

LOWER WILCOX SUBMARINE CANYON CHANNEL SANDSTONES SHERIDAN FIELD, COLORADO COUNTY, TEXAS

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ABSTRACT

Sheridan Field was discovered in 1940 by Shell Oil Company. The field is located along the Wilcox fault zone (Figure 1) and produces gas from Wilcox sandstones in an ovate, anticlinal structure on the downthrown side of a normal, down-to-the-southeast fault. Five wells in the field have been drilled below the main Lower Wilcox sandstone sequence and reveal some enigmatic sandstones in an otherwise very thick shale sequence (Figure 2). This sequence is at least 2500 feet thick at Sheridan Field and has been interpreted by regional correlation as part of the Lavaca submarine canyon fill (Galloway *et al.*, 1989) (Figure 3).

Sedimentological analysis of several Sheridan Field conventional cores, coupled with determination of vertical and lateral facies relationships, indicates that the canyon sandstones were deposited by mass-gravity flow mechanisms in channel and associated interchannel levee environments. Individual channel sandstones range from 3 to 30 feet thick but may locally form thicker sequences where they are stacked. These sandstones are very fine- to fine-grained, have sharp lower contacts, and are either 1) massive-appearing with "floating" mudstone clasts or 2) exhibit a combination of cross-stratification and severely contorted bedding (Figures 4 and 5). Levee sandstones are thin-bedded, horizontal planar-stratified to ripple-stratified, and form units similar to Bouma "bcde" and "cde" sequences (Figure 6). Associated levee mudstones are delicately-graded laminites. All lithologies commonly exhibit soft-sediment deformation resulting from gravity-induced, mass movement such as slumping, flowing, and sliding. The above sedimentary features and inferred depositional processes support a continental slope setting.

The channel sandstones are potential exploration targets in the field and surrounding areas because of their enormous stratigraphic trap potential. They form the reservoirs in the Lavaca Shale interval at several fields in the Hallettsville area (Chuber and Howell, 1986). The sandstones have geometries that are elongate down depositional slope and truncate updip against adjacent canyon shale fill. In cross section, the sandstones are lenticular and terminate abruptly into laterally-equivalent levee deposits (Figure 7). The recognition of these submarine canyon channel sandstones also implies that potential submarine fan reservoir sandstones may be present downdip at the mouth of the canyon.

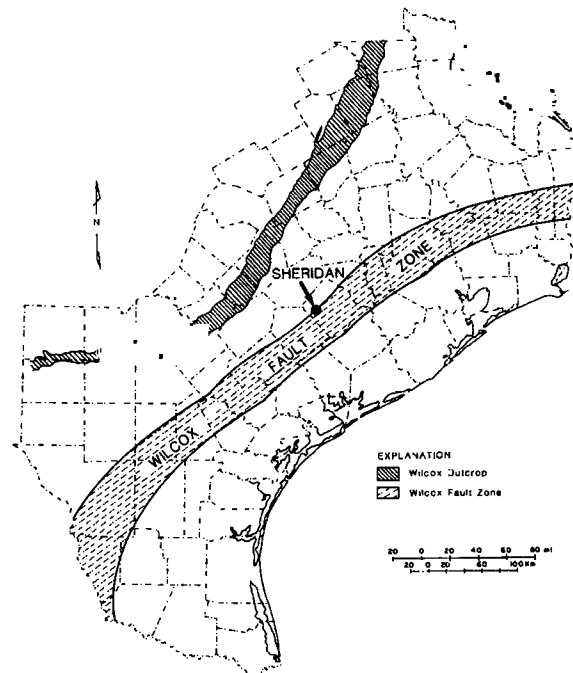


Figure 1. Regional map showing location of Sheridan Field in the Wilcox fault zone.

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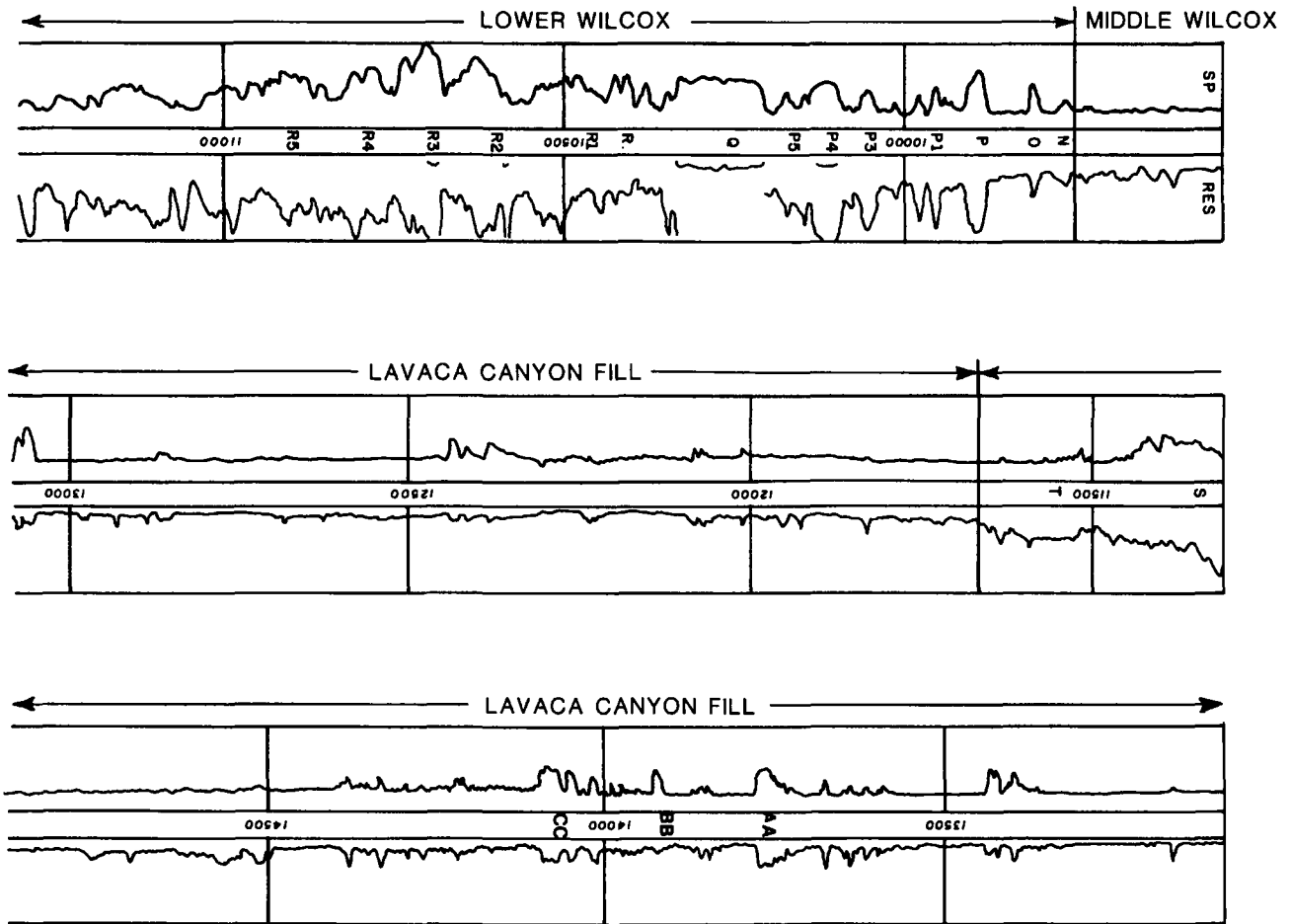


Figure 2. Sheridan Field type log through the Lower Wilcox and Lavaca Canyon fill.

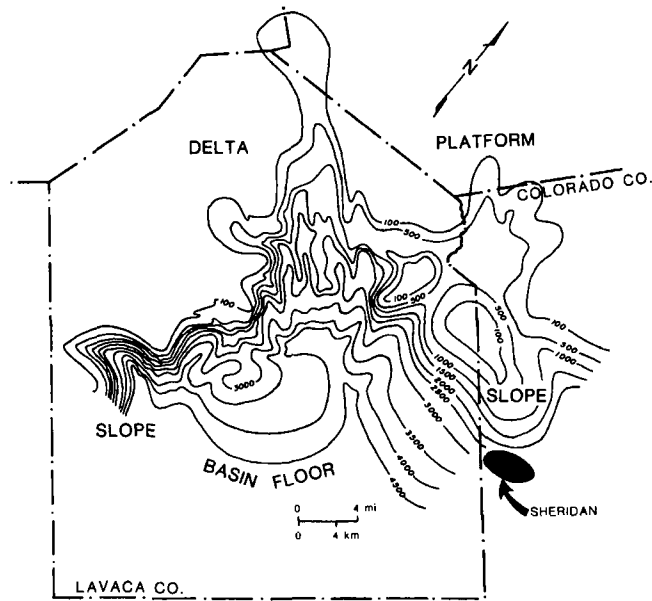


Figure 3. Isopach map of the decompactified fill of the Lavaca Canyon with respect to Sheridan Field (Modified from Galloway *et al.* 1989).

SHELL GAS UNIT NO. 75

SAND				MUD		CORE DEPTH		DESCRIPTION AND REMARKS	DEPOSITIONAL ENVIRONMENT
C	M	F	VF	S	C	FEET	METERS		
						13674	4169		
						13676	4170		
						13678	4171	<p>13,675-13,686' (11') -- Light gray, massive-appearing, very fine- to fine-grained, well-sorted, quartz sandstones with glauconite have sharp lower contacts and sharp or graded upper contacts with interbedded, finely-laminated and thinly interbedded, black claystone, siltstone, and very fine-grained sandstone that exhibits ripple-stratification. Local convolute bedding. Massive sandstones contain "floating" mud clasts.</p>	SUBMARINE CHANNEL
						13680	4172		
						13682	4173		
						13684	4174		
						13686	4175		
						13688	4176	<p>13,686-13,713' (27') -- Black to dark gray claystone and silty claystone with thin, delicate, silt laminations and local siderite concretions. Locally beds are slumped and/or display soft-sediment deformation with folds and microfaults.</p>	CHANNEL LEVEE OR SLOPE
						13690	4177		
						13692	4178		
						13694	4179		
						13696	4180		
						13698	4181		
						13700			
						13702			
						13704			
						13706			
						13708			
						13710			
						13712			
						13714			

Figure 4. Core description of Core #1 for the SGU No. 75 Well.

SHELL GAS UNIT NO. 75

SAND				MUD		CORE DEPTH		DESCRIPTION AND REMARKS	DEPOSITIONAL ENVIRONMENT
C	M	F	VF	S	C	FEET	METERS		
						14040			
						14042	4281		
						14044		14,041-14,047' (6') -- Light gray to tan, massive-appearing, fine-grained, well-sorted, quartz sandstone.	
MASS.						14046	4282		
						14048	4283	14,047-14,056' (9') -- Light gray to tan, very fine- to fine-grained, quartz sandstone. Sharp lower contact. Cross-stratified, ripple-stratified, clay-laminated in parts, and common slump features with bedding inclined up to 45°. Locally massive-appearing. Mud clasts occasionally present.	
SLUMPED						14050			
						14052	4284		
						14054	4285		
SLUMPED						14056		14,056-14,057' (1') -- Black claystone with thin bed of rippled, very fine-grained sandstone.	
						14058	4286	14,057-14,063' (6') -- Light gray to tan, very fine-grained, well-sorted, quartz sandstone with black claystone interbed at 14,061.5'. Sandstone cross-stratified, ripple-stratified, and massive-appearing locally. Slumped at 14,058' and 14,062.5'. Sharp lower and upper contacts. Mud clasts at base and top.	
SLUMPED						14060			
XB						14062	4287		
SSD						14064	4288	14,063-14,065.4' (2.4') -- Black claystone thinly interbedded with wavy-bedded to laminated, very fine-grained sandstone and claystone. Sand dike at 14,064.3'. Occasional sand-filled burrows.	
WB						14066			
SSD						14068	4289	14,065.4-14,067.5' (2.1') -- Light gray, very fine-grained, well-sorted, quartz sandstone. Ripple-stratified to massive-appearing and clay-laminated. Mudstone clasts common. Soft-sediment deformation at 14,065.7'.	
						14070			

SUBMARINE CHANNEL

Figure 5. Core description of Core #2 for the SGU No. 75 Well.

SHELL GAS UNIT NO. 54

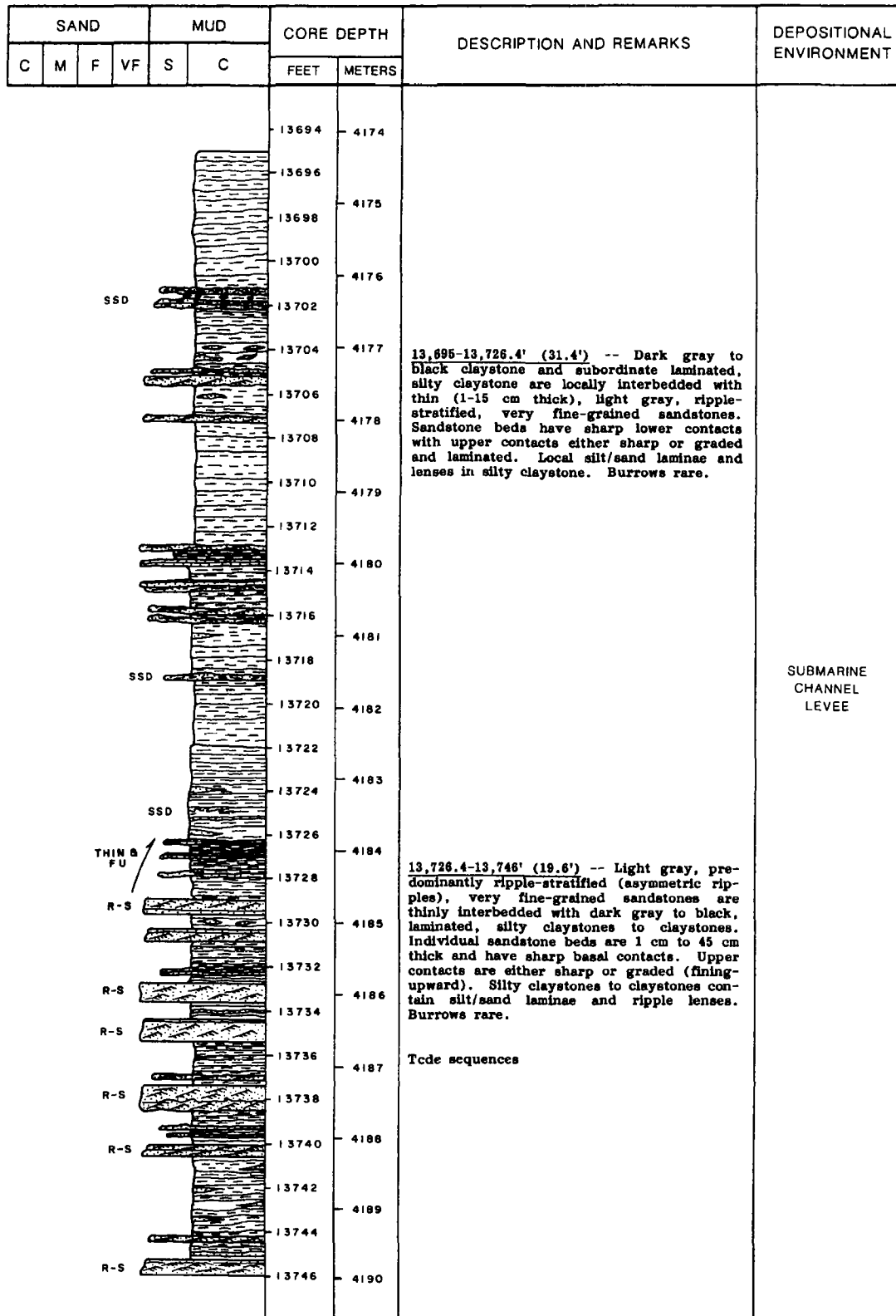


Figure 6. Core description for the SGU No. 54 Well.

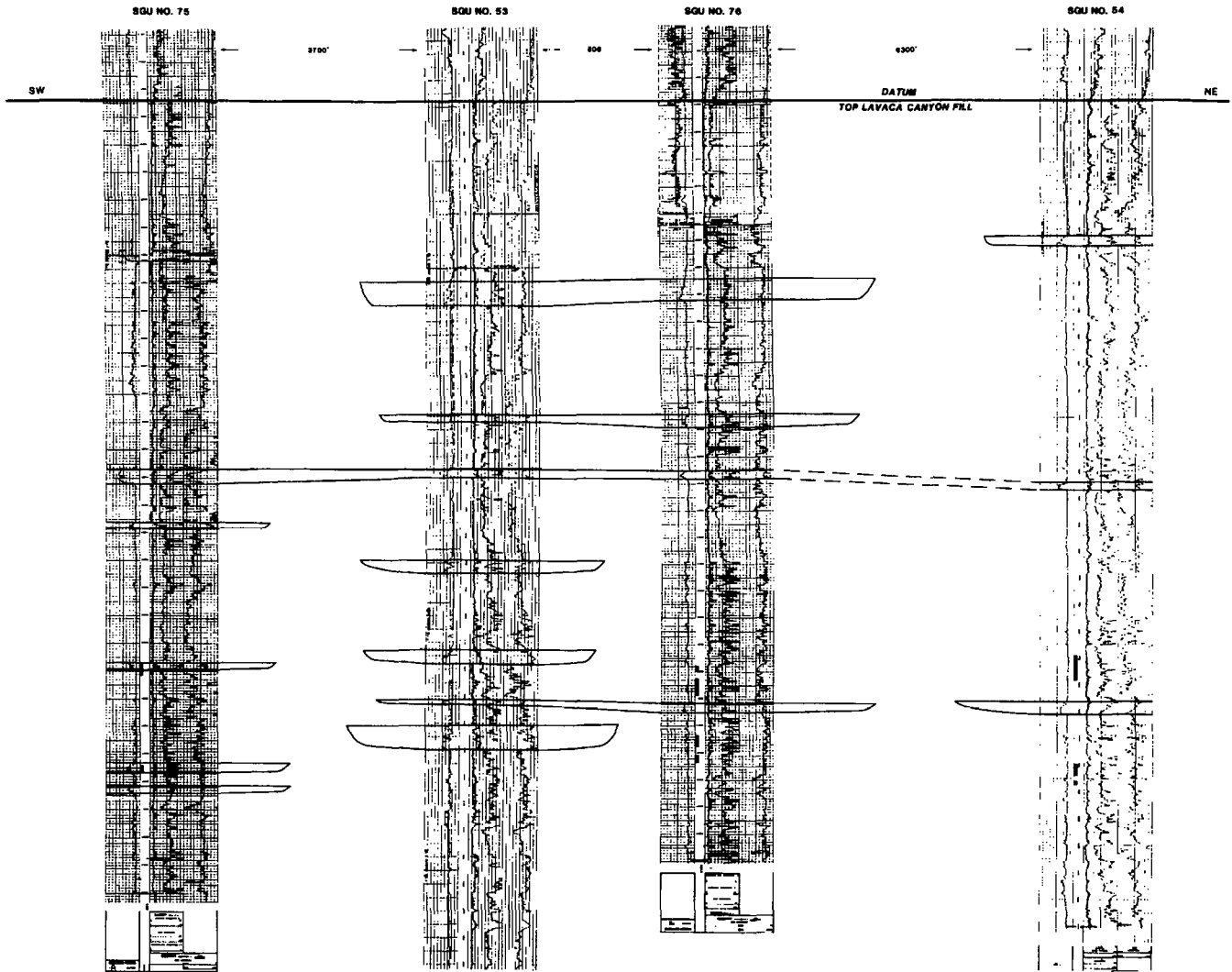


Figure 7. Stratigraphic cross section showing lenticular channel sandstones.

REFERENCES CITED

- Chuber, S. and H.H. Howell, 1986, Productive lower Wilcox distributary channel sands of the Hallettsville embayment, Lavaca County, Texas: *GCAGS Trans.*, v. 36, p. 59-60.
- Galloway, W.E., W.F. Dingus, and R. Paige, 1989, Seismic and depositional facies of Paleocene-Eocene Wilcox Group Submarine Canyon Fills, N.W. Gulf Coast, U.S.A.: AAPG Short Course No. 3, Lower Wilcox core workshop, Hallettsville Field, Lavaca County, Texas.