

STATEMENT OF RICHARD D. MORGENSTERN  
CONGRESSIONAL BUDGET OFFICE  
BEFORE  
THE COMMITTEE ON ENERGY AND NATURAL RESOURCES  
SUBCOMMITTEE ON ENERGY CONSERVATION AND REGULATION  
UNITED STATES SENATE  
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Mr. Chairman, I appreciate this opportunity to appear before the Committee on behalf of the Congressional Budget Office to discuss the pricing of Alaskan North Slope Crude oil.

In the paper we prepared for your recently published volume, "The Pricing of Alaskan North Slope Oil," we noted that various decisions on this subject will have far reaching economic impacts. The question of the entitlement treatment to be accorded North Slope oil is especially important. Decisions on this and other price related issues are likely to involve the disposition of many billions of dollars over the life of the North Slope oil fields. They are also likely to affect both the extent and timing of oil ultimately recovered from the Alaskan North Slope. The fact that the deliberations on Alaskan oil pricing are taking place while a new national energy plan is being considered makes the decisions all the more difficult.

Before proceeding with these issues, I will pause to offer the customary explanation of the work of the Congressional Budget Office. As established in the Congressional Budget and Impoundment Control Act of 1974, the CBO provides nonpartisan analysis of economic and other issues that come before the Congress. Thus, in keeping with CBO's mandate, my statement today contains no recommendations.



I will address several issues in my remarks. First, I will summarize the basic findings of our original paper. Second, since some of our computations were incomplete at the time the original paper went to press, I will, in accordance with our original understanding, take this opportunity to update those results. Basically, our new computations, which were performed for us by Mortada International, confirm most -- but not all -- of the conjectures contained in the original paper. Finally, in the context of our findings, I will address certain questions about criteria to use in evaluating the risks of oil exploration and in determining an equitable rate of return on the investments.

#### REVIEW OF ORIGINAL FINDINGS

The findings of our original paper can be summarized as follows. In analyzing the President's April 15 Report to the Congress, we found that over the 1977-81 time period, wellhead revenues would be \$5.54 billion more with foreign entitlement treatment -- which adjusts revenues to prices paid for foreign oil -- than with upper-tier entitlement treatment, which adjusts revenues to the lower prices paid for new domestic oil. . Over the entire life of the Prudhoe field, foreign entitlement treatment would yield as much as an additional \$30 billion or more in wellhead revenues compared to the upper-tier entitlement treatment. Other computations indicated slightly higher wellhead revenues if the West Coast surplus Alaskan oil went to Japan in exchange for Middle Eastern oil now going to Japan, and still higher wellhead revenues if foreign flag vessels were used to transport the oil to Japan. These additional wellhead revenues would be divided in the following way: approximately one-fourth to the State of Alaska in the form of taxes and royalties, and approximately three-eighths to the producers in the form of additional after tax profits, and a like amount to the U.S. Treasury in tax revenues.



Turning to the question of future Alaskan development, we used the Mortada analysis to estimate costs of producing oil from the two as yet undeveloped reservoirs adjacent to Prudhoe -- Lisburne and Kuparuk. Since these estimates are drawn entirely from the data put together by Dr. M. Mortada, whatever shortcomings are associated with these data apply to our estimates as well. Nonetheless, after accounting for the reduced transportation costs associated with the additional oil, we find that the added cost of obtaining the lower reserve estimates from Lisburne and Kuparuk ranges from \$1.50 to \$1.75 per barrel above the cost of Prudhoe oil.

Regarding the methodology of the Mortada paper, we found that, when the real after-tax return used by Mortada is converted to the more familiar rates of mortgages and bank deposits (technically, the before tax nominal return), his 12 percent annual yield rises to a level of 28 to 30 percent per year.

I will defer comment on the interpretation of this rate of return until a later section of my testimony.

#### NEW COMPUTATIONS

In the original paper we raised the possibility that, since some firms engaged in North Slope oil exploration in the late 1950s and early 1960s may have dropped out of the search for oil before the big discoveries, the inclusion of their costs in the rate of return calculations might tend to understate the actual return received by the producers. Our subsequent analysis indicates that very few firms that engaged in significant exploratory activity withdrew before the large oil deposits were found. Our estimate is that a very small percent of the funds invested in exploration were made by firms that are not now



party to the Prudhoe agreements. Thus, Mortada's use of total industry expenditures, rather than only the expenditures of the so-called "winners," is entirely legitimate. Separating the winners from the losers -- for which the data were not readily available -- would not have changed Mortada's results by a significant amount.

The other conjecture we made in the original paper, and on which I can now report new information, is the matter of separating the rate of return on field operations from the rate of return on the pipeline -- the latter, of course, is regulated by the Interstate Commerce Commission. Our new computations support the view that separating the two investments raises the calculated return on the field investment. The increase in the return, however, is relatively slight. Thus, our initial reservation about Mortada's procedure in this regard may have been excessive.

In the case where no adjustment is made for exploration risk, the return on the field investments rises by about 2 percent above Mortada's original estimate -- to approximately 16 percent per year -- when the field and pipeline investments are distinguished. When Mortada's procedure for adjusting of exploration risk is incorporated into the analysis, the rise in the rate of return is only about one-half of one percent per year. That is, whereas Mortada originally showed a real after tax rate of return of about 12 percent per year for the combined pipeline and field investments (after adjusting for risk), our new computations find that the comparable rate of return on the field investments alone rises to about 12-1/2 percent per year. In the terms of the more familiar interest rate terminology used on mortgages and bank deposits, the increase in the rate of return is approximately twice the increase in the real after tax rate, or about 1 percent per year.





## RISK AND THE RATE OF RETURN ON INVESTMENT

In the attempt to determine an equitable rate of return on Alaskan North Slope oil, two questions come up again and again:

- o What is the degree of risk involved in Alaskan oil exploration, and
- o What is the appropriate rate of return concept to use?

Let me see if I can shed some light on these questions.

Probably because of the difficulty in quantifying it, the question of risk has been widely debated. No one has quarreled with the idea that oil exploration is a risky business. And no one has quarreled with the idea that the rate of return on successful fields must be high enough to cover the losses on unsuccessful ones. What is at issue is exactly how much risk is involved in the Alaskan venture. The producers claim it is very risky; one producer, in fact, suggested that the odds of finding oil in commercial quantities ranged from one in ten to one in 50.

One problem with such statements is that they confuse the odds of success for individual wells with those for an entire field. And more important, they neglect the incremental nature of decisions to explore for oil. In 1958 the producers did not make a decision to commit \$120 million in the search for oil in the Alaskan North Slope. Rather, they began slowly, investing approximately \$1 million in lease bonus and rentals in 1959 and a similar amount on geological and geophysical services in that year. Records indicate that they spent another \$1 million on lease bonus and rentals in each of the next two years and



it wasn't until 1962 that they invested another \$3 million in geological and geophysical services. Significant amounts of drilling did not begin until 1963 -- and, in fact, only \$1 million was expended in that year.

The point here is that the decisions were made on an incremental basis and only after the results of the previous investments were studied. Thus, even if it is true that the odds of finding commercial quantities of oil were one in 50 in 1958, it is equally true that the chance of losing one's money decreased as more information was obtained. The relevant statistic is not the initial risk, but the average risk over the investment period -- actually, the risk weighted by the level of investment made at each stage. Especially since the amount of money increased in the later years of exploration, the average risk was considerably lower than the initial risk.

In addressing the rate of return problem, considerable confusion exists regarding the appropriate concept to be used in analyzing the Alaskan North Slope investments. In my view, there is no doubt that the real after-tax rate of return (the one used by Mortada) is technically correct. It is widely used by professional economists and is an accepted standard in the professional literature. The problem is that persons not formally trained in economics may equate the real after-tax rate with the commonly used interest rates on home mortgages, bank deposits, and Treasury and corporate bonds. As noted in our original paper, such a comparison is inappropriate because it confuses the effects which taxes and general inflation have on the rate of return calculations. When viewed in the framework of common financial instruments, Mortada's 12 percent real after-tax return rises to a rate of 28 to 30 percent



per year. And when the pipeline investment is separated from the field investment, the return on the field investment rises by another 1 percent or so.

Thus, in sum, the problem is not really which rate of return concept is correct, but which is more easily understood. As long as one is fully aware of the correct basis of comparison, either rate of return concept can be used.

Thank you.

