3.3 **The effect of pressure on oil shale thermal treatment**

Pankaj Tiwari, Milind Deo

*University of Utah, Salt lake City, Utah, United States*

The knowledge necessary for the commercial implementation of an oil production process using oil shale has led to an expansion of worldwide research efforts. Reservoir parameters and operational conditions determine yield distribution and oil quality, which in turn directly impact economic and environmental aspects of the process. The pressure at which an in situ oil shale retorting process operates depends on the reservoir depth. In this paper, we examine the effect of pressure on yield and oil quality in the pyrolysis of oil shale. Oil shale from the Mahogany zone of the Green River Formation was used in all experiments. Experiments were performed under batch and continuous flow conditions and at isothermal and non-isothermal conditions at different heating rates. Isothermal experiments were performed in the 300°C to 500°C temperature range, while the non-isothermal experiments were performed at heating rates of 1°C/min and 10°C/min. Pressurized experiments were performed at 500 psia by keeping a backpressure on the outlet line in continuous experiments. In general, increasing the retort pressure results in a reduction in oil yield but an improvement in oil quality. Compositional analyses of oil and gas samples were performed along with elemental analyses of raw materials and products. Kinetic-compositional models were developed for the pressurized process and compared to those available at atmospheric pressure. The elemental analysis data provide constraints on stoichiometric yield distributions and on compositional lumping of liquid products. The data generated and the models provide an understanding of the simultaneous effects of pressure and thermal history on shale oil quality and yield.