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Reserve Growth in Canadian Oil and Gas Pools

Reserve growth is a well recognized phenomenon especially in mature petroleum provinces around the world. It is an increase in reserves of oil, gas, and gas-liquids in the existing oil and gas pools/fields over time and is a major contributor to additional reserves compared with those from new discoveries. The importance of the reserve growth concept in evaluating the future reserve potential of major petroleum-producing regions of the world, such as Canada, is demonstrated by the studies we have been conducting on oil and gas pools/fields in the Canadian provinces of Saskatchewan and Alberta, which contain most of the Canada's reserves and are of strategic significance to the energy needs of the U.S.

Reserve growth evaluation has been completed for oil and gas pools of Saskatchewan Province, and is ongoing for pools in Alberta Province. Two methods, Modified Arrington and Group Growth, were used to evaluate reserve growth and its sensitivity to various reservoir parameters. The studies show that, in spite of a low oil-recovery factor, there is an annual reserve growth of 4.9 to 5.6 percent, depending on the method used for estimating reserve growth. Smaller pools (with reserves \leq 8 million barrels) grew at an annual rate of 2.3 percent, whereas larger pools grew at an annual rate of 5.3 percent. The nonassociated gas pools with average recovery factor of 70 percent show an annual reserve growth of about 4.7 percent, mostly in a few large pools. An interesting phenomenon is observed in gas pools, represented by a strikingly linear cumulative reserve growth trend that seems to be due in large part to an increase in total productive area rather than to recovery factors as a function of time, indicating Saskatchewan gas accumulations to be possibly unconventional. This is further supported by the fact that shallow gas reservoirs in Saskatchewan are considered to be from biogenic sources and have no well-defined gas-water contact.

The reserve growth studies in Saskatchewan and Alberta will help to understand the level of reserve growth in Canadian oil and gas pools, and will help develop reserve growth model(s) for predicting potential reserve additions.