

How well-connected is your well?

by

Ian D. Palmer

Amoco Production Company

ABSTRACT

Coalbed methane is bountiful in countries like Australia and the U.S. Normally, we drill a vertical well straight down to the coal. The trick is to get the gas out as fast as possible, but this depends on how the well connects to the formation. In conventional oil-gas-bearing formations, techniques have been developed that do a pretty good job. For example, creating a hydraulic fracture, like a crack in the footpath, is a standard way of improving the connection to the formation. Oil or gas flow is accelerated as it zips along this conduit to the well. However, in coalbeds, fractures sometimes go wrong. Although these fractures can reach a long way out, they sometimes hurt or damage the coal and discourage it from giving up its gas. Ways have been found to avoid this damage, for example, creating a fracture by pumping water down the well instead of thick, viscous gel. So, what is the best way to fracture a coalbed? A lot of work has been done recently in this area, and the latest developments will be summarized.

A totally different way of connecting the well to the coalbed is by enlarging the radius of the well itself. The bigger the hole, the faster the gas can flow out. In one pretty novel

technique, this is done by blowing down the well, that is, suddenly opening the well up to the atmosphere, allowing water and gas to come rushing out. Due to tremendous forces, some of the coal collapses into the well and is blown out too. Left behind is a cavity, which can be up to 16 ft in diameter. Hundreds of these "cavity" wells have been punched in coal seams in the U.S.A.

The "fairway" is the sweet spot of the San Juan Basin (Colorado and New Mexico), and the coalbed methane wells here are the best in the world. Most of these wells are cavity wells, and it is a little puzzling why they produce more gas than wells which have been hydraulically fractured. Part of the answer is that fractured wells damage the coal. The other part of the answer is that the coal surrounding the cavity is altered, its permeability is increased, and this increases the flow of gas into the well.

Finally then, what is the best way to connect a coalbed methane well to the coalbed - by creating a cavity or by creating a hydraulic fracture? Will cavity wells replace fractured wells? And what are the answers likely to be for Australian coalbeds? These questions will be addressed.