Alaska Oil Production in Perspective

By Dr. Charles Logsdon

The discovery of the Swanson River oil and gas field on the Kenai Peninsula in 1957 marked the beginning of the oil era in Alaska. Alaska became a state at about the same time. In many ways, the maturation and growth of the Alaskan economy mirrors the growth in oil production since that time. Figure 1 illustrates the oil production curve for Alaska compared to State employment since 1958.

By 1962 the Swanson River field was producing nearly 30,000 barrels of oil per day (Table 1). With the discovery of oil offshore in Cook Inlet and the installation of production platforms in the mid 1960s, the Middle Ground shoal field, the Granite Point field, the MacArthur River field, and the Trading Bay field together brought production up to over 200,000 barrels per day. By 1970, Alaska had become a significant oil producer and the oil industry was already contributing over 20% of the revenue coming into the State treasury.

The discovery of the super giant Prudhoe Bay field in 1968 suggested the real potential of Alaska as an oil producer. Over $900 million was spent in the 1969 state lease sale of the remaining tracts in the Prudhoe area. However, it would take the Arab oil embargo of 1973 to spur congress to pass legislation enabling the construction of the TransAlaska Pipeline System (TAPS) to move oil from Alaska's North Slope to Valdez for shipment to lower 48 markets.

TAPS was completed in June of 1977 at a cost of over $9 billion, making it the largest privately financed construction project ever undertaken. Oil production from Prudhoe Bay commenced June 20, 1977 and averaged 580,000 barrels per day that year. Production grew until the Maximum Efficient Rate (MER) established by the Alaska Oil and Gas Conservation Commission of 1,500,000 barrels per day was achieved in 1980.

High oil prices in 1980 and the decontrol of domestically produced oil prices spurred development of the giant Kuparuk River oil field 30 miles west of Prudhoe Bay. The completion of the Kuparuk pipeline in 1981 brought this field into production at 80,000 barrels per day. Kuparuk production was developed in three phases. The third phase completed in December 1987 brought production up to 300,000 barrels per day.

The Milne Point field north of Kuparuk came into production in late 1985 at roughly 20,000 barrels per day but was shut in when the collapse of oil prices made production unprofitable.

The Lisburne reservoir which underlies Prudhoe was brought into commercial production in 1987 and is currently producing at a rate of 45,000 barrels per day. The Endicott field which just began production has a target production rate of 100,000 barrels per day.

Barring new discoveries on the Alaska North Slope, oil production in Alaska will probably peak between now and 1990. In the event that no

Figure 1
new sources of oil are discovered, it is anticipated that one-half as much oil will be produced in Alaska in the year 2000 as is currently being produced. It might be pointed out that one-half of current production (900,000 barrels per day) is still a significant amount of oil—roughly the current production quota for the OPEC country Kuwait.

If Alaska were a country it would be the world’s seventh largest oil producer with 1986 production of 1.855 million barrels per day. Only two countries in OPEC produced more oil than Alaska did in 1986, Saudi Arabia and Iran. The USSR, the lower 48 U.S., the United Kingdom, China, and Mexico were the only non-OPEC countries with more production than Alaska. Alaska accounts for 21% of the total oil production in the U.S. and roughly 3% of total world production. Table 2 presents information on world oil production and reserves for 1986.

Alaska accounts for only one percent of total world oil reserves and roughly one-third of total U.S. reserves. The relationship between Alaska reserves and production suggest that Alaska
reserves are being depleted at a much faster rate than is the case for most countries.

There are two reasons for this. First, the Prudhoe Bay oil field is highly productive. The average well at Prudhoe produces at a rate of 2,800 barrels per day compared to the U.S. average of around 400 barrels per day. Second, most oil production worldwide is controlled by the governments of the producing country. Production rates are controlled to promote the oil price policy of the producing countries and also as an instrument for controlling economic growth. By contrast in the United States private companies determine production rates in response to market forces constrained only by regulations designed to promote maximum production through sound conservation practices.

With respect to production control, all of the OPEC countries produce at less than capacity to support the price structure agreements setup under the cartel production and pricing accord. Even producing at capacity, only four OPEC countries would have produced more than Alaska did in 1968. These comparisons illustrate in dramatic fashion just how large and productive the Prudhoe Bay oil field is.

The other important implication of the information contained in Table 2 is that of the 8.8 million barrels per day excess capacity which exists in the OPEC countries, Saudi Arabia accounts for 3.6 million barrels per day or 40%. This illustrates dramatically the potential supply side leverage the Saudis have in affecting OPEC pricing policy. This is why the Saudis have found themselves in the role of swing producer to enforce cartel pricing agreements. That is to cut production when oversupply in the market weakens price and to increase production to correct shortages or discourage production quota cheating by other cartel members.

Interestingly Iran is the OPEC country with the second largest share of 1986 OPEC excess capacity. This underlines the importance of the need for cooperation between Saudi Arabia and Iran in managing the cartels over-

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Unfortunately, looking at the situation as it occurred in 1986 doesn't tell the whole story because oil is a depletable resource which must be replaced by new discoveries over time if future production is to be maintained. In other words, capacity must be expanded and reserves replaced.

In Alaska this means replacing Prudhoe Bay which will begin to decline by 1990. So far new discoveries of oil in Alaska have come no where near replacing the 5.5 billion barrels of oil already produced from the Prudhoe field. This is not to say that they can not be replaced since billions and billions of barrels of oil are known to exist in the ground on Alaska's North Slope in reservoirs such as the Ugnu and West Sak not to mention in Prudhoe Bay itself. The key is the cost to produce that oil and under current technology most of this oil cannot be profitably extracted.

In contrast much of OPEC's additional capacity can be extracted from the ground at very low cost. Table 3 presents estimates of the cost of adding to capacity in the OPEC countries.

The information contained in this table has two important implications for Alaska. First, because the cost of developing and producing oil in the OPEC countries are so low relative to world oil prices, there will always be the tendency for the OPEC members to produce in excess of that amount which would keep price at high levels. This implies that it is more likely that prices will continue low, say below $20.00 per barrel.

Since these cost estimates are for capacity expansions in 1995 the further implication is that the long term prospects for large price increases is small. Prices in the $20 per barrel range make investment in high cost areas like the West Sak Sands or Ugnu questionable.

Alaska's greatest hope of replacing Prudhoe, if prices remain at current levels over time, is new large discoveries. The geologists tell us that the underground structures capable
of holding large accumulations of easily recoverable oil have largely been explored. The major exception are those structures located in the Arctic National Wildlife Reserve (ANWR) and the Outer Continental Shelf (OCS).

The second implication of Table 3 is that reserves may be added much more cheaply elsewhere than in Alaska (barring the discovery of another Prudhoe Bay sized field). This implies that Alaska will continue to suffer cost disadvantages in attracting investment for reserve additions. This raises interesting questions about the behavior of the companies who own the production from Prudhoe Bay. What are these companies doing to replace this asset as it is depleted? Are they reinvesting the profits from Prudhoe Bay back into Alaska? What is the state itself doing to encourage investment in Alaska production?

Figure 2 illustrates the ownership of 1986 Alaska North Slope production. The four major owners are Standard Oil Production, ARCO, EXXON, and the State of Alaska through its royalty interest in production. Table 4 summarizes the dependency of each of these three major companies on Alaska for their oil reserves.

Standard Oil Production is now a wholly owned subsidiary of British Petroleum (BP). Alaska oil now represents roughly one-half of the oil reserves of BP. Some of the revenue generated by the prolific Prudhoe Bay field will obviously be used to pay for this major acquisition. Standard will for some time continue to produce the largest amount of oil in Alaska. The company has a significant stake in all the current producing North Slope fields and the Trans-Alaska Pipeline in addition to being the operator of the Endicott field. As a result, Standard Oil Production has developed considerable expertise in Arctic oil production. It is not yet clear, however, what their acquisition by British Petroleum means for further investment in Alaska.

ARCO in press releases and in briefings with securities analysts has made a public commitment to continued investment in development of existing oil reserves in Alaska. The company has restructured to emphasize its position as a West Coast oil refiner/marketer. ARCO is Alaska's largest private employer. It appears that the company will continue to be an aggressive investor in Alaska.

EXXON has in the past drilled and participated in the drilling of numerous exploratory wells in Alaska, most recently in the Norton Sound. Like the other major Alaska producers, EXXON owns a large number of leases on the North Slope known to contain recoverable hydrocarbons and is a participant in all of the cur-
Figure 3
Predicted Oil Production for Alaska 1987–2012

Most oil-producing states are losing employment and population.

The Oil States—How Does Alaska Compare?

By Neal Fried

A short time ago Alaska and the other oil producing states in the U.S. basked in prosperous, fast growing economies. These states played host to thousands of economic refugees who had migrated from recession-torn states during the 1970s and early 1980s. There was a feeling of invulnerability in the oil patch.

Today the situation has changed. Most oil-producing states are losing employment and population; their unemployment rates are among the highest in the nation; and their incomes are falling or are below the national average. Meanwhile much of the rest of the nation is experiencing one of the longest stretches of uninterrupted growth in post-war history. If company provides comfort, Alaska has a good deal of it as it experiences today’s economic woes.

Alaska’s economic performance during the recent decline is comparable to four of the five largest oil producers in the nation—Texas, Louisiana, Oklahoma, and Wyoming. California, the nation’s fourth largest oil producer, is excluded because its oil industry represents only a fraction of that state’s tremendous economic might. California’s overall economy has actually benefited from lower oil prices. The remaining oil states are at different stages of economic diversification, but the oil industry still reigns king.