Hydrogeological Evaluation of the Western Canada Deep Basin Using GIS Cross-visualization and Integrated Stratigraphic Data Management

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The Deep Basin Gas System (DBGS) in the Western Canada Sedimentary Basin (WCSB) has estimated gas reserves in excess of 400 trillion cubic feet (tcf). The DBGS is characterized by normally pressured water sands that pass downdip into both under pressured and over pressured gas charged zones. Identification of the transition zone from conventional structural - stratigraphic trapping to 'Deep Basin' style trapping is a key factor in identifying areas of regional gas charge. The Deep Basin project used a GIS based cross-visualization application, HydroStation, with integrated stratigraphic data management to identify and map regional gas charged systems in the study area.

In the Deep Basin study area there are 41,471 wells, 469,821 stratigraphic tops and 29,846 pressure tests. Data management and visualization were key challenges in enabling geoscientists to iteratively map, graph and analyze the relatively large volume of data for each of the seven hydrostratigraphic (15 lithostratigraphic) intervals.
GIS cross-visualization is the ability to select data that correlates in one space; map, graph or spreadsheet, and immediately see that selected data in all application spaces. Identification of the Deep Basin traps was facilitated using a GIS based cross-visualization application that enabled geoscientists to correlate pressure data on Pressure vs Elevation graphs on a zone by zone basis, with map and spreadsheet based data. In this way, regional oil, water and gas systems could be identified on the graph, and their spatial distribution highlighted on the map interface.