

**CONTINUOUS CARBON/OXYGEN AND NEUTRON LIFETIME LOG® PROPOSED
INTERPRETATION FOR ORGANIC AND/OR SHALY DEPOSITIONAL ENVIRONMENTS**

by

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ABSTRACT

The Continuous Carbon/Oxygen and Dual Detector Neutron Lifetime Logs have successfully helped to locate and monitor potential hydrocarbon zones through casing for a number of years. Standard published interpretation techniques delineate pay zones easily under normal suitable conditions.

Some geological environments, however, make interpretation more difficult. In particular, "organic" shales can cause zones to appear too optimistic unless proper corrections are applied. Conversely, in areas where the shales contain a relatively large amount of water, the zones of interest can appear too pessimistic. In low effective porosity areas, small changes in shale volume can cause wide variations in water saturations when using standard published shale correction techniques.

The simplified "effective hydrocarbon saturation" technique to be described compensates for these shale effects in a stable manner by applying a correction similar to one used in determining effective porosity. "Effective water saturation" can then be determined for comparison.

INTRODUCTION

Although the Continuous Carbon/Oxygen (C/O) Log and Neutron Lifetime Log® (NLL) services have repeatedly proven their ability in locating and monitoring potential hydrocarbon zones through casing (Heflin, et al., 1977, Flynn, et al, 1981, Youmans, et al., 1963, Serpas, et al., 1977), some geological depositional environments make the interpretation of these logs more difficult. Of particular concern are areas where the shales exhibit significant apparent hydrocarbon saturation amounts such as in "organic" shales.

The quantity of organic matter present in any particular sediment depends directly on the environment of deposition and biological activity. Potential source rocks that may generate commercial quantities of petroleum typically contain between 0.2 to 5 percent organic matter. The quantity depends upon