2-D Basin Model Results, Cook Inlet, Alaska, USA

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Abstract

A 2D basin model was built near the north-south axis of the Cook Inlet Basin, Alaska, USA to evaluate hydrocarbon source, maturation and timing profiles in preparation for an anticipated OCS lease sale in 1Q2021. The modeling was conducted along a regional strike seismic line published by LePain et.al., (2013). Ten wells and pseudo wells were used for the 1D basin model input along the profile. The Cook Inlet basin can be divided into north and south subbasins separated by the Seldovia Arch. The upper Cook Inlet (north component) is dominated by Tertiary deposition. Basin model results show that Tertiary coals are the source for much of the gas production. The coals reached initial maturity in the Late Tertiary and are presently generating hydrocarbons. Cretaceous marine shales are the source for oil production in the upper Cook Inlet. Basin models show that first oil was generated in the Upper Tertiary. Triassic limestones are the third hydrocarbon source modeled and are overmature. The lower Cook Inlet (south of the Seldovia arch) is dominated by Cenozoic and Paleozoic deposition. Basin model results show that Tertiary and Cretaceous source rocks are immature. However Triassic limestone source rocks are mature and generated first oil in the upper Tertiary. Model results are very sensitive to burial history. Work is presently underway to run sensitivity tests to capture the impact of interpretation variations.