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Shale Oil: Alternative Energy or Environmental Degradation?

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In the continuing quest to diminish US dependence on foreign oil, in 2005 Congress passed the Energy Policy Act (EPAct), which calls for developing unconventional fuels. To fast-track the commercial development of oil shale and tar sands, the law directed the Bureau of Land Management (BLM) to prepare an environmental impact statement (EIS) for a leasing program, and to issue leasing regulations within two years thereafter. Last December the BLM released its draft EIS, endorsing a strategy to open roughly 1.9 million acres of public lands for development in Colorado, Utah, and Wyoming.

Shale-oil development was last on the national energy scene after the 1970s Arab oil embargo, when the Synthetic Liquid Fuels Program burned through $8 billion of congressional subsidies and propelled western Colorado through a boom-and-bust economy before Congress shut the program down in 1985. "Despite all the attempts to develop a shale-oil industry in the US over the past 100 years, the fact remains that no proven method exists for efficiently removing the oil from the rock," Bob Loucks, a former shale-oil project manager, attested at a Senate committee hearing last June.

The shale in the proposed lease lands holds an estimated 1.5 to 1.8 trillion barrels of oil. Roughly half of this is potentially recoverable, and calculations from a 2005 RAND Corporation report suggest that at a daily production rate of 5 million barrels—about 25 percent of today's national consumption—the recoverable resources could last more than 400 years. "Such a level of production would yield considerable economic and national security benefits, primarily by causing world oil prices to be lower than what would be the case in the absence of oil shale development. As a result, consumers would pay tens of billions of dollars less for oil," Jim Bartis, a coauthor of the RAND report, told the House Subcommittee on Energy and Mineral Resources last April.

However, shale's low energy density makes squeezing oil from it a Herculean task with draconian costs. "Per pound, it contains one-tenth the energy of crude oil, and one-sixth that of coal," Colorado energy analyst Randy Udall explained. Using conventional methods, creating 25 gallons of oil would require digging a ton of rock from massive open-pit mines and cooking it in surface retorts to release the low-grade oil, which would be shipped out for refining. Shell Oil is in the early stages of researching another technology that would involve heating the shale underground for two to three years, until it reaches temperatures high enough to release the oil.

Argonne National Laboratory estimates that manufacturing a million barrels of shale oil daily could consume up to 370,000,000 cubic meters of water per year—from the already overextended Colorado River system—necessitating considerable expansion of regional water-storage facilities. Likewise, electricity needs would be formidable. Production of a million barrels per day would require ten 1.2-gigawatt power plants and five new coal mines to feed them. Regional sulfur dioxide and nitrogen dioxide emissions would soar.

The EIS states that each project would heavily degrade up to 14,000 acres and require hundreds of miles of roads, pipelines, and transmission lines. Leases would displace all "incompatible" activities, such as recreation, mining, livestock grazing, and oil and gas drilling. Proposed lease lands encompass 170,000 acres with wilderness characteristics, 249 miles of perennial streams, and a vast array of plant and wildlife communities, including 14 threatened and endangered species.

The greenhouse gas costs also would be steep. Studies by energy analyst Adam Brandt at the University of California–Berkeley indicate that the full cycle of carbon emissions—from industrial processing to combustion of the finished product—would exceed those of conventional oil by 27 to 52 percent, depending on the technology used.

Although less lucrative deposits of tar sands have drawn little commercial interest, four corporations have obtained small-scale BLM leases for research and development of shale-oil technology, BLM spokesperson Heather Feeney said; none has begun on-site operations yet. (Shell's research is taking place on private land; the Department of Energy has identified more than 3 million acres of private lands containing shale oil—many controlled by oil companies—where no shale-oil activities have yet begun.)

Conservation groups and local government officials—including the Western Governors' Association—want to put the brakes on the leasing process until research and development efforts have run their course. Congressional funding for finalizing lease regulations was withheld from the 2008 omnibus spending bill, but draft regulations are under review by the White House Office of Management and Budget, Feeney said. "Unless the EPAct is amended, BLM is under very clear statutory direction to complete the program EIS and publish leasing regulations," she said.

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