SYNTHETIC FUELS: PAST PERFORMANCE AND FUTURE PLANS

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My subject is Synthetic Fuels: Past Performance and Future Plans. This is broad enough to encompass this entire conference, so obviously my remarks will hardly be comprehensive. It is also interesting to note that this subject leaves out the current, here and now. I might offer that this seems to be characteristic of the business aspects of our industry -- dwelling on the past and making mathematic accurate and glorious projections for a future always further away than the construction time for a plant.

The past performance of synthetic fuels should be obvious to all of you by this time. It has been described in every synthetic fu conference for the last 10 years; but in spite of that, conclusions vary and still depend on the point of view of the observer. Maybe it is easier to distinguish between past performance of synthetic fuels abroad on one hand, and in the U.S. on the other. Abroad here means quite specifically three countries, Germany, South Africa and Canada. I don't need to detail the operations in these countries, but in summary, Germany produced over half of its liquids at the outset of World War II, South Africa is expected to produce 60 percent of its transport fuels by 1985, and Canada, today, produces ten percent of its crude.

But an equally important story is that of the United States. Here, as in most other countries, the synthetic fuels industry actually preceded both the natural gas and crude oil business. The U.S. had a major synthetic fuel operation in manufactured gas, which dominated the gas business in the Eastern U.S. for something approaching 100 years. It was displaced by the natural product which was a better fuel and much cheaper.

What is the lesson learned from all of this?

First, I would think the established fact that, under proper conditions, private enterprise can and will enter the synthetic fuel business. It is not necessary for the government to do this.

Second, economic driving forces must be adequate. In the early 1920's the ratio of gasoline to coal price was about 8 to 1, that set the German synfuels in motion. Incidentally, that corresponds to something like western coal at $18/ton or $1.0/MMBTU or $1.00/gal. of gasoline, which is roughly where we are today.

On the gas side, some new deregulated gas prices have reached the $8.00/MMBTU level, and here again the SNG cost is not far away. In fact, if we had built synthetic plants like the one American Natural Resources is now building in North Dakota some five years ago when they were first proposed, the SNG price from these plants would be closer to $5/MM today, a very acceptable price level.

It seems, however, that an 8 to 1 price spread, which was enough to start synthetics in the twenties does not seem to be quite enough today. It almost seems as though we are losing ground. The problem is compounded, of course, by the fact that economics are not based on today's supply/demand and prices, but on those projected five to ten years hence.

Let me digress here for a moment and scotch the idea that technology will solve this problem. New technology, in our view, will be very important in broadening the choice of feedcoals and keeping competition among suppliers of technology, but no economic breakthrough or major cost reduction is in sight anywhere for either gas or liquid synthetics.

What then will be the future of synthetic fuels?

Official, semi-official and private forecasts abound. I will not bore you with another one, but in general recent ones are more sanguine. The current drop in energy demand and recent oil price softness will possibly reduce the interest in synthetics. But one can certainly argue that as a backstop, the U.S. should have the technology ready. Now, what the word "ready" means is what all the talk is about. It is certainly more than a laboratory test or pilot plant capacity. To be credible it must be commercial capacity in place and operating. But how much and what kind?

Actually, some production of synthetics is already in place -- ethanol from biomass -- but we must recognize the enormous subsidy which has been put into place to bring it about. The ethanol program is more a subsidy for agriculture than for energy supply. It is essentially a political issue.

As to the fossil synthetics, let's look at shale and then coal. The shale problems are quite obvious. Maybe the biggest is the high cost of infrastructure. Just how many big shale projects can the Piceance Basin absorb over a ten to twenty year period. We don't know whether there really is a problem until two or three big plants are running.

Also, oil shale involves "first-of-a-kind" technology all the way from mining to retorting to refining. Prudence suggests a slow stepwise development which will take time, but this development will surely proceed and there are several competitive schemes in the offing.

Strip-mining greatly reduces the mining risk, and some retorts have been tested up to the 1000 ton per day level. Extrapolation over the remaining 5 to 8 fold range should be acceptable, but in handling solids, any extrapolation remains a risk. But by the end of the decade shale oil production should be commercial. How many barrels per day is hard to tell at this time.

In a simple way, shale is an extension of our domestic oil resources as, incidentally, are heavy oils or tar sands which will certainly receive increased attention over this same period. I should point out that synthetics will be preceded, or at least accompanied, by a general shift of stationary energy users toward solid fuel or even to gas with an appropriate increase in the yield of high grade transportation fuels from every barrel of crude oil. This will require substantial upgrading of our refineries, including hydrocracking. This, too, is a synthetics industry in its broadest sense.

All these measures will reduce our need for imports which is, after all, the name of the game. We are already down to 5½ million barrels per day, and this should continue to shrink.

All this leaves to coal the job of filling the final gap, if any, for both gas and liquids. No one has a clear answer whether such a gap exists, or how big it will be in the future. You can get just about any answer you like. Recently I found two very erudite studies on my desk -- one predicted zero room for synthetics from now until the year 2000 -- the other predicted 3 million barrels per day; that certainly brackets the range of forecasts.

Three million barrels per day is no little task. Based on an arbitrary standard size of 50,000 bd, that implies 60 synfuel plants costing around $5 billion each, that's $300 billion of total investments, or some $20 billion put in place every year if we start in 1985.

But there are a few other dimensions to this problem. Who will do it? How many corporate entities can manage these $5 billion jobs? That is to conceive, engineer, finance, build and operate them? If there is a limit to the synfuel business, this is certainly one of them.

There is one possible out; make the initial projects smaller. But there is a lower limit here, not an absolute one, of course, but it is not easy to see projects with much less than 10,000 barrels per day of equivalent capacity. That might bring investment down into the $1 billion range. Even at this size we are limited to a small group of companies who can execute this size project. The job cannot be done without their involvement.

We have seen a profound change in the government's stance in synthetics. From a major position in the establishment of a synfuel industry based on centralized control of all facets, we have now a clear backing away and mainly reliance on market forces and possible tax policies to induce the private sector to take the tremendous risks on these plants.

As a result, there will be a change among those who will play in this game with major emphasis on the largest energy companies who are somewhat more used to taking billion dollar risks.

I should comment also on the status of coal conversion technology --its past performance and future outlook. Taking the word "performance" quite literally, I can think of only three synthetic liquid plants with any real extended record of operation: Leuna, the base plant of German hydro-technology, ran from 1927 to 1945, 18 years. Of course, the shutdown was not related to plant performance! Then there is SASOL I, with over 25 years of operations with the original equipment. And then there is Brux in Czechoslovokia; it should now have operated 40 years, but access to it is limited and so one cannot say much about equipment life.

But there is certainly no doubt about the long life of the many manufactured gas plants in the U.S. and elsewhere which ran during the first half of this century. They performed well for a long time. All in all, one should not have to worry about life of equipment in synfuel plants if they are well designed; they can be relied to work with assurance.

As to performance in terms of process efficiency, I have already expressed the opinion that there are no breakthroughs on the horizon. But there should be steady improvement of an evolving type; higher pressures, bigger equipment, better heat recovery -- by changing a process step here, a piece of equipment there. That is the history of any established technology. The fundamentals of converting coal or shale to gases or liquids remain the same as those which have been used for over fifty years. Much of the improvement will come about only if a synfuel industry is in being.

With respect to process selection, we must remain flexible. In the end let the market make the decision. There is room for a variety of processes, and with the great range in coal quality we have in the U.S. reserves, there is bound to be wide divergence of preference for technology among the operators of synfuel ventures. Nor is there agreement on which is the right product to make, except perhaps in the case of shale. Unanimity of view is not apparent, and that is a good thing. If you want to make some guess as to the coming technology, you may want to draw some conclusion from the choices of the 63 projects which were proposed to the SFC this spring.

One difficulty in forecasting future plans for synfuels stems from the unfortunate instability in energy policies which seem to characterize the U.S. scene.

There is no way to embark on a synfuel venture without some certainty, at least in the mind of management, that the future supply, demand, costs, prices and government policy are predictable within a reasonable range. The size of these ventures is simply too big to proceed otherwise.

There may be bubbles of gas or gluts of oil from time to time, and there can be shortages. We have seen both occur over a time span much shorter than the time required to create a synfuel plant from design to operation. One simply cannot change synthetic

fuels plans and programs in tune with these short-term events; there has to be a consistent position. It would seem to me that the basic policy of the U.S. should not be to gamble with the energy supply of this country. It is no great crisis if we have a temporary excess of supply. We can always keep production down. But it is a crisis, if we are short. We should err, if at all, on the side of abundance.

The cost of such an error, if that is what we call it, must be equitably distributed and that may be the Achilles Heel of synfuels. If synthetics are indeed more costly than natural energy sources, then who pays the bill?

One way to handle it is, of course, to keep the bill small. Build initially on technologies which are well demonstrated and which are sure to work. Build them as small as economically possible and, where the product is gas, roll in the price with the enormous volume of natural gas which makes up the mainstream of supply.

Where the products are liquid, the government price guarantee does effectively spread the extra cost over all taxpayers and that is one concept that may be used. Another would be more rapid depreciation which could bring the price down to competitive levels and spreads the cost over all taxpayers.

We should recognize that improved tax treatment for synfuels is in the national general interest and not necessarily an additional cost. It seems obvious to me that the nation would be better off to forego potential tax revenues in order to stimulate an industry which would put miners to work, use American equipment and engineers and labor, and back-out a dollar drain to OPEC.

After all, synthetic fuels can be viewed like the Strategic Petroleum Reserve which has encountered little objection. It is a extraneous added source of fuels which will initially probably

cost more than the normal market. But they may, in the end, cost less; or their very existence might keep the market price of imports restrained.

If this point of view is adopted by the government and by the key players in this high-stake gamble, we will indeed have a synthetic fuel business. Personally, I am bullish enough to believe that we will and my company has committed substantial resources toward that end. We intend to pursue the production of synthetics from shale, coal and heavy oils cautiously, but consistently, as a proper target for a diversified supplier of energy.

Thank you.

JMc/db