

That takes me to the other set of facts that I would like to mention to you, the status of the oil shale industry as we see it today.

First, as to the state of the technology. The technology needed for commercial shale oil production is not merely the retorting technology required to heat the oil shale, to produce condensible and noncondensable vapors yielding liquid and gaseous petroleum. It is true, of course, that a retort must be employed to produce the necessary vapors, which are then converted into the petroleum product.

However, before that material can be retorted, it must be obtained by a mining operation, and a mining operation on an unprecedentedly large scale. And when the product is obtained it must be treated, or properly crushed to appropriate size. Having been crushed, it is retorted and the valuable products of retorting are collected, but the remaining material, as much as 90 weight percent of the original feed, must then be disposed of consistently with contemporary high standards of the purity of air and streams.

The oil should have nitrogen and sulphur in substantial quantities removed from it to make it suitable for ordinary refinery work. And waste disposal and treatment of the oil are component operations in the costs for shale oil production.

In 1964, we joined with an experienced mining company and an oil company to establish definitively the operability and economics of a TOSCO developed system for shale oil production. The results of that work are now substantially all in hand.

The feasibility and costs of mining the material have been established to a high level of certainty, and while within original projections, notwithstanding adjustments in the national economy in the intervening years, a development mine has been and is being operated, and more than 500,000 tons have been mined to date.

In June 1965, the three companies completed construction of a semiworks retorting facility designed to operate at 100,000 tons per days of rock throughput. The plant represented a design scale-up from pilot plant operations carried out by TOSCO from 1957 onward of 24 tons per day. The semiworks retorting operation, originally scheduled for completion early in 1966, encountered difficulties associated both with the problems of joint management and of the initial operability of the facility.

As a result, in September 1966, TOSCO assumed sole operating responsibility for the plant. Since that time, albeit well over a year behind schedule, the objectives of the retorting and shale disposal operations have been met. The process, called the TOSCO II system, operates continuously and yields about 105 volume percent of the so-called modified Fischer Assay, and continuing operations indicate further improvements.

The oil is produced substantially free of solid sediments and well within original specifications. The plant is mechanically reliable and simple to operate. Spent shale disposal operations have been achieved consistent with high standards of air and stream pollution control and the preservation of wilderness and wildlife. The current operating program, which is devoted to further process organization, is nearing completion.

I would like to supplement the remarks on regrowth that were made yesterday. We have been in the business of producing spent shale a lot