Atlantic Upper Jurassic Carbonate (AUJ B1) Play

***Pseudocyclammina jaccardi* through *Ctenidodinium penneum* biozones**

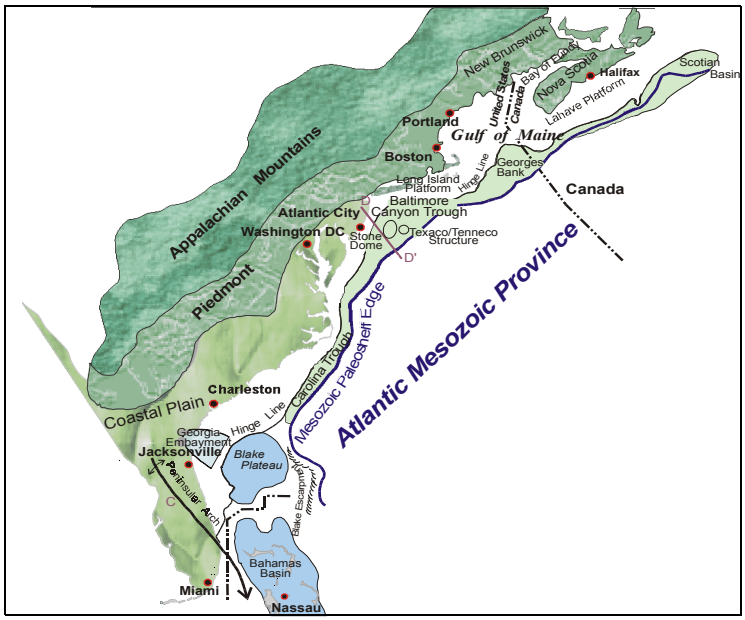

Figure 1. Physiographic map of the Atlantic Margin.

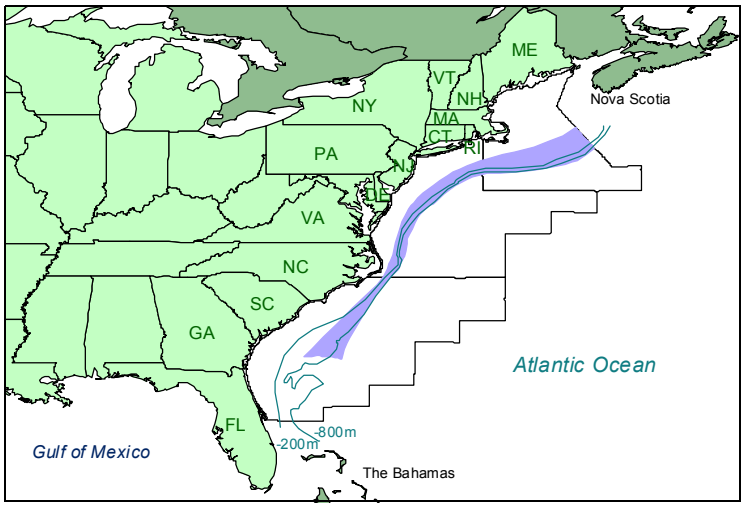

Figure 2. Play location.

Play Description

The frontier Atlantic Upper Jurassic Carbonate (AUJ B1) play occurs within the *Pseudocyclammina jaccardi*, *Senoniasphaera jurassica*, *Epistomina uhligi,* and *Ctenidodinium penneum* biozones. This play extends from the U.S.-Canadian border through the Carolina Trough to the Blake Plateau (figures 1 and 2).

The AUJ B1 carbonate platform and reef play is stratigraphically similar to the Atlantic Middle Jurassic Carbonate (AMJ B1) play; however, the carbonate platform became successively narrower during the Upper Jurassic because of increasing siliciclastic influx. Though not conclusive, micropaleontological evidence suggests that the seaward-most edge of the carbonate complex may be lowermost Cretaceous. These possible lowermost Cretaceous carbonates are thin, averaging about 200 feet, and cover too small an area to be mappable on a regional scale. Therefore, all possible lowermost Cretaceous shelf-edge carbonates are included in the AUJ B1 play.

Play Characteristics

The AUJ B1 play consists of late Jurassic shelf-edge reef complexes with associated back-reef carbonate platforms and reef-face carbonate talus. These carbonate platforms and reef complexes developed where deltaic clastic influx was minimal. Potential reservoirs are located in the reef itself, in the fore-reef talus, and in the back-reef as oolitic, pelletal, or reef detritus grainstones. Reef and back-reef deposits have the best potential for enhanced porosity because of subaerial exposure. Traps are mainly stratigraphic on the carbonate platform. Combination stratigraphic and fault traps occur within the reef complex on the shelf edge and in reef talus on the slope. Potential source rocks include Juras-

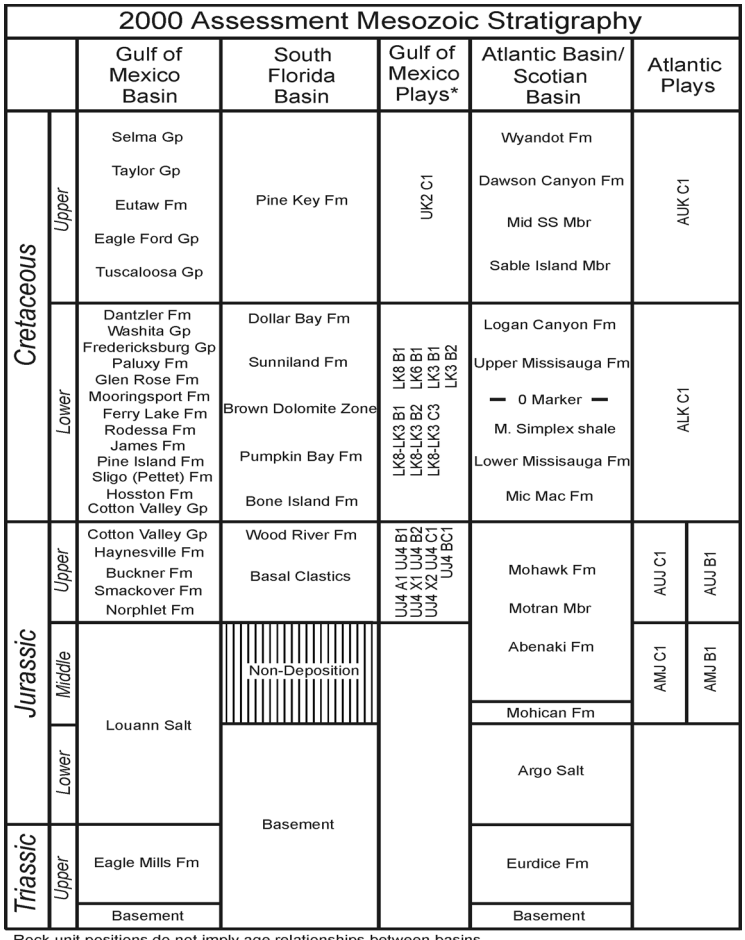

Figure 3. Mesozoic stratigraphy of the Gulf of Mexico and Atlantic Margins.

AUJ B1 Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	0	0.000	0.000	0.000
Cumulative production	–	0.000	0.000	0.000
Remaining proved	–	0.000	0.000	0.000
Unproved	0	0.000	0.000	0.000
Appreciation (P & U)	–	0.000	0.000	0.000
Undiscovered Conventionally Recoverable Resources				
95th percentile	–	0.087	0.718	0.232
Mean	35	0.234	1.488	0.499
5th percentile	–	0.520	3.371	1.060
Total Endowment				
95th percentile	–	0.087	0.718	0.232
Mean	35	0.234	1.488	0.499
5th percentile	–	0.520	3.371	1.060

Table 1. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

sic shelf and slope shales, and possibly lagoonal and platform carbonates. Geochemical analysis indicates organic matter to be primarily Type III with total organic carbon (TOC) ranging from 0.5 to 3 percent. The hydrocarbon evolution window extends from approximately 7,000 to 18,000 feet. Seals are provided by upper Jurassic or lowermost Cretaceous carbonates, shales, and anhydrites.

Discoveries

Exploration in the Atlantic Federal OCS area consists of 46 exploration and 5 COST wells. Three exploration wells, Shell Offshore Inc.'s 372-1, 586-1, and 587-1, drilled in Wilmington Canyon penetrated the shelf-edge reef and back-reef facies of the AUJ B1 play. Good reservoir rock was encountered, but no hydrocarbons were detected.

Analogs

Because the AUJ B1 play contains no Federal fields, productive upper Jurassic platform carbonate reservoirs of the onshore eastern Gulf of Mexico and the onshore central Gulf of Mexico lower Cretaceous Sligo-Stuart City reef trend provide analogs for the input parameters used in this assessment (figure 3). The analog type field for the AUJ B1 play is the Black Lake Field, Natchitoches Parish, Louisiana. This field's production is from the Lower Cretaceous Sligo Formation of the Sligo-Stuart City reef trend.

The onshore eastern Gulf of Mexico upper Jurassic platform carbonate analog comprises the Smackover, Buckner, and Haynesville Formations, and Cotton Valley lime in Louisiana, Mississippi, and Alabama (figure 3). This analog area covers 7.6 million acres (11,850 square miles). Exploration has a success rate of approximately 10 percent, and drilling is at a mature stage with approximately 60 to 90 percent of the analog area being explored. Fields in the analog area contain an average of 35 percent oil, 22 percent gas, and

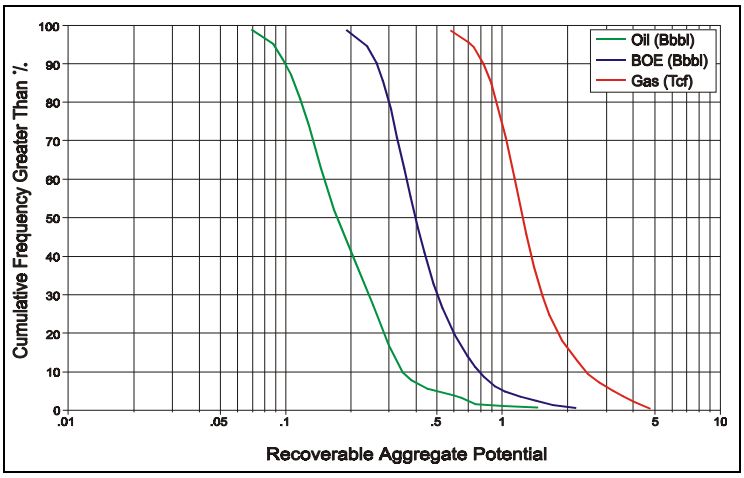

Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

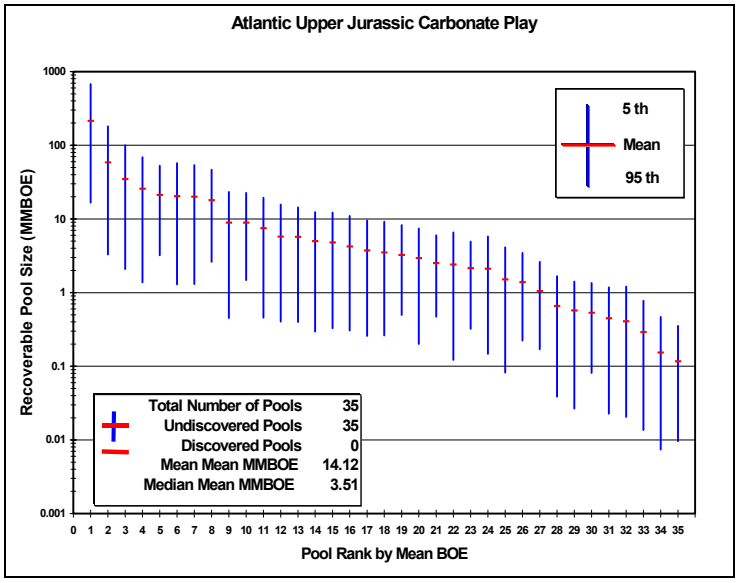

Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

43 percent mixed hydrocarbons.

The central Gulf of Mexico lower Cretaceous Sligo-Stuart City reef trend analog comprises the Sligo Formation and Edwards Group (Fredericksburg Group equivalent) and covers an area of 104 million acres (162,435 square miles). Exploration has a success rate of approximately 10 percent, and drilling is at a mature stage with approximately 75 to 85 percent of the analog area being explored. Analog fields in this area contain an average of 22 percent oil, 73 percent gas, and 5 percent mixed hydrocarbons.

Assessment Results

The marginal probability of hydrocarbons for the AUJ B1 play is 1.00. Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) are forecast to range from 0.087 to 0.520 Bbo and 0.718 to 3.371 Tcfg at the 5th and 95th percentiles, respectively (table 1; figure 4). Mean UCRR are forecast at 0.234 Bbo and 1.488 Tcfg (0.499 BBOE). These undiscovered resources might occur in as many as 35 pools. These pools have an unrisked mean size range of <1 to 215 MMBOE (figure 5) and an unrisked mean mean size of 14 MMBOE.

Potential for discoveries extends from the U.S.-Canadian border through the Carolina Trough to the Blake Plateau (figure 2).