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TITLE: Assessment of Oil and Gas Resources in the Coastal Plain of the Arctic National  
Wildlife Refuge, Alaska

## ABSTRACT

The oil and gas resource assessment in the Arctic National Wildlife Refuge (ANWR) 1002 area employed separate methods for estimating inplace and recoverable hydrocarbon resources. The inplace assessment utilized a play-analysis method, in which prospects are grouped according to their geologic characteristics into "plays," or natural associations with common characteristics. The assessment of recoverable resources employed a site-specific analysis of individual prospects. Both the play-analysis and site-specific methods depend on the recognition of potential hydrocarbon traps (prospects) and a description of their geologic and fluid characteristics. Although both assessments were carried out independently, particular care was taken to ensure consistent treatment of the geologic data in each.

The play-analysis method employed in the ANWR assessment is a modified version of that developed by the Geological Survey of Canada and used in earlier assessments of the National Petroleum Reserve in Alaska and the ANWR. The present assessment, however, is driven by a more efficient computer program based on probability theory rather than Monte Carlo simulation. Seven plays in the 1002 area were identified and assessed by a committee composed of U.S. Geological Survey and Bureau of Land Management (BLM) personnel. Together, these plays encompass the entire 1002 area and geologic column, and include both structural and stratigraphic traps. Estimates for each of the seven plays were aggregated using probability theory to produce estimates of total resources for the 1002 area. These estimates are: (1) a 95-percent chance for more than 4.8 billion barrels of oil (bbo) and 11.5 trillion cubic feet of gas (tcfg), (2) a 5-percent chance for more than 29.4 bbo and 64.5 tcfg, and (3) a mean estimated resource of 13.8 bbo and 31.3 tcfg.

Economically recoverable oil resources in the 1002 area were estimated to indicate the relatively near-term (approx 40 years) production potential of the area. Natural gas was found not to have economic potential for the time period considered. The assessment of economically recoverable oil resources was conducted by BLM personnel employing a prospect-specific analysis, using the computer simulation model PRESTO II. The basis for this assessment is 26 structural prospects identified and delineated from seismic data. Under the "most likely case" economic scenario (\$33 per barrel crude oil market price in 1984 dollars in the year 2000 and a 6-percent annual inflation rate), the minimum economic field size for the 1002 area as a whole is estimated to be 440 million barrels of oil. The chance for occurrence of a field of this size somewhere in the 1002 area is known as the marginal probability, estimated at 19 percent. Conditional estimates of economically recoverable oil in the 1002 area, conditioned on the 19-percent marginal probability, are a 95-percent chance of 0.59 bbo, a 5-percent chance of 9.24 bbo, and a mean value of 3.23 bbo.