



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-16
SHEET 1 OF 10	
SOIL BORING LOG	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)
 ELEVATION : 42.7 ft (NAVD88) DRILLING CONTRACTOR : Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/5/07 START : 4/5/2007 END : 4/8/2007 LOGGER : A. Teal

WATER LEVELS : 2.5' bgs on 4/9/07			START : 4/9/2007		END : 4/9/2007		LOGGER : A. Earl	
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			
42.7	0.0	1.0	SS-1	0-2-3 (5)	Poorly Graded Sand With Organics (SP) 0.0-1.0' - black to light brownish gray, (N1 to 5YR 6/1), moist, loose, no HCl reaction, very fine to fine silica sand, trace nonplastic fines, 30-35% fine organics, trace roots		08:33 Water level at 2.5' below ground surface 3-7/8" tricone bit	
	1.5							
5	5.0							
37.7		0.3	SS-2	4-4-2 (6)	Sandy Lean Clay With Silt (CL-ML) 5.0-5.3' - greenish gray, (5G 6/1), wet, stiff, low to medium plasticity, slow dilatancy, no HCl reaction, 30-35% very fine silica sand, trace roots			
	6.5							
10	10.0							
32.7		0.8	SS-3	11-15-6 (21)	Silt And Limestone (ML) 10.0-10.8' - moderate yellow, (5Y 7/6), wet, very stiff, very fine grained, 10-15% sand, nonplastic, rapid dilatancy, strong HCl reaction, 50% limestone, light olive brown, fine to coarse gravel-sized, strong rock			
	11.5							
15	15.0							
27.7		1.0	SS-4	39-50/6 (89/12")	Silt And Limestone (ML) 15.0-16.0' - Same as 10.0-10.8'		Set casing to 20'	
	16.0							
20								



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-16
SHEET 2 OF 10	
SOIL BORING LOG	

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 ELEVATION : 42.7 ft (NAVD88) DRILLING CONTRACTOR : Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler
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 WATER LEVELS : 2.5 ft bgs on 4/5/07 START : 4/5/2007 END : 4/8/2007 LOGGER : A. Teal

WATER LEVELS : 2.51 TDS ON 4/9/07			START : 4/9/2007			END : 4/9/2007			LOGGER : A. Earl		
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				
22.7	20.0	0.1	SS-5	50/3.5 (50/3.5")	Limestone Fragments 20.0-20.1' - dark yellowish orange, (10YR 6/6), weak rock (R2), voids to 1/16", limestone fragments to 1/8"-1/2" Begin Rock Coring at 21.0 ft bgs See the next sheet for the rock core log		21.0': End soil sampling switch to rock coring				
25											
17.7											
30											
12.7											
35											
7.7											
40											



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-16

SHEET 3 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION : 42.7 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER LEVELS : 2.5 ft bgs on 4/5/07

START : 4/5/2007

END : 4/8/2007

LOGGER : A. Teal

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.
21.0	R1-NQ 5 ft 44%	0	>10	21.0-21.7' - Fracture zone, limestone fragments from gravel to cobble-sized		Limestone 21.0-23.2' - grayish orange, (10YR 7/4), medium grained, strong HCl reaction, extremely weak to very weak (R0 to R1), highly fossiliferous (molds/casts), voids (<1/16") over 70-75% of surface No Recovery 23.2-26.0'	Fossils including echinoids, gastropods and brachiopods R1: 2 minutes
			>10	21.7-22.7' - Fracture zone			
			0	22.9' - Fracture, 45 deg, rough, planar, open			
			NR				
25 17.7	R2-NQ 5 ft 80%	25	>10	26.0-26.9' - Fracture zone, limestone fragments from gravel to cobble-sized		Limestone 26.0-30.0' - Same as 21.0-23.2' except dusky yellow, (5Y 6/4) No Recovery 30.0-31.0'	R2: 2 minutes
			>10	27.3-28.8' - Fracture zone, fragments up to 1-1/2"			
			>10				
			4	29.4-29.7' - Fracture or mechanical break (4), horizontal and 15 deg, rough, undulating, open			
			NR				
30 12.7	R3-NQ 5 ft 70%	50	>10	31.0-32.5' - Fracture zone, limestone fragments from gravel to cobble-sized		Limestone 31.0-34.5' - moderate yellow and light olive gray, (5Y 7/6 and 5Y 5/2), light olive gray mottling from 32.6-33.4', fine grained, strong HCl reaction, weak to medium strong (R2 to R3), predominately weak rock, medium strong from 32.3-33.8', voids (<1/16") over 80% of surface, fossiliferous No Recovery 34.5-36.0'	11:06 Stopped drilling to remix mud Driller's Remark: Lost circulation at 34.0-35.0' R3: 5 minutes
			>10	32.5' - Fracture, 40 deg, rough, stepped, open			
			2	33.75' - Fracture, 25 deg, rough, undulating, open			
			0				
			NR				
35 7.7	R4-NQ 5 ft 84%	47	>10	36.0-37.2' - Fracture zone, limestone fragments from gravel to cobble-sized		Limestone 36.0-40.2' - Same as 31.0-34.5' except light olive gray, (5Y 5/2), color transition from above run complete by 37.0', voids <1/16" and abundant larger cavities to 3/16" yielding a rough surface No Recovery 40.2-41.0'	R4: 4 minutes
			1	37.25' - Mechanical break 37.55' - 25 deg, smooth, undulating, very tight			
			>10	38.3-38.75' - Fracture zone, limestone fragments from gravel to cobble-sized			
			0	38.9' - 75 deg, rough, planar, very tight			
			>10	40.0-40.7' - Fracture zone, limestone fragments from gravel to cobble-sized			
40 2.7			NR				
41.0							



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-16

SHEET 4 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION : 42.7 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

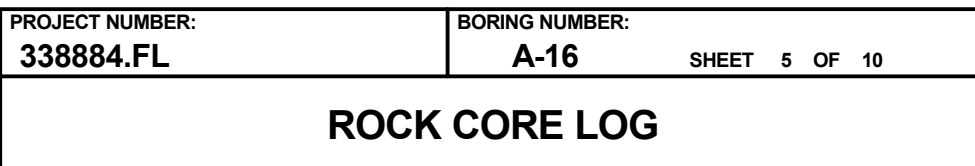
WATER LEVELS : 2.5 ft bgs on 4/5/07

START : 4/5/2007

END : 4/8/2007

LOGGER : A. Teal

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.
45 -2.3	R5-NQ 5 ft 22%	0	>10	41.0-42.1' - Fracture zone, fragments up to 1-1/2"		Limestone 41.0-42.1' - moderate olive brown, (5Y 4/4), fine grained, strong HCl reaction, extremely weak (R0), friable No Recovery 42.1-46.0'	
46.0			NR				R5: 2 minutes
50 -7.3	R6-NQ 5 ft 100%	70	>10	46.0-46.4' - limestone fragments, silt to fine sand-sized particles		Limestone 46.0-51.0' - Same as 41.0-42.1' except very weak (R1), voids <1/16" and cavities to 3/16" yielding rough appearance, trace black organic material 49.0-50.5'	SC-1 collected 46.4-47.45'
			1	47.45' - Fracture, 35 deg, smooth, undulating, open			
			0	48.3, 48.5, 48.7, 49.0' - Mechanical break (4)			R6: 2 minutes
55 -12.3	R7-NQ 5 ft 50%	18	0			51.0-51.9' - light olive gray, (5Y 5/2), fine grained, moderate to strong HCl reaction, weak (R2), voids <1/16" over 35% of surface, cavities to 3/16" over <5% of surface, fossiliferous Silt (ML) 51.9-53.5' - light olive gray, (5Y 5/2), strong HCl reaction, carbonate material No Recovery 53.5-56.0'	
56.0			NA				R7: 2 minutes
60 -17.3	R8-NQ 5 ft 78%	10	NA			Silt (ML) 56.0-58.7' - Same as 51.9-53.5'	
			3	58.75-59.0' - Fracture zone, limestone fragments from gravel to cobble-sized		Limestone 58.7-59.9' - moderate olive brown, (5Y 4/4), fine grained, moderate HCl reaction, weak (R2), voids <1/16" over 15% of surface, trace cavities to 9/16"x3/4" on surface No Recovery 59.9-61.0'	R8: 3 minutes
			NR	59.1' - Fracture, 80 deg, rough, planar, open 59.25' - Fracture, 30 deg, rough, stepped, tight 59.4' - 35 deg, rough, undulating, tight			
61.0							



ORIENTATION : Vertical

LOGGER : A. Teal

WATER LEVELS : 2.0 ft bgs on 4/3/07				START : 4/3/2007		END : 4/3/2007		LOGGER : A. Year	
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		SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
65 -22.3	R9-NQ 5 ft 96%	43	NA				Silt (ML) 61.0-63.0' - Same as 51.9-53.5' except trace organics 61.0-61.3', carbonate material	SC-2 collected at 63.4-64.3' R9: 3 minutes	
			1	63.0' - 60 deg, rough, planar, tight 63.4, 64.3' - Mechanical break (2)		Limestone 63.0-65.8' - moderate olive brown, (5Y 4/4), fine grained, moderate HCl reaction, very weak (R1), voids <1/16" over 15% of surface, trace cavities to 9/16"x3/4" on surface			
			0	64.4-65.2' - Mechanical break (>10)					
			2	65.3' - Fracture, 15 deg, smooth, undulating, open 65.7' - Fracture, 40 deg, rough, undulating, open					
	R10-NQ 5 ft 88%	50	NR	66.4' - Fracture, 10 deg, rough, undulating, open 67' - Fracture, 10 deg, smooth, undulating, tight 67.8' - Fracture, 65 deg, rough, planar, tight 68.1, 68.3' - Fracture (2), 20 deg, rough, undulating, open		No Recovery 65.8-66.0' Limestone 66.0-70.4' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids <1/16" on 25% of surface increasing from 68.8', extremely weak (R0) zone from 67.2-67.5', 3/4"x1-3/16" cavity at 70.2', very fossiliferous below 68.5', solution cavity at 68.5-69.0'			
			1						
			2						
			3	69.5, 69.8' - 40 deg, rough, undulating, open					
			1	70.1' - Fracture, 20 deg, rough, undulating, open					
			NR						
R11-NQ 5 ft 98%	67	2	71.25' - 10 deg, rough, undulating, open 71.5' - 85 deg, rough, planar, tight 72.0' - Mechanical break, strong to very strong (R4-R5) 72.25' - Fracture, 20 deg, rough, undulating, open		No Recovery 70.4-71.0' Limestone 71.0-73.3' - Same as 66.0-70.4' except moderate olive brown, (5Y 4/4) 73.3-74.4' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), fine grained, moderate to mild HCl reaction, weak (R2), laminated bedding, voids <1/16" over 10%-15% of surface, trace organics 74.4-75.9' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak (R1), voids <1/16" over <10% of surface, lower strength rock from 75.5-75.9' No Recovery 75.9-76.0' Limestone 76.0-77.2' - Same as 74.4-75.5' 77.2-79.0' - light olive brown, (5Y 5/6), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 40% of surface, cavities up to 3/4"x1-9/16" over 15% of surface, fossiliferous, trace organics No Recovery 79.0-81.0'				
		>10							
		5	73.2' - Fracture zone, limestone fragments from gravel to cobble-sized 73.4, 73.5, 73.7' - Mechanical break 73.95' - 25 deg, smooth, undulating, tight 74.5' - Mechanical break, medium strong (R3)						
		0	75' - 10 deg, smooth, undulating, tight 75.4-75.9' - Fracture zone, limestone fragments from gravel to cobble-sized						
		>10							
		NR							
75 -32.3	R12-NQ 5 ft 60%	47	0	76.75' - Mechanical break 77.0-77.35' - Fracture zone, limestone fragments from gravel to cobble-sized		R11: 4 minutes			
			>10						
			NR	78.75' - 10 deg, rough, undulating, tight 78.9-79.0' - Fracture zone, limestone fragments from gravel to cobble-sized					
80 -37.3									
81.0									

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION : 42.7 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

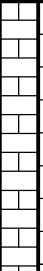
ORIENTATION : Vertical

WATER LEVELS : 2.5 ft bgs on 4/5/07

START : 4/5/2007

END : 4/8/2007

LOGGER : A. Teal

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	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
85 -42.3	R13-NQ 5 ft 50%	27	>10	81.1' - 5 deg, smooth, undulating, 1/16" clay infilling, dark brown clay infilling 81.6-82.6' - Fracture zone, limestone fragments from gravel to cobble-sized		Limestone 81.0-83.5' - dusky yellow grading to yellowish gray, (5Y 6/4 grading to 5Y 7/2), fine grained, moderate to mild HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 25% of surface, cavities up to 3/16"x3/8" over <5% of surface No Recovery 83.5-86.0'	4/6/07 08:04 Water level at 5.4' below ground surface
			>10				
			1	83.05' - 15 deg, smooth, undulating, open			
			NR				
86.0 90 -47.3	R14-NQ 5 ft 90%	37	>10	86.0-86.95' - Fracture zone, limestone fragments from gravel to cobble-sized 87.3' - 45 deg, rough, planar, tight 87.5' - 80 deg, rough, planar, open 87.55' - 10 deg, rough, undulating 87.85' - 50 deg, rough, planar, tight 88.2, 88.5' - 60 deg, rough, planar, tight 88.7' - 20 deg, rough, undulating 89.1-89.4' - Fracture zone, limestone fragments from gravel to cobble-sized 89.5' - 30 deg, smooth, undulating, open 89.6' - rough, undulating, tight		Limestone 86.0-89.5' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, medium strong (R3), voids <1/16" over 35% of surface, cavities to 3/4"x3/4" and fossil molds on 15% of surface, very fossiliferous transitioning to moderately fossiliferous at 88.0' 89.5-90.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), voids <1/16" on 5-10% of surface, trace cavities to 3/16", moderately fossiliferous (molds) No Recovery 90.5-91.0' Limestone 91.0-93.0' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on 30% of surface, cavities to 3/8"x3/4" No Recovery 93.0-96.0'	R13: 5 minutes R14: 6 minutes
			4				
			10				
			>10				
			0				
			NR				
95 -52.3	R15-NQ 5 ft 40%	0	>10	91.0-92.6' - Fracture zone, limestone fragments from gravel to cobble-sized 92.8' - 25 deg, smooth, undulating, tight			R15: 6 minutes
			>10				
			NR				
			NR				
100 -57.3	R16-NQ 5 ft 100%	65	3	96.25, 96.6, 96.7' - 30 deg, smooth, planar, very tight 97.2-97.25' - 45 deg, rough, planar, high angle fracture zone, very tight 97.9-98.6' - Fracture zone, limestone fragments from gravel to cobble-sized 98.8' - 60 deg, rough, planar, tight 98.95' - 25 deg, rough, undulating, open 99.05, 99.3' - 5 deg, rough, undulating, tight 99.2' - 15 deg, rough, undulating, tight 99.9' - 10 deg, rough, undulating, tight 100.2' - 60 deg, smooth, planar, tight		Limestone 96.0-97.9' - Same as 91.0-93.0' except inclusion fragments (to 1-3/16") of yellowish gray 97.9-101.0' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak (R2), voids <1/16" on 5% of surface, trace fossil molds to 3/16"	R16: 7 minutes
			>10				
			>10				
			4				
			1				
101.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-16
SHEET 7 OF 10	
ROCK CORE LOG	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION : 42.7 ft (NAVD88) DRILLING CONTRACTOR : Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 2.5 ft bgs on 4/5/07 START : 4/5/2007 END : 4/8/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION		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.
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -62.3	R17-NQ 5 ft 94%	62	>10			Limestone 101.0-103.1' - Same as 97.9-101.0'	SC-3 collected at 101.0-102.0'
			2	102.0-102.2' - Fracture zone, limestone fragments from gravel to cobble-sized			
			NA	102.65' - 10 deg, rough, undulating, open		Silt (ML) 103.1-104.2' - moderate olive brown, (5Y 4/4), soft, strong HCl reaction, trace organics	
			0	102.9' - 60 deg, rough, planar, open		Limestone 104.2-105.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on 30% of surface, trace fossil molds	R17: 6 minutes
			1	105.4' - 60 deg, rough, planar, tight		No Recovery 105.7-106.0' Limestone 106.0-110.0' - Same as 104.2-105.7' except color grades to mottled dusky yellow and light olive gray (5Y 6/4 and 5Y 6/1) by 107.0' then transitions to only dusky yellow by 109.0'	
110 -67.3	R18-NQ 5 ft 80%	58	NR	106.0-106.2' - Fracture zone, limestone fragments from gravel to cobble-sized			
			6	106.6' - 30 deg, rough, undulating, open			
			9	107.1-107.8' - 85 deg and vertical, planar, high angle fracture zone, multiple planar features open to moderately tight			
			3	108.5-110.0' - vertical, rough, planar, 15-20% charcoal gray to black, same as 107.1-107.8'			
			6				
115 -72.3	R19-NQ 5 ft 82%	33	NR			No Recovery 110.0-111.0'	R18: 5 minutes
			>10	111.0-111.2' - Fracture zone, limestone fragments from gravel to cobble-sized		Limestone 111.0-115.1' - dusky yellow grading to light olive gray by 112.4' grading to pale olive by 114.5', (5Y 6/4 to 5Y 5/2 to 10Y 6/2), fine grained, moderate HCl reaction, medium strong (R3), voids <1/16" on 35% of surface	Driller's Remark: Boring "cave-in" 15.0' from bottom (111.0') Advance HW casing from 70.0-110.0'
			3	112.35' - 60 deg, smooth, planar, tight			
			10	112.9' - 10 deg, rough, undulating, tight			SC-4 collected at 113.8-114.5'
			7	114.55-114.7' - Fracture zone, limestone fragments from gravel to cobble-sized		No Recovery 115.1-116.0'	R19: 4 minutes
120 -77.3	R20-NQ 5 ft 86%	52	NR	114.9' - 20 deg, smooth, undulating, open		Limestone 116.0-120.3' - Same as 114.5-115.1'	
			>10	116.0-116.3' - Fracture zone, rough, undulating, fragments 1/2"-1-1/2"			
			2	116.5, 117.0' - 20 deg, rough, undulating, open			
			1	117.35' - 10 deg, rough, undulating, tight			
			1	118' - horizontal, smooth, undulating, open			
			1	118.25' - horizontal, smooth, undulating, black, open to 1/16"			
			1	118.25-118.5' - Mechanical break, limestone fragments from gravel to cobble-sized			
			1	119.3-119.8; 120.0-120.3' - 70 deg, rough, undulating, black, open to 1/16"		No Recovery 120.3-121.0'	R20: 6 minutes
			NR				



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-16

SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION : 42.7 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER LEVELS : 2.5 ft bgs on 4/5/07

START : 4/5/2007

END : 4/8/2007

LOGGER : A. Teal

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			
145 -102.3	R25-NQ 5 ft 56%	0	10	141.2' - 10 deg, smooth, undulating, open		Limestone 141.0-141.8' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak (R2), voids <1/16" on 30% of surface, cavities and fossil molds up to 3/16" on 5% of surface 141.8-142.6' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), voids <1/16" on 5% of surface 142.6-143.8' - light olive gray, (5Y 5/2 with 5Y 7/2), 10% yellowish gray mottling, fine grained, strong HCl reaction, strong (R4), voids <1/16" on 25% of surface, trace cavities and fossil (molds) to 9/16"	R25: 5 minutes
			>10	141.35' - 15 deg, smooth, undulating, open			
			6	141.5' - 30 deg, smooth, undulating, open			
			NR	141.75' - 20 deg, smooth, undulating, open 141.76-142.4' - Fracture zone, black, irregular fragments to 1-1/2" 142.6-143.7' - Fracture (6), 20 deg and 30 deg, rough, undulating, open			
146.0				146.0-147.3' - Fracture zone, dark, limestone fragments from gravel to cobble-sized		No Recovery 143.8-146.0' Limestone 146.0-147.5' - yellowish gray, (5Y 7/2 and 5Y 5/2), light olive gray mottling, fine grained, mild HCl reaction, strong (R4), trace voids <1/16", cavities 1/16"x1/16" and fossil molds No Recovery 147.5-151.0'	Set casing to 150.0' due to cave-in on last run; stop coring at 151.0' for the day 4/7/07
			>10				
			>10				
			NR				
150 -107.3	R26-NQ 5 ft 30%	0				Limestone 151.0-155.5' - yellowish gray, (5Y 7/2 with 5Y 5/2), light olive gray mottling from 152.5-153.8', mild to moderate HCl reaction, medium strong (R3), laminar bedding below 153.5'	R26: 10 minutes
				151.0-151.5' - Fracture zone, subangular fragments predominately 1"-1/2"			
			5	152' - 25 deg, smooth, undulating, open			
			>10	152.3' - Mechanical break 152.45-153.2' - Fracture zone, rough, undulating, dark, staining on vertical fracture			
155 -112.3	R27-NQ 5 ft 90%	48	>10	153.7-154.2' - Fracture zone, fragments 1/16"-1/2"		No Recovery 155.5-156.0' Limestone 156.0-159.0' - yellowish gray transitions to dusky yellow below 158.0', (5Y 7/2 to 5Y 6/4), fine grained, mild HCl reaction, medium strong (R3), laminated bedding, voids <1/16" on 5% of surface, cavities and fossil molds to 3/16" on <5% of surface (predominantly on lighter colored laminations), increased voids and fossil abundance below 158.0' No Recovery 159.0-161.0'	Water level at 5.3' below ground surface
			>10	154.4, 154.7, 155.05' - Mechanical break			
			4	155.25' - 15 deg, smooth, planar, open, solution cavity			
			NR	155.3' - 10 deg, smooth, planar, tight			
160 -117.3	R28-NQ 5 ft 60%	47	>10	155.4' - 15 deg, smooth, planar, tight 156.0-156.4' - Fracture zone, rough, undulating, small fragments 1/16"- 1-1/2"			R27: 10 minutes
			1	157.65' - Mechanical break			
			>10	157.9' - 20 deg, smooth, undulating, open			
			NR	158.7-158.9' - Fracture zone			
161.0							R28: 9 minutes



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-16

SHEET 10 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION : 42.7 ft (NAVD88)

DRILLING CONTRACTOR : Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER LEVELS : 2.5 ft bgs on 4/5/07

START : 4/5/2007

END : 4/8/2007

LOGGER : A. Teal

WATER LEVEL: 20 RGS ON 4/8/07		DISCONTINUITIES		SYMBOLIC LOG		LITHOLOGY		COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	COMMENTS	
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
165 -122.3	R29-NQ 5 ft 86%	37	1	161.65' - Mechanical break			Limestone 161.0-162.9' - dusky yellow with moderate olive brown from 161.8-162.7', (5Y 6/4 with 5Y 4/4), fine grained, mild HCl reaction, medium strong (R3), thin bedding, voids <1/16" on 50% of surface, cavities up to 3/8"x3/4" and fossil molds on <5% of surface, evenly distributed thin (1/2"-1") bedding	R29: 4 minutes	
			6	161.8' - Fracture or mechanical break, horizontal, smooth, planar, open					No Recovery 165.3-166.0' Limestone 166.0-170.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), laminar bedding from 164.2-164.6', trace voids <1/16"
			>10	162.1' - 20 deg, rough, undulating, open, solution cavity					
			>10	162.25' - Fracture or mechanical break, horizontal, smooth, planar, open					
			1	162.35' - Mechanical break					
	166.0	NR	162.7' - 20 deg, rough, undulating, open		No Recovery 170.5-171.0' Limestone 171.0-171.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), voids <1/16" on 5% of surface		SC-7 collected at 167.95-168.75'		
	R30-NQ 5 ft 90%	77	1	162.9-163.5' - Fracture zone				R30: 6 minutes	
			2	163.5-164.2' - Fracture zone, 45 deg and 75 deg					
			>10	164.2-164.6' - Fracture zone					
			2	164.9, 164.95, 165.05' - 10 deg, smooth, planar, tight					
1			166.35, 167.7' - 40 deg, rough, planar, tight						
170 -127.3	171.0	NR	167.8' - 55 deg, rough, planar, tight		No Recovery 170.5-171.0' Limestone 171.0-171.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), voids <1/16" on 5% of surface	SC-8 collected at 173.9-175.0'			
R31-NQ 5 ft 100%	73	2	167.95' - Mechanical break				R31: 6 minutes		
		5	168.75-169.2' - Fracture zone, dark, staining on vertical fractures						
		>10	169.7' - Mechanical break						
		0	169.9' - 30 deg, smooth, undulating, tight						
		175 -132.3	176.0	4	170.4' - horizontal, smooth, planar, open		15:07 End boring at 176.0', met recovery and RQD requirements		
				171.45' - 5 deg, smooth, planar, tight					
				171.5' - 5 deg, smooth, planar, open					
				172.2' - 5 deg, smooth, undulating, open					
				172.4' - 85 deg, rough, planar, tight					
				172.55-173.9' - Fracture zone, 45 deg and 75 deg, smooth, planar, black staining, tight					
				175.1, 175.2, 175.35' - 10 deg, smooth, undulating, open, brownish staining at 175.2'					