



## THE WILDERNESS SOCIETY

### **A GIS Analysis of Economically Recoverable Gas and Oil In the Rocky Mountain Front of Montana**

May 3, 2004

#### **KEY FINDINGS:**

- *The Blackleaf area now being studied for drilling in the BLM's Blackleaf EIS contains less than a day's worth of natural gas and 15 minutes of oil for the nation.*
- *The Badger Two Medicine area contains less than two days of natural gas and five seconds of oil.*
- *The entire Montana Front (federal lands) contains less than a week of natural gas and 20 minutes of oil.*

#### **BACKGROUND:**

Located next to Glacier National Park and the Bob Marshall Wilderness, Montana's Rocky Mountain Front contains nationally recognized wildlife, recreation, and scenic values as well as oil and gas deposits. To better understand the tradeoffs with proposed energy development on the Front, The Wilderness Society used data from the United States Geological Survey (USGS) to estimate the amount of undiscovered gas and oil found in the Front and several sub-areas. The analysis is based on estimates of "economically recoverable" oil and gas (defined as "technically recoverable" gas that is estimated to be profitable to extract). This is the appropriate basis for policy analysis, as recommended by the Congressional Research Service. Management plans that ignore economic constraints on production and instead utilize technically recoverable estimates will exaggerate the energy potential, as well as the jobs and revenues that may flow from proposed drilling.

#### **METHODOLOGY AND SOURCES:**

Using USGS data we completed a geographic information system (GIS) analysis of the overlap between the boundaries of gas and oil assessment units and the boundaries of four study areas: federal lands in the Rocky Mountain Front, the Badger Two Medicine area (Lewis and Clark National Forest), all land within the Blackleaf Environmental Impact Statement (EIS) study area, and federal lands within the Blackleaf EIS study area. Our analysis utilized mean (average) estimates of technically recoverable gas and oil developed by the USGS in 2002. We derived economic recovery rates based on cost functions developed by USGS economists in 1998. For details on methods and assumptions see Morton et al. (2002) at [www.wilderness.org/Library/Documents/Energy\\_WesternWildlands.cfm](http://www.wilderness.org/Library/Documents/Energy_WesternWildlands.cfm) and <http://buscom.com/enerzine/exploration.pdf>.

To account for the uncertainty inherent in price forecasts, USGS used a range of prices, rather than a single-point estimate. Our economically recoverable gas and oil calculations are based on these two USGS price scenarios: \$21.21 and \$35.35/barrel of oil, and \$2.36 and \$3.94/thousand cubic feet (mcf) of gas (prices in 2002 dollars). Before recent price spikes, \$2.00 per mcf was viewed as the long-term wellhead price for natural gas (wellhead prices are lower than market prices paid by consumers). Current projections from the Energy Information Administration (EIA) suggest that natural gas wellhead prices will decline from the high levels of 2003 to \$3.40 per mcf (2002 dollars) in 2010. As with any long-term price forecast, uncertainty is large. If actual prices are higher than the USGS high price scenario, the amount of gas economically recoverable is likely to increase from our estimates. Similarly, if actual prices are lower, the economically recoverable amounts will likely be lower than our estimates.

To put the economically recoverable oil and gas estimates into perspective, we divided them by the latest EIA numbers for annual oil and gas consumption for the U.S. This gives us the amount of time that the gas and oil found in the Front or its sub-areas would meet our national energy demands.

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## **DISCUSSION AND CONCLUSIONS:**

The amount of economically recoverable oil and gas in the Rocky Mountain Front would be lower than our estimates if infrastructure costs, the costs of transporting the gas to market, mitigation costs, and non-market costs such as loss of local economic benefits from diminished hunting, fishing, and camping experiences were included. The USGS did not include these costs and base its assessment of economically recoverable resources on only the direct costs of exploration, development, and production at the wellhead, plus a profit margin. In any case, it is clear that Montana's Rocky Mountain Front does not contain significant quantities of oil or natural gas from a national perspective. Drilling the Front could mean trading a few minutes of oil and a few days of gas for a lifetime of watershed protection, wildlife, recreation, hunting and other wilderness benefits that would accrue to current and future generations of Montanans.

**Table 1. Estimates of economically recoverable gas and oil resources for federal land in the Rocky Mountain Front (400,000 acres).**

Resource	Technically recoverable	Economically recoverable as % of technically recoverable (%)	Economically recoverable quantity	Economically recoverable in relation to total U.S. consumption
Gas	608 Bcf <sup>a</sup>	48-65	289-397 Bcf	4.6 - 6.3 days
Oil	0.62 MMBO <sup>b</sup>	13-41	0.08-0.26 MMBO	6 - 19 minutes
Natural Gas Liquids	15.24 MBNGL <sup>c</sup>	43-57	7-9 MBNGL	n/a

<sup>a</sup> Billion cubic feet

<sup>b</sup> Million barrels of oil

<sup>c</sup> Million barrels of natural gas liquids. Natural gas liquids are secondary hydrocarbon products recovered from oil or gas drilling. Consumption estimates are not available for these by-products.

**Table 2. Estimates of economically recoverable gas and oil resources for the Badger Two Medicine Area of the Lewis & Clark National Forest (138,000 acres).**

Resource	Technically recoverable	Economically recoverable as % of technically recoverable (%)	Economically recoverable quantity	Economically recoverable in relation to total U.S. consumption
Gas	148 Bcf	48-65	71-97 Bcf	27 – 37 hours
Oil	29 barrels	25	7. 2 barrels	0.03 seconds
Natural Gas Liquids	3.43 MMBNGL	50-67	1.72-2.29 MBNGL	n/a

**Table 3. Estimates of economically recoverable gas and oil resources for all land within the Blackleaf EIS boundary (58.000 acres).**

Resource	Technically recoverable	Economically recoverable as % of technically recoverable (%)	Economically recoverable quantity	Economically recoverable in relation to total U.S. consumption
Gas	44 Bcf	46-64	21-28 Bcf	8 - 11 hours
Oil	0.48 MMBO	13-42	0.06-0.20 MMBO	5 - 15 minutes
Natural Gas Liquids	1.85MMNGL	10-13	0.18-0.24 MNGL	n/a

**Table 4. Estimates of economically recoverable gas and oil resources for federal lands within the Blackleaf EIS boundary (24,000 acres).**

Resource	Technically recoverable	Economically recoverable as % of technically recoverable (%)	Economically recoverable quantity	Economically recoverable in relation to total U.S. consumption
Gas	29 Bcf	47-64	14-19 Bcf	5.3 - 7.2 hours
Oil	0.22 MMBO	14-40	0.03-0.09 MMBO	2.2 - 6.3 minutes
Natural Gas Liquids	1.12 MMNGL	14-19	0.16-0.21 MNGL	n/a

### **For more information contact:**

Peter Aengst 406-586-1600 x105

Pete Morton, Ph.D. 303-650-5818 x105

Michelle Haefele, Ph.D. 303-650-5818 x109