

A simulation-based protocol for evaluating various shale processing options

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A number of process options are available for producing oil from mined shale. Fluidized bed pyrolysis, fixed bed combustion, rotary kiln retorting have all been proposed. The economic merit of a process option will depend on the conversion of organic matter to oil and on the energy integration of the process. Options available for energy integration include appropriate preheating, gasification of carbon on spent shale, recycling gas, etc. In this paper, we use Aspen Plus simulation results to assess the viability of different oil production processes. It is shown that staging of process options, such as pyrolysis, combustion and/or gasification, temperatures used at different stages, recycling possibilities are all significant in determining the energy integration in the system and the quality of oil produced. This study helps streamline a protocol for evaluating different processing possibilities for mined oil shale. Once process data are available, this protocol could be used for plant design, costing and up-scaling.