

Comparison of the acceptability of various oil shale processes

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While oil shale has the potential to provide a substantial fraction of our nation's liquid fuels for many decades, cost and environmental acceptability are significant issues to be addressed. Lawrence Livermore National Laboratory (LLNL) examined a variety of oil shale processes between the mid 1960s and the mid 1990s, starting with retorting of rubble chimneys created from nuclear explosions and ending with in-situ retorting of deep, large volumes of oil shale. In between, it examined modified-in-situ combustion retorting of rubble blocks created by conventional mining and blasting, in-situ retorting by radio-frequency energy, aboveground combustion retorting, and aboveground processing by hot-solids recycle (HRS). This paper reviews various types of processes in both generic and specific forms and outlines some of the tradeoffs for large-scale development activities. Particular attention is given to hot-recycled-solids processes that maximize yield and minimize oil shale residence time during processing and true in-situ processes that generate oil over several years that is more similar to natural petroleum.