

Stratigraphy of the Marble Falls Interval (Pennsylvanian), Jack and Wise Counties, Texas

Klinton M. Farrar

EOG Resource

The Marble Falls interval in the northern portion of the Fort Worth basin is comprised of five informal stratigraphic units. Four units, an upper limestone, upper shale, lower limestone and lower shale, are present in the eastern half of Wise County. The limestones and shales inter-finger to the west in Jack County with a heterolithic unit comprised of interbedded siltstone, mudstone and. Four lithologies are present in core taken in the Marble Falls interval in the House No. 1 well in southwestern Jack County. Here only the heterolithic unit is present. It is comprised almost entirely of spiculitic siltstone and laminated black mudstone. Crinoidal siltstone is present in a thin interval near the top of the heterolithic unit. A dark micritic limestone is present beneath the heterolithic interval in the core.

Six facies are present in the heterolithic unit in the cored interval. The facies are defined primarily by the relative abundance of siltstone to mudstone or claystone, and secondarily by the composition of the silt fraction and degree of bioturbation. Facies A is a light gray, laminated spiculitic siltstone with thin interbeds of dark gray to black laminated mudstone. Siltstone comprises 90% of the facies and is often highly bioturbated. The laminae in the siltstone are generally continuous across the core. Facies B consists of nearly equal amounts of highly bioturbated crinoidal siltstone and black claystone. Facies C resembles facies A, but the laminae in the siltstone are discontinuous across the core. Facies D contains significant amounts of quartz in the silt fraction and relatively fewer sponge spicules, but otherwise resembles facies C. Facies E is a black claystone with thin interbeds of spiculitic siltstone. The siltstones are moderately bioturbated. Facies F also consists of black claystone with thin interbeds of spiculitic siltstone, but the interbedded siltstones are not bioturbated.

The two facies (E, F) comprised mainly of black claystone are present only in the lower third of the core, and the one (F) in which the interbedded siltstones are not bioturbated is found only at the base of the core. Facies C comprises most of the cored interval (48%). It is inter-bedded with Facies E in the lower third of the core and passes upward in to silt-rich facies (A, B) at the top of the core. The stacking of facies reveals a gradual change from a low-energy anoxic setting to a higher energy environment with a thriving infauna. This change in depositional conditions during the deposition of the heterolithic unit probably represents a shift from basinal to slope and shelf settings associated with the filling of the Fort Worth basin in the late Pennsylvanian.