

NORTH AMERICAN EXPLORATIONISTS

Mississippi Salt Basin: Salt Distribution's Influence on Structure, Stratigraphy and Hydrocarbon Accumulation

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The Mississippi Salt Basin is a Mesozoic interior salt basin lying in the northeastern Gulf of Mexico. Original salt thickness in the basin was 3,000' to 5,000' over an estimated 20,000 square miles. The Mississippi Salt Basin, approximately 27,000' deep, is very clastic rich and the reservoirs are chiefly Jurassic and Cretaceous sands and a Jurassic carbonate. The source rock for most of the salt basin is the Jurassic Smackover carbonate and five regional seals have been identified.

Salt distribution can be separated into various structural styles depending on location within the basin (increasing overburden and salt thickness in a basin direction). The primary forces acting on the salt in this basin are differential loading and buoyancy with minimal

effect from gravity sliding and extension. The early loading effect of the clastic Norphlet and the size of the salt basin has helped differentiate this basin from the interior East Texas and North Louisiana salt basins. The Norphlet and the finite amount of original salt has created the present salt structural styles.

The different structural styles have had varying effects on the source rock and regional seals, therefore localizing hydrocarbon accumulations. Most of the large accumulations known to date are associated with the basin-bounding fault/graben system. The salt ridges and shallow piercement (salt dome) areas have very little oil or gas accumulations. The salt ridges high enough to disrupt Jurassic seals have varying fetch (drainage) depending on the shape of

the salt structure. This yields little production on the ridges; however, inter-ridge Jurassic/Cretaceous structures with more fetch may contain undiscovered oil and gas. The salt dome area has had some recent drilling success but late movement and a downbuilding history provides very little fetch. The interdomal inversion features are again the traps to pursue in this area and there is established Jurassic and Cretaceous production. The key for structural interpretation and successful economic ventures in the Mississippi Salt Basin is predicting salt movement and timing, estimating available salt volume (for height and shape of structure) and establishing the effects these have had on fetch, migration and regional seals.

Charles L. Sharpe - Biographical Sketch

Chuck Sharpe is a geologist with Amoco Production Company in

Houston. He graduated in 1976 from Morehead State University (Ky) with a BS in Geology and completed his graduate work at the University of Florida in 1980 receiving a MS in Geology. He has worked for Amoco since 1980 in various

assignments in and around the Gulf of Mexico. His current assignment is within the Worldwide Exploration Business Group working in the northern Gulf of Mexico on sandstone diagenesis.

Granville W. Smith - Biographical Sketch

Granville Smith is a geophysicist with Amoco Production Company and is a

graduate of Tennessee State University. In his 25 years, he has worked West Texas, Gulf of Mexico, Michigan and various other domestic areas, including a two year assignment working the Mississippi Salt Basin through 1992. His

current assignment is in Amoco's Egypt Business Unit interpreting 3D data sets in the Gulf of Suez. He is a member of the Society of Exploration Geophysicist.