NATURAL GAS: AMERICA'S ENERGY FUTURE OR ACHILLES HEEL?

Testimony Presented by Marlan W. Downey
President of the American Association of Petroleum Geologists
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Thank you, Chairman Cubin, for the opportunity to provide the view of the petroleum geology community on this important issue. I am Marlan Downey, President of the American Association of Petroleum Geologists (AAPG).

The AAPG was founded in 1917 in Tulsa, Oklahoma to "advance the science of geology, especially as it relates to petroleum, natural gas, other subsurface fluids, energy mineral resources; and the care and protection of the environment; to promote the technology of exploring for, finding, and producing these materials in an economically and environmentally sound manner; to foster the spirit of scientific research throughout its membership; to disseminate information relating to the geology and the associated technology of petroleum, natural gas, other subsurface fluids, energy mineral resources and environmental geosciences; to inspire and maintain a high standard of professional conduct on the part of its members; to provide the public with means to recognize adequately trained and professionally responsible geologists; and to advance the professional well being of its members." Today AAPG has a membership of more than 30,000, with members in virtually every petroleum-producing province in the World.

Madam Chairman, I am here today to provide the Subcommittee with our perspective on the current situation concerning supplies of natural gas, and to suggest ways that your Subcommittee may be able to contribute to increasing those supplies for our consuming public.

In the 1990s, energy consumption in the United States grew at more than twice the rate of the 1980s. Much of that growth in consumption was fed by imports of crude oil and refined products, as our appetite for transportation fuels soared. Today, 60 percent of our supply of crude oil and refined petroleum products comes from imports. While prices for these fuels did fluctuate during the decade, the average cost to the consumer remained relatively flat over that time. Our ability to import crude oil and refined products has provided the public with energy supplies at a relatively constant price, while creating those problems associated with dependencies on increasing imports.

Importation of natural gas presents a very different picture from the importation of crude oil and refined products. While we are able to import crude oil and refined petroleum products in ever-increasing quantities from numerous foreign sources, the importation of natural gas outside of North America is much more difficult to achieve. We are able to import natural gas from overseas only as liquefied natural gas (LNG). This requires specially constructed cryogenic tankers to transport the LNG, loading facilities overseas that are able to liquefy the natural gas, and unloading facilities in the U.S. that are able to gasify the liquid. The tankers and the facilities are very expensive and require long lead times to construct. Given the volatility of natural-gas prices in the U.S. over the past decade, the needed investment capital to develop such capabilities may be difficult to find. In addition, it may be difficult to find ports in the U.S. that will accept such shipping, given the crowded conditions of those facilities. The development of new commercial ports in the U.S. will be extremely difficult given the fact that about one-half of our citizens live within 50 miles of a coastline, and few are willing to accept larger ports and more tanker traffic.

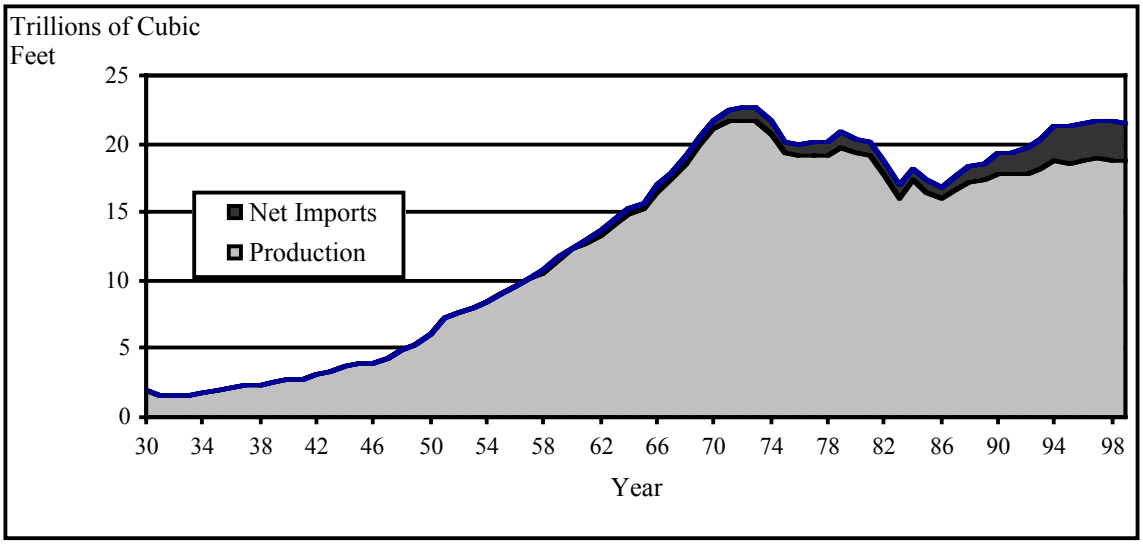
At least in the short term, natural gas must be considered to be a North American commodity. The supply of natural gas to meet our needs must come from U.S. sources, with some imports by pipeline from Canada. Mexico is not a potential source of natural gas in the near term. In fact, we are now exporting a small, but growing, amount (about 140 billion cubic feet per year) to serve the Mexican industries that have developed along the border in response to the North American Free Trade Agreement (NAFTA).

Madam Chairman, an important question to be raised is, "Can the domestic petroleum industry develop the additional supplies of natural gas to accommodate the needs of our citizens?" That question immediately raises the additional question of "How much additional natural gas will be needed to meet the growing demand?"

Several assessments have been made to estimate the growth in expected demand. The Energy Information Administration (EIA) has forecast an expected growth in demand of about 10 tcfs per year by 2020, plus additional demand based upon various carbon dioxide reduction scenarios. The former Gas Research Institute also projected U.S. demand to increase by about 10 tcfs per year by 2015. Other forecasts have arrived at numbers similar to these.

If history tells us anything, it tells us that most forecasts prove to be wrong. Unfortunately, at the present time, we don't know in which direction they may err. We do know that, given current conditions, demand will grow. Furthermore, based upon current growth in demand, those forecasts may look like reasonable expectations.

Assuming these forecasts of a growth in demand of 10 tcfs per year may be within the bounds of reason, is it possible to develop these increases in supply from domestic sources? The good news is that once before such an



increase was achieved. From 1950 through 1973, natural-gas production was increased by 15 tcfs per year. Figure 1 shows the marketed volumes of natural gas in the U.S. from 1930 through 1999.
At that time, the industry had an average of 2,000 drilling rigs operating per year, the major companies were heavily engaged in on-shore exploration, constraints on land access were minimal, and much of the on-shore state and fee lands were lightly explored. Today, the major companies have largely abandoned on-shore exploration; a large portion of public lands have been placed off limits or severely restricted for mineral access; much of the state and fee lands have been explored for conventional targets; and we have produced more than 800 tcfs of natural gas during this period.

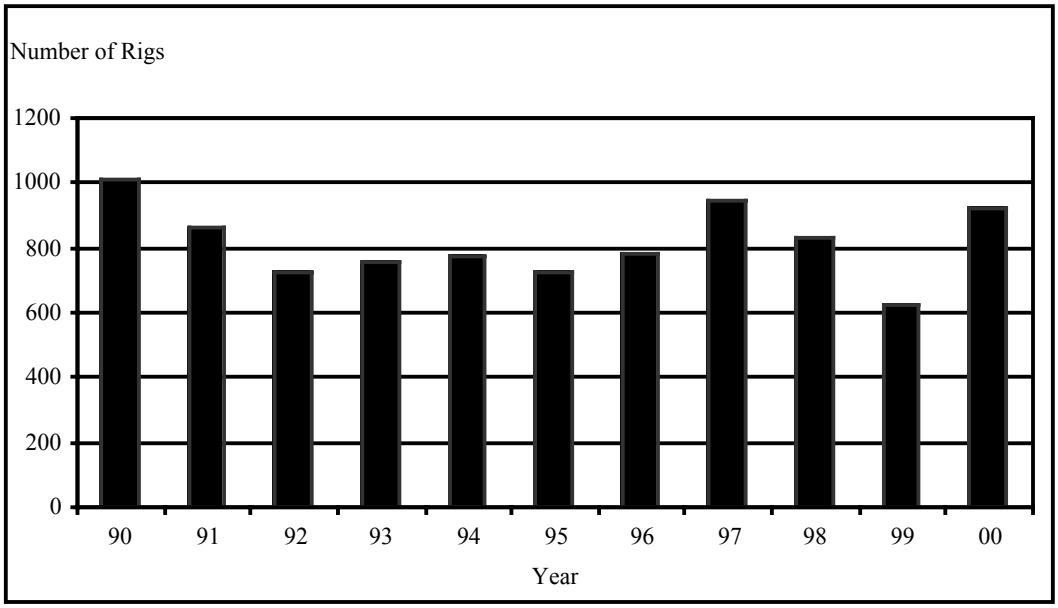


Figure 2 shows the number of rigs operating in the U.S. by year. (Data from Baker-Hughes.)

As previously noted, in the 23-year period beginning in 1950, the U.S. petroleum industry increased natural gas production by 15 tcfs per year. At that time an average of 2,000 rigs were operating in the U.S. and offshore waters. For the past 11 years, an average of 812 rigs were operating in the U.S., and today that number is about

1,000 operating in the on-shore U.S. and in the western part of the Gulf of Mexico. That is about one-half of the number that was needed to provide the increases in the previous period of supply growth. While science and technology have improved significantly from that quarter century ago, the number of rigs currently operating is totally inadequate to develop the natural gas resources to meet the anticipated demand.

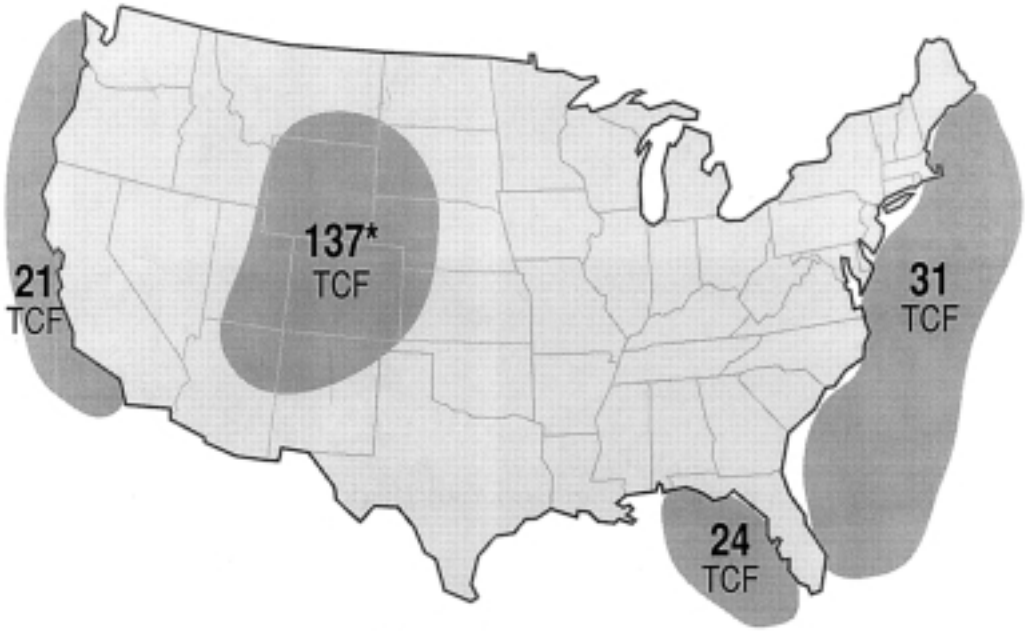
Madam Chairman, if the forecasts of increasing demand for natural gas are plausible, the question remains about the ability to supply that expected demand. To address that question, one must consider three issues:

- Is the undiscovered natural-gas resource base sufficient to supply the anticipated need?
- Is that resource base both technically and politically accessible?
- Does the industry have sufficient technical and financial resources to accomplish the task?

Estimates by the Potential Gas Committee, assessments of undiscovered natural-gas potential by the U.S. Geological Survey and the Minerals Management Service, and a recent evaluation by the National Petroleum Council all conclude that the remaining undiscovered resource base of natural gas is **more than adequate** to meet the projected needs. These estimates are in the range of 1,000 to 1,500 tcfs or about 1.5 to 2 times the cumulative production to date. Areas of highest immediate potential are the Gulf of Mexico, the Rocky Mountain basins, and the deep basins in Texas and Oklahoma. Other areas of importance include the offshore East Coast, South Florida Basin, and the North Slope of Alaska.

Unfortunately, not all of these areas are currently available for exploration and development. The following illustration, drawn from a recent assessment by the National Petroleum Council, depicts a part of this problem.

Figure 5. U.S. Lower-48 Natural Gas Resources
Subject to Access Restrictions



* Approximately 29 TCF of the Rockies gas resources are closed to development and 108 TCF are available with restrictions.

- Significant amount of resource is subject to access restrictions.
- These areas are close to large and growing population centers.

From NPC report on Natural Gas (12/15/1999)

Figure 3 shows the assessment by the National Petroleum Council of prospective areas in the lower-48 states that are either off limits for exploration and development or severely restricted to the point of making such activities uneconomic.

Action needs to be taken to permit expanded exploration and development of these currently restricted public lands. These lands were established to serve all of our Nation's citizens, not to provide scenic views for tourists. The best way to serve the interests of all citizens is to permit the development of vitally needed natural-gas resources on these lands, under careful regulation.

With respect to the financial capabilities of the industry to respond aggressively to the growing demand for natural gas, it should be noted that this challenge must be met by the numerous smaller oil and gas companies in the U.S.; companies whose financial capabilities are modest. Many have been on the verge of bankruptcy and many are no longer in business. Most of the smaller service companies have been closed, and drilling crews have gone on to other employment. It will take several years to mobilize the efforts of oil and gas companies, but Congress can assist by reviewing the 1986 Tax Reform Act, and addressing repeal of the Alternative Minimum Tax and the restoration of the ability of the passive investor to expense Intangible Drilling Costs against a revenue stream. Those actions would go a long way in assisting small companies and independents to generate the needed capital to finance expanded exploration activities.

Absent early action by the Congress on these important matters, national planning should begin to develop a future energy supply picture that depends on much less natural gas.

Thank you again for the opportunity to testify. I would be pleased to answer any questions.