Analyses of Pressure and Rate Transients of Gas flow in Mining Induced Formation Deformation to Determine Permeability's

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Abstract
Longwall mining is an underground mining method during which a mechanical shearer progressively mines a large block of coal, called a panel, in an extensive area. As the coal is extracted, the supports automatically advance and the roof strata cave behind the supports. Caving results in fracturing and relaxation of the overlying strata, which is called “gob.” Due to its highly fractured nature, gob contains many flow paths for gas migration. Therefore, it is important to understand the properties of the gas reservoir created by mining disturbances for mitigating methane emissions into mines and for optimizing the wellbore placement strategies accordingly.

This presentation covers a range of field studies, and analyses and interpretation of results conducted in NIOSH Pittsburgh Research Laboratory. In particular, use of well-test analyses and interpretation techniques with rate and pressure transient data to understand reservoir properties of caved and fractured strata are discussed and their importance to coal mine methane production and ensuring underground coal mine safety are emphasized. The insights obtained from well test analyses can be used for a better understanding of the gob and for designing more effective gob gas venthole systems.

Biosketch
Dr. Özgen Karacan graduated from Middle East Technical University, Ankara, Turkey, with Ph.D. degree in Petroleum and Natural Gas Engineering in 1998. He worked at the Pennsylvania State University between 1999 and 2003. Dr. Karacan joined NIOSH in July of 2003 to work in methane control and mine ventilation projects in the Pittsburgh Research Laboratory, where he is currently employed as senior research engineer and directs research tasks and research projects to understand methane migration paths in coal mines and to developing strategies for controlling it at the reservoir level and to develop methane production strategies to eliminate methane explosion hazards in underground coal mines.

Dr. Karacan has served in various promotion and award committees, and organized, co-organized and chaired sessions in conferences and reviewed research proposal applications for DOE and American Chemical Society. He has given numerous lectures in prestigious conferences and in workshops in the U.S. and abroad. Dr. Karacan has been serving as the Editor-in-Chief of the International Journal of Coal Geology since 2009.

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Refreshments will be provided