

Middle Middle Miocene Progradational (MM7 P1) Play

Cibicides opima through *Bigenerina humblei* biozones

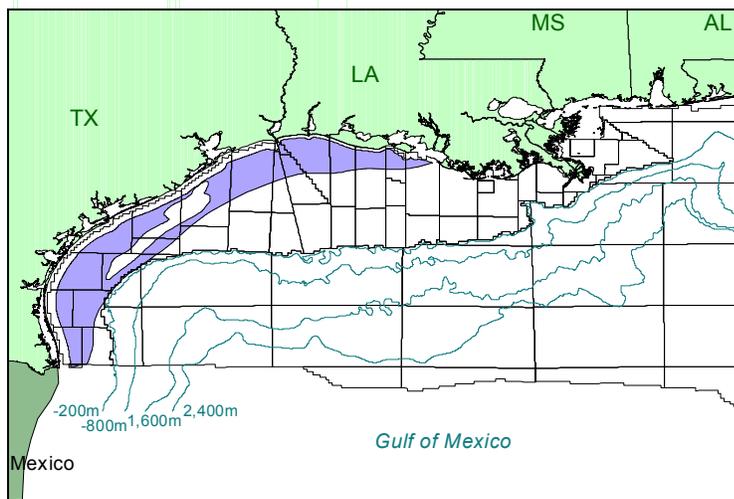


Figure 1. Play location.

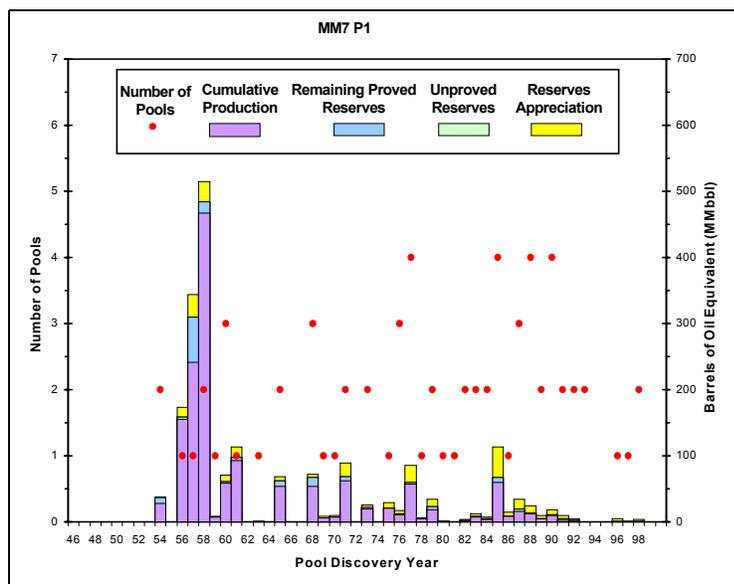


Figure 2. Exploration history graph showing reserves addition and number of pool discoveries by year.

MM7 P1 Play				
70 Pools 221 Sands	Minimum	Mean	Maximum	
Water depth (feet)	11	70	274	
Subsea depth (feet)	3514	8566	14548	
Number of sands per pool	1	3	11	
Porosity	17%	27%	35%	
Water saturation	16%	28%	48%	

Table 1. Pool attributes. Values are volume-weighted averages of individual reservoir attributes.

Play Description

The established Middle Middle Miocene Progradational (MM7 P1) play occurs within the *Cibicides opima*, *Cristellaria* "1," and *Bigenerina humblei* biozones. The play extends from the South Padre Island and Port Isabel Areas offshore Texas to the Eugene Island Area offshore Louisiana (figure 1).

Updip and to the northeast, the MM7 P1 play continues onshore into Texas and Louisiana. To the southwest, the play continues into Mexican national waters. Downdip, the play grades into the deposits of the Middle Middle Miocene Fan 1 (MM7 F1) play. In parts of the Mustang Island, Matagorda Island, Brazos, and Galveston Areas offshore Texas, the MM7 P1 play encloses the Middle Middle Miocene Structural Corsair (MM7 S1) play and the Middle Middle Miocene Structural Seagull (MM7 S2) play.

Play Characteristics

Sediments in the MM7 P1 play represent major regressive episodes of outbuilding of both the shelf and slope. The MM7 progradational section varies from approximately 50 feet to more than 6,000 feet in thickness, with net sand thicknesses of as much as 600 feet. The play is punctuated by well developed flooding surfaces associated with the *Cristellaria* "1" and *Bigenerina humblei* biozones. Depositional environments represented in the play include delta fringes, offshore marine bars, channel/levee complexes, and distributary mouth bars. In the western part of the play, the sandy progradational section is underlain by a thick shale section. In the eastern part of the play, the MM7 P1 play is overlain by a retrogradational section, while in other areas the play is overlain by a well developed aggradational sec-

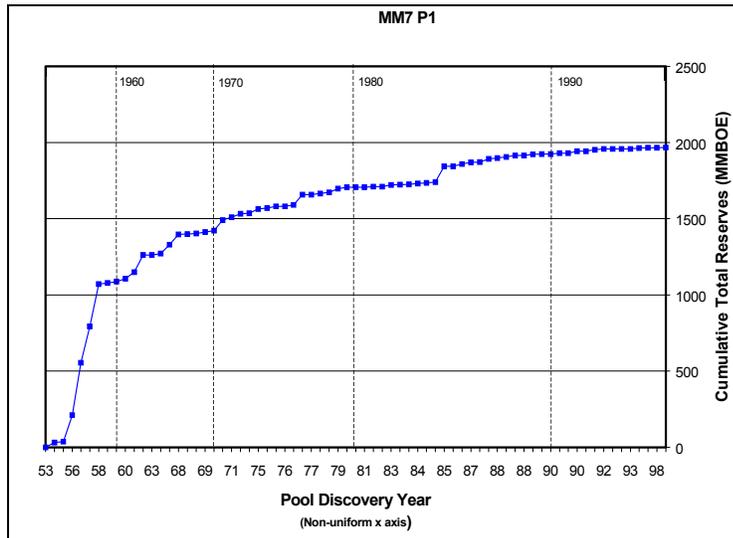


Figure 3. Plot of pools showing cumulative reserves by discovery order. Note the non-uniform x axis.

MM7 P1 Play Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	69	0.143	8.520	1.659
Cumulative production	—	0.129	7.681	1.496
Remaining proved	—	0.014	0.839	0.163
Unproved	1	<0.001	0.003	0.001
Appreciation (P & U)	—	0.035	1.535	0.309
Undiscovered Conventionally Recoverable Resources				
95th percentile	—	0.009	0.716	0.140
Mean	40	0.016	0.871	0.171
5th percentile	—	0.028	1.030	0.203
Total Endowment				
95th percentile	—	0.187	10.774	2.108
Mean	110	0.194	10.929	2.139
5th percentile	—	0.206	11.088	2.171

Table 2. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

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Most of the fields in the MM7 P1 play are structurally associated with normal faults and simple anticlines. The remaining fields are associated with growth fault anticlines and shale diapir-like bodies, with traps on the flanks of the shale or in sediment drape over the shale. Seals are provided by the juxtaposition of reservoir sands with shales, either structurally (e.g., faulting) or stratigraphically (e.g., lateral shale-outs, overlying shales).

Discoveries

The MM7 P1 gas play contains total reserves of 0.178 Bbo and 10.058 Tcfg (1.968 BBOE), of which 0.129 Bbo and 7.681 Tcfg (1.496 BBOE) have been produced. The play contains 221 producible sands in 70 pools of which 69 contain proved reserves (table 1; refer to the Methodology section for a discussion of reservoirs, sands, and pools). The first reserves in the play were discovered in the West Cameron 110 field in 1954 (figure 2). The largest pool in the play, with 344 MMBOE in total reserves, was discovered in 1957 in the East Cameron 64 field (figures 2 and 3). Maximum yearly total reserves of 514 MMBOE were added in 1958 with the discovery of two pools. Almost 75 percent of the play's cumulative production has come from pools discovered prior to 1968, reflecting the large sizes of early discoveries. Ninety-nine percent of the play's cumulative production and 98 percent of the play's total reserves have come from pools discovered before 1990, reflecting the maturity of the play. The most recent discoveries, prior to this study's cutoff date of January 1, 1999, were made in 1998.

The 70 discovered pools contain 456 reservoirs, of which 420 are nonassociated gas, 18 are undersaturated oil, and 18 are saturated oil. Cumulative production has consisted of 91 percent gas and 9 percent oil.

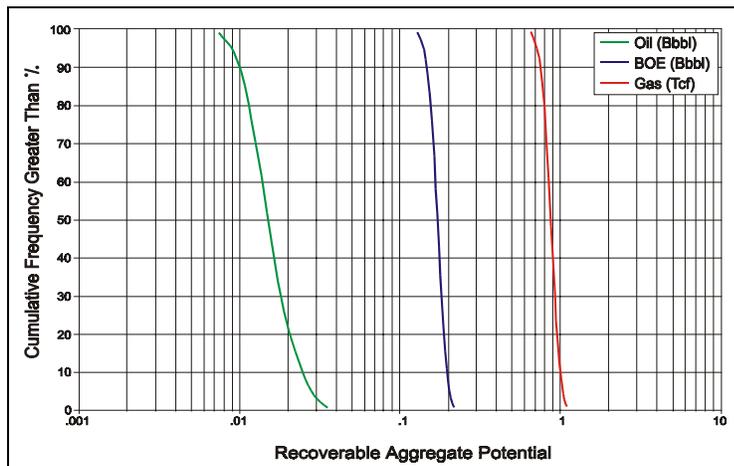


Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

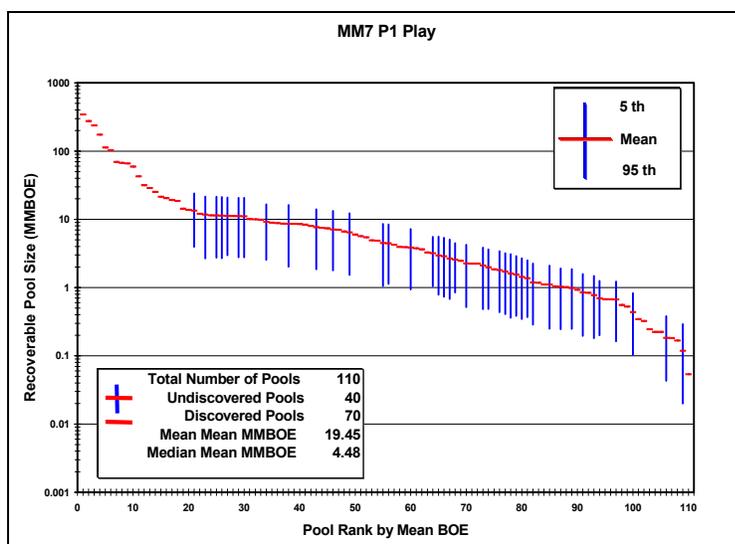


Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

Assessment Results

The marginal probability of hydrocarbons for the MM7 P1 play is 1.00. The play contains a mean total endowment of 0.194 Bbo and 10.929 Tcfg (2.139 BBOE) (table 2). Seventy percent of this BOE mean total endowment has been produced.

Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) have a range of 0.009 to 0.028 Bbo and 0.716 to 1.030 Tcfg at the 95th and 5th percentiles, respectively (figure 4). Mean UCRR are estimated at 0.016 Bbo and 0.871 Tcfg (0.171 BBOE). These undiscovered resources might occur in as many as 40 pools. The largest undiscovered pool, with a mean size of 13 MMBOE, is forecast as the 21st largest pool in the play (figure 5). The forecast places the next four largest undiscovered pools in positions 23, 25, 26, and 27 on the pool rank plot. For all the undiscovered pools in the MM7 P1 play, the mean mean size is 4 MMBOE compared with 28 MMBOE mean size of the discovered pools. The mean mean size for all pools, including both discovered and undiscovered, is 19 MMBOE.

The MM7 P1 is a super-mature play with BOE mean UCRR contributing only 8 percent to the play's BOE mean total endowment.