

"ECONOMIC AND POLICY CONSIDERATION
IN CHOICE OF A WEST COAST OIL PORT"

REGIONAL PROGRAM REPORT 78-19

by

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A. R. Thompson, Commissioner

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ABSTRACT

An outline is provided of the economic, institutional and political backgrounds of the West Coast 'oil surplus' problem. The elements of United States policy affecting oil transportation decisions are discussed, including pricing, "entitlements treatment" and the desire for energy self sufficiency. The range of outcomes of the West Coast surplus and the Northern Tier crude oil supply issues is surveyed.

There is at this moment no crude oil supply crisis. The absence of a west to east transportation system reduces the netback revenues from Prudhoe Bay crude oil for the producing companies and for the State of Alaska, and it threatens to raise the prices of petroleum products in the market areas of the landlocked Northern Tier refineries. But there is no reason we cannot get by almost indefinitely with make-shift devices like transshipment of Alaska oil through the Panama Canal, temporary swap arrangements and movement of crude oil in railway tank cars. These improvisations may be messier economically and environmentally in the short term and they may require more entrepreneurial and regulatory innovation than large scale long-term solutions, but they will not be as costly in real economic terms or in permanent environmental disturbance, nor as thorny from a political and regulatory standpoint as a decision to spend hundreds of millions or even billions of dollars on superfluous, uneconomic or wrongly located pipelines and terminals.

RÉSUMÉ

Le rapport donne un aperçu des aspects économiques, institutionnels et politiques du problème de surplus pétrolier de la côte ouest. On y commente les points de la politique américaine qui dictent les décisions concernant le transport pétrolier et, en particulier, le régime des prix, les contingents et la volonté d'autosuffisance énergétique. On passe en revue l'éventail des conséquences des surplus de la côte ouest et les enjeux de l'approvisionnement en brut des états du Nord.

Il n'y a pour l'instant aucune crise d'approvisionnement en brut. L'absence d'un système de transport de l'ouest à l'est réduit le revenu net cumulatif des sociétés productrices et de l'état de l'Alaska pour le pétrole brut provenant de la baie Prudhoe. La situation menace de faire monter les prix des produits pétroliers dans la zone de marché qu'alimentent les raffineries de l'intérieur dans les états du Nord. Cependant, rien ne nous empêche d'avoir recours indéfiniment à des solutions de rechange, telles que l'acheminement du pétrole de l'Alaska par le canal de Panama, des ententes d'échange temporaire et le transport du brut par wagons-citernes. Ces méthodes de fortune peuvent causer, à court terme, des ennuis économiques et environnementaux et taxer davantage l'imagination des entrepreneurs et des organismes de réglementation, que les solutions d'ensemble à long terme. Cependant, ces moyens provisoires coûteront moins cher en dépenses réelles et en perturbations environnementales permanentes et causeront moins de soucis politiques et réglementaires que de décider de dépenser des centaines de millions ou même des milliards de dollars pour construire des pipe-lines et des terminus maritimes superflus, non-économiques et mal situés.

BIOGRAPHY

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Born in Portland, Oregon in 1933, Tussing was educated at the University of Chicago (A.B., 1950); Oregon State University (B.S., 1952); Hitotsubashi University, Tokyo; and the University of Washington (Ph.D., 1965).

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West Coast Oil Ports Inquiry

In March 1977 Dr. Andrew R. Thompson was commissioned by the Government of Canada to inquire into the environmental, social and navigational safety aspects of a proposed oil port at Kitimat, B.C. and the broader Canadian concerns and issues related to west coast oil tanker traffic.

The Inquiry hearings were adjourned in November 1977 because there was then no active application in Canada for a west coast oil port. The Commissioner summed up his findings to that point and presented his Statement of Proceedings to the Minister of Fisheries and the Environment and the Minister of Transport on February 23, 1978.

The Ministers subsequently announced that "the Federal Government sees no need for a west coast oil port now or in the foreseeable future and doubts that the benefits of establishing such a port would be sufficient to offset the danger of risking a major oil spill". Consequently, the Inquiry did not continue.

This report contains material which was prepared for the Inquiry but was not examined due to the termination of the Inquiry.

This report was prepared under contract and does not necessarily represent the views and policies of the Department.

ECONOMIC AND POLICY CONSIDERATIONS IN CHOICE OF A WEST COAST CRUDE OIL PORT

by Arlon R. Tussing (Anchorage and Seattle)

1. Introduction

I have been asked by this Inquiry to outline the economic, institutional and political background of the West Coast "oil surplus" problem; the elements of United States policy affecting oil transportation decisions, including pricing, "entitlements" treatment and the desire for energy self-sufficiency. I was also asked to survey the potential range of outcomes with respect to the resolution of the West Coast surplus and Northern Tier crude oil supply issues, and the likely outcomes should Canada reject all proposals for transshipment of Alaska or other oil for United States destinations through the province of British Columbia.

My statement today first attempts to define the question, and finds that there are five and possibly six distinct problems being addressed by United States and Canadian authorities under the heading of the West Coast oil port issue. From the standpoint of transportation economics alone, none of these five or six problems requires the construction of a new crude oil handling facility on the Pacific Coast of North America. The West Coast oil surplus and the Northern Tier oil deficiency were created by policy decisions in the United States and Canada respectively that ignored or submerged conventional economic benefit criteria in favor of the appearance of greater national self-sufficiency in energy.

I emphasize the appearance of self-sufficiency as opposed to its substance, because the decision of the United States to prohibit the export or exchange of Alaska oil in the Far East has utterly no rational basis, and the federal Administration has never attempted to offer one. If exports or exchanges are precluded, the choice of a second-best or third-best set of solutions is complicated by real and imagined environmental risks which I do not feel qualified to evaluate.

I will, however, attempt to rank several broad transportation "packages" in terms of their expected economic benefit, and speculate about the outcome. In conclusion, I shall point out some lessons for the present deliberations from the debate and decision regarding the Trans Alaska pipeline.

2. The problems leading to this Inquiry.

The location of a large new oil port on the West Coast of North America has become an important policy issue in two countries because of five related but distinguishable problems. These are:

Firstly, a market for Alaska North Slope crude oil, whose supply exceeds the current and anticipated demand for the particular grade and quality of crude oil at West Coast refineries;

Secondly, a transportation system to bring increasing volumes of crude oil, either from Alaska or from the Middle East to Midwestern refineries which used to depend almost completely on oil from the U.S. Gulf and Southwestern states;

Thirdly, a supply of crude oil for the tidewater refineries of Washington State, which have historically depended upon Alberta crude delivered through the Trans-Mountain pipeline;

Fourthly, a supply of crude oil for the landlocked refineries of the Northern Tier states, particularly those of Montana and the Dakotas, which are faced with dwindling local production and a cut-off of imports from Alberta; and

Finally, a supply of crude oil for refineries in the Great Lakes States--Minnesota, Wisconsin and Michigan--which also historically used Canadian crudes.

This Inquiry must also consider the long-term logistical requirements of Canadian refineries, looking ahead to the time in which the Western Provinces cannot fully serve their present markets in Canada, but it is the apparent need of the United States for new crude oil transport arrangements which made the location of a new West Coast oil port an issue that has to be resolved in the immediate future.

If industry were allowed to face each of these five problems solely or mainly on the basis of transportation economics, and if governments could decide to licence the necessary facilities solely or mainly on the basis of comparing quantifiable economic costs and benefits, four and maybe all of the five problems would have single, separate and relatively simple answers that would not involve any new oil ports on the West Coast of North America.

The logical "second" markets --- that is, after the West Coast itself --- for Alaska crude oil are in the Far East, mainly in Japan. The refineries of the Midwest would most easily be served with additional crude oil from the Middle East, Africa or the Caribbean through expanding existing transportation facilities from the Gulf of Mexico. Puget Sound refiners could accomodate increasing volumes of Alaskan or Indonesian crude at their existing docks with very little additional investment or operating costs, and probably with declining environmental risks over time as more sophisticated vessels and navigational systems are introduced. The logical feedstock of the landlocked refineries of the Northern Tier is the Alberta crude they were designed to process, even given Canada's commitment to maximizing long-term crude oil self-sufficiency, if only because of the comparatively small volume of crude oil these refineries require from outside their own region.

Only for the refineries of the Great Lakes States is there no one clearly "best" answer. It is possible to consider a variety of swap arrangements, but the economics and political acceptability of each of them depends on how other problems are solved. In actual fact it appears

that these refineries are already well on their way to replacing Canadian crude oil with crude oil from the Southwestern States or abroad by means of pipeline expansions and barge traffic from existing Midwestern delivery points. The withdrawal of Koch Industries from the Kitimat project is a direct result of the fact that the Great Lakes refiners do not have to wait for the two national governments to make major policy decisions on oil ports or swap arrangements to deal with their own problems in some way. Once they have sunk capital into projects like the new Wood River pipeline, the urgency and the comparative economic merits of the various transcontinental proposals will be very much lessened, even if one of them otherwise would have been a lower cost alternative.

The proposition that there is a single obvious solution to each of the five general problems, which solution requires no new West Coast oil ports, appears to contradict the tariff projections of the various project sponsors and the Federal Energy Administration and its contractors. The FEA studies, for example, show that Prudhoe Bay oil would earn a higher **net-**back return if it were shipped to Chicago through the Kitimat, **Trans-Moun-**tain or Northern Tier system than if it were sold in Japan. Some of the projections show lower costs for **Middle** Eastern oil shipped to Chicago through one of these systems than through expansions of existing pipeline systems from the U. S. Gulf Coast. Finally, the projections show very similar costs of service from the West Coast to Chicago for the three Northern systems.

Tables I and 11 are representative of these comparisons. Table I is from a report I prepared for the Alaska Legislature, comparing the projected refinery prices, transportation cost and **netback** values of Prudhoe

TABLE I COMPARISON OF REFINERY PRICE, TRANSPORTATION COST, AND **NETBACK** VALUES AT **VALDEZ**, MAJOR MARKETING ALTERNATIVES FOR NORTH SLOPE CRUDE

(ollars per barrel)

Market	via	Refinery Price	Transport cost	Valdez Netback
Los Angeles	tanker only	12.87	.60	12.27
Japan	tanker only	12.11	.34 ^a	11.77
Chicago	Trans-Provincial Pipeline (Kitimat-Edmonton)			
	(300 mbd)	13.29	1.25 ^b	12.04
	(600 mbd)		1.02	12.27
	(900 mbd)		.91	12.38
	Trans-Mountain Pipeline (Cherry Point- Edmonton)	13.29	1.03 ^c	12.26
	Northern Tier Pipeline (Port Angeles- Clearbrook)			
	(600 mbd)	13.29	1.23 ^d	12.06
	(800 mbd)		1.07	12.22
	SOHIO (Long Beach-Midland)			
	(500 mbd)	13.29	1.30 ^e	11.99
	(1000 mbd)		.95	12.34
Houston	SOHIO (Long Beach-Midland)			
	(500 mbd)	13.07	1.13 ^f	11.94
	(1000 mbd)		.98	12.09
St. James, LA	Panama Canal (lighters)	13.07	2.14	10.93
	(66 DWT)		2.42	10.65

Source: FEA, North Slope Crude: Where to? How? An analysis of the alternatives available for the transportation of and disposition of Alaskan North Slope Crude. Draft, November 29, 1976. pp. 332-353, and author's calculations. The cost of the Middle Eastern reference crude has been assumed to increase 6 percent over 1976 figures.

Notes: Refinery prices assume that Prudhoe Bay crude oil is treated as imports for purposes of entitlements.

a - foreign tankers

b - Valdez Kitimat .30; Clearbrook-Chicago .19

c - Valdez-Cherry Point .41; Cherry Point-Edmonton .08

d - Valdez-Port Angeles .39; Clearbrook-Chicago .19

e - Valdez-Long Beach .59; Midland-Chicago .39

f - Valdez-Long Beach .59; Midland-Houston .22

Bay crude oil at Valdez under various transportation alternatives. The basic transportation cost estimates come from a 1976 Federal Energy Administration study; I have only changed the format and updated the crude oil price figures. You can see that the final netback values for Alaska oil in almost all of the systems are similar, far closer to each other than the error that could reasonably be expected in any one of them. All of the transshipment systems to the Midwest, moreover, seem to give higher values for Alaska crude oil sold in Chicago than in Japan.

The second example (Table II) reflects the calculations of Standard Oil of Indiana (Amoco), an advocate of the Northern Tier System. According to this table, the costs for moving Middle Eastern oil to Chicago would be comparable whether it were to come through the Northern Tier system, Kitimat or from the U.S. Gulf Coast. To the extent there is any advantage it seems to be clearly with Northern Tier, but with different assumptions regarding the capacity and throughput of the different systems, the comparison could be turned to favor Kitimat by about the same margin. The Amoco figures, however, show a very large advantage for Northern Tier over Kitimat in serving places like St. Louis, Kansas City and Denver.

3. Existing vs. new pipeline economics

In my judgment, tables such as I and II are very misleading as comparisons of the economic merits of the various systems. There are three adjustments which would have to be made before they truly reflect factors that govern the rational behavior of potential shippers and investors. Firstly, the tables do not distinguish between the nominal price of transportation and its economic cost. Specifically, the various

TABLE II

CRUDE OIL TRANSPORTATION COSTS FROM VALDEZ, ALASKA AND PERSIAN GULF TO REFINING CENTERS - 1986 (dollars per barrel)

Refining Center (tanker tariff)	Northern Tier			Trans-Mountain			Kitimat			SOHIO			CAPLINE		
	P/L	VDZ	PG	P/L	VDZ	PG	P/L	VDZ	PG	P/L	VDZ	PG	P/L	VDZ	PG
	(0.65)	(1.80)		(0.65)	(2.09)		(0.54)	(1.85)		(0.94)	(2.20)		(2.10)	(3.80)	
Billings	0.71	1.36	2.51	1.01 ²	2.66	3.70	1.63 ²	2.17	3.48						
Mandan	0.80	1.45	2.60	1.58 ²	2.33	3.67	1.60 ²	2.14	3.45						
Clearbrook ¹	0.90	1.55	2.70	1.12	1.87	3.21	1.14	1.68	2.99						
Twin Cities	1.07	1.12	2.87	1.29	1.94	3.38	1.31	1.85	3.18	2.09 ^{4,5}	3.03	4.29	1.03 ^{5,6}	4.83	3.41
Superior/ Wrenshall	1.03	1.68	2.83	1.18	1.83	3.27	1.20	1.74	3.05	(3)					
Chicago	1.13	1.78	2.93	1.31	1.96	3.40	1.33	1.87	3.16	1.69 ⁴	2.63	3.89	0.73 ⁶	4.53	3.11
Toledo	1.31	1.96	3.11	1.49	2.14	3.58	1.51	2.05	3.36	1.89 ⁴	2.83	4.09	0.93 ⁶	4.73	3.31
Detroit	1.41	2.06	3.21	1.52	2.17	3.61	1.54	2.08	3.39	2.02 ⁴	2.96	4.22	1.06 ⁶	4.85	3.44
Buffalo	1.32	1.97	3.12	1.47	2.12	3.56	1.49	2.03	3.34	1.95 ⁴	2.89	4.15	0.99 ⁶	4.79	3.37
Salt Lake	1.36	2.01	3.15	2.06	2.71	4.16	2.08	2.62	3.93						
Casper	1.11	1.76	2.91	2.01 ²	2.66	4.10	2.03 ²	2.57	3.88						
Denver	1.14	1.79	2.94	1.80	2.45	3.89	1.82	2.36	3.67						
Kansas City	1.41	2.06	3.21	1.92	2.57	4.01	1.94	2.48	3.79	1.34	2.28	3.54			
St. Louis (Wood River)	1.36	2.01	3.16	2.05	2.70	4.14	2.07	2.61	3.92	1.69 ⁴	2.63	3.89	0.61 ⁶	4.41	2.99

(1) Delivery point

(2) Construction of connecting pipelines required for deliveries at these points. (3) Some crude could be moved by products pipeline.

(4) New pipeline Cushing to Chicago

(5) New pipeline Wood River-Twin Cities

(6) Based on looping Capline and Chicap.

Source: Amoco. August 5, 1977

comparisons use the posted tariffs of existing pipeline segments. But these tariffs do not correspond to economic costs on the Trans-Mountain, Inter-Provincial, Lakehead, Rangeland and Wascana pipelines, for example, which are expected to be underutilized or in some cases empty unless they are used to serve Northern Tier or Midwestern refineries with crude oil from new sources. The tariffs on such pipeline segments are not true economic costs in the sense that they are payments for the use of labor, materials or capital which have alternative uses but are in most cases the maximum tariffs permitted by regulatory formulas. These nominal tariffs may be the real costs that future crude oil shippers will face--or they may not, because the owners of underutilized pipelines can be expected to negotiate their tariffs downward in order to meet competition and keep their facilities in use. Very few crude oil pipelines, it should be noted, have tariffs as high as regulation would permit. The irreducible floor for such tariff reductions is very low: it is of course the increase in operating costs--mainly fuel--required to move the additional volume of petroleum.

The same principle applies if somewhat less forcefully to expansions or modifications of existing pipeline facilities like Capline, which are expected to be fully utilized. Addition of power, looping and debottlenecking of existing pipelines usually has a lower incremental cost than construction of entirely new systems, and the cost of these expansions is often less per barrel than the prevailing tariff.

In contrast, the projected tariffs for new pipeline systems like Northern Tier or new pipeline segments like Kitimat are composed

entirely of real economic costs. Their owners will not build and operate such facilities unless they believe they can in fact realize the projected tariffs. Proposed new pipeline segments face another disadvantage compared to existing transport facilities with the same pro-forma tariffs. The capital costs and therefore the cost of service for new facilities are far less certain than the operating costs of existing facilities. The reliability of cost forecasts for expansion or modification of existing systems is somewhere in between. Because the capital costs of new construction are almost always underestimated, and often by huge amounts, it is reasonable to assume that the cost of new pipeline construction, and the required tariffs for new pipeline segments, are flexible only upward compared to the projections of their sponsors, or indeed the figures accepted by government regulatory agencies.

On the basis of these principles, I would be willing to make a pretty strong generalization--that the comparisons in Tables I and II tend to overestimate the cost of using existing pipelines like Trans-Mountain, Inter-Provincial and Lakehead; they tend to underestimate the cost of building new ones like Northern Tier; and that both effects are present in varying degrees with respect to the cost of transportation in proposed systems like Kitimat which would use some new segments together with existing facilities--or systems requiring the expansion or modification of existing facilities like Capline.

4. Pipeline vs. tanker economics.

A second reservation that has to be kept in mind in comparing the expected costs of tariffs for different transport systems concerns the economic differences between tanker and pipeline carriage, namely the

combination of relative flexibility with the absence of scale economies that characterize tankers, and the opposite with respect to pipelines. Underestimation of throughputs results in a higher than optimum cost for pipeline transportation because it leads to building a pipeline that is too small--or two pipelines that are less efficient than one large diameter line. Overestimation of transport demand leaves the pipeline underutilized and also results in a greater than optimum transport cost per barrel. But industry and government comparisons such as Tables I and II almost inevitably assume that proposed new pipeline segments would indeed be built to the right scale and, once built, would be operated at their optimum design capacity. You know and I know that won't really happen, except by chance.

Anyone who would forecast the cost of moving crude oil by tanker along a given route in the future faces a number of thorny problems. Nominal tanker tariffs or charter rates are not necessarily equal to true economic costs or even to the true cost of transportation to the shipper. Tanker tariffs depend on the length of the charter or commitment, and on expected supply and demand for vessels over that term. Tanker and tanker transportation markets are, moreover, stratified by size and, more importantly, balkanized by regulation into different market segments among which supply-demand conditions may be quite different or even moving in contrary directions. For our purposes the most important distinctions are between the market (1) for United States unsubsidized "Jones Act" tankers, the only kind that can normally be used in domestic trade; (2) for subsidized U.S. flag tankers which normally must be only used in international trade; and (3) the world tanker market.

Standing above and outside of these complications, however, is one fundamental economic fact. Tanker capacity on a given route, unlike the capacity of an oil pipeline, can be expanded or reduced readily and smoothly in response to varying demand and can readily compensate for almost any misjudgment of future demand. World and domestic markets for tanker charters may be tight or glutted at any particular time, but additional capacity is always available to a particular segment of the market at some price far earlier than a pipeline could be built or expanded. Excess capacity in tankers can always be dispensed with far more rapidly than investment in excess pipeline capacity could be amortized.

While there is no way to avoid either definitional problems or market uncertainty in projecting future costs of marine transport for petroleum, the accuracy of a tanker tariff forecast does not depend very much on an accurate estimate of transportation demand over a particular route. Significant forecasting errors are likely, but the likelihood they will be too high or too low are approximately equal. This is in sharp contrast to the situation with oil pipelines where a misjudgment of demand in either direction will result in costs substantially higher than the project's owners expected or intended.

The relevant generalization from these principles is that conventional economic comparisons between pipeline systems of delivery and ones relying mainly on tankers tend to be too favorable to pipelines, and particularly to proposed new pipelines. Regardless of the numbers in the comparative tables it is hardly conceivable, for example, that Kitimat, Northern Tier or Sohio's LATEX project would be considered seriously as solutions to the West Coast oil surplus problem if a Far Eastern outlet

were available for an indefinite period into the future.

5. Long-term vs. short-term solutions

The third adjustment that has to be made to conventional comparisons of transportation costs for different systems concerns the time horizon or economic life of proposed new investments. The tables we see are usually "normalized" so that certain arbitrary assumptions in calculating costs or tariffs are the same for all proposed projects. Typically they assume a 20 or 25 year economic life and amortize each project's capital costs over that period. Since the transportation systems we are considering are intended to serve different purposes, there is no reason to expect them actually to be designed or financed for the same term of service. Consider a hypothetical transportation facility whose main purpose was to link Alaska North Slope crude oil to markets beyond the West Coast of North America. In calculating the expected cost of service, over how many years should we amortize the capital investment?

We simply don't know how large the so-called West Coast oil surplus is going to get, nor how long it will last. How quickly will production from the main Prudhoe Bay reservoir be brought up to its expected peak capacity of 1.5 or 1.6 million barrels per day? How much production is possible from the nearby Lisburne and Kuparuk formations and other lesser discoveries in the Prudhoe Bay area? Will they in fact be developed and produced, and when? Will there be other discoveries in Alaska or on the Continental Shelf adjacent to Alaska? How successful will new exploration efforts off California be? Will pricing policies for Alaska and California oil force a shutting-in of developed high-cost production in California? Will Congress accept the President's proposal to shut in the Elk Hills Naval Petroleum Reserve in order to reduce the

"surplus" on the West Coast? How rapidly will petroleum demand grow in the Pacific States, and what incentives will be provided for West Coast refiners to convert to use higher sulfur, lower gravity refinery charges? What, if any, exchanges with Japan or Canada will be permitted in the future?

For all these reasons, the producers of Prudhoe Bay crude oil can only speculate how large their West Coast surplus will become and how long it will last. The peak surplus could be as little as 500 thousand barrels per day and last as little as three years; conceivably, however, it could grow to a million barrels per day by 1985 and keep growing beyond. This uncertainty explains seemingly puzzling aspects of the West Coast oil port debate: why, in view of its higher projected tariffs and the bitter environmental opposition to it, is Sohio so doggedly pushing its Long Beach transshipment plan, rather than one of the three northerly proposals any of which would seem to move Alaska oil to the Midwest much more cheaply? Likewise, why did ARCO keep pressing its terribly unpopular Cherry Point proposal when either Kitimat or Northern Tier seemed to be competitive in transportation costs to the Midwest for either Alaskan or Middle Eastern Oil? Why has the Northern Tier proposal received so little industry support despite its promising cost projections?

The answer is that the pro-forma comparisons of transportation costs can be totally misleading if they do not distinguish between the predictable (or at least negotiable) price of using existing facilities like an empty El Paso gas line or Trans-Mountain, and the inescapable and uncontrollable cost of building a new segment like Kitimat, or even worse, an entirely new system like Northern Tier. Considering

that the West Coast surplus might peak at about .5 million barrels per day and might last only five years, it would make no sense to build a pipeline chiefly to solve this problem if twenty years of full-capacity service were required to amortize its capital costs or to make it competitive with some other system that relied entirely or in part upon existing pipeline facilities.

These three considerations--the smaller capital commitment required to use existing pipeline links, underutilized or otherwise; the greater flexibility of tanker transport links compared with pipelines; and the uncertainty of the magnitude or duration of the West Coast crude oil surplus --- return us to where we began. If the United States government permitted it, exports to the Far East would become the second market (after the Pacific Coast of North America) for Alaska crude, and industry would not be pressing for any other outlet. If the United States and Canada could work out any of a number of swap arrangements, the landlocked Northern Tier refiners could be supplied from Alberta without new pipeline construction and without compromising Canada's commitment to long-term self-sufficiency. The same could be said with somewhat less force (because of the larger crude oil volumes involved) about the refineries of the Great Lakes States. Without Alberta crude oil, and without a trans-continental pipeline system created to solve one of the other problems, the Great Lakes, like the Midwest as a whole, will be served by extensions or expansions of the existing pipelines systems extending North from the U.S. Gulf Coast. Without the fear of environmental damage in Puget Sound, the refineries there would each simply expand their own dock facilities to receive any increased crude oil volumes they require. And finally, no serious consideration would be given to bringing Middle Eastern crude oil into the Chicago area through pipelines from any West Coast port, except

as part of a scheme to deal with the West Coast surplus.

In summary then, it is not transportation economics but an insistence upon a large degree of energy self-sufficiency by both the United States and Canada which seems to dictate the need for a new West Coast oil port. The issue exists only because Canada, on the one hand, wants to reserve her known Alberta reserves for future domestic consumption, and because the United States, on her part, wants Alaska oil to be refined domestically. Without Canada's curtailment of crude oil exports there would be no political urgency to the problem in the United States. And without the glut of crude oil on the West Coast which the United States government has created by forbidding exports of Alaska crude oil to Japan, the potential traffic volumes would not be sufficient for anyone seriously to propose a new Transcontinental crude oil transportation system.

6. Exports or exchanges with Japan.

The proposition that crude oil "exchanges" with Japan would be the most expedient and most economical solution to the West Coast oil surplus is widely accepted within industry and within the federal government, at least for the short run. The sponsors of individual transshipment schemes have from time to time produced analyses showing that their favored project would result in higher netback prices at Valdez than exports, and FEA's comparisons have had a similar implication. For the reasons I have set out earlier in this presentation, however, there has never been any question but that the producers would export or exchange their excess crude oil if they were allowed to do so.

The decision last Spring by Dr. Schlesinger not to permit exports was taken only after long and heated deliberation within the executive branch. To my knowledge no analytically respectable reasons

for such a prohibition were ever advanced in the debate. The reason given for the decision by Dr. Schlesinger was simple and truthful. Exports or "exchanges" of Alaska oil would be hard to sell to the Congress and to the people of the United States because the case for them on economic grounds was complicated and hard to explain, and there was no way --- given the rest of the President's program --- in which the transportation cost savings could be channeled to consumers.

The political abhorrence of exporting North Slope crude oil has its origin in the debate over the Trans Alaska oil pipeline prior to its approval in 1973. Some of the advocates of a Mackenzie Valley pipeline, including major environmentalist organizations and members of Congress from the Midwestern and Northeastern states, suspected or alleged that the Trans-Alaska route was being advanced by the producing companies and endorsed by the Nixon Administration because and only because the companies preferred exporting the oil to Japan to marketing it domestically.

Prior to 1972, some critics alleged that Japan was the producers' market of choice for crude oil surplus to West Coast requirements (despite the fact that domestic oil prices were higher than world prices) because shipments East of the Rockies at that time might have upset the delicate regulatory apparatus ("market demand prorationing" in Texas and Louisiana, plus the controls on oil imports) which supported the domestic oil price. By the fall of 1973, when the authorization law was actually before the Congress, however, world oil prices had overtaken domestic prices, which were now under direct price controls. Now the producers were accused of wanting to export Alaska oil in order to escape U.S. price controls.

It is impossible now to determine whether there was any merit

to the allegations, nor whether all the charges were made in good faith. In any case, the best political argument the producers and the Nixon Administration had for quick approval of the Trans Alaska proposal was the nationalistic slogan of "energy independence", a notion that was given urgency and vitality by the Arab embargo. In this climate, opponents of the pipeline added their own nationalistic rhetoric to their economic, environmental and regional interest arguments. Exports to Japan --- the industry's alleged purpose in building a pipeline to Valdez instead of Chicago --- would be a betrayal of the energy independence goal. The argument of the companies and the Administration was turned around: it was they, not the environmentalists or they Midwestern politicians, who were unpatriotic.

The export issue, whatever its merits, was an effective one for pipeline opponents, and one on which its supporters were very defensive. The Interior Department, the White House and two Alaska Governors joined the producing companies in assuring the public and Congress that there would be no "surplus" oil on the West Coast. Some company spokesmen chose their words with lawyer-like care in order to preserve their future options --- for example, no exports were "now planned" --- but the impression they gave and clearly intended to give was that of a collective "loyalty oath". All North Slope crude oil would easily be used on the West Coast of the United States, they insisted. In no circumstance did they contemplate any substantial exports to Japan.

The national security, energy independence argument for a quick authorization of the pipeline did prevail in the Fall of 1973 in the climate of urgency created by the Arab embargo. The victory was a narrow one, however, and the law was approved by a Congress which was still largely unpersuaded of the relative merits of the Trans-

Alaska route, and still suspicious of industry and Administration motives. One part of the price of this approval, demanded by the skeptics and agreed to by the sponsors, was a statutory limitation on exports. The Senate Committee on Interior and Insular Affairs, reporting out the proposed legislation, commented:

The question of possible exports of crude oil produced on Alaska's North Slope has been raised repeatedly before this Committee and elsewhere in connection with consideration of alternative pipeline routes for that oil. Some have contended that, despite the national deficiency in crude oil supply, the oil companies with major reserve interests on the North Slope chose the Trans-Alaska alternative in order to be in a position to export a significant fraction of its throughput to Japan.

Despite strong denials by spokesmen for the companies and the National Administration, these allegations have not been totally implausible . . . Because of uncertainty regarding the volume of District V crude oil production and the imponderable but almost surely enhanced attractiveness of oil exports to Japan in future years, the Committee is of the view that even though it has had repeated assurances from the oil companies and the Administration that the former "have no intention" to export crude oil produced on Alaska's North Slope, there should nevertheless be a statutory check on such exports.

Section 28(u) of the Mineral Leasing Act, as amended by the 1973 legislation, provided that exports would be permitted only if the President made and published " . . . an express finding that such exports will not diminish the total quantity or quality of petroleum available to the United States, and are in the national interest . . . " Even if the President made such a certification, Congress reserved to itself a veto power over exports by " . . . passing a concurrent resolution of disapproval stating disagreement with the President's finding concerning the national interest . . . "

Congress did not intend that the prohibition on exports should be categorical. The Senate Committee was explicit on this point:

There might well be a situation in which export-for-import arrangements would be of benefit to both the United

States and its trading partners. For example, the export to Japan of Alaskan crude oil surplus to West Coast needs in exchange for Latin American or Eastern Hemisphere crude (which would otherwise have been transported to Japan) for the Northeast could, under some circumstances, be a better arrangement to bring the Northeast additional crude oil supplies than either transcontinental pipelines or a tanker route around the Horn. A total prohibition might, in addition, encourage other countries to restrict exports to the United States, or cripple efforts to provide cooperation or sharing of restricted supplies among consuming countries.

Despite the flexibility of the law, and the fact that the Trans Alaska pipeline was indeed built and has indeed created a circumstance in which " . . . the export to Japan of Alaskan crude oil supplies surplus to West Coast Needs in exchange for Latin American or Eastern Hemisphere crude could . . . be a better arrangement . . . than either transcontinental pipelines or a tanker route. . .," the political suspicion and a political rhetoric hostile to exports live on.

With the exception of those sectoral interests --- maritime and steelmaking, for example --- who might benefit from a higher cost alternative, I believe the opposition to exports is almost entirely an emotional reflex unsupported by any serious economic or national security analysis. The most weighty attempt at a national security argument against exports asserts that shipments of Alaska oil to the Far East, offset by increased imports into the Midwest and East, would perpetuate or increase U.S. vulnerability to future curtailments of OPEC imports. Once North Slope oil is committed to foreign markets, the argument goes, it could not or would not be diverted back to the United States in time of need.

There is no substance to this argument. If there were a selective curtailment of United States imports, North Slope crude could be withdrawn from Japanese refiners and delivered to U.S. markets beyond the West Coast without harm to Japan. In case of a general

supply crisis, obligations under the International Energy Agreement would require the United States to share its available crude oil with Japan. Ironically, it is almost certain that such a contingency would result in a diversion of North Slope crude oil from domestic to Japanese refiners rather than the opposite! In either case, there would be a world-wide surplus of tankers of all sizes; in a true emergency, the United States would not hesitate to waive the Jones Act, allow subsidized tankers to operate in domestic trade, or take whatever other measures were necessary to move Alaskan oil to any part of the United States.

Exports or exchanges which reduce net transportation costs have essentially the same foreign exchange effects as production for domestic consumption, as the exported oil and the offsetting imports will both move at world prices. Any growth anywhere in the world's oil producing capacity, or world crude oil production, would increase the excess producing capacity in the OPEC countries by a corresponding amount, and so both help hold down the world oil price and make any deliberate curtailment less likely. And, in my judgment, an important impact of a federal policy permitting exports would be an increase in U.S. crude oil production, which would increase the national income (because the real resource cost of domestic oil is less than that of imports, even if they trade at the same price), reduce the foreign exchange cost of energy, and weaken OPEC.

The West Coast surplus leaves oil producers both in Alaska and in California uncertain as to where they are going to market their crude oil and at what price. There will clearly be downward price pressures on Prudhoe Bay-type crude oils as Alaska and California producers

compete for the relatively inelastic West Coast demand for high sulfur, heavy crudes, in order to avoid paying the additional cost of shipping it to Gulf Coast ports. Neither the price nor the share that different producers will have of the West Coast market can be predicted with any confidence, however.

This uncertainty regarding markets and transportation for additional volumes of crude oil on the West Coast materially inhibits the development of additional producing capacity. The full producing capacity of the main reservoir at Prudhoe Bay is 1.5 to 1.6 million barrels per day; the capacity of all the known reservoirs in the vicinity is probably on the order of 1.8 to 2.0 million, and the existing pipeline could move these volumes if additional pump stations were installed. The producing companies, who are also the pipeline's owners, have suspended plans to increase producing and transport capacities beyond 1.2 million barrels per day pending resolution of the uncertainty where the additional oil would go. This situation probably inhibits exploration efforts elsewhere in Alaska as well as postponing indefinitely development of known resources.

The surplus may also have an effect on California production. A large proportion of current California crude oil output (about 70 percent) has either a higher sulfur content or a lower API gravity than Prudhoe Bay oil. Much of the California oil is, moreover, "old oil" for purposes of price controls and the entitlements program; refiners of this oil are therefore required to purchase old oil entitlements.* Because of the relatively low market value of heavy, sour crudes, the result is that substantial volumes of California oil sell at a wellhead price of less than \$4.00 per barrel. Since much of this is relatively high cost

* The appendix contains a brief description of the entitlements program.

production, competition from excess supplies of Prudhoe Bay crude is likely to force a shutting-in of producing wells in California.

A third source of supply that is threatened by the West Coast surplus, and whose production would become more certain if an export outlet existed for surplus West Coast crude oil is the planned increase in production from the Naval Petroleum Reserve at Elk Hills. In April 1976, Congress directed the Navy to develop the Reserve within three years to a producing capacity of 350 thousand barrels per day, with the intention of selling the crude oil in domestic markets. As a result of the excess crude oil supply on the West Coast, however, the President recommended in his energy plan last April that plans to produce Elk Hills oil be suspended.

Reduced domestic production means a lower national product because the real economic cost of domestic oil is on the average much less than the price of imported oil; greater net imports, which are a consequence of postponing development of Alaska oil, shutting in private California production, or shutting in Elk Hills, mean a reduced real income for the United States. Conversely, increased domestic production anywhere in the United States means a reduced foreign exchange deficit; it also means a higher GNP. Moreover, each barrel of domestic crude oil displaces a barrel of OPEC oil and increases in U.S. production swell the "overhang" of surplus oil producing capacity in the OPEC countries, whether that domestic oil is consumed at home, exported (or "exchanged") abroad, or placed in the Strategic Petroleum Reserve.

The potential increases in production from the known resources at Prudhoe Bay, the projected capacity of the Elk Hills Reserve and the high costs California production that might be shut in as a result of the West Coast oil surplus may total as much as one million barrels per day. Not only would the substitution of this oil for OPEC oil save the Nation

at least \$5 per barrel in real economic costs (\$2 billion per year) and about twice that much in foreign exchange, but it could increase idle capacity in the OPEC nations by ten to twenty percent. This spare capacity plays a material role in restraining future OPEC price increases and in deterring politically inspired supply interruptions. Accordingly, it is not in the national interest to shut in any potential supply on the West Coast simply as response to a geographical imbalance in domestic supply. Authorization of exports would be the most certain and effective way of removing the market and logistical incentives to such shutting-in.

This case for exports is well enough understood at high levels in the United States government. The decision of Dr. Schlesinger and the President not to fight the nationalistic taboo against shipping Alaska oil abroad rested on another emotional reflex --- a punitive attitude toward the major oil companies which the President and his advisors share with much of the public. The direct beneficiaries of any cost savings that would result from exporting Alaska oil to Japan rather than transshipping it to U.S. markets beyond the West Coast would be the North Slope producers and the State of Alaska. The Administration's perception was probably correct that the public and Congress would not stand for the producers making additional profits from exporting Alaska crude oil.

Under the system of crude oil price controls promulgated under the Emergency Petroleum Allocation Act of 1973 and its amendments under the Energy Policy and Conservation Act of 1976, a mechanism is readily available for assuring that the transportation cost savings would be captured by U.S. consumers rather than the producing companies

and the State of Alaska. Exporters of Alaska oil could have been required to buy "entitlements" at a price which would offset the wellhead price advantage the producers would gain by exporting that part of North Slope production they otherwise would have to transship to markets East of the Rocky Mountains. These payments would have swelled the nationwide entitlements pool, which is used to equalize crude oil prices to refiners and to subsidize crude oil imports. Through this pool, the transport cost savings would have been distributed to consumers throughout the United States. On a national scale, the price reductions would have been minute, but it is the principle that the oil companies should not gain from exports which is the crucial issue in determining whether exports of Alaska oil would be politically acceptable. If it could be shown, firstly, that the absolute dollar savings from "exchanges" would be substantial, i.e., in the hundreds of millions of dollars per year, and secondly, that whatever savings were achieved would go to consumers, I do not believe that Congress would have overruled a Presidential decision to permit exports of Alaska oil to Japan on a year-to-year basis.

Such a strategy is not compatible with Mr. Carter's energy program, however, under which the price of all oil, imported and domestic, would rise to the world market level or higher. Higher prices are intended to promote conservation and remove the necessity for an entitlements program. In order to control windfall profits, price ceilings and entitlements would be replaced by a tiered excise tax on the categories of domestic crude oil that are now subject to price controls, called the crude oil equalization tax (COET). Conceivably, a tax on crude oil exports could be used to absorb the additional gain to producers, but its political appeal would not match that of returning the transportation cost savings to consumers of

petroleum products. In any event, one of the two explanations Dr. Schlesinger gave in April, 1977, when he rejected the export option was that he could not see any way that consumers could get the benefits.

I frankly do not know whether exports or exchanges with the Far East are a live option today. The answer probably depends upon the way in which the states of California and Washington approach the West Coast oil ports issue. If the Kitimat proposal were clearly rejected, or indefinitely postponed by the Canadian government, and if the political leaders of both states firmly opposed any oil port within their jurisdiction, the Administration and Congress would be forced to take a hard new look at the merits of marketing surplus West Coast oil in Japan, Taiwan and Korea. But opposition to new port facilities at Cherry Point, Port Angeles and Long Beach on purely parochial grounds might not be enough to overcome the political objections to export of domestic crude oil. The governors, state legislators and members of Congress from the West Coast states would have to make their case forcefully on a national scale that the so-called West Cost surplus is an artificial one, that the demand for a West Cost oil transshipment port is also artificial, created by the federal government's lack of imagination or courage. They would have to proclaim that the problem could and should be eliminated almost overnight in an environmentally acceptable manner if only the President would approve the "exchange" of surplus oil, and that for this reason, their states were not willing to accept the environmental risks that would go with an unnecessary oil terminal and unnecessary oil traffic.

7. Second-best, third-best and lower order solutions.

A loud and firm position like the foregoing could be expected to revive the export question, but exports or exchanges of Alaska oil answer

only one of the five problems that this Inquiry must address. The problems of the Northern Tier refineries would remain, but the collapse of present efforts to create a transcontinental crude oil pipeline system would focus the attention of industry and both national governments on approaches to the Northern Tier problem centering on exchanges of crude oil between the United States and Canada.

Let us assume, however, that exports of Alaska crude oil to the Far East are not now a viable policy for dealing with the West Coast surplus. The way in which this problem is resolved powerfully affects the relative merits of the various proposals directed at the other four problems. While we can identify the best or most obvious solutions readily, choosing the "second-best", "third-best", etc., even on strictly economic grounds, is difficult because there are not now any cost analyses in the public domain which cope with the issues I identified in section 3, 4 and 5 of this statement --- particularly between transportation costs and posted tariffs, and the expected impact on costs of over- or underdesigning new facilities. Such analyses are conceptually feasible, but my terms of reference and my time for preparing this statement have allowed me to make only a guarded guess how the various proposals would be ranked in terms of their net economic benefits.

Table III ranks six "packages" in the order I would expect them to fall. This ranking does not necessarily reflect my preferences, because it does not consider the distribution of costs and benefits, the environmental implications or the political feasibility of the various proposals. Moreover, the list contains some items, like the Cherry Point terminal and exports to Japan, which seem to have been ruled out at least for the present, and it omits some concepts which ought to be considered but are not part of

an active proposal.

One of these is an oil pipeline along the Alaska Highway between Big Delta, Alaska and Edmonton, which would serve the entire Northern Tier market, plus the Chicago market, with North Slope crude. At the time I prepared this presentation there were no cost estimates in the public domain regarding such a pipeline (but I hope to have something to say about it by the time of my appearance). Another potential element of a solution is movement of Alaska oil to the Montreal area by means of Kitimat, Trans-Mountain, an Alaska Highway pipeline or Northern Tier, as part of a swap arrangement. Tanker traffic through the Panama Canal and pipelines across Panama or Guatemala are also omitted. These facilities would tend to be at the bottom of my list as long-term solutions, but a deep sea-level canal might be competitive if (and only if) oil tanker traffic were not expected to carry all of the system's capital costs.

Another alternative for which figures are not publicly available is that of closing some of the Northern Tier refineries and substituting the shipment of petroleum products into their market areas. Some of the smaller refineries in the region may well be uneconomic without the support they received in the past through biases in the mandatory oil import program, and which they now receive from the small-refiner preferences in the entitlements systems.*

*The annex to this report contains brief descriptions of the entitlements system and of the existing preferences for small refineries and small refiners.

TABLE III

EXPECTED RANKING OF TRANSPORTATION "PACKAGES" ON LEAST-COST CRITERIA

<u>RANK</u>	<u>SOURCE OR MARKET</u>	<u>MARKET OR SOURCE</u>	<u>TRANSPORT LINK</u>
<u>NUMBER 1:</u>	Surplus Alaska to	Japan	via tanker
"JAPAN"	Puget Sound from	Alaska & Indonesia	via refinery docks
	Landlocked N.T. from	Alberta	via swaps
	Great Lakes from	Alberta <u>or</u> P. Gulf	via swaps <u>or</u> U.S. Gulf
	Chicago from	P. Gulf	via U.S. Gulf
	Vancouver from	Alberta	via Trans Mountain
<u>NUMBER 2:</u>			
"CHERRY POINT"	Surplus Alaska to	Puget Sound, Landlocked N.T., Great Lakes, & Chicago	Cherry Point & Trans Mountain
	Puget Sound from	Alaska & Indonesia	via Cherry Point
	Landlocked N.T. fr	Alaska & Indonesia	via Cherry Point & Trans Mountain
	Great Lakes from	Alaska & Indonesia	via Cherry Point & Transmountain
	Chicago from	Alaska & P. Gulf	via C.P. & T.M., & U.S. Gulf
	Vancouver from	Indonesia or Cook Inlet	via Cherry Point & Trans Mountain

(continued to next page)

TABLE III(continued)

<u>RANK</u>	<u>SOURCE OR MARKET</u>	<u>MARKET OR SOURCE</u>	<u>TRANSPORT LINK</u>
<u>NUMBER 3</u> and <u>NUMBER 4</u>	Surplus Alaska to	Puget Sound, Landlocked N.T., Great Lakes & Chicago	via Port Angeles & Trans Mountain
(rank uncertain)	Puget Sound from	Alaska & Indonesia	via Port Angeles
"PORT ANGELES/ TRANS- MOUNTAIN"	Landlocked N.T.	Alaska & Indonesia	via Port Angeles & Trans Mountain
	Great Lakes from	Alaska & Indonesia	via Port Angeles & Trans Mountain
	Chicago from	Alaska & P. Gulf	via via P.A. & T.M., & U.S. Gulf
	Vancouver from	Indonesia or Cook Inlet	via Port Angeles & Trans Mountain
-----OR-----			
"KITIMAT"	Surplus Alaska to	Puget Sound Landlocked N.T. Great Lakes & Chicago	via Kitimat
	Puget Sound from	Alaska & Indonesia	via Kitimat or refinery docks
	Landlocked N.T.	Alaska & Indonesia, or Alberta	via via Kitimat swaps
	Great Lakes from	Alaska, Indonesia & P. Gulf	via Kitimat
	Chicago from	Alaska P. Gulf	via Kitimat & U.S. Gulf
	Vancouver from	Alberta	via Trans Mountain

(continued to next page)

TABLE III (continued)

	<u>SOURCE OR MARKET</u>	<u>MARKET OR SOURCE</u>		<u>TRANSPORT LINK</u>
<u>NUMBER 5</u> and <u>NUMBER 6</u> (rank un- certain)	Surplus Alaska to	Chicago	via	Long Beach & Midland
	Puget Sound from	Alaska & Indonesia	via	refinery docks
	Landlocked N.T.	Alberta	via	swaps
"SOHIO"	Great Lakes from	Alberta P. Gulf	via	swaps & U.S. Gulf
	Chicago from	Alaska P. Gulf	via via	L.B. & Midland & U.S. Gulf
	Vancouver from	Alberta	via	Trans Mountain
----- or -----				
"NORTHERN TIER"	Surplus Alaska to	Puget Sound, Landlocked NT, Great Lakes & Chicago	via	Northern Tier
	Puget Sound from	Alaska & Indonesia	via	Northern Tier
	Landlocked NT from	Alaska & Indonesia	via	Northern Tier
	Great Lakes from	Alaska, Indonesia & P. Gulf	via	Northern Tier
	Chicago from	Alaska & P. Gulf P. Gulf	via	Northern Tier & U.S. Gulf
	Vancouver from	Alberta	via	Trans Mountain

8. Pipeline tariffs for Puget Sound and Vancouver refineries.

Some of the conceptual packages in table III provide for supplying Puget Sound and/or Vancouver refineries from ports at Kitimat or Port Angeles. So long as the Puget Sound refiners can bring crude oil directly to their docks and Vancouver refiners can obtain Alberta oil through the Trans-Mountain systems, they can be expected to resist such proposals, which would considerably raise their costs and the costs to their customers. There is one regulatory innovation by which the National Energy Board (NEB) or Federal Energy Regulatory Commission (FERC) might improve the economic attractiveness of moving Alaska or overseas crude oil to Puget Sound and Vancouver by a roundabout route. The transportation tariffs for such shipments could be calculated on the basis of incremental costs rather than "fully allocated" costs.

An incremental cost tariff for shipments to tidewater refineries in the Northwest would leave other shippers on the pipeline no worse off than they would have been if the tidewater refineries had brought all their crude oil into their own docks and had not used a pipeline at all. Puget Sound and/or Vancouver refiners would pay a tariff which corresponded only to the additional capital and operating costs imposed upon the pipeline companies necessary to serve their additional demand. For the Kitimat pipeline, FEA calculates a cost (not a tariff) of 23.0 cents per barrel with a 600 thousand daily barrel throughput. The cost of transportation from Kitimat to Edmonton drops to 18.7 cents per barrel at 900 thousand barrels per day. This means that the cost of moving the last 300 thousand barrels would be only about 10 cents per barrel.*

* I do not necessarily endorse FEA's cost calculations. The numbers are offered only to illustrate a principle.

Suppose, therefore, that 600 thousand barrels per day were loaded at Kitimat for shipment to landlocked Northern Tier refiners, the Great Lakes states, the Chicago area and Eastern Canada. They could expect to pay a tariff from Kitimat to Edmonton based upon a 23 cent per barrel transportation cost. If the pipeline were built to accommodate an additional 300 thousand barrels per day of crude oil bound for Puget Sound, that additional capacity could be offered at a tariff based upon costs of 10 cents per barrel without making the first group of refiners any worse off. A fully allocated cost tariff would, however, be based upon a cost of 18 cents per barrel for both groups.

The difference between incremental and fully-allocated costs can be expected to be even greater on the Trans-Mountain system because its facilities are already in place. Up to the full capacity of the present system, the incremental cost of transportation between Edmonton and Puget Sound should be only a few pennies, consisting entirely of operating expenses.

The same rate-making principles could be used as an incentive for Puget Sound and Vancouver refineries to use a Port Angeles terminal, provided the main function of the pipeline connecting Port Angeles with the existing Trans-Mountain system was to move crude oil further Eastward through either the Trans Mountain or Northern Tier system.

9. Speculations on the Outcome

My invitation to appear at this proceeding proposed that I give you a forecast of what the United States would do if Canada did not approve either the Kitimat proposal or reversal of the Trans Mountain pipeline. Predictions of political events on the basis of current information are particularly hazardous in the energy field where our "current information" is changing radically day-by-day. My speculations, therefore, will be limited to a review of some of the main elements in the decision process.

In the last month, the Congress has adopted legislation which prohibits federal agencies from issuing permits for new oil port facilities in Washington State waters East of Port Angeles. The Senate has adopted, and the omnibus energy bill reported out by the Congress will include a floor amendment by Senator Melcher which would require all federal agencies to complete their analyses and make a final decision on Sohio's Long Beach project by November 15 of this year, and on the Northern Tier project by April, 1978.

The first legislation clearly rules out Cherry Point as a trans-shipment port for crude oil moving beyond Western Washington. While it improves the relative position of Port Angeles as a terminal site, it does not guarantee that site would receive all of the necessary federal, state and local permits. Clallam County officials are opposed to an oil port in their jurisdiction, and the environmentalist forces which were formerly willing to consider Port Angeles as a site because they regarded Cherry Point as the greater evil are now free to ally themselves with local interest to block any new oil port in Western Washington's

inland waters. In view of the uncertainty whether Washington State's energy facility siting law allows the state to override local zoning and planning authority, a long legal and political battle is certain before Port Angeles could be certified as an oil transshipment port.

Neither does the new law substantially improve the economic position of the Northern Tier proposal relative to reversal of the Trans Mountain pipeline. Either Northern Tier or Trans Mountain would require essentially the same facilities between Port Angeles and the Eastern Shore of Puget Sound; their relative merits will depend as they did before upon the relative costs of using the existing facilities of Trans Mountain, Interprovincial and Lakehead pipelines as against building entirely new facilities from Puget Sound to Clearbrook, Minnesota. I would still rate the prospects for a Port Angeles facility as rather low, and that for the Northern Tier system as even lower.

If the measure passed by the Senate, requiring a final decision on Northern Tier and the Sohio Long Beach project, is adopted by the House and signed by the President, it will accelerate the process of receiving federal approval for either system --- if either one of them or both can meet the requirements of a host of other laws, including those dealing with air and water quality. This legislation does not, and no foreseeable legislation will, preempt state and local authority over the Coastal Zone,

environmental protection or safety. A federal decision in favor of either of these projects does not guarantee their commencement or completion. As I stated before, it may be a very long while before all the approvals could be obtained on a Port Angeles facility, and it might be never --- notwithstanding its possible endorsement by the National Executive.

The Sohio project has a somewhat better chance, despite very widespread skepticism, reluctance or outright opposition from California agencies which must approve it. If a final review this month indicates that the project can meet the letter of existing air and water quality regulations, it may be approved by the State as a result of federal pressure over other issues of interest to California --- particularly with respect to the timing of construction for a "Western Leg" of the Alaska gas pipeline system. At this time, I would have to rate the chances for eventual construction of the Long Beach to Midland system as about even, but these odds are likely to change radically between the time I write this and the time at which I appear before you.

So, there is a good possibility that the United States will not in fact agree upon and authorize any new oil transshipment port and transcontinental pipeline system. An indication from this Inquiry that it is about to recommend approval of Kitimat would almost certainly kill the Port Angeles alternative, and would very likely kill Sohio's Long Beach proposal as well. My own informal reading of official and industry opinion in the United States suggests that Kitimat is generally the favorite among the various port proposals, and that it is the second choice of those who are on record favoring some other system.

But if no visible progress is made toward approval and actual financing and construction of the Kitimat Pipeline, a system using Port Angeles, or the Sohio project, the West Coast surplus will build up, and there will be

increasing difficulty in moving all the surplus crude through the Panama Canal to U. S. Gulf Coast ports. Prudhoe Bay-type crudes will sell at a substantial discount on the West Coast, to the distress of California producers including the state of California, and the landlocked Northern Tier refiners will become more desperate.

In this circumstance, I believe that exchanges with both Japan and Canada will become the only realistic short term options, while an Alaska Highway pipeline will look more and more attractive as a long-term solution.

10. Lessons of the Trans-Alaska pipeline decision.

My discussion of the various problems we are attempting to solve ends with a warning from History. Five years ago there was a lively coalition of United States environmentalists, Midwestern members of Congress, fishermen and others, encouraged by the Canadian government--albeit in a less than lively fashion--who had a proposal that might have served all five of the purposes I listed for a West Coast oil port. According to the economic analysis released by the United States Department of the Interior at the time and the judgments of almost every independent expert, this proposal would have had a lower real economic cost than the course which was followed. It would, moreover, have required no new crude oil ports or transshipment facilities on the West Coast of North America and would indeed have reduced the crude oil tanker traffic into Pacific Coast harbors, once North Slope crude oil went on line.

The proposal to which I refer is of course the Mackenzie Valley oil pipeline. It is reasonable to assume that a serious examination of that project would have had the same outcome as the recent gas pipeline debate: the favored route would have shifted to the Alaska Highway. But it is obvious in retrospect that the United States built its Alaska pipeline in the wrong place, and the United States and Canada are going to be worse off both environmentally and economically because of that choice.

The reasons a pipeline was built from Prudhoe Bay to Valdez rather than to Edmonton are many and complex, so what I tell you today will be a simplification. Essentially, the North Slope producers wanted

the quickest route they could design to an all-water port, because from there oil could be shipped anywhere in the world, at least in principle. The Nixon administration overrode the analyses of its own State Department, Interior Department staff and Council on Environmental Quality, to give almost reflexive support to industry's first proposal, as was the fashion in those days. The Canadian government dropped broad hints that it looked with favor on an overland pipeline, but its coyness played into the hands of Administration arguments that negotiations with Canada over routes and tariffs could take a decade.

Despite all of these handicaps, it is my judgment that a procedure like that which led to the choice of the Alcan gas pipeline could have been enacted by Congress, and that it would indeed have led to the choice of an overland pipeline route if there had been any oil industry sponsorship at all for such a pipeline. Even without such sponsorship it is unlikely that unconditional approval for the Trans-Alaska pipeline would have passed the Congress had it not been for the sense of urgency and moral pressure created in the Fall of 1973 by the Arab oil boycott. Even then, it took the tie-breaking vote of Mr. Agnew in the Senate to enable that body to override the National Environmental Policy Act in order to grant an immediate licence for the pipeline to Valdez.

There are at least three warnings in this story. The first is that the best --- or least evil --- resolution to an economic problem may not have any responsible industry sponsorship until after it has been endorsed by some governmental authority. This was the case, for example, with the Alaska Highway gas pipeline despite the fact that staff studies of the Interior Department and the Federal Power Commission strongly suggested the superiority of such a system. This Inquiry seems to be aware

of such a possibility in its continued consideration of the Kitimat pipeline despite its sponsors' nominal withdrawal from their application at the National Energy Board. I would suggest that there are other innovations you might want to consider and to compare with those proposals now being offered by oil companies or project promoters?

What are the economics, for example, of a Big Delta to Edmonton pipeline? Does the decision to build a gas pipeline along this route offer significant cost savings, and make it a realistic option for avoiding the establishment of any new West Coast oil port? What kinds of incentives --- positive or negative --- could be devised to induce Puget Sound refiners to accept Port Angeles or Kitimat as their crude oil terminal despite the higher costs compared to using Cherry Point or their own docks? I have made one suggestion along these lines, but the point here is that not every innovation worthy of consideration has necessarily been put before you by a group or oil companies.

The second warning is against assuming that autarchic--one nation--solutions to energy supply problems are necessarily simpler or more secure than international ones. This is particularly true where a rigid notion of self-sufficiency leads policy-makers to ignore geography and economics for fear of very remote and speculative contingencies. This warning is addressed mainly to my own country, which built the wrong pipeline in part on the incorrect theory that it is harder to get an accommodation from the government of Canada than with the state governments of Washington or California. The United States government later compounded that mistake by rejecting the single cheapest, most logical outlet for surplus Alaska oil--the Far East--on the frank but sorry argument that exports would be "hard to explain" to the voters.

Finally, the history of the Alaska pipeline suggests that an atmosphere of urgency is not the best framework for making decisions with which we will have to live for many years. The licencing of a pipeline which could not be completed before 1977 was not a relevant response to a political curtailment of oil supplies in 1973. Ironically, it was OPEC's five-fold increase in world oil prices, made possible by the Arab embargo, which guaranteed an oil surplus on the West Coast by its impact on the growth of oil demand.

These lessons are not entirely hindsight, nor are they original with me. There is ample evidence that the United States Congress was aware of the dilemma which the tunnel vision of the oil industry and the national Administration had forced on it. I would like to quote briefly from the Report of the Senate Committee on Interior and Insular Affairs about the Trans Alaska Pipeline Authorization Act, published in 1973. A longer excerpt will be appended to my statement so that you can see these citations in their original context.

The Report reviewed the arguments over the merits of the Trans-Alaska pipeline-tanker combination compared to an overland pipeline through Canada, with respect to four major issues--environmental impact, markets, economic benefits, and ownership and control--and several lesser issues. The Committee then stated that it " . . . did not regard any one of the foregoing arguments or any group of them as conclusive in favor of either of the competing pipeline proposals." There was, however, " . . . one consideration in favor of the Trans-Alaska pipeline that the Committee found compelling. This consideration was the additional delay and

uncertainty associated with the Trans-Canada pipeline. Regardless whether the 1969 decision of the owner companies in favor of an all-Alaska route was the wisest or the most consistent with the national interest at that time, and regardless whether the Administration's early commitment in favor of that route was made on the basis of adequate information and analysis, the Committee determined that the Trans-Alaska pipeline is now clearly preferable, because it could be on stream two to six years earlier than a comparable overland pipeline across Canada." The reason for this conclusion was that, "the necessary business organization, financial arrangements, engineering design and logistical preparations for the Alyeska project have been completed, so that construction could begin as soon as a right-of-way is granted, while none of these necessary preparations has been accomplished for a Trans-Canada route. These tasks are expected to take about two years, quite apart from the legal, political and administrative hurdles that must be crossed before construction of a Canadian pipeline would be authorized."

The panel chided the companies and the national executive for not allowing Congress a real choice. "In the light of the existence of significant uncertainties which are unique to each of the routes, it is arguable that the interested companies and the federal government should have devoted substantial effort to investigations and preparations leading to development of more than one transportation system. The Committee believes that such a two-option strategy was and is warranted" "There has . . . been no actual route selection or engineering design leading to a specific Trans-Canada pipeline proposal. The companies have not formed an organization to design or build a pipeline

nor have they initiated discussions with Canadian government agencies for leading to a right-of-way application." Among the reasons the Committee identified for this failure were that "the companies, the Interior Department and the State of Alaska have tended from the beginning to underestimate the engineering, environmental, legal and political difficulties of their preferred route. Also, the advocates of an all-Alaska pipeline seem to have feared that serious consideration of a Canadian route would, by giving it additional credibility as a potential alternative, undermine their effort to get early approval of the Alyeska right-of-way application." Finally, the panel noted, the companies did not want to spend the money necessary for a thorough comparison of the two options.

Though the horse had already left the barn, and a majority of Congress felt that it had no choice but to approve the Trans-Alaska pipeline, the law that was adopted granting it a license declared that advance federal planning and consultations with Canada, were necessary to deal with the need for additional pipeline facilities to handle Alaska oil. The Committee Report concluded its section on the major issues by stating that the law expressed the Congress' intention as follows, that "it is possible . . . that no competent private entity will take responsibility for the preparations prerequisite to submitting necessary applications to Canadian governmental agencies. In such an instance, appropriate agencies of the United States government should take this responsibility."

11. The framework for the oil port decision.

After the experience of the United States with the Trans-Alaska pipeline decision it is curious that neither the oil companies nor the

federal government prepared for the West Coast oil "surplus." Again we are not dealing with hindsight. In the period up to 1973 when the pipeline was approved, there was room for legitimate disagreement over whether total crude oil production from the West Coast states was likely to exceed West Coast consumption. By 1974, however, the effect of world oil prices on demand should have wiped out any doubts. In that year, I was requested by Senator Jackson to investigate the prospects for exports of Alaska oil to Japan, and its implications for the United States economy and national security. The result was a thick green volume, published by the United States Senate, called The Trans Alaska Pipeline and West Coast Petroleum Supply, 1977-1982. An examination of the production and demand projections of the major producing companies and the Interior Department showed that all except one forecast implied a net excess of West Coast production over West Coast demand beginning in 1979. One forecast indicated that a surplus amounting to as much as 1.8 million barrels per day was at least conceivable by 1982. These forecasts are summarized in Table IV.

Because the projections were not broken down by grade and quality of crude oil produced, as against the grade and quality of crude oil that could be run in West Coast refineries, the tables did not indicate the full magnitude of the emerging problem, nor the fact that the surplus of Prudhoe Bay type crudes would appear in 1977 just as soon as the pipeline went on stream. Nevertheless, as early as the Spring of 1974 government and industry did know that the problem was approaching, and it is remarkable how little they have done so far to prepare for it. The same can be said about the problem of crude oil supply to Northern Tier refineries, for we have been on notice from the National Energy Board

TABLE IV

ESTIMATES OF NET CRUDE OIL EXCESS (OR DEFICIT), U.S. WEST COAST
(millions of barrels per day)

Source and date	1977	1978	1979	1980	1981	1982	1983	1984	1985
Interior Department									
1971				-0.4		-0.7			
1973				-1.2		-1.1			
1974 low demand	-1.5	-0.9	-0.3	.7	1.2	1.5			
high demand	-1.8	-1.1	-0.6	.3	.7	1.0			
Federal Energy Admin.									
1976		.6		.9					.7
				1.1					1.3
Federal Power Comm.		.3							
		.6							
Sohio									
1974 low demand						.8			
high demand						.6			
1976		.3				.6			
		.6				.8			
Exxon									
1973		-0.7	-0.4	-0.4	-0.3	0			
1976	.2	.6	.5	.7	.6	.6	.8	.9	1.0
Arco									
1974		-0.4	-0.1	.6	.8				
1976		.3		.5					.85
		.4		.6					
Rand 1976		.3							.75
A. D. Little 1976				.7					.8
									1.3
SoCal 1976				.6					.6
Kitimat Pipeline	-0.8	-0.2	.1	.4	.5	.6	.6	.5	.4

Note: the concepts of "surplus" are not necessarily consistent among the various projections.

Source: 1974 and earlier - U.S. Senate Committee on Interior and Insular Affairs, The Trans Alaska Pipeline and West Coast Petroleum Supply, 1977-1982. Washington, 1974.

FEA, FPC, Exxon & Kitimat, 1974 - U.S. Senate, Committees on Commerce and Interior and Insular Affairs, Problems of Transporting Alaskan North Slope Oil to Domestic Markets Washington, 1976.

Federal Energy Administration, North Slope Crude: Where to? How? Washington, 1976.

since 1974 that Canada planned to phase out its crude oil exports to the United States. Progress toward swap arrangements was severely hindered by the attitude of the Department of Commerce under the previous administration that any "exports" were against national policy, and the Department's resulting reluctance to approve pending applications for exchanges which amounted to only a few thousand barrels per day. The United States has yet to set up an orderly process like the present Inquiry in Canada, to resolve these issues.

Despite these failures of insight and procedure, the United States and Canada together are both in a better posture for rational policy-making than was the United States Congress in 1973. Firstly, there are a host of competing approaches to each of the five problems I listed at the beginning of my testimony, each with its own collection of private and governmental advocates. In contrast to the situation that existed during the Alyeska pipeline debate, the choice is not simply yes or no on a single proposition. Competing proposals mean not only that there is a real choice among them, but that government can consider the combinations and permutations among various discrete elements of different proposals. It in principle is possible, for example, to consider combining the Northern Tier concept with a Cherry Point terminal, or the Trans-Mountain pipeline reversal with a terminal at Port Angeles. We have an example of such a process in the gas pipeline determination, where the ultimate decision favored a combination of the concepts put forward separately by the Arctic Gas and Foothills groups.

Secondly, the climate is better for international solutions to the national problems of both the United States and Canada. It appears to me that both countries have drawn back from the most rigid concepts

of energy self-sufficiency advanced in the immediate post-embargo period. Secretary Schlesinger ultimately rejected exports or exchanges with the Far East as a short or long-term solution to the West Coast crude oil surplus problem, but the Administration did fight in Congress to keep this option open until the very last minute, and exports still have substantial backing from top civil servants within the Department of Energy. Also, the Commerce Department under the Carter Administration is no longer obstructing proposals for crude oil exchanges between the United States and Canada, as it did a couple years ago.

Agreement on a gas pipeline has shown both the United States and Canada that they can in fact reach an agreement on hard international issues in about the same time as it requires either one of them to reach an internal decision on the same kind of problem. Indeed, on the United States side of the border we cannot help but be impressed by the simplicity and rationality of your processes for making big choices, compared to our fragmentation of authority between the federal government, the states and local governments, and among various agencies at each level. If the Kitimat proposal combined with some crude oil swap arrangements, for example, emerge as the favorite of a broad spectrum of interests in the United States, it will be not only or mainly because both California and Washington would prefer that someone else take the environmental risks of an oil port. I believe that it will rest as firmly on a widespread conviction that Canada has its procedural house in order, that it is indeed easier to get a final and internally consistent decision in this country than it is, for example, in California.

Finally, there is at this moment no crude oil supply crisis. The absence of a West-to-East transportation system reduces the netback

revenues from Prudhoe Bay for the producing companies and the State of Alaska, and it threatens to raise the prices of petroleum products in the market areas of the landlocked Northern Tier refineries. But there is no reason we cannot get by almost indefinitely with makeshift devices like transshipment of Alaska oil through the Panama Canal, temporary swap arrangements, movement of crude oil in railway tank cars, and the like. These improvisations may be messier economically and environmentally, and they may require more entrepreneurial and regulatory innovation than big long-term solutions, but they will not be as costly in real economic terms or in permanent environmental disturbance, nor as thorny from a political and regulatory standpoint as a decision to spend hundreds of millions or even billions of dollars on superfluous, uneconomic or wrongly located pipelines and terminals.

[Excerpt "Major Issues" from report accompanying S. 1081, Federal Lands Right of Way Act of 1973, June 12, 1973]

III. MAJOR ISSUES

1. ALTERNATIVE TRANSPORTATION ROUTES FOR ALASKA NORTH SLOPE PETROLEUM

In hearings before this Committee on S. 1081 and other pending bills no witness seriously proposed that it would be in the national interest to postpone the development of Alaska Arctic oil and gas indefinitely. The relative lack of controversy over this issue is in contrast to previous hearings before this and other committees, and reflects rapidly changing public perceptions of the nation's energy needs.

There is now an obvious and growing deficiency in domestic production of crude oil and natural gas, leading to a rapidly increasing dependence upon insecure Eastern Hemisphere imports. Moreover, the prices of imported oil make it no longer the bargain it appeared several years ago. With passage of the Clean Air Act, the low sulfur crude oil that can be produced from the Prudhoe Bay field has become significantly more valuable. Meanwhile, the risk of environmental damage from development of North Slope oil and its transportation to markets in the "Lower 48" has been substantially lessened as a result of the stricter environmental stipulations, redundant safety systems, contingency planning and better engineering imposed upon the proposed Trans-Alaska pipeline. Finally, until passage of the Alaska Native Claims Settlement Act, many citizens feared—with some justification—that unchecked commercial development might leave the nation without unspoiled scenery, outdoor recreation areas or wilderness in the vast and heretofore remote territory of Northern and Central Alaska. This apprehension was mitigated by the provisions in the native claims settlement act that at least 80 million acres of land in Alaska will be considered by the Congress for incorporation into new wilderness areas, wild and scenic rivers, national forests, national parks and national wildlife ranges.

Although there now seems to be a broad consensus that Alaska North Slope oil and gas should be developed rapidly, there is controversy concerning the manner and route of its transportation. Serious consideration has been given in the past to the use of icebreaking oil tankers, submarine barges, railroads (a proposition recently revived and advocated by the Government of British Columbia), and even aircraft. The principal controversy today, however, is between advocates of (1) a 48-inch oil pipeline to be constructed from the North Slope to Valdez, Alaska, where the oil would be loaded onto tankers for transportation to ports on the west coast, and (2) a similar 48-inch pipeline overland through Canada to the vicinity of Edmonton, where it would join with existing pipelines (whose throughput capacity would have to be increased) in order to deliver the crude oil to the

Midwestern United States and possibly to the Pacific Northwest as well.

The precise route of the so-called Trans-Alaska pipeline has been set out in the proposal of the Alyeska Pipeline Service Company to the Department of the Interior; the route of the so-called Trans-Canada pipeline is far less certain. Routes considered to the Canadian border are (1) east along the Arctic Coast (through the Arctic National Wildlife Range), (2) south through the Brooks Range and east along the southern edge of that range toward the headwaters of the Porcupine River, and (3) south to the vicinity of Fairbanks, and then southeast up the Tanana River. Through Canada, a route up the Mackenzie River has been most often discussed, but an alternative generally following the Alaska Highway is also under consideration.

Advocates of the Trans-Alaska pipeline include the oil companies with reserves in the Prudhoe Bay field, industry and trade associations, the Alaska and National Administrations, and (apparently) most Alaskans. Those favoring the Canadian alternative include conservation organizations, commercial fishermen groups, state officials and Members of Congress from the Midwest, academicians and Canadian interests.

Apart from the right-of-way width limitation contained in Section 28 of the Mineral Leasing Act of 1920, the principal legal issue in the Federal courts has been whether or not the Interior Department, in evaluating the Alyeska right-of-way application, has given sufficient consideration to its environmental, economic and national security effects relative to an overland pipeline through Canada.

During Committee's examination of right-of-way policy and proposals for transportation of North Slope oil, the main points of controversy regarding the competing transportation systems have been the following:

(1) *Environmental Impact*—Proponents of the Canadian pipeline contended that its environmental risks are less serious than those of the Trans-Alaska route. They emphasize the latter's crossing of an active earthquake belt, the danger of marine pollution stemming from the ocean leg of the oil transportation system, and the possible reduction of environmental damage if oil and gas pipelines from the North Slope were confined to the common corridor, rather than two or more routes. Advocates of the Alyeska proposal maintain that there are some aspects in which Trans-Canada oil pipeline would be more damaging or more hazardous to the environment, for example, the very length of the pipeline, the number of miles it would cross the zone of discontinuous permafrost, and the number of major river crossings.

(2) *Markets*—A second point of contention is whether or not the West Coast of the United States (PAD District V) will be able to absorb all the crude oil that would be shipped there upon completion of the Trans-Alaska pipeline. A surplus of crude oil on the West Coast of the United States would have to be marketed east of the Rockies with considerably greater transportation expense or else exported. Advocates of the Alyeska project now acknowledge that the pipeline would have created a crude oil surplus on the West Coast if it had been completed in 1972 or 1973 as originally anticipated. The present throughput schedule, however, is not expected to be sufficient to meet all of the District's petroleum demands unless major new reserves are

discovered and developed offshore from California or in the Gulf of Alaska. Accordingly, the likelihood of major new oil discoveries in Southern Alaska or off the California coast and the desirability of exporting Alaska oil to other countries during an era of domestic shortages are both among the critical issues of controversy. (See 2. Exports of Alaskan Oil, below.)

The relative dependency of the two regions (the West Coast and the rest of the United States) upon imports from insecure sources is also a point at issue. The likelihood of additional production from new West Coast areas other than the North Slope is critical to this debate. Since Alaskan oil will at the margin be backing out Middle Eastern oil in either market, however, the principal effect of the choice of routes upon the total level of import dependency would be related to the time at which deliveries of North Slope oil began.

(3) *Economic Benefits*—Supporters of the Canadian pipeline proposal point to the fact that crude oil prices are higher in the upper Midwest than in California, and offer transportation cost calculations indicating that the "netback" value of North Slope oil would be greater if it were delivered to Chicago than to Los Angeles. They conclude, therefore, that the oil companies, the State of Alaska (in terms of the value of its royalties and production taxes) and the national economic welfare would all be served best by the Trans-Canada pipeline. The general assumptions of this argument were accepted by the Interior Department in its *Economic and Security Analysis of the Trans-Alaska Pipeline*. But the Interior Department pointed out, and the independent proponents of this argument acknowledge, that such economic benefits would be more or less wiped out by the discounting of future benefits, if a Trans-Canada pipeline would take two or more years longer to construct than a Trans-Alaska pipeline. Some supporters of the Trans-Alaska pipeline now dispute the earlier estimates both of the relative construction costs for the two pipelines (and thereby crude oil transportation costs) and the expected future price differentials between the Midwest and the West Coast; they assert that the netback value of the oil will actually be higher if it is delivered to western markets.

(4) *Ownership and Control*—Supporters of the Trans-Alaska pipeline point out that a pipeline across Canada would be regulated by the Canadian government, and that statements of Canadian officials indicate that a controlling equity in such a pipeline would have to be held by Canadian citizens. In addition, oil pipelines in Canada must generally be operated as common carriers; this requirement might result in the backing out of Alaskan oil to make room for oil produced in the vicinity of the pipeline in Canada. In addition, Canada's new controls over oil and gas exports raises the possibility that Alaskan oil destined for U.S. markets could in an emergency be diverted to Canadian customers, leaving the United States short of those supplies.

Advocates of the Canadian pipeline reply, however, that there are now no known Canadian reserves in the Arctic whose production could displace Alaskan oil carried by a Trans-Canada pipeline, and that the pipeline's throughput capacity could be increased by "looping" or other means well in advance of the appearance of any excess supply. They argue, moreover, that to the extent that the existence of a pipeline through Canada from Alaska to the Midwest does encourage the

exploration and development of Canadian Arctic resources, any oil exported to the United States via that pipeline is a benefit to United States interests because it would displace oil from less secure foreign sources. The notion that Canada might divert oil of United States origin to her own uses is discounted, both because, in that instance, the United States could simply cease shipping the oil, and because the United States holds a comparable Canadian hostage; most of eastern Canada's own crude oil supply enters that country through pipelines across the State of Maine.

(5) *Other Issues*—Other issues raised in the debate have included the economic and scheduling relationship between alternative pipelines to carry Prudhoe Bay crude oil and the pipelines for the natural gas that will be produced in association with it; the problems of financing a longer pipeline; the respective impact of the two pipelines on the U.S. balance of payments; the relative physical security of the two routes; the employment, economic and inflationary effects of construction within Alaska; and the comparative impacts upon competition and market power.

The Committee on Interior and Insular Affairs did not regard any one of the foregoing arguments or any group of them as conclusive in favor of either of the competing pipeline proposals. In some areas of debate the preponderance of evidence or analysis seems to favor one side or another, but no area of controversy, however, is without ambiguous or speculative elements. Even the most expert assessments made today are likely to be modified by new information that will become available or by unforeseen changes in circumstances occurring before either pipeline could be completed. Much information can be obtained only in the course of construction.

Any assessment based solely upon the foregoing considerations regarding the relative merits of the two pipeline routes clearly must depend heavily upon subjective judgment. There is, however, one consideration in favor of the Trans-Alaska pipeline that the Committee found compelling. This consideration was the additional delay and uncertainty associated with the Trans-Canada pipeline. Regardless whether the 1969 decision of the owner companies in favor of an all-Alaska route was the wisest or the most consistent with the national interest at that time, and regardless whether the Administration's early commitment in favor of that route was made on the basis of adequate information and analysis, *the Committee determined that the Trans-Alaska pipeline is now clearly preferable, because it could be on stream two to six years earlier than a comparable overland pipeline across Canada.*

The necessary business organization, financial arrangements, engineering design and logistical preparations for the Alyeska project have been completed, so that construction could begin as soon as a right-of-way is granted, while *none* of these necessary preparations has been accomplished for a Trans-Canada route. These tasks are expected to take about two years, quite apart from the legal, political and administrative hurdles that must be crossed before construction of a Canadian pipeline would be authorized. In addition to the delays that could be normally anticipated at each of these steps, a number of them suggest the possibility of indefinite delays or even the project's ultimate impossibility.

In the absence of a complex treaty enabling constructing and operation of an international pipeline as a unitary enterprise, the interested private parties would have to organize a separate consortium or business organization on each side of the border for financing, building and operating the two segments of the pipeline, and resolve the complicated relationships between them. Discussions would have to be conducted with, and applications submitted to, several Canadian agencies and the final plan would have to be submitted to the Federal Cabinet. Before approval could be granted numerous modifications and perhaps corporate reorganizations would be necessary. The project would run gauntlets of domestic Canadian opposition, and of attempts to influence the shape of the project by such interests as northern Indians and Eskimos, environmentalists, Canadian economic nationalists, and provincial interests. The prospects of ultimate approval by the Cabinet might well be jeopardized by the minority status in Parliament of the Government's party.

A new pipeline route through Canada would, of course, require a new environmental impact statement and public hearings, and involves the possibility of a new round of litigation within the United States.

Any assessment today of the time required for approval of a Trans-Canada pipeline project or of the probability of its ultimate approval in any form is purely speculative. *It is, moreover, doubtful whether further study could contribute to the accuracy of such speculations.* The seriousness of the obstacles at each organizational, financial and political step are testable only by an actual attempt to get approval for a specific proposal, and no such proposal exists today.

The listing of difficulties and uncertainties involved in getting approval for construction of a Canadian pipeline should not obscure the remaining difficulties and uncertainties facing the Trans-Alaska project: continuing litigation based upon National Environmental Policy Act requirements; litigation between the owner companies and the State of Alaska over a right-of-way across state-owned land and regarding state taxation and regulation; the possible vulnerability of the project under antitrust laws; and coastal zone legislation and regulation, which might conceivably affect the ability to land Alaska oil at West Coast ports.

Except for uncertainties regarding terminals in Washington and California, however, all the real or potential problems of law or political controversy facing the Trans-Alaska pipeline also face its Trans-Canada counterpart. In assessing the probable completion date of the latter project, the time required to resolve these problems must be added to both the additional time necessary for route selection, design, and logistical preparations, and the time involved in obtaining Canadian government approval. Moreover, to the remaining uncertainty arising from United States and Alaskan law and politics, which affect both pipeline proposals, must be added the uncertainty stemming from Canadian law and politics, and from the complexities of the international relationship.

In light of the existence of significant uncertainties which are unique to each of the two routes, it is arguable that the interested companies and the Federal government should have devoted substantial effort to investigations and preparations leading to development of more than one transportation system. The Committee believes that such a two-

option strategy was and is warranted, not only because of uncertainty, but because of the high probability that two or more pipelines will ultimately be required to transport Arctic crude oil.

To a limited degree, the companies operating on the North Slope have in fact seriously explored alternatives to the Trans-Alaska pipeline. Humble Oil and Refining Company (now Exxon) converted the *Manhattan* into an icebreaking tanker for an experimental journey through the Northwest Passage to Prudhoe Bay and return, while the companies with major interests in North Slope reserves joined to conduct the Mackenzie Valley Pipeline Study, which concluded in 1972 that a Trans-Canada oil pipeline would be physically and financially feasible, and environmentally acceptable.

There has, however, been no actual route selection or engineering design leading to a specific Trans-Canada pipeline proposal. The companies have not formed an organization to design or build a pipeline nor have they initiated discussions with Canadian government agencies leading to a right-of-way application. There seem to be several reasons for their failure to move ahead on both alternatives. First, the companies, the Interior Department and the State of Alaska have tended from the beginning to underestimate the engineering, environmental, legal and political difficulties of their preferred route. Also, the advocates of an all-Alaska pipeline seem to have feared that serious consideration of a Canadian route would, by giving it additional credibility as a potential alternative, undermine their effort to get early approval of the Alyeska right-of-way application. Finally, exploration of the Canadian alternative beyond the present feasibility study (which cost about \$7 million) requires selection of a specific route, which in turn necessitates even more costly on-the-ground surveys, including extensive core drilling.

Route selection, engineering design, and preparation of an environmental impact statement would involve tens—perhaps hundreds—of millions of dollars. In the past these costly activities might have been conducted in stages after, or at worst simultaneously with, application for and receipt of the necessary governmental permits, but both United States and Canadian policy now require these steps to be substantially completed before applications will even be considered. The companies cannot privately justify the major expense that would be necessary to prepare an application for the permits required to build a Canadian pipeline, if it were only to serve as a hedge against the possibility they would not be permitted to complete the Trans-Alaska pipeline. Hesitation based upon financial prudence has been reinforced by the fear that any such preparation would be used as political ammunition against the pending Alyeska application (as the Mackenzie Valley Study is indeed now being used).

It is likely, however, that Arctic crude oil resources will be much greater than indicated by present proved reserves estimates. Development of these resources will justify and require more than one 48-inch pipeline within a decade, and argues in favor of an early planning and organizational effort to build two pipelines. The probable future reserve additions, however, have so far played no part in corporate planning for transportation of North Slope oil. The 9.6 billion barrels of proved reserves currently estimated for the Prudhoe Bay field barely exceeds the minimum required for the throughput guarantees

necessary to finance a single 48-inch pipeline; it certainly cannot be used as security for two such pipelines.

Proved reserves as estimated by the American Petroleum Institute are an exceedingly restricted concept. There is little question that the reserve estimate for the Prudhoe Bay field will grow substantially, as both exploratory and development drilling delineate the field more completely, and as increased crude oil prices and improved methods make more complete recovery of the discovered oil-in-place commercially feasible. Typically, these two kinds of adjustments ("extensions" and "revisions," respectively) increase the proved reserves estimates for a newly discovered oil field by a factor of three to ten over its lifetime. Moreover, North Slope oil production will not be limited to the Prudhoe Bay field; giant oil fields are seldom found alone, and only a tiny proportion of the Arctic Slope's favorable geology has been explored geophysically, much less tested by the drill. It is worth noting that the Committee is currently considering measures to authorize the exploration and development of the 26 million acre Naval Petroleum Reserve, whose boundary is a few miles west of the Prudhoe Bay field.

The excellent prospects for an early expansion of North Slope oil and gas reserves sufficient to justify a second pipeline will not be realized until the industry is reasonably confident that a first pipeline will in fact be built. Throughput guarantees adequate to finance that pipeline are possible on the basis of present reserve figures, so that there is little justification for costly outlays on development drilling beyond the level (already surpassed) that could be accommodated by the Alyeska pipeline's planned initial throughput of 600,000 barrels per day (recently reported to have been increased to 1,200,000 barrels). Exploration on adjacent lands already under lease is also at a low ebb, and it is understandable that the State of Alaska, the Interior Department, and Alaska Native groups would postpone additional lease sales to a time when industry interest—and bonus bids—would be higher. A revival of intensive exploration effort depends above all upon the commencement of pipeline construction.

In weighing these manifold considerations, the Committee concluded that it would be a mistake to view the Trans-Alaska pipeline and Trans-Canada pipelines as competitors, except with respect to which of them could actually be completed first. Title II of S. 1081 authorizes the President to undertake negotiations with Canada and other actions leading toward construction of a crude oil pipeline across Canada from Northern Alaska to the Midwest, and it expresses the Committee's judgment that:

1. Federal planning for transportation systems to deliver Arctic crude oil should take account of the likelihood of greatly increased reserves in the Prudhoe Bay field, on other State, Federal, and Native-owned lands in northern Alaska, from Naval Petroleum Reserve No. 4, and from Northwestern Canada.

2. Two or more pipelines for crude oil from Arctic Alaska, or from Alaska and Arctic Canada together, serving different markets areas in the United States (and Canada) will be feasible, desirable and necessary in the foreseeable future.

3. Completion of the first crude oil pipeline from Prudhoe Bay is urgently in the national interest, and construction should begin as soon

as there is assurance its construction and operation will be environmentally sound.

4. The Trans-Alaska pipeline proposed by the Alyeska group ought to have priority in time, because of the overwhelming probability that it could be completed two to six years sooner than a Trans-Canada pipeline. The Trans-Alaska project is at a far more advanced stage of preparation and avoids the many uncertainties involved in organizing, financing and obtaining approval of an international pipeline.

5. Nevertheless, the very likelihood of extended delays in approval and construction of a Trans-Canada pipeline dictates that concrete efforts leading toward construction of such a pipeline should be started now. This beginning ought to be made notwithstanding the present insufficiency of proved reserves to provide private justification for a second oil pipeline, and without prejudice to the Alyeska proposal.

6. In order to protect both United States and Canadian interests in this multi-billion dollar project, and in order to minimize future international conflict and misunderstanding regarding its operation and regulation, detailed and explicit intergovernmental understandings, and perhaps a treaty, are necessary regarding ownership, financing, regulation and taxation.

7. It is possible, prior to the development of proved reserve figures adequate to support the private financing of two pipelines, that no competent private entity will take responsibility for the preparations prerequisite to submitting necessary applications to Canadian governmental agencies. In such an instance, appropriate agencies of the United States government should accept this responsibility.

2. EXPORTS OF ALASKAN OIL

The question of possible exports of crude oil produced on Alaska's North Slope has been raised repeatedly before this Committee and elsewhere in connection with consideration of alternative pipeline routes for that oil. Some have contended that, despite the national deficiency in crude oil supply, the oil companies with major reserve interests on the North Slope chose the Trans-Alaska alternative in order to be in a position to export a significant fraction of its throughput to Japan.

Despite strong denials by spokesmen for the companies and the National Administration, these allegations have not been *totally* implausible. Their most important foundation has been the possibility of a crude oil surplus on the West Coast. The throughput schedules announced for the Trans-Alaska pipeline in 1969 and 1970 considerably exceeded the anticipated domestic supply deficiency in P.A.D. District V (the West Coast) for several years after the pipeline's completion date. Notwithstanding this expected crude oil surplus on the West Coast, the owner companies indicated no clear plans for shipping Alaska oil to other United States markets.

With the prolonged delays in authorization of a Trans-Alaska pipeline right-of-way, and the repeated slippage of the expected completion date, however, projected West Coast oil demand in the early years of pipeline operation has greatly increased; at the same time, projected onshore production in California has declined. Current estimates by both the Interior Department and industry groups now indi-

cate that demand in P.A.D. District V would substantially exceed domestic production in the District, even including North Slope production.

These recent projections from government and industry sources do not completely dismiss the possibility of crude oil surpluses on the West Coast after the pipeline is completed, however, because these projections assume that no major reserve additions will occur in the region. Areas in which there could be significant reserve additions include the Gulf of Alaska, Lower Cook Inlet and Santa Barbara Channel provinces, where major new lease sales are scheduled or are under active consideration.

Public suspicions that exports were to be a significant function for the Trans-Alaska pipeline have been rekindled from time to time by a number of circumstantial indications. Premier Sato suggested in a 1971 interview in Anchorage that Japan was looking forward to receiving crude oil by way of the pipeline; a consortium of Japanese companies obtained a part interest in some (as yet unproved) North Slope leases; and Phillips Petroleum Co. proposed to the Cabinet Task Force on Oil Import Control that barrel-for-barrel import quotas be granted to producers who exported crude oil from the United States.

The "import-for-export" proposal envisioned a crude oil excess in one part of the United States, presumably the West Coast, in the context of a general national deficiency, and was aimed at reducing transportation costs. Alaska crude oil could be sold in Japan, for example, offsetting Caribbean or Middle Eastern imports to the East Coast. Not only would the total tanker distance be less than an Alaska-East Coast route, but the shippers could reduce costs further by using tankers of foreign registry, rather than the domestic vessels required in the United States coastal trade. The importance of this proposal was probably exaggerated at the time, however. Phillips did not (and does not) control significant North Slope reserves. The proposal was not pressed nor endorsed by the companies that did have such reserves, and it was never seriously entertained by the Task Force.

Price relationships argued strongly in the past against the existence of plans to export Alaskan crude oil. Because of United States quota restrictions on oil imports, the prices of crude oil on the West Coast of the United States were until 1972 about \$1.50 higher than landed costs of comparable Middle Eastern crudes in Japan, and U.S. Midwestern prices were on the order of two dollars higher. If these differentials continued, there would be little incentive to export Alaskan oil without the import-for-export allowance; it would clearly be worthwhile to transship any oil surplus in District V to the Gulf or East Coast or even to the Midwest, rather than to export it.

Alternatives considered by the companies (but not actively prosecuted) for getting North Slope oil to Midwestern or Eastern U.S. markets included a tanker route around the Horn; a pipeline across Panama linking two tanker segments; reversing the direction of the Four Corners pipeline in order to carry crude oil from Southern California to Texas and thence to the Midwest; reversing the direction of the Transmountain Pipeline between Alberta and Puget Sound, then using the Interprovincial Pipeline to deliver crude oil to the Midwest; and construction of a new pipeline from Puget Sound to the Midwest along the Burlington Northern or Milwaukee Railroad right-of-way.

Although the prospect of significant crude oil surpluses on the West Coast of the United States in the late 1970's and early 1980's have diminished somewhat (but not completely), the rising world prices of oil and devaluation of the dollar have increased the comparative attractiveness of export markets. If crude oil prices in both markets (Japan and Southern California) are determined in the future by transportation costs from the Persian Gulf, so that landed prices per barrel in Japan remain 25 to 50 cents lower than in California, this differential plus the 21-cent license fee announced in April 1973 (when the quota restrictions were removed) would seemingly more than offset the transportation cost advantage of shipping Alaska oil to Japan. But if the past two years' trends in exchange rates and world oil prices were to continue, North Slope oil would be marketable in Japan at considerably higher prices than on the West Coast of the United States by the time a Trans-Alaska pipeline could be on stream.

Three companies control more than 90 percent of the proved reserves of the Prudhoe Bay field, the largest in North America. This field, whose production will dominate West Coast oil supplies will be developed and produced as a single unit pursuant to state conservation law. The same companies will also own 82 percent of the Trans-Alaska pipeline, which is organized as an undivided interest joint venture. West Coast crude oil prices, the companies' profits and the state's revenues, and fuel prices for West Coast consumers, will all be affected powerfully by the amount of oil that the companies and the state permit to be delivered to District V markets. There is no assurance that all the oil which is "surplus" to the West Coast (and thereby "available for export") in the companies' eyes will be truly in excess from the standpoint of consumers, national security or national economic efficiency.

Because of uncertainty regarding the volume of District V crude oil production and the imponderable but almost surely enhanced commercial attractiveness of oil exports to Japan in future years, the Committee is of the view that even though it has had repeated assurances from the oil companies and the Administration that the former "have no intention" to export crude oil produced on Alaska's North Slope, there should nevertheless, be a statutory check upon such exports.

Section 114 of the Act expresses the Committee's concern that the companies that control the North Slope oil reserves might decide, on the basis of private commercial advantage, to make export sales or exchanges that result in a net reduction of crude oil supplies available to the United States, or an increased dependence of the United States upon insecure foreign supplies.

The Committee did not believe that a categorical prohibition of oil exports would be wise, however. There might well be a situation in which export-for-import arrangements would be of benefit to both the United States and its trading partners. For example, the export to Japan of Alaskan crude oil supplies to west coast needs in exchange for Latin American or Eastern Hemisphere crude (which would otherwise have been transported to Japan) for the Northeast could, under some circumstances, be a better arrangement to bring the Northeast region additional crude oil supplies than either transcontinental pipelines or a tanker route around the Horn. A total prohibition

might, in addition, encourage other countries to restrict exports to the United States, or cripple efforts to provide cooperation or sharing of restricted supplies among consuming countries.

Section 114 provides that any export arrangement be critically examined in light of the national interest to assure that a few pennies per barrel in private transportation expense are not saved only at a great cost to the total security of national energy supplies. Issues that might be scrutinized in such examination include whether any export at all is in the national interest, the duration of the export contract, the international consequences of diverting such exports to domestic use in an emergency, the availability of transport capacity to do so, and the net impact of any sale or exchange upon the United States balance of payments.

The provisions of the Section effectively place the burden upon an applicant for an export licence to demonstrate that exports of North Slope crude oil are indeed in the national interest, and by requiring an express Presidential finding, compel an examination of that interest at the highest levels.

THE ENTITLEMENTS SYSTEM

The system for regulating the prices of crude oil in the United States is similar to Canada's in that its objective and result is to control the wellhead price of most domestic crude oil at levels substantially below the cost of imported oil, and at the same time to equalize the average prices paid by different refiners for crude oil, regardless of the mix of imported and domestic oil they receive. Unlike the Canadian system which is based upon a tax on domestic crude oil which subsidizes imports, the United States relies upon direct ceilings on wellhead prices. There are essentially three "tiers" of prices: "old oil", with a wellhead price of about \$5.00 per barrel; "new oil" (or "upper tier") oil, whose price is around \$11.00, and uncontrolled oil, which includes stripper well production (production from wells averaging less than 10 barrels per day) and imports.

This multi-tier price control system is workable only if it is combined with measures to equalize the cost of crude oil to refiners who have access to varying proportions of low-priced old oil. The "entitlements" system is designed for this purpose. Generally, the system requires those refiners who acquire a disproportionate amount of price-controlled domestic crude oil to subsidize those refiners who run a larger proportion of uncontrolled oil by purchasing entitlements from them. I shall not attempt to explain the system in its full complexity, but only its general principles. The departures from these principles which favor small refiners are summarized in appendix III.

Refiners are required to have an entitlement for each barrel of "deemed old oil" they obtain. Deemed old oil is made up of all lower tier crude oil plus a specified fraction of the amount of upper tier domestic oil. Refiners obtain these entitlements either by "earning" them in pro-

portion to the amount of crude oil they run, or by purchasing them from other refiners who have earned more entitlements than they need.

The price of an entitlement, therefore, is the amount a refiner must pay to acquire a barrel of deemed old oil in excess of the proportion of such oil in the nation's petroleum supply --- the "national domestic crude oil supply ratio." The entitlement price is calculated as the differential reported each month between the weighted average cost per barrel to refiners for lower tier oil and that of imported oil, less 21 cents which corresponds to the import fee (tariff). The number of entitlements earned by a refiner is equal to the number of barrels of crude oil he runs each month, multiplied by the national domestic crude oil supply ratio.

In October 1976, for example, this ratio was .292905, the value of an entitlement was \$7.84, and refiners were required to have an entitlement for each barrel of old oil and .167604 entitlements for each barrel of domestic upper tier oil they acquired. The effect therefore is that purchasers of uncontrolled oil were granted a net subsidy of \$2.31 per barrel, i.e., $.292 \times \$7.84$; purchasers of upper tier oil were subsidized by \$0.98 per barrel, i.e., $(.292 - .168) \times \$7.84$; and purchasers of old oil paid a net penalty of \$5.59 per barrel, i.e., $(1.0 - .292) \times \$7.84$. With the exception of the preference for small refiners, the result was supposed to be a rough equalization of crude oil costs to all refiners regardless of the origin of their supply.

These subsidies and penalties can be expected to change over time along with the three parameters of the entitlements system. The national domestic crude oil supply ratio can be expected to fall as domestic crude oil and particularly old oil decline as a proportion of the nation's total petroleum supply. The value of an entitlement will tend to increase as the price of imported oil increases, at least so long as domestic oil prices are held constant. What happens to the amount of deemed old oil calculated

for each barrel of upper tier oil depends upon whether the upper tier price ceiling or the cost of imported oil increases more rapidly.

Although the prices of domestically produced crude oil generally are determined by their wellhead price ceilings, there are significant instances where producers are not able to receive the nominal ceiling price. In these instances, the actual price is determined by the entitlements treatment of the category of oil into which the production falls. Alaska North Slope crude oil is such an instance. As new or upper-tier oil according to the regulations, the North Slope producers are allowed to receive a wellhead price of more than \$11 per barrel. The cost of transportation from the wellhead to the refinery is so great, however, that the wellhead price calculated by subtracting transport costs from the value at the refinery is several dollars lower. The Federal Energy Administration has decided to treat Prudhoe Bay crude oil as imported oil rather than new oil for purposes of the entitlements program, however. This means that the refiners of such oil do not need to purchase entitlements in order to acquire it, and they are therefore willing to pay as much for it as they would for comparable grades of imported oil. If the oil were treated like other new oil, however, they refiners would have to purchase a partial entitlement for each barrel they acquired, and the wellhead price would be further reduced by the value of a partial entitlement required for new oil.

Another instance in which it is entitlements treatment rather than the price ceiling that determines the actual price in the field is that of heavy, high sulfur California oil. Most of this oil is "old" oil according to the regulations, and refiners who buy it must use a full entitlement for each barrel. Because of the relatively low quality of this oil, however, refiners will buy it only at a discount. Subtracting

the price of an entitlement from the value of the crude oil to the refiner in some cases leaves the producer only \$3 to \$4 dollars per barrel. The growing surplus of high sulfur, low gravity crude oil on the West Coast created by the addition of North Slope supply is expected to reduce the value of this oil further. Since much of it has relatively high production costs, producers and California energy officials fear that lack of an outlet for North Slope crude will force the shutting-in of substantial volumes of California production --- at best it will reduce the revenues of producers and royalty owners including the state and several of its municipalities.

THE SMALL REFINER BIAS

Source: Howard Useem, U.S. Library of Congress (July 1, 1977)

The following are brief descriptions of the various Federal programs and regulations which aid small refiners and refineries. Some of these have benefits which can be directly calculated in terms of dollars per barrel; other have benefits whose value is not so easily calculated. It should be noted that all of the programs and regulations listed, with the exception of the fee-free imports of crude oil program (item 5), apply on a refiner (corporate) basis. The fee-free import of crude oil program is granted on a refinery (plant) basis. Also, this memorandum does not list benefits granted to small refiners through exceptions and appeals.

1) Department of Defense (DoD) Small Refiner Set-Aside

The DoD set-aside program for defense fuel procurement^{1/} is limited to refiners who employ fewer than 1,500 employees and have a throughput capacity of not more than 50,000 barrels per day. The program "sets-aside" a portion (usually about 1/3) of the Defense Fuel Supply Center's (DFSC)

^{1/} Authorized by the Small Business Act (as amended) 15 U.S.C. 631 et seq; regulations in 13 CFR 121.3-2, and Federal register, Vol. 41, No. 180 (9/15/76).

contracts for fuel supplies that only small refiners can bid on. On the remaining contracts, small refiners can compete with the large refiners if they wish. Under this program, small refiners are not given any price advantage over large refiners, they are only assured a share of the market.

In fiscal year 1976, of the DFSC's \$2.211 billion in domestic fuel procurement contracts, about \$705 million (32%) were awarded to small refiners.

2) Naval Petroleum Reserves (NPR) Small Refinery Set-Aside

Under the NPR set-aside program 1/ the Secretary of the Navy is authorized to set aside up to 25 percent of the production from the Naval Petroleum Reserves for sale to small business refiners. To qualify as a small business, the refiner must employ fewer than 1,500 employees, and have a throughput capacity of not more than 50,000 barrels per day.

In this program, as in the DoD small refinery set-aside program, the small refiners participating are not given any price advantage over the large refiners; they are only assured a share of the oil sold. In contracts let on January 7, 1977 of the 133,820 barrels per day of NPR crude sold, 33,000 barrels per day (25%) were sold to small refiners.

3) Sale of Outer Continental Shelf Royalty Oil to Small Refiners

Under the Outer Continental Shelf Lands Act 2/ the Federal government collect a 1/6 royalty of the oil produced from the OCS. The royalty

1/ P.L. 94-258, Title 2, Section 7430(d) (3) and (4).

2/ 67 Stat. 462; 43 U.S.C. 1331 et seq.

oil sales are limited to refiners who employ fewer than 1,500 persons and have a throughput capacity of not more than 45,000 barrels per day.

Since small refiners tend to pay premium prices for crude oil due to their small purchases, the acquisition of the royalty oil at the fair market value provides small refiners with a cost saving. The Federal Energy Administration has estimated that the savings is in the \$0.20 per barrel to \$0.40 per barrel range.

In March 1977, 2,501,610 barrels of royalty oil were sold to small refiners.

4) Small Refiner Bias in the Entitlements Program

The small refiner bias in the entitlements program 1/ gives small refiners additional entitlements inversely proportional to their crude runs to still. The additional entitlements are calculated as follows:

Each small refiner with a daily average volume of crude oil runs to still of less than 175,000 barrels for a particular month shall be issued the following number of additional entitlements for each day of that month: (i) For each small refiner with a daily average volume of crude oil runs to stills of 100,000 to 175,000 barrels, 1,258 entitlements less the number of entitlements obtained by multiplying the difference between that small refiner's daily average volume of crude oil runs to stills (in thousands of barrels) and 100 by 16.7733; (ii) for each small refiner with a daily average volume of crude oil runs to stills of 50,000 to 100,000 barrels, 2,079 entitlements less the number of entitlements obtained by multiplying the difference between that small refiner's daily average volume of crude oil runs to stills (in thousands of barrels) and 50 by 16.42; (iii) for each small refiner with a daily average volume of crude oil runs to stills of 30,000 to 50,000, 3,123 entitlements less the number of entitlements obtained by multiplying the difference between that small refiner's daily average volume of crude oil runs to stills (in thousands of barrels) and 30 by 52.2; (iv) for each small refiner with a daily average volume of

1/ 10 CFR 211.67.

crude oil runs to stills of 10,000 to 30,000 barrels, 2,288 entitlements plus the number of entitlements obtained by multiplying the difference between that small refiner's daily average volume of crude oil runs to stills (in thousands of barrels) and 10 by 41.75; and (v) for each small refiner with a daily average volume of crude oil runs to stills of zero to 10,000 barrels, 228.8 entitlements for each 1,000 barrels of that small refiner's daily average volume of crude oil runs to stills. 1/

In March 1977, based on an entitlement cost of \$8.71, the small refiner bias was worth:

<u>Refinery Size</u> <u>(Bbl/d)</u>	<u>Value of the Small Refiner Entitlement Bias</u> <u>(\$/Bbl of crude runs to still)</u>
10,000	\$1.99
30,000	.91
50,000	.36
100,000	.11
150,000	.02
175,000 and over	.00

In March the total value of the small refiner bias was \$64.9 million.

5) Fee-Free Imports of Crude Oil

Crude oil imported into the U.S. is subject to an afixed import duty of 10.5 cents per barrel plus that portion of the 21 cent per barrel import fee which will not bring the sum of the two charges to more than 21 cents per barrel.

Refineries 2/ which have begun production, or have expanded production after January 1, 1973 are exempt from paying import fees on 75% of their refinery throughput for a period of five years.

1/ 10 CFR 211.67(e).

2/ In distinction to refiners.

Facilities which came onstream before January 1, 1973 are exempt from paying import fees in accordance with the following schedule:

<u>Refiner's Average Throughput (B/D)</u>	<u>Fee-Free Allocations, Percent of Refiner's Throughput</u>	
	<u>PAD I-IV</u>	<u>PAD V</u>
0-10,000	21.7	67.5
10-30,000	13.0	16.9
30,000+	-	5.6
30-100,000	7.6	-
100,000	3.8	-

These exemptions are scheduled to be phased out by 1980.

6) Mandatory Allocation Program

The mandatory allocation program (also known as the "buy/sell program") was established by the Emergency Petroleum Allocation Act.^{1/} This program helps provide independent and small refiners with an assured access to supplies of petroleum at the market price.

7) Domestic Crude Oil Supplier/Purchaser Regulations

The supplier/purchaser regulations^{2/} require the continuation of agreements for the sale or exchange of oil that were in effect on December 1, 1976 until the elimination of the allocation program.

This tends to protect the supply of oil to small and independent refiners.

^{1/} P.L. 93-159

^{2/} 10 CFR 211.63

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