

EXXONMOBIL'S ELECTROFRAC PROCESS FOR IN SITU OIL SHALE CONVERSION

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ExxonMobil is pursuing research and development of the Electrofrac process for in situ oil shale conversion. If successful, this process has the potential to provide cost-effective recovery in deep, thick formations with less surface disturbance than mining and surface retorting.

The Electrofrac process is designed to heat oil shale in situ by building a hydraulic fracture (a conventional oil field technology) in the oil shale and filling the fracture with an electrically conductive material. Electricity is conducted from one end of the fracture to the other, making it a resistive heating element. Heat flows from the fracture into the oil shale formation, gradually converting the oil shale's solid organic matter into oil and gas. The oil and gas are produced by conventional methods.

Results from laboratory experiments and numerical modeling have been encouraging, and field experiments are underway to test Electrofrac process elements on a larger scale. Resource description work indicates that U.S. Piceance Basin oil shales are sufficiently thick and rich for commercial development. Calcined petroleum coke is a suitable conductive material for use in the fracture heating element. Heat conduction models show that several fracture designs deliver heat effectively. ExxonMobil's methods for in situ conversion of oil shale in nahcolite-rich areas preserve the value of the sodium minerals and may significantly enhance their recovery. We anticipate that several years of research and development will be required to demonstrate the technical, environmental, and economic feasibility of this breakthrough technology.