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**A Quantitative Analysis of Muddy Formation Hydrodynamics in the  
Laramie and Carbon Basins, Wyoming**

A study of the hydrogeology of the Muddy Formation in

## Abstracts of Papers

the Laramie and Carbon Basins was used to develop quantitative measures of the impact of hydrology upon petroleum accumulation. The work was made more difficult by the lack of a reliable potentiometric surface map. This problem was overcome by using stratigraphic data to predict where changes in the potentiometric gradients would occur and what the magnitude of the change would be. Using equations developed by previous authors to describe the interaction of stratigraphy, structure, and oil/water dynamics, contour maps of oil entrapment potential were constructed.

Analysis of the data show that the existing oil fields are located in areas with a moderate bias toward being favorable for structural entrapment. In three of the fields stratigraphic factors may also play a minor role in forming the trap. The methods described show promise for enhancing exploration success ratios by showing areas with favorable potential for both structural and stratigraphic entrapment. By taking into consideration other factors such as geothermal gradients, water salinity trends, and the flow paths of formation fluids early in the process of developing a play, much time and effort could be spared.