

VI - SUB-ORISKANY OIL AND GAS POSSIBILITIES

A. GEOLOGY OF NORTHEASTERN APPALACHIAN BASIN

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Many geologists do not believe that the Appalachian Basin has been adequately prospected, in the light of modern methods and revised geologic thinking, in so far as the possibilities of production of oil and gas from horizons below the Oriskany are concerned. This discussion will only cover the northeastern portion of the Basin as this is the area with which most New York State geologists are familiar and in which they are most interested.

In descending order below the Devonian Oriskany Sandstone, the following portions of the generalized section offer the most interesting speculative possibilities:

Devonian	Helderberg Limestone
Devonian-Silurian Contact	
Silurian	Lockport (Niagara) Limestone Clinton-Medina Sands
Ordovician	Queenston Sandy Facies and Oswego Sands Trenton and Black River Limestones
Ordovician-Cambrian Contact	
Cambrian	Theresa Dolomite Potsdam Sands

The general characteristics of these horizons are fairly well known from work that has been done on their outcrops which, for the most part, can be found along the rim of the basin. Far less is known about their characteristics in the places in which we are most interested, namely toward the center of the Basin where they are covered by thousands of feet of sediments. It seems reasonable to suppose that where the requisite porosity-permeability characteristics are combined with suitable structural and stratigraphic closure some of the above formations should yield commercial production.

In recent years the presence of a buried ridge known as the Adirondack Axis (Kay, 1942), running from the Adirondack Mountains toward the northeastern corner of Pennsylvania and thence in the direction of Harrisburg, has been postulated by several well known geologists. This axis if present would cross the northeastern end of the Appalachian Basin and would afford possibilities of pinchout sedimentation traps on both sides with large drainage areas in both directions. As mentioned above, very little is known of the section in question as to whether there would be adequate source beds and reservoir rocks with porosity and permeability. Down the flanks of this axis and toward the center of the basin it seems reasonable to suppose from the information we do have that favorable conditions could exist.

The few wells in New York State and north and eastern Pennsylvania which have tested the above horizons have been disappointing. It must be pointed out that the most favorable areas from a sectional standpoint have not been tested, probably due to the great depths at which the prospective horizons would be encountered.

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Based upon the shallower production of the area and general geologic principles, we may expect primary and fracture porosity in the clastic rocks and primary, fracture, and secondary porosity in the carbonate rocks.

The best textural development of the sands will occur along the old shore lines which can only be determined by an intense study of the transgressive-regressive relationships and their association to earth movements and older geologic structures.

The carbonate rocks, on the other hand, depend very largely upon the development of the secondary solution properties associated with unconformity surfaces or hiatuses in the depositional process caused by relative uplift of an area. The recognition of such features from well samples requires exceptionally detailed work and a vast working knowledge of carbonate deposition and alteration.

The principal problem, then, is to ascertain the structural framework of the area, in terms of the buried Pre-Cambrian structural features, to determine the direction of the applications of force to this framework, and to establish the periods during which these forces were applied.

The overall picture is greatly complicated by the fact that the structural features below the Silurian salt beds may be independent of the Devonian and later structural movements.

The solution to these problems is not impossible. The best approach is from the regional study to the local and back to the regional. For further information reference should be made to Fettke (1948), Kreidler (1953), Swartz (1948) and other papers by the same authors and other students of the Appalachian area.

The only requisites for ultimate success are patience, diligence and adequate information.