

GEOLOGIST'S LOG OF WELL
LM-4266 (MW-C)

<u>Depth (ft BLS)</u>	<u>Lithology</u>
0 - 12	Quartz sand, fine grained, yellowish gray (5Y 8/1), well sorted, subrounded, occasional organic material.
12 - 20.5	Sandy clay, medium to light gray, soft, cohesive, with quartz sand, as above, 60%, and phosphate, medium grained, 10%, and clay, light yellow brown, 5%.
20.5 - 22	Limestone, biomicritic, shelly, pale orange yellow, friable, good apparent porosity and permeability.
22 - 24	Limestone, biomicritic, hard, medium light gray (N6), low apparent porosity and apparent permeability fair moldic porosity.
24 - 26	Limestone, as above, biomicritic, hard, medium light gray (N6) to yellowish gray (5Y 8/1), fair to poor porosity, fair permeability trace shell fragments.
26 - 30	Limestone, as above, biomicritic, medium light gray (N6), moderate moldic porosity fair to good porosity few coral fragments rare gastropod fragments.
30 - 32	Limestone, yellowish gray (5Y 8/1), biomicritic, hard to moderately friable with minor (10%) shell fragments, fair to good apparent moldic porosity fair to good permeability.
32 - 35	Limestone, as above, biomicritic minor amount of medium gray limestone (10%) fair to good apparent porosity, fair to good permeability, common light gray limestone (25%) with good to excellent apparent porosity (moldic) and apparent permeability.
35 - 42	Drilling with no returns.

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<u>Depth (ft BLS)</u>	<u>Lithology</u>
42 - 53	Limestone, moderate yellowish brown (10YR 5/4) to light olive gray (5Y 6/1), biomicritic, with medium gray (N5), micritic limestone with fair apparent porosity and poor apparent permeability. Matrix lithology has good apparent porosity (moldic & intergranular) and good permeability.
53 - 65	Limestone, as above, with good apparent porosity (primarily intergranular but common moldic) common (20%) brittle calcitic shell fragments minor (5%) casts of mollusks.
65 - 73	Limestone, yellowish gray (5Y 8/1), biomicritic, friable, good apparent porosity and apparent permeability, common (25%) calcitic shell fragments, occasional (5%) lime mud of same color but soft and fine grained.
73 - 94	Clay, grayish olive (10Y 4/2), soft, sticky cohesive, minor (15) small granules of dark purple to black phosphate, low apparent permeability.
94 - 99	Clay, as above, soft, less cohesive than above, occasional (5%) small granules of phosphate minor (1%) pieces of large (>1cm) phosphate nodules, occasional (15%) shell fragments, low apparent permeability.
99 - 104	Clay, as above, more cohesive, slightly higher percentage of large phosphate nodules and less shell fragments.
104 - 110	Limestone, light gray (N7) grainstone with apparent good to excellent vuggy and intergranular porosity and permeability, minor (1%) amount of small granules of phosphate and shell fragments, common (20%) fine grained hard, sandy limestone of the same color and some as medium gray.

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<u>Depth (ft BLS)</u>	<u>Lithology</u>
110 - 118	Limestone, as above with apparent good porosity (vuggular & intergranular), and good apparent permeability occasional (5%) phosphate granules.
118 - 156	Limestone, brownish gray (5YR 4/1) to yellowish gray (5Y 8/1), sandy fair to good intergranular porosity, fair permeability occasional (10%) shell fragments, trace (<1) phosphate granules. Note: Lost returns from 156 - 185 feet bls.
185 - 190	Limestone, light gray (N7) to light brownish gray (5YR 6/1), biomicritic to grainstone, sandy (40%) excellent apparent porosity (intergranular and moldic) and apparent. Note: No returns from 190 - 206. Intermittent returns from 206 - 211 @ 211 drilling became quicker and softer indicating possible top of clay. Drilled with no returns.
211 - 216	Clay, pale olive (10Y 6/2), soft, silty, very fine, disseminated phosphate.
216 - 220	Limestone, brownish gray (5YR 4/1), sandy, moderately hard, containing abundant (40%) very fine to fine grained quartz sand, semi-rounded to rounded, occasional shell fragments (10%) and trace (2%) fine disseminate phosphate, good to excellent apparent porosity (mostly intergranular, some moldic) and permeability. Note: No returns from 223 - 236 partial returns from 236 - 240 no sample.
220 - 240	Limestone; as above, with stringers of olive gray (5Y 4/1) clay. No enough sample to accurately describe.
240 - 250	Clay, grayish olive (10Y 4/2), sandy, soft, possibly contains abundant shell fragments, not enough sample to accurately describe.

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<u>Depth (ft BLS)</u>	<u>Lithology</u>
250 - 280	Limestone, brownish gray (5YR 4/1) sandy, biomicritic to grainstone, very good to excellent apparent porosity (mostly intergranular but some moldic) and permeability, occasional shell fragments, minor (5%) barnacle fragments
280 - 282	Limestone, as above brownish gray (5YR 4/1) to light gray, very good to excellent apparent porosity as above, formation contains clay stringers of olive gray (5Y 4/1) clay, clay is silty to sandy. Note: At 282 feet full returns were achieved by putting hole plug in borehole.
282 - 290	Limestone, brownish gray (5YR 4/1) to yellowish gray, biomicritic with fair apparent porosity (both moldic and intergranular) common medium gray (N5) grainstone limestone (30%) with fair to good apparent porosity (intergranular), common shell fragments (25%), common coarse grained phosphate nodules (25%) trace gravel sized.
290 - 296	Limestone, as above, with common stringers of lime mud light gray (N7), soft, not very cohesive with abundant disseminated fine grained phosphate.
296 - 306	Lime mud, light gray to olive gray, sandy, abundant fine to coarse grained disseminated phosphate, soft to semi-runny, common limestone (25%) brownish gray biomicritic as above.
306 - 321	Lime mud, light gray to olive gray, as above becoming more olive gray towards base also becoming less sandy and more silty, occasional (10%) small dense limestone fragments and shell fragments becoming less common towards base, common to abundant (35 - 40%) fine to medium disseminated phosphate.

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<u>Depth (ft BLS)</u>	<u>Lithology</u>
321 - 323	Lime mud, light gray to brownish gray (5Y 4/1), soft, slightly cohesive with abundant limestone (40%) biomicritic, hard, mostly dense, common (30%) medium grained phosphate.
323 - 333	Limestone, yellowish gray (5Y 8/1) biomicritic, hard, poor to fair apparent moldic porosity, common phosphate as above, occasional (10%) lime mud, as above becoming less common towards base.
333 - 336	Limestone, grayish orange (10YR 7/4) biomicritic, good moldic porosity, hard, occasional (10%) medium grained phosphate trace (5%) shell fragments.
336 - 346	Limestone, grayish orange (10YR 7/4) to yellowish gray (5Y 8/1) biomicritic, good to excellent apparent porosity (moldic) and permeability, trace phosphate (<1%), limestone is moderately soft and friable occasional lime mud, light gray stringers from 341 to 346.
346 - 356	Clay, greenish gray (5GY 6/1) soft dry, occasional shell fragments.
356 - 358	Lime mud, medium light gray (N6) soft, moderately cohesive dry.
358 - 369	Limestone, yellowish gray (5Y 8/1) biomicritic, good apparent porosity (moldic and intergranular).
369 - 372	Limestone, white to very light gray (N8), biomicritic, fair to poor apparent porosity, common (25%) shell fragments subrounded occasional (10%) coarse clear quartz grains.
372 - 384	Sand, clear to frosted quartz, rounded, medium to coarse grained with common micritic (30%) limestone light gray, increasing to abundant from 378 - 384.

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384 - 387	Limestone, light gray (N7) to yellowish gray (5Y 8/1) micritic fair to poor intergranular porosity, common (30%) sandy, common quartz grains, as above.
387 - 390	Limestone, yellowish gray as above but less sand (20%) and better apparent porosity (air to good intergranular) occasional (10%) clay, medium gray (3%) trace disseminated phosphate.
390 - 391	Clay, grayish olive, firm to slightly soft, dry, semi-cohesive abundant clay medium gray as above.
391 - 392	Limestone, light olive gray, micritic, moderately hard, poor apparent porosity common (30%) clay medium gray abundant (40%) clay, grayish olive.
392 - 399	Clay, grayish olive (10Y 4/2) soft sticky dry, silty, common (30%) medium gray clay as above, occasional (15%) micritic limestone as above, occasional (10%) disseminated fine phosphate.