

ORIGIN OF THE HYDROCARBONS OF THE UINTA BASIN

by

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Abstract

The Eocene sediments of the Uinta Basin, Utah, consist of fluvial and deltaic red and green shales and sands around the margins of the Basin and bituminous siliceous dolomites in the center. The latter, called Green River "oil shales", were deposited in a salt lake, probably chemically stratified, which occupied this area during Eocene time. Asphalts and oils ooze from outcrops of the Eocene and are found in joints, veins, fissures, crystal cavities, and in pores of sandstones. There are four chemically different types of these free hydrocarbons. Each type is found closely associated with one particular stratigraphic unit, so that the source rock of each type can be identified by field geology. In addition to the free hydrocarbons, there are other hydrocarbons that can be extracted by organic solvents from the sediments of the various stratigraphic units. Chemical data such as infrared spectra, elemental analyses, and various physical properties show that the extract from each unit is identical to the free hydrocarbons from the same unit, but differs from the extracts and free hydrocarbons of other units. These chemical data, together with the supporting geological data, are believed to constitute an identification of the source rocks of the Uinta Basin hydrocarbons.

It also was found that the changes in the chemical character of the hydrocarbons correlate with changes in lithology and therefore appear to be due to changes in depositional environment. There is no evidence that the differences in the hydrocarbons are a result of metamorphism, catalytic cracking, or depth of burial.

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