Facies Code	Name	Description	Al wt. %	Si wt. %	Ca wt. %	Mg wt. %	TOC wt. %	Depositional Process Interpretation
BMR1	Black Mudrock 1	Massive, ungraded, silty mudrock, silt/clay matrix, pyrite common to abundant, silica filled algal cysts (0.1-1.3mm), sponge spicules, occasional burrows, light-brown laminations of clayey sediment or rare fossiliferous debris, detrital silt and dispersed calcium carbonate silt	3.1-5.9 avg.=4.9	25.0-33.0 avg.=29.0	0.30-5.5 avg.=2.1	0.28-1.1 avg.=0.54	0.7-5.7 avg.=3.1	Suspension fallout
BMR2	Black Mudrock 2	Massive, ungraded, clayey mudrock, clay/silt matrix, pyrite common to abundant, silica filled algal cysts (0.1-1.3mm), occasional silty/clayey laminations, detrital silt, burrows, rare fossiliferous debris	6.1-8.3 avg.=7.0	23.2-31.0 avg.=27.1	0.22-2.8 avg.=0.98	0.06-0.58 avg.=0.29	0.69-4.0 avg.=2.1	Suspension fallout
GMR	Grey Mudrock	Massive, normal grading rare, clay/silt matrix, pyrite common, few silica filled algal cysts (0.1-1.3mm), occasional burrows, silty laminations, fossiliferous debris more common than BMR1 and BMR2, calcium carbonate silt, scarce detrital silt, lime mud matrix common	2.5-8.3 avg.=5.8	14.4-26.9 avg.=23.0	0.90-18.5 avg.=6.2	0.060-0.58 avg.=0.33	0.22-1.8 avg.=1.6	Low density turbidites and suspension fallout
M-Ls	Magnesium rich-Limestone / Dolostone	Massive, ungraded, dolomitic crystalline matrix, fossil grains/debris common, pyrite scarce	0.19-1.0 avg.=1.1	6.8-9.3 avg.=7.8	21.0-24.0 avg.=23.0	3.5-7.2 avg.=5.4	0.21-0.57 avg.=0.43	*In situ* submarine lithification
Ws	Wackestone/ Floatstone	Massive, ungraded, poorly sorted, sub-rounded to sub-angular clasts of cemented boundstone, projected clasts, non-scoured base, crinoids, brachiopods, bryozoans, foraminifera, gastropods, trilobites, occasional phylloid algae, silicified fossil grains/debris, pyrite, often dolomitized matrix, variable grain size	0.29-2.8 avg.=1.4	4.2-21.0 avg.=10.0	17.0-34.0 avg.=25.0	0.11-4.0 avg.=1.3	0.07-1.1 avg.=0.65	Debris flow
Ps	Packstone/ Rudstone	Massive, ungraded, poorly sorted, sub-rounded to sub-angular clasts of cemented boundstone, projected clasts, non-scoured base, crinoids, brachiopods, bryozoans, foraminifera, gastropods, trilobites, occasional phylloid algae silicified fossil grains/debris, pyrite, common dolomitized matrix, variable grain size	0.0-1.7 avg.=0.56	1.9-17.0 avg.=8.3	18.0-36.0 avg.=28.0	0.066-1.8 avg.=0.80	0.21-0.76 avg.=0.46	Debris flow
Gs	Grainstone	Thinly bedded, normal graded, often very fine-grained sand/silt to calcium carbonate silt, well sorted, often unidentifiable fossiliferous debris, silicified fossil grains/debris, pyrite	0.0-0.38 avg.=0.09	3.1-5.9 avg.=4.2	28.0-37.0 avg.=34.0	0.49-1.0 avg.=0.92	0.12-2.1 avg.=0.66	Turbidity current
Mx	Mixed	Distorted bedding, grading common, well to moderately sorted, deformed lamina of more clayey matrix/carbonate debris, silica filled algal cysts, occasional burrows, and localized cements	1.0-6.0 avg.=4.3	12.0-28.0 avg.=22.0	1.0-23.0 avg.=9.0	0.060-0.76 avg.=0.43	0.83-1.4 avg.=1.0	Soft sediment deformation (slumping)
DMB	Diagenetic Mineralized Beds	Massively bedded, ungraded, inches to one foot thick, bioturbated, phosphate nodules, pyrite, and glauconite indicative of this interval	0.0-4.8 avg.=3.2	9.5-33.0 avg.=23.0	1.3-19.0 avg.=7.6	0.16-5.2 avg.=1.2	na	Diagenetic alteration

Supplemental Table 1. Facies Table, Upton County Drill Core.
Nine distinct facies have been identified in the Upton County Drill core through thin section and inorganic chemostratigraphic analysis. This table displays facies codes, descriptions, associated major elemental analyses, wt. % TOC, and interpreted depositional processes. Numerical data describes the range of elemental variation within the facies types as well as average elemental concentrations derived from XRF analysis. These data are only from intervals that contained both XRF and thin section data with the exception of the Diagenetic Mineralized Beds facies. There were no thin sections that captured the DMB facies type for this study. However, these beds can be identified macroscopically in the core and XRF data was collected over these intervals.