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Abnormal Formation Pressure in the Chukchi Shelf, Alaska

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ABSTRACT

This study provides an improved interpretation and delineation of pore pressure in the Chukchi shelf region. Between 1989-91, five exploration wells were drilled on the Chukchi shelf and an array of drilling performance and petrophysical data were acquired. Resistivity, conductivity, sonic travel time, sonic porosity, and drilling exponent data were used to evaluate formation pore pressure. Normal compaction trendlines were established using depth-dependent relationships then integrated with Eaton and adapted Eaton equations to estimate formation pressures. Four of the five wells were found to contain significant overpressure at onset depths ranging from 3600 to 7600 feet subsea. The overpressure is mainly associated with organic-carbon-rich source rocks that have experienced thermal exposures sufficient for hydrocarbon generation. The driving mechanism for the origin and maintenance of the overpressure appears to be linked to hydrocarbon generation at the wellsites and access to hydrocarbons migrating from the regional generation center beneath the Colville basin to the east.