



# San Joaquin Geological Society

**Date:** Tuesday, October 14<sup>th</sup>, 2014

**Time:** 6:00 PM Social Hour  
7:00 PM Dinner  
8:00 PM Lecture

**Place:** American Legion  
2020 H St. Bakersfield, CA 93301

**PSAAPG Members & Mesozoics**  
\$25 w/ reservation  
\$30 without reservation

**Non PSAAPG Members**  
\$30 w/ reservation

**Full-time Students with ID:**  
Free, Courtesy of Chevron & Occidental

## **SJGS WEBSITE**

<http://www.SanJoaquinGeologicalSociety.org/>

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## **Structural Wedge Model and the Antelope Uplift, West Side of the San Joaquin Basin, California, and Hydrocarbon Potential**

**Thomas L. Davis, Geologist, Ventura, CA**

The west side of the San Joaquin basin, California, is a geologically complex area whose potential for additional discoveries is considered high due to rich source rock units and structural and stratigraphic complexity. Recent exploration interest has focused on "unconventional" shale plays, but conventional plays and prospects, those involving migrated hydrocarbons, continue to play an important role. New conventional plays require some unconventional thinking, too, as the basin has been intensely explored for over 130 years. One such play is based on a crustal-scale structural wedge being driven eastward into the undeformed San Joaquin basin with shallow-level backthrusts that dip basinward. The wedge model was first proposed by Namson and Davis (1988) and Namson et al. (1990) to explain the characteristics of the 1983 Coalinga earthquake (Mw=6.5) and the development of the Coalinga anticline (a similar wedge model was subsequently employed by Guzowski et al. (2007) to explain the same earthquake and anticline). In the interpretation presented here, the wedge model is applied to the Antelope uplift, an extensive area of older rocks at shallow depths, located between the northern Temblor Range and North Belridge oil field. There the wedge creates a triangle-zone geometry with a subthrust anticline(s) involving Tertiary-age strata with hydrocarbon potential, as opposed to the wedge at Coalinga that involves mostly Cretaceous- and Jurassic-age rocks with much less potential. The subthrust anticline(s) is bounded on the west by the westward-dipping Temblor Range thrust and on the east by the eastward-dipping Shale Hills thrust, and the Antelope uplift is a broad hanging-wall anticline to the Shale Hills thrust (roof thrust). The opposing thrust sheets conceal the subthrust anticline(s) that could have up to 10,000 acres of closure. This interpretation, while not unique, and untested by drilling, is supported by reprocessed 2D seismic lines tied to well data, Bouguer gravity, and ties to the surface geology. The stratigraphy of the subthrust anticline(s) can be postulated by two methods: First, geologic units within the subthrust block have approximately the same structural relief as the undeformed units to the east (Buttonwillow depocenter); and second, the stratigraphy of the northern Cymric oil field can be mapped northward, using deep well data and strike seismic lines, beneath the lateral ramp forming the southern edge of the Antelope uplift, and into the subthrust block. These methods suggest that subthrust anticline(s) should involve known reservoirs and source rock of late Cretaceous through Miocene age, and the prospectivity is further enhanced by a local petroleum system indicated by several nearby oil fields and numerous oil and gas shows in wells. Hydrocarbon generation and migration are most likely from the Buttonwillow depocenter (lateral migration) and deep subthrust areas (vertical migration). The structure of the Temblor Range suggests the wedge model could be used in additional locations to explore for large subthrust structures.

### **Bio -**

Thomas L. Davis is an oil and gas prospect generator with a background in complex structural settings and surface and subsurface geologic mapping. Davis has worked as a consultant and researcher, worldwide, for numerous energy companies, several national oil companies, and the United States Geological Survey (USGS). Formerly Davis was a partner in Davis & Namson Consulting Geologists, and prior worked for the Atlantic-Richfield Corporation. Davis has a BS and PhD in geology from the University of California.

### **\* RSVP \***

**By: Friday, Oct. 10<sup>th</sup>, 2014**

By Replying to this email  
or by phone 654-7252

or PayPal on the Website:  
<http://www.SanJoaquinGeologicalSociety.org/>