

partments of the government will also affect oil shale industry development, and I will mention one of them specifically in the course of these remarks.

Before turning to a discussion of the merits of the questions of leasing policy which are raised by the matters which have been excluded from, and those which have been included in, the Proposed Regulations, I would like to review with you briefly some of the facts concerning the oil shale industry, its reserves and technology, which we think are relevant to the formulation of the policy. Let me apologize in advance for repeating much that is very likely already obvious to you.

THE NEED FOR SHALE OIL

The first and most evident fact is that there is not today shale oil production in the United States on a commercial scale. This fact leads inevitably to the consideration of the additional facts which can provide an answer to the question whether there ought to be such commercial production. Any formulation of Federal leasing policy concerning the public domain reserves must take into account the answer to that question.

We think that domestic shale oil production is not only desirable but necessary; and in the light of the status of domestic petroleum supplies it has been too long delayed. This was the view of my company in 1957, when it commenced pilot plant operations. The evidence of a deterioration of the domestic crude oil supply position which has accumulated since that time is extensive.

Out of the maze of petroleum statistics, we have set out some of the evidence in Appendixes A and B, which are attached to this Statement. In general, our source has been the American Petroleum Institute-American Gas Association annual survey, and the Bureau of Mines reports.

The relevant facts are these: Demand for liquid petroleum, which in 1966 reached just over twelve million barrels per day, has been steadily increasing at an average of more than 3.5% per year for the past twelve years, and shows no sign of tapering off. (Appendix A—Table 1) However, drilling costs per foot have been steadily rising, the depth of wells has been steadily increasing, and in 1966 the amount of exploratory drilling hit its lowest point since World War II. (Appendix B—Tables 1-3)

As a result of increasing demand and decreasing finding rate, net additions to proved liquid petroleum reserves had practically ceased to exist by 1957, and no significant net addition has occurred since 1959. In the ten years from 1956 through 1966, four years saw declines in net reserves, one saw no increase, and only one, 1959, saw an increase of more than 3%. (Appendix A—Tables 2-3)

When these patterns are projected forward to 1980, the prognosis for domestic petroleum supplies is poor. Liquids demand will have by then reached at least seventeen million daily barrels, or about six billion barrels annually. Even if proved liquid reserves could be maintained in the face of increasing demand by a steadily increased finding rate, the present 39.7 billion barrels of total proved liquid petroleum reserves would in 1980 represent under seven years supply.

But, there is no indication that such a steady increase in finding rate is likely to occur; instead, the opposite seems probable. The amount of oil which would have to be added in order to maintain proved crude oil reserves at their present levels through 1980 is approximately equal to the entire amount of crude oil (80 billion barrels) which has been produced to date in the entire history of the United States domestic petroleum industry. Such a goal is more than merely ambitious.

In summary, it is apparent that if we rely, as we now do, upon conventional domestic sources to satisfy about 80% of our liquid petroleum demand through 1980, we will, by that time, be plainly deficient in liquid petroleum by any standard we have until now used to test petroleum supplies. (Appendix A—Table 4)

This is not our conclusion alone. The same conclusion has been voiced in recent months, not without alarm, and with surprising unanimity, by many distinguished Government and industry figures.

Apart from turning to oil shale, and other unconventional sources, there are three obvious means of reducing the rate at which our liquid petroleum sources are waning.

The most obvious is an increase in economic incentives to exploration. However, putting aside the substantial questions of policy affecting increased economic incentives from the public sector, there is, as I have said, little indication that even substantially increased exploration investment could really meet the needs of steadily increasing demand. A second obvious method of improving the projections is to divert demand from petroleum to other elements of the energy