

San Juan Citizens Alliance



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.

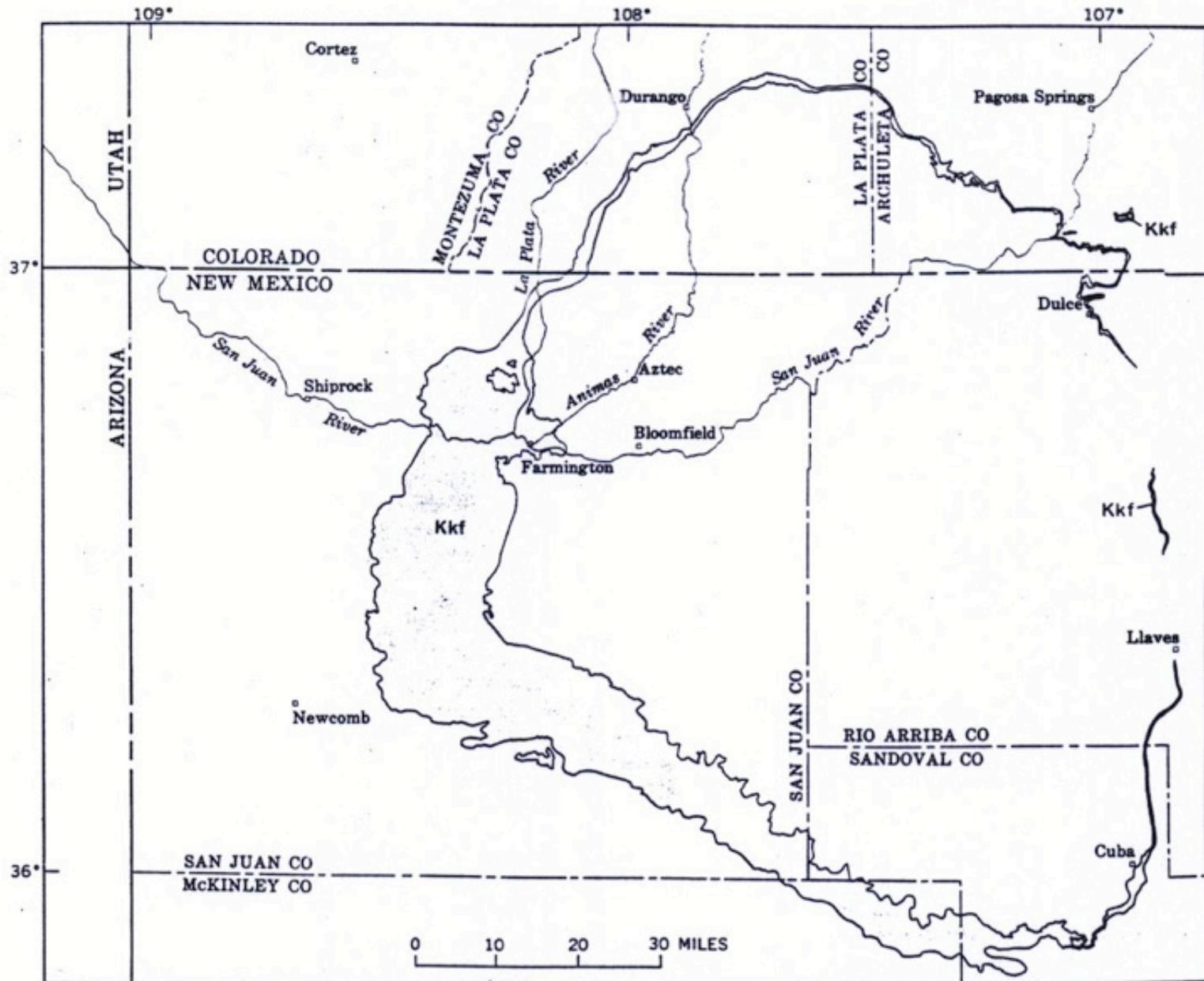


FIGURE 1.—Index map showing the location of the San Juan Basin. Kkf, Fruitland Formation and Kirtland Shale; outcrop is shaded.

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 H₂S 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:

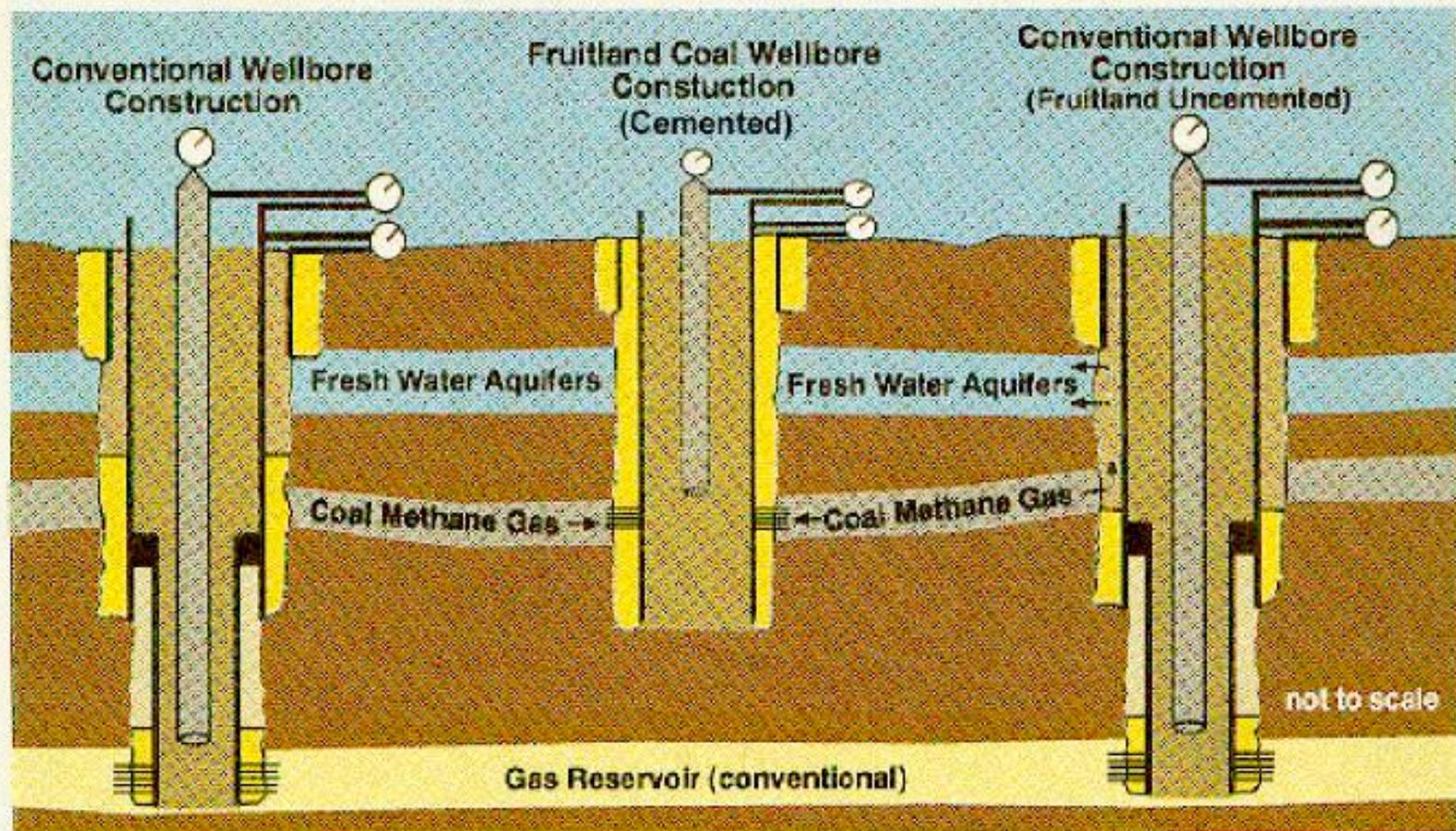
“Accordingly, gas seepage from the basin as of early 2000 is estimated to have increased by at least 3 MMcfd, and possibly as much as 10 MMcfd over predevelopment levels.” Questa Engineering, 2000, p. 1-4.

Other studies:

- *Pine River Investigative Team Report*, 1995
- *THE 3M CBM FINAL REPORT*, Questa Engineering Corporation, 2000.
- *Northern San Juan Basin Coal Bed Methane Project-Draft Environmental Impact Statement*, BLM and USFS, 2004.

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



NORTHERN SAN JUAN BASIN CBM EIS

**FIGURE 3-2
ILLUSTRATION OF METHANE FLOW ALONG
UNCEMENTED CONVENTIONAL WELLBORE
(RIGHT) INTO SHALLOW AQUIFER**

ANALYSIS AREA: LA PLATA & ARCHULETA COUNTIES, COLORADO

DATE: 04/01/04

AUTOCAD FILE: 994fig.dwg

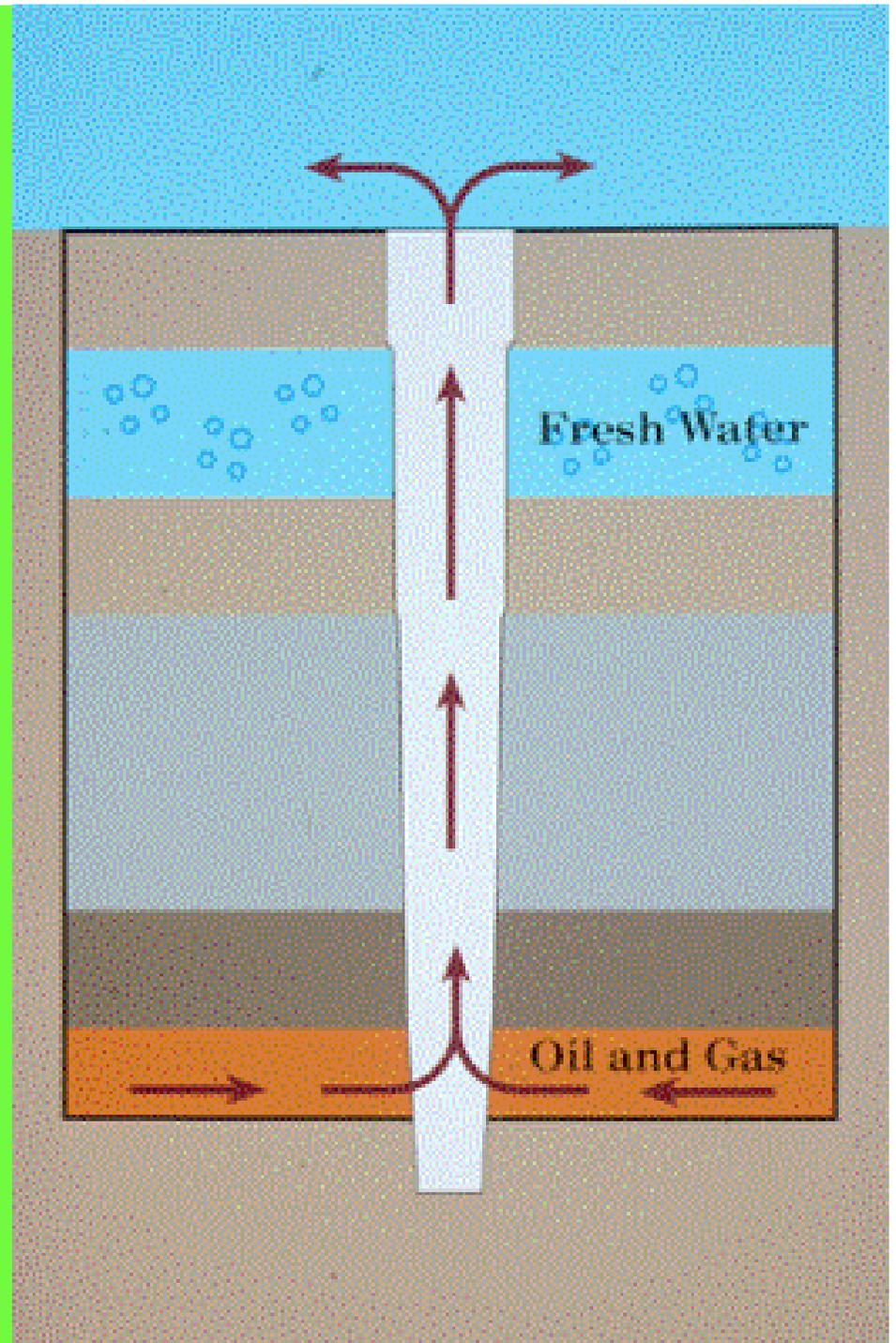
SCALE: n/a

PREPARED BY: ETC

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

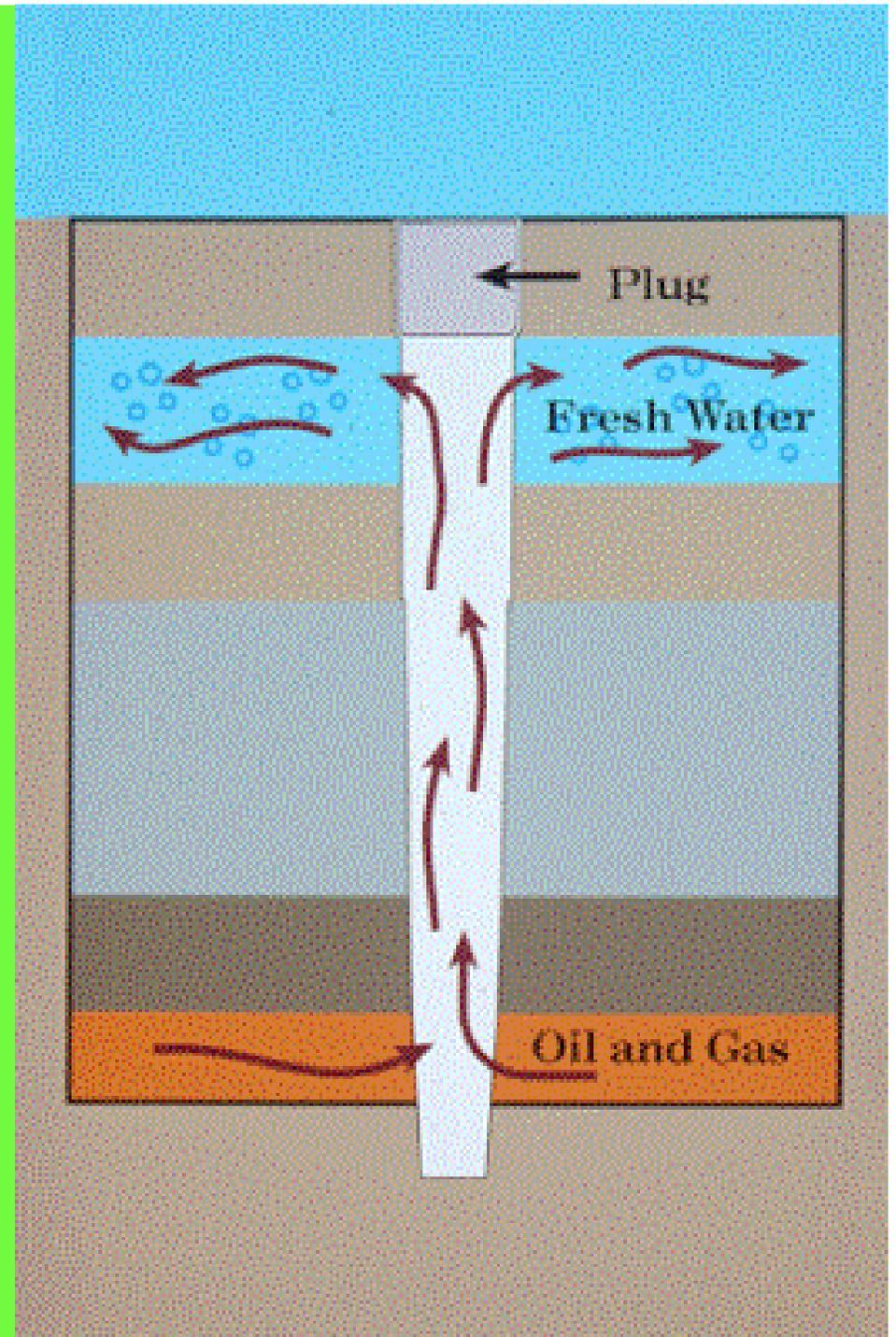




Photo Credit: Yodit Gidey, *Durango Herald*.

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.