PIRINC

Telephone: (212) 867-0052
Fax: (212) 972-9849

Petroleum Industry Research Foundation, Inc.

122 EAST 42nd STREET

New York, N. Y. 10168

You may be interested in PIRINC's supplemental submission to the Senate Energy Committee . . .

July 8, 1992

The Honorable J. Bennett Johnston
Chairman
United States Senate
Committee on Energy and
Natural Resources
Washington, DC 20510-6150

Dear Senator Johnston:

As per your letter of June 16th, I am sending you herewith the answers to 4 of the 6 questions you asked as a follow-up to the Hearings held by the Energy & Natural Resources Committee on May 19th, 1992. The questions we selected are those on which we believe we can make a contribution.

I appreciate the opportunity to testify before your Committee and am at your or your staff's disposal for any further information you may require.

Sincerely,

John H. Lichtblau
Chairman

JHL:cr
Encl.

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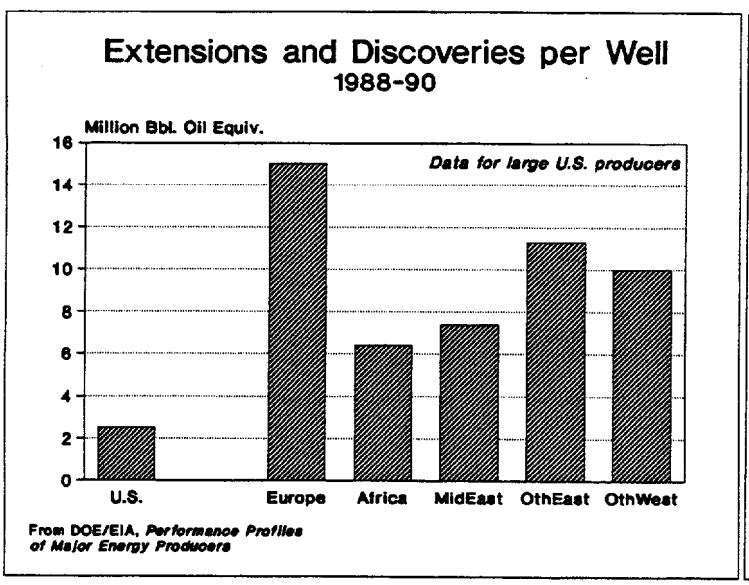
ANSWERS TO SUPPLEMENTAL QUESTIONS ON THE REFINING INDUSTRY

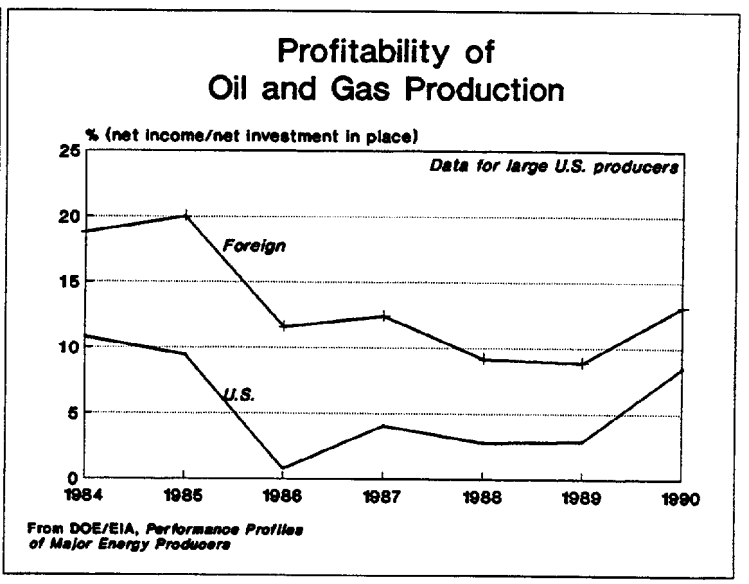
FROM SENATOR J. BENNETT JOHNSTON

1. Will refineries move overseas?

Refineries are unlikely to follow the overseas migration so clearly evident in the exploration and production segment of the petroleum business, because the causative forces are different:

- Exploration and production activity has moved overseas because the U.S. is the most densely explored and intensely developed area in the world. The best U.S. frontier prospects, the Outer Continental Shelf and the Arctic National Wildlife Refuge, are blocked from exploration. The existing fields, especially in the Lower-48, are mature, their production declining and the finding rate per well drilled is substantially lower in the United States than in most other major prospecting regions. (See the following figures, which illustrate the finding rates per well and profitability of investment in place for U.S. and foreign areas.)





The shift from U.S. to foreign investment in the upstream sector is evidenced by annual expenditure data, i.e., where the new investments are going. Even the new emphasis, however, does not mean that U.S. companies have abandoned their existing producing assets in the U.S. Likewise, the refining sector will, within limits, continue to operate its considerable U.S. investment in the future. In fact, most companies have committed additional funds for upgrading facilities and product quality. U.S. product specifications are the most stringent in the world for gasoline. Middle distillate standards are tightening in Europe as in the U.S. Like those in the U.S., foreign refineries cannot meet gasoline and distillate specifications without upgrading programs. Thus, while foreign refineries have a competitive edge because they do not have to meet the U.S. facilities standards, they have no similar advantage with respect to the stiffening product quality standards. As a broad generalization, foreign refineries are less sophisticated than U.S. plants, thus requiring an even bigger investment in downstream processing facilities to meet higher product specifications. Foreign suppliers also face higher transportation costs, and for transportation fuels, the hefty 52.5¢/Bbl U.S. tariff.

The qualifier in the above, "within limits," is a critical one. U.S. regulations, by imposing additional costs and capital requirements, push refinery economics closer and closer to the breaking point, where additional expenditures can no longer be justified by the expected return. This will be particularly true for the large companies' small, old plants serving marginal markets.

While a wholesale move of refining capacity offshore is unlikely, the Committee should be aware that increased product imports are likely. New crude oil processing capacity is unlikely in the U.S., so incremental product demand must come from abroad. The Energy Information Administration's forecast for 1995 shows product imports moving from 2 million B/D in 1991 to 2.9 million B/D by 1995. The EIA's balance implies that the incremental imports will be light products, a contrast to the historical pattern of high residual fuel oil imports (a low-valued product) and low light product imports (high-valued products). The increased product imports thus have a negative balance of payments impact, since light products are more expensive than residual fuel oil or crude oil.

2. Sufficient refining capacity.

Does the U.S. have sufficient refining capacity? Will it in the future?

Measuring the "sufficiency" of refining capacity is conceptually difficult in the world petroleum market, where freely flowing oil trade around the world increases the efficiency of the system, with consequent benefits to consumer costs. Imports and exports respond to price signals constantly, re-balancing supply and demand. The U.S. can and should count on these constant market adjustments. Only recently has the U.S.'s main refining region,

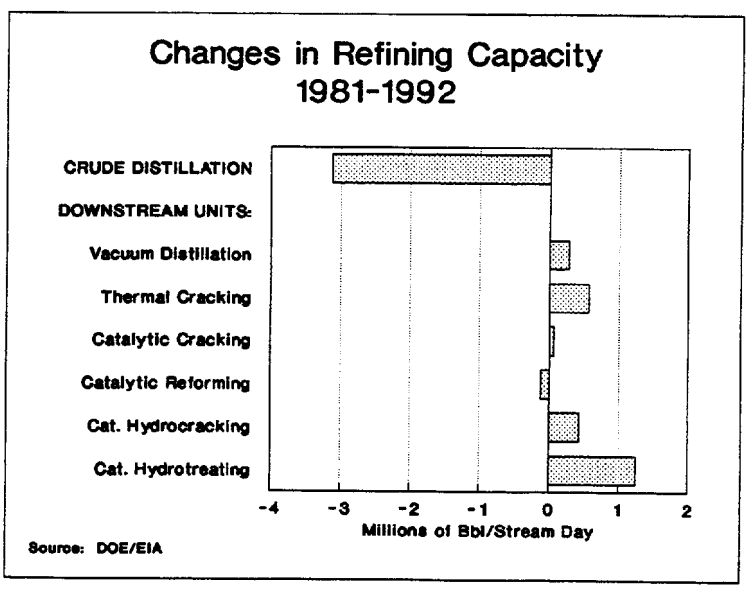
the Gulf Coast, become a routine exporter of light products, but the development was a predictable outcome of the world oil market's evolution. Therefore, dependence on imports of refined product to meet demand is not something to avoid by keeping open uneconomic refining capacity just because the capacity happens to be in the U.S. The U.S. consumer is certainly not well-served by misdirecting investment in such a fashion.

Thus, the highly competitive oil market will make better decisions than a government policy which intervenes. But policies, especially environmental policies, have already intervened.

What does the increase in refinery utilization tell us?

The increase in refinery capacity utilization between 1981 and 1990 reflects several factors. Refinery capacity in 1981 was swollen by government programs which encouraged small refinery construction in the 1970's and by investments driven by an earlier outlook for increasing product demand. As of January 1, 1981, the 324 U.S. refineries had 18.6 million B/D of crude oil distillation capacity. By January 1, 1985, the 223 refineries had 15.7 million B/D capacity. The refineries closed during this period of consolidation were mostly small, averaging less than 30,000 B/D, and usually inefficient. At the beginning of 1992, capacity continued at about the 1985 level. Thus, part of the reason for the increasing capacity utilization is the removal of inefficient, uneconomic capacity from the system.

While reducing crude oil distillation capacity, refiners have added the sophisticated downstream capacity necessary to increase their output of higher valued light products such as gasoline and middle distillates, as shown in the following figure. These downstream units are generally operated at very high utilization rates, with their maximum throughput dictating the utilization rate on crude oil distillation capacity. (Charging additional crude oil to a crude distillation column when the downstream units are operating at their maximum will generally result in an imbalance in the consequent product output, which will be heavier than desired.)



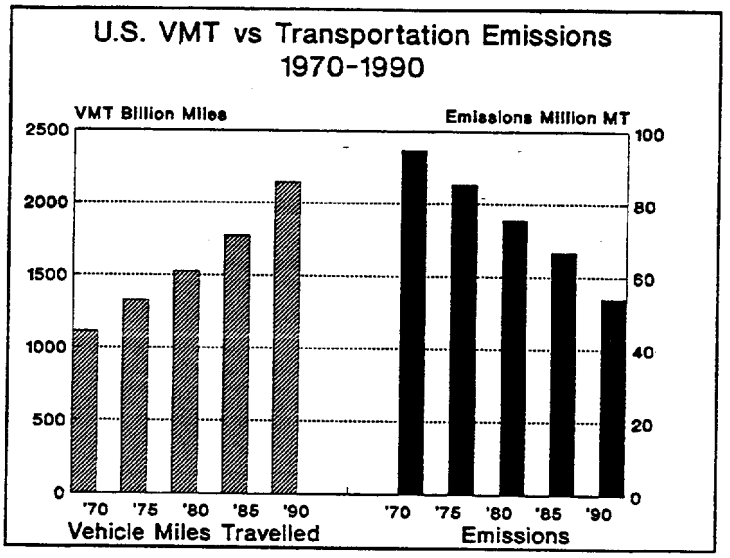
3. Reformulated gasoline opt-in

What will happen if a large percentage of the 87 opt-in areas decide to join the RFG program?

The nine "severe" non-attainment areas, as classified by the EPA, which must move to RFG on Jan. 1, 1995 will meet 22-25% of total U.S. gasoline requirements of about 7.3 million B/D in 1995. The additional 38 non-attainment areas which have already decided to opt-in to RFG on Jan. 1, 1995 are likely to boost U.S. RFG consumption in 1995 to 33-35% of total U.S. gasoline consumption. If all remaining non-attainment areas were to opt-in, RFG's share could reach 60-65%. Practically, this could not be accomplished by 1995, but could be phased in between now and 2000. Technically, the U.S. refining industry would probably be capable of supplying such a share of the market with RFG by then. But this would require a substantial capital investment as well as increased operating costs. As U.S. refineries move toward capacity utilization to meet the RFG requirements of all non-attainment areas, the cost of *all* RFG will go up. Hence, the cost of gasoline in the mandated RFG markets will be higher if many areas opt-in than it would otherwise be. Over time, all of these costs would have to be passed on to consumers in the form of higher gasoline prices. The question is, do the benefits justify these costs?

The costs vary with refinery size, type and location but are always substantial. For the average U.S. refinery the conversion to reformulated gasoline will require capital investments upwards of several hundred million dollars. On a per gallon basis the cost of moving to reformulated gasoline has been calculated at 5¢-10¢/gallon. Considering that the average U.S. household consumes nearly 1000 gallons per year, a price increase of this magnitude is significant enough to affect the economy at large. In the "severe" and "serious" non-attainment areas this cost can be justified by the demonstrable need to reduce ground level ozone formation for health reasons. However, in 1989 and 1990 about 40% of all designated U.S. non-attainment areas had no non-attainment days and another 25% had only 1 or 2 such days. In those areas the benefits derived from moving to reformulated gasoline would of course be much smaller than in the high non-attainment areas, while the costs would be the same. It should also be pointed out that many of the marginal non-attainment areas qualify for this designation only because the 3-year average 1987-89 on which the designations are based includes the exceptionally hot summer of 1988 which greatly increased ozone formation. If the base for the designation were to be moved to the most recent 3-year period (1989-91) the number of non-attainment areas would be substantially reduced.

To sum up, it is physically and technically possible to increase U.S. reformulated gasoline supply to include some additional non-attainment areas by 1995 and phase-in all such areas by 2000. However, in most of these areas the benefits are marginal while the costs are as high as in the severe non-attainment areas. It should also be pointed out that, nationwide, the reduction in air pollution from the transportation sector started long before the introduction of reformulated gasoline, as shown in the accompanying graph, and will continue even without it.



What if states other than California adopt the California gasoline standard?

California reformulated gasoline (CRFG) has substantially fewer emissions than the RFG complying with the Clean Air Act Amendment of 1990 (CAA). This reflects California's decision for a unique approach to its nationally unique southern California air pollution problem. The program will go into effect in the spring of 1996. The cost of CRFG is substantially higher than that of the CAA product. It has been estimated by industry sources that it will raise the cost of gasoline by 15-25¢/gallon, or 2.5-3.0 times as much as RFG. Thus, the negative economic impact of a large-scale move toward CRFG would be much more serious than the move towards maximum opt-in for federal RFG which in itself, as pointed out, would be far from insignificant. It would also greatly complicate the operations of refiners, transporters and marketers of gasoline since it would require the simultaneous availability of 3 different types of gasoline (non-reformulated, RFG and CRFG).

At the cost quoted above, the U.S. refining industry could probably expand its CFRG production substantially beyond California's requirements over the next 7-8 years. However, there is clearly no environmental justification for such action and, apparently, no serious political advocacy for it. If the CRFG standards should be adopted outside of California because of environmental advocacy it is quite possible that once the public realizes the full cost of this action it will clamor for a reversal or modification of the standards. If legislators comply, as seems likely, the refining industry could be left with large obsolete investments.

6. Emission credits in non-attainment areas, e.g., "cash for clunkers"

Are ideas such as "cash for clunkers" of practical value to the refining industry?

The answer is *yes*. According to a recent study cited by the EPA:

> "the dirtiest six percent of the cars on the road today emit 50 percent of the (automotive) hydrocarbons. The cleanest 50 percent of cars emit only three percent of these hydrocarbons."

Based on these findings the most effective way to reduce automotive air pollution over the next 7-8 years would be to remove old high polluting cars from the road. Currently approximate 32 million cars, or 36% of all passenger cars, are of 1979 or earlier vintage. About 1/3 of these do not have catalytic converters which became obligatory in 1975 and made a major contribution to reducing exhaust emissions. These cars also pre-date the fuel efficiency standards mandated since 1978. Their removal would have a disproportionately large effect on lowering automotive emissions, thereby removing some areas from the non-attainment category and keeping others out of it despite a growing car population and increase in miles travelled. The result would be a lower requirement for RFG and, hence, lower gasoline cost for consumers. A small but positive secondary effect of this process would be an increase in the demand for new cars through a chain of progressively newer model purchases to replace a large percentage of the scrapped cars.

Under CAA 1990 the scrappage program could be financed through pollution rights trading. Under this system a company may find that removing old "clunkers" from the road is a cheaper way to achieve pollution compliance in its non-attainment area than to reduce its own pollution further. An alternative approach would be for the government to remove these cars through direct purchase out of public funds. Using as a guide the price paid by Unocal in its highly successful "SCRAP" program, $700 per scrapped car, and allowing for some administrative costs, removing 1 million cars per year would cost somewhat less than $1 billion.