

oil produced in commercial operations involving mining, crushing, and processing would have about the same book rate of return as the national average for mining and manufacturing generally. Under the proposed Department of the Interior regulations, however, returns would be substantially lower. Thus, there is nothing in our studies that suggest windfall profits.

Some facts regarding shale oil reserves in this country are worthy reviewing. The most important oil shale deposits in the United States occur in the Green River formation of Colorado, Utah, and Wyoming. The frequently-quoted estimate of 2 trillion barrels of shale oil grossly overstates the economic reserves available. This figure includes all shale oil in the deposits and, as with crude oil, a large portion of the deposits will not be recoverable. There is a vast difference between a resource in place and the amount that is recoverable with existing technology and the usual economic limitations. With known technology, recoverable shale oil amounts to a relatively small fraction of the total oil in place.

There are wide differences of opinion on how much oil can be recovered from these oil shale deposits. The differences can be attributed in large part to the parameters used in making the estimates. For example, Dr. Russell G. Wayland, of the U.S. Geological Survey, recently testified before the Senate Antitrust and Monopoly Subcommittee that from the high-grade shale, which is a 30-35-gallon-per-ton shale, "about 80 billion barrels of shale oil is considered recoverable by demonstrated mining and retorting methods." Humble estimates that from a 25-gallon-per-ton and richer shale, about 160 billion barrels of oil could be recovered. Neither Dr. Wayland nor Humble says these amounts can be recovered economically. On either basis the oil potential is tremendous, even if it is only a small fraction of the trillions that have been quoted by various sources.

Regardless of the amount of recoverable reserves that is eventually established, about 80 percent or more is on the public domain. Some 11 million acres in Utah, Wyoming, and Colorado are underlain by the Green River formation and are classified as oil shale lands. Most deposits on these lands, however, do not contain sufficient recoverable shale oil to be commercially attractive. The richest shales are believed to be in the Piceance Basin of Colorado where some 770,000 acres contain 25-gallon-per-ton and richer shale in thicknesses of 15 feet or more. This acreage represents only a small part of the total acreage classified as oil shale lands, but it contains the bulk of the recoverable reserves with foreseeable economic potential.

The Federal Government controls about 580,000 acres of potentially productive lands in the Piceance Basin of Colorado. This acreage should be made available for leasing under the Mineral Leasing Act. Title to most of this land, however, is clouded with numerous types of unpatented mining claims and sodium exploration permits. Clear title is essential to the development of these federally owned shale lands. The validity of each title is subject to adjudication under existing laws and is properly the concern of our courts. The Department of the Interior should take immediate steps to expedite the final resolution of this all-important legal problem.

I would now like to comment on oil shale technology. Oil shale is a marlstone containing a solid hydrocarbon known as kerogen. Raw