

Title:

Estimate of Carbon Dioxide Production for In Situ Production of Shale Oil from the Green River Formation in Western Colorado

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World resources of oil shale are likely to consist of trillions of barrels of hydrocarbon product, and are distributed worldwide. Estimates for the Green River Formation of Colorado, Utah, and Wyoming in the United States range from 700 to 2,000 billion barrels of shale oil. Recent oil prices have driven a resurgence of interest in oil shale development around the world. In situ conversion of kerogen holds great promise, but economic production is still many years away. A recent issue for development of this resource is concern about the quantity of carbon dioxide (CO₂) co-produced as oil shale kerogen is pyrolyzed. CO₂ from oil shale processing includes that generated by the breakdown of carbonate minerals or oxidation of kerogen in the oil shale, and that generated by fossil fuel power plants that might be used to generate electricity to run the pyrolysis process. This paper considers the production of CO₂ for a nominal oil shale industry in the Western United States operating an in-situ process on oil shale of the Green River Formation. It discusses a simplified model for the quantity of CO₂ potentially requiring separation and segregation, and focuses on uncertainties in parameters of the model, and the sensitivity of the CO₂ output to those uncertainties, as a means of clarifying remaining questions to be resolved. The model confirms that power plant emissions are likely the dominant source of CO₂, and that uncertainty about the heat required to produce a barrel of shale oil remains a critical uncertainty.

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