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Basin Analysis and Petroleum System Characterization and Modeling, Interior Salt Basins,  
Central and Eastern Gulf of Mexico

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## **Abstract**

The principal research effort for Year 1 of Phase 2 (Concept Demonstration) of the project is Smackover petroleum system characterization and modeling. The necessary software applications are in the process of being acquired to accomplish this work. No major problems have been encountered to date, and the project is on schedule.

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# **Basin Analysis and Petroleum System Characterization and Modeling, Interior Salt Basins, Central and Eastern Gulf of Mexico**

First Quarter Report for Year 1, Phase 2  
May 1, 2006—July 31, 2006

## **Introduction**

The University of Alabama and Louisiana State University have undertaken a cooperative 5-year, fundamental research project involving sedimentary basin analysis and petroleum system characterization and modeling of the North Louisiana Salt Basin and Mississippi Interior Salt Basin. According to the USGS, the hydrocarbon volume of these basins ranks them in the top 8% of the most petroliferous basins of the world.

## **Executive Summary**

The principal research effort for Year 1 of Phase 2 (Concept Demonstration) of the project is Smackover petroleum system characterization and modeling. The necessary software applications are being acquired to accomplish this work. No major problems have been encountered to date, and the project is on schedule.

## **Project Objectives**

The principal objectives of the project are to develop through basin analysis and modeling the concept that petroleum systems acting in a basin can be identified through basin modeling and to demonstrate that the information and analysis resulting from characterizing and modeling of these petroleum systems in the North Louisiana Salt Basin and the Mississippi Interior Salt Basin can be used in providing a more reliable and advanced approach for targeting stratigraphic traps and specific reservoir facies within a geologic system and in providing a refined assessment of undiscovered and underdeveloped reservoirs and associated oil and gas resources.

## **Experimental**

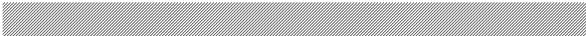
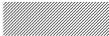
### Work Accomplished

*Smackover Petroleum System*—Work to characterize and model the Smackover petroleum system in the North Louisiana Salt Basin has started. Petromod software applications are being acquired by the UA to accomplish the hydrocarbon migration pathway flow modeling. Additional Smackover samples have been acquired by LSU to perform additional characterization work, including geochemical analyses.

Work Planned

*Smackover Petroleum System*—Work to characterize and model the Smackover petroleum system will continue.

**Table 1**  
**Milestone Chart—Year 4**

	M	J	J	A	S	O	N	D	J	F	M	A
Smackover Petroleum System	 xxx xxx xxx											
Mesozoic Petroleum Systems												

Work Planned   
Work Accomplished xxx

**Results and Discussion**

No major problems have been encountered at this point.

**Conclusions**

The project work is on schedule.

**References**

Evans, R., 1987, Pathways of migration of oil and gas in the south Mississippi Salt Basin: GCAGS Transactions, v. 37, p. 75-86.

Mancini, E.A., Parcell, W.C., and Puckett, T.M., 1999, Modeling of the burial and thermal histories of strata in the Mississippi interior salt basin: GCAGS Transactions., v. 49, p. 332-341.

Mancini, E.A., Parcell, W.C., Puckett, T.M., and Llinas, J.C., 2001, Topical Report 4, Basin and petroleum migration modeling of the Mississippi Interior Salt Basin, DOE Report, 46 p.

Mancini, Ernest A., and Puckett, T.M., 2002, Transgressive-regressive cycles: application to petroleum exploration for hydrocarbons associated with Cretaceous shelf carbonates and coastal and fluvial-deltaic siliciclastics, northeastern Gulf of Mexico, Sequence Stratigraphic Models for Exploration and Production: Proceedings of the 22<sup>nd</sup> Annual Research Conference, Gulf Coast Section, SEPM Foundation, p. 173-199.

Mancini, E.A., Parcell, W.C., Puckett, T.M., Llinas, J.C., Kopaska-Merkel D.C. and Townsend, R.N., 2002, Basin analysis of the Mississippi Interior Salt Basin and petroleum system modeling of the Jurassic Smackover Formation, eastern Gulf Coastal Plain, DOE Report, DE-FG22-96BC14946, 487 p.

Mancini, E.A., Aharon, P., Goddard, D.A., and Barnaby, R., 2006, Basin analysis and petroleum system characterization and modeling, Interior Salt Basins, Central and Eastern Gulf of Mexico, DOE Report, DE-FC26-03NT15395, 422 p.

Nunn, J.A., 1984, Subsidence histories for the Jurassic sediments of the northern Gulf Coast: thermal-mechanical model: Third Annual Research Conf., Gulf Coast Section, SEPM Foundation, p. 309-322.

Puckett, T.M., B.L. Bearden, E.A. Mancini, and B.J. Panetta, 2000, Topical Report 3, Petroleum plays and underdeveloped reservoirs in the Mississippi Interior Salt Basin, U.S. DOE Report, 105 p.

Waples, D. W., 1994, Modeling of sedimentary basins and petroleum systems, Petroleum System - from source to trap: AAPG Memoir 60, p. 307-322.

Zimmerman, R.K., 1998, Chronology of oil generation in Louisiana's fractured Austin Chalk deep horizontal drilling trend: GCAGS Transactions, v. 48, p. 517-525.

Zimmerman, R.K., 1998, Estimating Louisiana's probable initial in-place oil reserves: Basin Research Institute Bulletin, LSU, p. 7-29.

Zimmerman, R.K., 1999, Potential oil generation capacity of the North Louisiana hydrocarbon system: GCAGS Transactions, v. 49, p. 532-540.

Zimmerman, R.K., and Sassen, R., 1993, Hydrocarbon transfer pathways from Smackover source rocks to younger reservoir traps in the Monroe Gas Field, northeast Louisiana: GCAGS Transactions, v. 43, p. 473-480.

Zimmerman, R.K., and Shi, Y., 1996, Simulation and modeling of the hydrocarbon generation migration-mixing processes in Louisiana sedimentary basins: GCAGS Transactions, v. 46, p. 485.