Pierce Junction field is a shallow piercement salt dome located one mile south of Astroworld in Houston, Texas. The field was discovered in 1921 and produces from the Miocene, Discorbis, Marginulina, Frio, and Vicksburg sands. Gulf Oil Corporation drilled the discovery well on the 560-acre Taylor lease, which is still active and has produced more than six million barrels of oil. The field, including all leases, has produced about fifty million barrels of oil. Later the Taylor lease was acquired by Chevron. Wells A and B of this paper are on the Taylor lease in the southeast quadrant of the dome.

Well A was drilled in 1957 and produced a total of 261,026 barrels of oil from Vicksburg and Frio sands. Figure 1 shows the log and dipmeter. Dipmeter calculations 8 and 9 show dips into the dome and for all practical purposes were ignored for lack of an explanation. The dips could not be calculated in the zone from 4800 ft to 5000 ft because of indefinite correlation. Other calculated dips indicated the expected dip direction was to the east-southeast, away from the dome.

In 1995 well B was directionally drilled updip of well A in order to recover remaining reserves that could not be recovered by well A. Figure 2 shows the log and dipmeter for well B. Dips away from the dome are seen in the Discorbis section as expected. Scattered dips are seen in the gouge section. Dips into the dome are seen in the Vicksburg from about 4400 ft to 4700 ft. Scattered dips are encountered from 4700 ft to 5000 ft.

As well B was being drilled, it became apparent that the expected sands were not being encountered by the bit below 4600 ft. E. H. Stork, Jr. provided daily paleontological analysis of the drill cuttings. His analysis indicated that the well encountered Vicksburg section at 4440 ft, approximately 1500 ft structurally higher than the Vicksburg section in well A. A decision was made to log well B at 5040 ft and include a dipmeter. Subsequently, the well was drilled to final total depth and logs run over the deeper part of the hole.

By honoring and integrating all of the paleontological, log, and dipmeter data from both wells, one is forced to construct the cross section shown as Figure 3. Overturned Frio and Vicksburg sands are beneath a post-Frio unconformity. As successfully predicted after the first log run in well B, the well encountered Vicksburg sand at 5300 ft. A completion was made in the 5300 ft sand, but the sand was of poor reservoir quality and did not make an economic well.

The results of well B justified another hard look at the lease. The well data that were previously not understood suddenly made sense, and many new development prospects were identified. Four additional development wells have been drilled on the lease and completed since drilling well B, and many other locations remain to be drilled.

Note that two new objectives are evident on the cross section. It is possible to get a "take point" structurally higher in the overturned Frio sands, and it is possible to encounter the wet, lower Frio sands structurally higher in the trap.

Overturned beds have also been identified on other shallow piercement domes in the trend, such as Saratoga field in Hardin County, Texas and the Boling Dome in Fort Bend and Wharton counties, Texas.

Biographical Sketch
Mark R. Etheredge is currently consulting and generating prospects in the Texas onshore area. He began working internationally for Texas Eastern in the early eighties. Since then he has worked as a consulting and generating geologist and as an employee for several independent oil and gas companies.
Figure 3. Cross Section
Figure 3. Well B

WELL B Drilled in 1995

- Discobis
- Vicksburg/Jackson Gouge
- Vicksburg vertical dipping beds
- Cum 9110 MCFG
- Salt

- 80 degrees
- 46 degrees
- 45 degrees
- Scattered dips 8 to 80 degrees in gouge zone
- 45 degrees into the dome
- 55 degrees into the dome
- Scattered dips, subvertical to vertical dipping beds

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