



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-06

SHEET 1 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION : 42.8 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 2-15/16" tri-cone bit

ORIENTATION : Vertical

WATER LEVELS : 5.5 ft bgs on 5/02/07

START : 5/2/2007

END : 5/4/2007

LOGGER : C. Sump

WATER LEVEL: 1.04 RBG ON 02/20/17		START: 1/12/2007		END: 1/24/2007		ECCENTRIC CAMP	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
42.8	0.0	1.1	SS-1	1-1-2 (3)	Poorly Graded Sand With Silt (SP-SM) 0.0-1.1' - brownish black, (5YR 2/1), moist, very loose, very fine to fine grained, color grades to light gray (N7) below 0.6', 6% nonplastic fines, organics decreasing with depth, silica sand		
	1.5						
5	5.0						
37.8		1.0	SS-2	1-3-4 (7)	Sandy Fat Clay (CH) 5.0-6.0' - very light gray, (N8), moist, medium stiff, high plasticity, no dilatancy, with iron oxide staining (5.0-5.3'), 25-30% very fine grained, trace organic particles, silica sand		
	6.5						
10	10.0						
32.8		1.5	SS-3	1-2-3 (5)	Sandy Lean Clay (CL) 10.0-11.5' - Same as 5.0-6.0' except thin light gray, (N7), medium plasticity, 41% fine sand, sandy seams		
	11.5						
15	15.0						
27.8		1.1	SS-4	1-4-7 (11)	Sandy Fat Clay (CH) 15.0-15.2' - Same as 5.0-6.0' Silt (ML) 15.2-16.1' - grayish orange, (10YR 7/4), moist, soft, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 5% very fine sand-sized, carbonate material		First reaction to HCl
	16.5						
20							



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-06

SHEET 2 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION : 42.8 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 2-15/16" tri-cone bit

ORIENTATION : Vertical

WATER LEVELS : 5.5 ft bgs on 5/02/07

START : 5/2/2007

END : 5/4/2007

LOGGER : C. Sump

WATER LEVELS : 3.51 RDS ON 9/2/07			START : 9/2/2007			END : 9/4/2007			LOGGER : G. Gump		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS		SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS			
			RECOVERY (ft)	#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
22.8	20.0	1.3	SS-5	3-4-5 (9)	Clayey Sand (SC) 20.0-21.3' - yellowish gray, (5Y 8/1), moist to wet, loose, very fine to fine grained, no HCl reaction, 18% medium to high plastic fines, silica sand						
	21.5										
25	25.0										
17.8		1.3	SS-6	8-20-49 (69)	Clayey Sand (SC) 25.0-25.2' - Same as 20.0-21.3' except dark yellowish brown, (10YR 4/2), clay lens Silty Sand With Limestone (SM) 25.2-26.3' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), moist to wet, very dense, low plasticity, moderate HCl reaction, 15-20% low plastic fines, fine gravel-sized limestone, fine to coarse sand-sized, carbonate materials						
	26.5										
30	30.0										
12.8		1.5	SS-7	31-31-55 (86)	Silty Sand With Limestone (SM) 30.0-31.1' - Same as 25.2-26.3' Silt (ML) 31.1-31.5' - light brown, (5YR 6/4), moist, hard, low plasticity, rapid dilatancy, mild HCl reaction, trace very fine sand-sized, carbonate material						
	31.5										
35	35.0										
7.8		1.3	SS-8	39-47-45 (92)	Silty Sand (SM) 35.0-36.3' - dark yellowish brown, (10YR 4/2), moist, very dense, fine to coarse grained, mild to moderate HCl reaction, 30% nonplastic fines, trace to 10% fine gravel-sized limestone, carbonate material						
	36.5										
40											



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-06

SHEET 3 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION : 42.8 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 2-15/16" tri-cone bit

ORIENTATION : Vertical

WATER LEVELS : 5.5 ft bgs on 5/02/07

START : 5/2/2007

END : 5/4/2007

LOGGER : C. Sump

WATER LEVELS : 3.51 bgs on 9/22/07							START : 3/2/2007		END : 3/4/2007		LOGGER : G. Gump	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS		SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS				
			RECOVERY (ft)	#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
2.8	40.0 40.6	0.6	SS-9	56-50/1 (106/7")	Sandy Silt (ML) 40.0-40.6' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), mottled, moist, hard, fine to coarse grained, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 38% fine to coarse sand-sized, trace fine gravel-sized, carbonate material							
45	45.0											
-2.2	45.8	0.3	SS-10	36-50/4 (86/10")	Sandy Silt (ML) 45.0-45.8' - Same as 40.0-40.6' except 1/4" thick vertically extended black organic seam from 45.4-45.8'							
50	50.0											
-7.2	51.5	0.2	SS-11	25-43-45 (88)	Sandy Silt (ML) 50.0-51.2' - yellowish gray, (5Y 7/2), moist, hard, fine to coarse grained, nonplastic, rapid dilatancy, mild HCl reaction, 33% fine to coarse sand-sized, trace gravel-sized, carbonate material, trace organics							
55	55.0											
-12.2	55.8	0.8	SS-12	43-50/4 (93/10")	Silt With Sand (ML) 55.0-55.8' - Same as 50.0-51.2' except grading to moderate brown, (5YR 4/4), 10-15% sand-sized and thin organic lenses							
60												



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-06

SHEET 4 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION : 42.8 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 2-15/16" tri-cone bit

ORIENTATION : Vertical

WATER LEVELS : 5.5 ft bgs on 5/02/07

START : 5/2/2007

END : 5/4/2007

LOGGER : C. Sump

WATER LEVELS : 3.511 bgs on 9/2/07			START : 9/2/2007		END : 9/4/2007		LOGGER : G. Gump	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS	
	RECOVERY (ft)	#TYPE		6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
-17.2	60.0	0.1	SS-13	50/1.5 (50/1.5")	Limestone Fragments 60.0-60.1' - yellowish gray, (5Y 7/2), fine to coarse grained, mild to moderate HCl reaction, sand-sized fragments			
65 -22.2	65.0 65.2	0.2	SS-14	50/2.0 (50/2.0")	Limestone Fragments 65.0-65.2' - Same as 60.0-60.1'			
					Begin Rock Coring at 66.0 ft bgs See the next sheet for the rock core log			
70 -27.2								
75 -32.2								
80								

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION : 42.8 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER LEVELS : 5.5 ft bgs on 5/02/07

START : 5/2/2007

END : 5/4/2007

LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)		CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY		COMMENTS
			R Q D (%)	FRACTURES PER FOOT		DESCRIPTION	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	
						DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		
70 -27.2	66.0	R1-NQ 5 ft 78%	8	5	66.0' - Fracture, horizontal, rough 66.2' - Fracture, horizontal, rough 66.4' - Fracture, 45 deg, rough, semi planar 66.6, 66.8, 67.3' - Fracture, 45 deg and 60 deg, non-planar		Limestone 66.0-69.9' - pale yellowish brown, (10YR 6/2), fine to medium grained, strong HCl reaction, weak (R2), dissolution along bedding plane lamination, spaced (1/16"-1/4"), voids (1/16"-3/16") cover 10% surface	Numerous low angle to vertical healed fractures
				1				
				4	68.1-68.2' - sandy interbed 68.1, 68.5, 68.8, 68.9' - Fracture (4), rough, undulating, irregular, non-planar 69.0-69.9' - Fracture zone (>10)			
				>10				
				NR				
	71.0	R2-NQ 5 ft 72%	23	>10	71.0-72.0' - Fracture zone, fragments		Limestone 71.0-72.3' - Same as 66.0-69.9' except very weak (R1), increasing percent small voids, friable 72.3-75.6' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, very weak to weak (R1 to R2), finely laminated, trace voids/cavities, dissolution texture along the bedding plane (1/4" thick)	0.5" organic seam
				>10	72.0-73.0' - Fracture zone, fragments			
				1	73.1' - Fracture, vertical, rough, undulating			
				7	74.1, 74.2, 74.4, 74.5, 74.6, 74.8, 74.8, 74.9' - Bedding plane or mechanical break (8), <5 deg, rough, planar, open <1/16"			
				2	75.1-75.2' - Fracture or mechanical break, 80 deg and vertical, rough, planar, tight			
76.0	R3-NQ 5 ft 46%	33	0	77.7-78.1' - Fracture zone, <1/2" fragments	No Recovery 75.6-76.0' Limestone 76.0-78.3' - grayish yellow to orangish gray, (5Y 8/4 to 10YR 7/4), strong HCl reaction, weak (R2), voids (up to 1/16") cover 15-20% of the surface, cavities up to 3/4" diameter (10-20 per foot), fossil molds and solution cavities, dark brown /black staining on some larger cavities, light to dark gray fine grained inclusions, rip up clasts between 77.0-77.5', needle-like organic imprints on fracture surface, dark brown layering visible over 3/4" zone	Intact core 19.2" (76.1-77.7") break to reduce size SC-1 collected at 76.1-76.9'		
			>10					
			0					
			NR					
			NR					
81.0	R4-NQ 5 ft 60%	37	4	81.1, 81.2, 81.4, 81.5' - Fracture or mechanical break (4), rough, irregular	No Recovery 78.3-81.0' Limestone 81.0-84.0' - Same as 76.0-78.3' except strong HCl reaction, voids (1/16") and cavities cover 15-25% of the surface, fossiliferous with molds and casts (lot more than molds)	R3: 4 minutes		
			2	82.1' - Fracture, rough, planar, dark gray/black, possible organic pyrite 82.4' - Fracture, rough, undulating				
			>10	82.9-83.3' - Fracture zone, percent of large cavities (>1/2") increasing in this zone				
			NR					
			NR					
85 -42.2	86.0				No Recovery 84.0-86.0'	R4: 4 minutes		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-06

SHEET 6 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION : 42.8 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER LEVELS : 5.5 ft bgs on 5/02/07

START : 5/2/2007

END : 5/4/2007

LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
90 -47.2	R5-NQ 5 ft 26%	7	NR			No Recovery 86.0-89.7'	Driller's Remark: 86.0-89.5' very soft; possible void, lost 20 % circulation, no recovery likely in this zone
91.0			>10	89.9' - Discontinuity (sharp) between moderately dense limestone and limestone with large percent voids, possible missing material		Limestone 89.7-89.9' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, medium strong (R3), fossiliferous, voids (1/16"-1/8") cover 15-20% of the surface, trace oval cavities (up to 1/2") (possible fossil molds) molds and casts, black infilling in some voids, sharp contact with below	R5: 3 minutes
95 -52.2	R6-NQ 5 ft 70%	15	2	89.9-91.0' - Fracture, rough, irregular fractures on 2-4" core pieces, 1"-2" zone of fragments 1/2"-1-1/2" in size (upper weathered/bleached)		89.9-91.2' - yellowish gray to pale olive, (5Y 7/2 to 10 Y 6/2), medium strong (R3), fossiliferous, voids (1/4"-3/4" solution cavities) cover 25-30% of the surface, smaller fragments appear weathered or bleached possible void related, dark black (possible lignite) and light gray fine (silt sized) infilling in some voids	Clay interbed 91.7-92.2'
96.0			2	91.0-91.2' - Fracture zone, 3/4"-1-3/45" size fragments		91.2-91.7' - Same as 89.9-91.2' except yellowish gray, (5Y 7/2), very fine to fine grained, 1/16"-1/8" voids cover the surface	SC-2 collected at 92.6- 93.4'
			1	91.6' - Fracture or mechanical break, rough, undulating		Lean Clay (CL) 91.7-92.2' - yellowish gray, (5Y 7/2), medium plasticity, strong HCl reaction, few gravel-sized (1/4"-3/4") limestone fragments at 91.7-91.8', 25% fine silt	R6: 8 minutes Steady drill rate across run
			NR	91.7, 92.2' - Fracture, sharp contact between limestone and gravelly lean clay (CL) interbed		92.6-93.5' - yellowish gray, (5Y 7/2), strong HCl reaction, medium strong to strong (R3 to R4), fine grained silt	Driller's Remark: 100% loss of circulation at 97.0' below ground surface
			0	92.7' - Fracture, planar and stepped, parting surface on end of core piece, fine laminations		Limestone 92.2-92.6' - yellowish gray, (5Y 7/2), fine grained, weak (R2), finely laminated (1/10"-1/4")	R7: 3 minutes Driller's Remark: Possible void 100.0-102.0'
100 -57.2	R7-NQ 5 ft 14%	11	NR	93.5' - silt interbed (nonplastic)		Silt (ML) 93.5-93.9' - moderate yellowish brown, (10YR 5/4), nonplastic, few gravel-sized (1/16-3/16") limestone fragments (<10%)	Driller's Remark: Void at 100.0-102.0' based on barrel advancement ("fell"), setting temporary casing at 106.0'
101.0			0	93.9' - sharp contact with limestone		Limestone 93.9-94.5' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, weak (R2), small voids cover 20-30% of surface	R7: 3 minutes Driller's Remark: Possible void 100.0-102.0'
105 -62.2	R8-NQ 5 ft 20%	0	NR	94.1' - Fracture or mechanical break, vertical, rough, undulating		No Recovery 94.5-96.0'	R8: 4 minutes
106.0							



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-06

SHEET 7 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION : 42.8 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER LEVELS : 5.5 ft bgs on 5/02/07

START : 5/2/2007

END : 5/4/2007

LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
110 -67.2	R9-NQ 5 ft 84%	39	1	106.8-107.7' - Fracture zone, limestone fragments		Limestone 96.0-96.7' - pale yellowish brown, (10YR 6/2), strong HCl reaction, very weak (R1), fossiliferous, up to 1/16" voids cover 20-25% of surface, cavities/molds up to 1/2" cover 5-7%, easily broken by hand, punky texture No Recovery 96.7-102.0' Limestone Fragments 102.0-103.0' - Same as 96.0-96.7' except yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), 1"-2" fragments, medium strong to strong, almost conchoidal fracture No Recovery 103.0-106.0' Limestone 106.0-110.2' - grayish orange, (10YR 7/4), strong HCl reaction, very weak (R1), voids (1/16"-1/8") cover 10-15% of the surface, larger cavities/fossil molds (up to 1/2") cover less than 5% (variably spaced) but in concentrated in zones, white chalky carbonate infilling in some cavities/molds, limestone 1-1/2" fragments from 107.0-107.7', 1/2"-1" horizontal partings (bedding plane) from 107.7-108.5' No Recovery 110.2-111.0' Limestone 111.0-112.0' - Same as 106.0-110.2' except 1/2"-2" horizontal partings Silt (ML) 112.0-112.6' - grayish orange, (6YR 7/4), nonplastic, strong HCl reaction Limestone 112.6-113.1' - Same as 111.0-112.0' No Recovery 113.1-116.0' Limestone 116.0-120.9' - very pale orange, (10YR 8/2), medium to coarse grained, strong HCl reaction, very weak to weak (R1 to R2), up to 1/16" size voids cover 25% of the surface, 1/4" cavities and fossil molds cover up to 5% surface No Recovery 120.9-121.0' Limestone 121.0-126.0' - Same as 116.0-120.9' except slightly more competent, 123.5-126.0' zone of weak rock (R2)	R9: 5 minutes
			>10	107.7-108.5' - Bedding plane, horizontal, smooth to slightly rough, planar, 1/2"-1" spacing			
			>10				
			1	109.4, 110.0' - Fracture (2), horizontal, rough, undulating			
			1				
			NR				
111.0			>10	111.0-112.0' - Bedding plane, <5 deg, rough, planar, 1/2"-2" spacing, open to 1/8"			
			0				Driller's Remark: 112.5-114.0' possible void
115 -72.2	R10-NQ 5 ft 42%	0					R10: 2 minutes
			NR				
116.0							
			2	116.0-116.2' - Fracture zone, limestone fragments		Limestone 111.0-112.0' - Same as 106.0-110.2' except 1/2"-2" horizontal partings Silt (ML) 112.0-112.6' - grayish orange, (6YR 7/4), nonplastic, strong HCl reaction Limestone 112.6-113.1' - Same as 111.0-112.0' No Recovery 113.1-116.0' Limestone 116.0-120.9' - very pale orange, (10YR 8/2), medium to coarse grained, strong HCl reaction, very weak to weak (R1 to R2), up to 1/16" size voids cover 25% of the surface, 1/4" cavities and fossil molds cover up to 5% surface No Recovery 120.9-121.0' Limestone 121.0-126.0' - Same as 116.0-120.9' except slightly more competent, 123.5-126.0' zone of weak rock (R2)	Easily broken by hand "rotten rock"
			3	116.2, 116.7, 117.1, 117.2, 117.6, 118.0, 118.5, 118.8, 119.2, 119.3' - Bedding plane (10), horizontal, rough, undulating			
			3				
120 -77.2	R11-NQ 5 ft 98%	70	2	119.7-119.9' - Fracture zone, limestone fragments			
			2	120.2' - Fracture (60), rough, semi planar			R11: 4 minutes
			NR	120.9' - Bedding plane, horizontal, slightly rough, planar			
			4	121.3, 121.7, 121.8' - Fracture (3), horizontal, rough, undulating			
			2	121.9' - Fracture, 30 deg, rough, undulating			
			0	122.2' - Fracture, 45 deg, rough, semi planar			
			0	122.6' - Fracture, 45 deg, rough, semi planar			
125 -82.2	R12-NQ 5 ft 100%	60	2	124.4, 124.7, 125.3' - Fracture or bedding plane (3), horizontal, slightly rough, undulating, open to <1/8"			R12: 4 minutes
			1				
126.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-06
SHEET 9 OF 11	
ROCK CORE LOG	

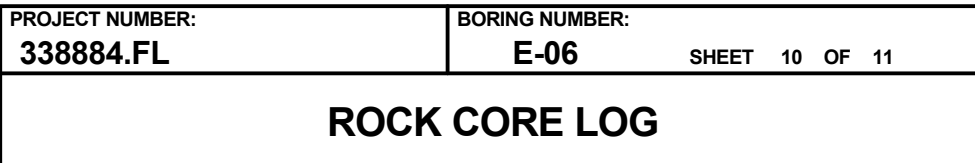
PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION : 42.8 ft (NAVD88) DRILLING CONTRACTOR : Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
150 -107.2	R17-NQ 5 ft 74%	29	>10	146.0-147.0' - Bedding plane, horizontal, planar, numerous partings spaced at 1/2"-1-1/2" apart		Limestone 146.0-147.0' - dark yellowish orange, (10YR 8/6), coarse grained, strong HCl reaction, weak (R2), friable disaggregates into medium sand-sized particles, numerous small voids over 30% of surface 147.0-149.4' - medium gray to yellowish gray, (N5 to 5Y 7/2), very fine to fine grained, mild HCl reaction, medium strong (R3), 1/16"-3/16" size voids concentrated in thin (<1/10") horizontal zones spaced at 6"-1.2' apart 149.4-149.7' - moderate yellow brown and yellowish gray, (10YR 5/4), laminated, contorted wavy bedding planes No Recovery 149.7-151.0' Limestone 151.0-155.5' - light olive gray to yellow gray, (5Y 5/2 to 5Y 7/2), moderate HCl reaction, very weak to weak (R1 to R2), sparse voids (1/16"-1/8"), and cavities (up to 1/2") above 152.5', percent of voids increase beyond 152.5', 25-30% porous by volume, somewhat friable disaggregates into medium sand-sized particles, voids/cavities oriented horizontally, cavities increase in size (up to 1-1/4") with depth No Recovery 155.5-156.0' Limestone Fragments 156.0-156.4' - Same as 151.0-155.0' except slough Limestone 156.4-157.7' - very pale orange, (10YR 8/2), fine to medium grained, strong HCl reaction, weak (R2), very small voids (1/16"), fossiliferous (1/16"-1/8") 157.7-159.0' - yellowish gray to grayish yellow, mottled with light gray, (5Y 7/2 to 5Y 8/2 mottled with N7), very fine to medium grained, strong HCl reaction, medium strong (R3), sharp contact No Recovery 159.0-161.0' Limestone 161.0-162.4' - medium gray, (N 5), moderate HCl reaction, medium strong (R3), with thin yellowish gray lamination zones of small cavities (<3/4"), 6"-8" spacing otherwise tight and dense, sharp contact	SC-4 collected at 148.3-149.4' R17: 7 minutes
			2	147.3' - Fracture, 60 deg, rough, undulating, semi planar fracture			
			2	147.6' - Fracture, 30 deg, rough, semi planar			
			2	148.2' - Fracture, 10 deg, rough, planar			
			3	148.3' - Fracture, 50 deg, slightly rough, semi planar			
155 -112.2	R18-NQ 5 ft 90%	33	NR	149.4-149.7' - Bedding plane, horizontal, planar			
			2	151.1' - Fracture, horizontal, rough, undulating			
			3	151.3' - Fracture, vertical, rough, undulating to non planar, 3" long			
			9	152.1' - Fracture or mechanical break, 60 deg, rough, undulating			
			4	152.1, 152.5' - Fracture, horizontal, rough			
160 -117.2	R19-NQ 5 ft 60%	35	3	153.0, 155.5' - Fractures (2), horizontal, rough, planar to undulating			R18: 5 minutes Redox changes possibly R19: 7 minutes
			NR				
			2	156.0-156.4' - Fracture zone, limestone fragments			
			1	156.4, 156.7' - Bedding plane, horizontal, smooth, planar			
			1	157.5' - Fracture or mechanical break, 15 deg, rough, undulating			
165 -122.2	R20-NQ 5 ft 88%	0	1	157.7' - Fracture, sharp contact with grayish yellow limestone (surfaces do not match)			
			NR	158.9' - Fracture, horizontal, smooth, planar			
			4				
			3	161.3, 161.4, 161.5' - Bedding plane (3), horizontal, smooth, planar			
			>10	161.9' - Fracture, horizontal, rough, planar			
166.0			>10	162.5-162.6' - Fracture zone, contact with olive brown limestone, limestone fragments		Change in redox conditions R20: 9 minutes	
			>10	162.7' - Fracture or mechanical break, vertical			
			>10	162.9' - Fracture, horizontal, rough, non planar			
			>10	163.3, 163.4, 163.5, 163.6' - Fracture (4), horizontal, smooth, planar			
			NR	163.5-163.8' - Fracture zone, limestone fragments			



ELEVATION : 42.8 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER LEVELS : 5.5 ft bqs on 5/02/07

START : 5/2/2007

END : 5/4/2007

LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)		CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY		COMMENTS		
			R Q D (%)	FRACTURES PER FOOT		DESCRIPTION	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS			
						DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
170 -127.2	R21-NQ 5 ft 88%	40	>10	164.2-165.4' - Fracture, <25 deg and >70 deg, non planar		Limestone 162.4-163.4' - moderate olive brown, (5Y 4/4), medium strong to strong (R3 to R4), voids (1/16-1/8") cover 20-30% of surface, horizontally oriented cavities (up to 1") in zones, thin medium gray limestone fragments 163.4-163.6' - medium strong to strong (R3 to R4) 163.6-165.4' - moderate olive brown, (5Y 4/4), coarse grained, moderate HCl reaction, medium strong (R3), fossiliferous, voids (1/16-1/4") cover 5-25% of surface No Recovery 165.4-166.0' Limestone 166.0-170.4' - grayish yellow, (5Y 8/4), fine grained, weak (R2), poorly fossiliferous, 1/16"-1/8" voids over less than 10% of surface in thin zones (1/2"-1-1/2" thick) on 1.0-1.5' spacing, cavities (up to 1/2") sparse and occur in zones with higher void content, thinly bedded zones 4"-6" thick on 2.0-3.0' intervals, with fine grained zones rock is weak (R2) to medium strong (R3) No Recovery 170.4-171.0' Limestone 171.0-174.4' - grayish yellow grading to yellowish gray, (5Y 8/4 to 5Y 7/2), fine grained, moderate to strong HCl reaction, weak (R2), finer grained than above, voids (1/16"-1/8") concentrated in thin horizontal zones along bedding plane/lamination (1/16"-1/4") and very thin beds (1/2"-1-1/2") void rich zones, fine grained laminated zones, high void zones spaced at 1.0' No Recovery 174.4-176.0' Limestone 176.0-178.3' - moderate olive brown, (5Y 4/4), weak (R2), cavities ranging in size from 1/4"-1" cover 5-8% of surface, cavities elongated in horizontal direction, horizontal partings 1"-2" spacing in 177.3-178.3' 178.3-178.6' - moderate yellowish gray, (5Y 7/2), very fine to fine grained, mild HCl reaction, medium strong to strong (R3 to R4), sharp contact with the above, interbed 178.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong HCl reaction, weak (R2), 1/16"-1/8" size voids cover 20-30% of surface, porous, laminated No Recovery 180.4-181.0'	R21: 10 minutes			
			>10	166.0-166.5' - Fracture zone, limestone fragments						
			4	166.5' - Fracture or mechanical break, horizontal, rough, undulating 167.1-167.4' - Bedding plane, horizontal, smooth, 3/4" thick limestone fragments 167.7' - Bedding plane, horizontal 168.4, 168.5' - Fracture (2), horizontal, rough						
			>10	168.5' - Fracture or mechanical break, 45 deg, smooth						
			2	168.9' - Fracture, horizontal, rough, undulating						
175 -132.2	R22-NQ 5 ft 68%	0	NR	169.1' - Bedding plane, horizontal, smooth 169.4' - Fracture, horizontal, fine grained limestone					R22: 10 minutes Start of shift 5/4/07	
			>10	169.4-169.7' - Bedding plane, horizontal, smooth, planar, limestone fragments (1/4"-1/2" thick)						
			>10	170.1-170.4' - Fracture, horizontal, slightly rough, fracture faces indicate partial recrystallization						
			>10	171.0-171.2' - Fracture zone, angular limestone fragments						
			>10	171.2, 171.4' - Fracture or mechanical break, horizontal, smooth, 45 deg fracture on 3" core piece						
180 -137.2	R23-NQ 5 ft 88%	42	NR	171.4-171.8' - Mechanical break, 80 deg, rough, undulating, fracture is on a 5" core piece					R23: 12 minutes	
			1	171.8' - Fracture, horizontal, rough						
			3	171.9' - Mechanical break, 45 deg, rough						
			5	172.1-172.2' - Fracture zone, limestone fragments						
			4	172.2-172.4' - Bedding plane, horizontal, smooth, planar, numerous partings across the zone, parting interval range from 1/4"-4" with most between 1/2"-2", laminated to very thinly bedded limestone						
185 -142.2	R24-NQ 5 ft 100%	30	2	176.3' - Fracture, horizontal, rough, undulating						
			NR	177.6, 177.7, 177.8' - Bedding plane (3), horizontal, smooth						
			1	178.0, 178.1, 178.15' - Bedding plane (3), horizontal, smooth						
			2	178.3' - Fracture, horizontal, smooth, planar, contact with fine grained limestone						
			9	178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone below						
	</									

