

## **A Look Back at the Prospect Generation of Cedar Hills-East Lookout Butte Fields Williston Basin, Codell Resource Play North Denver Basin**

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### **ABSTRACT**

Pennel Southeast and Little Beaver East Prospects, now known as the Cedar Hills-East and Lookout Buttes Fields, are located on the southeast flank of the Cedar Creek Anticline which at the time this prospect was generated (1988) have produced more than 350 million barrels of oil from 15 separate fields. Oil reservoirs include the Red River, Stony Mountain, Interlake, Duperow, Lodgepole and Mission Canyon Formations. The Ordovician Red River B Zone which is the most prolific of these reservoirs has responded well to waterflooding. The oil trapping mechanisms in the Red River B Zone have never been fully explained and very little Red River B Zone oil is trapped by four-way structural closure. Due to the complex nature of these Red River traps along the anticline, the oil-water contacts on the downdip east side of the fields were not defined. This fact was well documented by an active drilling program we initiated during the early 1980's when more than thirty producing wells were completed downdip of existing production at Cabin Creek and Pennel Fields. The downdip extension of production beyond the field boundaries suggests that a re-evaluation of the known limits of all the Cedar Creek Fields would be worthwhile. Pennel Southeast and Little Beaver East Prospects were defined simply by studying the well data on the east dip of the Cedar Creek anticline. A cluster of by passed and producing wells defined a large, undeveloped oil column downdip from the existing limits of Pennel – Lookout Butte and Little Beaver East Fields with a 216 million barrel horizontal target using water flood support. To date in these prospects 789 wells have been drilled and 190 million barrels of oil have been produced.

The Codell Sandstone play was generated in 2005 looking for a resource that would compare favorably to the very successful Bakken carbonate play taking place in Richland County, Montana. The Codell had produced modestly in vertical wells in and south of the Silo Field in Laramie County, Wyoming setting up a focus area. To add to the intrigue a mud log was located that showed the Codell sand was over pressured and attempted to blow out during the drilling of a J Sand test. Due to mineralogy and bound water, resistivity mapping would not define the resource. The resource boundaries were simply defined by a large cluster of good oil shows. This resource contains 1.65 billion barrels of oil in place and a recoverable 165 million barrel target was postulated. Currently there are 76 producing Codell wells with 1,660 Codell locations permitted in this play.