San Juan Citizens Alliance

Methane Migration from Seeps and Abandoned Wells

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Methane Migration in Coalbed Methane Development

• Must remove the water to reduce pressure within coal seams to allow gas to flow from the coal to the wells.

• Gas will flow to any low pressure area; primarily wells, but also formation outcrops, faults, and well bores.

• In cases of very shallow coals, gas may migrate up through soil column.
Figure 1.—Index map showing the location of the San Juan Basin. Kkf, Fruitland Formation and Kirtland Shale; outcrop is shaded.
Concerns: Outcrop Issues

Basis of Concern:

• Methane seeps
  Explosive levels of methane have been found both inside and outside homes along the Fruitland Formation outcrop: *Pine River Investigative Team Report*, 1995.

• Coal outcrop fires
  “Fires in coal outcrops could be induced or exacerbated by CBM development” (BLM and USFS, 2004, pg. 3-48)

• Hydrogen sulfide
  There appears to be a connection between H\textsubscript{2}S seepage and CBM development: BLM and USFS, 2004.
Concerns: Outcrop Issues

History of studies concludes production of Fruitland Formation coalbed methane has increased methane seepage at outcrop:

“Accordingly, gas seepage from the basin as of early 2000 is estimated to have increased by at least 3 MMcfd, and possibly as much as 10 MMcfd over predevelopment levels.” Questa Engineering, 2000, p. 1-4.

Other studies:
• Pine River Investigative Team Report, 1995
• THE 3M CBM FINAL REPORT, Questa Engineering Corporation, 2000.
Oil and Gas Migration up Wells and Well Bores

- Improper casing or cementing – migration between casing and well bore
- Damaged casing or cementing
- Orphan wells – many old wells did not have proper casing or cementing
- Deterioration of casing or cementing through time
Plugging prevents gas from leaking to the surface where it can cause explosions.

Ohio Department of Natural Resources, Orphan Wells Slide Show

http://www.dnr.ohio.gov/mineral/orphanwellsides/default.htm
Proper Plugging also protects fresh ground water from contamination by crude oil or natural gas.

Ohio Department of Natural Resources, Orphan Wells Slide Show
Methane seepage leads to house explosion and human injuries in La Plata County, Colorado, 2005.
• “In 1999, there were over 340,000 wells idle. This figure represented an increase of more than 58,000 over the number recorded in 1996.”

• “The breakdown by idle well category shows: 49% are idle with state approval; 34% are idle without state approval, but the operator is known and some security exists; and the remainder are orphan wells, where the operator is unknown or is insolvent. The survey showed the number of orphan wells to be approximately 57,064.”

**Source:** *Produce or Plug? A Summary of Idle and Orphan Well Statistics and Regulatory Approaches.* Keith T. Thomas, Interstate Oil and Gas Compact Commission. 2001. Society of Petroleum Engineers Inc.