18.24 **Groundwater computer model for simulating the hydrologic and hydrogeologic system in the Piceance Basin, Colorado**

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The Piceance basin extends over an area of about 1,600 square miles in northwestern Colorado and includes the drainage basins of Piceance, Yellow, Roan, and Parachute Creeks. Extensive fracturing and leaching of the Piceance Basin formations has increased their permeability and resulted in aquifers that lie within, above, and below the oil-shale deposits. The hydrologic system of the basin consists of natural recharge from precipitation, circulation through fractured aquifers and confining beds, and discharge to stream valleys or seepage faces. Previous models were utilized to simulate the flow systems in the Piceance basin and included the 3D Mathematical Model by O.J. Taylor. Petrologic and geophysical interpretation analysis was conducted and then assisted using programs such as ArcGIS, Autocad, and Groundwater for Windows. Then a preliminary three-dimensional, multiple-layer computer model was prepared for the entire basin using currently available and past hydrologic and hydrogeologic data. This analysis indicated that simulated hydrologic characteristics are plausible, all layers exhibit impaired vertical hydraulic conductivity and have been affected by the increased drilling activities since the 1980's Oil Shale boom.