

GEOLOGIST'S LOG OF WELL  
LM-4265 (MW-B)

<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 - 18	Sandy clay, medium light gray (N6), soft, cohesive, with quartz sand, as above, 60%, phosphate, medium grained, friable, 10%, and clay, pale yellowish brown (10YR 6/2), soft, 5%.
18 - 24	Limestone, biomicritic, shelly, pale yellowish orange (10YR 8/6), friable, good apparent porosity and apparent permeability.
24 - 31	Limestone, biomicritic, moldic, hard, medium light gray (N6) to yellowish gray (5Y 8/1), matrix displays low apparent permeability (moldic).
31 - 39	Limestone, as above, but more shelly, high apparent permeability (lost circulation zones).
39 - 51	Lost circulation hard drilling not returns.
51 - 75	LCZ - soft drilling no returns.
75 - 81	Clay, grayish olive (10Y 4/2), semi-firm to soft, cohesive to semi-cohesive, very low apparent porosity and apparent permeability.
81 - 84	Clay, as above, with interbedded shell fragments, and containing minor phosphate, black (N1), rounded, medium coarse.
81 - 101	Clay, as above, but more cohesive containing less shell material.

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<u>Depth (ft BLS)</u>	<u>Lithology</u>
101 - 108	Limestone, light olive gray (5Y 6/1) to medium gray (N5), biomicritic, moderately hard, containing common (30%) shell fragments, fair apparent intergranular porosity, good moldic and vuggy porosity, excellent apparent permeability, with minor (10%) medium grained phosphate.
108 - 117	LCZ - no returns.
117 - 149	Limestone, yellowish gray (5Y 7/2) biomicritic, sandy to calcaenitic, moderately friable, excellent intergranular porosity and apparent permeability with trace (<5%) clay, grayish olive (10Y 4/2), soft, and abundant (40%) calcitic shell fragments, and minor (10%) phosphate, fine grained.
149 - 151	Limestone, as above, with interbedded layers of clay, as above, and abundant (50%) medium grained phosphate.
151 - 162	Limestone, biomicritic, as above, with trace (<5%) clay, as above, and minor (10%) phosphate, as above, and common (30%) calcitic shell fragments increasing with depth.
162 - 169	Clay, grayish olive (10Y 4/2), soft, slightly cohesive, with abundant (40%) shell fragments and occasional (20%) medium grained phosphate interbedded with limestone, biomicritic, as above.
169 - 207	Limestone, biomicritic, shelly, sandy to calcarenitic, as above, with minor (10%) clay, soft, cohesive, grayish olive, containing occasional (20%) medium grained phosphate.
207 - 230	Clay, light olive gray (5Y 6/1) to olive gray (5Y 4/1), silty, fossiliferous, phos., some very thin limestone beds; clay is soupy to semi-cohesive.

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<u>Depth (ft BLS)</u>	<u>Lithology</u>
230 - 248	Limestone, yellowish gray, biomicritic, sandy, and clay, olive gray, phosphatic, silty, semi-cohesive.
248 - 270	Clay, olive black (5Y 2/1), silty, phosphatic, some shell fragments, and much very fine grained quartz sand; some interbedded clay, light olive gray, silty, phosphatic.
270 - 297	Clay, olive gray, silty, phosphate, minor shell material; thin phosphate layer @ 296; clay, as above, not very cohesive.
297 - 299	Clay, olive gray to light olive gray, silty, highly, phosphatic, abundant shell material.
299 - 317	Lime mud, light gray (N7), fairly cohesive, sticky, slow dig.
317 - 325	Lime mud, light olive gray (5Y 6/1), soft, sticky, semi-cohesive, with common (10%) fine to medium grained phosphate minor (5%) shell and barnacle fragments.
325 - 338	Limestone, grayish orange (10YR 7/4) to yellowish gray (5Y 8/1), biomicritic, moldic, hard to friable, fair apparent porosity and permeability, with common (30%) shell and barnacle fragments and occasional (20%) phosphate, black (N9), granule size, subrounded and minor (5%) lime mud, as above.
338 - 354	Limestone, as above but with minor (10%) quartz sand, clear medium grained, rounded, and no lime mud.
354 - 356	Lime mud, light olive gray (5Y 6/1), soft, moderately cohesive, with minor (10%) shell fragments and trace (5%) phosphate, as above.
356 - 361	Limestone, biomicritic, grayish orange to yellowish gray, shelly, hard, moldic, good apparent porosity and permeability, with minor (5%) phosphate granules.

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361 - 368	Lime mud, light olive gray, soft, sticky, with minor (10%) shelly limestone fragments, as above, trace (5%) phosphate medium to fine grained, and trace (5%) quartz sand, fine grained.
368 - 372	Lime mud, as above with common (30%) limestone, biomicritic, shelly, grayish orange, friable.
372 - 384	Limestone, medium light gray, biomicritic, sandy, friable, with good apparent porosity and permeability, common (30%) quartz sand, coarse to medium, clear, rounded, and minor (10%) phosphate granules.
384 - 391	Limestone, as above, but with trace (<5%) quartz sand.
391 - 408	Limestone, biomicritic, light gray to light yellowish gray, moderately friable, moldic, with minor shell fragments (10%) trace (5%) quartz sand, as above, trace (<5%) phosphate granules, and occasional (20%) clay, medium light gray, soft cohesive, interbedded with limestone.
408 - 410	Lime mud, medium light gray, soft, moderately cohesive, sticky, with common (30%) limestone, as cohesive, and common (30%) quartz coarse, clear, rounded.
410 - 418	Lime mud with limestone, quartz sand, and shell fragments, as above, with minor (10%) phosphate gravel, subangular and occasional (20%) fine grained phosphate.
418 - 423	Lime mud, medium gray, soft, moderately cohesive, sticky, with occasional (20%) shell and barnacle fragments, occasional (20%) phosphate, fine grained to granule-sized, and trace (5%) quartz grains, medium to coarse, rounded, clear.

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<u>Depth (ft BLS)</u>	<u>Lithology</u>
423 - 429	Lime mud, as above, interbedded with bivalve fragments and limestone, biomicritic, moldic and shelly, light yellowish gray, shelly, sandy.
429 - 443	Lime mud, as above, but interbedded with abundant (40%) shell fragments, minor (10%) lime mud, white (N9), soft, phosphatic, and occasional limestone, pale yellowish orange, sandy, moldic and trace (5%) clay, medium gray, stiff, dry.
443 - 452	Limestone, biomicritic, white (N9) to light gray (N7), medium hard, micritic, calcarnitic, minor (5%) phosphate, fine to medium grained, occasional (20%) shell fragments, medium to fair apparent porosity and permeability.
452 - 462	Limestone, biomicritic, shelly, phosphatic, medium light gray (N6) to yellowish gray (5Y 8/1), moderately hard, friable, containing minor (10%) fine-grained phosphate in micritic matrix, with abundant (40%) calcitic bivalve fragments, minor to fair moldic porosity, low to fair apparent permeability.
462 - 464	Clay, grayish olive (10Y 4/2) moderately stiff, cohesive, with limestone (25%) as above.
464 - 476	Limestone, biomicritic, light gray (N7), moderately hard, moderately friable, with occasional (20%) bryozoan and shell fragments, moderate porosity, fair apparent permeability.
476 - 482	Limestone, biomicritic, shelly, light olive gray (5Y 6/1), with occasional (20%) fine grained phosphate, in matrix and common (30%) calcitic shell fragments. Good to fair porosity and apparent permeability.

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<u>Depth (ft BLS)</u>	<u>Lithology</u>
482 - 487	Limestone, biomicritic, as above, with trace (5%) lime mud, white, soft.
487 - 491	Limestone, as above, with no lime mud.
491 - 503	Limestone, grayish yellow (5Y 8/4) biomicritic, to calcarenitic, moderately hard, friable, with minor (10%) fine grained phosphate in matrix, with minor shell fragments (10%), interbedded layers of occasional (20%) clay, grayish yellow, soft, semi cohesive, minor (5%) clay, medium gray, hard, fair porosity, fair apparent permeability.
503 - 505	Lime mud, phosphatic, soft, semi-cohesive, medium gray (N5) to light gray (N7), with occasional (20%) fine grained phosphate, and common (30%) limestone, as above.
	TD = 505 feet BTOC ( 503.5 feet - BLS)