Carbon Storage and Resource Development Potential of the Piceance Basin

Genevieve Young, Colorado Geological Survey

The Piceance Basin of northwestern Colorado offers considerable opportunity for carbon storage in geologic environments. Preliminary estimates approach 50 billion tons with deep saline aquifers representing over ninety percent of this capacity. Carbon storage in oil and gas reservoirs as well as unmineable coal seams provide the value-added benefit of incremental recovery, offsetting capital investment costs.

Chevron's Rangely Weber Sandstone miscible CO_2 flood in the northern Piceance Basin is the third largest enhanced oil recovery project worldwide based on incremental recovery resulting from CO_2 injection. In 2005, the Rangely project produced about 14,000 total barrels of oil per day, 70 percent of which are CO_2-EOR barrels.

The Piceance Basin also contains the largest known oil shale resource in the world, at 1.2 trillion barrels, with recovery rates of up to one million barrels per acre. Development of this strategic resource will be an energy intensive process. Previous research studies suggest that oil shale extraction may result in as much as five times as much CO_2 byproduct when compared to conventional oil. While this idea is not proven, it provides motivation for expanded study of CO_2 management. Emerging integrated gasification combined cycle technology for power generation may provide an incremental solution to meeting the energy needs of oil shale production and processing while reducing emissions and providing commercial-grade carbon dioxide for enhanced recovery applications. Geological sequestration of CO_2 associated with oil shale may be a very important component of future oil shale efforts.