

Deep Reservoir Quality

Gulf of Mexico

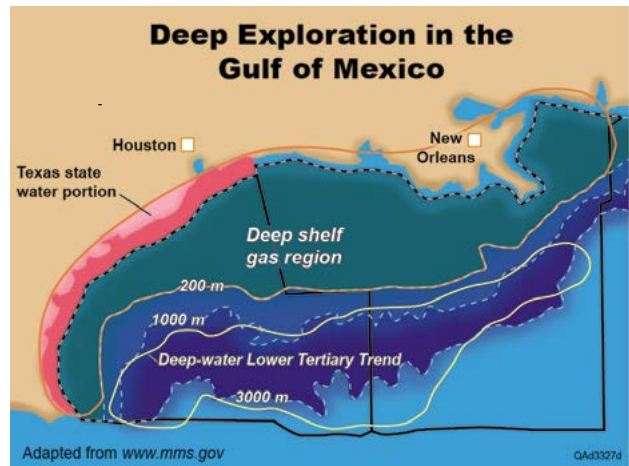
Objective

This project provides concepts and data that can be used to forecast reservoir quality, reservoir architecture, and associated risk factors when drilling deep to ultradeep (15,000–35,000 ft)

targets beneath the Gulf of Mexico (GOM) shelf and deep water. The study adds valuable updip regional knowledge for companies focused on downdip deep-water exploration.

Research

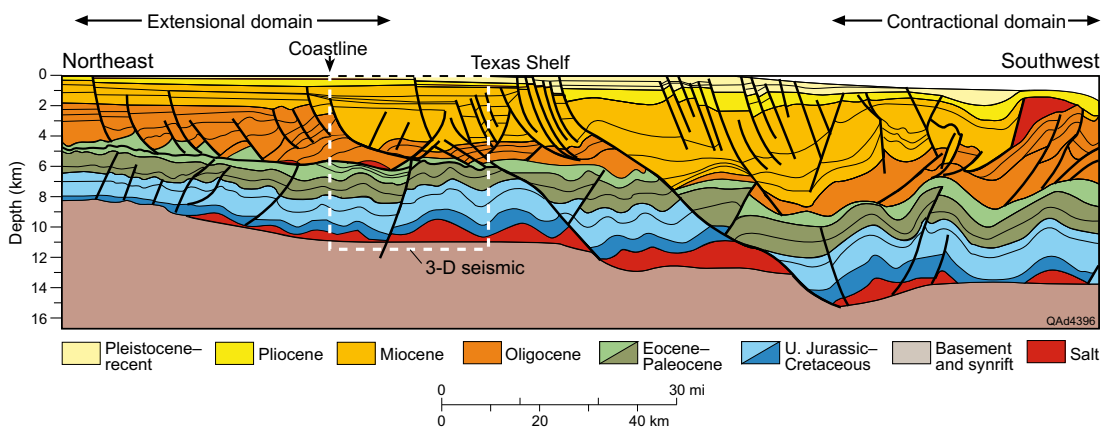
In January 2014, we began a study of Upper Jurassic Cotton Valley and Smackover sandstones in the northeastern GOM. We also continue to investigate reservoir quality in lower Tertiary reservoirs by studying onshore Wilcox sandstones from Zapata County, near the Texas–Mexico border. We will assess regional trends in sandstone composition, diagenesis, pore types, and reservoir quality to evaluate reservoir potential in the deep-shelf play and deep-water GOM. Samples will be placed into a sequence-stratigraphic systems tract framework so that the influence of stratigraphic setting on texture, grain size, detrital mineral composition, and diagenesis can be evaluated.



Approach

The greatest unknown and most critical risk factor for deep to ultradeep exploration is reservoir quality. To improve reservoir-quality forecasting for deep Cotton Valley, Smackover, and Wilcox reservoirs, we will conduct regional studies using data from onshore wells in Texas, Louisiana, and Mississippi. These multidisciplinary studies, which

are conducted by a team of experienced geoscientists, include (1) petrographic analysis of rock samples, (2) statistical analysis of porosity/permeability relationships to controlling parameters, (3) burial-history modeling of key wells, and (4) interpretation of sequence-stratigraphic systems tract framework.



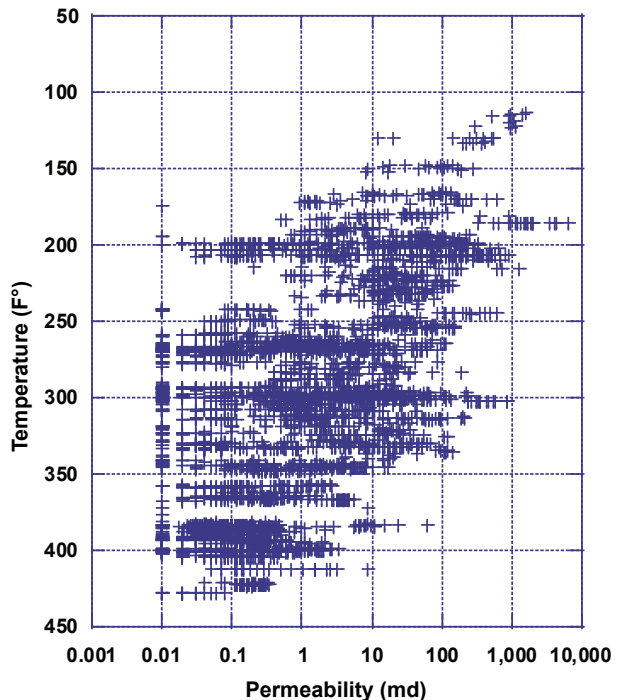
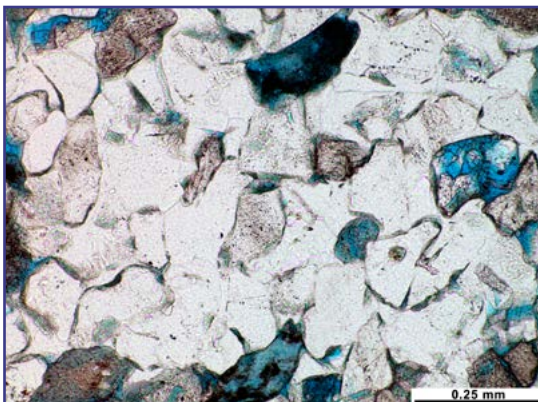
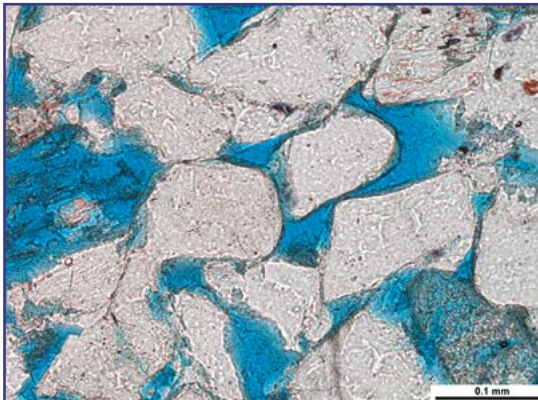
General stratigraphic and structural architecture of the Texas shelf (modified from Peel et al., 1995).
The project is improving understanding of deep-play potential.

Products

Research results are distributed to member companies each year at a project-review meeting and in deliverables posted online, with a final written report provided at the end of the study. Products include:

- ◆ Core descriptions of major Cotton Valley, Smackover, and South Texas Wilcox cores, with sequence-stratigraphic interpretation
- ◆ Databases of Cotton Valley, Smackover, and Wilcox sandstone mineralogy
- ◆ Core-analysis porosity and permeability data
- ◆ Analysis of reservoir-quality trends versus depth and temperature
- ◆ Databases of sandstone porosity and permeability organized by depth, temperature, and pressure in a web-based search system
- ◆ Annual project meeting to convey research results

Results of previous studies of stratigraphic/structural architecture and sandstone reservoir quality of deep Tertiary reservoirs and Upper Cretaceous Tuscaloosa/Woodbine reservoirs along the Texas and Louisiana Gulf Coast are available for purchase.



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