Conclusions

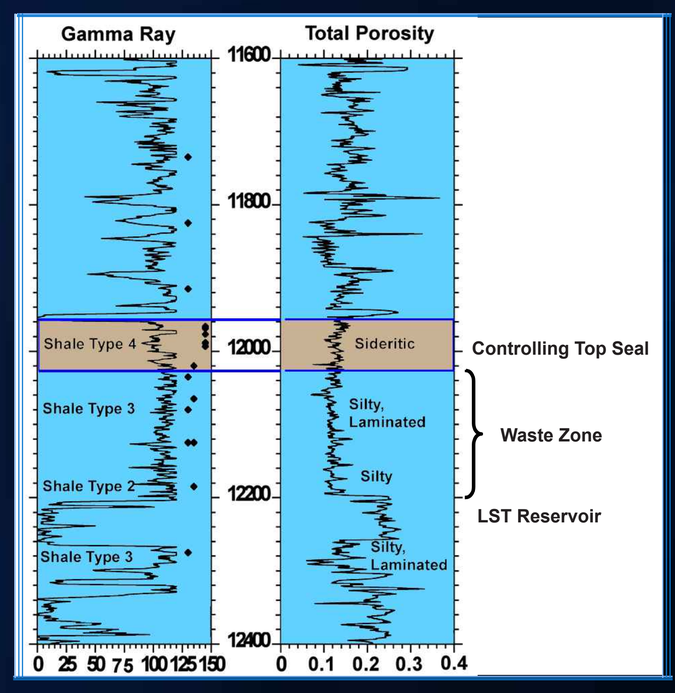
Lewis Shale strata consist of at least 5 argillaceous microfacies that exhibit distinctive sedimentological and petrophysical features along with significant variations in seal character.

Uppermost transgressive and condensed shales (Lewis Shale microfacies 1 and 4) offer excellent to exceptional top seal potential. These shales occur preferentially in distal parts of marine depositional systems.

The top seal capacity of highstand (Lewis Shale microfacies 2 and 5) and lowstand (Lewis Shale microfacies 3 and 5) intervals is reduced mainly because of elevated content (> 25%) of detrital silt and disrupted fabrics (extensive bioturbation).

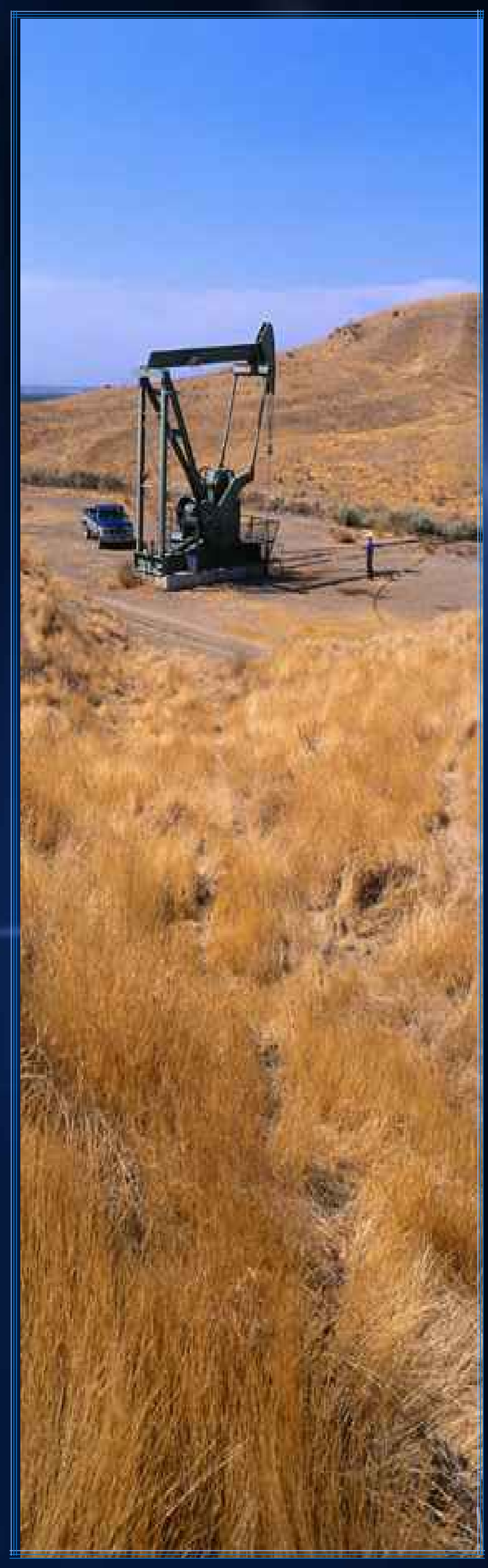
Significant stratigraphic separation (several hundred feet) can exist between a lowstand sandstone reservoir and its controlling top seal horizon (i.e., overlying transgressive shale).

Factors that tend to enhance sealing characteristics of marine shales include: low content (< 25%) of detrital silt; relatively slow rates of accumulation; low oxygen levels and limited bioturbation (preservation of laminar fabrics); and increasing content of Fe- and Mg-enriched minerals.



Seismically significant parameters (e.g., density, shear velocity, Poisson's ratio, and compressional velocity) exhibit systematic variations that are consistent within the 3rd-order sequence stratigraphic framework of the Lewis Shale.

Seismic modeling reveals a potential of some shales to exhibit an AVO response comparable to that exhibited by hydrocarbon-saturated sandstones.



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