February 1, 2001

Hon. Spencer Abraham
Secretary of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Mr. Secretary,

In my capacity as President of the AAPG Division of Professional Affairs, I am enclosing a copy of a speech I gave last October regarding the causes of the Energy Crisis and some recommended solutions. Also attached are some useful energy statistics to back up arguments made for certain energy policy proposals.

I would like to serve on your energy policy task force. It would be an appropriate appointment as I represent the 30,000 professional earth scientists of the AAPG on energy policy matters. We are the geoscientists whose job it is to find the nation's energy resources.

Yours sincerely,

G. Warfield Hobbs

attach.
cc: Vice President Cheney

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 Obtained and made public by the Natural Resources Defense Council, May 2002
THE ENERGY CRISIS:
WHY HAS IT HAPPENED AND
WHAT CAN WE DO ABOUT IT?

By

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PITTSBURGH ASSOCIATION OF PETROLEUM GEOLOGISTS
Pittsburgh, Pennsylvania

Thursday, October 12, 2000

High oil and gas prices, and the prospect of possible shortages of natural gas and heating oil this winter are making headlines. Energy is finally an election issue. I am disappointed, however, in the superficiality of the energy recommendations of both presidential candidates. But what can we expect. After all, there has been no comprehensive energy policy for over a decade. America has become addicted to cheap energy.

The public will be howling for relief, and for an explanation. Politicians will once again be pointing the finger of blame at the oil and gas industry, not at themselves.

As petroleum geologists, the pending energy crisis presents a tremendous challenge, and a great opportunity. We must be able to explain, as scientists, why there is an energy crisis, and what rational solutions exit to remedy the situation.

On July 26th, in my capacity as President of the DPA, and as a spokesman for the AAPG, I was invited to testify before the US Senate Committee on Energy and Natural Resources concerning the issue of natural gas supply, rising prices, and access to public lands. I want to share with you what I had to say to Congress in late July, and I would also like discuss my thoughts on energy policy going into the election.

My speech is full of useful statistics, and recommendations for a National Energy Supply Policy. So listen well, and take notes, because I want you to make the same arguments before the public in your own communities.

Obtained and made public by the Natural Resources Defense Council, May 2002
IS THERE A SUPPLY CRISIS?

Is there really a pending energy crisis? The statistics point to a very serious problem. Demand has finally caught up with supply, as the recent run-up in commodity prices so profoundly demonstrates. Complacency and addiction to cheap energy have prevailed for the past 15 years. This is now about to end, not with a whimper, but a gigantic thud!

Crude oil prices have more than tripled from about $10/bbl in late 1998 to more than $30/bbl this year. The average NYMEX spot gas price at the Henry Hub was $2.25/MMBTU in 1999. Spot natural gas prices have doubled this year alone to more than $5.50/mcf for winter delivery, and could spike to over $7.00/mcf. According to EIA projections, residential gas prices are expected to average $8.58/mcf, up 29.5% from last winter's average of $6.61/mcf. At current prices, residential gas consumers can expect a $200 to $300 increase in their winter gas-heating bill; and some can ill afford that cost.

The NYMEX 12 month and 24 month futures prices in excess of $4.60/mcf and $30/bbl indicate the market makers believe high oil and gas commodity prices are going to be the norm for the next two years.

Commodity prices have skyrocketed because the market perceives supply to be restricted. Is this truly the case?

Natural gas presently supplies about 25% of the nation's domestic energy requirements. Last year, gas consumption in the United States was approximately 22 Trillion cubic feet (TCF). According to the Department of Energy Information Agency (EIA), proven domestic gas reserves as of December 31, 1999 were 164 trillion cubic feet (TCF). At a consumption rate of 22 TCF/year, proved reserves represent only a 7.4-year supply.

Recent studies by the EIA, Gas Research Institute, and the National Petroleum Council (NPC), indicate annual demand will grow to as much as 32 TCF over the next 15 to 20 years. In its 1999 study, the National Petroleum Council projected annual demand to reach 29 TCF as early as 2010. At 32 TCF/year consumption, currently proven reserves represent only a five-year gas supply.

Gas demand is soaring, particularly as a "clean" fuel for electric power generation. Security analysts at Dain Rauscher Wessels, Inc. estimate that more than 275 new gas-fired power plants are planned to begin operation by 2006. These new electric power plants are expected to consume an additional 8.5 TCF/year.

Proven gas reserves in the United States have dropped 43% during the past 30 years, from 290 TCF at year-end 1970, to only 164 TCF now. In a report issued in late May, the EIA forecast that the nation's proved reserves would decline a further 2% during 2000, due to increased demand, and the very low drilling levels of the past few years. This may now turn around slightly with current higher commodity prices.

According to the recent EIA October Energy Report, working natural gas inventories in storage as of the October 1st beginning of the winter heating season were estimated at 2,530 bcf, or 227 bcf below the five year (1995-1999) average of 2,757 bcf. Below-average stock levels are a result of lagging USA production due to low commodity prices and increasing gas demand for power generation. Increases in summer gas power generation for air conditioning in the Southwestern this year, helped constrain inventory accumulations to half the normal rate. Operators of gas storage facilities were also reluctant to purchase gas at the unusually high prices that prevailed in the late spring and early

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summer, on the unfulfilled expectation that gas prices would decline over the summer.

EIA believes there will be adequate gas supplies if a "normal" winter occurs. However, end of season stocks next spring will be at the lowest level since 750 bcf was reached in 1996. There is now no marginal supply for extended cold weather demand, or any significant gas production or deliverability disruption this winter. If we have a "cold" winter, and it is about time, regional supply disruptions are likely in my opinion. Schools and factories may be shut to conserve gas for electric power generation and residential heating.

The supply situation in the winter of 2001 could be worse than this coming winter if we have a cold winter scenario, hence the high 24 month NYMEX option prices.

The public must be made aware of the seriousness of the gas supply situation, and prepared for significant price increases and possible regional gas curtailments.

OIL SUPPLY

World demand for petroleum was 74.8 million barrels per day in 1999, and is expected to rise to 75.9 MM bbl/day this year. The United States consumes 26% of the world's petroleum, or 19.5 MM bbl/day.

In 1999, the USA produced 5.88 MM bbl/day of crude oil and lease condensate. Crude plus natural gas liquids production totals 9.0 million bbl/day. In order to meet our 19.5 MM bbl/day petroleum demand, the U.S. now imports about 56% of its crude oil and refined product needs. This demand means that USA energy policy very definitely impacts world oil markets and national economies.

Crude oil production in the US has declined 33% since 1985, from 8.9 million barrels per day (MM bbl/day) to 5.9 MM bbl/day. At the same time, however, domestic petroleum demand has increased 23% from 15.90 MM bbl/day to 19.58 MM bbl/day.

Throughout 1999, domestic crude oil production declined 370,000 BOPD, or 5.9% from the 1998 average. Production is expected to climb somewhat this year and next, as new fields are brought on stream in Alaska and the Deep Water Gulf of Mexico.

In the face of rising domestic demand, and decreased levels of investment and exploration success, proven USA crude oil reserves have declined 26% from 28.4 billion barrels in 1985 to 21 billion barrels at year-end 1999. After the giant Prudhoe Bay Field discovery in 1970, US proved reserves reached a peak of 39 billion barrels.

In 1999, there were only 20,770 oil and gas well completions in the United States. This is a pathetic shadow of the 70,000-85,000 wells drilled per year in the period 1980-1985, when we were able to actually increase deliverability and make significant new reserve additions beyond just replacing annual consumption.

RIG COUNT

The average drilling rig count was only 623 per week in 1999, an all-time low since the 1940's. In 1982 there were over 4,000 drilling rigs at work in the United States. The rig count is a little over 1000 now, but that is not adequate to significantly increase domestic oil and gas deliverability, nor make a long-term increase in year-end reserves.

In its July 17, 2000 Energy Equity Research report, security analysts Raymond James & Associates, Inc. stated that there are only about 1,000 U.S. drilling rigs available to go to work on short notice (800 onshore and 200 offshore). An additional 100 to 150 rigs could be refurbished for service at an additional investment of about $1 million per rig. Therefore, the analysts conclude, a sustained rig count of no more than 1,100 is unlikely to be achieved before

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Finding and training crews to operate these rigs is a serious obstacle. An article on page one of the October 11th issue of the Wall Street Journal highlighted the serious shortage of rigs, rig equipment and supplies, and personnel.

SHOULD WE WORRY ABOUT DOMESTIC OIL SUPPLY?

Should we worry about the decline in our domestic oil reserves and crude deliverability? The answer is a resounding yes! The US, from a strategic point, has become dangerously dependent on crude oil imports from politically unstable countries. At the time of the 1973 Arab oil embargo, the US imported only about 35% of its crude requirements. At a current 56% import level, we are significantly more vulnerable to a supply disruption.

The Middle East produces about 20 million barrels of oil per day, and has proven reserves of 673 billion barrels, representing about 65% of total world proven reserves. Saudi Arabia alone has reserves of 259 billion barrels and produces 8 million barrels per day. It is entirely possible that we could wake up one morning to a news report that the King of Saudi Arabia has been assassinated by an anti-Western fundamentalist Muslim terrorist group, and that the rebels will destroy the principal Saudi oil export terminal with a weapon of mass destruction, unless certain demands are met. A world supply and price panic would explode on the news of the threat alone.

The West can no longer take access to unlimited Middle Eastern and Central Asian oil for granted. We have competition from the developing economies.

Worldwide petroleum demand is climbing at about 2.4% annually, and will likely take off when the Asian economy moves once again into high gear. There is a new and fast growing "consumer class" in the emerging economies of the world. Here is a very scary statistic - the USA has less than 5% of the world's population, yet consumes 26% of the world's petroleum (and mineral) resources. We use approximately 24 barrels of crude oil per capita per year. China, India; Pakistan and Indonesia, with 40% of the world's population use less than 1 barrel per capita/year. Asia is entering the mass consumer age where everyone wants electric power, consumer items and motorized transportation. How will the world supply the raw materials for these economies? We have already found the easy stuff.

China realizes that it must access international crude supplies to meet its growing domestic demand. The Chinese national petroleum company has actually outbid major western oil companies for oil field development projects in Kazakhstan and Iran. Pipelines are being planned to bring Caspian and Siberian oil to China. The country is also building a modern guided missile equipped navy to protect its seaways. The Chinese will be competing head-on with our children for Middle Eastern, Central Asian, and Siberian oil. The competition has already begun. India is also in the race, and is actively pursuing exploration and development projects in the Middle East.

Venezuela has always been a fallback position to Middle Eastern oil. However, under the leadership of President Chavez, the USA must also not take uninterrupted supply from Venezuela for granted.

An important aspect of America's foreign policy is unequivocal support for Israel. Israeli control of Jerusalem, a place that is also sacred to Muslims, is presently a flash point that could engulf the Middle East in another war. We must have a balanced policy with regard to Israel and the Muslim oil producing nations, or run the risk of another embargo. In my opinion, unless Jerusalem is made into an independent city-state, open to all, and under the governance
of the United Nations, lasting peace will never come to the Middle East. Continued oil volatility will prevail without peace.

In addition to the national security issue, the United States also must be concerned about the fact that crude oil imports are the largest component of the significant USA balance of trade deficit. Last March, the USA had a record trade deficit of $30.2 billion, when the nation's foreign crude oil bill hit a then record high. The EIA estimated total 1999 oil imports at $66.9 billion. This year that bill will be significantly higher.

HEATING OIL

Of more immediate concern, and perhaps a major factor in my "crisis" characterization of the national energy situation, is the winter heating oil supply. Very strong demand for gasoline this year, coupled with high prices, has resulted in refiners working flat out this past summer to meet gasoline demand. Significantly less distillate was produced as a result.

According to the EIA, distillate stocks are currently about 25 million barrels, or 21% below the middle of the distillate stock range. On the East Coast, where thirty-six percent of homes use heating oil, stocks are 40% below 1999 levels. In the New England states, where a cold snap last winter caused supply disruptions and huge price spikes, stocks are 65% below 1999 levels. God forbid should we have a really cold winter in New England!

EIA's base case winter fuel distillate requirement for 2000 is 3.88 MM bbl/day, assuming normal winter weather. In order to assure supplies in the Northeast, the president has established an emergency heating oil reserve of 2 MM bbl/oil in New England. This could backfire, if private suppliers cut back on their storage levels because they do not want to stock their tanks with high price fuel oil, and then have the price collapse when the emergency reserve is released.

GASOLINE SUPPLY

Forty-three percent of the nation's crude oil is refined into motor gasoline. Last year this amounted to 8.4 MM bbl/day. After the crude oil price spike in the 1979-1981 period, the nation responded by boosting average automobile mileage to over 20 gallons per mile. This was an important conservation measure, but it has been counteracted by the fact that there are now twice as many cars on the road.

Motor gasoline demand has increased 28% from 6.58 MM bbl/day in 1981 to 8.47 MM bbl/day, despite our conservation efforts.

This past summer price spikes and supply disruptions were experienced in California and the Midwest. This was due in part to the June 1st deadline to sell reformulated gasoline, rising crude oil prices, plus a refinery fire in California.

Our gasoline worries are not over. In its infinite wisdom, the EPA mandated the addition of MTBE to gasoline in 1992 and 1995 to reduce emissions. Unfortunately, MTBE is now causing serious groundwater pollution. California has banned MTBE as of January 1, 2003. EPA would like to ban MTBE nationally by 2005. According to refinery consultants Purvin & Gertz, the U.S. refining industry has developed a substantial reliance on MTBE, particularly on the East Coast and West Coast. If MTBE use is eliminated, refiners will have to compensate for the loss of its octane, volume, and other properties through expansion of refining facilities and higher-cost processing operations. Billions of dollars were spent by the refiners to comply with the original MTBE requirement. For What?

The EPA is also mandating reductions in motor fuel sulfur content.
Diesel fuel, which currently has a sulfur content of about 500 ppm, is supposed to have only 15 ppm sulfur by 2007. The Federal program to reduce the sulfur content of all U.S. gasoline will require significant refining investment. Increases in refining costs and the tighter gasoline supply/demand balance will have their greatest impact on gasoline prices and octane values in the U.S. market, with further effects in other world markets.

The public can expect further gasoline price spikes and supply disruptions as a result of the EPA action on MTBE and sulfur. Will anyone accuse the EPA of price gouging?

USA REFINING CAPACITY

Since 1981, the number of operating refineries in the United States has declined 47% from 324 to 174, representing a loss of over 3.0 million bbls/day of capacity. Refinery utilization has increased from 69% in 1981 to 96% in 2000.

Refinery closings were caused by deregulation (elimination of price controls and allocations), and the cost to retrofit older refineries to meet current environmental regulations. There have been no new grassroots refineries built in more than a decade. According to the EIA's April, 2000 Energy Report, "financial, environmental, and legal considerations make it unlikely that new refineries will be built in the United States."

In an October press release in response to Vice-President Gore's characterization of "Big Oil" as "gougers" and "profiteers," ExxonMobil said that it makes a profit of five cents on every gallon of gasoline it sells, while Federal and State Governments take an average of 40 cents in taxes for every gallon sold. The ExxonMobil press release went on to point out that:

"Since the end of World War I, inflation-adjusted gasoline prices have steadily declined, interrupted only by a few peaks and valleys. Through the end of World War II, when average real incomes for Americans were much lower than they are today, gasoline prices varied between $2.00 and $2.50 per gallon ($1999). The price then dropped steadily to about $1.50 per gallon before the oil shocks of the 1970s and early 1980s drove prices temporarily higher, peaking at over $2.50 in 1981. The lowest gas prices of the period occurred in 1998, when low crude prices drove gasoline near, and in some parts of the U.S. below, $1.00 per gallon. Prices have moved up sharply in 2000, but from a very low level and continue to be below historical levels.

The declining price of gasoline has contributed to the growth of our standard of living over the years. In 1966, the average American family spent each year a total of about $35,000 (in $1999), of which about three percent went for gasoline. Today, the average American family spends over $60,000 each year, with only two percent on gasoline. Over the same period, the vehicle fleet (cars, vans, light trucks and SUVs) increased from 91 million to over 200 million, and the average number of miles driven annually per vehicle rose from 9,500 in 1966 to almost 12,000 today. With vehicle efficiency improving from about 13.5 miles per gallon in 1966 to nearly 20 mpg today, the average cost of driving one mile has fallen from over 12 cents in 1966 to about six cents in 1999. Recent gasoline price increases have brought that cost back to only about seven cents per mile.

In its October, 2000 Energy Report, the EIA said "Regular unleaded, self-service retail motor gasoline prices hit their highest monthly level ever, in nominal terms, averaging $1.63 per gallon in June. Still, in real terms (adjusted for inflation) that price was about 40 percent lower than the price experienced in March 1981."

Crude oil prices over the past 10 years have consistently lagged the consumer price index inflator. The average price from January 1990 through August, 2000, has

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Consumers are screaming about high gasoline prices, but are quite willing to pay $3.50/gallon for bottled water. At $30/barrel, crude oil costs 71 cents per gallon at the wellhead. If after transportation, refining, storage, marketing, insurance and environmental compliance costs, Exxon makes only 5 cents per gallon profit on its gasoline, imagine the margin of Perrier on a gallon of water! Do you remember what you paid for a can of soda or newspaper in 1981, versus today?

PETROLEUM INVESTMENT

A number of factors are responsible for the decline in USA oil and gas production and reserves since the mid-1980's. Low, and unstable commodity prices have discouraged new investment. The stock market has been a much more rewarding area for "risk" capital. Frankly, wildcanning with a "dot.com" stock, where one could have a 25% stop loss order to limit the downside, and instant liquidity, is a lot less risky than drilling a hole in the ground.

According to the Financial Reporting System, the 23 largest producers reported an average return on assets of just 5.4% over the 12-year period from 1986 through 1997. During the past decade, the average oil industry return on capital employed has been only a meager 7-8% due to low commodity prices. With these returns, why would anyone want to invest in the upstream energy sector? Adequate new capital has not come into the industry, which explains in part, why the supply side of the equation has deteriorated so badly.

The December 1999 National Petroleum Council study concluded that the growth in natural gas demand will require funding of approximately $1.5 Trillion (in 1998 $). This includes $700 billion for operating expenses, and $658 billion dollars in upstream capital expenditures from 1998 through 2015. This latter figure includes all exploration, development, production, and gathering capital expenditures. In order to satisfy supply growth an increased annual average capital expenditure of $39 billion per year is required from 1999 through 2015, versus an average of $27 billion from 1991 through 1998. However, these needed levels of investment will take place only if investors have confidence that competitive rates of return will be earned. This will require an entirely new "attitude" toward the petroleum industry in Washington.

DOMESTIC PETROLEUM RESOURCES

The public is wondering whether the United States has enough oil and natural gas domestically, to meet future demand?

Some energy analysts will argue that the United States has exhausted its petroleum resources, and that there are no significant new reserves to be found. This is categorically at odds with the facts.

The most recent resource assessments of the US Geological Survey (USGS), Minerals Management Service (MMS), EIA, and the National Petroleum Council, confirm that the United States has huge remaining oil and gas resources.

According to the USGS, the technically recoverable onshore U.S. oil resource base is 110 billion barrels. This is five times our onshore and offshore proven reserves of 21 billion barrels.
The 1999 National Petroleum Council (NPC) study concluded that the United States has a remaining gas resource base in the Lower 48 States of 1,466 TCF. It should be noted that only 157 TCF, or just 10% of the identified resource, is considered proven. There are an additional 313 TCF in Alaska; however, this gas is useless without a pipeline to the Lower 48 markets. The total identified USA gas resource, including Alaska, is a whopping 1,779 TCF. Even at 32 TCF/year consumption, there is more than a 50-year supply. Cumulative domestic production over the past hundred plus years is estimated to be about 890 TCF.

The United States has the potential to be self-sufficient in natural gas supply well into the 21st Century. We have significant oil resources, but they are not likely to be adequate to satisfy future demand. However, unless the petroleum industry is allowed access to the areas where the remaining resources are located, the domestic energy “crisis” will become worse.

WHERE ARE THE REMAINING RESOURCES?

There are significant remaining known oil and gas resources in the traditional onshore producing areas of the Gulf Coast, West Texas and in the Mid-Continent. However, these areas are now intensely drilled and blanketed with 3-D seismic, and are not yielding the large new discoveries required to replace the nation’s depleting proven reserves. Major oil companies and large independents are exiting onshore exploration and moving their operations into the sparsely drilled waters of the Deep Gulf of Mexico, and overseas.

Many small oil and gas companies, and the majority of the independent prospect originators, are having trouble finding partners, as well as the capital, to drill the smaller reserve exploratory prospects that remain in the traditional producing areas. Higher oil and gas prices have significantly increased the drilling rig count; however, over 90% of the current drilling activity is for the development of known reserves.

The 1999 NPC report concluded that the most prospective areas for major new discoveries, particularly natural gas, are on public lands in the Rocky Mountain sedimentary basins, offshore in the Gulf of Mexico, in the Eastern Gulf of Mexico, and on the Atlantic and Pacific OCS. Despite the huge potential of these areas, Federal law presently prohibits exploration on the Atlantic and Pacific OCS, and in the Eastern Gulf of Mexico. Access to much of the remaining resource potential of the Rocky Mountain basins is restricted or closed.

Exhibit 1 is a map from the NPC report that shows the resource potential of the Lower 48 public lands that are closed and/or subject to severe restrictions. The total estimated gas resource of these areas is 213 TCF, or a nine-year supply at current rates of gas consumption. It is likely that with further exploration, these resource figures would increase significantly.

The total area of the U.S. Federal offshore, including Alaska, to the 200-mile economic limit, is about 2 billion acres. Only 2 percent has been leased. In its 1995 study, the Minerals Management Service assessed a mean undiscovered recoverable resource of 46 billion barrels of oil and 268 trillion cubic feet of natural gas in the Federal OCS. This is 2.5 times the offshore reserves found to date.

The next slide shows the USA offshore where the MMS estimates these potential resources. On June 12, 1998, By Presidential “Decree”, all but the Central and Western Gulf of Mexico were excluded from leasing until 2012.

The previous NPC map does not include Alaska. In its 1995 National Oil and Gas Assessment of Onshore Federal Lands, the USGS estimated that the Northern Alaska province accounts for more than half
economy, and to keep its citizens warm in the winter and cool in the summer.

ENVIRONMENTALLY RESPONSIBLE RESOURCE DEVELOPMENT

Development of the oil and gas resources in environmentally sensitive areas of the Rocky Mountains, the North Slope of Alaska, the Eastern Gulf of Mexico, and the Pacific and Atlantic OCS, can be done in an environmentally responsible manner, with no lasting harm.

Over the past 25 years, the environmental lobby in the United States has convinced the public that resource development necessarily means that the environment will be degraded and forever altered. Drilling, production, and environmental impact mitigation technological advances, as well as a new corporate environmental attitude that “Green” is good business, have made this perception obsolete. Oil and gas are produced every day in an environmentally responsible manner in environmentally “sensitive” areas all over the world. The greatest threat to the environment comes from the movement of oil to market by tankers, not by pipeline.

To illustrate that drilling and production can take place in a safe and environmentally sensitive manner, we can look to the East Coast of Canada. For more than thirty years, offshore exploration, and now production, have calmly co-existed in the Canadian Maritimes with tourism and commercial fishing, in a cooperative, and even supportive environment, for the betterment of all concerned communities. More than 300 exploratory wells have been drilled within the offshore outer continental shelf waters of the Canadian Atlantic. At least 12 trillion cubic feet of natural gas and 2 billion barrels of oil have been discovered so far. More than 125,000 barrels of oil and 400 million cubic feet (MMcf) of natural gas are being produced per day within the prime commercial fishing waters and the pristine tourist coastlines of Eastern Canada. Much of this new gas is now flowing to New England.

There is a major new deep Jurassic Age reef trend discovery offshore Nova Scotia. If successfully delineated, this new field alone could add an additional 400 MMcf/day gas production. Incidentally, John Hogg, the former chairman of the AAPG House of Delegates, and a Canadian, originated the new gas discovery.

Petroleum geologists believe that the same types of oil and gas accumulations that exist in the Eastern Canadian offshore, may extend south along the U.S. Atlantic Coast, from George’s Banks to the Carolina Trough, a distance of almost 1,000 miles.

The Canadians have also successfully developed and have been producing natural gas from their portion of Lake Erie since the 1950’s. The US portion of Lake Erie has a thicker sedimentary section, and would likely be more productive. New Yorkers could use the gas. United States law, however, prohibits exploration in the Great Lakes.

Brazil is successfully exploiting its substantial Atlantic OCS petroleum resources in an environmentally responsible manner. In doing so, it has become the world leader in ultra-deep water production technology.

New technologies also now permit oil and gas development in a way that minimizes onshore surface disruption in environmentally sensitive areas. The British, for example, who are even more fussy about open spaces then we are, agreed to develop the giant Wytch Farm Oil Field under Poole Harbour, smack in the middle of the most heavily visited coastal zone of the South of England. At the Wytch Farm development, long reach deviated wells are drilled in a radial pattern from a camouflaged central well pad onshore, to locations up to seven miles out into scenic Poole Bay.

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Obtained and made public by the Natural Resources Defense Council, May 2002
Opponents to petroleum development cite old operating practices, and prior environmental abuses, that are simply out of touch with modern reality. Just like the Canadians, British, Brazilians, Norwegians, Qataris, Thais, Australians, and many other petroleum producing nations, Americans likewise can develop their offshore and onshore energy resources in environmentally sensitive areas in a safe and rational manner. To believe otherwise is simply inconsistent with what is being done every day all over the world.

As someone who vacations on the New England coast, and loves to sail and fish in Long Island Sound, and in the Gulf of Maine, I have a vested interest in the environmental consequences of petroleum operations in the Atlantic OCS. I can truthfully testify that I have no fears, and am confident that the environmental risks of exploring for oil and gas offshore New England are minimal, and acceptable. Experience in the Gulf of Mexico has demonstrated the best fishing is actually right around the artificial reefs created by offshore oil and gas production platforms.

PETROLEUM SUPPLY POLICY
RECOMMENDATIONS OF THE AAPG

The petroleum industry can and will be able to provide the oil and gas supplies needed to maintain the economic stability and security of the United States. However, to do so, the nation must address three critical issues. These are: 1) Improved access to public lands; 2) Reform of the regulatory process; and 3), Fairer tax treatment to stimulate capital formation and investment.

1. Public Lands Access

In regard to the public lands access issue, the AAPG recommends the following:

- Lifting of the Moratorium on OCS Exploration and Development in areas where it exists today.
- Opening of the Eastern Gulf and Atlantic Margin OCS to Area-wide Leasing.
- Reform of the Dept. of Interior Policy regarding access to public lands in the Rockies.
- Opening the 1002 Area of the Arctic National Wildlife Refuge to Exploration.
- Amendment of the Federal Antiquities Act to prevent its misuse in restricting access to public lands.
- Balancing the needs of all stakeholders in shaping public lands policy.
- Assurance that there is no net loss of state and private land in creating new land restrictions.

2. Regulatory Reform

Reforms are needed to streamline the federal petroleum regulatory and permitting process to stimulate natural gas exploration and production. Rules and regulations must be based on scientific reality, not on popular environmental misconceptions. The practical economic impact of all regulations must be considered. In this regard, the AAPG recommends the following:

- Reform the Clean Water Act and Endangered Species Acts, especially

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those sections that pertain to wetlands.

- Reform the procedures used by the Department of the Interior in managing energy resources on public lands in the Rocky Mountain region and elsewhere.

- Limitation of the extensive delays of the permitting process.

- Limitation of the ability of the EPA to regulate drilling muds and hydraulic frac fluids as “hazardous wastes”.

3. Tax Reform

The independent petroleum industry has historically drilled over 80% of the nation’s oil and gas wells. However, over the past 15 years, low oil and gas prices, changes in the tax code, and the attraction of alternative higher yielding investment opportunities, has resulted in capital starvation for independents. Petroleum exploration and production are extremely capital intensive and high risk. In order to get the independents back to work finding and developing the nation’s gas resources; we must stimulate capital formation.

Technology and dot.com stocks have peaked. With high gas prices, investors in New York and elsewhere are now beginning to look for direct investment opportunities in natural gas. However, most non-industry investors are deterred by the liability exposure of a direct working interest in a gas well. They would prefer to be limited partners, and be rewarded through tax benefits for assuming exploration risk to drill for a depleting asset.

The role of taxation is critically important to the development of oil and gas resources. However, the U.S. Tax Code currently contains provisions that serve as major disincentives to petroleum investment. While we currently enjoy significant budget surpluses, Congress can afford to reform the tax code.

The AAPG recommends the following tax reform legislation to stimulate the investment needed to increase domestic natural gas supply.

- Restoration of the write-off of intangible drilling costs for the passive investor. This tax deduction was eliminated by the Tax Reform Act of 1986, and effectively wiped out the major source of drilling capital for small independent oil and gas exploration companies. Billions of dollars of new drilling capital would quickly become available to the industry through restoration of the Intangible Drilling Cost (IDC) tax deduction for passive limited partnership investors.

- Elimination of the onerous Alternative Minimum Tax.

- Allow expensing of delay rentals in the year incurred, not capitalizing them as currently required.

- Allow expensing of geological and geophysical costs in the year when the costs are incurred.

- Make permanent the suspension of the net income limit for percentage depletion on marginal properties.

- Raise the depletion allowance provision to previous levels.

CONCLUSION

The United States has abundant petroleum resources. However, absent access to these resources on public lands, and regulatory relief and tax incentives to stimulate domestic petroleum exploration and development, the nation will face a
serious gas supply shortage, and will continue its dangerous reliance on imported crude oil.

The AAPG recommends that Congress focus its attention on the energy issue without further delay. Presidential candidates also need to respond realistically to the energy crunch, because high prices and supply disruptions will be front-page news in November. Politicians must also realize that kicking the petroleum industry in the shins and shaking fists at OPEC, makes for good press, but is no solution to the pending natural gas supply crunch.

A National Energy Policy that balances the interests of all stakeholders, should be developed and implemented as quickly as possible. If this is not done, and soon, some Americans will truly run the risk of “freezing in the dark”. Time is running out! The proverbial “doo doo” is hitting the fan as we speak.

* * * * *

Skip Hobbs is Managing Partner of Ammonite Resources Company, a firm of international petroleum technical and business consultants that Mr. Hobbs formed in 1982. Ammonite is headquartered in New Canaan, Connecticut and has associate offices located in the oil patch of the United States, in Canada, the United Kingdom, and Argentina. The “Energy Forum” webpage on the <www.ammoniteresources.com> website contains numerous articles and statistics on energy issues.

As an addendum, I have attached comments regarding several issues that Vice President Gore has incorporated into his “energy policy”. At the risk of being somewhat partisan, I suggest that the Republicans confront the Democrats with some of the statistics and issues which follow.

* * * * *

ENVIRONMENTAL MYTHS - ANWR

The AAPG believes that the 1002 area of the Arctic National Wildlife Refuge (ANWR), and the similar coastal plain area of the National Petroleum Reserve-Alaska (NPRA), should be opened to exploration and development. A study recently released by the United States Geological Survey (March, 1998) cites potential economically recoverable oil resources beneath the ANWR Coastal Zone 1002 Area of 5.7 to 16 billion barrels of crude oil, with a mean expected resource of 10.3 billion BO. Mean peak production rates of 1.0 to 1.35 million BOPD are expected. The 1002 Area represents only 8% of ANWR’s 19 million acres. Less than 1 percent of the land within the 1002 area would be affected by petroleum exploration and development activities. Parts of the coastal plain of the NPRA, held back by the Bureau of Land Management (BLM) from the 1999 lease sale at the instruction of the Secretary of the Interior, contain an estimated minimum of 1.5 billion barrels.

The major objection to development of the Prudhoe Bay Field and Trans Alaska Pipeline was the potential threat of the development to Caribou migrations. According to the US Senate Committee on Energy and Natural Resources, the Prudhoe Bay herd, also known as the Central Arctic Herd has increased from 6,000 in 1978 to 19,700 in 2000. The caribou are not
bothered by the petroleum development infrastructure — in fact they prefer it to the prospect of having their calves devoured by wolves.

Opponents of ANWR development say that it is not worth forever despoiling ANWR for a few month’s of oil supply. This is a specious argument that assumes that supply from all other sources ceases during the life of the ANWR reserves. According to Government studies, the 2001 area of ANWR, could produce over 1.0 MMBO per day. Like the Prudhoe Bay area, production operations will likely run for more than 25 years, providing vital crude oil and natural gas for the nation’s economy, significant employment in Alaska and in the Lower 48 from production operations and equipment supply, hundreds of millions of dollars of annual state and federal tax and royalty income, as well as a reduction in the outflow of funds for the purchase of imported crude oil.

During this year Secretary of Energy Bill Richardson has repeatedly been on his hands and knees before the Arab OPEC producers to beg for production increases of initially 200,000 BOPD and then 800,000 BOPD. This is a humiliating gesture for the United States, the most powerful nation in the world. The current supply/demand balance is so precarious now, that even the threat of a storm in the Gulf of Mexico causes oil and gas prices to shoot up momentarily. An incremental 1 million barrels of oil per day from ANWR for a sustained period of at least 10 years would make a huge difference in the supply side equation.

During 1999, according to the EIA, the US obtained 23% of its oil imports of 10.6 MM bbl/day, or 2.43 MM bbl/day, from the Persian Gulf Region. If one were to use the same argument as the ANWR opponents about supply, development of potential ANWR reserves of 10+ billion barrels would eliminate 11 years of dependency on imports from the dangerously volatile Middle East.

The giant Alaskan Prudhoe Field went into production in 1977, and produced its 10 billionth barrel of crude oil in May, 2000. The field reached a regulated peak of 1.5 million barrels per day in 1979, and produced at this rate through 1988. Production is now in a steep decline.

* * *

THE MYTH OF ALTERNATIVE ENERGY

Vice President Gore believes United States Energy Policy should focus on conservation and alternate energy, not increased supply. Here are the statistics regarding sources of primary energy and electric power.

Total U.S. Energy Consumption by Primary Energy Source, 1998
(EIA Sept. 1999)

<table>
<thead>
<tr>
<th>Energy Source</th>
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</thead>
<tbody>
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</tr>
<tr>
<td>Natural Gas</td>
<td>24.1%</td>
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<tr>
<td>Coal</td>
<td>23.3%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>7.9%</td>
</tr>
<tr>
<td>Hydro</td>
<td>3.8%</td>
</tr>
<tr>
<td>Other</td>
<td>0.2%</td>
</tr>
<tr>
<td>Total:</td>
<td>100.0%</td>
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USA Electricity Supply By Source in 1999
(Calculated from EIA, October 2000 data)

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<tr>
<td>Hydroelectric</td>
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</tr>
<tr>
<td>Petroleum</td>
<td>3.8%</td>
</tr>
<tr>
<td>Geothermal, Solar, Wind</td>
<td>2.4%</td>
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<tr>
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</tr>
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Projects, yet alternate energy still provides over $9 billion in research funding for alternative energy research. Despite our conservation efforts, energy demand has skyrocketed. Motor gasoline demand has increased 28% from 6.58 MM bbl/day in 1981 to 8.47 MM bbl/day, despite our conservation efforts. Americans want mobility! How does Mr. Gore propose to provide Americans with the freedom of movement they demand and expect?

**GLOBAL WARMING MYTHS**

The earth has warmed and cooled over geological time, and has experienced significant climatic changes over the past 10,000 years of human history. Temperatures are rising, and have probably been doing so since at least 1850, certainly since the depths of the Little Ice Age around 1600. However, there is no concrete, or generally accepted scientific evidence that the current global warming episode is due to anthropogenic causes. Solar, orbital, and tectonic effects, and their combined impact on the world’s oceans are the most powerful climate drivers.

In the August issue of *Nature*, researchers Paul N. Pearson and Mark R. Palmer, cite recent scientific evidence that carbon dioxide levels during the Cretaceous Period were over 2000 parts per million, and that “normal” CO₂ might be about 500 ppm. The current level of CO₂ is about 360 ppm. Emissions from fossil fuels may, in fact, cause no climate change due to increased solar reflectivity.

The United States is being asked to accept the terms of the Kyoto Protocol. Under this international agreement, 38 developed nations must reduce their greenhouse gas (CO₂, CH₄, N₂O, HFC, PFC, and SF₆) emissions by an average of 5.2% below 1990 levels during the 2008 to 2012 timeframe. Unless there are some major technological break-through in alternate energy resources, combustion, and emission control technologies, American citizens will have to make significant adaptations to their life-styles to achieve compliance. In the end, these efforts may have no impact whatsoever on global warming!

Global warming is a fact. Rather than spend a decade arguing over percent industrial CO₂ reductions, and who is to blame, scientists and politicians alike should focus their efforts on how to solve and mitigate the social impact of the significant regional climatic changes that will result. These will include drought, famine, and sea level rises that will cause massive human dislocations.

Mr. Gore is a very strong proponent of the Kyoto Protocol. Does he have an electric car, and power his house with solar panels?
ENERGY STATISTICS

The AAPG Division of Professional Affairs is making this information available to all AAPG members and other interested parties so that discussions regarding energy policy can be documented with accurate statistics. Unless otherwise noted, all energy statistics are from the database of the US Energy Information Agency (www.doe.eia.gov). 1999 figures are actuals, and 2000 figures are projections. The weekly "Industry Scoreboard" in the Oil & Gas Journal is a good source for additional statistics.

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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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Obtained and made public by the Natural Resources Defense Council, May 2002
PETROLEUM DEMAND
(million barrels oil per day)

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Petroleum demand</td>
<td>74.8</td>
<td>75.9</td>
</tr>
<tr>
<td>USA Petroleum Demand</td>
<td>19.52</td>
<td>19.58</td>
</tr>
<tr>
<td>USA demand as % World Total</td>
<td>26%</td>
<td>25.8%</td>
</tr>
</tbody>
</table>

USA CRUDE OIL & LEASE CONDENSATE PRODUCTION
(million barrels per day)

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<tbody>
<tr>
<td></td>
<td>9.6</td>
<td>8.6</td>
<td>5.88</td>
<td>5.84</td>
</tr>
</tbody>
</table>

USA CRUDE AND NGL PRODUCTION
(million barrels per day)

<table>
<thead>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11.1</td>
<td>10.1</td>
<td>9.0</td>
<td>9.1</td>
</tr>
</tbody>
</table>

The U.S. now imports about 56% of its crude oil and refined product needs; therefore USA energy policy impacts world markets and economies.

Crude oil production in the US has declined 33% since 1985, from 8.9 million barrels per day (MMBOD) to 5.9 MMBOD. At the same time, however, domestic petroleum demand has increased 23% from 15.90 MMBOD to 19.58 MMBOD.

USA PROVEN OIL RESERVES

USA Proven Oil Reserves @ 12/31/99: 21.0 billion barrels
USA Proven Oil Reserves @ 12/31/85: 28.4 billion barrels

Proven oil reserves have declined 26% since 1985. Following discovery of the giant Prudhoe Bay Field in Alaska in 1970, USA proved oil reserves were 39 billion barrels as of year-end 1970.

MIDDLE EAST COMPARED TO USA

The Middle East produces about 20 million barrels of oil per day, and has proven reserves of 673 billion barrels, representing about 65% of total world proven reserves. Saudi Arabia alone has reserves of 259 billion barrels and produces 8 million barrels per day.

During 1999, according to the EIA, the US obtained 23% of its oil imports of 10.6 MM bbl/day, or 2.43 MM bbl/day, from the Persian Gulf Region.
During 1999, OPEC supplied 29.4 million BOPD, or 39.7% of total worldwide supply of 73.9 million BOPD.

**CRUDE OIL IN 1999 WAS USED FOR:**

- 8.4 MM bbl/d (43%) for motor gasoline;
- 3.6 MM bbl/d (18%) distillate fuel;
- 1.7 MM bbl/d (9%) jet fuel;
- 840,000 bbl/d (5%) residual fuel;
- 5.0 MM bbl/d (26%) “other oils”

**USA NATURAL GAS DEMAND (Trillion cubic feet)**

<table>
<thead>
<tr>
<th>Year</th>
<th>1985</th>
<th>1999</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17.3</td>
<td>21.36</td>
<td>22.22</td>
</tr>
</tbody>
</table>

Natural gas presently supplies about 25% of the nation’s primary domestic energy requirements.

Gas demand is skyrocketing, particularly as a “clean” fuel for electric power generation. Recent studies by the EIA, Gas Research Institute, and the National Petroleum Council (NPC), indicate annual demand will grow to as much as 32 TCF over the next 15 to 20 years. In its 1999 study, the National Petroleum Council projected annual demand to reach 29 TCF as early as 2010.

Security analysts at Dain Rauscher Wessels, Inc. estimate that more than 275 new gas-fired power plants are planned to begin operation by 2006. These new electric power plants are expected to consume an additional 8.5 TCF/year.

**USA NATURAL GAS PRODUCTION (TCF)**

<table>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22.6</td>
<td>16.8</td>
<td>17.2</td>
<td>17.8</td>
<td>18.6</td>
</tr>
</tbody>
</table>

**USA NATURAL GAS RESERVES (TCF)**

<table>
<thead>
<tr>
<th>Year</th>
<th>1999</th>
<th>1970</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>164</td>
<td>290</td>
</tr>
</tbody>
</table>

Proven gas reserves in the United States have dropped 43% during the past 30 years, from 290 TCF at year-end 1970, to only 164 TCF now. Approximately 14% of the nation’s natural gas supply is presently imported from Canada. The NPC estimates that LNG imports will supply less than 1% of natural gas demand through 2015.

**OIL AND GAS WELLS DRILLED**

In 1999, there were only 20,770 oil and gas well completions in the United States. This is a pathetic shadow of the 70,000-85,000 wells drilled per year in the period 1980-1985, when we were able to actually increase deliverability and make significant new reserve additions beyond just replacing annual consumption.
POTENTIAL UNDISCOVERED USA OIL AND GAS RESOURCES

The most recent assessment by the U.S. Geological Survey demonstrates that the petroleum and natural gas resource base is large enough to sustain an active domestic petroleum industry for many decades. The technically recoverable onshore U.S. resource base is estimated to be 110 billion barrels of oil and 1,015 trillion cubic feet of gas.

The National Petroleum Council (NPC) in its 1999 study concluded that the United States has a remaining gas resource base in the Lower 48 States of 1,466 TCF. It should be noted that only 157 TCF, or just 10% of the identified resource, is considered proven. There are an additional 313 TCF in Alaska; however, this gas is useless without a pipeline to the Lower 48 markets. The total identified USA gas resource, including Alaska, is a whopping 1,779 TCF. Even at 32 TCF/year consumption, there is more than a 50-year supply. Cumulative domestic production over the past hundred plus years is estimated to be about 890 TCF.

The 1999 NPC report concluded that the most prospective areas for major new discoveries, particularly natural gas, are on public lands in the Rocky Mountain sedimentary basins, offshore in the Gulf of Mexico, in the Eastern Gulf of Mexico, and on the Atlantic and Pacific OCS. Despite the huge potential of these areas, Federal law presently prohibits exploration on the Atlantic and Pacific OCS, and in the Eastern Gulf of Mexico. Access to much of the remaining resource potential of the Rocky Mountain basins is restricted or closed. A total of 213 TCF gas resources have been identified by the NPC in the areas that are closed and/or subject to severe access restrictions.

The total area of the U.S. Federal offshore, including Alaska, to the 200-mile economic limit, is about 2 billion acres. Only 2 percent has been leased. In its 1995 study, the Minerals Management Service assessed a mean undiscovered recoverable resource of 46 billion barrels of oil and 268 trillion cubic feet of natural gas in the Federal OCS. This is 2.5 times the offshore reserves found to date.

WORKING DRILLING RIGS

The number of drilling rigs working on a daily basis has decreased from over 4000 in 1982 to an average of only 623 in 1999.

USA REFINING CAPACITY

Since 1981, the number of operating refineries in the United States has declined 47% from 324 to 174, representing a loss of over 3.0 million bbls/day of capacity. Refinery utilization has increased from 69% in 1981 to 96% in 2000.

Refinery closings were caused by deregulation (elimination of price controls and allocations), and the cost to retrofit older refineries to meet current environmental regulations. There have been no new grass-roots refineries built in over a decade. According to the EIA April, 2000 Energy Report, "financial, environmental, and legal considerations make it unlikely that new refineries will be built in the United States."
RUDE OIL PRICES

Crude oil prices over the past 10 years have consistently lagged the consumer price index inflator. The average price from January 1990 through August, 2000, has been $19.95. The price spiked over the CPI during the Persian Gulf War, briefly in late 1996-early 1997, and recently in 2000. Crude oil prices rose from an inflation adjusted 53-year low of $8.03/bbl in December, 1998 to an average price of $22.55/bbl in December, 1999.

GASOLINE PRICES

In an October, 2000 press release ExxonMobil said that it makes a profit of five cents on every gallon of gasoline it sells, while Federal and State Governments take an average of 40 cents in taxes for every gallon sold. The ExxonMobil press release went on to say:

"Since the end of World War I, inflation-adjusted gasoline prices have steadily declined, interrupted only by a few peaks and valleys. Through the end of World War II, when average real incomes for Americans were much lower than they are today, gasoline prices varied between $2.00 and $2.50 per gallon ($1999). The price then dropped steadily to about $1.50 per gallon before the oil shocks of the 1970s and early 1980s drove prices temporarily higher, peaking at over $2.50 in 1981. The lowest gas prices of the period occurred in 1998, when low crude prices drove gasoline near, and in some parts of the U.S. below, $1.00 per gallon. Prices have moved up sharply in 2000, but from a very low level and continue to be below historical levels.

The declining price of gasoline has contributed to the growth of our standard of living over the years. In 1966, the average American family spent each year a total of about $35,000 (in $1999), of which about three percent went for gasoline. Today, the average American family spends over $60,000 each year, with only two percent on gasoline. Over the same period, the vehicle fleet (cars, vans, light trucks and SUVs) increased from 91 million to over 200 million, and the average number of miles driven annually per vehicle rose from 9,500 in 1966 to almost 12,000 today. With vehicle efficiency improving from about 13.5 miles per gallon in 1966 to nearly 20 mpg today, the average cost of driving one mile has fallen from over 12 cents in 1966 to about six cents in 1999. Recent gasoline price increases have brought that cost back to only about seven cents per mile.

In its October, 2000 Energy Report, the EIA said that "Regular unleaded, self-service retail motor gasoline prices hit their highest monthly level ever, in nominal terms, averaging $1.63 per gallon in June. Still, in real terms (adjusted for inflation) that price was about 40 percent lower than the price experienced in March 1981.

Motor gasoline demand has increased 28% from 6.58 MM bbl/day in 1981 to 8.47 MM bbl/day, despite conservation efforts.

BALANCE OF TRADE DEFICIT

The largest component of the projected 2000 foreign trade deficit of $387 billion is imported crude oil and refined petroleum products. In 1973, at the time of the Arab Oil Embargo, the United States imported 35% of its petroleum requirements. That figure now stands at 56%.

The EIA estimated total 1999 oil imports at $66.9 billion. This year that bill will be significantly higher.
INVESTMENT CONSIDERATIONS

According to the Financial Reporting System, the 23 largest producers reported an average return on assets of just 5.4% over the 12-year period from 1986 through 1997. During the past decade, the average oil industry return on capital employed has been only a meager 7-8% due to low commodity prices.

The December 1999 National Petroleum Council study concluded that the growth in natural gas demand will require funding of approximately $1.5 Trillion (in 1998 $). This includes $700 billion for operating expenses, and $658 billion dollars in upstream capital expenditures from 1998 through 2015. This latter figure includes all exploration, development, production, and gathering capital expenditures. In order to satisfy supply growth an increased annual average capital expenditure of $39 billion per year is required from 1999 through 2015, versus an average of $27 billion from 1991 through 1998. However, these needed levels of investment will take place only if investors have confidence that competitive rates of return will be earned.

REASONS FOR DECLINE IN DOMESTIC DELIVERABILITY AND RESERVES

1. Low and volatile commodity prices have discouraged investment.
2. Low return on petroleum investment compared with other economic sectors.
3. More attractive alternate investment opportunities for private capital (stock market).
4. Access denied to most prospective exploration areas on environmental grounds.
5. Onerous regulatory disincentives.
6. Tax disincentives.

ARCTIC NATIONAL WILDLIFE REFUGE (ANWR)

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This information was compiled by G. Warfield “Skip” Hobbs, 1999-2000 President of the AAPG Division of Professional Affairs. Please send any corrections and/or additions via e-mail to Skiphobbs@ammoniteresources.com.