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Margaret A. Keller and Kenneth J. Bird, U.S. Geological Survey, Menlo Park, CA

**Petroleum Source Potential of the Lower Cretaceous Mudstone Succession of the NPRA and Colville Delta Area, North Slope Alaska, Based on Sonic and Resistivity Logs**

Resource assessment of the North Slope of Alaska by the U. S. Geological Survey includes evaluation of the petroleum source potential of Mesozoic and Cenozoic rocks using the delta log R technique (Passey and others, 1990). Porosity and resistivity logs are used in combination with thermal maturity data to produce a continuous profile of total organic carbon content in weight % (TOC). From the pattern and amount of TOC in the profile produced, the depositional setting and thus the petroleum source-rock potential (kerogen type) of the organic matter can be inferred and compared to interpretations from other data such as Rock-Eval.

TOC profiles determined by this technique for the contiguous interval of pebble shale unit, Hue Shale (including the Gamma Ray Zone or GRZ), and lower part of the Torok Formation indicate important potential for petroleum generation in the Tunalik 1, Inigok 1, N. Inigok 1, Kuyanak 1, Texaco Colville Delta 1, Nechelik 1, and Bergschrund 1 wells of the western North Slope region. TOC profiles suggest that this interval contains both type II and III kerogens – consistent with proposed depositional models —and is predominantly greater than 2 wt % TOC (cut-off used for effective source potential). Average TOC for the total effective section of the pebble shale unit+ Hue Shale ranges from 2.7 to 4.1 wt % TOC (values predominantly 2-8% TOC) over 143-367 ft. Source potential for the lower Torok Formation, which has interbedded sandstone and lean mudstone, is good to negligible in these seven wells.