Stratigraphic Partitioning Of Reservoirs: The Evolution Of Reservoir From Deposition To Diagenesis

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ABSTRACT

Reservoir characterization is a critical step in proper management of a field if efficient and effective recovery of hydrocarbons is to be realized. Such characterization should begin as early as the proposed drilling of the well and continue right through the life of the field. Characterization involves the use of all data sets available, from the cuttings and the fluids recovered to the geophysics used to characterize the play, to advanced technologies applied during the life of the play. Unfortunately, it will continue to be reality for some time to come that the costs of such characterization efforts will be considered by many operators to be an unnecessary erosion of revenue derived from quick recovery of as much hydrocarbon as possible in the shortest time-frame. The tide is changing however with the result that future fields can look forward to having less hydrocarbon left in the ground by the end of their productive lives.

Stratigraphic partitioning defines those factors which lead to the subdivision of reservoirs into compartments having varying degrees of connectivity and which thereby directly influence the effective production of hydrocarbons. Stratigraphic partitioning is the result of a variety of conditions which developed during the deposition of the reservoir and then subsequently were modified during the burial, diagenesis, and subsequent infusion with hydrocarbons. The style of compartmentalization due to partitioning elements has a direct effect on the producibility of hydrocarbons in the field.

Assessment of partitioning starts with examination of the field itself. Is it a single depositional entity, or a combination of entities? For example a field may consist of a single point bar, or may be a segment of a meander belt. The initial scale of partitioning is different in both cases and the management of such fields must be addressed accordingly. Similarly, partitions encountered in longshore portions of a barrier island complex are quite different than those in the areas of the tidal channel cut-throughs.

Fluids in reservoirs are often evaluated only in the context of the field itself and most often are limited to the unit of the reservoir. In reality the fluid system affecting any reservoir is regional in scope. The plumbing system of the reservoir is simply one aspect of the larger system utilized for fluid migration. Thus regional characterization of reservoirs offers considerable insight into the effects of diagenetic partitioning which often transcend the reservoir type. For example, the various elements of a mixed coastal and fluvial complex are subject to the same regional chemistries of migrating fluids throughout, although local chemical inputs can provide for some modification of the regional relationships. The

specific depositional settings within the complex serve to influence the plumbing system relationships. Evaluation of the regional relationships not only provides insight into proper management of a particular reservoir, but it can lead to the identification of new reservoirs.