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## Production of Global Hydrocarbon Liquids: Is There a Near-Term Peak?

An evaluation of global production history and the global resource base suggests that a peak in global liquids production, resulting solely from a resource-base limitation, is unlikely to occur in the next 25 years. Furthermore, it appears that Hubbert's (1956) method, made famous by his correct prediction in 1956 that U.S. Lower 48 oil production would peak in the late 1960s or early 1970s, is not readily applicable to forecasting global liquids production. The following observations support these conclusions:

- Estimates of the liquids resource base have increased over the last 50–100 years and are likely to continue to do so. Forecasts of an imminent peak in global production appear to underestimate major sources of growth in the resource base, particularly improved recovery and new capabilities that make otherwise marginal resources economic. Hubbert's analysis does not encompass the timing or the volume of these future increases in the resource base.
- Although annual global production has exceeded annual discoveries since the early 1980s, annual global reserve additions still exceed annual production because of reserve growth in existing fields.
- Advances in technology are increasing recovery, opening new producing areas and lowering thresholds, thereby changing estimates of the resource base and production outlook.
- Non-OPEC supply has grown steadily for the last 10 years and is expected to continue for at least the next 5 to 10 years, based on new development projects underway or planned. OPEC countries also have numerous opportunities to increase production.
- Nations with the largest liquids resources typically have production histories with long-term restraints and interruptions in production that are not envisioned in Hubbert's method.
- Sources of conventional liquids other than crude oil, such as condensate, natural gas liquids, gas to liquids and improvements in refining are increasing. They were not included in Hubbert's analysis.
- Production from "unconventional" sources, such as very heavy oil, bitumen and shale oil is growing, and is often overlooked in global forecasts of peak production based on Hubbert's method.

- The interactions among supply, demand and price cause demand growth to slow as supply tightens and bring on new sources of supply.
- Current tightness in liquid supply results from rapid demand growth and interruptions to supply, not from a decrease in supply.
- Many previous predictions of a peak in global production based on Hubbert's method, dating back to Hubbert's own prediction in 1969 for a peak in 2000, have been proved wrong.

Focus on the application of Hubbert's method to predicting global peak production has drawn attention away from important questions regarding the global liquids resource base, such as: (1) What improvements in technology are likely to provide the largest improvements in supply and supply cost? (2) What factors limit growth in global liquids supply, today and in the future? (3) What alternative methods can be used to better assess the global resource base and the multitude of factors that influence the rate of resource consumption? ■

### Biographical Sketch

RICHARD C. VIERBUCHEN is Vice President, Caspian/Middle East Region, of ExxonMobil Exploration Company. He joined ExxonMobil in 1978 and has held numerous positions including research division manager, corporate exploration advisor, exploration manager of Imperial Oil, Canada, and of Esso, United Kingdom, and Exploration Director of ExxonMobil International Ltd. In his current job, he oversees exploration operations in the countries bordering the Arabian Gulf, and in Azerbaijan and Kazakhstan.



Prior to joining ExxonMobil, Dr. Vierbuchen received a PhD in Geology and Applied Geophysics from Princeton University. He also worked as a university professor and for several years as a geologist for the governments of Venezuela and Ethiopia.