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result, these ships are least likely to be idled except in the high export cases where the ship would be laid-up and the charterer would be faced with paying charter costs on unused tonnage. The ships that are most vulnerable to displacement are those owned by independent tanker operators and on short-term charters. These operators are highly likely to default on their Title XI guaranteed loans. Further, because the ANS trade is not isolated from the other domestic trades, there will be a spillover impact into the remainder of the U.S. tanker trades, making tankers employed in these other trades equally vulnerable to lay-up.

This loss of tonnage will have several consequences for both the public and private sectors. The losses to the Federal sector include outlays to pay off Federally guaranteed ship mortgages, loss of tax revenues, and reduced national defense readiness. The losses to the private sector include non-government guaranteed mortgage defaults, loss of seafaring employment, and loss of revenue by the U.S. ship operating and shipbuilding and repair industries.

The direct impact on the component of the maritime industry currently employed in the ANS trade has been estimated for each level of the export options. Direct impacts have been calculated in terms of (1) the number of tankers idled by the option, (2) the total deadweight tonnage of these tankers, (3) the total number of seafaring jobs involved, (4) the amount of Federally guaranteed loans outstanding on these vessels, and (5) an estimate of the unsecured private debt (no Federal guarantees) on the vessels. As can be seen from Table IV (F) 3, export of ANS crude at an unconstrained level would lay-up 32 tankers totaling 4.3 million DWT, exposing approximately $382 million of Federally guaranteed loans to default. Of this figure, about $191 million would be subject to nearly immediate default due to the nature of the charter commitments and lack of employment prospects for the affected tankers. The estimates in Table IV (F) 3 are based upon the mid-range forecasts of ANS production used in this study. If ANS production turns out to be higher than these forecasts, there would be less impact to the fleet under the "no export" scenarios than is shown in this table, but there would be little change in the results shown for the various export scenarios. The "no export" scenario does include the impact of the All American Pipeline on domestic tanker requirements.

Even if a portion of the export trade were reserved for U.S.-flag vessels, there would be no reduction in the Title XI losses incurred by the domestic tanker fleet. This result occurs because the exports would probably be carried on the existing tankers that were built with construction subsidy for the U.S. foreign trade and that have not repaid CDS to gain eligibility for the domestic trades. Due to lower capital costs, these tankers would be able to carry the oil at lower freight rates. At best, the effect of reserving a portion of the export trade for U.S.-flag tankers might be the prevention of Title XI defaults on otherwise idle foreign trade tonnage.

TABLE IV (F) 3

Impact of [illegible] Crude Oil Exports on the United States Flag Tanker Fleet
Losses to the Federal Government and Shipowners
Full Title XI Exposure
At Discount Rate, 1982 Dollars

Export Scenario	Change Due to Exports: No. of Vessels	Change Due to Exports: DWT	Change Due to Exports: Fed. Title XI at Risk of Default	Change Due to Exports: Estimated Owner's Exposure	Change Due to Exports: No. of Scrappers	Total Change Due to Lower Production and Redistribution: No. of Vessels	Total Change Due to Lower Production and Redistribution: DWT	Total Change Due to Lower Production and Redistribution: Fed. Title XI at Risk of Default	Total Change Due to Lower Production and Redistribution: Estimated Owner's Exposure	Total Change Due to Lower Production and Redistribution: No. of Scrappers	Total Change Due to Exports Combined With Lower Production and Redistribution: No. of Vessels	Total Change Due to Exports Combined With Lower Production and Redistribution: DWT	Total Change Due to Exports Combined With Lower Production and Redistribution: Fed. Title XI at Risk of Default	Total Change Due to Exports Combined With Lower Production and Redistribution: Estimated Owner's Exposure	Total Change Due to Exports Combined With Lower Production and Redistribution: No. of Scrappers
No Exports															
1987	0	0	00	00	0	0	0	00	00	0	0	0	00	00	0
1990	0	0	00	00	0	6	639,300	001,699,216	00,043,011	306	6	639,300	001,699,216	00,043,011	306
Total, No Exports	0	0	00	00	0	6	639,300	001,699,216	00,043,011	306	6	639,300	001,699,216	00,043,011	306
50,000 B/D															
1987	2	133,900	016,376,000	01,300,620	136	0	0	00	00	0	2	133,900	016,376,000	01,300,620	136
1990	1	190,000	003,613,032	07,[illegible],699	62	6	639,300	001,699,216	00,043,011	306	7	829,300	0123,313,048	016,977,000	000
Total, 50,000 B/D	3	326,700	060,[illegible]	00,000,000	198	6	639,300	001,699,216	00,043,011	306	9	966,300	0144,911,048	000,300,000	304
100,000 B/D															
1987	4	339,000	040,000,671	00,330,330	230	0	0	00	00	0	4	339,000	040,000,671	00,330,330	230
1990	2	326,700	033,112,630	020,090,090	170	6	639,300	001,699,216	00,043,011	306	8	966,300	0130,011,046	030,720,300	303
Total, 100,000 B/D	6	666,300	0101,317,301	031,233,020	304	6	639,300	001,699,216	00,043,011	306	12	1,306,000	0103,216,347	001,090,020	771
200,000 B/D															
1987	7	663,700	070,727,002	020,010,750	004	0	0	00	00	0	7	663,700	070,727,002	020,010,750	004
1990	2	300,100	036,176,237	037,300,102	133	6	639,300	001,699,216	00,043,011	306	8	1,047,600	0137,073,453	047,997,933	339
Total, 200,000 B/D	9	1,133,000	0133,104,139	030,139,096	377	6	639,300	001,699,216	00,043,011	306	13	1,793,300	0216,001,335	060,003,707	964
300,000 B/D															
1987	9	1,100,900	0171,030,073	033,226,960	377	0	0	00	00	0	9	1,100,900	0171,030,073	033,226,960	377
1990	13	1,907,300	0163,030,005	0232,004,234	072	6	639,300	001,699,216	00,043,011	306	19	2,627,200	0247,137,221	0242,750,042	1,230
Total, 300,000 B/D	22	3,000,600	0336,076,030	0267,033,191	1,449	6	639,300	001,699,216	00,043,011	306	28	3,736,100	0410,373,246	0277,677,002	1,033
Unconstrained Exports															
1987	9	1,100,900	0171,030,073	033,226,960	377	0	0	00	00	0	9	1,100,900	0171,030,073	033,226,960	377
1990	23	3,203,600	0210,131,733	0207,170,303	1,033	6	639,300	001,699,216	00,043,011	306	29	3,043,100	0291,030,936	0243,072,336	1,072
Total, Unconstrained Exports	32	4,317,500	0381,209,760	0240,403,300	2,013	6	639,300	001,699,216	00,043,011	306	38	4,933,000	0463,200,976	0280,299,316	2,399

In addition, the private sector, including both oil companies owning tankers and private tanker owners would be exposed to an additional potential default of $540 million in the unconstrained export case. To the extent this amount is written off against income, it will cause a loss of Federal income tax receipts. To the extent this idled capital cannot be written off against taxes, the loss will either be passed on to the consumer in the form of higher prices or will result in a loss to the owners.

5. Impact on Shipbuilding and Ship Repair Industries

The U.S. shipbuilding industry will also be affected by the exports of ANS oil. There are two principal components to this impact: shipbuilding and ship repair. It is clear that if the ANS market is considered to be an economically viable source of employment by the vessel operators, there will, by the year 2000, be construction of new tonnage to replace a portion of the fleet currently in service. These vessels would be built in the United States.

Table IV (F) 4 compares the tanker tonnage in the ANS trade fleet that is less than 20 years of age to the requirement for that tonnage, based upon the mid-range forecast of ANS production that is used in this study.

Table IV (F) 4

PROFILE OF TANKER FLEET
OPERATING IN ANS TRADE WITH NO EXPORTS
(Deadweight Tons in Thousands)

Year	1990	1995	2000
Tankers in the ANS Trade Less than 20 Years Old	6,116	4,251	858
Total DWT Required in ANS Trade	5,961	3,992	3,646
Shortfall of Tankers Less than 20 Years Old	155	259	-2,788

Through the year 1995 and under the export ban, the requirement for tankers is remarkably close to the capacity available that is less than 20 years of age. However, between the years 1995 and 2000, it appears that block obsolescence occurs and that by the year 2000, over 2.7 million deadweight tons serving in the ANS trade will be over 20 years of age. The shortfall would be greater and would occur earlier if the ANS production were to be higher than the mid-range forecast. Assuming that the employment prospects for the trade are stable, it can be expected that the overage capacity will

be replaced with new tonnage. Assuming that this 2.7 million DWT is replaced with tankers similar to EXXON's most recent new buildings (209,000 DWT and 58,000 DWT) the result would be the construction of 22 tankers. At a 1984 cost of $125 million escalated to a 1985 base of $128.3 million for the 209,000 DWT ships and at a 1981 cost of $85 million escalated to a 1985 base of $94.2 million for the 58,000 DWT ships, this construction would represent about $2.41 billion in U.S. shipyard revenues in 1985 dollars. Export of ANS crude would reduce this ship construction activity by up to $1.4 billion in the high export case as shown in Table IV (F) 5.

Table IV (F) 5

SHIP REPLACEMENT CONSTRUCTION FOR
ANS TRADE BY YEAR 2000
(Millions of 1985 Dollars)

Export Level	Replacement Construction	Loss of Replacement Construction Due to Exports
No Exports	$2,413.0	-0-
50,000 B/D	2,096.0	$ 317.0
100,000 B/D	1,874.0	539.0
200,000 B/D	1,301.0	1,112.0
500,000 B/D	984.0	1,429.0
Unconstrained Exports	984.0	1,429.0

In addition to the loss of ship construction revenues, the export of ANS oil would cause an annual loss to U.S. shipyards as a consequence of reduced revenues from the maintenance and repair of the ships that would otherwise operate in the ANS trade. Table IV (F) 6 details the cumulative impact for the various export scenarios.

Table IV (F) 6

CUMULATIVE LOSS OF MAINTENANCE AND REPAIR
REVENUE TO U.S. SHIPYARDS (1987-2000)
RESULTING FROM EXPORT OF ANS CRUDE
(Millions of 1985 Dollars)

Export Level	Maintenance and Repair
50,000 B/D	$ 39.1
100,000 B/D	72.6
200,000 B/D	118.1
500,000 B/D	286.6
Unconstrained Exports	392.7

G. TRADE IMPACTS

The analysis of trade impacts will be evaluated and presented from two perspectives:

- Consideration of changed petroleum product flows resulting from allowing ANS crude exports; and
- An analysis of crude replacement costs assuming no net changes in petroleum product flows resulting from ANS crude exports.

1. Changed Product Flows

The analysis indicates that lifting the ban on Alaskan exports results in a positive trade balance of approximately $3.7 billion in 1985 dollars over the 1987 - 2000 period. This conclusion is based on the projection that crude oil exports will not be offset on a barrel for barrel basis by imports. Specifically, Table IV (G) 1 shows that, under unconstrained conditions, exports of ANS crude and the resultant changes in West Coast refinery product flows will result in smaller crude oil import levels. This conclusion is reached because:

- Lifting the ban provides economic incentives for producers to export ANS crude (at $26.03 per barrel) rather than export residual fuel oil at substantially lower prices - ($20.91 per barrel). At pr sent, residual fuel oil exports are permitted while crude exports are prohibited.
- Under this approach, approximately 150,000 B/D of West Coast residual fuel oil exports would end. This residual oil, when combined with imports of Indonesian light crude, would be processed and would yield 150,000 B/D of light products (e.g., motor gasoline) for the West Coast market.
- Lifting the ban would result in higher domestic residual fuel oil prices that, in turn, would reduce domestic demand by about 60 MB/D in 1995.

The analysis concludes that in 1995, the United States would export 520,000 B/D of ANS crude and import only 310,000 B/D to offset the exports. The 210,000 B/D of crude oil is offset by: (1) a reduced economic incentive to export residual fuel oil because of its low price - 150,000 B/D; (2) the import of light Indonesian crude to get a refinery crude stream that yields desirable products for the West Coast market, and (3) a reduction in demand for residual fuel oil in California of 60,000 B/D, since lifting the ban raises residual fuel prices and results in reduced demand.

TABLE IV (G) 1

TRADE FLOW BASED
ON CHANGED PRODUCT FLOWS
(1985 $/Bbl and MB/D)

Unconstrained Exports

ANS Crude 520 MB/D at

25.47 FOB Gulf Plus 1.29 Freight
to United States less 0.73 Freight to Japan
$26.03 FOB Alaska

$26.03 X 520,000 B/D X 365 Days = $13,535,600 Per Day or
$4.94 Billion Per Year

Imports

Gulf Coast 190,000 B/D at

$25.47 FOB Persian Gulf Plus
2.04 Freight Yield
27.51 CIF Gulf $5,226,900 Per Day or
$1,908 Billion Per Year

West Coast 120,000 B/D at

$30.31 CIF for Indonesian crude oil $3,637,200 Per Day or
$1,328 Billion Per Year

Residual Fuel Oil

West Coast 150,000 B/D at

$20.91 FOB California For
Residual Fuel Oil No Longer
Exported Because Crude Yields
a Higher Price
($26.03 versus $20.91/Bbl) $3,136,500 Per Day or
$1,145 Billion Per Year

Trade Balance (Unconstrained Exports)

520,000 B/D	=	$4,940 Billion Per Year
460,000 B/D	=	$4,381 Billion Per Year
60,000 Net Exports		$ 559 Million Surplus

Net Savings on Imports

60,000 B/D of Oil Imports no longer needed because lifting the ban has raised residual fuel oil prices in California and has reduced demand for resid by 60,000 B/D.

Table IV (G) 2

PRICING CONCEPT FOR ANS EXPORTS AND CRUDE OIL REPLACEMENT IMPORTS (1985 dollars per barrel)

	1985	1/86	1/86	1/86
Arab Light to the U.S.				
FOB	25.90	25.00	20.00	18.00
Freight	1.10	1.10	1.10	1.10
Delivered on the Gulf Coast	27.10	26.10	21.10	19.10
Arab Light to Japan				
FOB	25.90	25.00	20.00	18.00
Freight	0.60	0.60	0.60	0.60
CIF	25.50	25.60	20.60	18.60
Less Quality Adjustment for Alaskan Crude	0.20	0.20	0.20	0.20
CIF Japan Adjusted for Quality of Alaskan North Slope Crude	26.30	25.40	20.40	18.40
Less Freight from Alaska to Japan (in foreign tanker) Yields	0.40	0.40	0.40	0.40
FOB	25.90	25.00	20.00	18.00
NOTE:				
Price U.S. Pays for Arab Light	27.00	26.10	21.10	19.10
Price U.S. Receives to Export ANS FOB Valdez	25.90	25.00	20.00	18.00
Theoretical Difference	1.10	1.10	1.10	1.10

NOTES:
1. Assumes hypothetical FOB Saudi Light prices. Current FOB, price of 1/14/86 is estimated at $20-22/BBL given market uncertainty.
2. Freight rates are derived from MARAD data.
3. Ocean distance from Persian Gulf to Japan is 6,600 nautical miles and from Alaska to Japan is 3,300 miles.

2. Crude Oil Replacement Scenario

This alternate trade impact scenario analyzes the one-for-one replacement costs of a barrel of ANS crude with foreign oils. It makes the following observations regarding the West Coast industry.

- PAD V refiners may choose to continue to export substantial quantities of residual fuel oil because they have covered their profit margins on high value added co-products such as gasoline and jet fuel and need to unload the residual fuel.

- Rather than replacing ANS crude in PAD V with Indonesian light, low sulfur crude, the refiners may opt for heavy sour crudes to feed their existing refinery configuration. It may be relatively cheaper to purchase heavy crudes than Indonesian light.

In their response to the DOC Federal Register Notice the American Independent Refiners Association notes their strong opposition to lifting the ANS crude oil ban because their constituents wish to continue purchasing ANS crude.

> "If substantial volumes of Alaskan crude oil were exported, crude oil costs on the West Coast, where much of the Alaskan crude oil is refined, would, in the long run, rise as much as several dollars per barrel . . . Market conditions probably would make it impossible, however, for independent refiners to pass on to consumers all of the additional crude oil costs in the form of product price increases. Because independent refiners already are struggling with a maze of financial problems, the need to absorb even a small portion of the crude oil price increase could force some additional refiners out of business."

On the other hand, West Coast refiners could maintain access to ANS crude even if the export ban were to be lifted. This would be possible if West Coast refiners bid-up the price of ANS crude to a level where it would be more profitable for the producers to sell ANS crude on the West Coast rather than export it to the Pacific Rim market. Assuming that by the 1990s, Valdez-West Coast and Valdez-Pacific Rim shipping rates are nearly equal, the result would be that the West Coast refiners could pay higher prices for ANS crude and the "West Coast Discount" would be eliminated.

3. Trade Analysis

The analysis of the crude replacement cost scenario begins with the general premise that ANS crude oil exports will be replaced on a barrel-for-barrel basis by crude imports. If U.S. ships do not transport any ANS crude exports to foreign markets, this scenario projects an overall trade deficit of approximately $3.4 billion

between 1987 and 2000. This is based on the fact that the United States will export crude on an FOB (i.e., free on board) Valdez, Alaska basis and replace it on a CIF (i.e., cost of insurance and freight) basis and on foreign tankers. If, however, U.S. ships obtain half of the projected export business, the analysis indicates that the above noted trade deficit could be almost eliminated (see Table IV (G) 4. The analysis is set forth below:

- The data in Table IV (G) 2 illustrates the primary calculation of the relative pricing of ANS exports and replacement crude imports. The analysis assumes that the United States and Japan will pay the same FOB price for Arabian Light Crude.

- The delivered U.S. Gulf Coast crude price is equal to the FOB Arabian Gulf price plus transportation. The comparable Japanese CIF crude price involves the same elements but is approximately $0.50 per barrel less expensive given the shorter distance between Saudi Arabia and Japan compared to Arabian Gulf and the U.S. Gulf Coast distance (i.e., 6,600 nautical miles versus 11,000 nautical miles).

- Adjusting for the quality differential between ANS crude and Arabian light (currently $0.20 per barrel) and the cost of freight between Alaska and Japan (in a foreign tanker) yields the FOB Alaska price. Table IV (F) 2 shows that under various hypothetical crude oil price scenarios, the United States would pay approximately $1.10 per barrel more in transportation charges to ship the imported crude to the United States on foreign ships.

- This $1.10 per barrel represents a small balance of payments deficit that stems from exporting ANS crude on an FOB basis and paying the transportation charge for the replacement crude oil import.

Table IV (G) 3 provides a possible forecast of U.S. crude oil replacement costs as well as Alaskan oil export prices.

- The estimated $1.10 per barrel figure for the United States Gulf Coast could grow to $1.78 by 2000.

- The $1.10 per barrel estimate would be reduced if the United States could provide part of the tankers for the ANS exports and substantially eliminated if the United States supplied half the shipping. (Note: This assumes that foreign purchasers would pay the higher freight rates for the U.S. flag tankers and not demand any offsetting adjustments of the FOB sales prices.)

Table IV (G) 3

PRICING OF U.S. OIL IMPORTS AND EXPORTS
($1985/BBL)

	1985	1987	1990	1995	2000
Arab Light to the U.S.					
FOB	25.90	23.13	22.22	25.46	30.33
Freight	1.10	1.37	1.78	2.04	2.17
Delivered on the Gulf Coast	27.00	24.50	24.00	27.50	32.50
Arab Light to Japan					
FOB	25.90	23.13	22.22	25.46	30.33
Freight	0.60	0.82	1.10	1.29	1.38
CIF	26.50	23.95	23.32	26.75	31.71
Less Quality Adjustment for Alaskan Crude	0.20	0.20	0.20	0.20	0.20
CIF Japan Adjusted for Quality of Alaskan North Slope Crude	26.30	23.75	23.12	26.55	31.51
Less Freight from Alaska to Japan (in foreign tanker) Yields	0.40	0.47	0.63	0.73	0.79
FOB ALASKA	25.90	23.28	22.49	25.82	30.72
NOTE:					
Price U.S. Pays for Arab Light	27.00	24.50	24.00	27.50	32.50
Price U.S. Receives to Export ANS FOB Valdez	25.90	23.28	22.49	25.82	30.72
Theoretical Difference	1.10	1.22	1.51	1.68	1.78

NOTES:
1. FOB Saudi Light Price defined as U.S. Imported Refiner's Crude Oil acquisition cost less freight from Persian Gulf to Gulf Coast. It is assumed that Japan pays an identical FOB price for Arab Light.
2. Freight rates are derived from MARAD data.
3. Ocean distance from Persian Gulf to Japan is 6,600 nautical miles and from Alaska to Japan is 3,300 miles.

TABLE IV (G) 4

POTENTIAL EARNINGS FROM ALASKAN OIL EXPORTS ($1985 Million)

Case/Year	1987	1990	1995	2000
FOB Valdez				
50 M B/D	425	410	471	561
100 M B/D	850	821	942	1,121
200 M B/D	1,699	1,642	1,885	2,243
500 M B/D	2,549	4,104	4,712	4,037-360
Unconstrained Exports Scenario	2,549	7,142	4,995	4,037-360
CIF Pacific Rim Based 50% U.S. Shipping				
50 M B/D	440	426	489	580
100 M B/D	879	853	979	1,159
200 M B/D	1,757	1,707	1,958	2,319
500 M B/D	2,636	4,266	4,895	4,174
Unconstrained Exports Scenario	2,636	7,425	5,188	4,174

Notes:

1. Based upon FOB export prices in Table 3: 1987- $23.28; 1990- $22.49; 1995- $25.82; and 2000- $30.72.
2. Freight derived from Marad is a weighted 50/50 on U.S. and foreign tanker rates: 1987- $0.79; 1990- $0.89; 1995- $1.00; and 2000- $1.04
3. Exports are constrained at 360 MB/D in year 2000 high export and 500 MB/D cases
4. Unconstrained exports rise linearly from 300 MB/D in 1987 to 870 MB/D in 1990, and then decline (linearly) to 530 MB/D in 1995 and to 360 MB/D in 2000.
5. The CIF export earnings assume that foreign purchases would pay higher prices that reflect the use of the American ships to move 50 percent of the oil.

Note:

FOB exports - Unconstrained Exports Scenario, 1987 - 2000, $70.8 billion.

4. Crude Oil Imports

If the export ban is lifted, large volumes of ANS exports could require increased imports of crude oil or refined products to the United States from the Persian Gulf by 1990 (see Table IV (G) 6). This projection is based on several factors. First, there are physical limitations on the availability of large new crude export supplies from Indonesia and Malaysia. Second, Mexico shows no signs of modifying its current overall export limitation of 1.5 million B/D with no more than 50 percent of total exports flowing to any particular country. Third, North Sea oil output is expected to peak in the early 1990s.

In short, the Persian Gulf contains the largest available reserve bases and has extremely low oil production relative to its potential.

5. Conclusion

The changed product flows and crude oil replacement scenarios represent two analytical approaches to measuring the trade impact of lifting the ANS crude export ban. While dollar volume difference between the two is large -- $3.7 billion surplus versus $3.4 billion deficit over the 1987-2000 period -- both scenarios will be affected by a number of developments. For example, net refinery processing gains from West Coast refineries could fall below the results projected in the product flows scenario.

On the other hand, U.S. ships could be used to transport 50 percent or more of the ANS crude exports. Moreover, world oil prices could remain depressed and OPEC producers seeking to maintain access to the U.S. market may price their crude below United States oil prices. The primary observation is that each of these factors could impact on the two above scenarios and produce a different trade impact.

TABLE IV (G) 5

PAYMENTS FOR OIL IMPORTS TO REPLACE ANS CRUDE ($1985/BBL)

	1987	1990	1995	2000
Arab Light FOB Ras Tanura	23.13	22.22	25.46	30.33
Plus Freight to U.S. Gulf Coast	1.37	1.78	2.04	2.17
CIF Price	24.50	24.00	27.50	32.50
Less Quality Adjustment for ANS Crude	-0.20	-0.20	-0.20	-0.20
Yield Gulf Coast Crude Replacement Price for ANS Crude	24.30	23.80	27.30	32.30
	Total Import Payments ($Million)			
50 M B/D	$ 443	434	498	589
100 M B/D	$ 887	869	996	1,179
200 M B/D	$1,774	1,737	1,993	2,358
500 M B/D	$2,661	4,344	4,982	4,244
Unconstrained Exports	$2,661	7,558	5,281	4,244

Notes:

(1) Arab Light FOB derived from midpoint estimates of world oil prices (see assumptions) netted back to Saudi Arabia to reflect transportation charges.

(2) Unconstrained and 500 MB/D scenarios limited to 360 MB/D in 2000.

(3) Total Import Payments to Replace ANS Crude, 1987 - 2000, $74.2 billion (Unconstrained Exports.)

TABLE IV (G) 6
POSSIBLE IMPORT SUPPLY
REPLACEMENT SOURCES
(M B/D)

Case/Year	Supply Source	1985	1987	1990	1995	2000
50 M B/D	Asia	0	0	0	0	0
	Western Hemisphere	0	25	25	25	25
	Persian Gulf	0	25	25	25	25
		0	50	50	50	50
100 M B/D	Asia	0	0	0	0	0
	Western Hemisphere	0	50	50	50	50
	Persian Gulf	0	50	50	50	50
		0	100	100	100	100
200 M B/D	Asia	0	40	40	40	40
	Western Hemisphere	0	80	80	60	60
	Persian Gulf	0	80	80	100	100
		0	200	200	200	200
500 M B/D	Asia	0	40	120	120	100
	Western Hemisphere	0	120	100	100	100
	Persian Gulf	0	140	280	310	160
		0	300	500	530	360
Unconstrained Exports	Asia	0	40	160	120	100
	Western Hemisphere	0	120	100	100	100
	Persian Gulf	0	140	590	310	160
		0	300	850	530	360

H. EMPLOYMENT IMPACTS

1. Introduction

Allowing exports of Alaska North Slope (ANS) crude oil is likely to cause U.S. maritime employment to decline substantially. ANS crude oil formerly carried between domestic ports on U.S. flag tankers under the Jones Act would probably be carried to foreign ports on foreign flag tankers. The wellhead price increase in ANS crude resulting from exports will provide more funds for new exploration and development. This would lead to a small increase in Alaskan oil and gas extraction employment. Oil and gas extraction employment in California should also rise due to crude oil and natural gas wellhead price increases. Californian oil refinery employment, however, should not be affected.

2. Seafaring

The estimated number of seafarers displaced due to ANS exports are reported in Table IV (F) 3 above.

- Displacements range from 198 seafarers or 5 percent of January 1985 seafaring employment, with exports limited to 50,000 barrels per day, to 2,013 seafarers or 52 percent with unlimited exports.

- Displaced seafarers would have difficulty finding work in other types of domestic shipping since employment opportunities in the U.S. shipping industry at large are poor.

3. Shipbuilding and Repairing

U.S. employment in shipbuilding and repair also would be affected if the ban is lifted, since ANS oil exports would be transported on foreign flag tankers. A large portion of shipbuilding and repair facilities, particularly on the West Coast are related to the ANS oil trade. Lifting the export ban would severely affect on employment in shipbuilding and ship repair. Specific employment effects for these industries are not presented due to insufficient data.

4. Alaskan Oil and Gas Extraction

Alaskan employment increases in oil and gas extraction will be generated as a result of expanded ANS crude oil production if the export ban is lifted. These effects are estimated using the procedure discussed in Technical Appendic C and the estimated ANS crude oil supply increases presented in Table IV (B) 3 above.

- Lifting the ban totally is expected to increase ANS production by 5-15 MB/D by the year 2000.

- As shown in Table IV (H) 1, eliminating the ANS export ban completely is estimated to increase Alaskan oil and gas extraction employment by 42 workers or less than one percent by the year 2000.

- Partial removal of the ban should result in smaller employment increases.

5. Californian Oil and Gas Extraction

Crude oil production in California would also increase if the export ban is lifted. This would result from eliminating the "West Coast Discount" for ANS crude and raising wellhead prices. An increase of 12-24 MB/D by 2000 would also boost employment.

Estimated effects of lifting the ANS oil export ban on Californian oil and gas extraction employment are presented in Table IV (H) 2. The estimation method is the same as that used to obtain the estimated Alaskan employment effects shown in Table IV (H) 1.

- Allowing unlimited ANS oil exports is estimated to increase Californian oil and gas extraction employment by 664 workers or 1.4 percent of the this workforce by the year 2000 due to increased Californian crude oil and natural gas prices.

- Estimated Californian employment increases are larger both in absolute terms and as a percentage of the total workforce than Alaskan employment increases, although increases may occur more slowly in California.

6. Californian Refiners

Allowing exports of ANS crude should not produce large changes in Californian oil refining employment. Californian refiners are expected to respond to higher prices for ANS and Californian crude by using more light imported crude from Indonesia and elsewhere. This should lower Californian refiner costs by making the mix of light and heavy crude more suited to existing refinery technology. To the extent that aggregate refinery production remains unchanged in California, refinery employment should not change appreciably.

TABLE IV (H) 1

ESTIMATED INCREASES IN ALASKAN OIL AND GAS EXTRACTION EMPLOYMENT DUE TO LIFTING THE ANS OIL EXPORT BAN

	1990	1995	2000
Unconstrained ANS Oil Exports			
Number of workers	17	39	42
Percent of total	0.24	0.59	0.71
500,000 Barrel Per Day ANS Oil Export Limit			
Number of workers	7	21	42
Percent of total	0.10	0.32	0.71
200,000 Barrel Per Day ANS Oil Export Limit			
Number of workers	2	7	4
Percent of total	0.03	0.11	0.07
100,000 Barrel Per Day ANS Oil Export Limit			
Number of workers	1	3	2
Percent of total	0.01	0.05	0.03
50,000 Barrel Per Day ANS Oil Export Limit			
Number of workers	1	2	1
Percent of total	0.01	0.03	0.02

Source: U.S. Department of Labor (ILAB) estimates based on estimated ANS crude oil supply responses given in Table IV (A). 3 estimated employment with no ANS oil exports reported in Technical Appendix C, and the assumption that employment is proportional to crude oil production.

TABLE IV (H) 2

PROJECTED CALIFORNIAN CRUDE OIL PRODUCTION

AND EMPLOYMENT IN OIL AND GAS EXTRACTION

WITH THE EXPORT BAN IN PLACE

	Production (millions of b/d)	Employment (number of workers)
1990	1.43	52,731
1995	1.32	48,675
2000	1.32	48,675

7. Gulf and East Coast Refiners

ANS crude exports should have a relatively small effect on Gulf and East Coast refinery production and employment. In contrast to West Coast refiners, Gulf and East Coast refiners are already using a mix of heavy and light crudes well-suited to existing plants. Heavy crude is not overly abundant in Gulf and East Coast markets and foreign crude supplies already account for a large portion of crude refined in Gulf and East Coast markets. Therefore, ANS oil exports should have little effect on Gulf and East Coast refiners.

8. Other Alaskan and Californian Industries

Widely diffused employment gains may also occur in Alaskan and Californian industries other than shipping and petroleum.

- As noted in Sections II and III, an increase in ANS crude oil production should lead to indirect employment increases in many other sectors of the Alaskan economy. Additional oil industry workers will spend their income on a variety of goods and services such as housing and food. These expenditures result in small employment gains throughout the economy.

- In addition, allowing ANS oil exports should increase the wellhead prices of ANS and Californian crude, causing profits of those crude oil producers to increase. To the extent that these profits are spent on capital goods such as machinery and construction, there may be an increase in Alaskan and Californian employment associated with the increase in investment spending.

- If West Coast product prices rise in the near-term, due to ANS exports, this would lead to employment decreases. On the other hand, lower refining costs combined with long-term product price declines may spur new employment.

However, these indirect employment changes are very difficult to estimate. Therefore, estimated indirect employment effects in Alaska and California are not presented here.

TABLE IV (H) 3

ESTIMATED INCREASES IN CALIFORNIAN OIL AND GAS EXTRACTION EMPLOYMENT DUE TO LIFTING THE ANS OIL EXPORT BAN

	1990	1995	2000
Unconstrained ANS Oil Exports			
Number of workers	20	490	664
Percent of total	0.04	1.01	1.36
500,000 Barrel Per Day ANS Oil Export Limit			
Number of workers	24	111	664
Percent of total	0.05	0.23	1.36
200,000 Barrel Per Day ANS Oil Export Limit			
Number of workers	6	28	(a)
Percent of total	0.01	0.06	
100,000 Barrel Per Day ANS Oil Export Limit			
Number of workers	(a)	16	(a)
Percent of total		0.03	
50,000 Barrel Per Day ANS Oil Export Limit			
Number of workers	(a)	6	(a)
Percent of total		0.01	

Note:
(a) The estimated employment increase is negligible.

Source: U.S. Department of Labor (ILAB) estimates based on estimated Californian crude oil supply responses given in Table IV (A).3 estimated employment with no ANS oil exports reported in Table IV (G). 2, and the assumption that employment is proportional to crude oil production.

I. FOREIGN POLICY IMPACTS

1. Introduction

The statutory ban on crude oil exports was originally imposed after the oil shocks of the 1970s to assure a stockpile of reasonably priced supplies for domestic consumption, to reduce U.S. dependence on potentially more expensive and less secure foreign sources of oil, and to moderate the impact of global price rises that occur even when U.S. supplies are not directly disrupted. The Administration has strongly urged the International Energy Agency to support an open trading system in which market forces determine prices and the movement of goods internationally. The International Energy Agency has developed a consensus that reliance on market forces is an effective means to promote stability and energy security. Lifting the ban on ANS crude oil exports would be consistent with these objectives.

Set forth below is a multilateral and bilateral foreign policy assessment of potential impacts of lifting the ban on ANS crude exports. It should be noted that interested parties who responded to the Federal Register Notice are split on the foreign policy and national security impacts of lifting the ban. A synopsis of their views is included at the end of this secton. For this analysis, we assume legislation will allow, but not require, exports of ANS crude oil.

2. International Energy Agency (IEA)

In the communique of the International Energy Agency (IEA) Ministerial held July 9, 1985, the Ministers agreed that one requirement for energy policy is flexible, open and resilient markets within which the different fuels can compete vigorously and find their levels of demand and supply through operation of the price mechanism. Another requirement is that governments also carry out policies that accomplish their objectives and at the same time supplement an effective market system.

Lifting the export ban on Alaskan North Slope crude oil is consistent with the objectives of the IEA as it would allow market forces to determine the destination of the product, thus creating a more efficient distribution system. In its annual review of U.S. energy policies and programs, the IEA recommended that the United States pursue action aimed at lifting the ban on exports of crude oil. Removing the ban could enhance global energy security through increased energy security for Pacific Rim countries.

3. Relations with Japan

Japan would likely be the major foreign customer for Alaskan North Slope oil, if its export were permitted. Japan, currently importing more than 4 million barrels-per-day, has long been interested in

Alaskan oil. At the highest levels, the Government of Japan is aware of the value of ANS crude as a secure energy source.

While Japan has taken significant steps to diversify its sources of energy since the OPEC oil crisis, it is still heavily dependent upon oil from the Middle East. In 1986, more than half of Japan's oil imports are expected to flow through the Strait of Hormuz. Recent damage to privately owned Japanese petroleum facilities in the Middle East and the evacuation of Japanese engineers assigned to those facilities has served as a reminder of the fragile status of oil imports from that area. Although it is unlikely that the Japanese would completely replace any one supplier with imports of Alaskan North Slope oil, ANS oil could contribute to Japan's goal of supply diversification and enhance U.S./Japanese security interests in the area.

The extent of Japanese participation in purchases of ANS oil would be based on commercial factors. The Japanese Government estimates that initially purchases would amount to no more than 100,000 B/D because Japan generally relies on long-term supply arrangements. The Japanese oppose any requirement that Alaskan oil be transported in U.S. flag vessels, as it would set a precedent for other oil suppliers, and higher than market rate transportation costs would reduce incentives to purchase ANS crude. On the investment side, a poll of Japanese companies reveals that the Japanese have an interest in investing in ANS crude development depending, again, upon commercial considerations of the projects.

The Department of State has noted that, lifting the ban on exports could:

Improve Japan's energy security by providing it with a new source of oil.

Maintain the momentum for increased energy cooperation, especially U.S. exports of coal and gas, as envisaged by the establishment of the U.S.-Japan Working Group on Energy and the Joint Energy Policy Statement of President Reagan and Prime Minister Nakasone of November, 1983;

Demonstrate that the United States is committed to maintaining a free and open global trading system;

Reduce marginally the U.S.-Japan trade imbalance (although the overall U.S. trade balance would be largely unaffected as oil exports would be offset by oil imports from elsewhere);

Encourage further reciprocal market-opening measures by the Japanese;

Contribute to a more independent Japanese stance vis-a-vis Middle East oil suppliers.

4. Relations with the Republic of Korea

At the United States - Korea Bilateral Economic Consultations in August 1985, during Energy Secretary Herrington's trip to the ROK in March and in response to a specific ANS study questionnaire, the Koreans expressed keen interest in Alaskan oil and requested that the United States provide Korea with equal access if the ban on ANS exports is lifted. The ROK is highly dependent on imported energy resources and members of its government have told U.S. negotiators that Korea values the U.S. as a reliable supplier of energy. Howevèr, possible restritions on ANS crude or termination in the event of a short supply crisis would reduce the "supply security" benefits in the view of ROK government sources. Requirements tying ANS exports to U.S. flag carriers would also negatively affect the level of ROK interest in ANS oil. The Koreans emphasized that price and quality would be the motivating consideration behind Korean purchases of ANS oil. They also believe that lifting the ANS crude export ban will lead to a reduction in the ROK trade surplus with the United States, a development viewed as mutually favorable by the Koreans.

5. Relations with Taiwan

Representatives of Taiwan have also expressed strong interest in access to ANS oil, most recently at the trade talks held in October 1985. In response to an ANS crude study questionnaire, representatives of Taiwan's Chinese Petroleum Corporation (CPC) reiterated their strong willingness to purchase ANS oil to increase supply diversification. Purchasing concerns are steadiness of supply, quality, price and economics of transportation. CPC representatives preferred that ANS exports not be tied to U.S. flag carriage unless such transportation was cost competitive. At present, CPC would consider initial purchases of 5,000 - 10,000 barrels/day with subsequent increases a possibility as current obligations expire. Were ANS crude exports liberalized, CPC officials expressed interest in investing in ANS crude production projects. Further, Taiwan authorities believe ANS exports would reduce Taiwan's trade surplus with the United States.

6. Relations with Mexico

Exports of Alaskan oil could increase the potential for Mexican oil sales to the United States. Any such sales could help to alleviate Mexico's current serious foreign debt service problems, which have been exacerbated by declining oil prices in the past few years. However, it should be noted that Mexico has a policy of limiting oil export to any one country to 50 percent of total oil exports, but

has been flexible in applying this policy. With oil prices falling, the GOM may find that its interests are best served by increasing exports to geographically closer markets so that it may realize a greater percentage of the total oil price. Although Mexico has large crude oil export potential, it is impossible at this stage to predict how much additional oil the Mexicans may be prepared to ship to the United States, and public speculation on the subject is not advisable.

7. Relations with Ecuador

A lifting of the ban could have favorable implications for U.S.-Ecuadorean relations. The U.S. West Coast was a major market for crude exports from Ecuador prior to the opening of the Alaska pipeline. It currently serves as a supplier of crude to the United States Gulf Coast. Petroleum accounts for 65 percent of Ecuador's exports and 12 percent of its gross domestic product. With declining oil prices, Ecuador, like other oil producing countries, has suffered a decline of export revenue. An increase in Ecuadorean crude sales to the United States would result in reduced transportation costs, higher netback prices, and thereby offset declining oil export revenues. One area of concern for the Ecuadoreans is the possibility that exports of ANS crude to Asia, in particular to the ROK and Taiwan, might affect Ecuador's own exports of oil to the area. Asian markets are Ecuador's prime long-term contract buyers.

8. Relations with Venezuela

The Venezuelans are also suffering from the decline in oil prices. Venezuela, although a member of OPEC, could find it in its national interest to increase production to preserve export earnings. Its oil reserves are sizeable and it has been an important source of U.S. oil. An estimated 11 percent (or 116,000 B/D) of Venezuelan oil exports was sold to non-affiliated European customers in 1984. There is no reason why a portion of this oil could not be diverted to the United States if market opportunities existed.

9. Relations with Panama

The Trans-Isthmian oil pipeline across Panama began operation in October 1982. This pipeline has reduced the cost of shipping ANS crude through the Panama Canal to the United States Gulf and East Coast markets. This pipeline which has an average maximum capacity of 800,000 barrels/day, is a joint public-private venture with the Government of Panama (through Cofina, the National Finance Corporation) at 40 percent equity; Northville Terminal Corporation (U.S.) at 38.75 percent equity and Chicago Bridge and Iron Industries (U.S.) at 21.25 percent equity. As of June 30, 1985, fixed assets (petroleum facilities and land rights at cost) amounted

to $347.7 million. The original project was financed by $290 million in commercial bank loans and $60 million in shareholder notes and equity. Approximately $50 million in original debt remains to be repaid. Current planning calls for final payment on this debt to be made in mid-1986.

The Government of Panama has gone on record as opposing any lifting of the export ban on Alaskan North Slope oil. In a letter dated March 25, 1985 to President Reagan, former Panamanian President Barletta stated that the Trans-Isthmian pipeline is essential to Panama's economic and political stability. The Panamanians estimate that termination of the pipeline could cost Panama an estimated $150 million per year and 700 jobs. It could seriously affect a Panamanian economy already stuck in the doldrums and in need of reform and renewed growth. The pipeline represents the single largest capital investment in Panama in recent years and is one of the country's most important ongoing industries. Panama's Trans-Isthmian pipeline will be negatively affected in any event by the All-America Pipeline, which is now under construction and is scheduled to transport up to 300,000 B/D of crude from California to Texas beginning in 1987.

10. Relations with Costa Rica

Several firms have expressed interest in building two pipelines across Costa Rica to transport crude (including Alaskan North Slope) from the Pacific to the Caribbean and vice-versa. The project is currently in its initial planning/feasibility stage.

11. Relations with Western Europe and Canada

The repeal of the export ban of North Slope oil would provide concrete evidence of U.S. commitment toward a more open trading system and to strengthening cooperation on international energy policy with our Western European and Canadian allies. The United State has encouraged non-OPEC oil producers like the UK and Norway to continue to rely on the free market in determining oil prices and quantities, and to resist efforts by OPEC to control the market. Both present secure and viable alternatives to ANS oil.

The Canadians in June 1985 agreed to allow the free exportation of Canadian crude oil to the United States, and the United States permitted the export of U.S. crude oil from the lower 48 States to Canada. Lifting the continuing export restrictions on ANS crude would present the opportunity to develop potential sharing arrangements of oil and could improve the efficiency of transportation and supply system of oil for both the United States and Canada.

From the perspective of Western Europe as a consumer of oil, demand has leveled off due to improved energy conservation and diversification. Therefore, potential increased U.S. purchases of oil from the North Sea, Mexico, etc., do not appear to pose a threat to present Western European oil supplies, nor do they necessarily entail increased European dependence upon Middle East oil.

12. Relations with the Middle East

At present, U.S. dependence on the Middle East for crude oil supplies is modest. The United States took only 7 percent of its oil imports from Middle East suppliers in the first three quarters of 1985, equivalent to 2 percent of U.S. consumption. U.S. oil imports passing through the Strait of Hormuz were 570 thousand B/D in 1984, equivalent to 4.9 percent of total U.S. imports. Large volume exports of ANS crude oil may increase our dependence on Middle East oil.

13. State and Energy Departments Consultative Process

The prospect of ANS oil exports has been discussed at several sessions of the semiannual U.S.-Japan Energy Working Group and Energy Experts Meetings. Most recently, the issue was discussed at the U.S.-Japan Energy Working Group held March 1986 and between Energy Secretary Herrington and Prime Minister Nakasone during the Secretary's trip to the Far East in March 1986.

ROK Government officials and Taiwan authorities responded to an ANS study Questionnaire through diplomatic channels.

The ANS oil export issue was discussed with the Koreans during the last round of US-ROK Energy Consultations held in August 1985 and during Secretary Herrington's visit to the ROK; with Taiwan's representatives during trade negotiations last fall; and with Canadian delegates at the biannual Energy Consultative Mechanism (ECM) meeting. We anticipate that the North Slope oil issue will be discussed again at the next meeting of the ECM in the spring.

The GOP has voiced its concern over the ANS oil issue through an exchange of letters as noted above. In addition, the American Embassy in Panama discussed the study and the ANS export scenarios with the Government of Panama for the specific purpose of this study.

14. Federal Register Comments on ANS Exports

The Department of Commerce received many comments from interested parties both in favor of and opposed to lifting the ban on ANS crude oil exports. Comments supporting lifting the ban follow.

For example, the State of Alaska noted in its January 23, 1986 Federal Register comments, that "oil exports from the United States to our Pacific Rim allies would strengthen our alliances with these countries and would correspondingly reduce their reliance on unstable foreign sources. Authorization for even limited exports could provide a basis for securing significant trade concessions from Japan and other Pacific trading partners."

In a statment to the House Foreign Affairs Committee on November 20, 1985, Charles Ebinger of the Center for Strategic & International Studies made the following remarks:

> "Removing the restrictions on Alaskan oil exports is good for U.S. and allied energy security and will send important signals to a vital trading partner - Japan. By allowing Alaskan oil exports to Japan, not only will substantial transportation savings be effected but also Alaskan oil exports can be offset by imports from Venezuela and Mexico - two countries of vital national security interest to the United States. Both these nations have large international debts owed to American and international banks."

Dr. S. Fred Singer of George Mason University also provided testimony before the Foreign Affairs Committee that supports the case for lifting export controls on ANS crude:

> "Some of the opposition to Alaskan oil exports comes from the mistaken belief that Japan would derive special benefits, implying that the United States would loose corresponding benefits. This idea is completely contrary to any economic analysis. Japan would pay the same price for Alaskan oil landed in Yokohama as they pay for any other world oil landed there by the principle of free competition. To the Japanese it should not matter where the oil comes from, as far as price is concerned."
>
> "However, the import of Alaskan oil would reduce the United States trade deficit with Japan by $15 billion per year, and one could argue that this would be helpful to both nations by at least providing psychological benefits."

Finally, the American Association of Exporters and Importers support the opinion that the decontrol of ANS crude oil will bring positive benefits to Japan, for which "diversifying its sources of petroleum is a prime goal of the country's leaders. For Japan, the shift of some of its exports surplus from Japan to the U.S. would be an economic boom."

Although the previous arguments clearly support the view that ANS crude oil exports promote U.S. foreign policy and energy security interests, this perspective is not unanimous. A number of public officials, consumer, labor and industry groups responded to the Department of Commerce Federal Register Notice and opposed the lifting of the ANS export ban on foreign policy/energy security grounds.

For example, Congressman Stewart McKinney (R-CT) notes that "Alaskan oil exports would weaken our national and energy security. The U.S. is a net importer of oil. Therefore, any oil which we export will have to be replaced with imports. Replacement oil would come from the Persian Gulf, not Mexico, Venezuela or Canada as been suggested." Further, Congressman McKinney notes that ANS exports would not help solve our trade problems with Japan. "The U.S. suffers from an industrial trade deficit with Japan, not a commodities trade deficit. Exports of oil would only perpetuate this situation by cosmetically lowering our bilateral trade deficit with Japan, therefore reducing pressure on the Japanese to open their market to U.S. manufactured and agricultural goods."

The AFL-CIO also noted that the United States remains a net oil importer and that ANS exports would weaken rather than improve the U.S. foreign policy position. Specifically, they assert that "Alaskan exports would, to the extent they relieved Japan's energy security, transfer a portion of that insecurity to the U.S."

The Citizen/Labor Energy Coalition argued that lifting the ban of ANS crude is contrary to our energy security and foreign policy interests because "replacement oil would likely come from OPEC and Middle East sources...The nations outside of the OPEC Middle East that could conceivably increase production--Venezuela and Mexico--are very unlikely to do so."

J. NATIONAL DEFENSE IMPLICATIONS OF ANS EXPORTS

The U.S. Government employs oil product tankers to transport petroleum products for support of global military requirements. An adequately sized tanker fleet under U.S. control is essential to our nation's ability to supply American forces abroad in the event of a conflict.

Export of ANS crude will have two consequences that are of significant concern to the national defense: (1) a decline in defense readiness caused by a loss of tankers from the active U.S. fleet, and (2) a reduction of the active pool of maritime labor that would be available in an emergency to operate the U.S.-flag merchant fleet.

Militarily useful tankers include "coated" tankers between 6,000 deadweight tons (DWT) and 82,000 DWT plus several larger coated vessels capable of transitting the Panama Canal. Coated tankers have chemically treated cargo tanks. These vessels are capable of carrying "clean" cargoes of defense mobility fuels (jet fuels, gasolines, and diesel fuels) after their tanks have been cleaned following carriage of "dirty" cargoes such as crude oil or residual fuel oil. Uncoated tankers up to 100,000 DWT are militarily useful for the carriage of "dirty" bunker fuels. Because of the wide variation of ship sizes, tanker requirements are expressed in terms of a standard measure, the "handy sized tanker equivalent" (HSTE). One HSTE equals 200,000 barrels of liquid cargo capacity, or about 28,000 DWT.

Several recent studies of emergency sealift requirements conducted jointly by the Departments of Defense and Transportation concluded that the existing U.S.-flag tanker and controlled fleet (i.e., U.S. owned but foreign flag) are not adequate to meet the concurrent requirements to support the deployment of U.S. forces and to meet U.S. domestic petroleum transportation requirements in an emergency.

Wartime military tanker requirements were derived in the DOD Sealift Tanker Study. The current planning scenario envisions a global conventional war with U.S. forces supplied with petroleum products from traditional Western Hemisphere sources only. Under this scenario (Group 1 sourcing), 275 coated HSTE are needed to meet military petroleum movement requirements. Two other scenarios with greater uncertainty of product supply assurance were also considered. If product continues to be available from sources elsewhere in the world outside of the war zones (Group 2 sourcing), the coated tanker requirement falls to 193 HSTE due to shorter supply lines. If sources in the war zones are included in the supply pattern (Group 3 sourcing), the military coated tanker requirement is estimated to be 146 HSTE.

Assuming that the Jones Act is waived during the conflict to allow foreign flag vessels to enter the U.S. domestic crude oil trade, 53 additional coated HSTE are needed to meet the domestic requirements for "clean" product movement. With no Jones Act waiver, the civilian coated tanker requirement may be as high as 195 HSTE. Thus, depending on assumptions about military product sourcing and domestic coastal trade, the total U.S. requirement for coated tankers can vary from 199 HSTE (Group 3 sourcing and Jones Act waiver) to 470 (Group 1 sourcing, no ANS exports, and no Jones Act waiver).

The DOD Sealift Tanker Study assumes the availability to the U.S. Government in 1990 of four groups of vessels: (1) U.S. flag tankers currently under private and U.S. Government charter (including Military Sealift Command tankers), (2) foreign flag tankers under U.S. ownership (effective U.S. control - EUSC), (3) the U.S. Ready Reserve Fleet (RRF), inactive vessels in the National Defense Reserve Force which are maintained in a high state of readiness for defense use, and (4) expected additions to the RRF by 1990. Due to maintenance schedules and commitments to Navy fleet operations, a fraction of the total capacity will not be available for bulk petroleum product movement at any given time. The baseline 1990 coated tanker fleet, assuming no changes in the current ANS trade, is shown in the table below.

TABLE IV (J) 1

1990 BASELINE COATED TANKER FLEET AVAILABILITY
(Derived from DOD Sealift Tanker Study)

Fleet	Vessels	HSTE
U.S. Flag	126	216
EUSC	42	60
RRF	16	15
subtotal	184	291
Less Maint./Fleet Ops	16	16
Total Available	168	275

According to the Maritime Administration, 11 militarily useful coated tankers (25 HSTE) are projected to be displaced from the U.S. flag tanker fleet by 1990 due to changes in domestic crude oil distribution patterns and CDS repayment by owners of vessels entering the domestic trade. Thus, 250 HSTE of coated tankers are expected to be available by 1990 to meet military

and civilian petroleum logistics requirements in the event of a conflict. Under ANS export scenarios, up to 11 additional miltarily useful coated tankers (28 HSTE) would be displaced.

TABLE IV (J) 2

CUMULATIVE DISPLACEMENT OF MILITARILY USEFUL U.S. FLAG COATED TANKERS UNDER ANS EXPORT SCENARIOS
(In HSTE, based on MARAD estimates)

ANS Exports	1987	1990
None	16	25
50 MBD	19	28
100 MBD	26	38
200 MBD	29	38
500 MBD	29	43
Unconstrained Exports	29	53

The comparison of wartime requirements with available tanker capacity is summarized in the table below. Under the conservative product sourcing option (Group 1) and wartime waiver of the Jones Act for the domestic crude oil trade, there is expected to be a shortage of available coated tanker capacity relative to requirements by 1990 under any of the export scenarios considered in this report. Under the medium-risk sourcing option, (Group 2), capacity is inadequate with ANS crude exports of 100 MB/D or more. Under the high-risk sourcing option (Group 3), tanker capacity is adequate under any export scenario.

TABLE IV (J) 3

SUMMARY OF EXPECTED WARTIME COATED TANKER REQUIREMENTS AND AVAILABILITY - 1990
(In HSTE, based on MARAD estimates)

Tanker Requirements	Group 1	Group 2	Group 3
Military	275	193	146
Civilian	53	53	53
Total Requirements	328	246	199

Export Level	Tanker Availability	Tanker Capacity Shortfalls		
		Group 1	Group 2	Group 3
No Exports	250	78	-	-
50 MBD	247	81	-	-
100 MBD	237	91	9	-
200 MBD	237	91	9	-
500 MBD	232	96	14	-
Unconstrained Exports	222	106	24	-

Should the Jones Act not be waived in wartime, the comparisons shown above become even less favorable. Clearly, the United States faces serious difficulties in meeting its sealift tanker requirements (under current planning assumptions) in the event of a major global conflict. These difficulties would be exacerbated by the likely tanker fleet displacements associated with the export of ANS crude oil. The estimated loss of up to 53 HSTE of coated tanker capacity by 1990 (if ANS exports are allowed) would have negative effects on the ability of the United States to fulfill its civilian and military petroleum shipping requirements during a major wartime emergency. (Note: The estimate of 53 HSTE assumes both: (1) a redistribution of ANS trade flows with more shipments to the West Coast and less to the Gulf and East Coasts during 1987-1990, and (2) Unconstrained ANS exports. See Table IV (J) 4 for details.)

However, not all tankers that are laid-up would be lost to the U.S. fleet. Those tankers that have been financed by Title XI guaranteed mortgages would, upon default, eventually become the property of the U.S. Government. As such, they could be transferred to the RRF, thus alleviating the loss to defense capability. Other displaced militarily-useful tankers that are not covered by Title XI guaranteed mortgages would have to be purchased by the Navy if this capacity is not to be lost to the U.S. sealift capacity. The cost to the U.S. Government of purchasing displaced militarily-useful tankers as the result of ANS exports could be as much as $34 million in addition to the Title XI expenditure. The Government would also have to maintain the ships acquired for the RRF at an annual cost of about $900,000 per vessel. These impacts are summarized in Table IV (J) 4.

Other than continued restriction of ANS exports and/or maintenance of a larger RRF, policy options which would assist in the development and maintenance of adequate strategic sealift tanker capacity include: (1) pursuit of allied commitments to provide tankers in wartime, (2) greater use of commercially chartered foreign flag tankers in wartime, (3) use of less restrictive product sourcing assumptions in the development of militarily useful tanker requirements, and/or (4) greater prepositioning of war reserve petroleum inventories in forward areas. Any combination of these options entails higher levels of risk to national security than the current policy of restricting ANS exports.

TABLE IV (J) 4

Impact of ANS Crude Oil Exports on the Coated Militarily Useful Tanker Fleet 1/
At Real Discount Rate, 1985 Dollars

Export Scenario	Total Tankers Laid-Up		Coated Militarily Useful Tankers Laid-Up			Available to U.S. Government through Title II				Available to U.S. Government through Purchase			
	No. of Ships	DWT (000)	No. of Ships	MSTE	DWT (000)	No. of Ships	MSTE	DWT (000)	Million $	No. of Ships	MSTE	DWT (000)	Million $
No Exports 2/:													
1987	11	603	8	16	833	5	9	263	79.2	3	7	170	7.2
1990	6	640	3	9	250	3	9	250	30.6	0	0	0	0.0
Total, No Exports	17	1,243	11	25	683	8	18	513	109.8	3	7	170	7.2
Impact of Exports:													
50,000 B/D													
1987	2	136	1	3	81	1	3	81	5.7	0	0	0	0.0
1990	1	191	0	0	0	0	0	0	0.0	0	0	0	0.0
Subtotal, Exports Only	3	327	1	3	81	1	3	81	5.7	0	0	0	0.0
Total, All Impacts	20	1,570	12	28	764	9	21	594	115.5	3	7	170	7.2
100,000 B/D													
1987	4	340	3	10	262	3	10	262	39.0	0	0	0	0.0
1990	2	327	1	3	81	1	3	81	3.9	0	0	0	0.0
Subtotal, Exports Only	6	667	4	13	343	4	13	343	42.9	0	0	0	0.0
Total, All Impacts	23	1,910	15	38	1,026	12	31	856	152.7	3	7	170	7.2
200,000 B/D													
1987	7	646	4	13	343	4	13	343	44.4	0	0	0	0.0
1990	2	508	0	0	0	0	0	0	0.0	0	0	0	0.0
Subtotal, Exports Only	9	1,154	4	13	343	4	13	343	44.4	0	0	0	0.0
Total, All Impacts	26	2,397	15	38	1,026	12	31	856	150.2	3	7	170	7.2
500,000 B/D													
1987	9	1,107	4	13	343	4	13	343	44.4	0	0	0	0.0
1990	13	1,990	3	5	131	1	2	43	33.7	2	3	88	2.7
Subtotal, Exports Only	22	3,097	7	18	474	5	15	386	78.1	2	3	88	2.7
Total, All Impacts	39	4,340	18	43	1,157	13	33	899	187.9	5	10	258	9.9
Unconstrained Exports													
1987	9	1,109	4	13	343	4	13	343	44.4	0	0	0	0.0
1990	23	3,204	7	15	379	2	3	80	59.1	5	12	299	36.1
Subtotal, Exports Only	32	4,313	11	28	722	6	16	423	103.5	5	12	299	36.1
Total, All Impacts	49	5,536	22	53	1,405	14	34	936	213.3	8	19	469	41.3

1/ Annual maintenance costs are excluded. The costs of acquiring uncoated tankers under 100,000 dwt are excluded from these estimates. However, in the No Export case, 3 uncoated tankers (157,100 dwt; 6 MSTE; $4.1 million estimated RRF purchase price) would be displaced by 1987. In all of the export scenarios, 1 uncoated tanker (79,000 dwt; 1 MSTE; $25.6 million estimated Title II default) would be displaced in 1987. At an export rate of 500,000 B/D, 1 uncoated tanker (39,000 dwt; 1 MSTE; $10.2 million estimated RRF purchase price) would be displaced by 1990. Unconstrained exports would displace 2 uncoated tankers (98,000 dwt; 4 MSTE; $47.3 million estimated RRF purchase price) by 1990.

2/ Assumes a redistribution of ANS trade flows with more oil shipments to the West Coast and less to the Gulf Coast. This results in a reduction in tanker requirements.

V. THE APPROPRIATENESS OF MAINTAINING EXPORT CONTROLS

The Administration believes that reliance on market forces is the most effective means to promote U.S. energy security. While lifting the ban on Alaskan crude oil exports would be in line with this objective, some government analysts point out that a number of other factors must be taken into consideration when making such a determination.

The ban on Alaskan crude oil exports should also be evaluated based on a number of peculiar institutional considerations which have developed since the Congress passed the Trans-Alaska Pipeline Authorization Act in 1973. These considerations relate to a wide range of interested parties with often divergent concerns and therefore must be evaluated as such. From a public policy perspective, changes in the current export control regime should take into account both the policy objectives of the Administration as well as the existing commercial relationships and ANS oil infrastructure that have been in place and operating for over a decade.

This section evaluates the costs and benefits to the United States in general and to specific affected parties in particular of decontrolled ANS crude oil exports. It also addresses the administrative and commercial aspects of a partial lifting of the export ban.

A. BENEFITS AND COSTS

This study examines the general economic efficiencies as well as sectoral/public policy impacts of removing the ban on ANS crude oil exports. Overall, a lifting of the ban would reduce government caused economic distortions and inefficiencies, and result in general welfare gains, but would have a negative impact on several particular sectors.

The principal benefits of a total lifting of the ban on ANS crude oil exports include: (1) increased tax revenues for the U.S. Government as well as the States of Alaska and California, (2) enhanced efficiency of the energy distribution system due to transportation savings, (3) additional oil producer profits, (4) improved energy security for U.S. allies in the Far East. Large exports to the Pacific Rim could result in a reduction of the U.S. bilateral trade deficit with Japan by $3-5 billion per year during the 1990s, (5) increased oil export opportunities for friendly Western Hemisphere countries (Mexico, Venezuela, Ecuador), (6) incentives to produce oil in Alaska and California.

On the other hand, the principal costs of lifting the ban involve: (1) possible increased U.S. dependence on oil imports to replace the ANS exports (Note: Some of the replacement crude oil imports will be from the Middle East); (2) approximately $500 million in expenditures by the U.S. Treasury to indemnify mortgage defaults on MARAD Title XI tankers and to purchase militarily useful tankers for the U.S. Ready Reserve Force; (3) economic losses to West Coast shipping industry interests, including employment; (4) a decrease in Government of Panama revenue of $100-$150 million annually if the Trans-Isthmian pipeline is forced out of business.

1. Benefits

a. Fiscal Revenues to Federal and State Governments

The U.S. Government registers a net gain in tax revenues after the deduction of some shipping-related losses.

- o Increased Federal revenues total $4.6 billion between 1987-2000.
  - The bulk of the revenues come from taxes on an increase in Alaska and California wellhead prices on existing production.
  - A smaller amount is derived from increased tax revenue arising from new oil production in the two States.

Both Alaska and California receive increased revenues under the Unconstrained Exports Scenario.

- o Alaska earns $3.95 billion between 1987-2000 under the Unconstrained Exports Scenario.
  - These revenues stem primarily from the increase in the wellhead price of $1.70 per barrel in 1990.
  - Increases in Alaskan oil production (an additional 10,000 B/D by 2000) yield a much smaller share of the revenues.
- o California receives $1.63 billion between 1987-2000. Here too, the State earns the bulk of its revenues from increased wellhead prices and smaller amounts from higher output -- 18,000 B/D more by 2000.
- o California refiners and consumers incur costs in terms of higher energy prices that result from lifting the ban and eliminating the "West Coast Discount."
- o Regardless of the export scenario, complete or partial, Alaska increases fiscal revenues without incurring any offsetting costs.

b. Energy Efficiency and the Oil Companies

The primary result of Unconstrained Exports would be to provide significant transportation savings. These savings represent a resource efficiency gain and translate into higher wellhead prices in Alaska and California.

- o After-Tax Oil Industry Profits

  - Oil Industry profits amount to $7.7 billion between 1987-2000, or $555 million on an annualized basis.

  - Producers in Alaska earn $3.7 billion while California operators earn $4.0 billion. The latter earns more because of the slightly higher oil production response in California.

  - On every $1 per barrel increase in the wellhead price, the oil producers would earn approximately $0.40 per barrel after taxes.

  - Increased profits, however, are offset by some losses. The oil companies will incur some losses on vessel charters and their own tankers which will be forced out of work as a result of lifting the ANS export ban.

  - Additional profits from higher wellhead prices would provide companies with capital funds for Alaskan oil exploration and development. In the long-term, increased production will benefit consumers.

  - Increased exploration and development will also create jobs in the petroleum industry.

c. Trade and Security Relations with Pacific Rim Countries

The U.S. and Pacific Rim countries benefit in several ways. Pacific Rim countries would have access to at least several hundred thousand barrels per day of ANS crude over the 1987 - 2000 period. Imports at this level could reduce the region's oil dependence on the Middle East.

ANS exports could reduce Japan's bilaterial trade surplus with the U.S., which was $49.7 billion in 1985. ANS exports to the ROK and Taiwan could produce similar results on those bilateral trade surpluses.

The Pacific Rim countries have expressed an interest in an approximate maximum of 150,000 barrels/day for the immediate future. These small volumes could result in a small reduction in their trade surplus with the U.S. However, if the U.S. exported 870 MB/D to Pacific Rim countries in 1990, at a price of $24 per barrel FOB Valdez, there could be a potential reduction of $7.6 in the current account surpluses with these countries.

d. Oil Imports From Western Hemisphere

ANS exports would provide friendly Western Hemisphere countries with increased oil export opportunities. Some of these countries urgently need additional revenues to repay loans to banks.

2. Costs

a. Oil Imports

- o The ultimate level of U.S. oil imports required to replace ANS exports would depend on refinery efficiency and net processing gains on the West Coast.
  - To the extent there are large processing gains, the United States would not have to replace the ANS crude exports on a barrel-for-barrel basis.
  - If refinery processing gains are lower, substantial oil imports would be needed to replace ANS exports.
- o Large ANS exports could result in additional imports from the Middle East during the 1990s.
  - Under the Unconstrained Scenario, U.S. imports of Middle East oil could increase by up to 590 MB/D in 1990 and 310 MB/D in 1995, respectively.
  - To the extent U.S. oil output declines in the 1990s, additional oil imports would be required. The Middle East remains the marginal supplier and the replacement of ANS exports would increase U.S. import dependence on oil imports.

b. Militarily Useful Tankers

- o A number of U.S. tankers that can carry military mobility fuels will be forced out of business if the ban were to be lifted completely.

- The U.S. Government would be required to purchase displaced military useful tankers or risk having foreign tankers carry a large proportion of U.S. military mobility fuels during a crisis.

- As U.S. tankers are displaced from the ANS trade, the U.S. dependence on foreign tankers to carry the replacement oil imports would become greater.

c. Maritime Losses

The shipping sector would experience the largest overall economic losses. The severity of the losses would be in direct proportion to the level of exports, with the Unconstrained Exports Scenario resulting in the largest dislocations. The scope of the maritime losses extends to existing ships under public or private mortgage guarantee as well as the prospective loss of business for shipbuilding and repair yards.

o MARAD Title XI Program

- Unconstrained Exports of ANS crude would probably lay-up 32 tankers totalling 4.3 million DWT or over 40 percent of operating U.S. fleet tanker tonnage.

- Approximately $382 million of Federally guaranteed loans would be subject to default.

- Of the above amount, nearly $200 million would be subject to nearly immediate default.

- Even if a portion of the export trade were reserved for U.S.-flag tankers, there would likely be no reduction in Title XI losses incurred by the domestic tanker fleet. Exports would probably be carried on existing tankers that were built with a construction subsidy for the U.S. foreign trade. These vessels have not repaid the subsidy to gain eligibility for the domestic trade.

o Militarily Useful Tankers

- $34 million in U.S. Treasury expenditures would be needed to acquire tankers for the Ready Reserve Force. These expenditures are for product coated tankers that can carry clean products for the military during an emergency.

- o Private Owned Tankers
  - Private sector tanker owners could be exposed to a potential default of $540 million in the Unconstrained Exports Scenario.
  - If all or part of this amount is written off against income, it will cause a loss of Federal income tax receipts.
- o Employment
  - Over 2000 seafarers would be displaced under the Unconstrained Exports Scenario.
  - These seafarers would have difficulty finding alternative work in the U.S. merchant shipping industry.
- o Shipbuilding and Repair
  - ANS exports that displace U.S. Jones Act ships could mean less future demand for new tankers and repair to existing vessels.
  - The cumulative loss or revenue for maintenance of repair resulting from ANS exports could amount to about $392 million.

d. Loss of Panamanian Revenue

- o Trans-Isthmian Oil Pipeline
  - Termination of the oil pipeline across Panama resulting from lifting the ANS export ban would cost the Government of Panama an estimated $100-150 million per year in direct revenue and would have a major negative impact on the Panamanian economy.

B. OTHER ISSUES

1. Oil Production

Another way of addressing the appropriateness of maintaining export controls is to examine the contribution of ANS exports to future North Slope oil production. Specifically, would lifting the export ban result in more Alaskan oil production than would have occurred with the ban in place? Section IV contains projections that ANS and California production will expand in 2000 by a combined total of 28 MB/D under the Unconstrained Exports Scenario. The combined increase of 28 MB/D amounts to approximately 1-1/2 percent of the current ANS output of 1.8 million B/D.

However, other factors should also be taken into consideration. The primary production response benefit associated with ANS crude exports is that it assists in maintaining ANS crude output at relatively constant levels through the early 1990s and then slows down the rate of decline of oil production. If ANS output were to decline at a more rapid rate during the 1990s, as some observers suggest, then the State of Alaska would have substantially lower fiscal revenues and there would be less oil for West Coast energy markets.

The second major production related issue is whether lifting the export ban would result in substantial foreign investment in Alaskan petroleum exploration and development. Foreign capital and technology to finance Alaskan exploration will depend upon the perceived direction of world oil prices and the attractiveness of lease offerings. It may also depend on the ability of foreign inventors to negotiate guaranteed oil supply offtake rights.

2. Export Scenarios

The findings of Section IV are that a complete lifting of the ANS export ban yields the largest economic benefits. The 500 MB/D export scenario also yields positive benefits, while the smaller export scenarios -- 50, 100, and 200 MB/D -- result in limited economic benefits. Some critics of the current export ban have put forth proposals for a partial lifting of the ban. These proposals have run the gamut from freeing-up State of Alaska royalty oil to crude oil from new fields to straight volumetric export formulas. All of these proposals are designed to capture part of the increased transportation savings in the form of higher wellhead prices and government revenues.

The adoption of partial export volumes must be evaluated based upon a number criteria. Would a partial lifting of the export ban discriminate against one company in favor of another? Who would determine which parties are allocated export shares and in what amount? Who would administer a limited export regime and how would the costs be financed? The creation of a situation where one party or a group of parties receives preferred benefits at the expense of other parties unfairly penalizes certain companies. While there would certainly be no intent to cause economic disadvantage, a situation where one or two companies held export rights to several hundred thousand barrels per day of ANS crude would impair the ability of other companies to compete based upon market forces. It would confer advantages on certain parties while simultaneously preventing others from maximizing their economic opportunities. A government entity rather than the market forces would be making economic choices.

Another consideration is to determine the respective shares of export rights allocated to the oil companies and the State of Alaska. The most likely situation would be for a Federal Government entity to allocate export rights. In addition to the administrative cost of allocating export rights, there would be costs associated with issuing validated licenses pursuant to the Export Administration Act.

Finally, it is important to point out that this study only evaluates the implications of removing or modifying export controls on ANS crude oil. It does not address the costs and benefits of export controls on other domestically produced crude oil. From a public policy perspective, removal or modification of export controls on Alaskan crude should be considered in the context of overall restrictions on crude produced in the lower 48 states; i.e., if ANS crude oil exports are in the national interest, why should export restrictions be maintained on other domestically produced crude?

There are also practical difficulties associated with decontrolling exports of ANS crude without addressing other controls. As previously noted, there are five separate and often overlapping statutes that prohibit the export of domestically produced crude oil. Each statute permits the President to make a national interest finding to allow exports in special circumstances. At present, the statutory restrictions on ANS crude exports are the most stringent -- the Export Administration Act focuses specifically on ANS crude and the requirements for a national interest finding to permit exports are almost impossible to meet. <u>However, even if the Congress were to remove or modify the restrictions on ANS crude set forth in the Export Administration Act, the President would still be required to make national interest findings to permit the export of ANS crude under the other statutes</u>.

VI. IMPLICATIONS OF DECLINING OIL PRICES

While this study was under preparation, world oil prices declined substantially. World oil prices averaged $25-28 per barrel in December 1985. (Note: The world oil price is defined here as the average U.S. imported refiner's crude acquisition cost.) The delivered U.S. price for foreign crude under contract dropped to $13-15 per barrel by March 1986. Furthermore, spot cash and future prices for crude fell below $12 per barrel. Some energy analysts, however, expect world oil prices to recover by 1990, so that the 1990-2000 analysis presented in this study still contains reasonable world oil price projections.

The oil price decline has resulted in actual oil prices that are below the lower end of the crude oil price range forecast used in this study of $22 per barrel in 1987 (see Appendix A). Today, the range for contract prices for crude oil imported into the United States is estimated at $13-15 per barrel. The recent price decline impacts on Alaskan North Slope (ANS) crude oil production, distribution flows, and Federal and State revenues.

The Interagency Working Group believes that it would be useful to address the impact of near-term lower oil prices on ANS crude exports. What follows is a brief analysis of implications of a $15 per barrel oil price case on ANS exports in the 1986-1990 time frame, and is based on the DOE Oil Trade Model (OTM). The macroeconomic, energy production and pipeline tariff assumptions remain identical to those used in Tasks III and IV (see Appendix A).

The following analysis is derived from the Export Ban and Unconstrained Exports Low Price Scenarios for 1990. The Valdez FOB netback prices are based upon estimates of reduced shipping (see Appendix A) and lower tariffs that will be adopted under the terms of the Pipeline Settlements between the Justice Department and the companies operating the pipeline. Based upon a $15 per barrel price, the lower shipping and pipeline tariff rates yield estimated 1990 FOB Valdez prices of $12.34 and $11.70 per barrel for West and Gulf Coast shipments in the Export Ban Scenario, and $14.09 per barrel for West Coast sales in the Export Scenario (Table VI-5). It is important to note that under the Export Ban Scenario, there are only small shipments to the Gulf Coast by 1990. In the Export Scenario, however, these shipments are eliminated by 1990. Therefore, the Valdez FOB netback price for West Coast sales is the appropriate marker for evaluating price and revenue impacts of the low price Export Scenario.

A. LOW OIL PRICE SCENARIO

This study has pointed out that Alaskan oil is more expensive to develop and transport than oil found in the lower 48 States. North Slope oil shipping costs (including the Trans Panama Pipeline Tariff) currently amount to approximately $1.09 and $3.83 per barrel

to the U.S. West and Gulf Coasts, respectively (see Table VI-1). When world oil prices averaged $25-27 per barrel, this resulted in an FOB Valdez netback price of $23-23.85 per barrel. On the other hand, the $15 barrel scenario used in this Low Price Case would yield $11.70 - 14.09 (see Table VI-5) per barrel FOB Valdez prices that amount approximately to a 50 percent decline in the FOB netback price in less than a year.

While the study makes no specific estimate of the price at which North Slope producers would be forced to curtail severely their current production, it was assumed and the results of the modeling run (see below) corroborated that operators with existing production would continue to operate at $15 world oil prices -- i.e., $11.70-$14.09 per barrel FOB Valdez in 1990. To the extent that world oil prices and the resultant Valdez FOB netback declined below the FOB netback prices used in these low price scenarios and remained there, producers could decide to shut-in considerably more oil than estimated under the $15 per barrel case. The oil companies operating in Alaska face a number of complex economic decisions if and when world oil prices decline below $15 per barrel. The economic decisions on how much to produce and at what price should be governed by market forces and the respective commercial interests of various firms. With the removal of the export ban, well-head prices would rise to market levels and would allow producers to make economically sound decisions.

The commercial interests of companies in turn will depend upon the magnitude of their individual Alaskan investment and project-related debt, crude oil supply commitments, and perceptions regarding the future direction of oil prices. For example, a company that has heavy debts and operating charges may opt to produce for a short time at a very low or even a negative return. This company may justify production on a cash flow basis -- i.e., total revenue exceeds short-run variable costs -- such that choosing to operate will increase profits (or at least reduce losses). On the other hand, a company that has amortized its debt and has sources of lower cost crude may seek to maximize profits (i.e., 15-20 percent after taxes). This approach would argue for a particular company partially shutting-in some production until prices begin to increase. However, the company would still need to calculate its costs of shutting-in production in economic and political terms. Finally, a company decision to produce today depends on what value it sets on the costs to find and replace the barrel of crude that it produces today. If a company believes that it will cost $15 per barrel to find and produce a new barrel of ANS crude, it may be reluctant to produce large volumes of crude at $11.70 FOB netback prices.

Low oil prices force tough decisions on firms with development and exploration programs. For example, the low oil price may force one firm to defer or stretch-out development of a new field. Another firm may substantially revise its decisions to bid on new lease acreage while a third firm may elect to stretch-out or defer its offshore exploration. The key point here is that firms may continue to produce at low prices but new exploration and development will fall off in proportion to the companies' perceptions of the level and the duration of the oil price decline. The consequence could be a precipitous decline in post-1990 production and less ANS crude available for U.S. consumption and/or export -- if world oil prices persist at $15 per barrel into the 1990s.

B. LOW PRICE CASE - ENERGY FLOWS

The $15 price case was modeled using Export Ban and Unconstrained Exports Scenarios. These scenarios measured the difference in production and U.S. distribution under export ban and unconstrained export conditions. Tables VI-2 and 3 present the overall findings while Table VI-4 addresses the West Coast petroleum balance. Production impacts are not large because results for 1990 are near-term in nature. If oil prices persist at $15 per barrel beyond 1990, production impacts would be significantly larger in 1995 and 2000.

1. Export Ban Scenario

- ANS crude production declines by only 30 MB/D to 1.70 MMB/D (Table VI-4) as compared to the base export ban case (i.e., base case) while California output falls by 40 MB/D to 1.38 MMB/D.

- Prices below $15 per barrel, however, could result in proportionately larger oil production declines, particularly if prices approach operators' costs of production.

- The West Coast (PAD V) receives an additional 300 MB/D of ANS crude as compared to the base case, while shipments to the East Coast (315 MB/D) and Puerto Rico (25 MB/D) are phased-out (Table VI-2).

- Deliveries to the Gulf Coast remain at 200 MB/D level found in the base export ban scenario.

- In addition to increased West Coast demand for ANS crude, lower oil prices with fixed per barrel shipping rates result in per barrel transportation costs that are a

larger proportion of the purchase price. Therefore, less ANS crude will be shipped to the East Coast and Puerto Rico since shipping distances to these destinations are greater.

2. Unconstrained Exports Scenario

- Rising consumer demand as a result of lower oil prices reduces exports in 1990 from 870 MB/D in the Base Case to 650 MB/D.

- The reduction in 1990 exports to the Pacific Rim results in an 190 MB/D increase in ANS shipments to the West Coast from 830 MB/D to 1.02 MMB/D (Table VI-3).

- Under this scenario, deliveries to the Gulf Coast, East Coast, and Puerto Rico are eliminated totally by 1990 (Table VI-3).

(NOTE: Both the Export Ban and Unconstrained Export Scenarios assume completion and full operation by 1990 of the All American Pipeline (300 MB/D) from California to Texas.)

Under some low oil price scenarios this pipeline may be delayed or operate at limited capacity, thus increasing the availablity of West Coast crude.

3. West Coast Petroleum Balance

- PAD V petroleum consumption (Table VI-4) in the low price export ban and export scenarios rises in 1990 by 140 and 120 MB/D, respectively over the base cases.

- The lower oil prices encourage additional consumption while Alaska and California production declines are modest in both low price scenarios.

- The major result of lower prices in the export case is higher West Coast demand and less exports (220 MB/D). While reduced exports yield less economic benefits in terms of lifting the ban, lower oil prices for PAD V consumers would represent a positive economic benefit in terms of lower inflation and fuel prices for U.S. manufacturers that compete in world markets.

C. PETROLEUM EXPLORATION AND DEVELOPMENT

The wellhead price impacts of lifting the export ban remain essentially unchanged but at lower world oil prices become relatively much more important. Unconstrained exports in 1990 would result in an increase of approximately $1.75 per barrel in the wellhead price of all ANS crude. This increase in the price would result in raising the FOB Valdez price by $1.75 per barrel in the export ban scenario to approximately $14.09 in the unconstrained export scenario. Similarly, the export scenario benefits California producers. The wellhead price increases by $1.84 per barrel above the $12.13 level in the export ban scenario. Under low oil price scenarios the $1.75 per barrel increase in the wellhead price could push prices from below break-even levels and thereby have a marked impact on near-term production.

The shipping component of the ANS crude prices becomes larger at low oil prices. Given the prospect of shut-in, near-term oil production in Alaska and California, the $1.75 per barrel wellhead price impact resulting from lifting the ban may well play a major role in production decisions by companies.

The decline in the wellhead price as a result of lower oil prices is partially offset by the lower pipeline tariff. The pre-settlement 1985 pipeline tariff of $6.11 per barrel is expected to decline to $3.25 per barrel by 1990 (see Table VI-5), thereby increasing the wellhead price received by the producer and the base on which the State's income taxes are calculated. Therefore, net producer returns on the wellhead do not totally drive production decisions. Companies that own and operate the Trans-Alaska Pipeline (TAPS) will still earn large per barrel profits on TAPS. After the recovery of capital and operating costs on TAPS the companies that own and operate the pipeline are likely to earn profits in excess of $2 per barrel. These companies' financial bottom line will be determined by joint oil production and pipeline operations. On the other hand, producing companies that have no financial interest in the pipeline will face a different set of economic calculations.

The key issue is the impact of prolonged low world oil prices on current and future Alaskan exploration and development. First, continued Valdez FOB netbacks in the $12-14 per barrel range make go-ahead decisions on new marginal, remote onshore and offshore Gulf of Alaska deposits more difficult to justify from an economic perspective. Companies will either defer or stretch out existing developments. If, however, prices increase by 1988-89, operators will move ahead with new developments.

The decision on which course to pursue will depend upon individual company finances as well as the physical/technical elements of a given project. For example, a company about to make an investment

decision may go ahead with a project that involves the second stage of an existing field, or if the new project is located adjacent to the Trans-Alaska Pipeline (TAPS). Notwithstanding the level of financial return, a company may be forced to invest if the physical/technical aspects of the petroleum reservoir require workover. On the other hand, a firm may postpone a decision to develop a small offshore or remote onshore deposit that is not proximate to TAPS. A recent victim of the oil price drop was Conoco's recent decision to cancel phase II of the Milne Point field development.

Exploration for new reserves also raises economic issues. First, companies that have leased new acreage are likely to stretch out their exploration programs consistent with the overall corporate funds available for exploration. Expensive offshore exploratory drilling is likely to slow down. Onshore prospects will involve drilling adjacent to existing producing properties and other relatively low risk areas.

Low oil prices will certainly affect company reactions to large U.S. Government sales of new lease acreage. In fact, there could be situations where large new lease sales attract limited bids by companies. Again, the situation will depend on individual company cash positions, need for new reserves and perceptions of oil prices. In this regard, the Atlantic Richfield Company, the second largest oil producer in Alaska, is reported to have cut its 1986 exploration and production budget by $1.0 billion to $2.0 billion.

Separate but related to the petroleum development issue is the question of how to facilitate new ANS exploration during a period of falling oil prices. The following discussion addresses the constraints that must be removed to facilitate ANS exploration. The first issue is project economics. Private firms plan frontier and marginal energy projects on a long-term basis and require a stable long-term business environment and prospective netback prices that provide adequate incentives to invest. They require stable project costs and government tax rates. Given the large drop in oil prices, private firms are probably interested in tax regimes that balance exploration risk and development expenses against government revenue requirements. Second, the oil companies will seek to contain project construction costs. The scissors of declining prices and rising project development charges cut into profits. To the extent that companies and unions can curb construction charges, the profit picture will be better.

The third key area involves the environment and licensing/permit process. The companies operating in Alaska will be reluctant to commit limited exploration funds without access to attractive

onshore and offshore lease acreage. They will also push to streamline State licensing and permit processes. This could result in shortened time spans to develop Alaskan petroleum deposits and reduce project costs.

D. IMPACTS ON REFINERS AND CONSUMERS

The West Coast refining industry benefits from lower crude oil prices in the Export Ban and Unconstrained Export Scenarios. In both cases, PAD V refiners have access to large volumes of ANS crude at relatively low prices.

1. Export Ban

- The lower ANS FOB netback price enables PAD V refiners to benefit from a West Coast Discount.
- The Gulf Coast still receives small amounts of ANS crude (200 MB/D) at aporoximately $11.70, thereby reflecting the large transportation differential.

2. Unconstrained Exports

- The ANS wellhead price rises to $14.09 per barrel and reflects a market based price on the West Coast.
- Exports combined with growing PAD V demand put an end to the "West Coast Discount" and refiners now pay market prices for ANS crude.

Consumers benefit from the lower prices. The benefits vary between the Export Ban and Unconstrained Export Scenarios. The primary benefits are derived by West Coast consumers. In the Export Ban Scenario, consumers continue to benefit from the "West Coast Discount." Lifting the export ban eliminates the discount in the Unconstrained Export Scenario. Consumers, however, still receive the benefits of lower world prices for oil imports while in turn paying more for ANS crude because the "West Coast Discount" has been eliminated. To the extent that exports result in imports of light crudes that yield refinery gains of light product over time, consumers could ultimately receive small benefits from lower refining operating costs that translate into slightly lower product prices.

E. FISCAL IMPACTS

There are Federal and State fiscal impacts associated with the low oil price case. The impacts in the export ban case consist of reduced Federal and States of Alaska and California revenues resulting from the lower oil prices. The latter also insures the elimination of Federal Windfall Profit Tax (WPT) revenues from Alaska as well as California production.

The Export Case results in additional Federal and combined State revenues but the gain in Federal revenues is reduced about 25 percent from the $1.6 billion increase associated with the Base Case Unconstrained Export Scenario in Section IV. The key points regarding revenues include:

- The U.S. Government would receive approximately $1.1 billion in fiscal revenues, while the States of Alaska and California would earn approximately $1.3 billion and $500 million, respectively.

- Federal and State revenues will increase almost entirely in proportion to the wellhead price increase resulting from lifting the export ban ($1.75 and $1.84 per barrel for Alaska and California, respectively in 1990). There will probably be no benefits from increased Alaska and California oil production.

- Lower export volumes and declining oil prices will reduce the revenue benefits as compared to the base case.

F. MARITIME IMPACT

The shipping sector experiences some financial losses at lower oil prices but less than what would be the result in the Base Case Export Scenarios.

1. <u>Export Ban</u>

   - Lower oil prices increase PAD V 1990 consumption and end deliveries to the East Coast and Puerto Rico.

   - The resultant change in demand for Jones Act tankers is the net difference between increased shipments to California and the end of deliveries to East Coast and Puerto Rico.

   - Additional declines in ANS production after 1990 would result in a lower demand for U.S. flag tankers. However, this development is sensitive to the timing and magnitude of the price decline.

2. Unconstrained Exports

- Demand for U.S. tankers declines substantially but less than would be the case in the Base Unconstrained Export Scenario.
- Exports of 650 MB/D result in less immediate losses to the U.S. flag tanker fleet.
- If exports continue at those levels beyond 1990 and/or production declines more than in the Base Case, then the U.S. shipping industry will continue suffering financial losses beyond 1990.

G. EMPLOYMENT IMPACTS

Lower oil prices present a mixed blessing in terms of the labor impact. Reduced exports in 1990 result in less financial and employment losses to the shipping sector and the resultant lower unemployment. Alaskan petroleum exploration and development, however, slows down through 1990 and may decline substantially after that date. Reduced exploration and development may have two impacts on California and Alaska petroleum-related employment: (1) lower exploration and developments may mean that fewer new jobs are created, and (2) lower Alaska and California oil output (1990 export case) would probably result in the loss of existing jobs. The key point in terms of the labor impact is the duration of low oil prices and the timing of when oil companies would resume large new exploration in the two States. However, removal of the export ban could result in the retention of many of the oil-related jobs that would have otherwise been lost because of lower oil prices.

H. TRADE IMPACT

The impact on U.S. foreign commerce remains essentially unchanged in the base and low oil price cases. The trade impact will in large part be determined by the relative ANS export volumes and prices as well as the replacement imports. This is a very complex issue and it will also be driven by the duration and intensity of the oil price decline.

Separate but related to this issue is the fact that a prolonged period of low oil prices could result in expanded U.S. oil imports. This would be the case if U.S. oil exploration falls off, stripper well production is shut-in, and demand rises as a result of low oil

prices. Expanded oil imports would further exacerbate the U.S. trade deficit. To the extent that removal of the ANS export ban results in an increase in U.S. oil production or prevents the shutting-in of existing production, this could reduce imports and yield some benefits.

TABLE VI-1

ANS ECONOMICS UNDER VARIOUS PRICE SCENARIOS (1985 $/bbl)

	Sales to West Coast			Sales to Gulf Coast		
	6/85	2/86	3/86	6/85	2/86	3/86
Delivered Price	$25.00	$20.00	$15.00	$27.00	$22.00	$17.00
Less:						
Shipping Cost	1.15	1.09	1.09	4.00	3.83	3.83
FOB Valdez	$23.85	$18.91	$13.91	$23.00	$18.17	$13.17
Less:						
Pipeline Tariff*	6.11	5.04	4.74	6.11	5.04	4.74
Estimated Wellhead Price	17.74	13.87	9.17	16.89	13.13	8.43

* Assumes pipeline settlement tariff beginning in 1986.

Sources: Based upon Petroleum Intelligence Weekly - 6/24/85

TABLE VI-2

ANS OIL FLOWS UNDER LOW OIL PRICE CASE - EXPORT BAN - 1990 (Million B/D)

Export Ban Case	Base Case	Low Price Case	Change
West Coast	1.160	1.460	+0.300
Gulf Coast	0.200	0.200	----
East Coast	0.315	0.010	-0.305
Puerto Rico/ Virgin Islands	0.025	----	-0.025
Pacific Rim	----	----	----
Total	1.700	1.670	-0.030
World Oil Price (1985 $/Bbl.)	24.00	15.00	

Source: Department of Energy

TABLE VI-3

ANS OIL FLOWS UNDER LOW OIL PRICE CASE
UNCONSTRAINED EXPORT SCENARIO - 1990
(Million B/D)

Free Market	Base Price	Low Price Case	Change
West Coast	0.83	1.02	+0.19
Gulf Coast	---		
East Coast	---		
Puerto Rico/Virgin Islands	---		
Pacific Rim	0.87	0.65	-0.22
Total	1.70	1.67	-0.03
World Oil Price (1985 $/Barrel)	$24.00	$15.00	

Source: Department of Energy

TABLE VI-4

PAD V PETROLEUM BALANCE - 1990
(Million B/D)

	Base Ban	Low Price Ban	Base Export	Low Price Export
Demand				
Product Consumption	2.30	2.43	2.29	2.41
Refinery Fuel	0.23	0.24	0.23	0.23
Total	2.53	2.67	2.52	2.64
Supply				
Alaska Crude Production	1.73	1.70	1.73	1.70
California Crude Production	1.42	1.38	1.42	1.38
NGL	0.04	0.04	0.04	0.04
Crude Imports	0.08	0.06	0.26	0.29
Net Product Imports	(.04)	(.10)	(.05)	(0.04)
Product Shipments From Other U.S. Regions	(.04)	(.07)	0.10	0.07
Crude Shipments to Gulf via All American P/L	(.30)	(.30)	(.30)	(0.30)
Refinery Gain	0.18	0.17	0.19	0.15
Total	3.07	2.88	3.39	3.29
Excess Crude Supply Shipments to Gulf/East Coasts Under Ban	0.54	0.21		
Exports to Pacific Rim			0.87	0.65

Source: Department of Energy

TABLE VI 5

ANS ECONOMICS UNDER LOW OIL PRICE SCENARIO - 1990 (1985 $/bbl)

	Export Ban		Unconstrained Exports	
	West Coast	Gulf/East Coasts	West Coast	Gulf/ East Coasts
Delivered Price	13.34	15.00	15.00	----
Less:				
Shipping Cost	1.00	3.30	0.91	
FOB Valdez	12.34	11.70	14.09	
Less:				
Pipeline Tariff	3.25	3.25	3.25	
Estimated Wellhead Price	9.09	8.45	10.84	

Sources: DOE Oil Trade Model and Appendix A

VII. FINDINGS AND RECOMMENDATION

A. FINDINGS

The decontrol of ANS crude oil exports would have a number of economic and policy implications. Some of these effects can be quantified based on a number of predetermined economic assumptions while others are not subject to quantification.

This study concludes that decontrol would have long-term positive economic benefits for the economy as well as immediate economic benefits for a number of private sector interests (e.g., petroleum industry) as well as state and Federal Government revenue flows. Decontrol would raise wellhead prices and result in higher producer revenues as well as state and Federal taxes.

The study also concludes that decontrol would have a number of immediate negative implications for the maritime and related industries as well as West Coast consumers.

The balance of the trade consequences of decontrol is uncertain, even using predetermined macroeconomic assumptions. Some analysts project that decontrol would lead to a net positive change in the U.S. trade balance on the microeconomic assumption that exports would not be replaced by imports on a barrel for barrel basis. Other government analysts project that decontrol would lead to a net negative trade balance on the grounds that ANS exports would be replaced by imports on a barrel for barrel basis and carried on foreign rather than U.S. tankers. The United States would, therefore, lose the transportation element of each sale.

The employment implications are mixed. The maritime sector and industries that support it would suffer severe near-term losses. On the other hand, decontrol would be beneficial for employment in the petroleum and related industries.

The foreign policy and national/energy security implications of decontrol are not subject to precise quantification. ANS exports would improve the energy security of our allies in the Far East as well as create oil export opportunities for countries in the Western Hemisphere. Decontrol could, however, require offsetting oil imports from OPEC sources and thereby increase U.S. dependence on foreign suppliers.

B. RECOMMENDATION

Lifting the export ban on Alaskan North Slope (ANS) crude oil would result in short-term economic dislocations to certain sectors but could yield economic benefits over the long run. Specifically, lifting the export ban would have significant adverse consequences for the U.S. maritime industry and the industries that support it, as well as increase petroleum products prices for West Coast consumers.

At the same time, lifting the ban would enhance the efficiency of the U.S. energy distribution system and result in higher fiscal revenues for Federal and state authorities and increase oil industry profits.

An interagency review has been conducted of the analytical and technical findings of the study and the following is recommended: that the appropriate Federal agencies continue to review the prospects for Alaska North Slope exports, in light of changing energy market conditions. During this continuing review process, the appropriate Federal agencies will consult with the owners of the oil, including the State of Alaska, the maritime industry, and other interested parties.

APPENDIX A

ECONOMIC/ENERGY ASSUMPTIONS FOR THE ALASKAN 126 OIL STUDY

1. Scope/Timing

The Working Group has agreed to use 1985 as the base year. We believe that we can present an accurate estimate of preliminary data for 1985.

The Working Group also assumes that January 1, 1987 would serve as the effective date with respect to any Congressional action on the Alaskan oil situation. The plan is to take the study out to the year 2000, thereby providing a meaningful time span to measure the economic impact of alternative scenarios.

2. Oil Price

Table 1 shows the range of benchmark crude oil prices to be used in the study. For analysis requiring a point estimate, the group agreed to use mid-range values from the table. The world oil prices in the table are defined as the average imported refiner acquisition cost of crude oil delivered to the United States (IRAC). The range for the world oil price estimates was derived from a review of recent private and public sector world oil price projections.

The Valdez, Alaska prices in Table 1 are consistent with the range of world oil prices in the table minus: (1) a differential equal to average shipping costs to deliver Alaskan oil to U.S. refiners and, (2) a quality differential because Alaskan crude on average is of lower quality than the average imported barrel of crude oil.

In 1985, this difference equalled about $4 per barrel. We project the future difference to remain at $4 per barrel. We believe that the projected decline in shipping costs will be offset by a projected return to a larger quality differential of approximately $0.50 per barrel.

TABLE 1
Crude Oil Price
($1985 per barrel)

	1985 Estimated	1987	1990	1995	2000
World Oil Price 1/ (Range)	$27	$22-27	$21-27	$22-33	$25-40
Valdez Alaska Crude 2/ (Range)	$23	$18-23	$17-23	$18-29	$21-36

1 Defined as the imported average refiner acquisition cost of crude oil (IRAC).
2 Assumes continuation of prohibition on Alaskan crude oil exports.

3. GNP

The Working Group agreed to use the Administration's Mid-session 1985 numbers for the assumptions regarding economic growth. The assumptions were jointly prepared by the Department of the Treasury, the Council of Economic Advisers, and the Office of Management and the Budget. The assumptions only go to 1990, but the Working Group agreed to base 1991-2000 annual GNP growth on extrapolations of the past trends.

Year	GNP Growth (%)
1985	2.7
1986	4.2
1987	4.0
1988	4.0
1989	3.9
1990	3.6
1995	3.3
2000	3.0

4. Inflation

The Administration's current estimates of inflation are derived from the 1985 mid-session review. The inflation rate is necessary for calculating pipeline tariffs. The Administration's forecasts are for the 1985-1990 period. The Working Group has assumed a flat 3 percent annual inflation rate between 1991-2000.

The following are the inflation rates:

Year	Percent
1985	3.8
1986	4.1
1987	4.2
1988	3.9
1989	3.6
1990	3.3
1991-2000	3% annual inflation

5. TAPS Tariff

The Working Group believed that it was necessary to examine the pre-settlement and settlement pipeline tariffs. The current pipeline tariff is $6 per barrel at approximately 1.8 million B/D throughput. We relied upon the Department of Justice to calculate the pipeline tariff under the terms of the settlement agreement between the North Slope producers and the Federal Government. Table 2 incorporates the range of pipeline throughput levels and the related pipeline tariff settlement rates. Each yearly tariff rate reflects an agreed upon pipeline throughput level (see Table 2).

TABLE 2

PIPELINE TARIFF

($1985)

	PIPELINE THROUGHPUT (MILLION B/D)			PRE-SETTLEMENT TARIFF*			SETTLEMENT TARIFF		
YEAR	LOW	MIDPOINT	HIGH	LOW	MIDPOINT	HIGH	LOW	MIDPOINT	HIGH
1985	-	1.8	--	-	6.00	--	-	5.04	--
1986	-	--	--	-	--	--	-	--	--
1987	-	1.8	--	-	6.00	--	-	4.35	--
1988	-	--	--	-	--	--	-	--	--
1989	-	--	--	-	--	--	-	--	--
1990	1.6	1.7	1.8	6.75	6.36	6.00	3.36	3.25	3.16
1991	-	--	--	-	--	--	-	--	--
1992	-	--	--	-	--	--	-	--	--
1993	-	--	--	-	--	--	-	--	--
1994	-	--	--	-	--	--	-	--	--
1995	1.3	1.55	1.8	8.31	6.97	6.00	2.25	2.05	1.98
1996	-	--	--	-	--	--	-	--	--
1997	-	--	--	-	--	--	-	--	--
1998	-	--	--	-	--	--	-	--	--
1999	-	--	--	-	--	--	-	--	--
2000	1.0	1.4	1.8	10.80	7.71	6.00	1.77	1.52	1.48

6. North Slope Crude Oil Production

After discussion, it was agreed to develop two oil production rates. The high and low production cases generally capture the most realistic scenarios for oil output.

The high case uses oil output of approximately 1.8 million B/D and holds this constant from 1985-2000. The high case reflects the upper bound of the range of production possibilities in DOE's National Energy Plan. The lower oil production scenario was derived from the Energy Information Administration's (EIA) forecast out to 1995. Production for the 1996-2000 period was extrapolated based upon the 1990-1995 period.

The Working Group recognizes that the low oil production case is somewhat more optimistic than the State of Alaska's Department of Revenue's current oil production forecasts. The Department of Revenue estimates crude oil production at 900,470 B/D in 1995 and 2000, respectively. There are three principal reasons for the different forecasts: (1) the Alaskan case assumes no improvement in oil field technical production and recovery techniques that are applied to the North Slope; (2) the Alaskan case shows no increases in production stemming from settlement of the pipeline tariff; and(3) the Alaskan case assumes that all recoverable reserves in Prudhoe Bay, includir additional undiscovered but recoverable oil, are not developed during the 1990-2000 period. These are the major differences that account for the variance between the State of Alaska and the Working Group's estimates. The numbers breakout as follows:

	(Million B/D)		
	High	Mid-point	Low
Year			
1985	1.80	1.75	1.70
1987	1.80	1.75	1.70
1990	1.80	1.70	1.60
1995	1.80	1.55	1.30
2000	1.80	1.40	1.00

7. Shipping Rate (U.S.)

Table 3 incorporates numbers that reflect U.S. tanker charges for the Valdez to Gulf and West Coast trade routes.

The principal difference between the ranges is the magnitude of the decline in the U.S. tanker rate stemming from a recent MARAD policy change. Large U.S. tankers that repay the Construction Differential Subsidy (CDS) would now be allowed to enter the Alaskan trade on a full-time basis. DOT/MARAD believes that the employment of two to nine large tankers will result in a large reduction in U.S. tanker rates. The other end of the range of tanker rates represents a more conservative view regarding the magnitude and timing of the declines

in the freight rate. The following discussion explains the DOT methodology behind the forecasts of U.S. tanker rates.

- o 1985:
  - The 1985 shipping cost was derived by estimating the types and amount of shipping used over the first eight months of 1985, DOT staff estimates of current time charter rates, and DOT staff analysis of operating and voyage costs for different sized tankers. Added to this is a mid-range estimate of $0.80 per barrel to use the Panama Pipeline system.
- o 1987:
  - The 1987 estimate is derived by simply assuming that there is a transition period before rates settle down to their lower level and that half the change in rates occurs by 1987.
- o 1990-2000:
  - Estimated shipping rates beyond 1990 are derived from an analysis of the expected shipping configuration after construction subsidy repayment on seven VLCCs that were previously precluded from full-time employment in the ANS trade. (This is possible because of a DOT rule issued last summer.) In this case, rates are lower because of: (1) greater use of the more efficient VLCCs instead of the less efficient smaller tankers; and (2) competitive pressure from the introduction of additional capacity drives time charter rates down to average break-even levels for each size class of ship.
  - The high estimate assumes that the only changes to the fleet are the introduction of two ARCO tankers that have already repaid their construction subsidies and the two Exxon tankers that are currently under construction. It is also based upon the (unlikely) assumption that the introduction of this new tonnage into the trade has no impact on charter rates. This case accounts for the efficiency improvements from these four vessels but assumes that there are no competitive rate effects.
  - The low estimate assumes full implementation of CDS repayment with the prepayment by seven VLCCs, plus introduction of the two Exxon vessels which are currently under construction. It also assumes that in response to this added capacity, time charter rates are driven to average break-even levels for each size class of vessels. It still does not consider the rate impacts that could result from various policy and structural changes.

TABLE 3

DOMESTIC SHIPPING RATES FOR ALASKA NORTH SLOPE CRUDE OIL: 1985-2000

($1985 per barrel)

Trade Route		1985	1987	1990	1995	2000
Valdez-Gulf/East Coast*	High	--	3.87	3.75	3.75	3.75
	Medium	4.00	3.65	3.30	3.30	3.30
	Low	--	3.45	2.90	2.90	2.90
Valdez-West Coast	High	--	1.08	1.00	1.00	1.00
	Medium	1.15	1.02	0.87	0.87	0.87
	Low	--	0.94	0.73	0.73	0.73

* Includes $0.80 per barrel Panama Pipeline System Cost

8. Trade Flows

The group agreed to a series of trade flows that are based upon the production scenarios. There will be a series of model runs involving export ban and export cases. The export ban and export cases will have high, medium and low freight rates and use the mid-point for oil production (see Table 2). The cases will be for 1987, 1990, 1995, and 2000.

Note: The Working Group also plans to address the impact of the new California to Texas crude oil pipeline on the trade flows. This line is slated to come onstream in 1986 and be eventually able to handle 300,000 B/D of throughput (see Section II of the report).

9. International Tanker Rates and Assumptions

International tanker rates are based on The Drewry Tanker Forecast-1985. H.P. Drewry has projected world tanker costs for representative tanker sizes through the year 2000. Tanker rates have also been projected for representative vessel sizes through 2000 based on Drewry's projections of international tanker supply and demand by vessel size categories. Future tanker rates for specific routes were obtained by multiplying Drewry's projected Worldscale (WS) freight rates for representative vessel sizes (adjusted for inflation) by the January 1, 1985 Worldscale 100 base rate for the routes applicable to the Section 126 Study.

- o Tanker Cost Assumptions

  - Tanker costs (expressed in 1985 dollars) have been estimated for the three major components: voyage (fuel and port), operating (manning, stores, lubes, maintenance and repairs, insurance, etc.), and capital. (See Table 4.)

- o Voyage Costs

  - Bunker fuel costs are assumed to fall between 1985 and 1987. In 1989 and 1990, bunker prices are assumed to grow by about 1 percent per year. Beyond 1990, bunker prices increase by about 2 percent per year.

    Port charges are assumed to remain constant between 1985 and 2000.

- o Operating Costs

  - Vessel operating costs, in general, are assumed to remain constant between 1985 and 2000. However, manning costs are assumed to grow under 3 percent per year. (The growth in manning costs incorporates crew size reductions.)

- Capital Costs

  - Capital costs are dependent on new building prices and financing terms. Future new building prices, in turn, are dependent on market conditions. Capital costs reflect changes in the supply and demand balance for the representative mix of ships employed on the routes provided in Table 4.

- Freight Rate Assumptions

  - Estimated future spot tanker rates are provided in Table 4. Rates for the first four routes listed are based on a 50-50 mix of 120,000 DWT and 250,000 DWT tankers. Rates for the last two routes are based on a 50-50 mix of 80,000 DWT and 120,000 DWT tankers. The mix is an approximation of vessels actually employed on these routes.

TABLE 4

ESTIMATED WORLD SPOT TANKER RATES
(1985) DOLLARS PER BARREL
(Medium Estimate)

Route	1985	1987	1990	1995	2000
(1) Alaska-Japan	0.36	0.47	0.63	0.73	0.79
(2) Alaska-Virgin Islands	1.51	1.97	2.64	3.09	3.31
(3) Arabian Gulf-Japan	0.63	0.82	1.10	1.29	1.38
(4) Arabian Gulf-U.S. Gulf (rev.) 1/	1.10	1.37	1.78	2.04	2.17
(5) Arabian Gulf-U.S. East (rev.) 1/	1.61	1.90	2.10	2.54	2.67
(6) Far East-U.S. West Coast	1.17	1.43	1.61	2.01	2.12
(7) Arabian Gulf-U.S. West	1.72	2.10	2.36	2.93	3.11
(8) Arabian Gulf-Far East	0.36	0.47	0.63	0.73	0.79
(9) Arabian Gulf-N. Europe 1/	0.71	0.85	1.12	1.25	1.32
(10) Arabian Gulf-Italy 1/	0.55	0.63	0.83	0.90	0.95
(11) Arabian Gulf-Virgin Isl. 1/	1.02	1.27	1.65	1.88	2.00
(12) Arabian Gulf-Puerto Rico 1/	1.66	1.96	2.17	2.61	2.77
(13) Far East-Japan	0.57	0.69	0.78	0.96	1.02
(14) Arabian Gulf-Caribbean 1/	1.08	1.34	1.75	2.00	2.13

1/ Includes Suez Canal Toll which varies by vessel size and not by market freight rate:

Arabian Gulf-U.S. Gulf	$0.19/ BBL
Arabian Gulf-U.S. East	$0.29/ BBL
Arabian Gulf-N. Europe	$0.19/ BBL
Arabian Gulf-Italy	$0.19/ BBL
Arabian Gulf-Virgin Isl.	$0.19/ BBL
Arabian Gulf-Puerto Rico	$0.29/ BBL
Arabian Gulf-Caribbean	$0.19/ BBL

TABLE 4 (Cont'd)

ESTIMATED WORLD SPOT TANKER RATES

(1985) DOLLARS PER BARREL

(High Estimate)

Route	1985	1987	1990	1995	2000
(1) Alaska-Japan	0.36	0.54	0.72	0.83	0.90
(2) Alaska-Virgin Islands	1.51	2.27	3.04	3.55	3.80
(3) Arabian Gulf-Japan	0.63	0.94	1.27	1.48	1.58
(4) Arabian Gulf-U.S. Gulf (rev.) 1/	1.10	1.58	2.05	2.34	2.50
(5) Arabian Gulf-U.S. East (rev.) 1/	1.61	2.19	2.42	2.92	3.06
(6) Far East-U.S. West Coast	1.17	1.64	1.85	2.31	2.43
(7) Arabian Gulf-U.S. West	1.72	2.42	2.71	3.36	3.57
(8) Arabian Gulf-Far East	0.36	0.54	0.72	0.84	0.90
(9) Arabian Gulf-N. Europe 1/	0.71	0.98	1.29	1.43	1.51
(10) Arabian Gulf-Italy 1/	0.55	0.72	0.95	1.03	1.09
(11) Arabian Gulf-Virgin Isl. 1/	1.02	1.46	1.90	2.16	2.30
(12) Arabian Gulf-Puerto Rico 1/	1.66	2.25	2.50	3.00	3.19
(13) Far East-Japan	0.57	0.79	0.90	1.10	1.17
(14) Arabian Gulf-Caribbean 1/	1.08	1.54	2.01	2.29	2.45

TABLE 4 (Cont'd)

ESTIMATED WORLD SPOT TANKER RATES

(1985) DOLLARS PER BARREL

(Low Estimate)

Route	1985	1987	1990	1995	2000
(1) Alaska-Japan	0.36	0.40	0.54	0.62	0.67
(2) Alaska-Virgin Islands	1.51	1.67	2.24	2.62	2.81
(3) Arabian Gulf-Japan	0.63	0.70	0.94	1.10	1.17
(4) Arabian Gulf-U.S. Gulf (rev.) 1/	1.10	1.16	1.51	1.73	1.84
(5) Arabian Gulf-U.S. East (rev.) 1/	1.61	1.62	1.79	2.16	2.27
(6) Far East-U.S. West Coast	1.17	1.22	1.37	1.70	1.80
(7) Arabian Gulf-U.S. West	1.72	1.79	2.01	2.49	2.64
(8) Arabian Gulf-Far East	0.36	0.40	0.54	0.62	0.67
(9) Arabian Gulf-N. Europe 1/	0.71	0.72	0.95	1.06	1.12
(10) Arabian Gulf-Italy 1/	0.55	0.54	0.71	0.76	0.81
(11) Arabian Gulf-Virgin Isl. 1/	1.02	1.08	1.40	1.60	1.70
(12) Arabian Gulf-Puerto Rico 1/	1.66	1.67	1.84	2.22	2.35
(13) Far East-Japan	0.57	0.59	0.66	0.82	0.87
(14) Arabian Gulf-Caribbean 1/	1.08	1.14	1.49	1.70	1.81

APPENDIX B

DOMESTIC SHIPPING RATES

1. Estimation of Tanker Rates

A major determinant of shipping rates is vessel size. Large tankers transport crude at a lower cost per unit than do small tankers because operating costs do not increase proportionately as cargo volumes increase. The relative efficiency of larger tankers becomes even more pronounced over longer hauls. For example, a 37,500 DWT tanker has operating expenses per barrel mile (excluding fuel costs, terminal charges, and fixed costs) over four-and-a-half times that of a 250,000 DWT tanker (18.5 cents versus 4.4 cents per 1,000 barrel miles). An 80,000 DWT tanker is almost three times more costly to operate than a 250,000 DWT vessel.

Our estimates of current and projected ANS crude oil shipping rates consider the size and type of vessel employed in each trade. By averaging the high and low estimates, we have generated a "middle" estimate. Our estimates are based on the assumption that the number and size distribution of the ships currently operating in the ANS trade remains constant.

An implicit assumption in our analysis is that the average efficiency of replacement vessels will remain unchanged over time. We also assume that the average rate of the Panama Pipeline remains the same throughout the study period. Pipeline charges now range from $0.60-$1.00 per barrel. We use an average $0.80 per barrel for the entire forecast period.

Finally, no consideration is given to any possible impact on rates of the opening of a California to Texas crude oil pipeline. If such a pipeline were to be built and were to divert shipments from Panama to the West Coast for transshipment to Texas, there would be a significant decrease in the demand for tanker capacity. For example, the diversion of 200,000 B/D from trans-Panama shipments to the new pipeline would decrease the amount of shipping capacity needed by about 1.4 million DWT (about a fourth of the tanker capacity that was used in 1985). This would have a negative impact on rates.

- 1985 Rates

  Shipping costs for 1985 were derived by considering the type and number of vessels deployed during the first eight months of 1985, estimating operating and voyage costs for tankers of different sizes. As mentioned, we also add $0.80 per barrel for the use of the Panama Pipeline. Based on this methodology, we estimate that in 1985, the average cost to

ship ANS crude to the Gulf was $4.00 per barrel ($1.00 to $1.50 less than it was in 1981) and that it cost about $1.15 to ship oil from Alaska to the West Coast (down from $1.50 in 1981).

- o 1987 Rates

  Since we expect ANS shipping rates to decline, our 1987 estimates were derived by assuming that it takes some period before rates decline and that half of this reduction occurs by 1987.

- o 1990-2000 Rates

  Our forecasts of shipping rates beyond 1990 were derived from analyzing the effect of allowing seven VLCCs built with CDS assistance to enter the ANS trade on a full-time basis. Rates decline because of the greater use of the more efficient VLCCs and the competitive consequences of introducing additional capacity. The high estimate of $3.75 per barrel to the Gulf Coast and $1.00 to the West Coast is based on the assumption that the two Arco tankers that have already repaid their construction subsidies and the two Exxon tankers that are currently under construction are the only vessels that enter the trades. The high estimate is also based on the assumption that the introduction of these vessels would have no impact on charter rates.

The low estimate of $2.90 per barrel to the Gulf Coast and $0.73 to the West Coast assumes full implementation of CDS repayment (i.e., payment by seven VLCCs) plus the introduction of the two Exxon vessels. We also assume that in response to this added capacity, time charter rates fall to break-even levels.

2. Types of Charter Arrangements

Ship charters range from a single voyage to the life of the vessel. A single voyage or "spot" charter, is one in which the ship owner agrees to use a specific vessel to transport a fixed amount of oil for a fixed fee. The owner of the vessel provides the vessel, crew, and appropriate stores. All costs associated with making the voyage are borne by the vessel owner, including port, fuel, and canal charges.

Time charters range from a few days to the vessel's life. Under a time charter, the vessel owner agrees to provide a seaworthy vessel, crew, and appropriate stores, and agrees to make all insurance and maintenance payments. The charterer is responsible for paying fuel,

port, canal, and any other voyage costs. Even if the vessel is not fully employed, the charterer is obligated to comply with the terms of the contract.

Bareboat charters, a form of time charter, generally extend over the life of the vessel. The vessel owner is responsible for providing a seaworthy vessel. The charterer is responsible for insurance, maintenance and repairs, crew, and appropriate stores, as well as voyage costs (e.g., fuel, port charges, canal fees).

APPENDIX C

METHODOLOGY

1. Return to the Producer and Equivalent Valdez F.O.B.

For this analysis, it was assumed that the incentives to produce were the same under two different scenarios if the return to the producer (wellhead price minus royalties, severance tax, and WPT) was the same under both scenarios. Due to the complex structure of oil producing companies, this assumption may not be valid, but it can be made for purposes of approximation. So that existing estimates of supply elasticity could be used, the equivalent wellhead price was calculated for each policy option. That is, the wellhead price yields the same return to the producer as does implementing the policy option.

For analysis of the TAPS tariff settlement (Table 4) the base case assumed the old (pre-settlement) tariffs. It is difficult to predict what the TAPS tariffs would be in the future in the absence of a settlement. At the suggestion of the Department of Justice, the future pre-settlement tariffs were calculated which would provide the pipeline owners with constant gross revenues. The new (settlement) tariffs were used for the base case for all other policy options because adoption of the settlement seems likely. Mid-point Valdez F.O.B. prices were used for the base case for all policy options except exemption from WPT. The impact of exemption from WPT is sensitive to original price because under mid-point and low price assumptions, the wellhead price does not exceed the base price. Only if prices turn out to be high will any Windfall Profit Taxes be owed. For the other policy options, the ratio between equivalent wellhead price and original wellhead price, and therefore the supply response, was relatively insensitive to the choice of base case Valdez F.O.B. price. The WPT was assumed to phase out between 1990 and 1995.

2. Supply Response

While there is general agreement that an increase in the wellhead crude price will induce a higher level of crude production than would otherwise occur, the amount and timing of the response is uncertain and subject to debate. A common method of quantifying an oil production response is with an oil supply elasticity (i.e., the percentage increase in production for a one percent increase in price). Experts have estimated such oil supply elasticities in the 0.3 to 0.4 range, which is by definition inelastic. Since price effects are cumulative and there are delays between exploration and actual production, these elasticities are not assumed to reach their full value until after 15 years from the initial price change.

Table A-1 shows the range of crude oil supply elasticities for Alaska North Slope crude oil production used in this study. The elasticities were chosen to be consistent with other studies and expert opinion.

TABLE A-1

ALASKA NORTH SLOPE SUPPLY ELASTICITIES
(Dimensionless)

Elasticity	1987	1990	1995	2000
Low	negl.	0.00	0.05	0.10
Medium	negl.	0.025	0.10	0.20
High	negl.	0.05	0.15	0.30

Table A-2 gives the range of elasticities for California crude oil production.

TABLE A-2

CALIFORNIA SUPPLY ELASTICITIES
(Dimensionless)

Elasticity	1987	1990	1995	2000
Low	negl.	0.00	0.10	0.20
Medium	negl.	0.05	0.15	0.30
High	negl.	0.10	0.20	0.40

The elasticity in any year is assumed constant over a range of price and production levels according to the equation:

$$et = \frac{dQ/Qo}{dP/Po}$$

where
et = elasticity in year t
dQ = change in oil production
Qo = base case oil production
dP = change in wellhead price
Po = base case wellhead price

The elasticities in Table A-1 are assumed to start from essentially zero in 1987 (the first year of the price change) and to increase to a maximum in the year 2000. The increase in elasticity over time reflects the view that the increase in production in response to a change in price will be greater if that increase was expected for a long time. The initial response to an increase in the incentives to produce is to increase production from existing wells. Over time, new wells are drilled in response to the increase in profitability. Eventually, increased exploration activity results in new fields being discovered. However, in the Arctic, development of a new field takes about 15 years. Since this study only goes out 13 years (1987 to 2000), the elasticities are assumed not to reach 0.3 to 0.4 by 2000. Also, we assumed that the harsh operating conditions in Alaska make the elasticities smaller for that region than for the national average. Given these considerations, the elasticities in Table A-1 should be viewed as a reasonable but somewhat conservative estimate of the possible production response for Alaska North Slope crude production.

The elasticities in California are assumed slightly higher than in Alaska because of the more favorable operating conditions and the potential for enhanced oil recovery of heavy California crude oils.

3. Base Case and Policy Option Calculations

Tables 1 through 3 show the three base cases used in the calculation of equivalent Valdez F.O.B. and the supply response from each policy option. Tables 4 through 7 show the calculations for each policy option. The following equations are used in the tables:

Pipeline Loss = Valdez F.O.B. * 0.003

Royalty = Wellhead Price * Royalty Rate

Severance = (Wellhead Price - Royalty) * Severance Rate

WPT = (Wellhead Price - 17.85) * (1 - Severance Rate) * (1 - Royalty Rate) * WPT Rate

Wellhead Ratio = Equiv. Wellhead Price/Orig. Wellhead Price

Supply Response (%) = (Wellhead Ratio) A Elasticity - 1

Supply Response (MBD) = Supply Response (%) * Amount of oil affected

4. Estimation of Labor Impacts

To estimate the employment effects in SIC 13 for each policy option analyzed in section A, it is assumed for simplicity that oil and gas extraction employment is proportional to production. There are a wide variety of reasons why this assumption may not be correct, although the direction of bias is uncertain.

ANS oil production and employment for the Anchorage and Northern Labor Market Areas in the absence of policy changes are shown below:

ESTIMATED ANS OIL RELATED PRODUCTION AND EMPLOYMENT IN SIC 13

	Production	Employment
1987	1.8 MMBD	7,627 workers
1990	1.7	7,203
1995	1.55	6,567
2000	1.4	5,931

Estimated ANS oil production figures are mid-points of the ranges which are used throughout this study. Employment estimates are derived from a 1984 employment base and assume that employment will decline over time in proportion to the amount of oil produced. Employment effects of implementing policy options are obtained by multiplying the percentage increase in production due to the policy option by the employment level in that year.

Increased incentives for ANS oil production, with the export ban in place, should lead to only a small increase in ANS oil shipments on U.S. flag tankers relative to existing levels. Given the small magnitude of the increase, it is reasonable to assume that the structure of ANS oil shipping will not be changed by any of the policy options considered. In particular, proportions shipped along the various tanker routes - Valdez to West Coast, Valdez to Panama, Panama to Gulf and East Coasts and Puerto Rico - should not be affected. Also, average tanker size on each route should remain the same. It is possible that proportions shipped along different routes and average tanker size may change over time anyway. It is important to emphasize that no adjustment has been made for such changes for purposes of estimating employment effects. The bias introduced by failing to account for structural change in shipping is expected to be small.

Employment effects of a policy option are estimated by allocating the total ANS crude oil supply increase to different shipping routes using the 1984 proportion of ANS crude oil shipments on that route (1984 is the last year for which complete data are available):

1984 ANS CRUDE OIL SHIPMENTS
(percent of total)

Valdez to:

West Coast	58%
Gulf and East Coasts and Puerto Rico (through Panama)	35%
Virgin Islands	7%
Total:	100%

Source: U.S. Maritime Administration

It should be noted that 1984 shipments to the Virgin Islands were not carried on U.S. flag tankers. Also, shipments directly from Valdez to the Gulf and East Coasts are ignored for simplicity.

To estimate the employment effects, shipments by route are multiplied by 1984 conversion factors for each route to obtain the required increases in tanker fleet size, measured in deadweight tons (DWT), for each route:

1984 CONVERSION FACTORS

Trade Route	Conversion Factor (DWT/barrel per day)
Valdez to West Coast	1.986

Trade Route	Conversion Factor (DWT/barrel per day)
Valdez to Panama	4.712
Panama to:	
Gulf and East Coasts	2.084
Puerto Rico	1.557

Source: U.S. Maritime Administration

To convert ANS oil shipments from Panama to the Gulf and East Coasts and Puerto Rico into deadweight tonnage, an upper bound conversion factor of 2.084 was used. This causes employment effects to be overstated and they should be interpreted as upper bounds.

Next, increases in deadweight tonnage are multiplied by 1984 ratios of seafaring employment to deadweight tonnage for each route using data supplied by the U.S. Maritime Administration and presented in Tables H-2 and H-3 of Section II. As noted previously, these data show number of seafarers and deadweight tonnage for tankers in the ANS oil trade as of January 1984. Translating changes in deadweight tonnage into changes in seafaring employment for each route is

justified as follows. First, the number of seafarers per tanker is approximately the same regardless of tanker size, as shown in Section II-H. Also, the average tanker size on each route is assumed not to change as a result of increased ANS crude oil production incentives. Therefore, the percentage increase in seafaring employment will be approximately equal to the percentage increase in deadweight tonnage along each route. The final step used to obtain seafaring employment increases is to add across the different trade routes.

5. Base Case and Policy Option Tables

TABLE 1

BASE CASE 1 - OLD (PRE-SETTLEMENT) TARIFFS AND

MID-POINT VALDEZ F.O.B. PRICES

	RATE	1987	1990	1995	2000
VALDEZ F.O.B.		20.50	20.00	23.50	28.50
Less:					
PIPELINE LOSS		0.06	0.06	0.07	0.09
PIPELINE TARIFF		6.00	6.36	6.97	7.71
WELLHEAD PRICE		14.44	13.58	16.46	20.70
Less:					
ROYALTY	0.125	1.80	1.70	2.06	2.59
SEVERANCE	0.150	1.90	1.78	2.16	2.72
WPT	0.700	0.00	0.00	0.00	0.00
RETURN		10.74	10.10	12.24	15.40

TABLE 2

BASE CASE 2 - NEW (SETTLEMENT) TARIFFS AND MID-POINT VALDEZ F.O.B. PRICES

	RATE	1987	1990	1995	2000
VALDEZ F.O.B.		20.50	20.00	23.50	28.50
Less:					
PIPELINE LOSS		0.06	0.06	0.07	0.09
PIPELINE TARIFF		4.35	3.25	2.05	1.52
WELLHEAD PRICE		16.09	16.69	21.38	26.89
Less:					
ROYALTY	0.125	2.01	2.09	2.67	3.36
SEVERANCE	0.150	2.11	2.19	2.81	3.53
WPT	0.700	0.00	0.00	0.00	0.00
RETURN		11.97	12.41	15.90	20.00

TABLE 3

BASE CASE 3 - NEW (SETTLEMENT) TARIFFS AND HIGH VALDEZ F.O.B. PRICES

	RATE	1987	1990	1995	2000
VALDEZ F.O.B.		23.00	23.00	29.00	36.00
Less:					
PIPELINE LOSS		0.07	0.07	0.09	0.11
PIPELINE TARIFF		4.35	3.25	2.05	1.52
WELLHEAD PRICE		18.58	19.68	26.86	34.37
Less:					
ROYALTY	0.125	2.32	2.46	3.36	4.30
SEVERANCE	0.150	2.44	2.58	3.53	4.51
WPT	0.700	0.38	0.95	0.00	0.00
RETURN		13.44	13.68	19.98	25.56

TABLE 4

CALCULATIONS FOR TARIFF SETTLEMENT COMPARED WITH BASE CASE 1

RATE	1987	1990	1995	2000
WITH NEW (SETTLEMENT) TARIFFS				
VALDEZ F.O.B.	20.50	20.00	23.50	28.50
Less:				
PIPELINE LOSS	0.06	0.06	0.07	0.09
PIPELINE TARIFF	4.35	3.25	2.05	1.52
WELLHEAD PRICE	16.09	16.69	21.38	26.89
BASE CASE				
VALDEZ F.O.B.	20.50	20.00	23.50	28.50
Less:				
PIPELINE LOSS	0.06	0.06	0.07	0.09
PIPELINE TARIFF	6.00	6.36	6.97	7.71
WELLHEAD PRICE	14.44	13.58	16.46	20.70
IMPACT ON WELLHEAD PRICE				
WELLHEAD DIFFERENCE	1.65	3.11	4.92	6.19
WELLHEAD RATIO	1.114	1.229	1.299	1.299
SUPPLY RESPONSE				
AMOUNT OF OIL AFFECTED (MBD)	1,800	1,700	1,550	1,400
LOW ELASTICITY	0	0	0.05	0.1
%	0.00%	0.00%	1.32%	2.65%
QUANTITY (MBD)	0.0	0.0	20.4	37.1
MID ELASTICITY	0	0.025	0.1	0.2
%	0.00%	0.52%	2.65%	5.37%
QUANTITY (MBD)	0.0	8.8	41.1	75.2
HIGH ELASTICITY	0	0.05	0.15	0.3
%	0.00%	1.04%	4.00%	8.16%
QUANTITY (MBD)	0.0	17.6	62.0	114.3

TABLE 5a

CALCULATIONS FOR REDUCING ROYALTY RATE BY 25% COMPARED WITH BASE CASE 2

	RATE	1987	1990	1995	2000
WITH ROYALTY RATE REDUCED 25%					
VALDEZ F.O.B.		20.50	20.00	23.50	28.50
Less:					
PIPELINE LOSS		0.06	0.06	0.07	0.09
PIPELINE TARIFF		4.35	3.25	2.05	1.52
WELLHEAD PRICE		16.09	16.69	21.38	26.89
Less:					
ROYALTY	0.094	1.51	1.56	2.00	2.52
SEVERANCE	0.150	2.19	2.27	2.91	3.66
WPT	0.700	0.00	0.00	0.00	0.00
RETURN		12.39	12.86	16.47	20.72
EQUIVALENT WELLHEAD PRICE					
WELLHEAD PRICE		16.66	17.29	22.15	27.86
Less:					
ROYALTY	0.125	2.08	2.16	2.77	3.48
SEVERANCE	0.150	2.19	2.27	2.91	3.66
WPT	0.700	0.00	0.00	0.00	0.00
RETURN		12.39	12.86	16.47	20.72
EQUIVALENT WELLHEAD PRICE INCREASE					
WELLHEAD DIFFERENCE		0.57	0.60	0.77	0.97
WELLHEAD RATIO		1.036	1.036	1.036	1.036
SUPPLY RESPONSE					
AMOUNT OF OIL AFFECTED (MBD)		negl.	negl.	negl.	negl.
LOW ELASTICITY		0	0	0.05	0.1
%		0.00%	0.00%	0.18%	0.35%
QUANTITY (MBD)		negl.	negl.	negl.	negl.
MID ELASTICITY		0	0.025	0.1	0.2
%		0.00%	0.09%	0.35%	0.71%
QUANTITY (MBD)		negl.	negl.	negl.	negl.
HIGH ELASTICITY		0	0.05	0.15	0.3
%		0.00%	0.18%	0.53%	1.06%
QUANTITY (MBD)		negl.	negl.	negl.	negl.

TABLE 5b

CALCULATIONS FOR REDUCING ROYALTY RATE BY 50% COMPARED WITH BASE CASE 2

	RATE	1987	1990	1995	2000
WITH ROYALTY RATE REDUCED 50%					
VALDEZ F.O.B.		20.50	20.00	23.50	28.50
Less:					
PIPELINE LOSS		0.06	0.06	0.07	0.09
PIPELINE TARIFF		4.35	3.25	2.05	1.52
WELLHEAD PRICE		16.09	16.69	21.38	26.89
Less:					
ROYALTY	0.063	1.01	1.04	1.34	1.68
SEVERANCE	0.150	2.26	2.35	3.01	3.78
WPT	0.700	0.00	0.00	0.00	0.00
RETURN		12.82	13.30	17.04	21.43
EQUIVALENT WELLHEAD PRICE					
WELLHEAD PRICE		17.24	17.95	22.91	28.81
Less:					
ROYALTY	0.125	2.16	2.24	2.86	3.60
SEVERANCE	0.150	2.26	2.36	3.01	3.78
WPT	0.700	0.00	0.05	0.00	0.00
RETURN		12.82	13.30	17.04	21.43
EQUIVALENT WELLHEAD PRICE INCREASE					
WELLHEAD DIFFERENCE		1.15	1.26	1.53	1.92
WELLHEAD RATIO		1.072	1.075	1.072	1.071
SUPPLY RESPONSE					
AMOUNT OF OIL AFFECTED (MBD)		negl.	negl.	negl.	negl.
LOW ELASTICITY		0	0	0.05	0.1
%		0.00%	0.00%	0.35%	0.69%
QUANTITY (MBD)		negl.	negl.	negl.	negl.
MID ELASTICITY		0	0.025	0.1	0.2
%		0.00%	0.18%	0.69%	1.39%
QUANTITY (MBD)		negl.	negl.	negl.	negl.
HIGH ELASTICITY		0	0.05	0.15	0.3
%		0.00%	0.36%	1.04%	2.09%
QUANTITY (MBD)		negl.	negl.	negl.	negl.

TABLE 6a

CALCULATIONS FOR REDUCING SEVERANCE TAX RATE BY 25% COMPARED WITH BASE CASE 2

	RATE	1987	1990	1995	2000
WITH SEVERANCE TAX RATE REDUCED 25%					
VALDEZ F.O.B.		20.50	20.00	23.50	28.50
Less:					
PIPELINE LOSS		0.06	0.06	0.07	0.09
PIPELINE TARIFF		4.35	3.25	2.05	1.52
WELLHEAD PRICE		16.09	16.69	21.38	26.89
Less:					
ROYALTY	0.125	2.01	2.09	2.67	3.36
SEVERANCE	0.113	1.58	1.64	2.10	2.65
WPT	0.700	0.00	0.00	0.00	0.00
RETURN		12.49	12.96	16.60	20.89
EQUIVALENT WELLHEAD PRICE					
WELLHEAD PRICE		16.80	17.43	22.32	28.09
Less:					
ROYALTY	0.125	2.10	2.18	2.79	3.51
SEVERANCE	0.150	2.21	2.29	2.93	3.69
WPT	0.700	0.00	0.00	0.00	0.00
RETURN		12.50	12.96	16.60	20.89
EQUIVALENT WELLHEAD PRICE INCREASE					
WELLHEAD DIFFERENCE		0.71	0.74	0.94	1.20
WELLHEAD RATIO		1.044	1.044	1.044	1.044
SUPPLY RESPONSE					
AMOUNT OF OIL AFFECTED (MBD)		1,800	1,700	1,350	1,400
LOW ELASTICITY		0	0	0.05	0.1
%		0.00%	0.00%	0.22%	0.44%
QUANTITY (MBD)		0.00	0.00	3.3	6.1
MID ELASTICITY		0	0.025	0.1	0.2
%		0.00%	0.11%	0.43%	0.87%
QUANTITY (MBD)		0.00	1.8	6.7	12.2
HIGH ELASTICITY		0	0.05	0.15	0.3
%		0.00%	0.22%	0.65%	1.31%
QUANTITY (MBD)		0.00	3.7	10.0	18.4