

A GLIMPSE AT THE SUSPECTED OLDEST COMMERCIAL RESERVOIR IN THE GULF COAST PROVINCE

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ABSTRACT

This core presentation enables industry to view the majority of the productive section in the Murphy Adams #1, Texarkana West Field, Bowie County, Texas. The field was discovered in July, 1985 with the completion of the Murphy Sorsby #1, located 1600 ft (488m) to the northwest. The core is considered unique in that it contains, to the authors knowledge, the oldest *commercial* reservoir in the Gulf Coast producing region. Figure 1 illustrates the dual induction log profile of the reservoir section which consists of 50 ft. (15m) of very fine-grained, silty sandstone net pay. Core porosities range from 9 to 18% and permeabilities, 1 to 906 md within the effective reservoir section. Calculated water saturations are difficult to assess due to the abundance of pyrite, but typically run 20 to 25% in those intervals where pyrite is visually less abundant. The Adams #1 potentialled for 245 bbls oil/day flowing on March 6, 1987 and has produced over 225,000 bbls oil thru December, 1991.

Age dating of the Adams #1 reservoir section has proven difficult due to the scarcity of age specific palynomorphs and other paleontological elements. Dating has also been complicated by the potential for sediment recycling which might introduce older elements into younger rocks. Figure 2 presents an age determination summary indicating a possible late Triassic age for the reservoir section identified in Figure 1. A second palynology study (personal communication, Waanders Palynology Consulting Incorporated, 1988) supported a somewhat older Early Triassic to Late Permian age based on the occurrence of a Permian palynomorph below 7570 ft (2307m) (log depth).

Of special interest is the fact that the reservoir interval is bounded by thin igneous units. Detailed petrographic examination of the upper unit identifies it as a fine-grained dolerite most probably originating in a shallow intrusive setting. Potassium-argon dating summarized in Figure 3 suggests several episodes of igneous activity are involved with the upper unit being the oldest pulse.

Emplacement of the igneous units has presumably exerted a significant diagenetic control on reservoir quality and is also considered an integral component of the trapping mechanism. Highly altered, well-cemented sandstone stringers are intimately associated with less altered, more porous and permeable reservoir. The upper igneous unit appears to constitute a resistant layer which has preserved an erosional remnant of older reservoir section within an interpreted paleotopographic type trap. Dipmeter data also suggests that an unconformity surface is present on top of the upper igneous unit.

The Texarkana West Field is noteworthy in that it should be a reminder to the explorationist that there are still hydrocarbons to be found in unusual traps and unexpected parts of the stratigraphic section even in basins considered to be ultra-mature. Additional studies are planned to investigate in more detail relationships between the igneous units and the reservoir interval (the affects of associated mineralizing solutions on reservoir quality, tectonic implications, the influence of igneous events on hydrocarbon type, age dating confirmation, etc.).

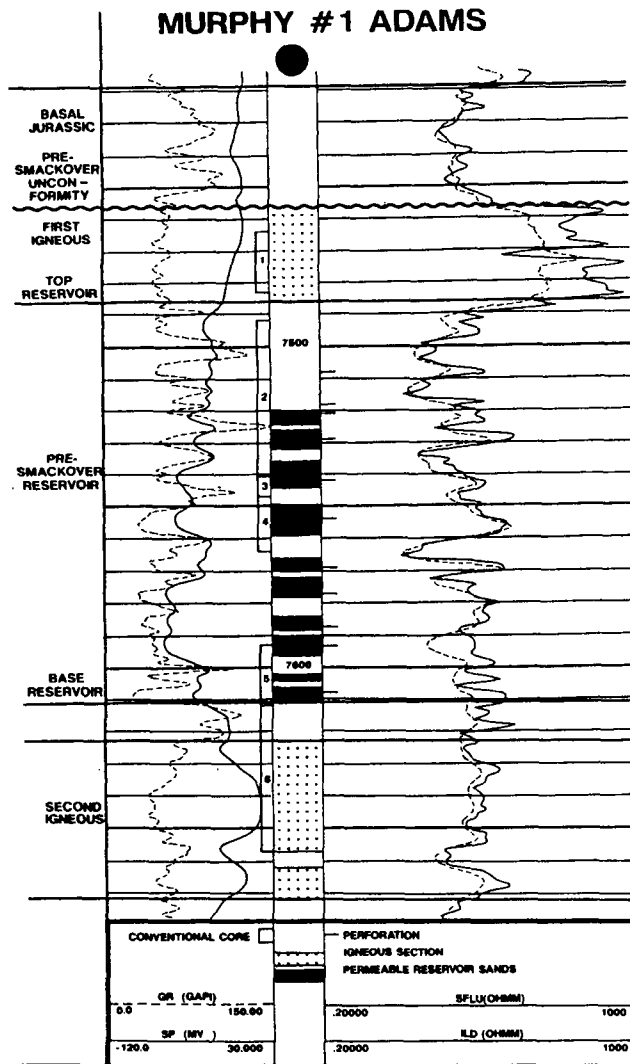


Figure 1. Dual Induction log profile of the Murphy Adams #1 showing placement of conventional cores. Igneous units, reservoir intervals, and perforations are also illustrated.

<p>Sample Information: Well: Adams #1 Type: Conventional Core depth 7482 ft Reported Date + Error: 195 MYA ± 5 MY Analytical Data</p>					
Potassium Data	Potassium Mean	Radiogenic Ar Data	Radiogenic Ar Mean	% Atm. Ar Data	% Atm. Ar Mean
1.210	1.213	433.0	432.4	15.6	15.6
1.220		431.9		15.6	
1.208		430.7		15.6	
		433.9		15.4	
<p>Sample Information: Well: Adams #1 Type: Conventional core depth 7638 ft Reported Date + Error: 152 MYA ± 3 MY Analytical Data</p>					
Potassium Data	Potassium Mean	Radiogenic Ar Data	Radiogenic Ar Mean	% Atm. Ar Data	% Atm. Ar Mean
2.449	2.455	671.6	673.4	8.0	7.8
2.478		672.5		8.2	
2.519		672.3		8.3	
2.386		675.8		8.3	
2.443		681.7		7.2	
		671.7		7.3	
		668.4		7.3	
<p>(MYA = Million years before present, MY = million years)</p>					

Figure 3. Potassium - Argon age dates for the upper and lower igneous units identified in Figure 1 (personal communication, University of Arizona - Isotope Geochemistry Laboratory, 1986).

SAMPLE	DEPTH (in feet)	INFERRED AGE	PALEOENVIRONMENT	
1	7430-7460 (cuttings)	JURASSIC *	Shallow water, paralic, detrital, possibly non-marine	
2	7510 + 7511.5 (cores)			
3	7526 + 7533.5 (cores)	Possible LATE TRIASSIC (Eagle Mills Formation)		
4	7568 + 7570 (cores)			
5	7574-7594 (cuttings)			
6	7607 + 7618.5 + 7622 (cores)			
7	7659 (core)	Possible EARLY TRIASSIC/ LATE PERMIAN		
8	7660-7690 (cuttings)			
	7690-7860 Samples not examined			Red beds
9	7860-7880 (cuttings)	Possible EARLY TRIASSIC/ LATE PERMIAN		Shallow water, paralic, detrital, possibly non-marine
10	7880-7900 (cuttings)			

* Based on palynological information.

Figure 2. Age and paleoenvironmental summary for the reservoir interval in the Murphy Adams #1 (personal communication, Micro-strat Incorporated, 1987).