CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
338884.FL	AD-01	SHEET 1 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R.Q.D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
	204.0						Boring AD-1 blind drilled to approximately 204 feet below ground surface before beginning sampling/logging. Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" 08/22/07 HW casing set to 204.25' below ground surface 08/23/07 Begin rock coring HQWL Use thick mud mix with 250-350 rpm rotation R1: 4 minutes 204-204.2': Probable sluff fallen to bottom of borehole during sonic advancement R2: 3 minutes R3: 6 minutes 08/26/07 Switch drill rigs and crew: Boart Longyear BL300T drill rig operated by Minnesota crew. Using HW casing previously set. Using face discharge type bit. C. Sump takes over logging. R4: 7 minutes R5: 13 minutes
205 -163.0	R1-HQ 2.5 ft 100%	24	>10	204.0-204.7' - Fracture zone, multiple intersecting fractures, gravel-sized fragments <3" diameter		**Limestone** 204.0-206.5' - yellowish gray, (5Y 7/2), very fine to medium grained, mild to moderate HCl reaction, extremely weak (R0), with areas of 1" diameter weak (R2) rock, voids over 40% of surface, trace laminations, fossiliferous, medium strong to strong (R3 to R4) from 204.0-204.2', HCl reaction 1-3 seconds 206.5-208.5' - yellowish gray, (5Y 7/2), very fine to medium grained, extremely weak to very weak (R0 to R1), 206.5-207.15': light olive gray (5Y 5/2), high organic content; slow, moderate HCl reaction, trace strong organic odor, 207.15-208.5': laminated with trace organics in laminations, <10% voids over surface **No Recovery 208.5-209.0'** **Limestone** 209.0-209.4' - yellowish gray, (5Y 7/2), very fine to fine grained, medium strong to strong (R3 to R4), voids <1/16" over <20% of surface, poorly fossiliferous, trace laminations, trace organics **Sandy Silt (ML)** 209.4-210.6' - yellowish gray, (5Y 7/2), moist to dry, hard, strong HCl reaction, >60% low to moderate plasticity carbonate fines, <40% fine to medium grained carbonate sand, trace H_2S odor **No Recovery 210.6-214.0'** **Limestone Fragments** 214.0-215.3' - yellowish gray, (5Y 7/2), slow moderate HCl reaction, weak (R2), 2-3" fragments from 214.0-214.7' decreasing to <1" from 214.7-215.3', voids 1/16-1/8" over 15-25% of surface **Limestone And Limestone Fragments** 215.3-219' - yellowish gray, (5Y 7/2), fine grained, slow moderate HCl reaction, extremely weak to very weak (R0 to R1), finely laminated (<1/16"), thin zone (217.0-217.1') of medium strong (R3) rock fragments, fine grained laminated material appears argillaceous **No Recovery 217.8-219.0'** **Limestone** 219.0-219.7' - Same as 215.3-217.8'	
			4	204.7, 204.9, 205.1, 205.3' - Fractures (4), <10, 80, <10, and <10 deg, rough, undulating, intersecting fractures			
	206.5		>10	205.9-206.5' - Fracture zone, rough, undulating, fragments <2" diameter			
	R2-HQ 2.5 ft 80%	0	>10	206.5-207.15' - Fracture zone, rough, undulating, multiple intersecting fractures, gravel-sized fragments <2" diameter			
			>10	207.3, 207.4, 207.55, 207.6, 207.9, 208.15' - Fractures or mechanical break (6), <10 deg, undulating, smooth to rough, bedding planes			
	209.0		NR	208.15-208.5' - Fracture zone, gravel-sized fragments <2" diameter			
210 -168.0	R3-HQ 5 ft 32%	0	NA	209.0-209.4' - Fracture zone, rough, undulating, gravel-sized fragments <2" diameter			
			NA	209.4-210.6' - Sandy silt interval, friable			
			NR				
	214.0						
215 -173.0	R4-HQ 5 ft 76%	8	>10	214.0-214.7' - Fracture zone, angular limestone fragments 2-3"			
			>10	214.7-215.3' - Fracture zone, fragments <1" diameter			
			>10	215.3-217.1' - Fracture zone, fragments range from 1/2" to >3" in zones			
			3	217.0, 217.5' - Mechanical break (2), rough, undulating			
			NR	217.8' - Fracture, horizontal, rough, undulating, possible bedding plane			
	219.0						
220 -178.0	R5-HQ 5 ft 60%	13	3	219.0' - Fracture or mechanical break, horizontal, rough, undulating			
			2	219.4' - Fracture, rough, stepped 219.7' - Bedding plane, horizontal, rough, bedding plane fracture			
			>5	220.2, 220.5' - Fractures (2), rough, undulating, ends of single full core piece 220.5-222.0' - Fracture zone			
			NR				
	224.0						

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WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R.Q.D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
225 -183.0	R6-HQ 5 ft 56%	8	1	224.3' - Fracture, horizontal, rough, undulating, contact with very soft sandy silt carbonate material		**Limestone And Silty Sand** 219.7-222.0' - mild to moderate HCl reaction, with gravel-sized limestone fragments, very fine to fine grained fragments are fossiliferous (casts and molds up to 1/2" diameter over 10-15% of surface), voids (1/16-1/8") over 15-20% of surface, larger fragments and full core diameter zones medium strong to very strong (R3-R5), small fragments (<1") weak (R2)	
			0	224.3-225.1' - carbonate silt with gravel sized fragments (1/4-1/2")			
			0	225.1-225.7' - Fracture zone, very weak limestone fragments 1-4"; full core piece laminated, easily parted on bedding plane fractures			
			NR	225.7-226.8' - Fracture zone, limestone material with fragments		**No Recovery 222.0-224.0'**	R6: 10 minutes
229.0						**Limestone** 224.0-226.8' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), voids (1/16") over <1-5% in zones, trace fossil casts/molds (<1%), larger fragments tend to be more competent, 225.6-226.1' medium strong (R3), extremely weak (R0) zones, friable, trace bedding (laminae 1/16-1/8"), recurring sequence of thin (6") more competent limestone beds separated by extremely weak very fine grained silt-sized carbonate material	
230 -188.0	R7-HQ 5 ft 48%	0	NA	229.0-229.55' - Fracture zone, limestone fragments, 3/4-2", weak (R2), fine oxidation staining on fracture surfaces			
			NA	229.55-230.2' - Extremely weak rock fractured into sand/gravel sized carbonate material			
			NA	229.8' - Mechanical break, horizontal, rough			
			NR	230.2-230.4' - Fracture zone, more competent limestone fragments, angular, fine grained, 1/4-1" diameter 230.4-231.4' - Extremely weak material, same as 229.55-230.2'		**No Recovery 226.8-229.0'**	R7: 13 minutes
234.0						**Limestone Fragments** 229.0-229.2' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, weak (R2), 3/4"-2-1/2" fragments, fossiliferous with fossil molds/casts over 20% of surface, voids (1/16-1/8") over 15% of surface 229.2-229.5' - Same as 229.0-229.2' except strong (R4), thin, fine-grained bed, trace voids (1/16"), very fine (<1/32") black inclusions (possibly pyrite)	
235 -193.0	R8-HQ 5 ft 32%	0	NA	234.0-234.7' - Fracture zone, limestone fragments 1/2-2" in size, weak to medium strong (R2-R3)			
			NA	234.7' - Horizontal contact with silty, sandy fine gravel-sized limestone fragments			
			NR			**Limestone** 229.5-229.9' - yellowish gray, (5Y 7/2), very fine to fine grained, weak (R2), voids (1/16") over 40-50% of surface, larger cavities up to 1/2" over 5-10%	R8: 13 minutes
239.0						**Silty Sand Sized Material (SM)** 229.9-231.4' - with gravel-sized very weak (R1) limestone fragments similar to 224.0-226.5' **No Recovery 231.4-234.0'**	
240 -198.0	R9-HQ 5 ft 36%	8	>10	239.0-239.7' - Fracture zone, limestone fragments 1" to 2-1/2" diameter		**Limestone Fragments** 234.0-234.7' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), small voids (1/16-1/8") over 10-15% of surface, trace small fossil molds (<3/8")	
			2	239.7' - Fracture, horizontal, rough, undulating, chipped fracture face 240.0, 240.4' - Mechanical break (2), horizontal, smooth, planar			R9: 8 minutes
			NR				
244.0							

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ROCK CORE LOG

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CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
245 -203.0			>10	244.0-244.6' - Mechanical break, 1-2" Limestone core pieces and fragments, mostly horizontal, rough, undulating fracture faces; extremely weak rock		**Silt (ML)** 234.7-235.6' - yellowish gray and dark olive gray in alternating mottled bands, (5Y 7/2 and 5Y 3/2), moderate to strong HCl reaction, extremely weak (R0), finely laminated, all carbonate material **No Recovery 235.6-239.0'**	244.0': Slightly improved recovery/RQD after mixing new batch of mud
			3	244.6, 245.1' - Bedding plane (2), horizontal, rough, undulating, fractures on intact core pieces		**Limestone** 239.0-240.8' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, extremely weak (R0), finely laminated (1/16-3/16"), <5% fine black inclusions (<1/16"), 1/4" thick more competent bed at 239.9' (very weak -R1)	
	R10-HQ 5 ft 50%	20	>10	245.2, 245.9' - Fractures or mechanical break (2), rough, undulating, very weak rock			
			NR	245.9-246.2' - Fracture zone, 1/4-3/4" fragments (very weak) 246.2-246.5' - Fractures (2), rough, undulating, on either end of single core piece of very weak (R1) limestone			R10: 8 minutes
	249.0						
250 -208.0			3	249.4' - Fracture, 10 deg, rough, undulating		**No Recovery 240.8-244.0'** **Limestone** 244.0-246.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1), voids (1/16") over 10-20% of surface, variable in zones, trace fossil molds (<1/2"), light olive gray (5Y 5/2) thinly laminated zones up to 1/4" thick spaced 1-2" apart over 244.6-245.1'	
			>10	249.5' - Fracture or mechanical break, 60-70 deg, rough, undulating 249.6' - Fracture, horizontal, rough, undulating, contact with finer grained limestone			250.0': Not re-circulating mud
	R11-HQ 5 ft 58%	24	4	249.6-250.4' - Fracture zone, limestone fragments 1/2-3/4" thick up to 3" diameter			
			NR	250.4, 250.9' - Fractures or mechanical break (2), horizontal, rough, undulating 251.1' - Disk-shaped discontinuity with finer grained limestone below, brown staining on surface		**No Recovery 246.5-249.0'** **Limestone** 249.0-249.4' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), pitted surface, <1/16" dark brown laminations, many with 1/2" relief	R11: 10 minutes
	254.0						
255 -213.0			>10	251.2, 251.35' - Bedding plane (2), horizontal, bedding plane fractures 251.4' - Fracture, 10 deg, rough, undulating, stepped, crosses bedding planes		249.4-251.9' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over surface variably <5-10% in thin zones, larger cavities/fossil molds up to 1/2" variable from trace to 5%; thinly bedded (1/2-3/4") at 249.6-250.4', very fine grained thin beds (<2") with no voids/fossils 251.2-251.5', very fine black inclusions (<1/16") over 1-2%	
			>10	254.0-254.7' - Fracture zone, 30% limestone fragments 1/2-3/4" in size, single 4" half core diameter with vertical rough undulating fracture or mechanical break, remaining fragments 1-2" diameter			
	R12-HQ 5 ft 96%	35	>10	255.1' - Fracture, horizontal, rough, undulating			R12: 8 minutes
			2	255.4' - Fracture or mechanical break, horizontal, rough, undulating, stepped, 1/2"			
			>10	255.6-255.8' - Fracture zone, 1/2" thick bedding plane parting			
	259.0		NR	255.8, 256.2' - Bedding plane (2), horizontal, smooth, bedding plane partings		**No Recovery 251.9-254.0'** **Limestone** 254.0-258.8' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1), medium density, alternating zones of very fine grained and fine grained, voids (1/16") occur in horizontal zones up to 25% of surface, fossil molds and casts up to 1/2" in discrete zones 1/2-1" thick	
			2	256.2-256.6' - Fracture zone, similar to 255.6-255.8'			
260 -218.0			>10	256.9, 257.1' - Bedding plane (2), horizontal, rough, bedding plane partings 257.8' - Fracture or mechanical break, 70-80 deg			
	R13-HQ 5 ft 44%	0		257.9-258.4' - Fracture zone, fragments 1-2" in length			
			NR	259.0-259.4' - Coarse carbonate sand 259.4-259.6' - Fractures (2), horizontal, rough, undulating, single full-core diameter, limestone, fracture faces on both ends		**No Recovery 258.8-259.0'**	R13: 7 minutes
	264.0						

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ROCK CORE LOG

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WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

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265 -223.0				259.6-261.2' - Fracture zone, limestone fragments 1/2" to 1-1/2" with 20% sand and fine gravel material		**Limestone** 259.0-261.2' - Same as 254.0-258.8' except extremely weak (R0), fractured during drilling process into silty sand/gravel-sized material **No Recovery 261.2-269.0'**	264.0': Driller's Remark: No loss of torque Tag bottom of hole at 268.5' Bit clear Mud pump on low (6 - 8 gallons per minute) Sand-sized limestone material in previous run - possible washout
	R14-HQ 5 ft 0%	0	NR				
	269.0						
270 -228.0			>10	269.0-269.6' - Fracture zone, limestone fragments; 1/2-2" diameter, <5% fines (sand-sized)		**Limestone Fragments** 269.0-269.8' - yellowish gray, (5Y 7/2), mild HCl reaction, fine to medium gravel-sized fragments range in size from 1/4-2", fragments exhibit voids (1/16-1/8") over 10-25% of surface, cavities (up to 3/4") variable from trace to 15%	
			>10	269.6-270.1' - Fracture zone, sandy gravel sized material		**Clayey Silt (ML)** 269.8-270.0' - slow strong HCl reaction	
	R15-HQ 5 ft 32%	0	NR	270.1' - Discontinuity with competent limestone, weak rock (R2) 270.3' - Fracture or mechanical break, horizontal, undulating, bedding plane fracture 270.6' - Mechanical break		**Limestone** 270.0-270.6' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, extremely weak (R0), medium density, thinly bedded (1-2") with fine laminations (<1/16") between beds, voids (1/16") up to 30% in discrete horizontal zones 1/2" thick **No Recovery 270.6-274.0'**	R15: 11 minutes
	274.0						
275 -233.0			>10	274.0-274.2' - Fracture zone, 3/4-1" limestone fragments		**Limestone** 274.0-275.8' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids (1/16") over 5% of surface concentrated in discrete horizontal zones (bedding plane fractures)	
			>10	274.2, 274.5, 274.7' - Bedding plane (3), horizontal, smooth, planar, bedding plane fractures			
				274.7-275.1' - Fracture zone, 3/4" to 1-1/2" fragments			
	R16-HQ 5 ft 62%	0	>10	275.2' - Fracture or mechanical break, vertical, rough, undulating			R16: 10 minutes
			NR	275.4' - Contact between fractured limestone above and very weak limestone below 275.6-276.2' - Fracture zone, 1/4" to 1-1/2" fragments 276.2-277.1' - Fracture zone, limestone fragments 3-4" with sandy fine gravel sized pieces at end		**Limestone Fragments** 275.8-276.1' - very fine grained, with 1" thick bed of greenish gray (5G 6/1) limestone, very strong (R5), numerous cavities up to 7/8" on one side of bed (cannot determine bed orientation)	
	279.0						
280 -238.0			>10	279.0-280.7' - Fracture zone, 80% fragments 3/4" to 1-1/2", few larger fragments up to 3", undulating fracture surfaces		**Limestone** 276.1-277.1' - yellowish gray, (5Y 7/2), fine to medium grained, mild HCl reaction, medium strong (R3), voids (1/16") over 15% of surface, larger cavities up to 1" over 10-15% of rock **No Recovery 277.1-279.0'**	
			>10				
	R17-HQ 5 ft 34%	0	NR				R17: 13 minutes
	284.0						

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285 -243.0			>10	284.0-285.65' - Fracture zone, 70% fragments 1-3" in size, 30% 1/2-1" in size, thinly bedded (1/4" thick) smaller fragments; fragments exhibit bedding plane partings		**Limestone Fragments** 279.0-280.7' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), trace voids (1/16") over surface, fossil molds and casts over 10-15% surface of most fragments, 90% of fossil molds <3/8" in longest dimension, few molds up to 3/4", fragments from 279.0-279.1' contain only trace fossils (casts and molds) and exhibit smooth bedding plane fractures **No Recovery 280.7-284.0'** **Limestone** 284.0-284.3' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), HCl reaction on fresh (powdered) surface **Limestone Fragments** 284.3-284.7' - yellowish gray, (5Y 7/2), fine grained, weak (R2), very mild HCl reaction, moderate where pulverized, 5-10% voids (1/16") over surface, fossil molds and casts 1/4-3/4" over 25% of surface 284.7-285.7' - yellowish gray with light gray mottling, (5Y 7/2 and N7), fine grained, 50% fragments exhibit thin bedding plane partings (1/4-1/2" thick), light gray clayey seam at 284.7-285.0' **Limestone** 285.7-288.1' - light gray, (N7), very fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), mostly weak (R2), with thin zones of weaker (R1) material, voids (1/16-3/16") over 10-15% of surface, larger cavities/fossil molds up to 1/2" diameter over 15-20% of surface **No Recovery 288.1-289.0'** **Limestone And Limestone Fragments** 289.0-291.1' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction on powdered surface, weak to medium strong (R2 to R3), voids (1/16-1/8") over 15-25% of surface, trace cavities/fossil molds (up to 1/2"), extremely weak (R0) fractured soft material 290.4-290.7': silty, sandy gravel-sized limestone material **No Recovery 291.1-294.0'**	284.0-286.5': Note core barrel plugged after coring 2.5 feet. Pulled barrel and core, then cored second 2.5 feet with clean barrel. Upper portion of second run indicates material fell out of 1st run (cored twice). Combined cores for 5 foot interval.
			>10	285.65' - Fracture, 5 deg, smooth, with black staining			
	R18-HQ 5 ft 82%	22	>10	286.1' - Fracture or mechanical break, horizontal, rough, undulating			
			3	286.1-286.4' - Fracture zone, 1/2-2" fragments			
				286.4' - Fractures, 45 deg, rough, undulating, intersecting fracture set (end of full core diameter limestone)			
289.0			NR	286.85' - Fracture or mechanical break, 45 deg, rough, undulating			R18: combined run time: 15 minutes
290 -248.0			>10	287.3' - Fracture, 45 deg, rough, undulating			
			>10	287.7' - Fracture, 5 deg, rough, undulating, soft material			
	R19-HQ 5 ft 42%	7		287.9' - Fracture, horizontal, rough, undulating, stepped (1/4" relief)			
				289.0-289.15' - Fracture zone, fragments 3/4" to 1-1/2"			
			NR	289.15' - Silty sand material on fracture surface of full core diameter limestone piece			
294.0				289.6' - Fracture, 10 deg, undulating, very rough			R19: 11 minutes
				289.7-290.1' - Fracture zone, fragments 1-3" in size			
				290.15-290.4' - Fractures (2), horizontal, rough, undulating, fractures on both of ends of single core diameter limestone			SC-1 collected at 294.0-294.91'
295 -253.0			1	290.4-290.7' - Fracture zone, 3/4-1" fragments with soft sandy material			
			>10	290.7-291.1' - Fractures, undulating, partial full core diameter limestone rock; vertical fracture surfaces intersected by 45 deg fracture set			
	R20-HQ 5 ft 58%	18	>10	294.95' - Fracture, 45 deg, rough, undulating			
				294.95-296.9' - Fracture zone, 2-3" fragments to 296.0' then rock becomes extremely weak and fractures into silt, sand , and fine gravel sized pieces (<3/4")			
299.0			NR				R20: 8 minutes
			2	299.25, 299.8' - Fractures or mechanical break (2), horizontal, rough, undulating, soft material			
300 -258.0			1	300.3' - Fracture, horizontal, with loose material; top of dark black (organic) silt clay seam (1" thick)			
	R21-HQ 5 ft 78%	29	>10	301.1' - Fractures (2), rough, undulating, vertical and horizontal intersecting fractures, possible mechanical break			
			>10	301.1-301.4' - Fracture zone, gravel sized limestone fragments (1/4-3/4") with silty sandy fines			
304.0			NR	301.7' - Fractures, vertical, rough, undulating, intersecting fracture set in 3-1/2" core piece			R21: 11 minutes

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
305 -263.0			>10	301.9-302.9' - Fracture zone, silty sandy material with gravel sized (1/4-3/4") limestone fragments (25%)		**Limestone And Limestone Fragments** 294.0-295.2' - yellowish gray to grayish yellow, (5Y 7/2 to 5Y 8/4), strong HCl reaction, extremely weak to very weak (R0 to R1), intact core from 294.0-294.9': finely laminated with darker laminae (1/16" thick) spaced 1/2-1" apart **Limestone Fragments** 295.2-296.2' - Same as 294.0-295.2' except voids (1/16-1/8") over 5-10% of surface, trace cavities up to 1/2" diameter 296.2-296.9' - Same as 294.0-295.2' except moderate HCl reaction, extremely weak (R0), fractured into silty sandy gravel-sized material 25% gravel / 75% coarse to fine-grained silt and sand-sized particles **No Recovery 296.9-299.0'** **Limestone** 299.0-300.3' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), moderate HCl reaction, extremely weak (R0), fragments with preferred horizontal orientation (yellowish gray) with fine grained light olive gray matrix material, fragments up to 1" in longest dimension, finely laminated	
			>10	304.0-304.7' - Fracture zone, extremely weak silt-sized material			
	R22-HQ 5 ft 91%	9	>10	305.1, 305.2, 305.35, 305.7' - Fractures or mechanical break (4), horizontal, slightly rough to smooth, weak rock, possible bedding planes			
			2	305.7-305.9' - Fragments (1/2-1")			
			1	305.9-306.5' - Fracture zone, extremely fractured zone slightly healed (intact core piece)			R22: 12 minutes
			NR	306.5-307.0' - Fracture zone, 1-3" fragments			
	309.0			307.3, 307.6, 307.9, 308.0' - Fractures (4), horizontal, rough, undulating, partially stepped (1/4" relief)			
310 -268.0			>10	309.0-310.3' - Fracture zone, 3/4-3" fragments			
			1				
	R23-HQ 5 ft 76%	22	2	310.9, 311.2, 311.4, 312.1, 312.4, 312.6' - Fractures or mechanical break (6), horizontal, rough, undulating			
			3				
			NR				R23: 11 minutes
	314.0						
			>10	314.0-316.5' - Fracture zone, 1-3" limestone fragments		**Clay (CL)** 300.3-300.5' - dark black, no HCl reaction, finely laminated, organic	
315 -273.0			>10			**Limestone** 300.5-301.9' - yellowish gray, (5Y 7/2), fine grained, extremely weak (R0), dark gray/black blebs covering 5-10% of surface, dark brown staining on few fracture surfaces 301.9-302.9' - Same as 300.5-301.9' except fractured into silt and gravel-sized limestone fragments **No Recovery 302.9-304.0'** **Limestone** 304.0-307.8' - yellowish gray, (5Y 7/2), fine grained, slow strong HCl reaction, extremely weak to weak (R0 to R2), with dark gray blebs up to 1/2" in size 307.8-308.55' - light olive gray, (5Y 5/2), strong HCl reaction, medium strong (R3), sharp contact with yellowish gray limestone above, finely laminated 307.8-307.9', voids 1/16" over 30-40% of surface, few larger cavities up to 3/8" (<2%) **No Recovery 308.55-309.0'**	
	R24-HQ 5 ft 94%	20	>10				
			>10	316.8' - Fracture, 45 deg, rough, undulating 317.0' - Fracture, 50 deg, rough, undulating, tight			R24: 8 minutes
			2	317.5' - Fracture or mechanical break, horizontal, rough, undulating			
	319.0		NR	317.5-317.8' - Fracture zone, silty material with gravel sized fragments (3/4")			
			5	318.1' - Fracture, 15 deg, rough, undulating 318.3' - Fracture or mechanical break, horizontal, rough, undulating			
320 -278.0			>10	319.3, 319.4, 319.6, 319.7, 319.85' - Fractures (5), horizontal, rough, undulating, bedding plane partings 2-4"			
	R25-HQ 5 ft 82%	37	>10	320.2-321.8' - Fracture zone			
			2	321.8' - Contact with competent limestone 322.1' - Fracture, horizontal, stepped, (1/4" relief)			
			NR	322.7' - Fracture or mechanical break, horizontal, rough, undulating			R25: 9 minutes
	324.0						

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
325 -283.0			>10	324.0-324.7' - Fracture zone, 1" to 1-1/2" fragments; 324.0-324.2' thin very weak fractured silty material		**Limestone** 309.0-311.5' - yellowish gray, (5Y 7/2), weak (R2), very strong HCl reaction, voids (1/16-1/8") variable 10-30% of surface concentrated in zones preferentially oriented along horizontal bedding planes 311.5-312.1' - Same as 309.0-311.5' except pale yellowish brown, (10YR 6/2) 312.1-312.8' - Same as 309.0-311.5' **No Recovery 312.8-314.0'** **Limestone** 314.0-318.7' - Same as 309.0-311.5' except more fragmented, color becoming pale yellowish brown (5YR 5/2) at 317.0' **No Recovery 318.7-319.0'** **Limestone** 319.0-321.8' - pale yellowish brown with zones of yellowish gray, (5Y 5/2 with 5Y 7/2), strong HCl reaction, very weak (R1), grading to fractured material 320.2-321.8', voids (1/16") over 25-30% of surface, trace cavities up to 3/8" 321.8-323.1' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), finely laminated (1/16") 321.8-322.2' **No Recovery 323.1-324.0'** **Limestone Fragments** 324.0-324.2' - very light gray, (N8), fine grained, strong HCl reaction, strong to very strong (R4 to R5), voids/fossil molds (1/16-3/16") over 15-20% of surface **Fractured Limestone** 324.2-324.7' - yellowish gray, fine grained, very strong HCl reaction, extremely weak (R0), with fine gravel-sized limestone fragments (1/4-1/2"), dark brown organic material (<2%) **No Recovery 324.7-329.0'** **Sandy Silt To Gravelly Silt (ML)** 329.0-329.4' - yellowish gray, (5Y 7/2), moist, moderate to strong HCl reaction, >50% silt with <50% limestone fragments as sand to gravel-sized fraction **Limestone** 329.4-330.4' - yellowish gray, (5Y 7/2), very fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), trace fossil fragments, strong organic odor	Driller's Remark: No loss of torque during drilling; wash out fine soft material possible R26: 10 minutes C. Sump and R. Bitely logging R27: 7 minutes R28: 9 minutes SC-2 collected at 338.6-339.4' 6" of R29 at end of R28 run; adjust R28 to 5.5' and R29 to 4.5' to accommodate R29: 7 minutes
	R26-HQ 5 ft 14%	0	NR				
329.0							
330 -288.0			>10	329.0-329.4', 330.4-331.15', 331.7-331.95' - Silt intervals 329.6, 329.95, 330.4, 331.15, 331.5, 331.7, 331.95' - Bedding plane fractures, mechanical breaks, or silt contacts (7), <10 deg, smooth to rough			
			>10				
	R27-HQ 5 ft 70%	19	>10				
			0				
			NR				
334.0							
335 -293.0			3	334.25, 334.6, 334.85, 335.15, 335.45, 335.65, 335.9, 336.25, 337.5, 338.3, 338.65' - Fractures (11), <10 deg, rough, undulating, bedding plane fractures or mechanical breaks, tight to <1/2" open			
			4				
	R28-HQ 5.5 ft 100%	55	1	336.5' - Mechanical break			
			1				
			2				
339.5			0				
340 -298.0			>10	339.9, 340.1' - Fractures (2), <10 deg, smooth, undulating, bedding plane fractures or mechanical breaks			
			>5				
	R29-HQ 4.5 ft 100%	53	2	340.1-340.75' - Fracture zone, rough, undulating, gravel sized fragments <3" diameter			
			2	341.35, 341.5, 341.65, 343.65' - Fractures or mechanical break (4), <10 deg, rough, undulating, bedding plane fractures or mechanical breaks, tight to open <1/2"			
			1	342.25-342.3' and 343.15-343.45' - Clay seams and silt seams			
344.0							

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
345 -303.0			1	344.4, 345.25, 345.5, 345.75, 346.0, 346.5, 346.75, 348.3' - Fractures (8), 40 deg, bedding plane fractures or mechanical breaks, smooth to rough, undulating		**Sandy To Gravelly Silt (ML)** 330.4-331.15' - Same as 329.0-329.4'	Driller's Remark: 100% circulation J. Burkard and C. Sump logging SC-3 collected at 344.4-345.25'
			4			**Limestone** 331.15-331.7' - Same as 329.4-330.4'	
	R30-HQ 5 ft 100%	77	2			**Sandy To Gravelly Silt (ML)** 331.7-331.95' - Same as 329.0-329.4'	
			0			**Limestone** 331.95-332.5' - Same as 329.4-330.4' **No Recovery 332.5-334.0'**	08/29/07 16:30 Stop drilling AD-1 for shift. Remove core barrel for geophysical logging R30: 7 minutes
	349.0		1			**Limestone** 334.0-339.5' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl reaction, very weak to medium strong (R1 to R3), voids <1/16" over <30% of surface, highly variable, trace bedding plane of 30 deg, trace bedding plane 40 deg, trace inclusion clasts 339.5-340.05' - very light gray to yellowish gray, (N8 to 5Y 8/1), very fine to medium grained, strong HCl reaction, extremely weak to weak (R0 to R2), highly variable, increasing organic laminations with depth to mildly to moderately competent organic lens, olive gray to dark gray (5Y 4/1 to N3), very fine to fine grained, extremely weak (R0), no apparent HCl reaction on organic material, mild reaction on limestone in section, 10-20% limestone probably due to boxing, limestone same as 340.05-344.0' 340.05-344.0' - Same as 339.5-340.5' except strong HCl reaction, very weak to weak (R1 to R2), trace voids <1/16" intermittent over surface, trace laminated organics, variable hardness, variable grain sizes, trace fossil structure, trace mottled coloration, silt seam at 342.25-342.3' and clay seam at 343.15-343.45', carbonate derived, friable, nonplastic silts and moderately to highly plastic clays 344.0-349.0' - very light gray with yellowish gray mottling, (N8 and 5Y 8/1), very fine grained, moderate to strong HCl reaction, very weak to medium strong (R1 to R3), trace voids <1/16" over surface, trace fossil casts, few cavities <1"x1/4" 349.0-350.3' - yellowish gray, (5Y 8/1), fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), few cavities <1"x1/4"	09/05/07 10:00 Start drilling at the beginning of the shift
350 -308.0			2	349.6, 349.8' - Mechanical break (2), 10-30 deg, rough, undulating			
			>10	350.2-351.7' - Fracture zone, rough, undulating, multiple breaks with sharp angular fragments, no visible orientation			
	R31-HQ 5 ft 94%	50	>10				
			1				
			0	352.7' - Fracture, 70-80 deg, rough, undulating, tight			R31: 8 minutes
	354.0		NR				
355 -313.0			1	354.6, 355.2, 356.0, 356.5, 357.5, 358.2, 358.7, 358.8' - Mechanical break (8), horizontal to 10 deg, rough to smooth, undulating			
			2				
	R32-HQ 5 ft 100%	95	1				
			1				
			3				R32: 7 minutes
	359.0						
360 -318.0			2	359.7, 359.8, 361.2, 361.9, 362.0, 362.5, 363.1' - Mechanical break (7), horizontal to 15 deg, rough to smooth, undulating			
			>10	360.3-360.7' - Horizontal bedding plane followed by a fracture zone composed of very weak (R1) rock fragments			
	R33-HQ 5 ft 90%	60	2				
			4				
			1	362.7-363.1' - Fracture, 70-80 deg, rough, undulating, trace stain			R33: 7 minutes
	364.0		NR				

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
365 -323.0			1	364.5, 365.0, 365.3, 365.6, 365.9, 366.3, 367.3, 367.6, 368.3' - Mechanical break (9), horizontal to 10 deg, rough to smooth, undulating		350.3-351.0' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, very weak to weak (R1 to R2), <1/16" thick laminar bedding planes	
			5	364.6-366.5' - Silt-size particle infill		351.0-351.7' - yellowish gray transition to pale blue, (5Y 7/2 to 5B 6/2), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), visible casts and molds	
	R34-HQ 5 ft 98%	35	>10	366.5-367.0' - Fracture zone, angular fragments up to 1/2"x1" in size			Driller's Remark: loss of circulation at 366.8'
			2			351.7-353.7' - yellow gray, (5Y 8/1), fine grained, mild HCl reaction, very weak to weak (R1 to R2), no casts or molds	
			2				R34: 7 minutes
	369.0		NR			**No Recovery 353.7-354.0'**	
			1			**Limestone**	
370 -328.0			>10	369.7, 370.3, 371.4' - Fractures (3), horizontal to 40 deg, rough to smooth, undulating, no stain, no infill		354.0-358.4' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), fine to medium grained, mild to moderate delayed HCl reaction, very weak to weak (R1 to R2), moderately fossiliferous (casts and molds), <1/16" voids cover 20-50% of surface, solution cavities 1/8x1"	
	R35-HQ 5 ft 96%	55	1	370.7-370.9' - Fracture zone, with clay size particle infill			
			>10	372.4-373.4' - Fracture zone, top of zone along a smooth bedding plane, bottom section is rough and undulating		358.4-359.0' - yellowish gray, (5Y 7/2), fine to very fine grained, moderate to strong delayed HCl reaction, weak to medium strong (R2 to R3), <1/16" voids covering <5% of surface	
			>10				R35: 7 minutes
	374.0		NR				
			>10	374.2-374.5' - Fracture zone, no visible orientation, gravels 1/2", angular to subangular		359.0-361.3' - very pale orange, (10YR 8/2), very fine to fine grained, moderate HCl reaction, very weak to weak (R1 to R2), trace voids 1/16" on surface, mildly fossiliferous (casts and molds), 360.4' undulating bedding plane 1/4" thick, dark yellowish brown (10YR 4/2)	T. Borton and J. Burkard logging
375 -333.0			3	375.3-376.1' - Fracture, 80 deg, rough, undulating, 9-9/16" length visible			
	R36-HQ 5 ft 100%	67	2	375.5, 375.7, 376.1, 377.6, 378.3' - Fractures or mechanical break (5), horizontal, rough, undulating			
			1	376.8' - Fracture or mechanical break, horizontal, smooth		361.3-362.4' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong delayed HCl reaction, contains silt-sized particles between breaks	
			1				R36: 5 minutes
	379.0					362.4-363.5' - grayish yellow, (5Y 8/4), fine to medium grained, strong HCl reaction, solution cavities 1/8"x1/2"	
			>10	379.2-379.4' - Fracture zone, subangular fragments, 1" length or less		**No Recovery 363.5-364.0'**	
380 -338.0			>10	379.9' - Fracture or mechanical break, horizontal, smooth		**Limestone**	
				380.1-380.6' - Fracture zone, subangular fragments, 1" length or less, no visible orientation between fractures		364.0-364.6' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), fine to medium grained, delayed HCl reaction, very weak to weak (R1 to R2), 1/16" voids cover 10-20% of surface, few cavities 1/4"x1/2"	
	R37-HQ 5 ft 82%	60	3	380.1' - Fracture, horizontal, rough, undulating			SC-4 collected at 381.7-382.8'
			1	380.6' - Fracture, 35 deg, rough		364.6-366.5' - dusky yellow, (5Y 6/4), very fine to fine grained, delayed mild to strong HCl reaction, very weak to weak (R1 to R2), laminar bedding 1/8" planes throughout the section	
				381.0' - Fracture, <5 deg, rough, undulating			
			NR	381.2, 381.7' - Fractures (2), horizontal, rough, undulating			R37: 5 minutes
	384.0			382.7' - Fracture, 50 deg, rough, undulating			

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R.Q.D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
385 -343.0			>10	384.0-385.0' - Fracture zone, rough, undulating, no visible orientation, angular fragments up to 1" length		366.5-368.9' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (molds and casts), two casts at 368.4' (bivalve crinoids, 1"), solution cavities 1/4"x1"	
			1	385.3' - Fracture or mechanical break, horizontal, rough, undulating, 20% of fractured plane stained black		**No Recovery 368.9-369.0'**	
	R38-HQ 5 ft 74%	13	>10	385.8-387.7' - Fracture zone, no visible orientation, angular fragments up to 2" in length		**Limestone** 369.0-372.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to very fine grained, strong HCl reaction, very weak to weak (R1 to R2), moderately fossiliferous (casts and molds), 369.0-370.2': 1/16" voids 20-40% of surface, 370.2-372.3': 1/16" voids covering up to 0-10% of surface	
			>10				
			NR				R38: 6 minutes
	389.0						
390 -348.0			>10	389.4' - Fracture zone, no visible orientation, subangular fragments up to 1/2" length		372.3-373.8' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), moderately fossiliferous (casts and molds), solution cavities 1/2"x1" in size	
			1	389.9' - Fracture or mechanical break, horizontal, rough, undulating		**No Recovery 373.8-374.0'**	
	R39-HQ 5 ft 90%	48	4	390.5' - Fracture, horizontal, smooth, possible mechanical break 391.0, 391.1' - Fractures (2), horizontal, smooth, bedding plane parting		**Limestone** 374.0-378.5' - transitions from grayish yellow to dusky yellow, (5Y 8/4 to 5Y 6/4), fine to medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids to <1/16" over 10-20% of surface, moderately fossiliferous (casts and molds)	
			3	391.5, 391.8, 392.0, 392.3, 392.4' - Fractures (5), horizontal, smooth, undulating			R39: 7 minutes
			3	393.1, 393.2' - Fractures (2), horizontal, smooth, undulating, bedding plane parting			
	394.0		NR				0.2' of core believed to be recovered from R39
			3	393.3' - Fracture or mechanical break, horizontal, rough, undulating			
395 -353.0			3	394.3, 394.4, 394.7' - Fractures (3), horizontal, smooth, bedding plane parting			
			>10	395.0, 395.2' - Fractures (2), horizontal, rough, undulating		378.5-379.0' - bluish white, (5B 9/1), fine grained, delayed strong HCl reaction, weak (R2), voids to <1/16" over 30-50% of surface	
	R40-HQ 5 ft 100%	43	2	395.4-395.7' - Fracture zone, no visible orientation, subangular fragments up to 1" 395.9' - Fracture, horizontal, rough		379.0-380.6' - yellowish gray, (5Y 8/1), fine to medium grained, delayed moderate to strong HCl reaction, very weak to weak (R1 to R2), planar laminations, trace fossils	
			2	396.2' - Fracture, <5 deg, rough, undulating 396.6, 396.8, 397.8' - Fractures (3), horizontal, rough, undulating			R40: 7 minutes
			3	398.4' - Fracture, horizontal to 10 deg, smooth, undulating		380.6-383.1' - Same as 378.5-379.0' except yellowish gray, (5Y 7/2)	
	399.0					**No Recovery 383.1-384.0'**	
			4	399.2, 399.4, 399.6' - Fractures (3), <10 deg, rough, undulating		**Limestone**	
400 -358.0			3	399.9' - Fracture, horizontal, smooth, undulating		384.0-385.0' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, weak (R2), voids to <1/16" over 20-30% of surface	
			2	400.1, 400.2' - Fractures (2), horizontal, rough, undulating, bedding parting			
	R41-HQ 5 ft 74%	37	2	400.6' - Fracture or mechanical break, horizontal, rough, undulating		385.0-386.0' - light bluish gray, (5B 7/1), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), trace organics	
			1	401.0' - Fracture or mechanical break, horizontal, smooth, undulating			
			NR	401.8, 402.1' - Fractures (2), horizontal, smooth, undulating			R41: 5 minutes
	404.0						

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
405 -363.0			2	404.3' - Fracture, <5 deg, rough, undulating		386.0-387.7' - yellowish gray, (5Y 7/2), fine to medium grained, delayed mild to moderate HCl reaction, weak (R2), layered organics, laminae visible, voids to 1/16" over 20-30% of surface, possible cross bedding	0.3' of core placed in box with R41 Mechanical break at bottom of 0.3' is horizontal and smooth
			1	404.9, 405.7' - Fractures or mechanical break (2), horizontal, smooth 406.4' - Fracture, <10 deg, rough, undulating		**No Recovery 387.8-389.0'**	
	R42-HQ 5 ft 100%	60	2	406.7' - Fracture, 20 deg, rough, undulating		**Limestone**	SC-5 collected at 404.75-405.55'
			2	407.0' - Fracture, horizontal, smooth, undulating		389.0-391.5' - very pale orange, (10YR 8/2), fine to medium grained, delayed mild to moderate HCl reaction, very weak (R1), voids to <1/16" over 0-10% of surface	
			3	407.2' - Fracture, horizontal, smooth			
			5	407.7-407.9' - Fracture, horizontal, rough, undulating, fine to very fine grained 408.0' - Fracture, <5 deg, rough, undulating 408.3' - Fracture, 10 deg, rough, undulating		391.5-393.5' - yellowish gray, (5Y 8/1), fine to medium grained, delayed mild to moderate HCl reaction, very weak (R1), trace surface voids (<1/16"), 393.1': chert lens 0.05"	R42: 10 minutes
	409.0						
410 -368.0			>10	408.7' - Fracture, horizontal, rough, undulating		**No Recovery 393.5-394.0'**	
			1	408.9' - Fracture or mechanical break, <10 deg, rough, undulating, bedding plane parting 409.0' - Fracture or mechanical break, <10 deg, smooth, undulating		**Limestone**	
	R43-HQ 5 ft 72%	40	>10	409.3' - Fracture zone, horizontal orientation of fragments up to 1-3/16"		394.0-395.2' - pale greenish yellow, (10Y 8/2), fine grained, strong HCl reaction, very weak (R1), <1/16" voids over 0-5% of surface	
			1	409.6' - Fracture, horizontal, smooth, bedding plane parting		395.2-396.8' - Same as 394.0-395.2' except fine to medium grained, moderate to strong HCl reaction, voids to <1/16" over 10-20% of surface	
			NR	410.4' - Fracture or mechanical break, horizontal, rough, undulating 411.1-411.5' - Fracture zone, no visible orientation, one fragment 2-3/8", most <1-3/16", subangular, silty clay size, fine to very fine fill			R43: 10 minutes
	414.0					396.8-399.8' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), voids to <1/16" over 20-30% of surface	
415 -373.0			>10	411.9' - Fracture, horizontal, smooth, undulating		399.8-402.7' - Same as 395.2-396.8' except yellowish gray, (5Y 8/1), fine grained, delayed strong HCl reaction	
			1	412.5' - Fracture or mechanical break, 5 deg, rough, undulating		**No Recovery 402.7-404.0'**	
	R44-HQ 5 ft 88%	18	>10	414.3-414.6' - Fracture zone, no visible orientation, fragments up to 2-3/8", subangular, silt/clay intermixed with limestone fragments		**Limestone**	
			>10	414.9-415.0' - Fracture zone, no visible orientation, fragments up to 5/8", subangular 415.4' - Fracture, horizontal, rough, undulating, lithologic discontinuity		404.0-407.4' - yellowish gray, (5Y 8/1), fine to medium grained, delayed strong HCl reaction, very weak (R1), voids up to <1/16" over 0-5% of surface	
			NR	416.0, 416.05, 416.1, 416.2, 416.35' - Fractures (5), horizontal, rough, undulating, bedding plane partings		407.4-409.4' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, mild to moderate HCl reaction, weak (R2), trace voids <1/6", fine scale laminar and planar bedding	R44: 8 minutes
	419.0						
420 -378.0			>10	416.5' - Mechanical break 416.8-416.9' - Fracture zone, no visible orientation, fragments up to <5/8"', subangular to angular			Driller did not note a change in drilling patterns (no given reason for low recovery)
			>10	417.4' - Fracture, <5 deg, rough, undulating, trace fill		409.4-410.45' - yellowish gray with undulating laminae of olive gray, (5Y 8/1 and 5Y 4/1), fine to medium grained, mild HCl reaction, extremely weak to very weak (R0 to R1), voids to <1/16" over 0-5% of surface, delayed HCl reaction but strong reaction when pulverized, undulating laminations	
	R45-HQ 5 ft 42%	17	NR	417.8-418.1' - Fracture zone, no visible orientation, fragments up to 1-7/8", trace fine to very fine grained fill 419.0-419.9' - Fracture zone, no visible orientation, fragments up to 2-3/8", subround, fine to very fine fill 419.9' - Fracture, 10-20 deg, smooth			R45: 10 minutes
	424.0						

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
425 -383.0			>10	420.2-420.6' - Fracture zone, <10 deg at 420.2', no visible orientation elsewhere; fragments up to 2-3/8", mostly smaller varying sizes, trace dark brown-black staining		410.45-412.6' - yellowish gray, (5Y 7/2), fine to medium grained, delayed mild HCl reaction, very weak (R1), trace voids <1/16"	424.4': Man-made break
			>10	424.7-424.9' - Fracture zone, no visible orientation, subangular fragments up to <5/8"', fine to very fine grained fill		**No Recovery 412.6-414.0'**	
	R46-HQ 5 ft 88%	30	>10	425.3-425.5' - Fracture zone, no visible orientation, fragments up to 1-3/16", angular, trace very fine fill		**Limestone** 414.0-414.5' - Same as 410.45-412.6'	
			1	425.8-426.2' - Fracture zone, large fragments up to 3", possible multiple mechanical breaks		414.5-415.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), medium grained, mild to moderate HCl reaction, very weak (R1), voids to <1/16" over 10-20% of surface	
			>10	426.4-427.0' - Fracture zone, fragments up to 4", subangular to angular, multiple mechanical breaks during extraction		**Silty Clay (CL-ML)** 415.3-415.9' - dark greenish gray transition to greenish gray, (5GY 4/1 to 5GY 6/1), very fine to fine grained, no HCl reaction, extremely weak (R0)	R46: 12 minutes
			NR				
	429.0						
430 -388.0			1	427.2' - Mechanical break 427.5' - Fracture, horizontal, smooth, bedding plane parting		**Limestone** 415.9-418.4' - yellowish gray, (5Y 8/1), fine to medium grained, very weak (R1), moderate to strong HCl reaction where pulverized	429.5' and 429.8': Man-made breaks
			>10	427.8-428.4' - Fracture zone or mechanical break, fragments up to 3", trace dark gray/blue staining		**No Recovery 418.4-419.0'**	Only able to obtain 4.0' run due to core blockage
	R47-HQ 4 ft 100%	46	>10	429.5' - Fracture, horizontal, smooth, undulating, bedding plane parting		**Limestone** 419.0-419.9' - yellowish gray, (5Y 7/2), fine to medium grained, weak to medium strong (R2 to R3), strong HCl reaction when pulverized, clays are very fine to fine grained, extremely weak (R0), no HCl reaction, medium plasticity	
			>10	430.1-430.2' - Fracture zone, no visible orientation, fragments up to 1-3/16", trace fine to very fine infill		**Limestone** 419.9-421.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, slightly delayed strong HCl reaction, weak to medium strong (R2 to R3), <1/16" voids on 10-20% of surface	R47: 12 minutes
	433.0			430.7' - Fracture, horizontal, smooth, undulating, bedding plane parting		**No Recovery 421.1-424.0'**	
			2	430.85' - Fracture, 80 deg, rough, undulating		**Limestone** 424.0-424.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on surface 10-20%	
			2	431.0' - Fracture, horizontal, smooth, bedding plane parting 431.5' - Fracture, 45 deg, rough, undulating, fragments of quartz up to 1/2", angular to subangular		**Clayey Gravel (limestone Fragments) (GC)** 424.7-425.55' - yellowish gray, (5Y 8/1), moderate to mild HCl reaction, extremely weak (R0), fine to medium grained limestone gravels, <1/2"	
435 -393.0			1	431.9-433.0' - Fracture zone, no visible orientation, fragments up to 2", angular, trace fine to very fine fill		**Limestone** 425.55-426.2' - yellowish gray, (5Y 8/1), fine grained, very weak (R1), strong HCl reaction where pulverized	SC-6 collected at 435.3-436.2'
	R48-HQ 6 ft 100%	56	3	433.4, 433.6' - Fractures or mechanical break (2), horizontal, bedding plane parting, trace black staining			
			>10	434.0' - Fracture, horizontal, smooth, undulating			
			2	434.5' - Fracture or mechanical break, <10 deg, smooth 435.1-435.5' - Fracture or mechanical break, 45-50 deg, rough, stepped			R48: 20 minutes
	439.0						
			>10	436.3' - Fracture, horizontal, smooth, trace fill			
440 -398.0				436.5, 436.6' - Fractures (2), 20-30 deg, rough, undulating, large solid fragment 1-3/16" in between			
			>10	437.1-437.6' - Fracture zone, no visible orientation, fragments up to 2-3/8", angular to subangular, trace amounts of very fine fill			
	R49-HQ 5 ft 46%	0		437.6-438.1' - Fracture, 80 deg, rough, undulating			
			NR	438.1' - Fracture, horizontal, smooth, bedding plane parting 438.4' - Fracture or mechanical break, 40 deg, rough, undulating			R49: 10 minutes
	444.0						

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
445 -403.0			>10	439.0-439.6' - Fracture zone, no visible orientation, weak fragments <1/2", angular to subangular		**Clayey Gravel (limestone Fragments) (GC)** 426.2-426.4' - Same as 424.7-425.55' except slightly delayed strong HCl reaction, clay, low to medium plasticity	
			2	439.6' - Bedding plane, horizontal 439.8' - Fracture, <5 deg, clay and gravels <1/2" fill			
	R50-HQ 5 ft 94%	53	2	440.0-441.3' - Fracture zone, no visible orientation, fragments up to 2", mostly <1", subangular, possibly fine grained fill		**Limestone** 426.4-428.4' - Same as 425.55-426.2' except very fine to fine grained, slightly delayed moderate to strong HCl reaction, medium strong to strong (R3 to R4), laminations	Manual break above 446.5' to fit in box
			2	444.0-444.8' - Fracture zone, fragments up to 1-3/16"', subround, including quartz fragments			
			1	444.8' - Fracture, horizontal 445.6, 445.9' - Fractures or mechanical break (2), horizontal, rough, undulating		**No Recovery 428.4-429.0'**	R50: 14 minutes
	449.0		NR			**Limestone** 429.0-430.2' - alternating yellowish gray and very light gray, (5Y 8/1 and N8), fine grained, delayed mild HCl reaction, very weak to weak (R1 to R2), laminar planar bedding with some variation	
450 -408.0			3	446.6, 446.8' - Fractures or mechanical break, 10-20 deg, rough, undulating, fractures same direction			
			>10	447.5, 447.7' - Fractures, 10-20 deg, fractures angled in opposite directions: 447.5' angled toward ground surface, 447.7' angled away from horizontal			
	R51-HQ 5 ft 44%	13	NR	448.3' - Fracture, horizontal, smooth, undulating 449.3' - Fracture, horizontal, smooth, undulating, bedding plane parting 449.7' - Fracture, 30-40 deg, rough, undulating 449.7-450.0' - Fracture or mechanical break, >80 deg, rough, undulating		430.2-430.7' - yellowish gray, (5Y 8/1), very fine to fine grained, delayed mild HCl reaction, medium strong to strong (R3 to R4), trace voids <1/16"	
	454.0					**Clay (CL)** 430.7-431.0' - dark greenish gray, (5G 4/1), very fine grained, low to medium plasticity, no HCl reaction, extremely weak (R0)	R51: 14 minutes
			>10	450.0-450.9' - Fracture zone, fragments up to 2-3/8", angular to subangular, trace black staining		**Limestone** 431.0-431.5' - yellowish gray, (5Y 7/2), fine to medium grained, extremely weak (R0)	
455 -413.0			2	454.0-454.3' - Fracture zone, no visible orientation, fragments up to 1-3/4", subangular		431.5-431.9' - Same as 429.0-430.2' except yellowish gray, (5Y 7/2), weak to medium strong (R2 to R3), laminations	
	R52-HQ 5 ft 86%	0	>10	454.3-454.9' - Fracture, rough, gradually undulating 454.6, 454.8' - Fractures or mechanical break (2), horizontal to <10 deg		**Clayey Gravel (limestone Fragments) (GC)** 431.9-433.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), very fine to fine grained gravel, low to medium plasticity clay	
			>10	454.9' - Fracture, 45 deg, rough, undulating 455.2, 455.3' - Fractures or mechanical break (2), horizontal to <10 deg, rough, undulating, large angular gravels, 1-3/4"			R52: 17 minutes
	459.0		NR	455.7-456.9' - Fracture zone, no visible orientation, fragments up to 4", mostly <1-3/16", including quartz - no HCl reaction		**Limestone** 433.0-436.2' - light olive gray, (5Y 5/2), fine to medium grained, weak to medium strong (R2 to R3), strong HCl reaction when pulverized, undulating lamination	
			>10	457.0' - Fracture, 20-30 deg, rough, undulating			
460 -418.0	R53-HQ 2 ft 95%	0	1	457.3-457.5' - Fracture zone, fragments <1-3/16", including quartz			R53: 8 minutes
	461.0		NR	457.9-458.3' - Fracture zone, angular fragments up to 2-3/8", horizontal bedding plane at 457.9'			
			2	459.1-460.4' - Fracture zone, no visible orientation, fragments up to 2-3/8", subangular, including quartz		436.2-437.5' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 20% of surface	461.65': circular void with drusy crystals
	R54-HQ 3 ft 100%	39	>10	460.7' - Fracture, <10 deg, rough, undulating, fragments of quartz infill			
			2	461.1' - Fracture or mechanical break, horizontal, rough, undulating			R54: 10 minutes
	464.0						

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
465 -423.0			>10	461.9' - Mechanical break, horizontal, rough, undulating		437.5-438.0' - dark greenish gray with dusky yellow, yellowish gray, very light gray, (N8 with 5Y 6/4, 5GY 8/1, 5Y 4/1), very fine to fine grained, very strong delayed HCl reaction, strong (R4), trace chert layers	
			1	462.2' - Fracture, horizontal, smooth, bedding plane parting 462.7-463.15' - Fracture zone: at 462.7', 20-30 deg; at 463.15', 20-30 deg (opposite directions), elsewhere no visible orientation, fragments up to 1-3/4", angular to subangular		438.0-439.0' - yellowish gray, (5Y 7/2), moderate to strong delayed HCl reaction, strong (R4), <1/16" voids over <5% of surface, trace organics (peat or coal)	R55: 15 minutes
	R55-HQ 5 ft 82%	17	>10	463.4' - Fracture, horizontal, rough, undulating, bedding plane parting		**Coal** 439.0-439.5' - black, (N1), very fine to fine grained, extremely weak (R0), trace amounts of limestone fragments: dusky yellow (5Y 6/4), fine to medium grained, mild HCl reaction, trace calcite crystals to 1/8"	Milky white quartz found on table after core was boxed; possibly from fracture zone, not found somewhere in run (after boxed)
			>10	463.7' - Fracture, horizontal, rough, undulating		**Limestone Fragments** 439.5-441.3' - moderate olive brown, (5Y 4/4), fine to medium grained, extremely weak (R0), fine grains have strong HCl reaction, gravels have moderate HCl reaction, 20-30% voids on gravel, some weak (R1) gravel **No Recovery 441.3-444.0'**	
			NR	464.3-465.0' - Fracture zone, no visible orientation, angular fragments up to 1-13/16"			
469.0				465.3' - Fracture, horizontal, rough, undulating			
470 -428.0			>10	465.7-466.8' - Fracture zone, (465.7-466.1': fine to medium infill with limestone fragments); fragments up to 1-3/4", black staining, mostly infill at 466.6-466.8'			
			4	467.4-467.9' - Fracture zone, rough, undulating, horizontal at 467.4', no visible orientation elsewhere, fragments up to 2-1/16", angular to subangular, similar infill to 465.7-466.8', fine to medium grained, <10% black staining			SC-7 collected at 470.85 to 472.05'
	R56-HQ 5 ft 90%	42	0				
			>10	469.0-470.0' - Fracture zone, rough, undulating, fragments to 2-3/8", horizontal plane at 470.0'; possible bedding plane parting		**Limestone** 444.0-447.4' - yellowish gray, (5Y 7/2), fine to medium grained, very weak to weak (R1 to R2), strong HCl reaction where pulverized, voids to <1/16" over <5% of surface	R56: 10 minutes
474.0			NR				
475 -433.0			1	470.6, 470.7, 470.75, 470.85' - Fractures (4), horizontal, rough, undulating		**Limestone** 447.4-448.7' - grayish orange, (10YR 7/4), fine grained, medium strong (R3), strong HCl reaction where pulverized **No Recovery 448.7-449.0'**	
			3	472.0, 472.3' - Fractures or mechanical break (2), 20 deg, rough, undulating, opposite directions			
	R57-HQ 5 ft 100%	65	3	472.6' - Fracture, horizontal, rough, undulating 472.6-473.3' - Fracture zone, no visible orientation, fragments up to 4", mostly <2-3/8"		**Limestone** 449.0-450.0' - yellowish gray with light gray laminations, (5Y 8/1 and N7), fine to medium grained, mild to moderate HCl reaction, alternating very weak (R1) and weak (R2)	R57: 13 minutes
			1	474.3-474.5' - Fracture, horizontal to <10 deg, open with fragment 2-3/8"			
			3	475.0' - Fracture or mechanical break, horizontal to <10 deg, rough, undulating 475.3' - Fracture, 20-30 deg, rough, with fragment 1-3/16", subangular			
479.0							
480 -438.0			>10	475.9' - Fracture or mechanical break, horizontal, rough, undulating, bedding plane parting		**Limestone Fragments** 450.0-451.2' - transition from yellowish gray to moderate yellowish brown, (5Y 7/2 to 10YR 5/4), fine to medium grained, moderate to strong HCl reaction, medium strong (R3) in yellowish gray fragments, strong (R4) in moderate yellowish brown gravels **No Recovery 451.2-454.0'**	
			>10	476.3, 476.4' - Fractures (2), horizontal to <10 deg, rough, undulating			
	R58-HQ 5 ft 96%	22	>10	476.5' - Fracture, 40-50 deg, rough, undulating, with large fragments 477.4' - Fracture or mechanical break, 10-20 deg, rough, undulating			
			1	478.2, 478.5' - Fractures or mechanical break (2), <10 deg, rough, undulating, black staining			R58: 10 minutes
			2	478.8' - Mechanical break, horizontal, rough, undulating			
484.0							

CH2MHILL

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION (DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS)	SYMBOLIC LOG	LITHOLOGY (ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS)	COMMENTS (SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.)
485 -443.0	R59-HQ 4 ft 88%	0	NR >10 2 >10 3 NR	478.9' - Fracture or mechanical break, 40-50 deg, rough, undulating 479.4-479.7' - Fracture zone, horizontal at 479.7', no visible orientation elsewhere, fragments up to 1-3/4" 479.7-480.0' - Fracture or mechanical break, 80-90 deg, rough, undulating 480.0' - Fracture, 30-40 deg, rough, undulating 480.0-480.4' - Fracture zone, fragments up to 1-3/4", angular 480.4' - Fracture, horizontal, rough, undulating, bedding plane parting		**Limestone** 454.0-456.8' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, strong HCl reaction, medium strong to strong (R3 to R4), <1/16" voids on 0-10% of surface 456.8-457.3' - moderate yellowish brown, (10YR 5/4), medium grained, moderate HCl reaction, very weak (R1), trace organics	R59: 13 minutes
488.0	R60-HQ 6 ft 70%	38	3 >10 >10 >10 >10 NR	480.9-481.3' - Fracture zone, no visible orientation, fragments up to 1-3/4", angular to subangular 481.7' - Fracture, 30 deg, slightly rough, slightly undulating 481.9-482.2' - Fracture zone, no visible orientation, fragments up to 1-3/16" 482.9' - Fracture, horizontal to <10 deg, rough, undulating 483.3' - Fracture, <5 deg, rough, undulating 483.6-483.7' - Fracture, horizontal, rough, large fragment in between 1-3/16" 484.0-484.1' - Fracture zone, no visible orientation, fragments up to 1-5/8", mostly <5/8", subangular 484.3, 484.5' - Fractures (2), horizontal, slightly rough, slightly undulating, bedding plane partings		**Limestone Fragments** 457.3-458.3' - Same as 454.0-456.8' except more fragmented **No Recovery 458.3-459.0'** **Limestone** 459.0-460.0' - white to very light gray, (N9 to N8), fine to medium grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), voids to <1/16" over 10-20% surface area, laminations 460.0-460.4' - Same as 456.8-457.3' except yellowish gray, (5Y 7/2), fine to medium grained 460.4-460.9' - Same as 459.4-460.0' except moderate HCl reaction **No Recovery 460.9-461.0'**	SC-8 collected at 490.35-491.25' R60: 20 minutes
494.0	R61-HQ 6 ft 62%	22	3 >10 1 >10 NR	484.7, 484.8' - Fractures or mechanical break (2), horizontal, rough, undulating 484.9-485.2' - Fracture zone, fragments up to 2-3/8", rough, angular; horizontal fractures at 484.9' and 485.2': rough, undulating 485.4, 485.5' - Fractures or mechanical break (2), <10 deg, rough, undulating, possible bedding partings 485.8-486.3' - Fracture zone, fragments up to 3", mostly <5/8", subangular to angular 486.6' - Fracture or mechanical break, horizontal, rough, undulating 486.8, 487.0, 487.2' - Fractures or mechanical break (3), horizontal, rough, undulating 487.2-487.5' - Mechanical break, >80 deg, rough, undulating		**Limestone** 461.0-462.2' - Same as 459.0-460.0' except fine grained, strong HCl reaction 462.2-463.0' - Same as 460.0-460.4' except yellowish gray with olive gray laminations, (5Y 7/2 with 5Y 3/2) 463.0-464.0' - Same as 461.0-462.2' except very light gray with light bluish gray, (N8 with 5B 7/1), fine to medium grained, strong to very strong HCl reaction, <10% voids on surface **Limestone** 464.0-465.7' - pale greenish yellow, (10Y 8/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), long voids to 1-1/2", mostly <1/16", over 20-30% of surface, possible dissolution features	R61: 18 minutes
495 -453.0							
500 -458.0	500.0			488.0-488.3' - Fracture, 70 deg, rough, undulating 488.3' - Fracture or mechanical break, horizontal, rough, undulating 488.9' - Fracture or mechanical break, horizontal, rough, undulating, bedding plane parting 489.3' - Fracture, horizontal, rough, undulating, open with large rock fragment 1-3/4", angular 489.8-490.3' - Fracture zone, horizontal fragments, two large <4", mostly <1-3/16", trace silty infill		**Silty Limestone Fragments (GM)** 465.7-466.8' - dusky yellow, (5Y 6/4), medium grained, moderate to strong HCl reaction, extremely weak (R0) **Limestone** 466.8-467.4' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, weak (R2), <10% voids to <1/16" on surface, undulating laminations transition to planar, trace organics	

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ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION — DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	LITHOLOGY — ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	COMMENTS — SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
				491.2-492.2' - Fracture zone, or multiple mechanical breaks, fragments up to 2-1/2"-5", mostly <2-3/8", angular with variable orientation 494.2' - Fracture, horizontal, smooth, undulating 494.6' - Fracture or mechanical break, 20-30 deg, rough, undulating 494.7-495.7' - Fracture zone, horizontal at 494.7', elsewhere no visible orientation, fragments up to 3", angular 496.2' - Fracture, horizontal, rough, undulating, possible bedding plane parting 497.1' - Fracture or mechanical break, horizontal, rough, undulating 497.4-497.7' - Fracture zone, subangular fragments up to 1-3/4"		**Limestone With Peat** 467.4-468.1' - grayish black and dusky yellow, (N2 and 5Y 6/4), medium grained, dusky yellow has moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), prevalent organics **No Recovery 468.1-469.0'** **Limestone Fragments** 469.0-469.5' - yellowish gray, (5Y 7/2), with milky white quartz fragments, fine with medium coarse gravels, weak to medium strong (R2 to R3) gravels, extremely weak (R0) fines, fragments up to 4", limestone gravels mild HCl reaction, quartz no HCl reaction **Limestone** 469.5-473.5' - transition from yellow gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to medium grained, moderate to strong HCl reaction, medium strong to strong (R3 to R4), variable voids, mostly <30% up to 1/4" diameter, 470.4-<470.85': calcite crystals in voids up to 1-1/2", mostly <1/4" for 50-60% voids, at 470.8' linear features - possible burrows or dissolution features 1-1/2" to 2" long, 1/4" wide **No Recovery 473.5-474.0'** **Limestone** 474.0-479.0' - from light olive gray to yellowish gray with depth, (5Y 5/2 to 5Y 7/2), fine to medium grained fining with depth, moderate to strong HCl reaction increasing with depth, weak (R2), at 478.2' <1-3/16" zone of extremely weak to very weak (R0 to R1) with strong HCl reaction, voids <1/16" on 10-20% of surface 479.0-483.8' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, weak (R2), voids to <1/16" on 25% of surface, fossiliferous (casts and molds), 479.5-480.3': coarse pebble size fragments, very pale orange (10YR 8/2), hardness and reactivity same as surrounding lithology, 481.6-481.9': silty gravels, same as surrounding lithology, 482.4-483.1': quartz in voids, crystalline growth **No Recovery 483.8-484.0'**	

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ROCK CORE LOG

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ELEVATION : 42.0 ft (NAVD88) DRILLING CONTRACTOR : Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

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WATER LEVELS : 5.17 ft bgs on 9/13/07 START : 8/23/2007 END : 9/7/2007 LOGGER : R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	DISCONTINUITIES: R Q D (%)	DISCONTINUITIES: FRACTURES PER FOOT	DISCONTINUITIES: DESCRIPTION — DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	LITHOLOGY — ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	COMMENTS — SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
						Limestone 484.0-487.5' - yellowish gray, (5Y 7/2), fine to medium grained, weak (R2), moderate to strong HCl reaction where pulverized, voids to <1/16" on 20-30% of surface, at 485.1': silty clay zone, <2-3/8" wide, extremely weak (R0), strong HCl reaction, all other properties same as surrounding lithology, very similar to 474.0-479.0' and 479.0-483.5' **No Recovery 487.5-488.0'** **Limestone** 488.0-492.2' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction (slightly weaker with depth), weak (R2), voids to <1/16" cover 15-25% surface, voids to 1/2" with crystals that strongly react to HCl, very similar to 474.0-479.0' and 484.0-487.5' **No Recovery 492.2-494.0'** **Limestone** 494.0-497.7' - yellowish gray, (5Y 7/2), fine to medium grained decreasing with depth (fining down), moderate to strong HCl reaction increasing with depth, very weak (R1) to weak (R2) slightly increasing with depth, <1/16" voids on 0-10% surface **No Recovery 497.7-500.0'** Bottom of Boring at 500.0 ft bgs on 9/7/2007	