

NATURAL GAS RESOURCE POTENTIAL OF THE LEWIS SHALE, SAN JUAN BASIN, NEW MEXICO AND COLORADO

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The gas reserves of the Lewis Shale in the San Juan Basin are immense yet remain highly undeveloped. However, this resource can be economically developed through uphole completions in existing wellbores. Approximately 3,000 existing wellbores are located within a fairway of potential commercial production. The Lewis possesses reservoir characteristics clearly analogous to many Western Interior mud-rich deposits, as well as to hydrocarbon-bearing shales. Since production from conventional reservoirs in the continental United States is decreasing, gas from the Lewis and from similar unconventional reservoirs will become increasingly important for future gas supply. This paper presents fundamental geologic, reservoir and production data from the Lewis that have not been previously released in the public domain. Much of this data is preliminary.

The Lewis was not a completion target in the San Juan Basin from the 1950's through 1990. The only production from the Lewis originated from 16 wells which encountered natural fracture systems while drilling for deeper objectives. In 1991, Burlington Resources (B.R.) initiated a pilot program to re-enter existing wellbores and to fracture stimulate the Lewis. As of 1997, approximately 90 wells have been completed in the Lewis, including one horizontal well. Isolated Lewis production tests, three months after completion, range from 100-540 mcf/d. Production declines appear to stabilize at very shallow rates. Fracture stimulation types have included nitrogen-foam, slick water, and linear gel, with average proppant loads of 100,000 lbs.

Storage capacity for the 1,400 foot thick Lewis interval is approximately 22 bcf per 160 acres. This estimate was determined by performing methane adsorption isotherms on six samples, ranging from sandy to shaly lithologies in the Lewis. Adsorptive capacity ranges from 13-38 scf/ton. All samples have storage capacity, indicating that the desorption component is important for sandy intervals as well as for true shales. Permeability is provided by an extensive microfracture system in the sandy intervals and by regional tectonic fractures. Variability in production rates and recovery factors should be anticipated due to the natural fracture component of the reservoir. B.R. has defined an 1100 square mile fairway where commercial production potential exists. Total storage capacity for the Lewis in this fairway is 96 tcf, and this value will increase if the play area is expanded.

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