

Lower Pleistocene Fan 2 (LPL F2) Play

Lenticulina 1 and *Valvulineria* "H" biozones

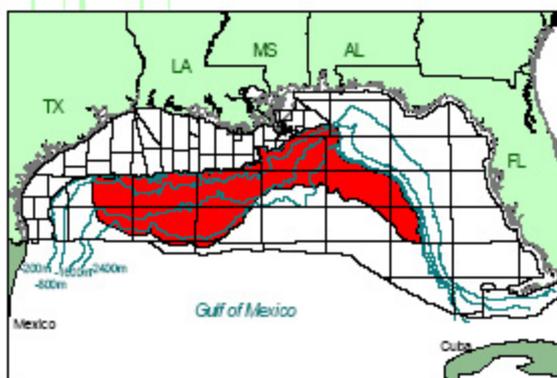


Figure 1. Play location.

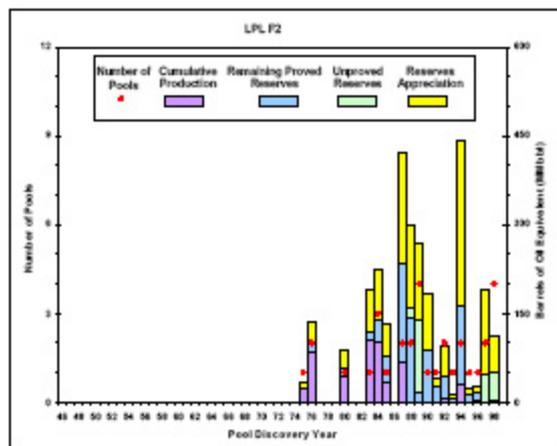


Figure 2. Exploration history graph showing reserves addition and number of pool discoveries by year.

LPL F2 Play		Minimum	Mean	Maximum
32 Pools	121 Sands			
Water depth (feet)		663	2259	6845
Subsea depth (feet)		5990	11187	17368
Number of sands per pool		1	4	11
Porosity		27%	31%	36%
Water saturation		18%	24%	43%

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

Play Description

The established Lower Pleistocene Fan 2 (LPL F2) play contains the third largest BOE mean total endowment of any play in the Gulf of Mexico Region. The play occurs within the *Lenticulina* 1 and *Valvulineria* "H" biozones and is defined by deep-sea fan sediments in a structural regime of allochthonous salt sheets and canopies with intervening salt-withdrawal basins located on the modern Gulf of Mexico Region slope. The LPL F2 play extends from the central East Breaks and Alaminos Canyon Areas to the southwestern Destin Dome and western Desoto Canyon Areas east of the present-day Mississippi River Delta, and southeast to The Elbow and Vernon Areas offshore Florida (figure 1).

The LPL F2 play is bounded updip by the Lower Pleistocene Fan 1 (LPL F1) play. The LPL F2 play does not extend farther to the west because of a lack of sediment influx at the edge of the LPL depo-center. To the east, the play overlaps the Cretaceous carbonate slope. Downdip in the western and central Gulf of Mexico Regions, the LPL F2 play 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 Gulf of Mexico Region, the play is limited by the southern extent of Louann Salt deposition, as defined by the downdip extent of the Upper Cretaceous to Upper Jurassic Salt Roller/High-Relief Salt Structure (UK5-UJ4 S1) play.

Play Characteristics

Component depositional facies include channel/levee complexes, sheet-sand lobes, interlobes,

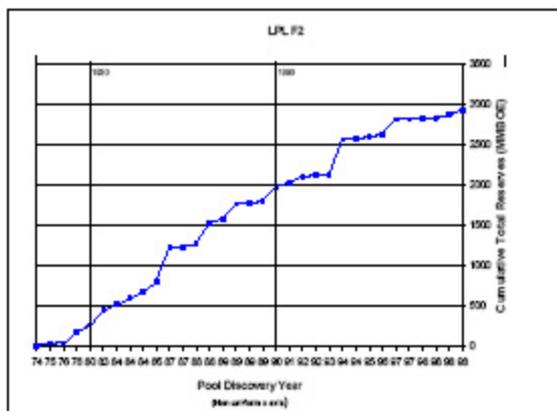


Figure 3. Plot of pools showing cumulative reserves by discovery order. Note the non-uniform x axis.

LPL F2 Play Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	23	0.791	2.678	1,268
Cumulative production	--	0.308	1.051	0,495
Remaining proved	--	0.483	1.627	0,773
Unproved	9	0.152	0.469	0,235
Appreciation (P & U)	--	0.931	2.733	1,418
Undiscovered Conventionally Recoverable Resources				
95th percentile	--	2,360	9,038	4,043
Mean	128	2,699	10,247	4,522
5th percentile	--	3,301	11,815	5,372
Total Endowment				
95th percentile	--	4,234	14,918	6,964
Mean	160	4,573	16,127	7,443
5th percentile	--	5,175	17,895	8,293

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

lobe fringes, and slumps deposited on the LPL upper and lower slopes, in topographically low areas between salt structure highs and on the abyssal plain. 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.

Over half of the fields in the LPL F2 play are structurally associated with salt bodies, mostly of intermediate and deep depths, with hydrocarbons trapped on salt flanks or in sediments draped over salt. Some fields contain hydrocarbon accumulations trapped by permeability barriers, updip pinchouts, or facies changes. Seals are provided by the juxtaposition of reservoir sands with shales and salt, either structurally (e.g., faulting, diapirism) or stratigraphically (e.g., lateral shale-outs, overlying shales).

Discoveries

The LPL F2 mixed oil and gas play contains total reserves of 1,874 Bbo and 5,880 Tcfg (2,921 BBOE), of which 0,308 Bbo and 1,051 Tcfg (0,495 BBOE) have been produced. The play contains 121 producible sands in 32 pools, of which 23 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 the Mississippi Canyon 194 field (Cognac) in 1975 (figure 2). Pool discoveries peaked at four in both 1989 and in 1998 and have averaged about three pools every two years throughout the play's history. Substantial reserves have been added almost every year since the initial discovery, with a maximum of 443 MMBOE found in 1994 in two pools. One of these pools, the Green Canyon 244 pool (Troika), is the largest in the play with 432 MMBOE in total reserves. Other significant pool discoveries were made in the Garden Banks 428 field (Auger) with 409 MMBOE in total reserves and in the Green Canyon 205 field (Genesis) with 263 MMBOE in total reserves

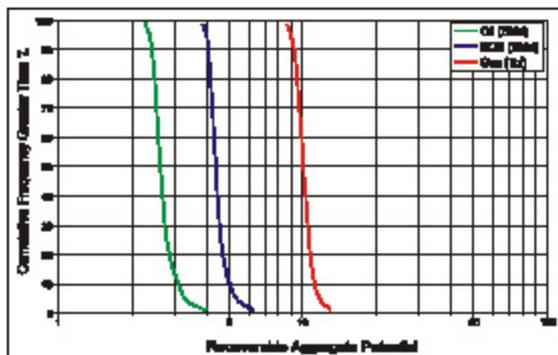


Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

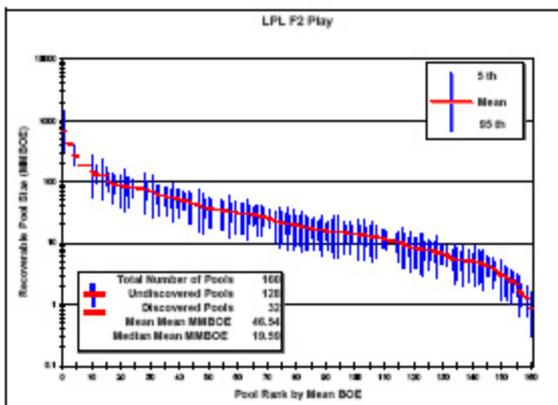


Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

(figures 2 and 3). The most recent discoveries, prior to this study's cutoff date of January 1, 1990, were in 1998. Ninety-two percent of the cumulative production from this play has occurred from pools discovered prior to 1990, and 61 percent of the remaining total reserves is estimated to be in pools discovered before 1990.

The 32 discovered pools contain 196 reservoirs, of which 61 are nonassociated gas, 120 are undersaturated oil, and 15 are saturated oil. Cumulative production has consisted of 62 percent oil and 38 percent gas.

Of the 87 assessed plays in the Gulf of Mexico Region, the LPL F2 contains the largest amounts of total oil reserves with 8 percent of oil in the Region. The LPL F2 play is also the largest of the 13 fan 2 plays on the basis of BOE cumulative production.

Assessment Results

The marginal probability of hydrocarbons for the LPL F2 play is 1.00. This play is the third largest in the Gulf of Mexico Region on the basis of a mean total endowment of 4.573 Bbo and 16.127 Tcfg (7.443 BBOE) (table 2). Seven percent of this BOE mean total endowment has been produced.

Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) have a range of 2.380 to 3.301 Bbo and 9.038 to 11.815 Tcfg at the 95th and 5th percentiles, respectively (figure 4). Mean UCRR are estimated at 2.699 Bbo and 10.247 Tcfg (4.522 BBOE). These undiscovered resources might occur in as many as 128 pools. The largest undiscovered pool, with a mean size of 880 MMBOE, is also forecast to be the largest pool in the play (figure 5). The forecast places the next four largest undiscovered pools in positions 4, 10, 12, and 14 on the pool rank plot. For all the undiscovered pools in the LPL F2 play, the mean mean size is 35 MMBOE, which is

substantially smaller than the 91 MMBOE mean size of the discovered pools. The mean mean size for all pools, including both discovered and undiscovered, is 47 MMBOE.

Of all 87 assessed Gulf of Mexico plays, the LPL F2 play is forecast to contain the fifth-most mean UCRR with 4.522 BBOE, or 61 percent of the

play's BOE mean total endowment. Seven pools with 100 MMBOE or more are forecast as remaining to be discovered (figure 5). The LPL F2 play covers a vast area with relatively few well penetrations, although hydrocarbons have been encountered in significant portions of this deep-water area. Exceptions are the southernmost portions of the

Garden Banks and Green Canyon Areas, and most of the sparsely explored Keathley Canyon Area.