Smackover Formation/ Upper Jurassic of the Eastern Gulf Rim

Overview

Major new discoveries, both onshore and offshore, are fueling continued interest in Upper Jurassic rocks of the eastern Gulf Coast. This report provides a comprehensive geological study which integrates stratigraphic, geochemical, petrographic, petrophysical, and production data for these rocks in eastern Mississippi, southwestern Alabama, and the Florida Panhandle.

This regional study, representing approximately 10 man-years of geologic research, focuses on the exploration and production potential of the Smackover along the Gulf Rim from the eastern part of the Mississippi Salt Basin to the Apalachicola Embayment. The study area encompasses all or portions of 49 counties and approximately 28,000 square miles in Mississippi, Alabama, and Florida.

More than 12,000 feet of cores from 89 Smackover wells were described. This information is integrated into the stratigraphic framework for this study. Approximately two-thirds of these cores are proprietary.

Approximately 1,500 thinsections from 60 wells were examined. A classification of grain types based on petrographic characteristics and grain size was developed for the Smackover. This summary provides industry with the first attempt to describe and document photographically all the major types of non-skeletal grains found in the upper Smackover. Differentiation of the types of coated grains in the Smackover is a cornerstone for interpreting the depositional environments of these rocks.

Fifteen stratigraphic markers were correlated which have sub-regional and regional importance to Smackover exploration. Markers are defined from the base of the Cotton Valley Group to the Louann Salt or basement.

Stratigraphic correlation of the 2,198 study wells provides a unique database. It provides a three-fold system for regional analysis of Smackover and Haynesville rocks. This analysis is based upon a combination of lithologic and chronostratigraphic markers and log facies characterization. A comparison of these data yields a basin-wide model for Smackover basin evolution, depositional style, and timing of salt and fault movement.

Selected fields for study include Blacksher, Nuxford, Chatom, Blackjack Creek, and Nancy fields. Each field study contains development geology and engineering analyses including evaluations of reservoir drive mechanisms, key well panels showing lithologic and fluid saturation computations, reserve evaluations, and well performance reviews.

Organic geochemical analyses were acquired on 1,116 source rock samples throughout the study area. These analyses of source potential and thermal maturity data were incorporated into a stratigraphic context. From this information, source rock maturity trends were mapped.
Database

2,198 Study Wells
15 Regional and Subregional Markers
89 Cores Described (12,095')
1500 Thinsections

Maps

Regional Maps (1:250000) (1:96000) (1:48000)
15 Isopach Maps
8 Structure Maps
8 Time-Slice Maps
6 Miscellaneous Maps

Field Study Maps (1:24,000)
24 Isopach Maps
6 Structure Maps
6 Location Maps
5 Miscellaneous Maps
5 Lithofacies Fence Diagrams

Cross Sections

7 Regional Cross Sections (VS 1”=100’)

19 Field Cross Sections (VS 2.5” = 100’)

Organic Geochemical Analyses

1,116 core samples selected for Rock-Eval analysis including total organic carbon, thermal maturity data, and hydrogen and oxygen indices.

Filed Studies

Blackjack Creek, Blacksher, Chatom, Huxford, Nancy

Report Contents

TEXT AND FIGURES - This fully-illustrated report includes discussion, figures, and color photographs of rocks and thinsections on such topics as: Regional Tectonic and Environmental Setting, Depositional History, Lithofacies, Depositional Models, Source Rock Analyses, Petrography and Diagenetic History, Field Studies, and Exploration Recommendations.
RESERVOIR CHARACTERIZATION - This section includes: core descriptions; core-to-log comparisons and petrographic summaries of the cores, plus graphic displays of at least six key wells used as references to illustrate and to explain the relationship of lithofacies to log response as well as porosity, permeability and other log-derived measurements of reservoir performance.

STRATIGRAPHIC DATA - Well identification and stratigraphic marker data for the 2,196 study wells in this study are available in digital form. This database includes the 15 stratigraphic tops, lithologic markers, and chronostratigraphic picks data for the study wells. This information is referenced by well name, operator, and API number.

MAPS AND CROSS SECTIONS - These two files contain a grid of cross sections and maps. Fifty-six field maps, 20 field cross sections, 37 regional maps and seven regional cross sections are provided for correlation and mapping applications. The regional maps show the distribution of wells, structural elements, sedimentary and diagenetic facies, porosity, and production.
Smackover/Upper Jurassic of the Eastern Gulf Rim

Study Boundary

GULF OF MEXICO
Smackover/Upper Jurassic
of the
Eastern Gulf Rim

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Figure 4.20D. Example of SMF-24 (Intraclast Packstone to Grainstone) and SMF-25 (Pisoid Grainstone to Packstone). #1 Caraway 26-12, Escambia Co., AL, 14,707 ft. This sample of a pisoid packstone interpreted to have formed in a soil zone is also from Huxford Field. Note the poor sorting of the grains, the irregular rims on some grains, the dolomite-filled sheet crack, and the composite nature of the large grain at top center. These textures support the interpretation that this microfacies formed during times of subaerial exposure and vadoid formation.