State suggest a probable density-flow mechanism for the deposition of the sandstones which were subsequently modified to form HCS units.

A 150-m (500-ft) thick section of flat Ithaca sediments is well exposed in the Finger Lakes region where the formation can be traced for kilometers both parallel and normal to the paleoshoreline. This shallow marine sequence is composed largely of fine sandstones and mudstones deposited in an Upper Devonian epicontinental sea. Detailed examination of the sandstone beds at the base of the Ithaca Member reveals a marked transition over a distance of 40 km (25 mi) normal to the shoreline from a hummocky cross-stratified sequence within the more proximal facies to a sequence of interbedded sandstones and shales displaying turbidite features in the more distal western exposures. The section also indicates shallowing paleodepths upsection, with vertical sequences suggesting a progression of environments increasingly dominated by the encroaching shoreline of a regressing sea.

One explanation for the observed lateral transition of sedimentary features normal to paleoshoreline is that the hummocky cross-stratified beds and the turbidites were deposited concurrently. Subsequent reworking of the HCS unit by storm waves would account for its variant internal sedimentary features. This is in accord with the results presented in 1979 by Hamblin and Walker.

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Clay-Mineral Relationships in Some Low-Permeability Hydrocarbon Reservoirs and Their Use as Predictive Resource Tools

Detailed mineralogical characterizations, using X-ray diffraction and scanning electron microscopy of sand-shale and carbonate-shale-bentonite sequences, of some classic low permeability hydrocarbon reservoirs reveal basic clay-mineral relationships that are helpful in evaluating the extent of diagenesis and petroleum resource potential.

Gas-potential units of the El Paso Natural Gas 1 Wagon Wheel and BELCO 3-38 (formerly INEXCO 1-A WASP) wells, Green River basin, Wyoming, contain shales composed primarily of altered detrital clay suites of various origins and compositions that are consistently different than authigenic clays formed within adjacent sandstones. Commonly, discrete illite is abundant in the shales as a major detrital component; the percentage of illite is lower in the sandstones. Chlorite typically comprises a high percentage of the clay-size ($<2\mu m$) material of sandstones and is primarily authigenic, however, little chlorite ($<8\%$) is inherent in the shales. Authigenic interstratified illite-smectite (I/S) formed in relatively clean sandstones is typically less illitic and more restricted in composition range than I/S clay of various origins within shales or shale-laminated sandstones.

Therefore, because of these primary differences in clay mineral assemblages between sandstones and shales from these units, log interpretations of low permeability sand reservoirs should not be extrapolated from the log response of adjacent shales. The composition of I/S clay from relatively cleaner sands also may give a better indication of diagenetic "minimums."

Indigenous gas and oil are produced from low-permeability chalk beds of the Upper Cretaceous Niobrara Formation within the Denver basin of eastern Colorado and western Kansas. Clay-mineral studies of I/S clay in insoluble residues of shaly chalk sampled throughout the basin show that the starting composition of the I/S clay in these strata is highly variable due to a complex mixing of I/S clays from many different sources at the time of deposition. However, the composition of I/S clay from thin bentonites in these strata is quite consistent throughout a section from any one specific location and/or depth, and these clays become progressively more illitic and ordered with increasing temperature due to increased burial. At approximately 60% illite layers in I/S, the I/S of bentonites proceed from random ($R = 0$) to short-range ordered ($R = 1$) interstratification. I/S clay formed in thin, discrete bentonite beds within Niobrara strata, where original starting compositions were nearly fixed and uniform and there was little or no contribution from detrital clays, is the best indicator of the extent of diagenetic reactions. The presence (or absence) of regular interstratified clay minerals in thin bentonite beds of the Niobrara can, therefore, be used as relative geothermometers for constructing predictable petroleum resource maturation maps of the Denver basin and adjacent areas.

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Patterns of Uranium Mineralization in Reading Prong

Recent studies of uranium occurrences in the Precambrian crystalline terrain of the Reading Prong show a definite correlation between the presence of uranium and late stage magmatic activity during the Grenville orogeny. All uranium concentrations examined show a close spatial association with catazonally emplaced granitic, alaskitic, or pegmatitic rock of anatectic origin. Published age dates indicate that uranium concentrations developed during the period 975 to 950 m.y. The ultimate source of the uranium is a granitic magma formed by partial melting of the metasediments in the root zones of the Reading Prong. Emplacement of granitic layers into a variable metamorphic sequence has resulted in different types of uranium occurrences. (1) Anatectic granite association: granitic stocks and sheets intruded into the metasedimentary section near the zone of anatexis may show internal enrichments of uranium. (2) Magnetite association: magnetite ore bodies provide locally reducing conditions ("oxygen-sink") to precipitate uranium released from nearby intrusions. (3) Metasedimentary contact association: granitic intrusion into a lower pressure zone in a metasedimentary sequence may result in release and concentration of uranium from a fluid phase along the intrusive contact. (4) Skarn association: similar to type 3, uranium concentrations may develop where uraniferous granites intrude a calc-silicate assemblage. (5) Massive sulfide assemblage: uranium concentrations can develop in the reducing environment where a granitic magma intrudes or abuts a massive sulfide body.

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Burial Cementation—Is It Important? A Case Study—Stuart City Trend, South-Central Texas

The Stuart City trend is a shelf-edge buildup of Lower Cretaceous bioclastic and reefal carbonates that is currently buried to depths of between 3,300 and 5,000 m (11,000 and 16,000 ft). Compaction and cementation have generally reduced rock porosities to less than 9%. Sediments were cemented in the marine environment by finely crystalline bladed, isopachous cement and volumetrically important (14 volume %) coarse to very coarsely crystalline, fibrous to bladed, isopachous, Mg-calcite cement. These cements have been neomorphically altered