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# Comparison of stimulation techniques and production methods used in unconventional reservoirs in Cherokee Basin, Kansas And Oklahoma, USA

**Steven A Tedesco**
Energid Energy, USA

Coalbed methane and carbonaceous mudstone reservoirs require unique drilling and completion methods to minimize reservoir damage and achieve optimal production. Determining successful drilling and completion techniques for unconventional reservoirs tends to be a long-term process that is based on more trial and error. Which particular drilling or completion method will be optimal may not be known for years after production has begun from an area. Despite the success or failure of a particular completion method(s) used, there are geologic and reservoir characteristics that may be unknown initially that can have an adverse or positive effect on production. In 2008 over 7,000 wells were producing from coals and carbonaceous mudstones for the Cherokee Basin (Figure 1). In 2008 more than 1,000 wells were awaiting completion or connection to a gathering system. In that same year, drilling and completions began to slow due to the collapse in gas prices. By 2009, coal bed methane drilling activity completely ceased in the Cherokee Basin. The reservoirs are characterized by low volumes of produced water and production decline curves similar to conventional gas reservoirs. Drilling for new coalbed methane and shale gas reservoirs post-2010 is almost non-existent. The types of completion methods used can be categorized in to single zone or up to 7 zone completions. The number of fracture stimulations can be further characterized by single zone fracture stimulation to multiple zone fracture stimulation. Specific coals and carbonaceous shales were consistently gas productive whereas other zones were not. The data is impacted by drilling methods used, location of the reservoirs in the basin, water data, completion methods, and understanding rock properties and compare to actual production. This paper will present integration of production and completion data with general geologic data determines: 1) the optimal completion technique (s); 2) specific coals and carbonaceous shales are more productive; 3) the median decline production profile; 4) optimal areas in which to find production; and 5) how can production rates and total volumes be improved.

**e:** Steve@energidenergy.com