

Resource Assessments

Having done resource assessments since 1975 when he joined the United States Geological Survey, Kenneth Bird has a superior knowledge of the process and realities presented in these reports. We ask him about the methodology and what the numbers actually mean.

What prompted you to do your first resource assessment?

When I joined the USGS in 1975, it was just a couple of years after the first shock of the Arab Oil Embargo, and there was growing concern that the U.S. was running out of oil. The basic question of how much oil remained to be found in the U.S. was critical to national security, public policy and land management decisions – the same reasons that exist today for doing assessments. At that time there were conflicting estimates by prominent USGS scientists: A rather pessimistic estimate by M.K. Hubbert indicating U.S. oil production had already peaked (in 1970) and an optimistic estimate 3-times larger than Hubbert's by V.E. McKelvey, director of the USGS. I was hired to work on the petroleum potential of carbonate rocks of northern Alaska, not to do assessments. But shortly after joining the Survey, it became clear that assessment work was an increasingly important part of my job and that of many other Survey geologists. All totaled, I've been involved in 20 to 30 assessments.

Over the years, you have developed a "tried and true" methodology. How was your methodology developed?

The origins of the play-analysis method we currently use can be traced to a resource-appraisal method developed by Roy and others of the Geological Survey of Canada in 1975. Their method was modified and incorporated as one component of a more comprehensive analysis of the National Petroleum Reserve in Alaska (NPRA). This 1980 assessment involved exploration, development, production, transportation, and the distribution of petroleum resources.

What is the assessment process?

The initial step of the assessment is to define the basic unit of assessment or play. The play is defined as a volume of rock with common geologic attributes, such as source rock, reservoir rock, trapping mechanism, and timing. Then, for each play, distributions of prospect size and number, reservoir thickness and porosity and trap fill are combined

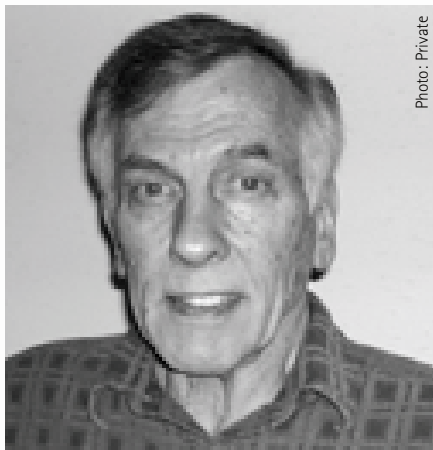


Photo: Private

Kenneth J. Bird is a geologist with the U.S. Geological Survey specializing in the petroleum geology of northern Alaska, where his experience spans more than 40 years. He is a co-leader of the Alaska Petroleum Studies Project, one of the larger projects funded by the Geological Survey Energy Program. He has a doctorate degree in geology. His work experience includes seven years with an oil company and 30 years with the USGS. With interests primarily in stratigraphy and sedimentology, he has been extensively involved in petroleum resource assessment activities in Alaska and elsewhere in the U.S. He has authored more than 100 papers and abstracts, most related to Alaska petroleum.

to produce an estimate of the number and size of potential petroleum accumulations. The resulting distributions are then risked to weigh the likelihood that geologic conditions are favorable to generate a certain sized accumulation and an estimate of in-place petroleum resources for each play is generated. A recovery factor is then applied to calculate recoverable resources.

Who comes up with the parameters used in the assessment?

Typically for each play there is a lead geologist who is responsible for the parameters. This geologist draws on the efforts of a team consisting of geochemists, log analysts, paleontologists, stratigraphers, engineers, seismic interpreters, structural geologists, and basin modelers.

The results include 95th and 5th percentiles and the mean. What do the figures

actually indicate?

The assessment methodology yields results that express a range of uncertainty. To stress the importance of this uncertainty, results reported include 95th and 5th percentiles, which are considered reasonable minimum and maximum values. The mean expresses the average or expected value.

There was a lot of speculation about the Arctic National Wildlife Refuge (ANWR) in Alaska. Was there any political pressure to "inflate the numbers"?

No, none whatsoever.

You have seen some of the areas drilled after doing a resource assessment. How do the results of the assessments stack up with reality?

The pace of exploration in northern Alaska is such that only a few wildcat wells are drilled each year and those may test prospects in different plays. So it takes a good number of years of exploration to get a sense of how our assessment results compare with reality. One of the plays assessed in 1994 as part of the 1995 National Oil and Gas Assessment was the Barrow Arch Beaufortian play in which we estimated a mean value of about 1.5 billion barrels of technically recoverable oil remained to be discovered. This has been one of the more actively explored plays, and since 1994 numerous oil discoveries have been announced (Alpine, Fiord, Oooguruk, Placer, Midnight Sun, Spark, Rendezvous, Lookout) that together represent a volume of oil approaching about 50% of our mean value estimate, or about 700 million barrels of oil.

What is your view of the future of Arctic Alaska as a petroleum province?

Arctic Alaska has a long way to go before it can be written off. Outside of the State lands coastal strip, the area is still very lightly explored and the gas potential has hardly been tested. It is safe to say the future depends on economics; the price of oil and gas, the construction of a gas pipeline, and the economic limit of the oil pipeline.