

Upper Middle Miocene Fan 2 Play

MM9 F2, #1482

Textularia "W" and *Bigenerina* 2

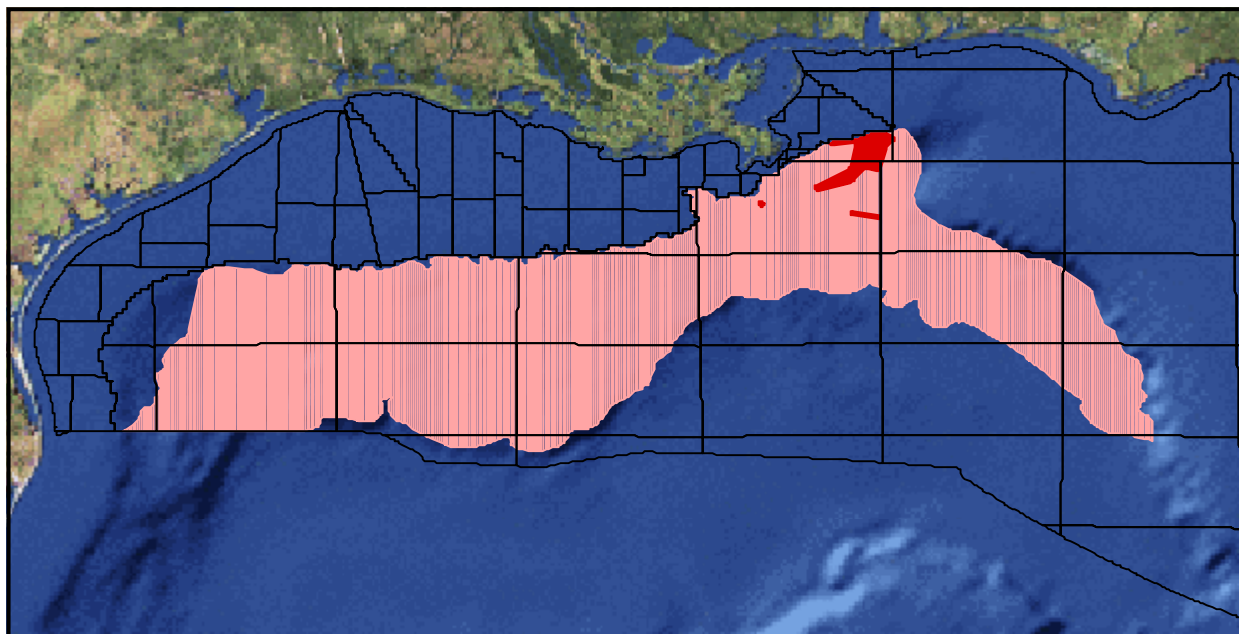


Figure 264. MM9 F2 map showing location of play. Play limit shown in light red; hydrocarbon limit shown in dark red.

Overview

The Upper Middle Miocene Fan 2 Play (MM9 F2) contains reserves of 1,448.431 Bcfg and 173.818 MMbo (431.546 MMBOE) in 27 sands in 10 fields. The play extends continuously across the modern GOM slope from the Port Isabel/Alaminos Canyon/East Breaks to Destin Dome and Desoto Canyon Areas, and to the south and east of the Desoto Canyon Area to the Henderson and Vernon Basin Areas (Figure 264). Relative to the play's areal extent, hydrocarbon discoveries are sparse and occur only in the Mississippi Canyon and Viosca Knoll Areas. Located on the modern GOM slope, MM9 F2 is not nearly as well explored as plays on the modern shelf. This play covers a vast area, with large expanses not penetrated by wells.

Description

MM9 F2 is defined by (1) a deep-sea fan depositional style representing sediments deposited basinward of the shelf edges associated with the MM9 Chronozone, (2) a structural regime of allochthonous, small salt sheets or large salt canopies with intervening salt-withdrawal basins on the western and central GOM slope and high-relief salt structures on the southeastern GOM slope, and (3) the MM-8 and MM-9 Chronozones, the tops of which are defined by the *Textularia* "W" and *Bigenerina* 2 biozones, respectively (Figure 8).

MM9 F2 extends continuously downdip of the modern GOM shelf edge from the Port Isabel/Alaminos Canyon/East Breaks Areas to the southwestern Destin Dome and western Desoto Canyon Areas east of the modern Mississippi River Delta, and south and east of the Desoto Canyon Area to the Henderson and Vernon Basin Areas (Figure 264). Relative to the play's areal extent, hydrocarbon discoveries are sparse and occur only in the Mississippi Canyon and Viosca Knoll Areas. Located on the modern GOM slope, MM9 F2 is not nearly as well explored as plays on the modern shelf. This play covers a vast area, with large expanses not penetrated by wells.

Depositional systems in MM9 time were similar to those of middle lower Miocene (MM7) time. The South Brazos Delta System (Morton et al., 1985) was the dominant supplier of clastics to the Texas offshore and the ancestral Mississippi River Delta System to the Louisiana offshore.

Play Limits

MM9 F2 is limited updip by the Upper Middle Miocene Fan 1 Play (MM9 F1). To the southwest,

the play extends into Mexican national waters. To the east, the play onlaps the lower Cretaceous carbonate slope. Downdip in the western and central GOM, MM9 F2 is limited by the farther downdip occurrence of either (1) the Sigsbee Salt Canopy Escarpment, where the farthest extent of large salt bodies overrides the abyssal plain or (2) the downdip limit of the Perdido Fold Belt and Mississippi Fan Fold Belt Plays. Downdip in the eastern GOM, the play is limited by the southern extent of Louann Salt deposition, as defined by the downdip extent of the Salt Roller/High-Relief Salt Structure Play (UK5-UJ4 S1) (Lore et al., 2001).

Depositional Style

MM9 F2 is characterized by deep-sea fan systems deposited basinward of the MM-8 shelf edge, the farthest updip shelf edge associated with the MM9 Chronozone. Component facies include channel/levee complexes, sheet-sand lobes, interlobe/fringe sediments, and slump sediments that were deposited on the MM-8 and MM-9 upper and lower slopes, in topographically low areas between salt structure highs, and abyssal plains. These deep-sea fan systems are often overlain by thick shale intervals representative of zones of sand bypass on the shelf, or sand-poor zones on the slope.

The MM9 deep-sea fan interval varies from approximately 100 to more than 16,500 ft in thickness, with net sand thicknesses as much as approximately 1,300 ft. Individual sands range from a few feet to approximately 100 ft in thickness. Sand-dominated successions comprising deposits of multiple sheet-sand lobes are more than 1,000 ft thick, with intervening shale sequences reaching as much as several thousands of feet in thickness. Thick, upward-coarsening and upward-fining log patterns of sand-dominated intervals represent sheet-sand lobe progradation and channel fill/abandonment, respectively, in proximal-fan areas. Irregularly stratified sand successions displaying spiky log patterns suggest deposition in distal-fan areas.

Structural Style

Fields in the play contain hydrocarbon accumulations trapped by permeability barriers and updip pinchouts or facies changes, anticlines, and salt bodies.

Quantitative Attributes

On the basis of reserves calculations, MM9 F2 is 60% gas and 40% oil. The 27 sands in the play comprise 34 reservoirs, of which 16 are nonassociated gas, 13 are undersaturated oil, and 5 are saturated oil. Proved reserves are estimated at 1,107.956 Bcfg and 147.066 MMbo (344.211 MMBOE) in 15 sands in four fields ([Table 125](#)). Unproved reserves are estimated at 340.475 Bcfg and 26.752 MMbo (87.335 MMBOE) in 12 sands in six fields. These proved plus unproved reserves account for 22% of the reserves for the MM9 Chronozone.

	No. of Sands	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)
Proved	15	147.066	1,107.956	344.211
Cum. production	7	27.647	95.443	44.630
Remaining proved	14	119.419	1,012.513	299.581
Unproved	12	26.752	340.475	87.335

Table 125. MM9 F2 reserves and cumulative production.

Cumulative production from MM9 F2 totals 95.443 Bcfg and 27.647 MMbo (44.630 MMBOE) from 7 sands in three fields. MM9 F2 production accounts for only 3% of the MM9 Chronozone's total production. Remaining proved reserves in the play are 1,012.513 Bcfg and 119.419 MMbo (299.581 MMBOE) in 14 sands in four fields.

[Table 126](#) summarizes that water depths of the fields in MM9 F2 range from 689-6,590 ft, and play interval discovery depths vary from 9,681-16,312 ft, subsea. Additionally, porosity and water saturation range from 20-32% and 16-47%, respectively.

27 Sands	Min	Mean	Max
Water depth (ft)	689	2,555	6,590
Subsea depth (ft)	9,681	11,850	16,312
Reservoirs per sand	1	1	4
Porosity	20%	27%	32%
Water saturation	16%	27%	47%

Table 126. MM9 F2 sand attributes. Values are volume-weighted averages of individual reservoir attributes.

Exploration History

MM9 F2 has a 14-year history of discoveries ([Figure 265](#)). The first (and largest) sand in the play was discovered in 1985 in the Viosca Knoll 956 Field (Ram Powell), adding the most reserves to the play of any year. However, the maximum number of sands discovered in any year occurred in 1997 with

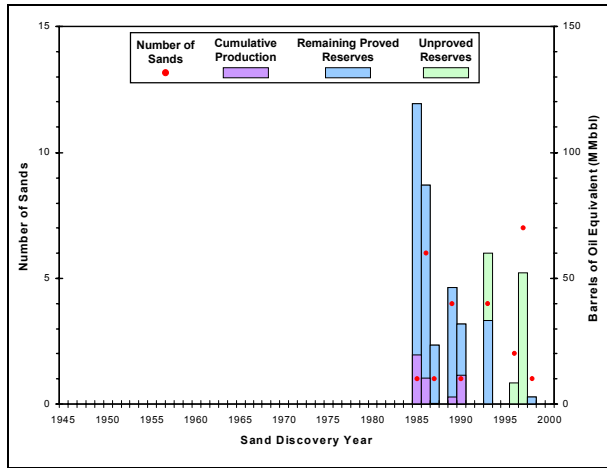


Figure 265. MM9 F2 exploration history graph showing reserves and number of sands discovered by year.

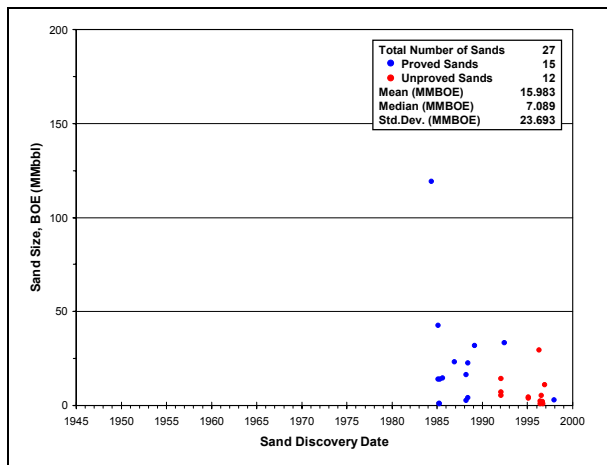


Figure 266. MM9 F2 sand discovery graph showing the size of sands discovered by year.

7 sands from four fields. Sand discoveries have averaged about 2 per year throughout the play's history.

The two largest sands in the play were discovered in the mid-1980's in the Ram Powell Field and contain an estimated 119.309 MMBOE and 42.574 MMBOE (Figure 266). The mean sand size for the play is 15.983 MMBOE. Since the first Atlas database cutoff of January 1, 1995, 10 sands have been discovered, the largest of which is estimated to contain 29.388 MMBOE in the Viosca Knoll 914 Field (Nile).

Production History

MM9 F2 has a two-year history of production which began in 1997 (Figure 267).

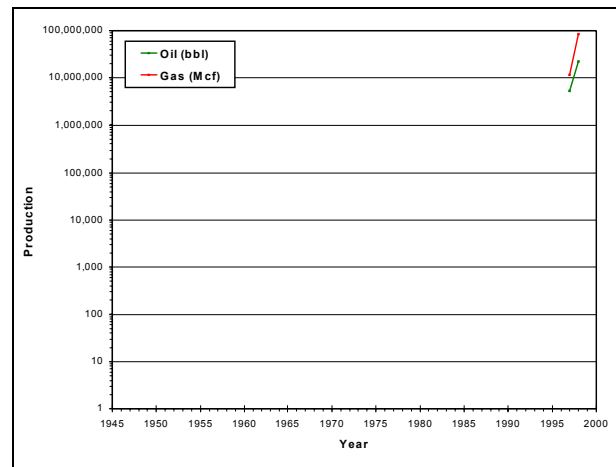


Figure 267. MM9 F2 production graph showing oil and gas production by year.