# Energy Security Challenges I –National Security

**Charles R. Perry**
**Chairman of the Board, Perry Gas Companies, Inc.**
**Midland and Houston, Texas**

***Presentation to the 22nd meeting of the United States-Japan Energy Policy Dialogue***
***Keidanren Guest House, Japan, November 16-17, 1998***

**SUMMARY:**

As has happened so many times in the past, when there is no energy crisis on the horizon, we in the United States completely ignore energy security. Only when we are faced with an imminent energy crisis do we get serious about energy security for our national security. While our U. S. Department of Energy has prepared a "Comprehensive National Energy Policy ", which does attempt to address energy security, at this time, this document is a plan only with very little action.

In spite of the above dismal outlook, the U. S. does have available large quantities of relative secure supplies of energy. In this paper, an attempt is made to address the four major sources of energy in the U. S., namely, (1) crude oil; (2) natural gas; (3) coal: and (4) nuclear. For each energy source, an attempt is made to provide the present consumption and source, the projected consumption to the year 2015 t0 2020, and provide an assessment of potential interruptions and the U. S. vulnerability to threats to its energy supply. (Hydropower, wind power, biomass, and other forms of renewable energy are not addressed in this paper; these sources of energy are minor, and are not expected to become significant in the time period under discussion.)

Experts in terrorism in recent years have determined that perhaps energy supplies are most vulnerable to terrorist computer hackers obtaining entrance to the electronic data systems which control every aspect of our energy delivery systems. With the broad availability of access to systems through the Internet, even a hacker located in a foreign country could work as effectively from a remote location as in the U. S.

Even though the Clinton Administration agreed to attempt to meet the Kyoto objectives for carbon dioxide emissions, it is clear that the present Congress, particularly the Senate, will not pass legislation requiring reductions in carbon dioxide emissions. There is little likelihood that industry will voluntarily take steps to meet these objectives. Therefore, for the purpose of this paper, it is assumed that the U. S. will use an increasing amount of fossil fuels.

**CRUDE OIL SECURITY:**

When an American thinks about energy security, because of his love affair with his automobile, his first thought is about crude oil and gasoline. Certainly the long lines to obtain gasoline in the 1970's is still fresh on his mind, even though most feel that these shortages were caused by regulatory bureaucracy rather than real shortages. Since that date, the U. S. has become even more dependant on imports, and thus theoretically is more vulnerable to crude oil supply disruptions now than ever before.

Perhaps the most significant short term crude oil security improvement that the U. S. has instituted since the 1970's is the Strategic Petroleum Reserves (the "SPR"). In this program, the U. S. Department of Energy has stored a total of 563 million barrels of crude oil in deep salt caverns located along the Texas and Louisiana Gulf Coast. The maximum withdrawal rate from this reserve is 4,000,000 barrels per day. At this withdrawal rate, this reserve will last 140 days. While this is no long term solution to a disruption, this amount of oil along with other crude sources available to the U. S. would be enough to prevent any shortage for either the U. S. military or essential civilian needs.

At the end of 1997, U. S. crude oil reserves had declined to 29.8 billion barrels, for a reserve/production ratio of slightly less than 10 years. However, total North American Reserves were 76.6 billion barrels, and Central and South America added another 86.2 billion barrels. (Mexico and Venezuela, which are two major suppliers of crude oil to the U. S., had 40.0 and 71.7 billion barrels of reserves respectively.) Total North and South America

reserve/production ratio is about 21 years. Also, it is believed that Venezuela, Columbia, Ecuador and even Mexico have large reserves yet to be discovered.

As might be expected, imported crude oil from the western hemisphere is perceived to be the most secure to the U. S. Certainly from a political standpoint, these supplies are more dependable than those from Middle East Islamic countries. However in the event of all out war, most of the imports to the U. S. from these western hemisphere sources are by tanker, and thus will be only slightly more secure than crude supplies from the middle east.

In 1997, the U. S. consumed 846.5 million tonnes (17,735,000 bbls./day) of crude oil, but only produced 379.2 million tonnes (8,255,000 bbls./day). Imports provided for 55% of the U. S. oil consumption. Of the U. S. imports of 489.6 million tonnes (10,258,000 bbls./day), 272.8 million tonnes (56%) came from North or South American sources. Only 170.8 million tonnes (3,578,000 bbls./day) came from the Middle East and North and West Africa. Thus approximately 20% of the U. S. crude oil consumption was provided by what is traditionally considered to be unstable sources. Assuming that the U. S. could maintain its Western Hemisphere sources of crude oil, this shortfall could be met by withdrawals from the SPR. However, it would be essential for the U. S. to develop alternate sources of crude oil, or instigate severe restrictions on the use of crude oil products during the time the SPR supplemented the shortage.

At a 1.5% per year increase, U. S. crude oil consumption will rise to 23 million barrels per day by 2015. By that date, U. S. production will have declined to 5,000,000 to 6,000,000 barrels per day, resulting in about 17,000,000 barrels of imports required. Also, in the 2015 –2020 era, the world oil production is expected to peak. Baring development of huge new reserves in the western hemisphere, the U. S. will become increasingly dependant on the more unstable sources of crude oil, such as from the Middle East. Between now and 2015, the U. S. military requirements in the event on a national emergency will be met by priority allocation of available crude. However, an increasingly major disaster will occur in the economy of the U. S. All but the most essential industries that consume crude oil products would have to greatly restrict their activities, or find alternate sources of energy

In summary, while the U. S. has available today relatively secure sources of crude oil in the event of a national emergency, its position will deteriorate over the next 18 years due to (1) decreasing domestic crude production, (2) the ever increasing U. S. appetite for crude oil, and (3) the rather limited availability of increased crude supplies in the western hemisphere. .

**NATURAL GAS SECURITY:**

Proven natural gas reserves in the U. S. at the end of 1997 were 166.5 trillion cubic feet. Although reserve/production ratio for natural gas was only 8.8 years, the reserve/production ratio, as well as reserves have been fairly constant for the last ten years. As was noted in the last Dialogue meeting in Maui, gas producers in the U. S. have for some time been developing gas reserves only as needed; while the country has not faced a shortage of natural gas since 1980, nevertheless, gas producers have already produced more gas than the total proved reserves in 1980. After all of this gas being produced, the country still has adequate reserves for the near future.

Only Canada traditionally exports significant quantities of gas to the U. S., and Canada has an additional 65 trillion cubic feet of proved reserves, some of which is available to the U. S. Mexico has 63.9 trillion cubic feet of proven reserves, but so far, has exported little gas to the United States.

In 1997, the U. S. produced 19.24 trillion cubic feet of natural gas, and consumed 22.3 trillion cubic feet. Most of the difference between U. S. production and consumption (3 trillion cubic feet) was supplied by Canada, a very secure source of supply to the U. S.

In the 1999 GRI Baseline Projection of U. S. Energy Supply and Demand, it is forecasted that the U. S. will consume 30 trillion cubic feet of gas in 2015. Of the increase of 8 trillion cubic feet, GRI projects that offshore Gulf of Mexico supplies will grow from the current 5 TCF to 9 TCF in 2015. Onshore production is projected to increase from the current 13.5 TCF to

16.9 TCF, with most of this growth to occur in the west, primarily in the Overthrust Belt and in the San Juan Basin. Net imports, primarily from Canada will only grow slightly form the current 3.0 TCF to 3.5 TCF by 2002. Thereafter, Canadian imports will remain fairly constant.

Of the 8.0 TCF increase forecasted to occur by 2015, 4.3 TCF will be utilized as fuel for additional electric power generation. (Natural gas has become the fuel of choice for all new power generation facilities.)

Thus supplies for the U. S. will be relatively secure, except perhaps for the offshore production. This is currently 5.0 TCF, to increase to 9.0 TCF by 2015. In an all out war, the offshore platforms would particularly be vulnerable to either an attack or sabotage; in a limited war or national emergency the offshore platforms would be vulnerable to terrorist attacks and/or sabotage. To guard the many offshore platforms would take an enormous amount of resources.

From the above, it appears that 75% to 80% of the U. S. natural gas is quite secure and will be readily available in the event of a National Emergency; the security of the remaining 25% will depend how many resources the country is willing to assign to protect offshore platforms. Also it should be noted that the U. S. has underground storage facilities for natural gas with a maximum of 3 TCF capacity of gas. While this inventory may drop to as low as 1.0 TCF in the winter, nevertheless this stored gas can function as s "Strategic Gas Reserve", to be used to case of an emergency.

**COAL SECURITY:**

As of December 31, 1997, the U. S. had total coal reserves of 240,558 million tonnes (236,709 million long tons), and the reserve/production ratio was 244 years. The U. S. has 23.3% of the world's proven coal reserves.

During 1997, the U. S. produced 868.95 million tonnes, and consumed 791.85 million tonnes of coal. Coal consumption has risen an average of 11.1 million tonnes per year in the U. S. over the last ten years. During the near term, with pressure to reduce carbon dioxide emissions, this rate of growth in the use of coal will dwindle. Long term, the U. S. will be forced to accept fuel alternatives which may not be attractive today, and coal may become the only readily available fuel.

As can be seen by the above statistics, the U. S. coal supply is quite secure and adequate to meet all long term requirements of the U. S.

**NUCLEAR FUEL SECURITY:**

Nuclear fuel use for the current 105 U. S. nuclear power plants peaked in 1996 at 183.2 million tonnes oil equivalent, and then declined in 1997 to 170.9 million tonnes oil equivalent. There are currently no new plans to build any nuclear power plants in the U. S., and there is little likelihood any new plants will be considered between now and 2015. Instead, there most likely will be early decommissioning of some of the nuclear power plants in operation today. Five U. S. nuclear power plants have already been shutdown and are presently being decommissioned.

With decreasing demand for nuclear fuel, the U. S. has a secure supply of nuclear fuel for its power plants for the foreseeable future. While reprocessing of spent fuel is not likely in the near future in the U. S., should nuclear fuel be in short supply, then reprocessing would greatly extend the availability of nuclear fuel.

There are several security issues which must be addressed about the power plants themselves, as well as the spent nuclear fuel. Nuclear power plants are perceived to be attractive targets for terrorists. While all nuclear power plants have a high level of security in effect at all times, they still are not impenetrable, and a determined terrorist could enter most plants. This

could result in major property damage, loss of life, and because each nuclear power plant tends to be huge, this could result in loss of a significant amount of electric power.

Insofar as nuclear power plants are concerned, there is also some concern of terrorists gaining control of spent nuclear fuel, and reprocessing it into weapons grade nuclear material. However, the required facilities to perform reprocessing are so great that this is only a remote possibility. Regardless, both the nuclear power industry and the Nuclear Regulatory Commission must always exercise high security measures to be sure that no unauthorized persons have access to spent nuclear fuel at any time. It is believed at this time that this is of minimal concern with respect to security.

## ELECTRONIC DATA PROCESSING AND COMPUTER CONTROL SECURITY:

In the modern world in the transmission and distribution of energy, particularly for electric power and natural gas, operating companies have highly automated the systems. Most of the larger systems are now controlled remotely from a single central computer. This has done wonders for the improvement in efficiencies and cost reductions.

However, this has created new opportunities for computer hackers to take control of a system totally. Furthermore with Internet connection, it is now possible for a computer hacker in another country to take control of a large, complex transmission system without even entering the U. S.

Although there have been only a few minor incidents of someone attempting to enter the control system and of a complex energy transportation system, the possibility exists. Industry trade groups have ongoing studies to determine ways of guarding against this occurring.

**CONCLUSIONS:**

As of 1998, the U. S. is moderately secure in its energy supplies. While some disruptions might occur, over 75% of the sources of energy fuel to the U. S. are secure. Losses of the 25% of energy supply which is not secure, should it occur, would result in severe economic disruption to many of our businesses. However, our military requirements would be easily met with secure energy supplies, and thus even in a National Emergency, the U. S. would be well prepared to defend itself.