

# URANIUM ON HORSEBACK: OR SOUTH TEXAS RE-VISITED

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## ABSTRACT

In 1968 minerals' explorers flocked back to South Texas to have another look at the Tertiary sedimentary prism that is between the outcrops of the Jackson and Goliad Formations. In a trend belt already 200 miles long and 50 miles wide uranium has been discovered in quantities which challenge the traditional position of the established mining districts of the Colorado Plateau and Wyoming.

History, background, and a review of 1968 developments set the South Texas uranium scene. The lure of major opportunities for future discoveries finds Texas sharing in a greatly stepped-up minerals activity that is based on growing world demand for nuclear fuels.

The geologist who would try to set the complex uranium phenomenon in a simple framework faces several alternatives, all credible; and not the least part of the dilemma is the coincidence of oilfield structural features with the occurrence of ore. Despite an element of inexactitude in the state of the art, the prospector today brings to uranium exploration refinements in tools and techniques which leave little to chance that significant mineralization will be overlooked.

Oil companies with an eye on diversification have moved vigorously into the uranium play. The economics' case presented by familiar, relatively shallow sediments of the Texas coastal plain offers excellent profit opportunity; and there is confidence that the emerging uranium industry will see steady, responsible growth in the future.

# PERMEABILITY ANISOTROPY IN MICROSUCROSLIC DOLOMITES<sup>1</sup>

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## ABSTRACT

It is generally agreed that there is no preferred relationship between porosity and permeability unless additional parameters, such as grain size, and shape, or pore size distribution, are used as a basis of initial selection. Most mechanically deposited sediments obviously retain directional properties such as preferred orientation of elongated grains, imbrication, etc., unless substantially modified by diagenesis. This anisotropy is also reflected in their respective permeability properties. Somewhat less obvious is the occurrence of permeability anisotropy in fine-grained carbonate deposits referred to an intertidal and supratidal origin. This is surprisingly true of the uniform microsucrosic dolomites.

Silurian dolomites from the Montana subsurface demonstrate a vertically consistent dielectric and permeability anisotropy. This is based on the simultaneous solution of three equations of the form  $y = a \sin(kx - b)$ , where three permeability plugs of  $120^\circ$  apart are analyzed for each foot of core. Use of the sine function, calculated in the expansion identity form

$$\sin(kx - b) = \sin kx \cos b - \cos kx \sin b,$$

assumes that there is one maximum and one minimum value lying within  $180^\circ$  horizontal rotation, since permeability is a two-directional feature. The resulting calculations yield an ellipse whose major and minor axes provide a ratio equivalent to the permeability contrast based on azimuthal orientation.

Assuming that the concepts of shoreward distribution of common matrix carbonate particles in a tidal-flat complex, and local source dolomitization are valid, both primary deposition and secondary dolomitization habits would provide a condition of final permeability anisotropy. Based on remnant magnetic orientation of the described core samples, the anisotropy is shown to be concordant with presumed directions of regressive facies progression and normal to regional structural axes and small scale fracturing.

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