

## **Finding New Oil Fields in a Mature Play: BV Nose Discovery, Upper Miocene Stevens Play, San Joaquin basin, California: Case study**

**Manuel Paz<sup>1</sup> and Keith Meyerholtz<sup>1</sup>**

<sup>1</sup>Senior Geological Advisor, California Resources Corporation

### **Abstract**

The BV Nose field was discovered in 2012 and is the most significant Stevens sands oil discovery in the last 30 years in the San Joaquin basin. BV Nose is not only significant in size but also because it was discovered in the relatively mature Stevens sand play. These new resources found by fine tuning the regional stratigraphic framework, integrating those details with the 3D seismic data, and mapping the sequences throughout the seismic volume.

The Stevens sandstones are a series of Miocene deep marine turbidite sands deposited within a closed-basin setting. The sands were confined by topographic sea floor highs and encased within the Monterey Formation biogenic shales.

Detailed log correlation and sand thickness maps of several subunits along with reviewing historical drilling reports and mud logs were key in identifying the most prospective intervals and highlighting areas of interest. One of these areas of interest was on the eastern flank of the Buena Vista anticline. Here the Stevens sands are thicker in the east and pinch-out towards the west.

From 1939 to 1988, twelve wells had been drilled in the general vicinity of the BV Nose field searching for Stevens traps. Five of these wells encountered sands with oil shows in the upper Stevens, but the sands were either too thin or the resistivity was too low to encourage extended tests.

Three of the wells, which encountered upper Stevens sands, had good sonic logs that allowed synthetic tying of the interval of interest to the seismic data. The top and base of the uppermost Stevens sand were interpreted and an isochron map showing the sand trend was generated. The first exploration well targeted a thick zone in an up-dip position. The well found 130' of gross sand, with a NTG over 75%, and an average porosity of 12%. This was close to pre-drill expectations based on the isochron and the sands found in the nearby wells. The reservoir sands were tested and flowed at initial rates greater than 500 bopd.

With the success of the exploration well, an appraisal well was drilled 300' downdip to test the thicker isochron area. The well found 250' of gross sand, 70% NTG and porosities better than encountered in the exploration well. These reservoirs were again tested with initial flow rates greater than 1000 bopd. The BV Nose discovery demonstrates that detailed integration of log and seismic data can lead to new discoveries in a geologic play even after more than 100 years of drilling history.