14.2 **Northwest Piceance Creek Basin hydrogeology**

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Shell Exploration and Production Company (Shell) has been actively performing field studies to characterize the hydrogeology of the northwest region of the Piceance Creek Basin over the last 12+ years as part of its oil shale R&D program. During these field programs, Shell has installed over 250 ground-water hydrology wells, collected over 1,000 water levels and ground-water samples, conducted several hundred packer permeability tests for horizontal and vertical permeability determination, and has performed numerous single-well and several multi-well pump tests in locations from near Cathedral Bluffs to a few miles east of Yellow Creek. A comprehensive data set has been developed including: total and effective porosity, horizontal and vertical hydraulic conductivity, coefficient of storage, anisotropy, water quality, water isotopic data, and surface water quality. These data have been used to build conceptual and numerical hydrogeologic models for the northwest Piceance Creek Basin that have also shed light on the segregation of water bearing intervals, the influence of the central Basin Saline Zone, the influence of major faults, and on the basin's overall water balance. This new conceptual model represents a significant improvement over the model developed in the 1970s which included, as an example, an upper and lower aquifer separated by the Mahogany zone.