

14.1 **Potentiometric head in brines in the central Piceance Creek Basin**

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Sodium bicarbonate brines surround a saline mineral zone in the oil shale sequence of the central Piceance Creek Basin in Colorado. The brines have densities up to eight percent higher than fresh water, complicating measurement of potentiometric head and gradients, and assessment of flow between fresh and saline intervals in interconnecting conduits. A saturated nahcolite brine in a 1,000-foot deep well water column has a bottom-hole pressure of approximately 35 psi (80 feet head) higher than it would if it were fresh water. This factor is significant in the hydraulic model of the central basin, where salinities vary considerably, and vertical leakages of brines on faults and old wells complicate characterization of "baseline" conditions antecedent to hydrocarbon and mineral recovery. No algorithms are known from the literature for determination of brine density for salts other than sodium chloride, for which solute concentrations are typically reported as "salinity", which is different from the "total dissolved solids" analysis orthodox in groundwater culture. A set of density measurements was conducted covering temperature and concentration ranges encountered in sodium bicarbonate brines in the Colorado oil shale to allow for head corrections to well water level observations.