89.90–90.87	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Very light gray (N8) **Ichnofabrics:** Ichnofabric index 5, *Thalassinoides*? **Carbonate grains:** Dominated by pelecypods with minor gastropods, echinoid plates and spines **Accessory grains:** 90% quartz grains, very fine to medium sand size, moderate sorting. 1–2% heavy minerals **Porosity and permeability:** 25% intergranular, 1% moldic; relatively low permeability **Comments:** Slight cementation by calcite make this subunit less friable than those above and below
90.87–91.87	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Very light gray (N8) **Ichnofabrics:** Ichnofabric index 5, *Thalassinoides*? **Carbonate grains:** Dominated by fragments of pelecypods with minor gastropods, echinoid plates and spines **Accessory grains:** 90% quartz grains, very fine to coarse sand size, moderate sorting. 1–2% heavy minerals **Porosity and permeability:** 25% intergranular porosity; relatively low permeability **Comments:** Very friable
91.87–95.87	No recovery, 20% intergranular porosity; relatively low permeability
95.87–100.45	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Greenish gray (5YG 6/1) **Ichnofabrics:** Ichnofabric index 5, *Thalassinoides*? **Carbonate grains:** Dominated by pelecypod fragments with minor echinoid spines, amphisteginids **Accessory grains:** 90% quartz grains, very fine to medium sand size, moderate sorting. 3% heavy minerals **Porosity and permeability:** 20% intergranular; relatively low permeability **Comments:** Massive bedded; friable
100.45–108.10 TD	No recovery, 20% intergranular porosity; relatively low permeability

G–3883 Test Corehole	
Depth Interval (feet below land surface)	**Described by Kevin Cunningham** [Visual estimates of permeability are based on comparison of lithofacies and pore classes to 276 air-permeability permeameter measurements (Cunningham and others, 2006b), and lattice Boltzmann permeability calculations (Cunningham and others, 2009, 2012; Cunningham and Sukop, 2011]
0–3.50	No core recovery.
3.50–5.00	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid grainstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5, rhizoliths, *Ophiomorpha* **Carbonate grains:** Peloids, minor pelecypods, *Halimeda* **Accessory grains:** 10% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 20% moldic, 15% intraburrow vugs; relatively high permeability **Comments:** Core rubble zone. Calcite intergranular cements and molds after the dissolution of peloids. Cycle top at 3.50 feet
5.00–6.00	No recovery
6.00–8.20	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid grainstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. *Ophiomorpha*, rhizoliths **Carbonate grains:** Peloids, minor pelecypods and gastropods, *Halimeda*, uncommon *Schizoporella* **Accessory grains:** 10% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 20% moldic, 15% intraburrow vugs; relatively high permeability **Comments:** Calcite intergranular cements and molds after the dissolution of peloids
8.20–10.87	No recovery
10.87–11.08	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid grainstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. *Ophiomorpha*, rhizoliths **Carbonate grains:** Peloids, minor pelecypods **Accessory grains:** 10% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 20% moldic, 15% intraburrow vugs; relatively high permeability **Comments:** Core rubble zone. Calcite intergranular cements and molds after the dissolution of peloids
11.08–12.58	**Lithofacies:** Peloid wackestone and packstone **Depositional texture:** Peloid pelecypod packstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. *Thalassinoides*, rhizoliths **Carbonate grains:** Pelecypods, *Halimeda*, gastropods, rare *Schizoporella* **Accessory grains:** 10–15% quartz sand, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic, 25% touching vugs; relatively high permeability **Comments:** Pellets are coarse-grained and clotted; many pelecypods are calcite-replaced; some vugs are lined with calcite cements. Many reddish colors suggestive of oxidized iron at and below an exposure surface. Cycle top at 11.08 feet
12.58–16.10	No recovery
16.10–16.18	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated calcrete **Comments:** Cycle top at 16.10 feet
16.18–16.60	No recovery

G–3883 Test Corehole	
16.60–18.06	**Lithofacies:** Peloid wackestone and packstone **Depositional texture:** Pelecypod wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. *Thalassinoides*, rhizoliths **Carbonate grains:** Pelecypods, peloids, benthic foraminifera (including archaiasinids, miliolids) **Accessory grains:** 5–15% quartz grains, very fine to coarse sand size, moderate sorting. 1% heavy minerals **Porosity and permeability:** 5–10% moldic, 20% vuggy; relatively moderate permeability **Comments:** None
18.06–19.70	No recovery
19.70–19.82	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Peloidal mudstone and wackestone **Color:** Very pale orange (10YR 8/2) **Carbonate grains:** Peloids, benthic foraminifera (including *Elphidium*), ostracods **Accessory grains:** 10% quartz grains, very fine to medium sand size, moderate sorting. 1% heavy minerals **Porosity and permeability:** 10–12% moldic, 20% vuggy; relatively low permeability **Comments:** Pedogenic cap and brackish mudstone cycle cap. Cycle top at 19.70 feet
19.82–20.85	No recovery, relatively low permeability
20.85–23.85	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Pelecypod mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed, rhizoliths **Carbonate grains:** Pelecypods, peloids, gastropods, benthic foraminifera (including archaiasinids, soritids, miliolids), **Accessory grains:** 15% fine- to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic, 5% vuggy; relatively moderate permeability **Comments:** Thick to massive bedding
23.85–24.25	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Skeletal packstone and grainstone with *Manicina* heads **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thinly bedded **Ichnofabrics:** Uncertain **Carbonate grains:** Pelecypods, peloids, small *Manicina* heads, benthic foraminifera (including archaiasinids, soritids, miliolids) **Accessory grains:** 5% quartz grains, very fine to fine sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic, 30% vuggy; relatively high permeability **Comments:** Core rubble zone
24.25–24.255	**Lithofacies:** Pedogenic limestone **Depositional texture:** Chalky laminated calcrete **Comments:** Cycle top at 24.25 feet
24.255–24.87	**Lithofacies:** Peloid wackestone and packstone **Depositional texture:** Peloid mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium bedding **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypod fragments, peloids, archaiasinids **Accessory grains:** 1–2% quartz grains, very fine to fine sand size, moderate sorting Porosity: 30% moldic, 2 vuggy **Comments:** Ostracod wackestone fills a large cavity; a white two-millimeter thick layer of calcrete caps this interval.

G–3883 Test Corehole	
24.87–25.19	**Lithofacies:** Laminated peloid packstone and grainstone **Depositional texture:** Laminated peloid packstone and grainstone **Color:** Pale yellowish brown layers (10YR 6/2) and very pale orange layers (10YR 8/2) **Sedimentary structures/textures:** Thinly to thickly laminated **Ichnofabrics:** Ichnofabric index 2 **Carbonate grains:** Peloids (some of which are aggregate grains) **Accessory grains:** 15–25% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 2% moldic, bedding plane vugs; relatively moderate permeability **Comments:** Interval includes tidal flat stromatolites
25.19–29.35	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Pelecypod-fragment mud- and grain-dominated packstone and grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypod fragments, benthic foraminifera (including archaiasinids, soritids), echinoid spines **Accessory grains:** 10–30% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic, 1% vuggy; relatively moderate permeability **Comments:** Fine-grained sandstone fills cavities.
29.35–30.45	No recovery, relatively high permeability
30.45–31.25	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Lime mudstone **Color:** Very light gray N8 with minor light gray N7 **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Minor pelecypod fragments, skeletal particles, fragmented barnacle **Accessory grains:** 5% quartz grains, very fine sand size to medium (mostly very fine to fine), well sorted **Porosity and permeability:** 5% moldic, 5% irregular vugs; relatively low permeability **Comments:** Brackish marginal marine transgressive limestone
31.25–32.00	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated calcrete at top, but mainly massive calcrete **Porosity and permeability:** 10% microporosity; relatively low permeability **Comments:** Cycle top at 31.25 feet
32.00–33.00	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous skeletal quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed, semivertical rhizoliths **Carbonate grains:** Lithoclasts (of calcrete layers); minor pelecypod fragments and gastropods **Accessory grains:** 95% quartz grains, very fine to fine sand size, moderate sorting. 5% heavy minerals **Porosity and permeability:** 15% intragranular, 2% moldic; relatively low permeability **Comments:** Has a chalky texture with good microporosity; coarsens in grain size upward to the top of this interval
33.00–35.40	No recovery
35.40–36.74	**Lithofacies:** Touching-vug pelecypod floatstone and rudstone **Depositional texture:** Touching-vug pelecypod rudstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Burrowed; root structures **Ichnofabrics:** Ichnofabric index 5. Burrowed, rhizoliths **Carbonate grains:** Pelecypods, coral head **Accessory grains:** 15% quartz grains, very fine to fine sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 10% moldic, 20% vuggy; relatively high permeability **Comments:** None

G–3883 Test Corehole	
36.74–38.50	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, gastropods **Accessory grains:** 10–15% quartz grains, very fine to medium sand size, moderate sorting. 1–2% heavy minerals **Porosity and permeability:** 10% moldic, 5% vuggy; relatively low permeability **Comments:** Possible high-frequency subtidal cycle top, abrupt contact, lithofacies shift, and shift in grain size at 36.74 feet
38.50–38.84	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone with a skeletal grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypods, *Schizoporella* **Accessory grains:** 15% quartz grains, very fine to medium sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic, 20% vuggy; relatively high permeability **Comments:** None
38.84–39.20	No recovery
39.20–39.75	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod *Schizoporella* floatstone with a skeletal grains-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypods, peloids, benthic foraminifera (including archaiasinids, miliolids), gastropods, *Schizoporella* **Accessory grains:** 15% quartz grains, very fine to medium sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic, 20% vuggy; relatively high permeability **Comments:** None
39.75–40.60	No recovery
40.60–40.80	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone and rudstone with a benthic foraminifer grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypods, gastropods, benthic foraminifera **Accessory grains:** 45% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic, 20% vuggy; relatively high permeability **Comments:** A single fragment of *Manicina* and Clionid galleries observed at the very top of this interval
40.80–41.30	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone with skeletal wackestone and packstone matrix **Porosity and permeability:** 5% vuggy; relatively low permeability **Comments:** Abrupt contact. Brackish mudstone high-frequency cycle cap at 40.80 feet
41.30–42.00	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal packstone and grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypods, gastropods, discoid foraminifera (including archaiasinids), peloids **Accessory grains:** 35% quartz grains, very fine to medium sand size, poor sorting **Porosity and permeability:** 2% moldic, 15% vuggy; relatively moderate permeability **Comments:** Marine facies
42.00–42.45	No recovery

G–3883 Test Corehole	
42.45–43.98	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone with a skeletal mudstone and wackestone matrix (minor lime mudstone also occurs in interval) **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed, rhizoliths **Carbonate grains:** Ostracods, gastropods, minor pelecypods **Accessory grains:** 15% quartz grains, very fine to medium sand size, poor sorting **Porosity and permeability:** 2% moldic, 2% vuggy; relatively low permeability **Comments:** Brackish mudstone high-frequency cycle cap at 42.45 feet
43.98–44.26	No recovery
44.26–48.35	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod benthic-foraminifera mud- and grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrows **Carbonate grains:** Pelecypods, skeletal fragments, gastropods, benthic foraminifera, stick-shaped *Porites* **Accessory grains:** 45% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 15% molds, 20% touching vugs; relatively moderate permeability **Comments:** None
48.35–49.35	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Ostracod lime mudstone with minor *Planorbella* **Color:** Light gray (N7) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5. Burrows, rhizoliths **Carbonate grains:** Small ostracods and ostracod fragments, minor *Planorbella*, peloids, pelecypods, gastropods **Accessory grains:** 10–15% quartz grains, very fine to medium sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 2% moldic, relatively low permeability **Comments:** Fresh to brackish high-frequency cycle cap at 48.35 feet
49.35–49.90	No recovery, relatively high permeability
49.90–51.00	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone and rudstone with a skeletal mud- and grain-dominated packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5. Burrows, rhizoliths **Carbonate grains:** Pelecypods, gastropods, skeletal fragments, rare encrustations of red algae **Accessory grains:** 20–25% quartz grains, very fine to medium sand size, moderate sorting. 1% heavy minerals **Porosity and permeability:** 15% moldic, 35% vuggy (probable solution pipes); relatively high permeability **Comments:** None
51.00–51.90	No recovery, relatively high permeability
51.90–53.50	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone and mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. *Ophiomorpha*, burrowed **Carbonate grains:** Pelecypods, other skeletal particles **Accessory grains:** 45% quartz grains, very fine to medium sand size, moderate sorting. 1% heavy minerals **Porosity and permeability:** 5–10% moldic, 10% vuggy; relatively low horizontal permeability and relatively high vertical permeability **Comments:** Vertical solution pipes
53.50–55.30	No recovery

G–3883 Test Corehole	
55.30–56.80	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod mud- and grain-dominated packstone and grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowing, *Ophiomorpha*, rhizoliths **Carbonate grains:** Pelecypods **Accessory grains:** 40% quartz grains, very fine to medium sand size, well sorted. 1% heavy minerals **Porosity and permeability:** 5–10% molds, 30% touching vugs; relatively high permeability **Comments:** None
56.80–57.80	No recovery, relatively high permeability
57.80–59.25	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod mud- and grain-dominated packstone and grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed, rhizoliths **Carbonate grains:** Pelecypods, gastropods, peloids, benthic foraminifera (including archaiasinids) **Accessory grains:** 5–40% quartz grains, very fine to medium sand size, moderate sorting. 1% heavy minerals **Porosity and permeability:** 15% moldic, 15% vuggy (touching vugs); relatively high permeability **Comments:** Intraburrow vugs
59.25–60.35	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone and rudstone with ostracod wackestone matrix **Color:** Grayish orange pink (5YR 7/2) **Sedimentary structures/textures:** Medium to thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Mainly *Planorbella* and other gastropods, ostracods, pelecypods **Accessory grains:** 3–5% quartz grains, very fine to fine sand size, well sorted **Porosity and permeability:** 15% moldic (after the dissolution of gastropods), 2% vuggy, 15% solution pipe porosity; relatively low permeability **Comments:** Abundant *Planorbella* specimens indicate a freshwater limestone; sediment-infillings contain 10% fine- to medium sand size. Cycle top at 59.25 feet
60.35–60.80	No recovery, relatively moderate permeability
60.80–61.55	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed, rhizoliths **Carbonate grains:** Pelecypods, minor gastropods and other skeletal particles **Accessory grains:** 10% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic, 5% vuggy, 5% bedding plane vugs; relatively high permeability **Comments:** Common late-stage calcite (grayish orange 10YR 7/4) lines several large vugs, one of which is nearly horizontal
61.55–61.70	No recovery, relatively high permeability
61.70–63.60	**Lithofacies:** Coral boundstone (*Montastrea annularis* dominant) **Depositional texture:** *Montastrea annularis*, encrusting-red-algal framestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Borings into corals, rhizoliths **Carbonate grains:** *Montastrea annularis*, encrusting red algae, encrusting bryozoans, pelecypods, clinoid-generated carbonate silt, *Manicina*, red algal-bryozoan rhodoliths at base of interval **Accessory grains:** 10% quartz grains, very fine to fine sand size, moderate sorting **Porosity and permeability:** 15% moldic, 20% vuggy; relatively high permeability **Comments:** Arenaceous content is within burrows; corals are mainly *Montastrea annularis* specimens, rhodoliths may be transgressive onto exposure surface below
63.60–64.08	No recovery, relatively high permeability

G–3883 Test Corehole	
64.08–66.25	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Skeletal quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thick bed **Ichnofabrics:** Ichnofabric index 5. *Gastrochaenolites* at upper bounding surface, burrowed, calcified rhizoliths with concentric micrite and microspar Ichnofacies: *Tyrpanites* ichnofacies at upper bounding surface **Carbonate grains:** Minor pelecypods, gastropods, and benthic foraminifera (including mostly archaiasinids, soritids, peneroplids, amphisteginids) **Accessory grains:** 60% quartz grains, very fine to coarse sand size, moderately sorted, angular to subrounded. <1% heavy minerals **Porosity and permeability:** 3% moldic, 15% vuggy; relatively low permeability **Comments:** Abrupt contact and lithofacies shift at upper contact. Boundary between chlorozoan particle assemblage above 64.08 feet and heterozoan particle assemblage below 64.08 feet. Calcified rhizoliths in this interval indicated an exposure surface at 64.08 feet and *Gastrochaenolites* indicates an earlier hardground followed by exposure. Also, calcretization of rock below upper bounding surface is a chalky texture is indicative of subaerial exposure. High-frequency cycle boundary at 64.08 feet
66.25–68.90	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod peloidal wackestone and mud-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed, rhizoliths **Carbonate grains:** Pelecypods, peloids **Accessory grains:** 10–15% quartz grains, very fine to medium sand size, poor sorting. 1% heavy minerals **Porosity and permeability:** 5% moldic, 1–2% vuggy; relatively low permeability **Comments:** None
68.90–69.50	No recovery
69.50–72.50	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod grain-dominated packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypods, gastropods, small solitary corals (*Manicina*) **Accessory grains:** 35% quartz grains, very fine to coarse sand size, poor sorting. 2% heavy minerals **Porosity and permeability:** 10% moldic, 10% vuggy (probably touching vugs); relatively moderate permeability **Comments:** None
72.50–73.50	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone and rudstone with a skeletal grain-dominated packstone matrix **Color:** Light gray (N7) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Dominated by pelecypods with minor gastropods, ostracods, amphisteginids **Accessory grains:** 10% quartz grains, very fine to very coarse sand size, very poor sorting. 1–2% heavy minerals **Porosity and permeability:** 20% moldic, 15% vuggy (many are touching vugs); relatively moderate permeability **Comments:** None
73.50–73.90	No recovery, relatively high permeability

G–3883 Test Corehole	
73.90–75.00	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated and massive brecciated calcrete **Color:** Grayish orange (10YR 7/4) **Sedimentary structures/textures:** Thickly bedded **Carbonate grains:** Pelecypod fragments, benthic foraminifera **Accessory grains:** 3% quartz grains, very fine to fine sand size. 3% heavy minerals **Porosity and permeability:** 3–5 % moldic, 15% vuggy; relatively low permeability **Comments:** Major cycle boundary at top of interval at 73.90 feet. Calcrete fills fractures and wraps around breccia clasts. Is probably a soil breccia and may be related to rhizobrecciation. Top of Tamiami Formation and top of Pinecrest Sand Member of the Tamiami Formation at 73.90 feet
75.00–75.60	No recovery
75.60–77.50	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal grain-dominated packstone and grainstone **Color:** Medium light gray (N6) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Dominated by pelecypods with minor benthic foraminifera **Accessory grains:** 25% quartz grains, very fine to coarse sand size, moderate to poor sorting. 2% heavy minerals **Porosity and permeability:** 10% moldic, 15% vuggy; relatively moderate permeability **Comments:** None
77.50–77.60	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous skeletal quartz sandstone **Color:** Light gray (N7) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypod fragments, other skeletal particles **Accessory grains:** 95% quartz grains, very fine to medium sand size, moderate sorting. 2–3% heavy minerals **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Massive bedded, friable
77.60–86.00	No recovery—based on digital optical borehole wall image, possible top of pedogenic quartz sand and cycle top at 81.90 feet
86.00–87.90	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Calcareous skeletal quartz sand **Color:** Light gray (N7) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed, *Ophiomorpha* **Carbonate grains:** Dominated by pelecypod fragments with minor gastropods (including *Turritella*), miliolids, echinoid spines, amphisteginids **Accessory grains:** 85% quartz grains, very fine to medium sand size, moderate sorting. 2–3% heavy minerals **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Massive bedded, friable
87.90–88.70	No recovery
88.70–89.65	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod floatstone and rudstone and skeletal quartz sand matrix **Color:** Light gray (N7) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Dominated by whole pelecypods (including oysters) and pelecypod fragments, gastropods (including *Turritella*) **Accessory grains:** 85% quartz grains, very fine to medium sand size, moderate sorting. 1–2% heavy minerals **Porosity and permeability:** 25% intergranular porosity; relatively low permeability **Comments:** Core rubble zone, very friable sandstone

G–3883 Test Corehole	
89.65–92.30	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Calcareous pelecypod quartz sand **Color:** Greenish gray (5YG 6/1) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Dominated by pelecypod fragments with minor gastropods (including *Turritella*), echinoid spines and plates, ostracods **Accessory grains:** 85% quartz grains, very fine to medium sand size, moderate sorting. 2% heavy minerals **Porosity and permeability:** 25% intergranular porosity; relatively low permeability **Comments:** Very friable
92.30–94.40	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Calcareous pelecypod quartz sand **Color:** Greenish gray (5YG 6/1) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** 15% pelecypod fragments; gastropods (including *Turritella*) **Accessory grains:** 90% quartz grains, very fine to medium sand size, moderate sorting. 2% heavy minerals **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Massive bedded, friable, abrupt contact that dips 46.5 degrees bearing 183 degrees southwest
94.40–98.90	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Calcareous pelecypod quartz sand **Color:** Greenish gray (5YG 6/1) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Dominated by pelecypods and pelecypod fragments (many are very large), gastropods (including *Turritella*), with minor echinoid spines and plates **Accessory grains:** 90% quartz grains, very fine to medium sand size, moderate sorting. 2% heavy minerals Porosity: 25% intergranular **Comments:** Massive bedded, friable
98.90–101.00	No recovery
101.00–104.70	**Lithofacies:** Skeletal quartz sand **Depositional texture:** Calcareous skeletal quartz sand **Color:** Greenish gray (5YG 6/1) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed, *Teichichnus*? **Carbonate grains:** Dominated by pelecypod fragments with minor echinoid spines, gastropods, globular planktic foraminifera **Accessory grains:** 90% quartz grains, very fine to medium sand size, moderate sorting. 2% heavy minerals **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Massive bedded, friable
104.70–108.20 TD	No recovery

G–3884 Test Corehole	
Depth Interval (feet below land surface)	**Described by Kevin Cunningham** [Visual estimates of permeability are based on comparison of lithofacies and pore classes to 276 air-permeability permeameter measurements (Cunningham and others, 2006b), and lattice Boltzmann permeability calculations (Cunningham and others, 2009, 2012; Cunningham and Sukop, 2011]
0–4.50	No core recovery.
4.50–5.00	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid packstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Common *Ophiomorpha* and rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite **Carbonate grains:** Peloids, pelecypod fragments **Accessory grains:** 25% quartz grains, very fine to medium sand size, poor to moderate sorting. <1% heavy minerals **Porosity and permeability:** 10% moldic; 25% mainly vugs related to *Ophiomorpha*; relatively high permeability **Comments:** Core rubble zone
5.00–11.50	No recovery
11.50–12.50	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid packstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Common *Ophiomorpha* and rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite **Carbonate grains:** Peloids, pelecypod fragments, *Schizoporella* **Accessory grains:** 25% quartz grains, very fine to medium sand size, poor to moderate sorting. <1% heavy minerals **Porosity and permeability:** 10% moldic; 25% mainly vugs related to *Ophiomorpha*; relatively high permeability **Comments:** Core rubble zone
12.50–17.17	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod, *Schizoporella* packstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Burrow mottled; pervasive rhizoliths **Ichnofabrics:** Ichnofabric index 5. Common *Thalassinoides* and rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite **Carbonate grains:** Pelecypods, *Schizoporella*, archaiasinids, *Halimeda*, ostracods **Accessory grains:** 35% quartz grains, very fine to medium sand size, poor sorting. <1 heavy minerals Porosity and permeabililty: 5–10% molds; 30% vuggy porosity; relatively moderate permeability **Comments:** None
17.17–17.67	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone **Color:** Grayish orange (10YR 7/4) and very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans and/or thalassinidean-like crustaceans. Very minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite **Carbonate grains:** Pelecypods, benthic forams **Accessory grains:** 15–20% quartz grains, very fine to medium sand size, poor sorting. <1 heavy mineral; core rubble zone **Porosity and permeability:** 10% molds; 35% intraburrow touching vugs; relatively high permeability **Comments:** Iron-stained intraburrow pores
17.67–18.60	No recovery

G–3884 Test Corehole	
18.60–22.40	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous skeletal wackestone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 2–3. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Very minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite **Carbonate grains:** Skeletal fragments, pelecypod fragments, benthic forams (including archaiasinids). Ripped up lithoclasts of Fort Thompson lime mudstone contain *Elphidium*, *Ammonia*, and ostracods **Accessory grains:** 15–20% quartz grains, very fine to medium sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 10% molds; 30% vuggy that is dominated by a vertical solution pipe from 18.60 to 25.00 feet; relatively high permeability **Comments:** None
22.40–22.53	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated and massive calcrete **Porosity and permeability:** 30% vug that is dominated by a vertical solution pipe from 18.60 to 25.00 feet; relatively high permeability
22.53–26.18	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal wackestone and packstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Common rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite **Carbonate grains:** Pellets, pelecypods, gastropods, benthic forams (including archaiasinids), ostracods **Accessory grains:** 15% quartz grains, very fine to medium sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 10% moldic; 30% vuggy that is dominated by a vertical solution pipe from 18.60 to 25.00 feet; relatively high permeability **Comments:** None
26.18–27.62	**Lithofacies:** Coral boundstone (*Montastrea* dominant) **Depositional texture:** Coral bryozoan rubble **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4)) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Head coral (*Montastrea annularis*) and solitary corals (*Manicina*), pelecypods **Accessory grains:** 1–2% quartz grains, very fine to fine sand size **Porosity and permeability:** 10% moldic; 25% mostly burrow related vugs with 50% bedding plane vugs from 27.40 to 27.62 ft; relatively high permeability, **Comments:** Iron-stained, mainly along the margins of vugs
27.62–27.90	**Lithofacies:** Pedogenic limestone **Depositional texture:** Pedotubule and laminated calcrete interlaminated **Porosity and permeability:** 10% microporosity; relatively low permeability **Comments:** Cycle top
27.90–28.40	**Lithofacies:** Lime mudstone and wackestone, and laminated peloid packstone and grainstone **Depositional texture:** Pedotubule and laminated calcrete interlaminated with centimeter-scale interbedded layers of lime mudstone, pelletal skeletal packstone, and lithoclastic rudstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Thinly laminated to very thinly bedded **Ichnofabrics:** Ichnofabric index 2 **Carbonate grains:** Pelecypods, gastropods, benthic forams, pellets, reworked lithoclasts of light gray gastropod wackestone with *Planorbella* **Accessory grains:** 25% fine to medium sand size, moderate sorting. 2% heavy minerals **Porosity and permeability:** 10–12% moldic; 25% bedding plane vugs and irregular vugs: relatively high permeability **Comments:** Tidal flat stromatolites between 28.40 and 28.72 feet

G–3884 Test Corehole	
28.40–28.72	No recovery
28.72–31.53	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Burrows; vertical rhizoliths **Ichnofabrics:** Ichnofabric index 5. Burrows and rhizoliths lined with concentric micrite and microspar **Carbonate grains:** Pelecypods, rare gastropods and bryozoa, benthic foraminifers (including archaiasinids, peneroplids) **Accessory grains:** 45–49% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 20% moldic; 5% irregular vugs; relatively moderate permeability **Comments:** Slightly iron-stained
31.53–32.40	No recovery
32.40–33.08	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod rudstone with an arenaceous pelecypod packstone matrix **Color:** Very pale orange (10YR 8/2) and minor grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, benthic foraminifers (including archaiasinids, peneroplids, miliolids) **Accessory grains:** 20–25% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 10–20% fossil molds; 10% irregular touching vugs; relatively high permeability **Comments:** This is the lowest subunit with any grayish orange iron-staining
33.08–37.16	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone and wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, benthic foraminifers (including archaiasinids), ostracods **Accessory grains:** 40–45% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic; 5–10% vuggy; relatively low to moderate permeability **Comments:** None
37.16–40.70	No recovery—probable thin laminated calcrete at 39.02 feet based on digital optical borehole wall image
40.70–42.08	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod wackestone and packstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Pelecypods, gastropods, benthic foraminifers (including archaiasinids) **Accessory grains:** 15% quartz grains, very fine to medium sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 3–5% moldic; 3–5% irregular vugs; relatively low permeability **Comments:** Pedotubule calcrete filled irregular vertical solution pipes related to exposure surface at 39.02 feet
42.08–45.87	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod rudstone with an arenaceous pelecypod packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded unit **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Very minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite **Carbonate grains:** Pelecypods, ramose bryozoa, gastropods, benthic foraminifers (including archaiasinids) **Accessory grains:** 0–45% quartz grains, fine to medium sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 15% fossil moldic; 5–15% irregular vugs; relatively moderate in middle and upper part and relatively high in lowest part of interval **Comments:** Concentrations of quartz sand occur in molds of pelecypods or in sediment-filled voids. Late-stage calcite cement lines several touching vugs
45.87–47.00	No recovery

G–3884 Test Corehole	
47.00–47.40	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Lime mudstone **Color:** Very pale orange (10YR 8/2) and light gray (N7) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5. Rhizoliths **Carbonate grains:** Very minor pelecypods and gastropods; ostracods, very small archaiasinids **Accessory grains:** 15% quartz grains, very fine to medium sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 3% moldic; 5% irregular vugs; relatively moderate permeability **Comments:** Brackish mudstone high-frequency cycle cap, sand-filled vertically oriented vugs
47.40–48.70	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous skeletal packstone and grainstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Skeletal fragments, pelecypods, gastropods, dasycladacean algae, benthic foraminifers (including archaiasinids, miliolids) **Accessory grains:** 0–45% quartz grains, very fine to medium sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic; 15% irregular and burrow-related vugs; relatively moderate to high permeability **Comments:** Basal marine part of cycle
48.70–49.40	**Lithofacies:** Mudstone and wackestone **Depositional texture:** Lime mudstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium bedding **Ichnofabrics:** Ichnofabric index 3. Rhizoliths **Carbonate grains:** Minor gastropods and pelecypods **Accessory grains:** 8% fine sand size, good sorting; <1% heavy minerals **Porosity and permeability:** 3% moldic; 25% vertical vugs; relatively low matrix permeability, but relatively high vertical permeability and possibly horizontal permeability **Comments:** Core rubble zone
49.40–51.40	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium bedding **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, unidentified skeletal fragments **Accessory grains:** 15% quartz grains, very fine to coarse sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 10% moldic; 20% vuggy porosity related to burrows and minor irregular vugs; relatively moderate to high permeability **Comments:** Core rubble zone
51.40–52.00	No recovery
52.00–52.75	**Lithofacies:** Coral boundstone (*Porites porites* dominant) **Depositional texture:** *Porites porites* bafflestone (floatstone and rudstone) **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Medium bedding **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Very minor rhizoliths with dark yellowish orange 10YR 6/6 to moderate yellowish brown 10YR 5/4 concentric microspar or micrite **Carbonate grains:** *Porites porites*, pelecypods, and solitary head corals (*Manicina*); minor bryozoans **Accessory grains:** 15% quartz grains, very fine to medium sand size, poor sorting. <1% heavy minerals **Porosity and permeability:** 20% moldic; 15% irregular vugs; relatively high permeability **Comments:** None

G–3884 Test Corehole	
52.75–54.99	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Very minor rhizoliths with microspar or micrite **Carbonate grains:** Pelecypods, benthic foraminifers (including archaiasinids, peneroplids), echinoid spines and plates, one finger coral (*Porites porites*) **Accessory grains:** 15% quartz grains, very fine to medium sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 3% moldic; 5% irregular vugs and vugs related to burrows; relatively high permeability **Comments:** None
54.99–55.66	No recovery
55.66–57.22	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Pelecypod packstone and grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5, *Gastrochaenolites* bounds upper part of interval. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Rhizoliths with microspar or micrite Ichnofacies: *Trypanites* ichnofacies bounds upper surface **Carbonate grains:** Pelecypods, skeletal fragments **Accessory grains:** 15% quartz grains, very fine to medium sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 3% moldic; 10% irregular vugs and vugs related to burrows; relatively moderated permeability **Comments:** Hardground with *Trypanites* ichnofacies bounds uppermost part of this subtidal cycle cap
57.22–58.89	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone and grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Rhizoliths with microspar or micrite **Carbonate grains:** Pelecypods, gastropods **Accessory grains:** 25% quartz grains, very fine to fine sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 10% moldic; 15–25% irregular vugs and vugs related to burrows; relatively moderated permeability **Comments:** None
58.89–59.39	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods **Accessory grains:** 45% quartz grains, very fine to fine sand size, good sorting. 1% heavy minerals **Porosity and permeability:** 5% moldic; 25% vugs related to burrows; relatively high permeability **Comments:** Core rubble zone
59.39–60.37	No recovery

G–3884 Test Corehole	
60.37–62.27	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone and grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Very minor rhizoliths with microspar or micrite **Carbonate grains:** Pelecypods, discoidal large benthic foraminifers, echinoid spines and plates **Accessory grains:** 40% quartz grains, very fine to medium sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 15% moldic; 10–30% irregular vugs and vugs related to burrows; relatively moderate to high permeability **Comments:** None
62.27–63.80	No recovery
63.80–65.00	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone with skeletal wackestone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thick bed **Ichnofabrics:** Ichnofabric index 5. Burrowed and rhizoliths common **Carbonate grains:** *Planorbella*, pelecypods, ostracods, *Elphidium* **Accessory grains:** 1–15% quartz grains, very fine to coarse sand size, poor to moderate sorting. 1% heavy minerals **Porosity and permeability:** 10% moldic; 2% irregular and vertically oriented vugs; low horizontal relative permeability and moderate to high vertical relative permeability **Comments:** Freshwater to brackish high-frequency cycle cap
65.00–65.45	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thick bed **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, echinoid plates and spines, benthic foraminifers (including archaiasinids, miliolids) **Accessory grains:** 20% quartz grains, very fine to medium sand size, poor to moderate sorting. <1% heavy minerals **Porosity and permeability:** 5–7% moldic; 10% irregular vugs; relatively low to moderate permeability **Comments:** Marine
65.45–66.15	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone and packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thick bed **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, echinoid plates and spines, benthic foraminifers (including archaiasinids, miliolids) **Accessory grains:** 45% quartz grains, very fine to medium sand size, poor to moderate sorting. <1% heavy minerals **Porosity and permeability:** 10% moldic; 10% irregular vugs; relatively low to moderate permeability **Comments:** Marine

G–3884 Test Corehole	
66.15–66.71	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with skeletal packstone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thick bed **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Very minor rhizoliths with microspar or micrite **Carbonate grains:** Pelecypods, gastropods, echinoid plates and spines, benthic foraminifers (including archaiasinids) **Accessory grains:** 15% quartz grains, very fine and medium sand size, moderate sorting. <1% heavy minerals **Porosity and permeability:** 7% moldic; 30% vugs related to burrow porosity; relatively high permeability **Comments:** Marine
66.71–68.27	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone and rudstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thick bed **Ichnofabrics:** Ichnofabric index 5. Possible *Gastrochaenolites* bounds upper part of interval Ichnofacies: Possible *Trypanites* ichnofacies bounds upper surface **Carbonate grains:** Gastropods (mostly *Planorbella*), peloids, pelecypods, ostracods **Accessory grains:** None observed **Porosity and permeability:** 10% moldic; 5–20% irregular and vertically oriented vugs; relatively moderate horizontal permeability and high vertical permeability **Comments:** Probable hardground at upper bounding surface. Probably a transgressive freshwater limestone filling and covering underlying karstic top at 68.27 feet below.
68.27–69.31	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone and packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, benthic foraminifers (including archaiasinids) **Accessory grains:** 25% quartz grains, very fine to medium sand size, moderate sorting. 1% heavy minerals **Porosity and permeability:** 10% moldic; 15% irregular vugs and vugs related to burrows; relatively moderate permeability **Comments:** Karst exposure surface or a cavity wall occurs extending downward from upper bounding surface at 68.27 feet and infilled with transgressive freshwater limestone from interval above
69.31–71.80	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone and grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, benthic foraminifers (including archaiasinids), ostracods, gastropods **Accessory grains:** 25% quartz grains, very fine to coarse sand size, poor sorting. 1% heavy minerals **Porosity and permeability:** 15% moldic; 35% vugs related to burrows; relatively high permeability **Comments:** Core rubble zone
71.80–75.08	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, benthic foraminifers (including archaiasinids), ostracods **Accessory grains:** 35–40% quartz grains, very fine to coarse sand size, poor to moderate sorting. 1–2% heavy minerals **Porosity and permeability:** 10% moldic; 25% irregular vugs and vugs related to burrowing; relatively moderated permeability with relatively high permeability near the top of the interval **Comments:** Some bedding plane vugs

G–3884 Test Corehole	
75.08–77.63	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Very light gray (N8) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Rhizoliths common **Carbonate grains:** Pelecypods, gastropods, echinoid spines, miliolids, ostracods, amphisteginids **Accessory grains:** 65% quartz grains, very fine to very coarse sand size, poor sorting, subangular to subrounded. 4–5% heavy minerals **Porosity and permeability:** 15% moldic; 15% irregular vugs and vugs related to burrows; relatively low to moderate permeability **Comments:** Coarse and very coarse quartz grains are abundant and fairly evenly distributed throughout this interval
77.63–79.80	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Very light gray (N8) **Sedimentary structures/textures:** Very thickly bedded **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans. Rhizoliths common **Carbonate grains:** Pelecypods, gastropods, echinoid spines, miliolids, ostracods, amphisteginids **Accessory grains:** 65% quartz grains, very fine to very coarse sand size, poor sorting, subangular to subrounded. 4–5% heavy minerals **Porosity and permeability:** 15% moldic; 15% irregular vugs and vugs related to burrows; relatively low to moderate permeability **Comments:** Coarse and very coarse quartz grains are abundant and fairly evenly distributed throughout this interval
79.80–80.00	**Lithofacies:** Skeletal packstone and grainstone **Depositional texture:** Pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** Pelecypods, gastropods, ostracods, amphisteginids **Accessory grains:** 10% quartz grains, very fine to coarse sand size, poor to moderate sorting. 1% heavy minerals **Porosity and permeability:** 5% moldic; 35% irregular vugs and vugs related to burrows; relatively moderate to high permeability **Comments:** None
80.00–81.70	No recovery
81.70–83.05	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone with skeletal mud- and grain-dominated packstone and wackestone matrix **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans, probably includes *Ophiomorpha*. Upper 3 inches sparsely riddled with calcified rhizoliths with inner linings of microspar and micrite **Carbonate grains:** Pelecypods, *Ostrea*, other skeletal fragments **Accessory grains:** 10% quartz grains, very fine to coarse sand size, poor to moderate sorting. 1% heavy minerals **Porosity and permeability:** 5% moldic; 35% irregular vugs and vugs related to burrows; relatively moderate to high permeability **Comments:** Upper 3 inches sparsely riddled with a calcified rhizoliths with inner linings of microspar and micrite and associated very discontinuous laminated calcrete that also irregularly sparsely riddles the pore network of the limestone. Rhizoliths and calcrete are suggestive of an exposure surface at or just above 81.70 in not recovery interval and top of Tamiami Formation at 81.70 feet
83.05–85.88	No recovery

G–3884 Test Corehole	
85.88–86.98	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very light gray (N8) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans, and probably includes *Ophiomorpha* **Carbonate grains:** 5% pelecypods, very minor unidentified benthic foraminifers **Accessory grains:** 45% quartz grains, very fine to medium sand size, poor to moderate sorting. 1% heavy minerals **Porosity and permeability:** 3% moldic; 20% vugs related to burrows; relatively high permeability **Comments:** Weakly cemented by calcite
86.98–92.40	No recovery—Top of quartz sand dominated succession or top of Pinecrest Member of the Tamiami Formation at 89.10 feet
92.40–93.00	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Grayish orange pick (5YR 7/2) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** 20% fragments of mostly pelecypods and skeletal fragments **Accessory grains:** 93% quartz grains, very fine to coarse sand size, moderate sorting. 2–3% heavy minerals **Porosity and permeability:** 25% intergranular porosity; relatively low permeability **Comments:** Somewhat friable, weakly cemented
93.00–94.40	No recovery
94.40–94.80	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Grayish orange pick (5YR 7/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans, and probably includes *Ophiomorpha* **Carbonate grains:** 5% fragments of pelecypods (very fine and thin-walled) **Accessory grains:** 93% quartz grains, very fine to coarse sand size, moderate sorting. 2–3% heavy minerals **Porosity and permeability:** 25% intergranular porosity; relatively low permeability **Comments:** Somewhat friable, weakly cemented
94.80–97.00	No recovery
97.00–97.90	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod quartz sandstone **Color:** Greenish gray (5YG 6/1) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Most ichnofabrics probably produced by thalassinideans or thalassinidean-like crustaceans, and probably includes *Ophiomorpha* **Carbonate grains:** 10–15% pelecypod fragments (including oysters) and gastropods **Accessory grains:** 85% quartz grains, very fine to very coarse sand size, very poor sorting, and angular to sub-angular grains. 3% heavy minerals **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Massive bedded, friable
97.90–101.00 TD	No recovery

G–3889 Test Corehole	
Depth Interval (feet below land surface)	**Described by Kevin Cunningham** [Visual estimates of permeability are based on comparison of lithofacies and pore classes to 276 air-permeability permeameter measurements (Cunningham and others, 2006b), and lattice Boltzmann permeability calculations (Cunningham and others, 2009, 2012; Cunningham and Sukop, 2011]
0–0.50	No core recovery.
0.50–1.00	**Lithofacies:** Ooid packstone and grainstone **Depositional texture:** Ooid grainstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. common open *Ophiomorpha* burrows that are iron-stained along their margins, rhizoliths common **Carbonate grains:** Ooids, very minor skeletal fragments **Accessory grains:** 5% quartz grains, very fine to coarse sand size, occur inside ooids or inside their molds, but not in between ooid grains; angular to subangular quartz grains **Porosity and permeability:** 20% oomoldic; 25% vugs related to *Ophiomorpha*; relatively high permeability **Comments:** Core rubble zone, excellent sorting of ooids, quartz nuclei for many of the ooids
1.00–3.43	**Lithofacies:** Ooid packstone and grainstone **Depositional texture:** Ooid grainstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. common open *Ophiomorpha* burrows that are iron-stained along their margins, common rhizoliths **Carbonate grains:** Ooids, very minor skeletal fragments **Accessory grains:** 5% quartz grains, very fine to coarse sand size, occur inside ooids or inside their molds, but not in between grains; angular to subangular quartz grains **Porosity and permeability:** 20% oomoldic; 25% vugs related to *Ophiomorpha*; relatively high permeability **Comments:** Core rubble zone, excellent sorting of ooids, quartz nuclei for many of the ooids
3.43–4.83	No recovery
4.83–8.83	**Lithofacies:** Ooid packstone and grainstone **Depositional texture:** Ooid, peloid grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Cross-bedding of very thin beds to thick laminations **Ichnofabrics:** Ichnofabric index 2–3, *Ophiomorpha* common **Carbonate grains:** Ooids, peloids, very minor pelecypods and other skeletal fragments **Accessory grains:** 10% quartz grains, very fine to medium sand sized, moderate sorting; quartz grains occur both outside of and within some ooids **Porosity and permeability:** 20% moldic; 25–30% vugs related to *Ophiomorpha*; relatively moderate permeability **Comments:** Peloids are bimodal in size, fine-grained and very coarse-grained clotted peloids
8.83–11.60	**Lithofacies:** Ooid grainstone **Depositional texture:** Ooid, peloid grainstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Low-angle cross-bedding of thin beds to thick laminations **Ichnofabrics:** Ichnofabric index 2–4, *Ophiomorpha* common, minor *Favreina* **Carbonate grains:** Ooids, peloids, *Halimeda*, pelecypod fragments **Accessory grains:** 35% quartz grains, very fine to medium quartz sand, poorly sorted **Porosity and permeability:** 15% moldic (after the dissolution of pellets and/or ooids), 5–15% vugs related to *Ophiomorpha*; relatively moderate permeability **Comments:** None
11.60–13.83	**Lithofacies:** Peloid packstone and grainstone **Depositional texture:** Peloid mud- and grain-dominated packstone and grainstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Thickly bedded **Ichnofabrics:** Ichnofabric index 5. maximum density of *Ophiomorpha* **Carbonate grains:** Peloids, pelecypod fragments, *Halimeda* **Accessory grains:** 5–10% quartz grains, very fine to medium sand size, poorly sorted **Porosity and permeability:** 5–10% moldic; 35–40% vugs related to *Ophiomorpha*; relatively high permeability **Comments:** Iron-stained intraburrow pores; core rubble zone; late stage calcite cement lines some vugs

G–3889 Test Corehole	
13.83–21.00	No recovery
21.00–22.20	**Lithofacies:** Arenaceous peloid packstone and grainstone **Depositional texture:** Arenaceous pelletal grainstone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. *Ophiomorpha* **Carbonate grains:** Peloids, minor skeletal fragments **Accessory grains:** 20% quartz grains, very fine to medium quartz sand, poorly sorted **Porosity and permeability:** 10% moldic; 30% vugs related to *Ophiomorpha*; relatively high permeability **Comments:** Core rubble zone
22.20–27.35	No recovery—estimated top of HFC 4 at 24.84 feet, based on digital optical borehole wall image
27.35–28.51	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous quartz sandstone **Color:** White (N9) with some core pieces of light gray (N7) at the bottom of this interval. **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. *Ophiomorpha*, rhizoliths **Carbonate grains:** Pelecypod fragments, other skeletal fragments **Accessory grains:** 99% quartz grains, very fine to medium quartz sand; moderate sorting; <1% dark minerals **Porosity and permeability:** 15% intergranular; 50% vugs related to burrows, irregular vugs, and vertical solution pipe between about 24.90 and 39.20 feet; relatively high horizontal and very high vertical permeability **Comments:** Medium to medium light gray colored gastropod-bearing mudstone lithoclasts common at base of interval. This lithofacies commonly occurs at the base of the HFC 4 high-frequency cycle
28.51–29.09	No recovery
29.09–29.67	**Lithofacies:** Arenaceous mudstone and wackestone **Depositional texture:** Arenaceous lime mudstone **Color:** Grayish orange pink (5YR 7/2) **Sedimentary structures/textures:** Medium bedded **Ichnofabrics:** Ichnofabric index 5. burrow mottling, rhizoliths **Carbonate grains:** Skeletal fragments **Accessory grains:** 45–65% quartz grains, very fine to coarse sand size, poorly sorted; <1% dark minerals **Porosity and permeability:** 15% intergranular, 50% irregular vugs and vertical solution pipe between about 24.90 and 39.20 feet; relatively high horizontal and very high vertical permeability **Comments:** Brackish lime mudstone and high-frequency cycle cap at 29.09 feet
29.67–34.25	No recovery
34.25–37.33	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod, benthic-foram packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. burrow mottled, rhizoliths **Carbonate grains:** Pelecypods, gastropods, benthic foraminifera (mainly archaiasinids); *Halimeda*, echinoid spines and plates **Accessory grains:** 15–20% quartz grains, very fine to coarse sand size, poorly sorted; <1% dark minerals **Porosity and permeability:** 10–15% moldic; 50% vugs related to burrows, irregular vugs, and vertical solution pipe between about 24.90 and 39.20 feet; relatively high horizontal and very high vertical permeability **Comments:** None
37.33–40.58	No recovery

G–3889 Test Corehole	
40.58–41.88	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Skeletal wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. burrow mottling; rhizoliths (with alveolar-septal fabric occurring with many of the rhizoliths) **Carbonate grains:** Small peloids, pelecypods, ostracods, miliolids, archaiasinids, echinoid spines **Accessory grains:** 10–15% quartz grains, very fine to coarse sand size, poorly sorted; 1% dark minerals **Porosity and permeability:** 3–5% moldic; 10–50% vertical solution pipe from 41.00 to 48.60 feet, irregular vugs, and vugs related to burrows; relatively high horizontal permeability and very high vertical permeability **Comments:** Marginal-marine equivalent to transgressive *Planorbella* floatstone and rudstone that commonly occurs at the base of the MIS9a high-frequency cycle. Rhizoliths with alveolar fabric are indicative of subaerial exposure bounding the upper surface of this interval
41.88–42.95	No recovery
42.95–44.78	**Lithofacies:** Arenaceous skeletal packstone and grainstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. 1/2 inch-scale-wide rhizoliths with some filled or partly filled with allochthonous quartz sand and 0.2 inch-wide rhizoliths that form a sparse pedotubule calcrete **Carbonate grains:** Pelecypods, gastropods, other skeletal fragments **Accessory grains:** 25% quartz grains, very fine to coarse sand size, poorly sorted; 1% dark minerals **Porosity and permeability:** 10% moldic; 5–35% vertical solution pipe from 41.00 to 48.60 feet and irregular vugs; relatively moderate horizontal permeability and very high vertical permeability **Comments:** Karstic vertical solution pipes extended downward from the upper bounding surface for at least 3.5 feet and pedotubule calcrete is indicative of subaerial exposure bounding the upper bounding surface of this interval. Top of interval is top of HFC 2 high-frequency cycle
44.78–46.10	No recovery
46.10–48.39	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous skeletal quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrow mottled, rhizoliths **Carbonate grains:** Minor pelecypods, echinoid spines and plates, ostracods **Accessory grains:** 85% quartz grains, very fine sand size to granule size, poorly sorted; <1% dark minerals **Porosity and permeability:** 3% moldic, 5% intergranular, 5–30% vertical solution pipe from 41.00 to 48.60 feet, irregular vugs, and at the base of the interval vugs related to burrows; relatively moderate horizontal permeability and very high vertical permeability **Comments:** None
48.39–51.28	No recovery—abrupt contract and lithofacies shift indicative of a high-frequency cycle top at 50.72 feet on digital optical borehole wall image. May be correlative to maximum flooding surface defined in the Snapper Creek Well Field area, where it overlies a freshwater *Planorbella* floatstone and rudstone
51.28–51.98	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod rudstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a medium bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed, rhizoliths **Carbonate grains:** Pelecypods, bryozoans, skeletal fragments **Accessory grains:** 15–65% quartz grains, very fine to medium sand size, moderate to well sorted; <1% dark minerals **Porosity and permeability:** 15% moldic; probable 20–35% burrow related vugs and irregular vugs; relatively high permeability **Comments:** Core rubble zone

G–3889 Test Corehole	
51.98–53.63	**Lithofacies:** *Planorbella* floatstone and rudstone **Depositional texture:** *Planorbella* floatstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Cracks probably related to drying of muddy sediment, thickly bedded **Ichnofabrics:** Ichnofabric index 5. Rhizoliths and burrows **Carbonate grains:** Gastropods (including minor *Planorbella*, ostracods, rare pelecypods **Accessory grains:** Variable concentrations of quartz grains with about 1% in the rock matrix, but up to 80% within sediment-infills of vugs and root molds; trace of dark minerals **Porosity and permeability:** 3–5% moldic; 15% thin solution pipes in upper part of interval, irregular vugs; relatively low permeability **Comments:** Brackish mudstone high-frequency cycle cap and cycle boundary at 51.98 feet. Thin karst vertical solution pipes and rhizoliths partly filled with allochthonous quartz sandstone or sand. Upper bounding surface is a subaerial exposure surface
53.63–53.86	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous skeletal quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded unit **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Minor pelecypod fragments **Accessory grains:** 70% quartz grains, very fine and medium sand size, poorly sorted; 1% dark minerals **Porosity and permeability:** Very low porosity and relatively low permeability **Comments:** None
53.86–54.42	No recovery
54.42–54.50	**Lithofacies:** Pelecypod floatstone and rudstone **Depositional texture:** Pelecypod floatstone and rudstone **Color:** Very pale orange (10YR 8/2) **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypod fragments (abundant *Chione*) **Accessory grains:** 70% quartz grains, very fine and medium quartz grains, poorly sorted; 1% dark minerals **Porosity and permeability:** Very low porosity and relatively low permeability **Comments:** None
54.50–55.85	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded unit **Ichnofabrics:** Ichnofabric index 5. Burrow mottled, rhizoliths **Carbonate grains:** Pelecypods, benthic foraminifera (including archaiasinids, peneroplids) **Accessory grains:** 60% quartz grains, very fine to very coarse sand size, poorly sorted; trace of dark minerals **Porosity and permeability:** 3% moldic, 5% intergranular, 2% irregular vugs; relatively low permeability **Comments:** Upper bounding surface contains a trace of calcrete, indicative of subaerial exposure. Also, abrupt contact and facies shift across upper bounding surface. *Chione* floatstone overlies this boundary. High-frequency cycle top at 54.50 feet
55.85–56.60	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod rudstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrow mottling, rhizoliths **Carbonate grains:** Pelecypods, coral fragment, benthic foraminifera (including archaiasinids, peneroplids) **Accessory grains:** 35% quartz grains, very fine to medium sand size, moderately sorted; <1% dark minerals **Porosity and permeability:** 15% mainly fossil moldic, 15% irregular vugs; relatively moderate permeability **Comments:** Poor recovery due to vugs.

G–3889 Test Corehole	
56.60–57.60	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod rudstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrow mottling, rhizoliths **Carbonate grains:** Pelecypods **Accessory grains:** 75% quartz grains, very fine sand size to granule size, poorly sorted; <1% dark minerals **Porosity and permeability:** 25–35% mainly fossil moldic, 15% irregular vugs; relatively moderate permeability **Comments:** None
57.60–57.608	**Lithofacies:** Pedogenic limestone **Depositional texture:** Laminated calcrete and minor pedotubule calcrete **Porosity and permeability:** Mainly microporosity, relatively low permeability **Comments:** Upper bounding surface is a subaerial exposure surface and high-frequency cycle top at 57.60 feet. Major facies shift between overlying interval and underlying interval. Appears to represent a major exposure event
57.608–58.20	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous pelecypod sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrow mottling, rhizoliths **Carbonate grains:** Pelecypods, other skeletal fragments **Accessory grains:** 75% quartz sand, very fine sand size to granule size, poorly sorted; <1% dark minerals **Porosity and permeability:** 10% moldic, 5% intergranular, 1–10% irregular vugs; relatively low to moderate permeability **Comments:** Karstic solution voids and fill below overlying calcrete are part of an amalgamated subaerial exposure
58.20–60.65	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Pelecypod-bearing quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrow mottled **Carbonate grains:** Pelecypods, echinoid spines and plates, serpulid tubes? **Accessory grains:** 85% quartz grains, very fine to coarse sand size, poorly sorted; <1% dark minerals **Porosity and permeability:** 5–7% moldic, 5% intergranular, 1–10% irregular vugs; relatively low to moderate permeability **Comments:** None
60.65–61.81	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypods, gastropods **Accessory grains:** 45% quartz grains, very fine to medium sand size, poorly sorted; <1% dark minerals **Porosity and permeability:** 3–5% moldic; 15–40% irregular vugs; relatively high permeability **Comments:** None
61.81–64.50	No recovery
64.50–65.10	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod, bryozoan packstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypods, gastropods, *Schizoporella* **Accessory grains:** 40% quartz grains, very fine to medium sand size, poorly sorted; 1–2% dark minerals **Porosity and permeability:** 10–15% moldic; 15% vuggy; relatively low permeability **Comments:** None

G–3889 Test Corehole	
65.10–68.84	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrow mottling, semivertical rhizoliths (up to three inches in length) **Carbonate grains:** Pelecypods, echinoid spines and plates, benthic foraminifera (*Elphidium*, *Ammonia*, minor archaiasinids) **Accessory grains:** 40–45% quartz grains, very fine to fine sand size, well sorted; <1% dark minerals **Porosity and permeability:** 5–7% moldic; 1–15% vugs related to burrows at base of interval; relatively low permeability **Comments:** Karsted and calcretized surface at upper bounding surface
68.84–71.25	No recovery
71.25–73.18	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Pelecypods, other skeletal fragments **Accessory grains:** 15% quartz grains, very fine to medium-grained quartz grains, moderately sorted; <1% dark minerals **Porosity and permeability:** 2–10% moldic, 5–20% irregular vugs; relatively moderate permeability **Comments:** Chalky weathering(?) texture
73.18–74.34	**Lithofacies:** Skeletal wackestone and packstone **Depositional texture:** Pelecypod wackestone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrows, rhizoliths **Carbonate grains:** Pelecypods, gastropods, other skeletal fragments **Accessory grains:** 15% quartz grains, very fine to medium sand size, poorly sorted; <1% dark minerals **Porosity and permeability:** 5% moldic; 2% irregular vugs; relatively moderate permeability **Comments:** None
74.34–78.90	**Lithofacies:** Coral boundstone (*Montastrea annularis* dominant) **Depositional texture:** *Montastrea annularis* framestone **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrows, coral heads are bored by possible Lithophaga borings **Carbonate grains:** Pelecypods, gastropods, head corals (mainly *Montastrea annularis*, *Porites* asteroides) and minor branching corals, rhodoliths, echinoid spines, discoid large benthic foraminifera (including archaiasinids), echinoid spines **Accessory grains:** 5–7% quartz grains, very fine to medium sand size, poorly to moderately sorted; <1% dark minerals **Porosity and permeability:** 10% moldic; 1–15% irregular vugs; relatively moderate permeability **Comments:** None
78.90–81.60	**Lithofacies:** Arenaceous pelecypod floatstone and rudstone **Depositional texture:** Arenaceous pelecypod, oyster floatstone with a skeletal packstone matrix **Color:** Very pale orange (10YR 8/2) and grayish orange (10YR 7/4) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrow mottling, rhizoliths **Carbonate grains:** Dominated by pelecypods (including oysters) with minor serpulid worm colonies, barnacles (*Balanus*) **Accessory grains:** 40 % quartz grains, very fine to very coarse sand size, poorly sorted; subangular to subrounded; 1–2% dark minerals **Porosity and permeability:** 5–10% moldic; 25% irregular vugs, minor fracture porosity; relatively moderate permeability **Comments:** Coarse and very coarse quartz grains are abundant and appear to be concentrated in sediment-filled karst cavities and fractures. Upper bounding surface appears to be a major unconformity with allochthonous fill of the associated karst cavities and fractures. Top of Tamiami Formation at 78.90 feet

G–3889 Test Corehole	
81.60–84.90	No recovery, abundant thalassinidean or thalassinidean-like crustacean burrow related porosity and relatively high permeability
84.90–87.06	**Lithofacies:** Skeletal quartz sand and skeletal quartz sandstone **Depositional texture:** Calcareous skeletal quartz sand and calcareous quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed by thalassinidean or thalassinidean-like crustaceans **Carbonate grains:** Dominated by pelecypods, other skeletal fragments **Accessory grains:** 99% quartz grains, very fine to coarse sand size, poorly to moderately sorted; 1% dark minerals **Porosity and permeability:** 5% moldic, 10–15% intergranular, 35% vugs related to burrows; relatively low permeability **Comments:** Very friable; could possibly be sand caved in from uphole
87.06–89.67	No recovery
89.67–90.35	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous skeletal quartz sandstone **Color:** Very pale orange (10YR 8/2) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5 **Carbonate grains:** Dominated by pelecypods, other skeletal fragments **Accessory grains:** 95% quartz grains, very fine to medium sand size, moderately sorted; 1–2% dark minerals **Porosity and permeability:** 3% moldic, 10% intergranular, 5% vugs related to burrows; relatively low permeability **Comments:** None
90.35–92.85	No recovery
92.85–94.40	**Lithofacies:** Arenaceous skeletal wackestone and packstone **Depositional texture:** Arenaceous pelecypod packstone **Color:** Very pale orange (10YR 8/2) and greenish gray (5YG 6/1) rubble **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Burrowed **Carbonate grains:** Dominated by pelecypods **Accessory grains:** 45% quartz grains, very fine to coarse sand size, poorly to moderately sorted; 3% dark minerals **Porosity and permeability:** 3–5% moldic; 5% vugs related to burrows; relatively low permeability **Comments:** None
94.40–94.46	**Lithofacies:** Pedogenic limestone **Depositional texture:** Massive calcrete riddled with rhizoliths with concentric micrite and minor probable alveolar septal fabric **Comments:** Intra-Tamiami Formation subaerial exposure and cycle top
94.46–96.32	No recovery
96.32–97.54	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous skeletal quartz sandstone **Color:** Greenish gray (5YG 6/1) and white (N9) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Mainly burrows produced by thalassinideans or thalassinidean-like crustaceans **Carbonate grains:** 10% pelecypods **Accessory grains:** 85% quartz grains, very fine to coarse sand size, poorly to moderately sorted; 5% dark minerals **Porosity and permeability:** 5% moldic, 10% intergranular; relatively low permeability **Comments:** Quartz grains are contained in a lime mud matrix
97.54–99.20	No recovery

G–3889 Test Corehole	
99.20–102.80	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous skeletal quartz sandstone **Color:** Greenish gray (5YG 6/1) and white (N9) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Mainly burrows produced by thalassinideans or thalassinidean-like crustaceans, *Ophiomorpha* **Carbonate grains:** 15% pelecypods, gastropods, echinoid plates **Accessory grains:** 80% quartz grains, very fine to very coarse sand size, moderate to poorly sorted; 5% dark minerals **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Friable
102.80–105.48 TD	**Lithofacies:** Skeletal quartz sandstone **Depositional texture:** Calcareous skeletal quartz sandstone **Color:** Greenish gray (5YG 6/1) **Sedimentary structures/textures:** Part of a very thickly bedded interval **Ichnofabrics:** Ichnofabric index 5. Mainly burrows produced by thalassinideans or thalassinidean-like crustaceans, common *Ophiomorpha* with narrow to moderate inner burrow diameter **Carbonate grains:** 5% small pelecypod fragments (few complete shells), gastropods, amphisteginids **Accessory grains:** 90% quartz grains, very fine to very coarse sand size, poorly sorted, angular to subangular; 5% dark minerals **Porosity and permeability:** 25% intergranular; relatively low permeability **Comments:** Massive bedded; friable