

Unique approaches, tools and lessons learnt in development of coal bed methane

Azam Khan¹; Mian Tauseef Raza¹; Tasaddaq Younas²; Sikander Azam¹; Amir Ali Lakhu¹ and Sayed Muhammad Iqbal³

¹*Petroleum and Gas Engineering Department, UET, Lahore, Pakistan*

²*Department of Earth Sciences, University of Sargodha, Sargodha, Pakistan*

³*Department of Petroleum and Gas Engineering, BUIITEMS, Quetta, Pakistan*
mst.seefi@yahoo.com

Abstract

The fraction of gas production from coal seams is growing steadily particularly in USA, Canada and Australia. Coal fields have several traits in common which comprise extremely low permeability and they are both the source as well as the reservoir from which hydrocarbons are produced. In hydrocarbon exploration terminology they are categorized as “Unconventional Resources”. Very low permeability offered by coal compels to develop special techniques to recover the CBM; the methane gas present in coal seams as adsorbed or free gas. These techniques include horizontal drilling, drilling multilateral wells and multistage fracturing to recover the maximum possible of the methane gas. On-site coal seam-specific drilling methods were decreasing the capital cost of drilling a CBM well in last decade.

Pakistan has large coal reserves. CBM can be produced from operational mines, abandoned coal mines, and from unmined coals using surface boreholes. It is fast becoming an important energy source mainly because of the declining conventional gas resources. Methane gas in coal seams is present in two ways; free gas present in pore space and associated gas adsorbed on the coal surface. Pore gas has smaller fraction and reservoir pressure deplete rapidly, so, even after the multilaterals and horizontal wells followed by multistage fracturing have less recovery. From 1990's and onward, nitrogen gas was introduced as a recovery optimizing tool through adsorbed gas recovery. Nitrogen has certain drawbacks. It is difficult to obtain pipeline quality gas after nitrogen gets mixed with methane resulting in increased operating costs. In this paper, carbon dioxide flooding is discussed as a tool to recover least contaminated gas in a cost effective manner. It has certain benefits over other methods including environmental friendliness in the form of “Carbon Credits”. This paper addresses the quality of coal to be a best candidate as CBM reservoir, different methods used for recovery and their comparison, at the end; carbon dioxide flooding and its advantages over the other methods are discussed. This paper will focus on how developed countries are maximizing their CBM production what lessons can we learn from them to partake in the energy crunch of Pakistan.