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DEPARTMENT OF TRANSPORTATION AND RELATED  
AGENCIES APPROPRIATIONS FOR 1976

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HEARINGS  
BEFORE A  
SUBCOMMITTEE OF THE  
COMMITTEE ON APPROPRIATIONS  
HOUSE OF REPRESENTATIVES  
NINETY-FOURTH CONGRESS  
FIRST SESSION

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SUBCOMMITTEE ON THE DEPARTMENT OF TRANSPORTATION AND  
RELATED AGENCIES APPROPRIATIONS

JOHN J. McFALL, California, *Chairman*

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SILVIO O. CONTE, Massachusetts

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PART 4

DEPARTMENT OF TRANSPORTATION:

Federal Railroad Administration

Federal Grants to Amtrak

RELATED AGENCIES:

National Transportation Safety Board

Panama Canal

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Printed for the use of the Committee on Appropriations



submit for the record both the questions that the committee forwarded as well as the response of the Congressional Research Service compiled by Dr. Cole.

[The information follows:]

CONGRESS OF THE UNITED STATES,  
HOUSE OF REPRESENTATIVES,  
COMMITTEE ON APPROPRIATIONS,  
Washington, D.C., March 4, 1975.

MR. LESTER S. JAYSON,  
*Director, Congressional Research Service, The Library of Congress,  
Washington, D.C.*

DEAR MR. JAYSON: The Transportation Subcommittee has jurisdiction over the appropriations for the Panama Canal. Currently the canal is an important element of our Nation's transportation system. Over 70 percent of the commerce moving through the Panama Canal comes or goes to U.S. ports.

The committee feels that a thorough understanding of the economic ramifications of the canal is important for our consideration of future budget requests of the Panama Canal Co. The committee, therefore, would appreciate it if your office would conduct, under contract, if necessary, a comprehensive examination of this issue and report to the committee, if possible, by July 1, 1975.

The following are some of the questions which we feel should be examined:

(1) What kind of price increase in products shipped through the Panama Canal can the American consumer, and consumers of allied nations, expect should the cost of using the canal rise 10, 50, 100, or 250 percent above present costs?

(2) What is the probability that fees for use of the canal will rise, and to what degree will they rise, should operation of the canal be in the hands of the Panamanians?

(3) Assuming the loss of the Panama Canal to the U.S. transportation system, what alternatives are now available for transporting goods which currently are being shipped, or can be expected to be shipped, through the Panama Canal? Given the present, and anticipated 1980 rail, truck, air freight, and inland waterways capacities within the United States, is there sufficient slack in these transportation elements to pick up the additional burden of transporting products now moving through the Panama Canal?

(4) Assuming that a transportation mode which does not make use of the canal must be employed to move products now being transported through the canal, what will be the differences in transportation costs? The analysis of this question should include oceanic shipping routes which do not include the canal, as well as transporting the products to the coastal regions involved via truck, rail, inland waterways, air freight or some combination of these modes.

(5) What will be the differences in costs to U.S. consumers of products which formerly moved through the Panama Canal when those products must be transported without the use of the canal?

(6) What effect will loss of the use of the canal have on the marketability of U.S. products in international trade?

With best regards.

Sincerely,

JOHN J. McFALL,  
*Chairman, Subcommittee on Transportation Appropriations.*

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CONGRESSIONAL RESEARCH SERVICE,  
Washington, D.C. 20540.

ECONOMIC RAMIFICATIONS OF FUTURE PANAMA CANAL CONTROL AND USE:  
A SURVEY

(By Dr. Leon M. Cole, Senior Specialist in Transportation, April 3, 1975)

I. INTRODUCTION AND SUMMARY

Negotiations between the Republic of Panama and the United States over the future control and use of the Panama Canal have been underway intermittently for 11 years, and there are some indications that a draft treaty, to replace the existing Treaty of 1903, will be announced in the near future. Presumably the

new treaty will be based on the joint statement of principles agreed to on February 7, 1974, in Panama. (See appendix A.) In earlier negotiations, the Government of Panama indicated future intentions to rely on the canal, and the revenues it generates, to support general economic development goals of the Republic, particularly since the canal would be its major national economic asset. The extra revenues probably would be generated by substantial toll increases.

Such a policy of extracting larger revenues from canal operations to support activities separate from the canal itself would represent a sharp departure from the policy followed by the United States since the beginning of canal operations, viz, charging only those tolls necessary to cover costs of maintaining and operating the canal. Questions arise, therefore as to what economic effects such toll increases might have on the U.S. economy and consumer, and on world trade generally.

This report is a survey of the information and data contained in recent studies and reports concerning the economic value of the Panama Canal and its operations. It also is a preliminary response to the six questions raised in the letter of March 4, 1975 (the questions are listed in appendix B).

The six questions concern three underlying issues:

(1) What increases in domestic U.S. and allied nation commodity and product prices can be expected should Panama Canal tolls increase substantially over current levels, and what is the probability that fees will rise, and how much, should the Republic of Panama assume full control of the canal? (Questions 1 and 2.)

(2) What alternatives to the canal are available in the event of closure, and what would be the differential cost of such alternatives over present canal route costs? In addition, would there be any capacity constraints on U.S. domestic land transportation systems as alternatives to the canal in the event of closure? (Questions 3, 4 and 5.)

(3) What effect would the loss of use of the canal have on the marketability of U.S. products in international trade? (Question 6.)

A most important element in projecting future trade conditions resulting from drastically increased tolls or canal closure is that of time. All of the analyses surveyed agreed that short-run effects (6 months to 1 or 2 years) would be quite different from longer term adjustments (5 to 10 years), and would incur higher cost levels for a temporary period. This essential distinction between short- and long-term effects is incorporated in the following discussions.

A brief profile of Panama Canal Traffic compared to total world and U.S. seaborne commerce is included as section II of this report to help place the present use of the Canal in a general economic context.

### Summary

The conclusions to be distilled from the reports and data surveyed are that while the Panama Canal is indeed an important facility for world and U.S. commerce, it is not of overwhelming or critical economic importance. According to the reports, market conditions in origin and destination countries exert much more influence on aggregate commodity and product prices than would increased levels of Panama Canal tolls or even a complete closure, after an interim period of adjustment in trade routes and markets. Canal traffic represents only a small percentage of allied nations seaborne trade, same for a few Latin American countries. The United States itself is the major user of the canal, but many alternative trade routes now exist for the most important products and commodities, and more would become economically competitive if the canal were closed. One estimate is that long term adjustments, because of route and market substitutions, would stabilize at cost levels comparable to current costs through the canal.<sup>1</sup> The pending reopening of the Suez Canal in June 1975 may provide even more competitive alternatives to routes through the Panama Canal.

Technological trends also are reinforcing the economic competitiveness of alternative trade routes in several ways. Larger and faster ships, of course, reduce the past and present time and cost savings on some major canal routes. A newly developing class of ships in particular, oil-bulk-ore or O-B-O- ships, loom as formidable competitors, particularly as deep water ports off the United States become operative. In addition, larger and speedier container ships which take advantage of the time and cost savings represented by container technology are Panama Canal use.

<sup>1</sup> Reference 12, p. 15. See Appendix C.

With regard to alternative land states, a large portion of the seal probably continue to use the same and facilities, the only changes being trade through the canal, which pr canal were closed, represents only : from gulf ports to Asia, however, r through the canal, could be shipped carried from producing regions to ramifications of these possible shi section IV.

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Table I shows the fiscal year 1 trade routes through the canal, 1 route also listed. Oriental trade traffic. The U.S. intercoastal ro operations, now ranks sixth amc long tons of cargo in fiscal year :

TABLE I.—MAJO

East coast United States—Asia.....	
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Europe—West coast United States/Canada.....	
East coast United States—West coast South Ame.....	
Europe—West coast South America.....	
U.S. Intercoastal (including Alaska and Hawaii).....	
Europe—Oceania.....	
East coast Canada—Asia.....	
East coast United States/Canada—Oceania.....	
West coast South America—West Indies.....	
West coast United States—East coast South Am.....	
South American Intercoastal.....	
Subtotal.....	
All other routes.....	
Total.....	

Source: Panama Canal Company, annual rep

<sup>1</sup> Reference 19, p. 5. See append the Panama Canal Company.

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With regard to alternative land transport system capacity in the United States, a large portion of the seaborne trade now transiting the canal would probably continue to use the same ports and port hinterland transport systems and facilities, the only changes being in ocean routes and ship sizes. Intercoastal trade through the canal, which probably would go overland in the U.S. if the canal were closed, represents only a small volume. Grain and soybean shipments from gulf ports to Asia, however, presently second only to petroleum in tonnage through the canal, could be shipped eastward around the Cape of Good Hope, or carried from producing regions to west coast ports for ocean shipment. Some ramifications of these possible shifts in transport are discussed more fully in section IV.

It should be noted that such general conclusions are in fact general, and that specific or special cases quite different from the general trends could be swept up in the aggregative considerations. More specific analyses might reveal particular problems of ports or shippers or carriers not readily identifiable in aggregate statistics. It seems unlikely however, that analyses more detailed than those represented by the reports surveyed could reverse or significantly change their general economic conclusions.

## II. PANAMA CANAL TRAFFIC IN PERSPECTIVE

This brief summary of traffic through the Panama Canal is provided to help place in context the volume of trade and relative size of canal operations to U.S. and world seaborne trade generally. A cross section of major trade route volumes and important commodity traffic transiting the canal in fiscal year 1974 is also provided.

Some 5 percent of total annual world seaborne trade, including petroleum products, now transits the Panama Canal. If petroleum is excluded from the totals, approximately 8 percent of the world's dry cargo moves through the canal. While the canal is an important facility in world seaborne commerce, the pattern of cargo passing through the canal is not an exact representation of world trade. For example, whereas about half of total world seaborne commerce on all world trade routes consists of petroleum and its products, this commodity group represented only about 22 percent of canal traffic in fiscal year 1974. The Panama Canal is characterized as a general purpose canal, serving a wide range of goods rather than one or two major commodities as, for example, the Suez Canal, which was primarily an oil canal, or the Welland Canal, used largely for the shipment of grains.<sup>1</sup>

Table I shows the fiscal year 1974 cargo in long tons (2,240 pounds) by major trade routes through the canal, with the cargo percentage for each major trade route also listed. Oriental trade, principally with Japan, now dominates canal traffic. The U.S. intercoastal route, once dominant in the early years of canal operations, now ranks sixth among the major trade routes, with 4,647 thousand long tons of cargo in fiscal year 1974, or about 3 percent of the total canal traffic.

TABLE I.—MAJOR TRADE ROUTES IN CANAL TRAFFIC

	Fiscal year 1974 (in thousands of tons) long tons cargo	Percent of total
East coast United States—Asia .....	56,935	38.5
Europe—Asia .....	8,500	5.8
Europe—West coast United States/Canada .....	11,555	7.8
East coast United States—West coast South America .....	8,498	5.8
Europe—West coast South America .....	4,782	3.2
U.S. Intercoastal (including Alaska and Hawaii) .....	4,647	3.1
Europe—Oceania .....	3,588	2.4
East coast Canada—Asia .....	4,025	2.7
East coast United States/Canada—Oceania .....	4,005	2.7
West coast South America—West Indies .....	4,060	2.7
West coast United States—East coast South America .....	4,462	3.0
South American Intercoastal .....	4,598	3.1
Subtotal .....	119,655	.....
All other routes .....	28,252	19.1
Total .....	147,907	.....

Source: Panama Canal Company, annual report, fiscal year 1974.

<sup>1</sup> Reference 19, p. 5. See appendix C. Statement by Hon. David S. Parker, president of the Panama Canal Company.

Commercial cargo to and from the Far East in fiscal year 1974 amounted to 41.2 percent of total canal cargo, with 37.1 percent of Japanese origin or destination.

Table II lists the percent of international seaborne shipping transiting the Panama Canal in fiscal year 1973 by country. While many countries use the canal to some degree, certain Latin American nations are more dependent on the canal than other foreign users. The United States remains the major user of the canal, however, with about 40 percent of all cargo transiting the canal originating in the United States, and about 28 percent destined to the United States. In total, about one-third of all canal cargo is U.S. oriented.<sup>2</sup>

TABLE II.—PERCENT OF INTERNATIONAL SEABORNE SHIPPING BY COUNTRY TRANSITING THE PANAMA CANAL, FISCAL YEAR 1973

Country	Percent of total trade through canal	Country	Percent of total trade through canal
Algeria.....	0.2	India.....	1
Angola.....	.1	Indonesia.....	1.5
Argentina.....	.4	Ireland.....	(0)
Australia.....	3.3	Israel.....	.5
Belgium.....	2.4	Italy.....	.8
Brazil.....	1.0	Jamaica.....	5.6
Canada.....	6.8	Japan.....	10.7
Chile.....	34.3	Kenya.....	.1
China, Peoples Republic of.....	(1)	Korea, Republic of.....	11.9
China, Republic of.....	9.8	Mexico.....	16.6
Colombia.....	32.5	Netherlands.....	1.5
Costa Rica.....	27.2	New Zealand.....	15.7
Cuba.....	(1)	Nicaragua.....	76.8
Denmark.....	.4	Norway.....	.6
Ecuador.....	51.4	Panama.....	29.4
Egypt.....	.7	Peru.....	41.1
El Salvador.....	66.4	Philippines.....	8.8
Finland.....	.6	Poland.....	2.3
France.....	.9	Singapore.....	.6
Germany, Democratic Republic of.....	1.4	Sweden.....	.8
Germany, Federal Republic of.....	2.9	Thailand.....	.6
Ghana.....	.4	United Kingdom.....	1.6
Greece.....	1.1	U.S.S.R.....	.3
Guatemala.....	30.9	United States.....	16.8
Guyana.....	1.4	Venezuela.....	7.4
Honduras.....	9.1	Vietnam, Republic of.....	12.8
Hong Kong.....	3.7	Yugoslavia.....	1.3

<sup>1</sup> Data on international seaborne shipping not available.

Source: Panama Canal Company, 1973.

With respect to total U.S. seaborne commerce, about 264 million tons of cargo were exported, and another 447 million tons imported in 1974, for a total of 711 million tons in seaborne traffic. Of these amounts, about 17 percent transit through the canal (refer to table II).

Principal commodity groups are shown in table III as percent of total canal commercial cargo in fiscal year 1974.

TABLE III.—PRINCIPAL COMMODITY GROUPS TRANSITING THE PANAMA CANAL, SEABORNE COMMERCIAL CARGO

	Fiscal year 1974	
	Approximate long tons (millions)	Percent of total cargo
Petroleum and products.....	32.0	21.6
Grains.....	24.0	16.3
Coal and coke.....	19.0	12.7
Ores and metals.....	13.0	9.0
Nitrates, phosphates, and potash.....	9.1	6.0
Manufactures of iron and steel.....	9.0	5.9
Miscellaneous agricultural commodities.....	8.2	5.6
Lumber and products.....	7.9	5.3
Canned and refrigerated foods.....	4.2	2.8
Chemicals and petrochemicals.....	3.5	2.3
Machinery and equipment.....	2.5	1.7
Miscellaneous minerals.....	2.2	1.6
All other.....	14.0	9.2

Source: Panama Canal Company, annual report, fiscal year 1974.

<sup>2</sup> Ibid., p. 4.

### III. ECONOMIC EFFECTS OF P

attempts to measure precisely economic effects of Canal toll charges are of course interrelated and dynamic economic sensitivities to price of different shipping and market arrangements.

#### Effect on canal traffic

because of the 20-percent toll increase, the Panama Canal Company (PCC) and put into effect the reports commissioned by the PCC of toll increases on Panama Canal. The value of toll increases on Panama Canal is to answer questions of effect of canal control by the Republic of Panama is useful and relevant.

The reports and projections were prepared by the University of Los Angeles and Washington State University, together with the University of Palo Alto, Calif., together with the list of references in appendix A. The reports are consistent, and the estimates contained in a report by the MarAd in May 1974, do differ from the estimates below, estimates in the MarAd report of this survey report. The purpose of this survey report, if it is to question 1 and 2 concerning the estimates extracted and summarized below, is to note on question 2. With respect to the Republic of Panama, the increase seems limited by economic conditions that toll rate increases much larger than declining revenues earned by the Republic of Panama producing potential of the Republic of Panama.

Generalizations about effects of toll increases because the probable sensitivity of the Republic of Panama to another. Estimate: a 10 percent toll rate increases should account the highly specific toll rate transiting the canal.

A sensitivity study was prepared by the International Research Associates (I.R.A.) in 1972 by Economic Research Associates of transit demand for the Republic of Panama. The toll rate increases of 15, 20, and 25 percent were updated in a subsequent report on the "Panama Canal" (December 1973).<sup>4</sup> In the report, the data were updated to 150 percent. "The effects of the increase of tolls, were not explained in terms of one commodity group, the effect of the increase is that high. That the effect of the higher toll rate is to reduce the volume of traffic. Also, specific numerical estimates of the effects of toll increases beyond 150 percent are not available."<sup>5</sup>

Table IV shows the expected long-run effect of toll increases on each commodity group to each indicated toll rate. The long-run sensitivity shown

Table IV shows the expected long-run effect of toll increases on each commodity group to each indicated toll rate. The long-run sensitivity shown in Table IV is based on the toll rates now are \$1.08 per laden Panama Canal ton of ballast, up from the former \$0.90 per ton. Reference 11. See Appendix C. Reference 21. Reference 18. Reference 19, p. 21.

III. ECONOMIC EFFECTS OF PANAMA CANAL TOLL INCREASES

Attempts to measure precisely economic effects of significant increases in Panama Canal toll charges are of course fraught with difficulties because of the intricate interrelated and dynamic economic patterns of world commerce, the varying sensitivities to price of differing commodities, and the numerous alternative shipping and market arrangements for most commodities.

*Effects on canal traffic*

Partly because of the 20-percent toll rate increase recommended by the Panama Canal Company (PCC) and put into effect on July 8, 1974, there exists a series of recent reports commissioned by the PCC which examine and estimate the effects of toll increases on Panama Canal traffic and measure the general economic value of the canal to the United States.<sup>1</sup> The analyses were not directed directly to answer questions of effects on U.S. and allied nation consumers or effects of canal control by the Republic of Panama, yet much of the information generated is useful and relevant.

The reports and projections were prepared either by Economic Research Associates of Los Angeles and Washington, D.C. or International Research Associates of Palo Alto, Calif., together with economists from Stanford University (see the list of references in appendix C). While the projections and assessment in these reports are consistent, and seemingly objective and competent, short-term cost estimates contained in a report prepared by the Maritime Administration (MarAd) in May 1974, do differ. For several reasons, discussed in more detail below, estimates in the MarAd report are somewhat questionable. For the purpose of this survey report, the information in these available reports pertinent to question 1 and 2 concerning the economic effects of higher canal tolls is extracted and summarized below.

First a note on question 2. With regard to probable toll increases should the canal be controlled by the Republic of Panama, the rational upper limit of probable increases seems limited by economics not politics. All the recent studies agree that toll rate increases much beyond 150 percent of present tolls would result in declining revenues earned by the canal and thus would denigrate the revenue producing potential of the canal, regardless of who collected the revenues.

Broad generalizations about effects of toll rate changes are questionable, however, because the probable sensitivity of canal traffic to toll charges varies from one commodity to another. Estimates of changes in traffic volume associated with different toll rate increases should be made only on a disaggregated basis, taking into account the highly specific conditions which prevail for each type of cargo now transiting the canal.

Such a sensitivity study was prepared for the Panama Canal Company by International Research Associates (IRA).<sup>2</sup> Using the baseline projections of a study in 1972 by Economic Research Associates,<sup>3</sup> the IRA study projects probable tonnages of transit demand for 1975, 1980 and 1985 by commodity groups, for effective toll rate increases of 15, 25, and 50 percent. The original IRA study results were updated in a subsequent IRA study, "The Economic Value of the Panama Canal" (December 1973).<sup>4</sup> Incorporating more recent information and using similar methodologies, the data were extended to cover toll rate increases of 100 and 150 percent. "The effects of toll increases larger than 150 percent, e.g., a tripling of tolls, were not explicitly prepared since, with the possible exception of one commodity group, the data indicate that total revenues decline when the increase is that high. That is, beyond a 150 percent increase, the revenue impact of the higher toll rate is more than offset by the decline in traffic volume. Also, specific numerical estimates of the probable change in traffic for toll increases beyond 150 percent do not have an acceptable degree of reliability."<sup>5</sup>

Table IV shows the expected long-run sensitivity of traffic volume for each commodity group to each indicated toll rate increase after transitory effects have faded. The long-run sensitivity shown in table IV was derived by comparing the

<sup>1</sup> Toll rates now are \$1.08 per laden Panama Canal net ton, and \$0.86 per Panama Canal net ton in ballast, up from the former \$0.90 and \$0.72 respectively.

<sup>2</sup> Reference 14. See Appendix C.

<sup>3</sup> Reference 21.

<sup>4</sup> Reference 18.

<sup>5</sup> *Ibid.*, p. 21.

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... shipping transiting the ...  
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cargo transiting the canal origi- ...  
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oriented.<sup>2</sup>

COUNTRY TRANSITING THE PANAMA CANAL,

Country	Percent of total trade through canal
.....	.1
.....	1.5
.....	(0)
.....	.5
.....	.8
.....	5.6
.....	10.7
.....	.1
.....	11.9
.....	16.6
.....	1.5
.....	15.7
.....	76.8
.....	.6
.....	29.4
.....	41.3
.....	8.8
.....	2.3
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... mported in 1974, for a total of 711 ...  
... mounts, about 17 percent transits

... table III as percent of total canal

PANAMA CANAL, SEABORNE COMMERCIAL CARGO

Fiscal year 1974	
Approximate long tons (millions)	Percent of total cargo
32.0	21.6
24.0	16.3
19.0	12.7
13.0	9.0
9.1	6.0
9.0	5.9
8.2	5.6
7.9	5.3
4.2	2.8
3.5	2.3
2.5	1.7
2.2	1.6
14.0	9.2

expected level of a commodity's shipment through the canal in 1985 (assuming a given toll rate increase) to the expected 1985 level assuming no further toll rate increase. Using wheat as an example, table IV shows that an effective 50 percent toll increase on wheat shipments would lead in the long run to a volume of wheat traffic that is 96 percent of the no-toll increase baseline level; a 100-percent increase to one that is 74 percent of the baseline level, and an increase of 150 percent to a volume of 61 percent of baseline. Although the underlying analysis was not done, the coefficient for a toll change of 200 percent, reading across the row for wheat, probably would be smaller than .61. That is, there is a strong presumption that the response to a tripling in toll rates would cause wheat tonnage to drop at least 50 percent, that is, have a coefficient of .5 or lower. "It is imperative to understand that these are the equilibrium or 'steady state' responses after users and world markets have had time to adjust to the toll changes, and that they do not measure immediate or transitory behavior. Time is the essential differentiating factor; for example, even a tripling of tolls might have no effect on wheat cargoes in ships already within sight of the canal's channel markers."<sup>6</sup>

TABLE IV.—ESTIMATED LONG-RUN SENSITIVITY OF TRAFFIC TONNAGE, BY COMMODITY, TO SELECTED TOLL INCREASES

Cargo	Percent by which present toll rate is increased—				
	0	25	50	100	150
Wheat	1	1.00	0.96	0.74	0.61
Coarse grains	1	.98	.92	.76	.60
Bananas	1	.93	.73	.33	.20
Sugar	1	1.00	.97	.70	.54
Soybeans	1	.98	.94	.93	.68
Lumber	1	1.00	1.00	.84	.68
Wood pulp, paper and paper products	1	1.00	1.00	.86	.70
Phosphates	1	.96	.91	.75	.60
Fertilizers, potash, and fish meal	1	1.00	1.00	.83	.67
Iron ores	1	.88	.75	.39	.15
Miscellaneous ores	1	1.00	.98	.91	.84
Scrap metal	1	1.00	1.00	.67	.50
Alumina and bauxite	1	1.00	1.00	.85	.71
Miscellaneous metals	1	1.00	1.00	.81	.67
Coal	1	.94	.89	.61	.37
Crude petroleum	1	.94	.88	.59	.33
Petroleum products	1	.94	.88	.68	.49
Chemicals	1	1.00	1.00	.83	.66
Sulfur	1	1.00	1.00	.83	.66
Other nonmetallic minerals	1	1.00	1.00	.83	.66
Iron and steel manufacturers	1	.97	.95	.80	.65
Autos and trucks	1	1.00	1.00	.83	.65
General cargo	1	.99	.98	.77	.66

Note: Figures shown are (1985 tonnage associated with a specified toll increase) divided by (1985 tonnage projected with no toll increase). Calculated from tonnage figures rounded to nearest 100,000.

Source: International Research Associates, "The Economic Value of the Panama Canal, December 1973," p. 22.

#### Aggregate effects on the U.S. domestic economy

According to the 1973 IRA report,<sup>7</sup> canal tolls cannot have much aggregate effect on the domestic U.S. economy simply because the magnitudes involved are too small. "This conclusion includes impacts on domestic U.S. employment, whether national or regional, since again changes in PCC policies would not have any significant impact on a U.S. civilian labor force of over 90 million persons. . . . These conclusions apply not only to initial, first-round effects but also to secondary effects through local industries and local labor markets, with the possible exception of the highly local and specialized group of canal pilots."<sup>8</sup>

Another approach is to inquire about the total as opposed to the incremental importance of the canal to the U.S. economy, again looking specifically at particular industries and labor markets. What would be the cost (using that word in a general and total form) to U.S. industry of a closing of the canal? According to an IRA report, the net economic value of the canal was estimated to average \$100 million per annum for the decade 1975-85 (in 1972 dollars). This

<sup>6</sup> Ibid., p. 23.

<sup>7</sup> Reference 18, p. 35. See appendix C.

<sup>8</sup> Ibid.

is the outer limit of the loss if the world. The U.S. users share of this about \$34 million annually. That is, the average about \$34 million a year in toll compared to the size of using industrial dollar terms. This measurement, of course, after users have had the opportunity to adjust the economic value (i.e., the loss assessed) to be higher than this."<sup>9</sup>

#### IV. ALTERNATIVES

In discussing alternatives to the Panama Canal, the report prepared for the Panama Canal Commission lists the list of references in appendix C and 5 (see appendix B) is extracted as

##### Short-term cost estimates

Because of the diversity of commodities there would be a larger number of alternatives if a canal closure, even in the short term. States-Asia trade there would be a large diversion of movements from U.S. ports. This diversion may be particularly pronounced in the trend toward containerization which may also occur in the case of grain. In terms of tonnage accounted for in fiscal year 1974. At the present time, the trend toward economic grain and soybean ports. The initial impetus for this diversion of U.S. gulf ports which occurred during the economic basis for the plan is that movements via Pacific ports can be combined with the use of larger ships, and the avoidance of the Panama Canal.

Land transportation may also be used in the case of U.S. imports from Canada to the eastern United States.

In the case of some commodities, it is likely that some movements may be shifted to other ports. For instance, the ripening time of bananas, for instance, would not be feasible in the case of Peruvian and Chilean ore to Europe and in the case of a Panama Canal. In the case of petroleum, alternate routes may replace alternate routing.<sup>2</sup>

"The period of maximum impact would be less than 6 months. By the end of the transition, tankers will have declined substantially in fact, have returned to their prior level at the beginning of the transition from the canal."<sup>3</sup>

Costs of short-term alternatives amount to \$178 million or \$367 million collected for the year. Since the U.S. share of the canal, it was estimated that the additional cost of approximately \$100 million previously transited the canal."<sup>4</sup>

<sup>9</sup> Ibid., p. 36.

<sup>10</sup> Reference 16, p. 4. See appendix C.

<sup>11</sup> Ibid.

<sup>12</sup> Reference 16, p. 5. See appendix C.

<sup>13</sup> Ibid., p. 8.

through the canal in 1985 (assuming a 1985 toll assuming no further toll rate changes that an effective 50 percent increase in tolls would run to a volume of wheat equivalent to a 100-percent increase in tolls; and an increase of 150 percent in tolls). The underlying analysis was not a 200 percent, reading across the row for 1. That is, there is a strong presumption that a 200 percent increase in tolls would cause wheat tonnage to drop at least to 50 percent or lower. "It is imperative to have a 'steady state' responses after users adjust to the toll changes, and that they do so. Time is the essential differentiator. Behavior of tolls might have no effect on wheat tonnage if the canal's channel markers."\*

TRAFFIC TONNAGE, BY COMMODITY, TO SELECTED TOLL RATES

Percent by which present toll rate is increased—

	0	25	50	100	150
1	1.00		0.96	0.74	0.61
1	.98		.92	.76	.60
1	.93		.73	.33	.20
1	1.00		.97	.70	.54
1	.98		.94	.83	.68
1	1.00		1.00	.84	.68
1	1.00		1.00	.86	.70
1	.96		.91	.76	.60
1	1.00		1.00	.83	.67
1	.88		.76	.39	.15
1	1.00		.98	.91	.84
1	1.00		1.00	.67	.50
1	1.00		1.00	.86	.71
1	1.00		1.00	.81	.67
1	.94		.89	.61	.37
1	.94		.88	.59	.33
1	.94		.88	.68	.49
1	1.00		1.00	.83	.66
1	1.00		1.00	.83	.66
1	.95		.80	.65	.65
1	1.00		1.00	.83	.65
1	.98		.77	.65	.66

Adjusted toll increase) divided by (1985 tonnage projected to nearest 100,000.

of the Panama Canal, December 1973," p. 22.

my  
I tolls cannot have much aggregate impact because the magnitudes involved are small. Changes in PCC policies would not have a significant impact on the labor force of over 90 million people in the United States, and local labor markets, with their specialized group of canal pilots,<sup>8</sup> would be unaffected. The total cost, as opposed to the incremental cost, would be the cost (using that word) of a closing of the canal? The economic value of the canal was estimated to be \$1.2 billion in 1975-85 (in 1972 dollars). This

is the outer limit of the loss if the canal were to become unavailable to the world. The U.S. users share of this \$100 million flow is about 34 percent, or about \$34 million annually. That is, the value to the U.S. commercial users will average about \$34 million a year in the decade beginning in 1975. Again, when compared to the size of using industries, the canal is of limited importance in dollar terms. This measurement, of course, is at the new equilibrium position, after users have had the opportunity to find alternatives; in the shorter term, the economic value (i.e., the loss associated with dislocations) can temporarily be higher than this."<sup>9</sup>

IV. ALTERNATIVES TO PANAMA CANAL USE

In discussing alternatives to the Panama Canal, it is important to distinguish between short-term and long-term costs and adjustments. Such analyses were prepared for the Panama Canal Co. and by the Maritime Administration (see the list of references in appendix C) and material pertinent to questions 3, 4 and 5 (see appendix B) is extracted and summarized here.

Short-term cost estimates

Because of the diversity of commodities and trade routes transiting the canal, there would be a larger number of alternative movements available in the event of a canal closure, even in the short run. "For instance, with respect to United States-Asia trade there would be almost from the very beginning a substantial diversion of movements from U.S. Atlantic and gulf ports to Pacific coast ports. This diversion may be particularly pronounced in the case of general cargo where the trend toward containerization makes such diversion relatively easy. But it may also occur in the case of grain and soybean shipments to Asia—which in terms of tonnage accounted for over 16 percent of all Panama Canal traffic in fiscal year 1974. At the present time, there is considerable effort being made to develop economic grain and soybean shipments to Asia via the Pacific coast ports. The initial impetus for this plan came from the massive congestion at U.S. gulf ports which occurred during the 1972-73 upsurge of grain exports. The economic basis for the plan is that the additional rail haul required for shipments via Pacific ports can be compensated for by a shorter ship movement, the use of larger ships, and the avoidance of Panama Canal tolls."<sup>10</sup>

Land transportation may also be substituted for movements through the Panama Canal in the case of U.S. intercoastal traffic, and shipment from western Canada to the eastern United States.

In the case of some commodities, such as petroleum, bananas and iron ore, it is likely that some movements may be discontinued, even in the short run. The shipment time of bananas, for instance, is limited by the time available prior to ripening. Therefore, any alternative routing that would add substantially to the time in transit would not be feasible. In the case of iron ore, the shipments of Peruvian and Chilean ore to Europe and the United States are already marginal, and in the case of a Panama Canal closure these may be completely terminated. In the case of petroleum, alternate supply arrangements would to a large extent replace alternate routing.<sup>2</sup>

"The period of maximum impact and maximum transitional costs is likely to be less than 6 months. By the end of that period charter rates of bulk carriers and tankers will have declined substantially from their postclosure peaks, and may, in fact, have returned to their prior level. That point can also be regarded as the beginning of the transition from the short-term to the long-term costs."<sup>3</sup>

Costs of short-term alternatives were estimated in the 1974 IRA report to amount to \$478 million or \$367 million more than the tolls that would have been collected for the year. Since the U.S. traffic represents about one-third of the use of the canal, it was estimated that in the first year the U.S. economy "would incur an additional cost of approximately \$122 million related to shipments that had previously transited the canal."<sup>4</sup>

<sup>8</sup> Ibid., p. 26.

<sup>9</sup> Reference 16, p. 4. See appendix C.

<sup>10</sup> Ibid.

<sup>11</sup> Reference 16, p. 5. See appendix C.

<sup>12</sup> Ibid., p. 8.



*Other estimates of short-term alternative costs*

The Maritime Administration (MarAd) of the U.S. Department of Commerce prepared an analysis of the short term effects of Canal closure on toll increases entitled "The Panama Canal in U.S. Foreign Trade: Impact of a Toll Increase and Facility Closure."<sup>6</sup> That report concluded that a closure of the canal would result in a \$932 million increase in the yearly total delivered price of all exports, and a \$583 million increase in the yearly total delivered price of all imports, including \$78 million for intercoastal deliveries. A toll increase of 100 percent would, according to the MarAd study, result in an "annual loss of export revenue" of \$26.2 million and an annual increase in cost to consumers of imports of \$25 million.<sup>6</sup>

The analyses in the report, admittedly designed to present a "worst case," suffer from several factual mistakes in shipping costs and toll rates per cargo ton, and from some dubious assumptions about the operations of seaborne commerce. For example, the MarAd analyses added in substantial cost increases by commodities and trade routes, as a result of toll increases, for a number of nonexistent or very small trade movements. A cost increase of \$23.6 million was included for grain shipments between the west coast of the United States and Europe, yet there are no measurable grain shipments on that route. Another cost increase of \$18.3 million was included for U.S. intercoastal grain shipments, yet again there are no measurable grain shipments on that route through the canal.<sup>7</sup>

A thorough critique of the MarAd study reveals numerous deficiencies in concepts and factual errors, and places the usefulness and accuracy of the study estimates in question, particularly as they tend to increase the magnitude of the economic effect of higher Canal tolls and a Canal closure.

*Long-term alternatives and cost considerations*

It is not possible, of course, to predict precisely what the long-term, sustainable alternative for every present commodity movement through the Canal might be. It can be useful, however, to indicate alternatives available to buyers and sellers by briefly reviewing (1) what principal commodities move on what trade routes; (2) what alternatives are available to the various buyers and sellers; and (3) how comparable in cost these alternatives would be.<sup>8</sup>

a. *The east coast United States—Far East* trade route is by far the most important U.S. trade route through Panama, with exports totaling 60 million tons and imports 10 million tons in fiscal year 1974. The composition of exports and imports are quite different. Exports are dominated by bulk material, with grains, coal, phosphate and scrap accounting for nearly 45 million tons of the total. Imports, on the other hand, are dominated by iron and steel products and general cargo shipments.<sup>9</sup>

The most economical alternatives available for bulk material exports involve the use of large bulk carriers of 100,000 tons or so in movements around the Cape of Good Hope. Included here would be O-B-O carriers of approximately the same size which are currently being built in large numbers.

The Panama Canal is already experiencing competition from large-size bulk carriers. During 1973, approximately 2.5 million tons of coal were exported from the United States to Japan in large bulk carriers, going around the Cape; and as more large bulk carriers come into use, this bypass traffic is expected to grow and involve not only coal, but grains and phosphates as well.

*Bypass dry bulk charter rates to Japan via the Cape are fully competitive now*

The only disadvantage, from the buyer's point of view, is the large size of a single shipment. Should a Canal closure occur, this is not likely to present a serious problem.

As far as iron and steel manufactures and general cargo imports from the Far East are concerned, the most economical alternatives are likely to be ocean shipments to West Coast ports and rail transportation from there. The recent study of domestic and international transportation of U.S. foreign trade, conducted jointly by the Census Bureau and the U.S. Department of Transportation, shows, for instance, that 41 percent of all imports have destinations more than 25 or more miles beyond the port of entry. For many manufactured goods,

which are likely to be shipped land transportation is even greater. For example, 54 percent for iron and steel equipment, 54 percent for machinery, 54 percent for textiles and fabric. For port-to-port movements need via the Panama Canal because they involve the true origins or destinations.

Many import commodities use the west coast ports of entry. At times, on many container import shipments, shipments beyond Cleveland. But with a Canal closure, transportation of foreign traffic to be large, even to destinations pointed out that rerouting to ports and rail transportation.

The same alternatives would be available to the Far East machinery produced in Illinois more economical at present extension of land shipments, but nowhere near.

b. On the west coast United States, petroleum production is dominated by petroleum products nearly one-half of 4.4 million tons accounted for by lumber, bar iron and steel products and machinery.

The likeliest alternatives for a rearrangement of sources: trade is dominated by numerous alternatives with these companies also engage facilities, it is obvious that petroleum products from Los Angeles.

With respect to general cargo, it is likely to be ocean shipment. It should be emphasized that costs from ocean to land traffic of combined ocean and land the growth of fishy back traffic 1.4 to 1.8 million tons (see).

On lumber and canned food ocean shipment to Europe is noted that rail shipment was discovered by U.S. intercoastal trade most of its intercoastal lumber.

c. The east coast United States involves primarily imports of which in 1974 accounted for which totaled 3.3 million tons manufactured goods.

Shipments of crude oil and a cost that is very close to shipments are made from European port facilities and permit us way to construct offshore oil once 200,000-ton tankers can more economical than transit.

Iron ore shipments from increases. During dry periods draft and thereby lessens the find it more economical to take U.S. ports are capable of handling all of the iron ore traffic will

<sup>6</sup> Reference 13. See appendix C.

<sup>7</sup> Reference 13, pp. 1 and 2. See appendix C.

<sup>8</sup> Reference 12, p. 13. See appendix C.

<sup>9</sup> The following discussion is taken from Reference 12, pp. 16-19. See appendix C.

<sup>0</sup> Reference 10.

U.S. Department of Commerce  
 Canal closure on toll increases  
 Impact of a Toll Increase and  
 a closure of the canal would result  
 in total delivered price of all imports, including  
 A toll increase of 100 percent would, accord-  
 "annual loss of export revenue" of \$26.2  
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#### Considerations

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—*Far East* trade route is by far the most  
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 ne port of entry. For many manufactured goods,

#### Appendix C.

See from Reference 12, pp. 16-19. See appendix C.

which are likely to be shipped in containers, the percentage requiring ongoing  
 land transportation is even greater. It is 61 percent for machinery and transport  
 equipment, 54 percent for miscellaneous manufactured articles and 74 percent  
 for textile yarn and fabric. This study proved, in other words, that the present  
 port-to-port movements need not be reproduced in an alternative to shipment  
 via the Panama Canal because the present ocean movements do not necessarily  
 involve the true origins or destinations.

Many import commodities could most economically be shipped via rail from  
 west coast ports of entry. At the present time, west coast ports have an advantage  
 in many container import shipments with destinations as far east as Cleveland;  
 shipments beyond Cleveland are currently more economical via east coast ports.  
 But with a Canal closure, and the competitive conditions that exist in the  
 transportation of foreign trade cargo, the increase in transport cost is not likely  
 to be large, even to destinations on the eastern seaboard. It also should be  
 pointed out that rerouting of import cargo from the Far East via west coast  
 ports and rail transportation from there produces a saving in transport time.

The same alternatives would apply to exports of general cargo from the  
 United States to the Far East. Already, on export shipments of construction  
 machinery produced in Illinois and Wisconsin, shipment via west coast ports is  
 more economical at present than shipments from east or gulf coast ports. The  
 extension of land shipments from points farther east would involve some addi-  
 tional costs, but nowhere near the costs indicated in the study.

b. On the west coast United States-Europe route exports to Europe are  
 dominated by petroleum products, primarily petroleum coke, which accounts for  
 nearly one-half of 4.4 million tons shipped in fiscal year 1974. The rest is  
 accounted for by lumber, borax, and canned food. Imports consist primarily of  
 iron and steel products and manufactured goods.

The likeliest alternatives for the petroleum product shipments would involve  
 a rearrangement of sources and markets. As is well known, petroleum product  
 trade is dominated by companies with worldwide operations, who have num-  
 erous alternatives with respect to crude and product shipments. In addition,  
 these companies also engage in product swaps with each other. Given these  
 facilities, it is obvious that the least cost alternative would not require shipping  
 petroleum products from Los Angeles around the Horn to Europe.

With respect to general cargo imports from Europe, the least cost alternative  
 is likely to be ocean shipment to east coast ports and rail shipment West. Again,  
 it should be emphasized that containerization has greatly reduced the transfer  
 costs from ocean to land transport and therefore increased the competitiveness  
 of combined ocean and land transportation. Evidence of this can be found in  
 the growth of fishy back traffic, which between 1964 and 1972 has increased from  
 1.4 to 1.8 million tons (see *Transport Economics*, ICC, Oct.-Nov. 1973).

On lumber and canned food exports, land shipment to east coast ports and  
 ocean shipment to Europe seems to be the least cost alternative. It should be  
 noted that rail shipment rates for lumber are very competitive, as has been  
 discovered by U.S. intercoastal shipping, which in the last 10 years has lost  
 most of its intercoastal lumber business.

c. The east coast United States-west coast of South America trade route  
 involves primarily imports of crude oil, iron ore, nitrates, copper, and bananas,  
 which in 1974 accounted for 5.3 million tons. Exports from the U.S. east coast,  
 which totaled 3.3 million tons, consisted primarily of grain, fertilizer, coal, and  
 manufactured goods.

Shipments of crude oil and iron ore would be made in larger size vessels at  
 a cost that is very close to current transport cost via the canal. The crude oil  
 shipments are made from Ecuador where work is currently underway to deepen  
 port facilities and permit use of larger size tankers. Similarly, plans are under-  
 way to construct offshore oil terminals in the United States. It is expected that  
 once 200,000-ton tankers can be used, shipments around the Horn would be  
 more economical than transit in smaller vessels via the canal.

Iron ore shipments from Peru and Chile are currently very sensitive to toll  
 increases. During dry periods, when the Panama Canal reduces the maximum  
 draft and thereby lessens the carrying capacity of ships, some iron ore ships  
 find it more economical to take the Horn route. It is generally expected that once  
 U.S. ports are capable of handling ships with drafts of 60 feet or so, practically  
 all of the iron ore traffic will disappear from the canal.



...nt ? ... in tons. Of the remainder, ... eliminated and substituted ... Similar arrangements ... act that the Pacific basin ... coasts of North and South ... growth rate of any such large area ... have no problem finding substitute

... in case of Canal closure some U.S. ... to west coast sources. As for the ... represent the least cost alternative. ... coast South America route involves ... ducts from Venezuela to California. ... ion tons in 1974, of which 4 million ... counting for most of the remainder. ... imarily in manufactured goods.

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... million tons in 1974. They are com- ... steel products (509,000 tons), chemi- ... s (1,354,000 tons). U.S. intercoastal ... ch as recently as 1960 carried a total ... and west coasts of the United States. ... ments in 1953, amounted to more than ... 000 tons in 1974. Shipments of canned ... ey have been completely eliminated. ... lion tons in 1965; they were 1,354,000

... ipping was competition by land trans- ... railroads outperformed the shipping ... service, with the result that railroads ... inental traffic in the very same com- ... for intercoastal shipment. According ... t of Transportation, 1969), trans- ... from ... tain-Pacific to official and ... illior ... and shipments of primary

... or Trade Routes<sup>11</sup> ... (ports).— *General cargo.*—For most ... ative will probably be shipment via ... s route is already containerized and ... is already being promoted under the

... ipment in large bulk carriers via the ... elopment here is the use of multiple ... re ships. These ships engage in the ... ties which share the total transport ... on a cargo of coal in Virginia, load ... all for movement to Japan via the ... ready occurring and diverting cargo

... -All commodities.—These movements ... Suez Canal being closed. For all these ... e shipments via the Cape of Good ... ened. ... ica.—

... gulf coast, the long-run alternative

*Petroleum.*—A pipeline would in all likelihood be the most economical alternative. This, of course, would apply to all petroleum shipments via the Panama Canal. In the short run, most petroleum movements might be eliminated through the use of product exchanges.

*Bananas.*—These movements would probably stop and bananas from the west coast of South America would attempt to find markets in the Pacific area.

*Other bulk cargo.*—For iron ore, fishmeal, et cetera, rerouting via the Straits of Magellan would be the indicated long-run alternative.

*General cargo.*—Movement via the Pacific coast or rerouting via the Straits of Magellan are the indicated alternatives.

*U.S. Intercoastal Trade.*—This would in all likelihood be replaced by rail movement, with the exception of petroleum traffic, which would be shipped by pipeline.

*Europe-West Coast U.S. and Canada.*—Much of this traffic would be shifted to shipments via east coast ports. For bulk cargo, the alternative would be rerouting, perhaps through use of multiple commodity ships.

*Oceania-U.S. East Coast.*—

*General cargo.*—Shipments via the Pacific coast or rerouting via the Straits of Magellan are the likely long-run alternatives.

*Bulk cargo.*—The most economic alternatives would involve rerouting, probably through the Straits of Magellan.

"Given the very large number of companies and organizations involved in trade through the Panama Canal, the search for long-run alternatives to the canal would initially involve many separate and diverse undertakings. But after 5 to 10 years, the most economical alternatives for each trade route and for each commodity would undoubtedly emerge and find general acceptance."<sup>12</sup>

*A note on grain and soybean export alternatives<sup>13</sup>*

At the present time, practically all corn, wheat, and soybean shipments to the Far East are made via gulf coast ports. The only significant exception involves the shipment of wheat grown in the Northwest, which is shipped via Seattle or Portland.

In terms of transport costs, export shipment via gulf coast ports has traditionally been the most economical. In addition to relatively low rail rates available for grain movement from Kansas, Iowa, Illinois, and so forth, there are ample opportunities for barging grain down the Missouri and Mississippi Rivers. These natural cost advantages have led to a strong concentration of all grain exports in the gulf coast area.

Until 1972-73, this concentration of exports presented no serious problems. But in that year the Russian wheat sale, and resumption of grain shipments to mainland China, as well as strong export demand from many other countries, led to an unprecedented increase in grain exports as well as to a massive congestion at gulf ports such as Houston, New Orleans, and Galveston. And this congestion greatly increased the cost of shipments through gulf coast ports and now has led to the search for alternatives. The proposed shipments of corn and soybeans, primarily via Pacific coast ports is one such alternative. The economic basis for the alternative is simply this: corn and soybeans grown in Iowa, Nebraska, or Minnesota would have a rail haul to the Pacific coast which is 500 to 700 miles longer than to gulf ports. However, in exchange, there would be a substantially shorter ocean voyage to the Far East and opportunities to use bulk carriers larger than Panama Canal maximum size, with lower unit costs, and a way of avoiding the continued congestion at gulf coast ports.

At the present time, such shipments cannot be made economically because the railroads have not yet established any competitive rates for such movements, and Pacific coast ports lack facilities for handling such movements. But with time and initiative these difficulties can be overcome.

## V. CONCLUSION

### *U.S. international trade effects*

As can be seen from the discussions in sections III and IV of this report, a precise and detailed answer to question 6 in appendix B is difficult. The general conclusion in the reports surveyed is, however, that transport cost increases on

<sup>11</sup> Reference 16, p. 12. See appendix C.

<sup>12</sup> Extracted from reference 16, p. 9. See appendix C.



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December 1973

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## PREFACE

The idea for a study to measure the economic value of the Panama Canal originated within the Panama Canal Company during 1973. There was a need for a soundly based judgment about the economic value of the Canal which could serve as a guide for the policy options which the U.S. government is facing with respect to the Panama Canal.

As is noted in the introductory section of the paper, the only two existing sources regarding the economic value of the Canal are the accounting records of the Panama Canal Company and a study entitled Panama Canal Revenues and Estimates of Savings to Users, prepared in 1971 by CEPAL, also known as Economic Commission for Latin America (a U.N. organization). The accounts of the Panama Canal Company are a historical record of revenues and costs, but given the unique nature of the Canal, they are of limited help in determining the economic value of the Panama Canal. The CEPAL study was intended to establish an estimate of the economic value of the Canal. However, its usefulness was impaired by lack of adequate data and some theoretical misconstructions.

At the request of the Panama Canal Company, Ely M. Brandes, President of International Research Associates, Palo Alto, Calif., organized a research team consisting of Dr. James E. Howell, Professor of Economics, Graduate School of Business, Stanford University, and Dr. Ezra Solomon, Dean Witter Professor of Finance, Graduate School of Business, Stanford University, to conduct an economic value study of the Canal. Both Dr. Howell and Dr. Solomon are well known economists, with broad experience in research and consulting, as well as teaching.

The objective of the study was to develop a definition of economic value of the Panama Canal in accordance with accepted economic principles, and to prepare estimates consistent with this definition. In preparing the actual estimates, use was to be made of the latest Panama Canal traffic projections and sensitivity estimates. The traffic projections completed by Economic Research Associates during November 1973 were then used by International Research Associates to prepare traffic sensitivity estimates.

While this study confines itself to the economic value of the Canal, there was no intent to deprecate the strategic or political value of the Panama Canal. Rather, the issues surrounding the Panama Canal are best understood by maintaining separate identities for the various roles which the Canal fills and not by confusing economic value with military or political value.

In the course of this study certain key issues emerged and it became apparent that the value of the findings here would depend greatly on the resolution of these issues.

The first of these issues concerns the proper definition of the various value concepts that must be considered in a study of this kind, and their relation to each other. Annual economic value of the Canal is related to maximum possible revenues which in turn is related to users' surplus value and owners' profit. Beyond this, economic value can be associated with world commerce, the United States or any other country. In addition, there are distinctions to be made between economic benefits accruing to the users of the Canal as opposed to the owners. Each of these concepts and their relationship to each other must be precisely defined, yet in a way that is intelligible to the layman.

The second issue is that of making these concepts operational by developing actual value estimates. Of necessity, the research team could not develop the data on which these value estimates are based; instead it relied on existing data sources. However, this reliance on data developed by others in no way lessened the responsibility of the research team with respect to the findings.

The third and perhaps most important issue relates to time. It was recognized at the very beginning of the project that the estimates of annual economic value should be made on a long-run basis. If the results of this study are to be used for policy decisions, the estimates of maximum revenue should reflect the conditions that are likely to prevail after transitional effects have disappeared. It is recognized, for instance, that the short-run maximum revenue potential may be far greater than the level that can be regarded as sustainable.

Although a preference for the long-run view is logically correct, the public impression of the magnitude of events and the attendant costs is often set by the very same short-run considerations that this study

has sought to avoid. For instance, if some sudden and unforeseen event were to force the closing of the Panama Canal, the cost of providing alternative transportation and supply services would, in the short run, far exceed any estimate contained here. And the public officials who must deal with the short-run aspects of the problem would need to estimate the costs on the same basis. But long-run policy decisions should be based on long-run considerations of value and cost.

The study itself was conducted by Drs. Howell and Solomon, and the findings and conclusions of this report are primarily theirs. Mr. Brandes acted as project manager and consultant to the team.

Officials of the Panama Canal Company were most helpful to the study team by making necessary data available, and that assistance is greatly appreciated.

## I. INTRODUCTION

The Panama Canal has been a multi-faceted undertaking combining engineering, political and military elements on a heroic scale that has captured the attention of history. Of course, it has also been viewed from its inception as an economic asset subject to most of the economic forces and constraints typical in such cases. This is reflected unmistakably in its organization, operating policies, and personnel. The Canal is owned by a public corporation, the Panama Canal Company (PCC), which in turn is owned by its stockholder, the United States government (nominally through the Secretary of the Army). The PCC is charged inter alia with holding and operating the Canal as an economic facility open to all comers, but at a price which will at least cover all costs, including recovery of the stockholder's original capital investment through appropriate amortization.

That the PCC is a publicly owned corporation with assets to be managed according to certain economic instructions laid down by its stockholder-owner differentiates it from government agencies such as the FBI or government assets such as the Washington Monument. It is perfectly sensible in such a setting to ask about the economic value of the Canal, the Company's primary asset, and the only one of concern here.

There are several general reasons why an owner might inquire about the value of a business asset, quite beyond the initial one of simply wanting to know what is owned. One is the wish to be prepared to make an informed decision about additional capital investments in this same venture, in a different but similar one, or in one totally dissimilar but which competes for capital. Another use of accurate information is evaluation of the long-run effectiveness of operating policies or of the management. Finally, knowledge of current asset value is useful in making decisions about the future disposition of that asset.

More specifically, the Canal's owners are currently facing important issues such as user charges, capital improvements related to developments

such as larger and faster ships and to the possibility of traffic reaching Canal capacity by 2000, the changing composition and pattern of world trade, and the political questions associated with the Treaty of 1903. In all these cases accurate information about the economic value of the Canal is useful if not indispensable. This is attested to by the words of Congressman Leggett, Chairman of the Panama Canal Subcommittee of the Merchant Marine and Fisheries Committee as reported in the Congressional Record (H5881) of July 10, 1973: "The economic value of the canal to our country and to the other user nations of the world has never been measured... It is one thing to record the tonnage of the some 15 thousand ships and the type and value of the cargoes which pass through the canal on an annual basis but the real value of this most important international waterway to the economies of the nations concerned is a far different matter... I feel very strongly that we must have the best understanding possible as to the real value of this canal to our country and to the other user nations of the world."

It is not the assignment here to go further into the potential uses of an estimate of the value of the Canal. Rather it is to develop a theoretically, economically, and operationally sound definition of Economic Value, and then to give it empirical content based on current and projected economic conditions. The numerical estimate is needed not only for its own sake as described in the previous paragraph, but also as a demonstration of the workability of the conceptual apparatus. Finally, the report will show how Economic Value, as developed and measured here, is related to the United States both as owner and as user of the Canal, and, in addition, how these conclusions relate to U.S. employment and balance-of-payments objectives. All military and political considerations are explicitly excluded from consideration.

A fortunate corollary of the economic character of the Canal has been a tradition of strong economic analysis. The outstanding example is the work of Emory R. Johnson, Special Commissioner on Panama Canal Traffic and Tolls, in 1913. After many years the results of that work are both fresh and, to the delight of economists, accurate and relevant. Hopefully, the present work will be a worthy part of this tradition.

This raises explicitly the question of antecedent studies. That is, can the present report build on prior definitions and measurements of the worth of the Canal? In general, the answer is no. Of course, PCC accountants

have careful records of worth in the sense of book value, and each annual report by the PCC begins with a review of exactly that. For example, in 1973 the PCC reported that the book value of U.S. ownership in the Canal was some \$530 million. Valuable for some purposes, this simply is not what an economist would define as the economic value of the PCC's exotic asset, and thus it is not the appropriate information for many of the strategic decisions that the PCC and the U.S. government must make regarding the Canal.

One study which certainly attempts to define and then estimate economic value is that prepared by the Economic Commission for Latin America: CEPAL (to use the Spanish initials of the Commission), Panama Canal Revenues and Estimates of Savings to Users, 1971. That effort and the present one agree on the critical importance of knowing economic value, and both see "maximum obtainable revenues-alternative cost" as the proper approach, but from that point on the two studies diverge dramatically, so necessarily their numerical results differ. The present authors naturally think their theoretical work the sounder, but it is necessary in fairness to point out that they had the advantage of coming later and thus are able to benefit from both the strengths and weaknesses of the CEPAL study. The only other known effort is an internal memorandum in early 1973 by the PCC's own economist. The ideas presented here go well beyond that brief, explanatory paper, but the two are certainly consistent.

## II. BASIC CONCEPTS

### Economic Value

The annual net Economic Value of the PCC can be viewed as the difference between the resource cost of operating the Canal and the resource cost of providing equivalent services in the most economical alternative way. This concept, a comparison of the levels of resources needed to provide a given service through two alternative systems is directly independent of such things as toll level or owner's profit. It changes significantly over time only if Canal costs change relative to the cost of users' alternatives, referring in both instances to economic costs (including the cost of capital). It is based on a fundamental axiom of benefit theory: when not set by market forces, prices cannot be used as a measure of benefit or value. This is, the only economic alternative to the use of price as a value measure is the resource cost of providing service which is equivalent. On this basis, current net Economic Value of the Canal is approximately \$80 million per annum (Figure 1), as will be more precisely explained below.

### Maximum Possible Revenue

Inextricably linked to Economic Value is the concept of maximum Canal revenues and, as a means thereto, the revenue-maximizing toll structure. In fact, Maximum Possible revenue, also on an annual basis, is exactly what was meant immediately above by the words, cost to users of securing alternatives to the Panama Canal — the \$185 million in the illustration of Figure 1. It is useful to redisplay this fact in another diagram, Figure 2, where the revenues associated with a number of conceptually feasible revenue policies are compared with one another. As explained later, only transit revenues are considered in this report.

This formulation makes explicit that, despite an impression in some minds of economic indispensability to world commerce, the Panama Canal exists today in a world in which there are many potential substitutes for it. One need only look at the recent history of the Suez Canal to see the force of the point. Most Panama Canal users also have alternatives which are not too

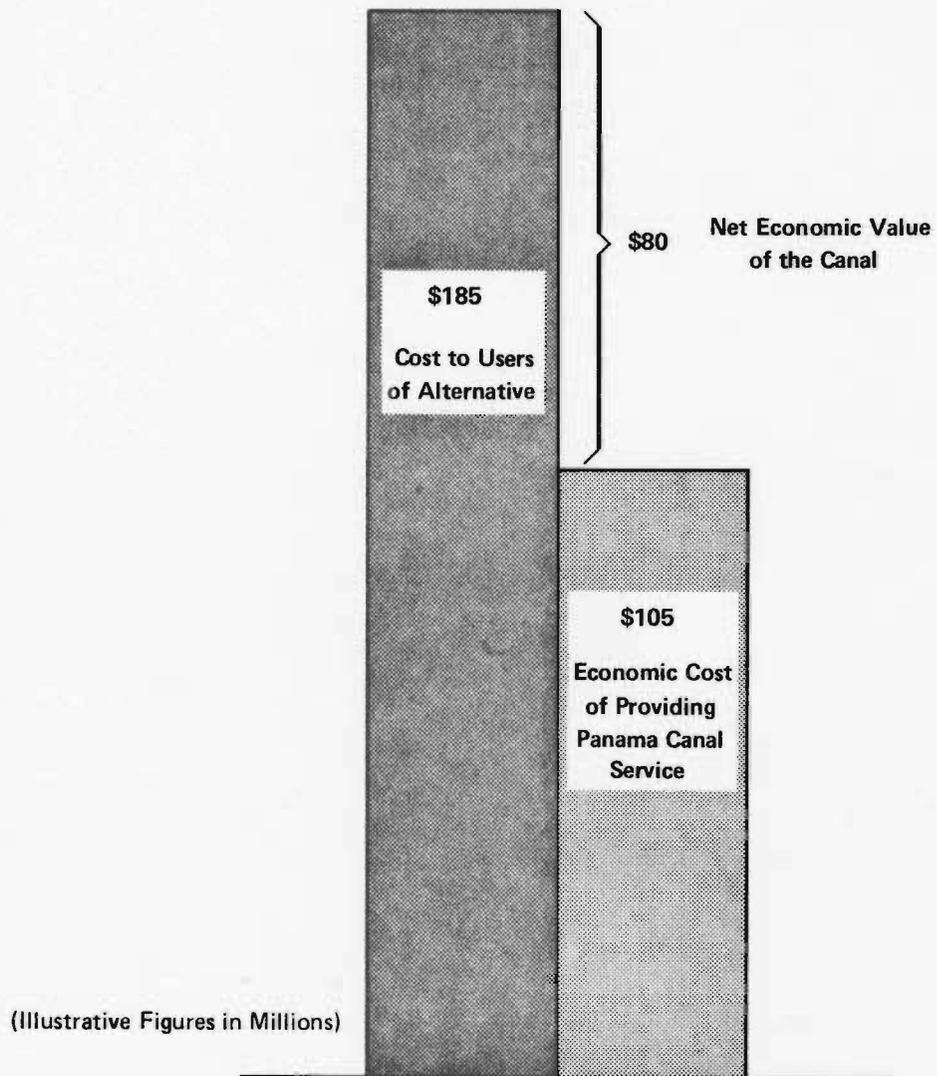


Figure 1. Annual Economic value of the Panama Canal

(Illustrative Figures for 1975 in Millions)

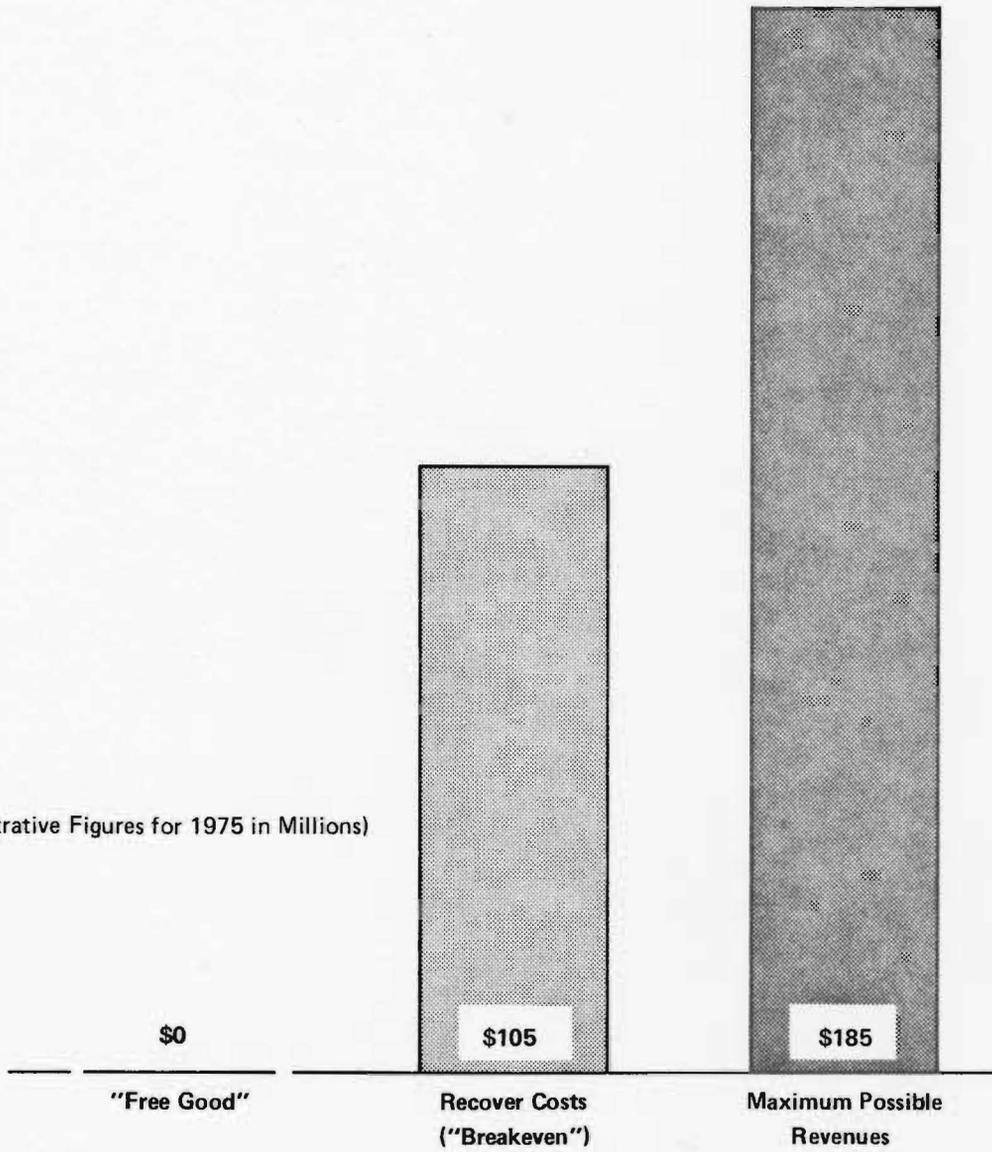


Figure 2. Long-run Transit Revenues Associated with Alternative Tolls Policies

remote when viewed on the all-important dimension of economic cost. In fact, the largest amount of long-run revenue that can be recovered by the PCC from any particular class of users is precisely the cost to them of the cheapest long-run alternative to using the Canal. This is maximum potential revenue, ignoring for the moment both the transitional revenues available in the short-run and the frictions and slippages which prevent long-run realization of any theoretical maximum, as shown in Figures 1 and 2.

### Users Surplus Value

It is useful to combine the concepts of Economic Value (Figure 1) and alternative revenue policies (Figure 2) so as to define and display a new value concept, that of Users Surplus (Figure 3). In particular, taking their viewpoint, Users Surplus is defined as the difference between the value to users of the Canal's services and what they actually must pay for them. From the viewpoint of the PCC, users surplus value is the amount of potentially collectible revenue left in the hands of users. Of course, it is greatest if the Canal is free to users and zero if the revenue level is at the maximum of \$185 million of Figure 1. For example, under PCC's 1972 revenue policy, the surplus value which will be enjoyed by users in 1975 is about \$65 million.

### Profit or Subsidy

Users surplus must not be confused with the direct out-of-pocket subsidy to Canal users that exists when revenues are set at a level less than full costs. Users surplus is the difference between actual revenues and maximum possible revenues, whereas direct subsidy is the excess of actual costs over actual revenues. Of course, when revenues exceed costs the subsidy is negative and is more conveniently called operating profit. Figure 4 compares alternative revenue policies (ignoring for the moment the effect of lower traffic associated with higher tolls) in order to display graphically the subsidy to users if revenues are less than the amount required to recover full costs, and the profit to the owner if they are higher than that. Under current law, the PCC is required to follow a revenue policy such that all costs are recovered, i.e., that operating losses (overt subsidies to users) be avoided.

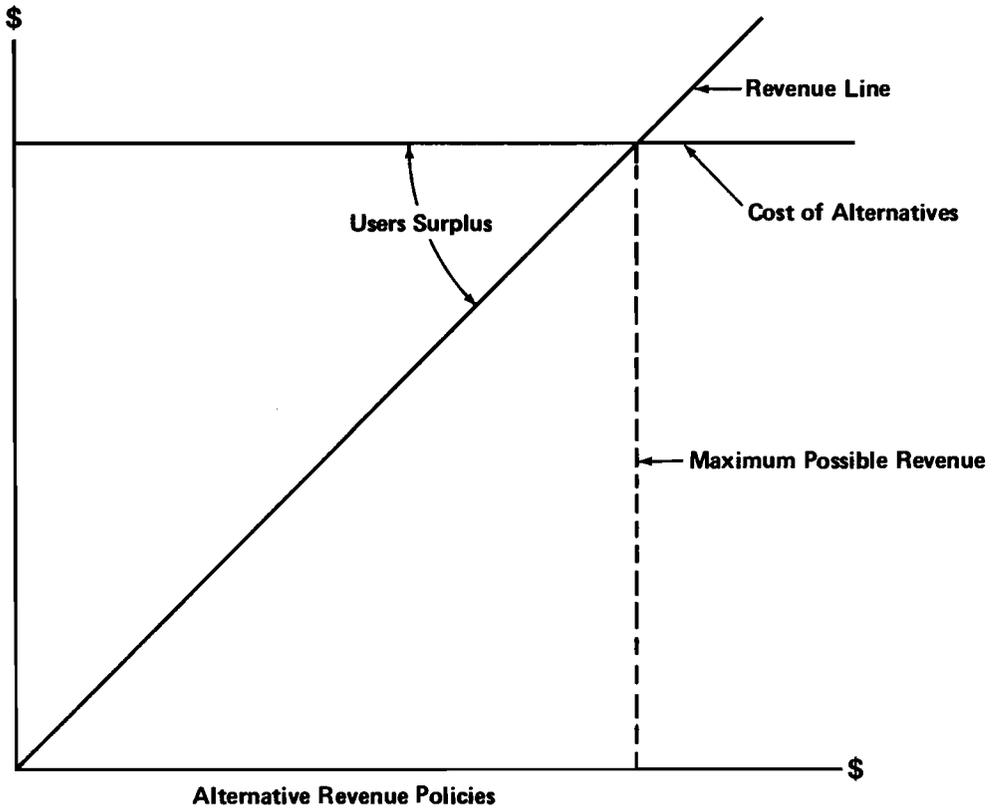


Figure 3. Users Surplus Enjoyed by Canal Users

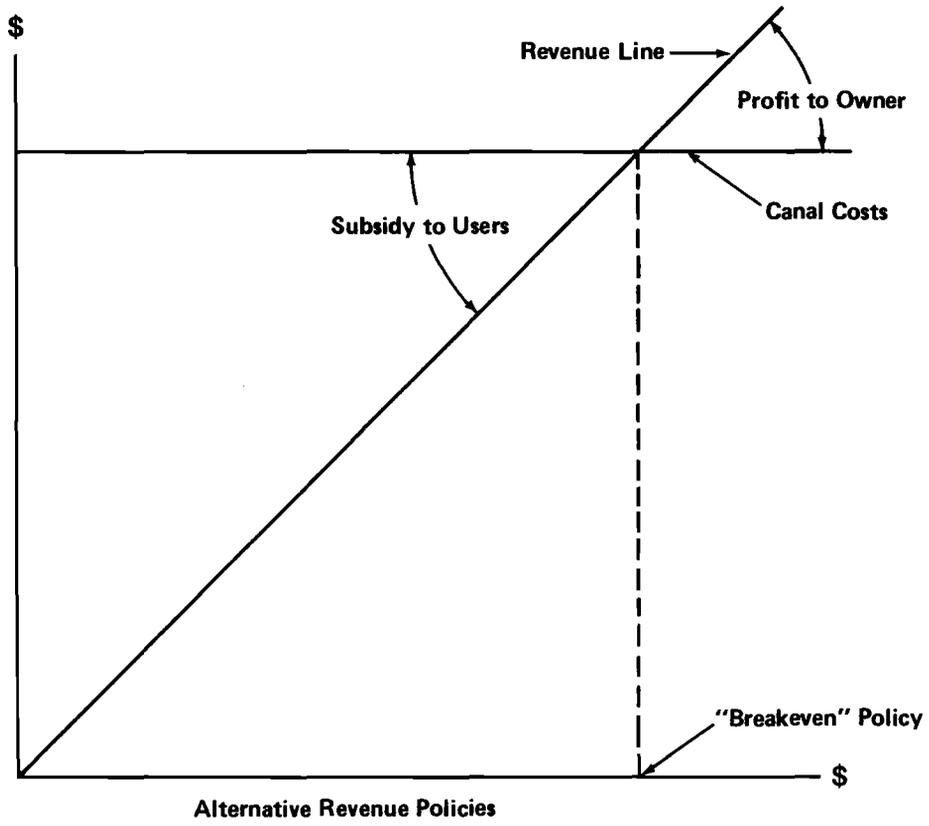


Figure 4. Costs, Alternative Revenue Policies, and Resulting Subsidy or Profit

### The Three Value Concepts

Three value concepts — Net Economic Value, Users Surplus, and Owner's Profit — have now been presented. To summarize, they have been derived by comparing pair-wise three concepts, one revenue and two cost, as follows (all in annual amounts):

Annual Net Economic Value of the PCC	=	Annual Cost of Alternatives as Measured by the Theoretical Revenue Maximum	—	Annual Cost of Providing Canal Services
Annual Users Surplus Value	=	Annual Cost of Alternatives as Measured by the Theoretical Revenue Maximum	—	Actual Annual Revenues Collected by PCC
Annual Profit to Owner	=	Actual Annual Revenues Collected by PCC	—	Annual Cost of Providing Canal Services

The exact relation of these concepts is shown in Figure 5 which is simply a summary of the diagrams presented thus far. Note that the first two concepts are equal if a "breakeven" revenue policy is pursued. With such a breakeven policy, there is no subsidy to users, but they nonetheless continue to enjoy some surplus (equal to the economic value of the Canal) since the owner is foregoing claiming any of the potential profit. It is important to note further that Net Economic Value is independent of the revenue policy adopted (measured on the horizontal axis in Figure 5), although the surplus enjoyed by users certainly is not.

How relevant are the simple conceptual definitions developed thus far? The answer is that they are both reasonably realistic and quite useful. However, proof of this will be demonstrated only later when the concepts are given operational content. It suffices here to warn that functional relationships have not been presented thus far, and that those relationships implicit in the definitions have been suppressed. An example of an important relationship thus far ignored is that of costs to revenue policy since the latter is a partial determinant of traffic volume, which in turn affects costs. Such interrelationships will be carefully considered later in connection with putting numbers on the definitions.

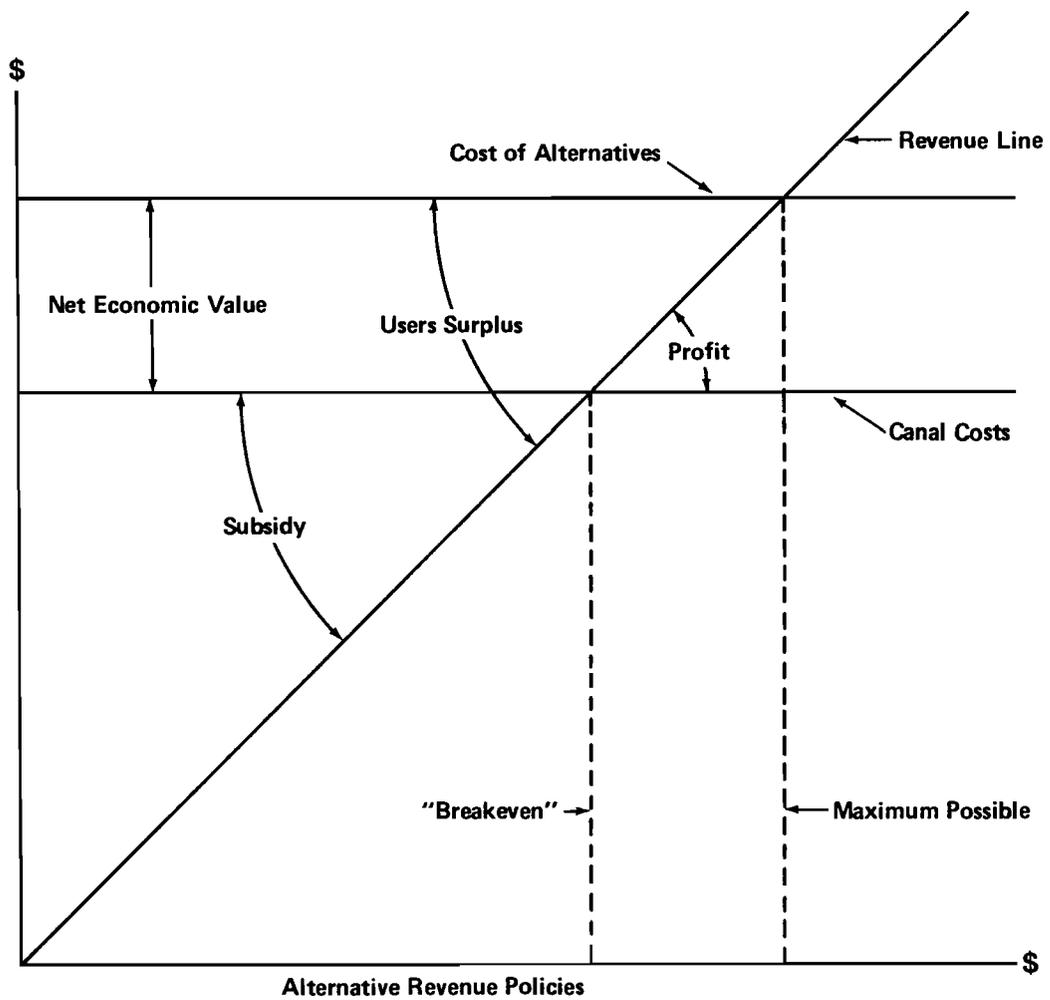


Figure 5. Three Concepts of Value

## Economic Value to the United States

The total annual net economic value of the Canal as defined is the value to all users. What of the economic value to the United States? Before making any definitive statements about the Canal's impact on or value to the United States, one must distinguish carefully among several perspectives:

- the U.S. as one of the major users of the Canal
- the U.S. government as the sole stockholder and operator of the PCC
- the impact of the PCC on the U.S. balance of payments and the U.S. domestic economy.

Each perspective will be examined.

The first perspective of importance for the United States is that of the United States as a major user of the Canal. The value of the Canal to U.S. users is measured by the share of U.S. users in total users surplus (Figure 3), i.e., their share of the cost advantage of the Canal over alternatives. That is, it is the difference between what U.S. users would and do pay. As pictorially represented in Figure 6 this is unequivocal enough, at least conceptually. But it is no simple task to differentiate U. S. and non-U.S. users. To do so requires decisions about who actually pays transit costs and who actually enjoys the users surplus when it exists, as it certainly does now. Only then can one establish the geographic identity — U.S. or not — of those users who would lose surplus value if a more aggressive revenue policy were adopted by the PCC. Who pays the tolls and enjoys users surplus when it exists — the shipping company who pays the transit fees, the originator of the cargo, or the ultimate customer? If the PCC is conferring benefits on users through a breakeven revenue policy, is it the owner of the ship that transits with a load of Japanese cars who enjoys that benefit, or is it the Japanese companies who made and own the cars, or is it the European customers who will buy them? And so on. This, of course, is the classic economic problem of how costs are shifted, a subject which has been central for decades to the tax theorist.

There is no unequivocally definitive way to handle this question short of a detailed investigation of all the final markets for all goods transiting the Canal. Theoretically, with enough information about demand

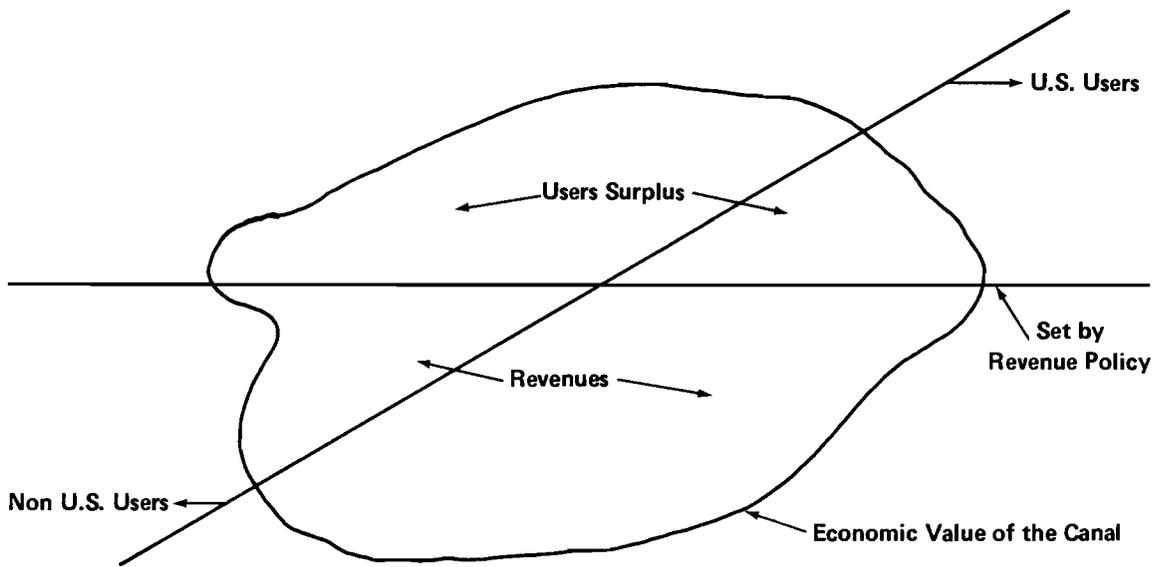


Figure 6. Allocation of the Economic Value of the Canal



elasticities and pricing behavior, one could judge reasonably well at least the first-order shifting. This intensive a look is neither possible nor desirable here, and the present analysis will be limited to making a reasonably sensible division of the distribution of users surplus among U.S. and non-U.S. users. This can be done in two ways: by origins and destinations of cargos and on the basis of elasticity estimates for each of the major commodity groups.

In addition to its role as a major user, the United States is also the sole owner and operator of the PCC. Over the past sixty years it has chosen to operate the Canal as an international public utility and has followed a revenue policy which just provides for recovery of annual costs, including depreciation of tangible assets, and a moderate rate of interest on investment funds originally advanced by the U.S. Treasury. As owner, the United States could institute a different revenue policy. For example, it could, through higher transit charges, capture some or all of the surplus which now accrues to users, including U.S. users of the Canal. The flow of revenues that would be generated by higher tolls, less the total annual costs associated with servicing the traffic associated with the higher toll structure, would represent profit. Such profits could be used to compensate the U.S. government, as owner, for its initial investment and risk; it could be used to expand and improve the PCC's physical assets; or it could be used to support a higher level of annuity payment to the host country.

The third way in which the PCC is of economic importance to the United States, is that the U.S. as a nation has economic and social objectives with respect to its gross domestic output, employment, and balance of payments. Does the Panama Canal contribute significantly to the national policy of maintaining high levels of domestic output and employment? It does not if one looks at the number of PCC and Canal Zone government jobs held by U.S. nationals: currently about 2000 and 1500 respectively. But the more important question concerns the output and employment impact on U.S. industries which are linked to the use of the Canal. More particularly, would a change in revenue policy have any significant employment effects in the United States, and if so, in what industries and in what regions? This question will be addressed later. At the same time, an estimate will be made of the impact of the Canal on the U.S. balance of payments, with both revenue and trade effects considered.

In summary, the U.S. interest in the PCC must be examined separately from that of value in general, although of course the Canal's economic value to the world community is important. Further, U.S. interests must be treated from three perspectives: the United States as owner of the Canal; the value of the Canal to U.S. users, which requires consideration of the shifting problem; and the impact of the Canal on the public policy objectives of the United States with respect to its own level of output, employment and balance of payments. This report provides estimates and conclusions from all three perspectives.

Actual, Estimated, and Potential Revenues

Revenues and costs as reported by the PCC for fiscal years 1972 and 1973 are shown in Table 1. Tolls and other transit charges (e.g., pilotage tugs, line handlers) provide over sixty percent of reported gross revenues, with sales of other services, including sales to employees, providing the rest.

Table 1  
Tolls, Revenues, and Costs  
(millions)

	<u>Fiscal 1972</u>	<u>Fiscal 1973</u>
<u>Revenues</u>		
Tolls	\$101.5	\$113.4
Other Transit Revenues	<u>14.7</u>	<u>19.4</u>
Total Transit Revenues	\$116.2	\$132.8
Net Revenue on Other Activities	<u>2.2</u>	<u>0.6</u>
Total Revenue	\$118.4	\$133.4
<u>Costs of Operating the Canal</u>	<u>117.7</u>	<u>134.7</u>
<u>Net Operating Revenue</u>	\$ 0.7	\$ (1.3)

For this analysis it would be incorrect to include as revenues and costs the gross flows associated with non-transit activities — for example, the \$30,415,784 of sales to employees and the corresponding operating costs of \$30,415,784 associated with those sales. The net, if there had been any, might be relevant (especially if a true cost), but certainly the gross figures are not. Thus, Table 1 is presented to show revenues and costs

on a basis suitable for use here: the net revenue, of course, is not affected. Costs (including all expenses) were approximately the same as total revenues, so net revenue was a nominal \$0.7 million (profit) in 1972 and a minus \$1.3 million (subsidy to users) in 1973.

Since toll rates have remained essentially unchanged over the nearly sixty years of Canal operation, increase in toll revenues has come exclusively from traffic growth. Other user charges are adjusted from time to time, so usually the PCC has been able to cover costs or even have a small net operating profit as it did in 1972. In other words, the PCC, in spite of unchanging toll rates, has been able to meet the legal requirements that revenue be sufficient to cover costs through the combined effect of traffic growth, non-toll user charges, and cost control programs. Beyond avoiding losses, the PCC appears to have followed essentially a breakeven revenue policy, something it can do even though not all variables are under its control. The existence of relatively small profits or losses is consistent with this characterization since, from a broader point of view, those profits — small relative to what they could have been — can be considered a safety margin against incurring a loss in the future or as a contribution to owner's unallocable overhead costs (e.g., supervisory and policy-making costs in Congress or the Department of Defense).

Clearly the PCC has been following a policy of offering the Canal to world users essentially at cost. Can it continue to do so in the future? Should it? The second question is not to be answered here, but the analysis elsewhere in this report shows that the present policy certainly confers a substantial surplus value upon Canal users. As for the first question, it can be expected that in the next decade even a breakeven policy will require higher tolls since the other user charges simply cannot bear the full burden of rising costs that most observers expect.

Figure 7 shows, on the same basis as Table 1, Canal toll revenues through 1972 and a projection through 1985 on assumptions of unchanged toll rates. Base-line projections were prepared by Economics Research Associates (ERA) in their report Perspectives of Panama Canal Commodity Flows, Transits and Tolls through 1985 (Los Angeles, 1972) and updated November 1973. Canal users were classified by commodity shipped, origin, destination, and shipping route. Each user group so identified was then studied intensively in order to learn how its use of the Canal would change between now and

Millions of Dollars

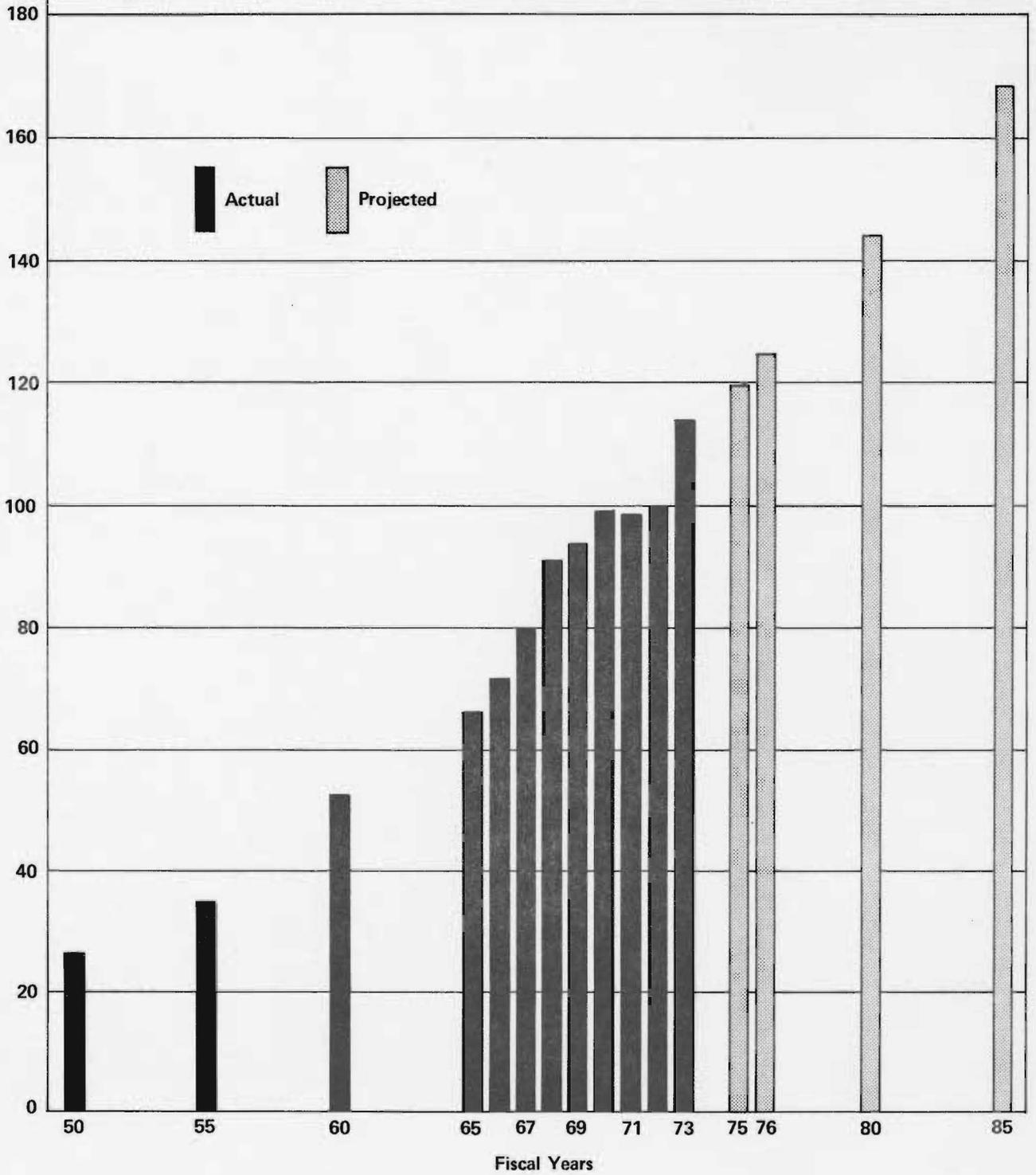


Figure 7. PCC Toll Revenues, Past and Projected

1985. Estimates were made on the assumption that tolls would not change but that other user charges would be adjusted to reflect specific and identifiable cost increases. That is, they reflect the present toll structure.

Even if present toll rates are maintained unchanged, the flow of commercial toll revenues is expected to rise from \$98.8 million in 1972 to \$168.4 million in 1985, or by 4.2 percent per annum. Users surplus, or the annual extra volume of commercial tolls users would be willing to pay rather than by-pass the Canal, would also rise between now and 1985. The critical task to which this report now turns is an estimate of users surplus for 1975, 1980 and 1985.

It is worth noting that the traffic forecasts underlying Figure 7 show that there is little possibility of capacity being reached by 1985. It may or may not do so in the succeeding decade, that of the 90's, depending on how much ingenuity the PCC is able to bring to bear on modifying or removing some of the constraints — e.g., availability of water — that currently define capacity.

### III. MEASURING ANNUAL NET ECONOMIC VALUE

The annual net economic value of the Panama Canal has been defined as the difference between the maximum sustainable revenues available from transit operations and the corresponding economic cost of accommodating the implied volume of traffic (Figure 1, above).

#### Time Dimension

The time element in both the revenue and cost measures needs precise definition before numbers can be developed. In the first place, both maximum revenue and cost are certain to grow over time as the volume of world output and trade expand; thus economic value itself is a function of time and must be estimated with reference to a particular year. This study covers three years: 1975, 1980 and 1985.

The concept of "long run" implied in the definitions by the word "sustainable" covers another dimension: it refers to equilibrium conditions of revenue and cost which are likely to prevail after transitional effects are eliminated. For example, if tolls are doubled, revenues may double, but this would be transitional. For in the longer run, some five to ten years depending on the commodity, some users would adapt by using more economical alternative arrangements, and the level of long-run revenue (excluding the effect of growth) would stabilize at some lower level, but still one which is higher than that which prevailed before the toll changes. It is this latter, non-transitory level which provides the appropriate estimate of the maximum sustainable revenue. The maximum revenue potential of the Canal, in any selected year, is equal to the cost of providing the world economy with the equivalent service in the most economical alternative way: Thus, each concept can be measured by measuring the other.

The same problem exists on the cost side of the equation. In any particular year there may be transitory factors affecting cost. For example, there may be a sharp change in traffic patterns, or unusual operating difficulties, or, if accounting cost is used as a proxy for economic cost, a change in accounting practices. The concept of "long-run" cost ignores

such transitional effects and seeks instead to measure the more enduring or non-transitory level of costs which would prevail in equilibrium.

#### Alternatives to the Canal

A straightforward, but misleading approach to the measurement problem which is sometimes used is to ask what it would cost to move the commodity flows now transiting the Canal via alternative ocean routes. The answer would be a larger dollar number, and it would be an exaggeration of the true economic value of the Canal. The reason is simply that the most economical alternative, in the long run, is not one which will involve moving identical commodities between identical points using identical ships but merely by-passing the Canal. In some cases, alternative ocean routes may provide the best available long-run alternative to the Canal, but this is only one of many, more complex and interrelated adaptations available to world commerce. Other equally important alternatives exist.

At 1972 costs and Canal Tolls, a dry-bulk carrier of 12,500 DWT could breakeven by sailing about 1000 miles extra in order to avoid Canal tolls; for one of 37,500 DWT the extra available distance is 1600 miles, and for a larger vessel of 67,500 DWT (which is subject to draft limits as far as present Canal passage is concerned), the figure is twice as high. The economical alternative to shipping via the Canal would not be to use identical ships on alternative routes but to use much larger ships, and this significantly reduces the cost of alternative routes.

Another substitute to rerouting ships would be to reroute traffic via alternative modes of transport. Land transport is a significant alternative for a considerable portion of current Canal traffic. For example, land shipment of lumber, canned goods, and steel products between the U.S. west and east coasts have already made large inroads into what was previously Canal traffic. Even more important is the rerouting of shipments whose origin or destination is somewhere in the interior of the United States, via the "alternate" coast. For example, exporting agricultural products to the Far East via the west coast instead of the Gulf.

A third alternative to the simple rerouting of ships would be some rearrangement of the present pattern of commodity movements. The emergence of Japan as a major supplier and buyer and the relatively rapid economic growth of the North American west have greatly increased the potential for such a rematching of sources and markets. Different patterns of resource

development and plant location provide yet another adaptive alternative to the simple rerouting of current commodity flows. The rapid growth which is occurring in world output and trade increases the possibility of this form of adaptation.

Finally, consumption patterns can adapt to the new structure of cost and availability which would be caused by significant changes in Canal tolls.

### Measuring Traffic Sensitivity

The probable sensitivity of Canal traffic to toll changes varies from one commodity to another, and no easy generalizations are possible. Rather, estimates of changes in traffic volume associated with different toll rate increases can only be made on a disaggregated basis, taking into account the highly specific conditions which prevail for each type of cargo now transiting the Canal.

Such a sensitivity study has been prepared for the Panama Canal Company by International Research Associates (IRA), Panama Canal Toll Rate Increases, (Palo Alto, 1972). Using the base-line projections of the ERA study cited earlier, the IRA study projects probable tonnages of transit demand for 1975, 1980 and 1985 by commodity group, for effective toll rate increases of 15, 25, and 50 percent. The original 1972 IRA results have been updated to incorporate more recent information and using similar methodologies, the data have been extended to cover toll rate increases of 100 and 150 percent. The effect of toll increases larger than 150 percent, e.g., a tripling of tolls, were not explicitly prepared since, with the possible exception of one commodity group, the data indicate that total revenues decline when the increase is that high. That is, beyond a 150 percent increase, the revenue impact of the higher toll rate is more than offset by the decline in traffic volume. Also, specific numerical estimates of the probable change in traffic for toll increases beyond 150 percent do not have an acceptable degree of reliability.

Table 2 shows the expected long-run sensitivity of traffic volume for each commodity group to each indicated toll rate increase after transitory effects have faded. The long-run sensitivity shown in the table has been derived by comparing the expected level of a commodity's shipment through the Canal in 1985 (assuming a given toll rate increase) to the expected 1985 level assuming no toll rate increase. Using wheat as an

Table 2  
ESTIMATED LONG-RUN SENSITIVITY OF TRAFFIC TONNAGE,  
BY COMMODITY, TO SELECTED TOLL INCREASES

<u>CARGO</u>	<u>PERCENT BY WHICH PRESENT TOLL RATE IS INCREASED:</u>				
	<u>0%</u>	<u>25%</u>	<u>50%</u>	<u>100%</u>	<u>150%</u>
Wheat	1.00	1.00	.96	.74	.61
Coarse Grains	1.00	.98	.92	.76	.60
Bananas	1.00	.93	.73	.33	.20
Sugar	1.00	1.00	.97	.70	.54
Soybeans	1.00	.98	.94	.83	.68
Lumber	1.00	1.00	1.00	.84	.68
Wood Pulp, Paper & Paper Products	1.00	1.00	1.00	.86	.70
Phosphates	1.00	.96	.91	.76	.60
Fertilizers, Potash & Fish Meal	1.00	1.00	1.00	.83	.67
Iron Ores	1.00	.88	.76	.39	.15
Misc. Ores	1.00	1.00	.98	.91	.84
Scrap Metal	1.00	1.00	1.00	.67	.50
Alumina & Bauxite	1.00	1.00	1.00	.86	.71
Misc. Metals	1.00	1.00	1.00	.81	.67
Coal	1.00	.94	.89	.61	.37
Crude Petroleum	1.00	.94	.88	.59	.33
Petroleum Products	1.00	.94	.88	.68	.49
Chemicals	1.00	1.00	1.00	.83	.66
Sulfur	1.00	1.00	1.00	.83	.66
Other Non-Metallic Minerals	1.00	1.00	1.00	.83	.66
Iron & Steel Mfrs.	1.00	.97	.95	.80	.65
Autos & Trucks	1.00	1.00	1.00	.83	.65
General Cargo	1.00	.99	.98	.77	.66

NOTE: Figures shown are (1985 tonnage associated with a specified toll increase) ÷ (1985 tonnage projected with no toll increase).

Calculated from tonnage figures rounded to nearest 100,000.

example, the table shows that an effective 25 percent toll increase on wheat shipments would have no long-run effect on wheat traffic through the Canal; a 50 percent increase would lead in the long run to a volume of wheat traffic that is 96 percent of the no-toll increase base-line level; a 100 percent increase to one that is 74 percent of the base-line level, and an increase of 150 percent to a volume of 61 percent of base-line. Certainly, although the underlying analysis has not been done, one must expect that the coefficient for a toll change of 200 percent, reading across the row for wheat, would be smaller than .61. That is, there is a strong presumption that the response to a tripling in toll rates would cause wheat tonnage to drop by at least 50 percent, i.e., have a coefficient of .5 or lower. It is imperative to understand that these are the equilibrium or "steady state" responses after users and world markets have had time to adjust to the toll changes, and that they do not measure immediate or transitory behavior. Time is the essential differentiating factor: for example, even a tripling of tolls might have no effect on wheat cargos in ships already within sight of the Canal's channel markers!

Table 3 shows the level of sustainable toll revenue available from each commodity for each toll-rate increase covered in Table 2, from which it is derived. As an example, for bananas, toll revenues reach a long-run maximum with a toll rate increase of 25 percent; beyond this, revenues decline as production and commerce adapt. For five commodity groups (sugar, iron ore, scrap metal, coal and crude petroleum), toll revenue increases with toll rate increases up to 50 percent. Beyond this the expected shrinkage in transit volume more than offsets the increase in toll rate. For seven commodity groups the toll rate increase which provides the maximum revenue flow is 100 percent; for 10 groups it is 150 percent, or possibly more. While specific data for changes above 150 percent have not been calculated, the pattern of sensitivity shown in Table 2 indicates that 150 percent is in fact the probable maximum for nine of these, and probably for the tenth as well. In any case the volume of maximum obtainable revenue for these ten groups cannot be significantly above that achievable through an effective toll rate increase of 150 percent.

#### Maximum Revenue Potential in 1975

Table 4 combines the data in Table 3 with the base-line projections from Table 2. The second column of Table 4 shows the expected toll revenue,

Table 3  
ESTIMATED LONG-RUN SENSITIVITY OF REVENUE COLLECTIONS,  
BY COMMODITY, TO SELECTED TOLL INCREASES

<u>CARGO</u>	<u>PERCENT BY WHICH PRESENT TOLL RATE IS INCREASED:</u>				
	<u>0%</u>	<u>25%</u>	<u>50%</u>	<u>100%</u>	<u>150%</u>
Wheat	1.00	1.25	1.44	1.48	1.53
Coarse Grains	1.00	1.22	1.38	1.52	1.50
Bananas	1.00	1.16	1.10	.66	.50
Sugar	1.00	1.25	1.45	1.40	1.35
Soybeans	1.00	1.23	1.41	1.66	1.70
Lumber	1.00	1.25	1.50	1.68	1.70
Wood Pulp, Paper & Paper Products	1.00	1.20	1.50	1.72	1.75
Phosphates	1.00	1.20	1.37	1.52	1.50
Fertilizers, Potash & Fish Meal	1.00	1.25	1.50	1.66	1.67
Iron Ore	1.00	1.09	1.14	.78	.38
Misc. Ores	1.00	1.25	1.47	1.82	2.10
Scrap Metal	1.00	1.25	1.50	1.34	1.25
Alumina & Bauxite	1.00	1.25	1.50	1.72	1.78
Misc. Metals	1.00	1.25	1.50	1.62	1.67
Coal	1.00	1.17	1.33	1.22	.92
Crude Petroleum	1.00	1.18	1.32	1.18	.83
Petroleum Products	1.00	1.17	1.32	1.36	1.22
Chemicals	1.00	1.25	1.50	1.66	1.65
Sulfur	1.00	1.25	1.50	1.66	1.65
Other Non-Metallic Minerals	1.00	1.25	1.50	1.66	1.65
Iron & Steel Mfrs.	1.00	1.21	1.42	1.60	1.62
Autos & Trucks	1.00	1.25	1.50	1.66	1.63
General Cargo	1.00	1.24	1.47	1.54	1.65

NOTE: Figures shown are (1985 revenue collections associated with specified toll increase) ÷ (1985 revenue collections projected with no toll increase).

Calculated from revenue collections rounded to thousands.

Table 4

## ESTIMATED MAXIMUM TOLL REVENUE COLLECTIONS AVAILABLE

	<u>Optimal Toll-Rate Increase</u>	<u>Toll revenues with present toll rates applied to projected 1975 tonnages (a)</u> (thousands of \$)	<u>Estimate of probable 1975 toll revenues if optimal toll rates had been in effect (b)</u> (thousands of \$)
<u>+25%</u>			
Bananas	25%	\$ 4,422	\$ 5,130
<u>+50%</u>			
Sugar	50%	3,605	5,227
Iron Ore	50%	1,472	1,678
Scrap Metal	50%	1,620	2,430
Coal	50%	8,736	11,619
Crude Petroleum	50%	10,751	14,191
<u>+100%</u>			
Coarse grains	100%	7,853	11,937
Phosphates	100%	2,769	4,209
Petroleum Products	100%	8,107	11,026
Chemicals	100%	2,908	4,827
Sulfur	100%	623	1,034
Other Non-Metallic Minerals	100%	738	1,225
Autos & Trucks	100%	8,641	14,344
<u>+150%</u>			
Wheat	150%	1,663	2,544
Soybeans	150%	3,603	6,125
Lumber	150%	4,849	8,243
Wood Pulp, Paper, etc.	150%	2,933	5,133
Fertilizers, Potash, etc.	150%	2,723	4,547
Misc. Ores	150%	2,385	5,008
Alumina & Bauxite	150%	995	1,771
Misc. Metals	150%	1,298	2,168
Iron & Steel Mfrs.	150%	6,571	10,645
General Cargo	150%	30,256	49,922
<u>TOTAL</u>		<u>\$119,521</u>	<u>\$184,983</u>

(a) This is the Economic Research Associates projection for 1975 toll collections for each commodity.

(b) This estimate is made by multiplying the 1975 ERA projection for 1975 toll collections by the long-run sensitivity ratio appropriate to the optimal toll increase for each commodity as shown in Table 3.

by commodity group, from present toll rates. The total expected level is about \$120 million annually. The third column shows the toll revenue for 1975 that would be generated if optimum level of toll rates had been set for each commodity. "Optimum," of course, is from the PCC viewpoint, not that of users. The total expected level, which is the maximum obtainable revenue for 1975, is about \$185 million annually.

It must be made explicit that \$185 million is not an estimate of revenues in 1975 if the increases are put into effect in, say, 1974. Given that a significant part of the expectable volume adaptation requires time, actual tolls in 1975 would be well above \$185 million if toll rates were increased only in 1974 as indicated. Rather, \$185 million is the level at which toll revenues would have stabilized in 1975 had the new toll structure been in effect long enough to permit commerce to adapt. Underlying secular growth will, of course, occur beyond 1975. (See Fig. 8.) The \$185 million report, the Net Economic Value of the Canal.

#### Maximum Revenue Potential, 1980 and 1985

Procedures similar to those used for 1975 can be used to derive estimates of maximum potential toll revenues for 1980 and 1985. The basic sensitivity estimates are used to develop estimates of the maximum potential toll revenues which would be available for non-selective toll rate increases, i.e., uniform, across-the-board increases of 50, 100 or 150 percent. Such uniform increases do not produce as high a revenue as that which can be obtained by the optimal selective toll rate changes shown in Table 4. The economic value of the Canal to world commerce in 1980 and 1985 is higher than for 1975 due to the expected normal growth in production and trade. The base-line revenue projections shown in Figure 7 indicate a long-run growth rate of 4.2 percent a year to 1985. This rate provides one basis for an estimate of the growth in the Canal's economic value. On this basis, and using today's prices, maximum achievable transit revenues would be \$228 million in 1980 and \$280 million in 1985.

The estimates for 1980 and 1985 are subject to potential errors over and above those attaching to the \$185 million estimates for 1975. One source of error is that the basic data on which all of the estimates are derived implicitly assume future alternatives to the use of the Panama Canal that are highly similar to the set of potential alternatives now available. For example, it is implicitly assumed that the Suez Canal will remain

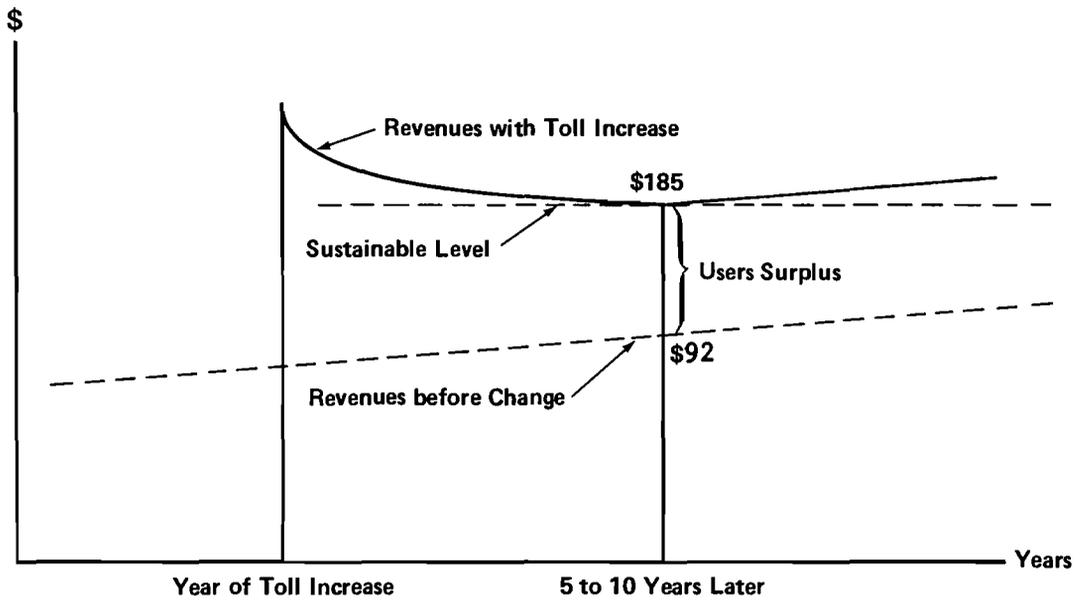


Figure 8. Toll Revenues after Increase to Maximum Level

closed. Thus, the reopening of the Suez, or the development of some new transport technology not now understood, could significantly increase the sensitivity of Panama Canal traffic to toll rate increases, and thus reduce the maximum level of revenue. On the other hand, if long-run inflation, including ship construction costs, ship operating costs (especially fuel prices), and the general price level of commodities proceeds at a higher pace than historical experience indicates, the long-run sensitivity of Panama Canal traffic to a given set of toll rate increases will be lower than those indicated in Table 3, and the maximum achievable level of revenues will be correspondingly higher.

Just how these two sets of countervailing forces will actually operate cannot be predicted accurately. In effect the estimates developed in this study — \$185 million for 1975 and \$280 million for 1985 — ignore these two opposing influences, which is equivalent to assuming they will tend to be of approximately the same magnitude, thus cancelling each other.

#### Cost and Economic Value

The crucial concept of net economic value for 1975 is the difference between \$185 million and the resource cost of providing the services required to accommodate the implied volume of transits. The only available measures of the cost of operating the Canal are those provided by the PCC's accounting and financial statements. It is possible to quarrel with the concepts on which these statements are based, and therefore to question the estimates on which they lead.

For example, it might be argued that the United States should recover, over some reasonable period, all of the initial costs associated with developing and excavating the Canal itself: about \$330 million. At present, no provision is made for this. The only annual charge is \$12 million to cover interest on unrecovered outlays, which in addition to the \$330 million mentioned includes a further amortizable balance of \$425 million. In economic terms, provision for a fair annual interest return, even at an arbitrary rate of six percent, would require something closer to \$45 million. In short, it might be argued that present accounting practices understate the true cost of both capital recovery and return on investment.

An opposing argument with almost equal validity is that the "sunk" costs of building the Canal are no longer relevant, i.e., that it is not

appropriate to allow for any recovery of capital except for capital assets that actually require periodic replacement. There is no simple answer to the problem of measuring true economic costs for a facility as complex as the Canal and for which no external market value exists. The simple resolution is to accept the present accounting data as reasonable "best" estimates of present economic costs. This becomes the base for estimating costs associated with alternative traffic projections, as is done in the next section.

#### Net Economic Value, 1975-1985

It is easy to compute the expected volume of commercial traffic which would be associated with the \$185 million of sustainable revenue expected in 1975. It would be about 104 million long-tons. By contrast the actual transit volume in 1972 was 109 million tons. The theoretical shift to a higher toll structure leads to lower tonnage in 1975 in spite of a tendency for volume to grow over time. The total cost of Canal operations in 1972 was \$117.7 million; of this total \$17.4 million represents costs which are an integral part of transit operations, but which are billed and collected outside the toll system. Thus the cost of operating the facilities associated with commercial toll revenues was \$100.3 million.

The next step is to estimate the level of cost for 1975 which is analagous to the \$100.3 million figure for 1972. On the one hand, the actual tonnage transited in 1975 is expected to be lower than in 1972, by about 5 percent, and this should result in slightly lower operating costs. The evidence shows that variable costs — those which vary with traffic volume — account for about one-third of total cost, and on this basis a fall of 5 percent in tonnage, on average, should produce a cost saving of about \$1.6 million. On the other hand, the cost of operating the Canal is sensitive to changes in wage-rates, and between 1972 and 1975 net wages, after allowing for productivity growth, are likely to rise by somewhat more than the cost saving of \$1.6 million. Thus, an approximate measure of economic cost in 1975, with maximum tolls, would be about \$105 million. This gives \$80 million as a "best estimate" of the annual net economic value of the Canal in 1975, excluding transitory effects that can be expected to fade as traffic flows adapt.

Corresponding estimates for 1980 and 1985 can be developed in two ways. One way is to estimate costs for each of those years, but this approach

implies a forecasting precision which is unjustified. The alternative approach is to assume that the Canal's net economic value will rise at the same pace as its gross value, or 4.2 percent per annum. On this basis the estimates for 1980 and 1985, corresponding to the \$80 million estimate for 1975, are \$98 million and \$120 million. The figure for the decade 1975-1985 is about \$1 billion, or an average of \$100 million per annum, the final best estimate and the one which should be used in policy discussions.

#### Deriving Users Surplus

Users surplus, as defined earlier, is the difference between the maximum amount users would pay to use the Canal and what they would actually pay for a corresponding volume of transits, under the present toll structure. The first figure has already been estimated at \$185 million for 1975. The second figure can be estimated by applying the present level of tolls to the volume estimate of 104 million long-tons which would be associated with the maximum revenue figure of \$185 million — which amounts to \$92 million. Thus users surplus in 1975 is estimated at \$93. The corresponding estimates for 1980 and 1985 are \$117 and \$141 respectively.

#### IV. THE ECONOMIC IMPORTANCE FOR THE UNITED STATES

As indicated in the conceptual section of this report, the United States has three separate interests in the Panama Canal: it is the major user of the Canal, it is the sole owner and operator of the Canal, and finally the level of Canal tolls and traffic may affect the nation's output, employment and balance of payments.

##### Its Share of Users Surplus

Although the net annual economic value of the Canal to the world economy in 1975 is about \$80 million, the Users Surplus collectively enjoyed annually by the world is \$93 million. This should rise, as was just seen, to about \$141 million annually by 1985. For the 1975-85 decade as a whole, Users Surplus would thus be about \$1,170 million if present toll rates are maintained. What is the share of the United States in the Users Surplus currently being enjoyed by users? Alternatively, if toll rates are changed so as to capture all of the \$93 million for the PCC and its owner, how much would it cost U.S. users?

The answer to either question requires a basis for allocating the \$93 million among U.S. and non-U.S. users of the Canal. This, in turn, requires an answer to one of the least tractable problems in economics: who benefits if a tax on transportation is lowered and who suffers if it is raised?

Clearly, the "benefit" of users surplus now available because the Canal prices its services below full economic value accrues to one of three groups: those who purchase commodities that pass through the Canal, those who produce such commodities, or those who actually move the commodities from producers to purchasers. The difficult question concerns the proportions in which the three groups share the estimated benefit.

It is realistic and correct to simplify the issue by assuming that the shipping industry generally is sufficiently competitive that it is forced to pass on all of its potential share in the users surplus to either the producer or consumer groups, just as those same market pressures would

cause an increase in costs to be passed on. This leaves two groups — purchasers and producers — and the U.S. economy participates in Canal traffic in both capacities.

A rough estimate of the U.S. share in the available users surplus can be developed from overall commodity flow data. In 1972 about 109.3 million long tons of commercial traffic passed through the Canal. Of that total, the United States imported 26.9 million tons from the rest of the world, exported 40.1 million tons, and shipped 3.7 million tons between U.S. ports.

Assuming that half the users surplus benefitted buyers, and half the sellers, a rough estimate of the U.S. share in the available users surplus can be calculated. U.S. buyers bought 30.6 million tons of the cargo that transited the Canal, 26.9 million tons from foreign sellers, and 3.7 million from U.S. sellers. This was 28 percent of the total cargo shipped to buyers; so that the U.S. share of the buyers' half of the \$93 million users surplus estimated for 1975 would be \$13 million. Similarly, U.S. sellers accounted for 43.8 million tons (40.1 million to foreign buyers and 3.7 million to U.S. buyers) or 40 percent of the total tonnage; so that the U.S. share of the sellers' half of the users surplus would be \$18.6 million. Strictly on a tonnage basis, the U.S. share of the users surplus would be given by the sum of the two or about 34 percent. Thus for the estimated level of users surplus in 1975, \$93 million, the U.S. share would be about \$32 million.

A more refined approach to allocating the users surplus of \$93 million among U.S. and non-U.S. users would be to analyze individual commodity flows, assigning users surplus between buyers or sellers depending on demand and supply conditions prevailing in each particular market. This approach, using a judgmental partitioning of the estimated surplus for each commodity flow as between U.S. and non-U.S. beneficiaries, is described in Panama Canal Toll Rate Increase: Effects on the U.S. Economy, an earlier report by IRA. It yields results very close to the 34 percent estimate derived from the simpler, overall approach.

In summary, if the PCC were to raise tolls selectively to the optimal levels shown in Table 4, it could capture about \$93 million a year on a sustainable basis from users who now collectively enjoy a users surplus of this amount. Of this, \$32 million or 34 percent would be borne by U.S. users of the Canal. The remaining \$61 or so million would be paid by non-U.S. persons. The transitory windfall revenues realizable by the PCC during the period of adjustment are not included in these estimates.

## The United States as Owner of the PCC

Under existing policies, the United States, as owner of the PCC, derives no financial gain from Canal operations on balance, since revenues approximately equal costs. In theory, there are two alternative approaches available. One policy alternative would be to stay with the basic principle of pricing Canal services at a level just sufficient to recover total cost, but to redefine "cost." As redefined, "cost" would include: some or all of those sunk costs not now being amortized and hence not counted; and an appropriate rate of return on all unrecovered capital investment.

A second alternative would go further and price services at a level closer to the Canal's annual economic value, i.e., to capture for the owner the surplus now accruing to users. As estimated in a previous section, the amount involved is part of an additional \$93 million in 1975, rising to about \$141 million in 1985. (No feasible toll structure could capture all of the user surplus.)

Is this amount of money significant to the U.S. government? Probably not, but it is hard to think of any argument why U.S. taxpayers should be this generous to private users of the Canal, foreign or domestic. It is a policy question, however, to be answered by Congress. The most that can be done here is to point out that the value to the United States as owner is presently nil, and that it could be around \$35 to \$70 million annually over the next ten years through a more aggressive toll structure, with approximately 66 percent of the increase coming from non-U.S. persons.

## Impact on the Balance of Payments

The sale of PCC services, including transit services, to non-U.S. Canal users appears in the U.S. balance of payments as a demand for dollars, i.e., as an export-type item. To the extent these costs to non-U.S. persons are shifted forward to U.S. customers or backward to U.S. producers, the benefit to the U.S. balance of payments is reduced. Note the asymmetry here, because tolls paid directly by U.S. persons do not appear at all in the U.S. balance of payments unless they are shifted forward or backwards to non-U.S. persons. In the absence of contrary evidence, standard national income accounting procedures require that shipping costs be imputed to the importing country regardless of the appearance of who signs the check, the country of origin, or the nature of the commodity.

Following this convention, PCC transit charges on U.S. outbound and on foreign-to-foreign shipments would be imputed in balance of payments

accounting to non-U.S. countries, and thus the dollar amounts would appear in the U.S. balance of payments as an export item, i.e., as a demand for dollars. The other two categories of traffic, U.S. intercoastal and U.S. inbound, by this procedure have no impact on the U.S. balance of payments.

Tonnage data, already presented in this section, can be used to provide estimates of the actual balance of payments impact for 1972. Thus, about 72 percent of 1972 transit income of \$98.8 million, or \$71 million, can be imputed to non-U.S. persons, and thus represents a contribution to net U.S. exports. For 1975, the two toll estimates presented earlier, \$120 million (at present toll rates) and \$185 million (at maximum toll rates) would imply net U.S. exports of \$86 and \$133 million, respectively, using the 72 percent rule. But since the higher toll rates would have an asymmetrical impact on traffic adjustments, the best guess is that the latter number would be somewhat smaller, so the net differential, balance of payments effect from higher tolls would be not \$47 million but perhaps \$25-\$35 million. An improvement of that magnitude in U.S. export figures, and thus in the U.S. balance of payments, is too small to be significant in the light of the fact that U.S. exports of goods and services in 1973 were over \$100 billion. As a practical matter, one must conclude that Panama Canal tolls, while contributing positively to the demand for dollars, do not do so to a significant extent, not even when the larger, hypothetical maximum toll levels are considered.

Using a different method of analysis, one based on a commodity-by-commodity scrutiny of market conditions, International Research Associates in its Panama Canal Toll Rates Increases: Effects on the U.S. Economy (Palo Alto, 1972), gets essentially the same results for the balance of payment impact.

PCC operations affect the U.S. balance of payments in ways other than through tolls and shifting of transit costs. In particular, purchases by PCC of services and materials from non-U.S. sources are a balance of payments drain to the extent that the amounts are not respent in the United States or in the Canal Zone. The largest element here, of course, is the non-U.S. work force, about 10,000 people in 1972, with a wage bill of about \$62 million. No information is available on how much is respent on U.S. goods and services and thus the net negative effect cannot be determined. In the same way, although salaries to U.S. personnel are not balance of payment drains, those amounts

which U.S. employees spend outside the United States and outside the Zone, i.e., mainly in the Republic of Panama, are indeed a drain. Again, although no information exists for meaningful estimates, it can be said with confidence that all of these effects when added together show a net positive contribution to the demand for dollars, i.e., a positive balance of payments effect, although it must be remembered that it is not large enough in absolute terms, now or in the foreseeable future, to be significant within the larger context within which balance of payments phenomena must be judged.

#### Impact on the Domestic Economy

Increased toll payments would represent an addition to the U.S. Gross National Product since they are an increase in the value of a service (transiting the Canal) being sold. However, the increased value is in price, not volume. That is, the increase is in nominal rather than real product. For certain purposes this can be described by analogue with tax flows, but for this report this is unnecessary. Thus, to put empirical content in the elementary statement, raising toll revenues by the maximum possible amount, some \$93 million under the conditions described earlier, would increase the U.S. trillion dollar GNP only trivially. It is manifest that PCC revenue policies cannot be an instrument of general economic policy for the United States as far as domestic economic objectives are concerned simply because the magnitudes are too small.

This conclusion includes impacts on domestic U.S. employment, whether national or regional, since again changes in PCC policies would not have any significant impact on a civilian labor force of over 90 million persons. Even on the smaller figure of unemployment, some four million people this year, the impact would be trivial. These conclusions apply not only to initial, first-round effects but also to secondary effects through local industries and local labor markets, with the possible exception of the highly local and specialized group of Canal pilots. Easy verification can be made by comparing probable changes in traffic of particular commodities to and from the United States with actual production as reported in standard government publications.

A different question is to inquire about the total as opposed to the incremental importance of the Canal to the U.S. economy, again looking specifically at particular industries and labor markets. In dramatic and

extreme form, what would be the cost (using that word in a general and total form) to U.S. industry of a closing of the Canal? This is part of the question asked earlier about the net economic value of the Canal which is estimated to average \$100 million per annum for the decade 1975-1985. This is the outer limit of the loss if the Canal were to become unavailable to the world. The U.S. users share of this \$100 million flow is about 34 percent (derived earlier), or about \$34 million annually. That is, the value to the U.S. commercial users will average about \$34 million a year in the decade beginning in 1975. Again, when compared to the size of using industries, the Canal is of limited importance in dollar terms. This measurement, of course, is at the new equilibrium position, after users have had the opportunity to find alternatives: in the shorter term, the economic value (i.e., the loss associated with dislocations) can temporarily be higher than this. Employment effects are even more diffused than direct industry effects, groups such as Panama Canal pilots aside.

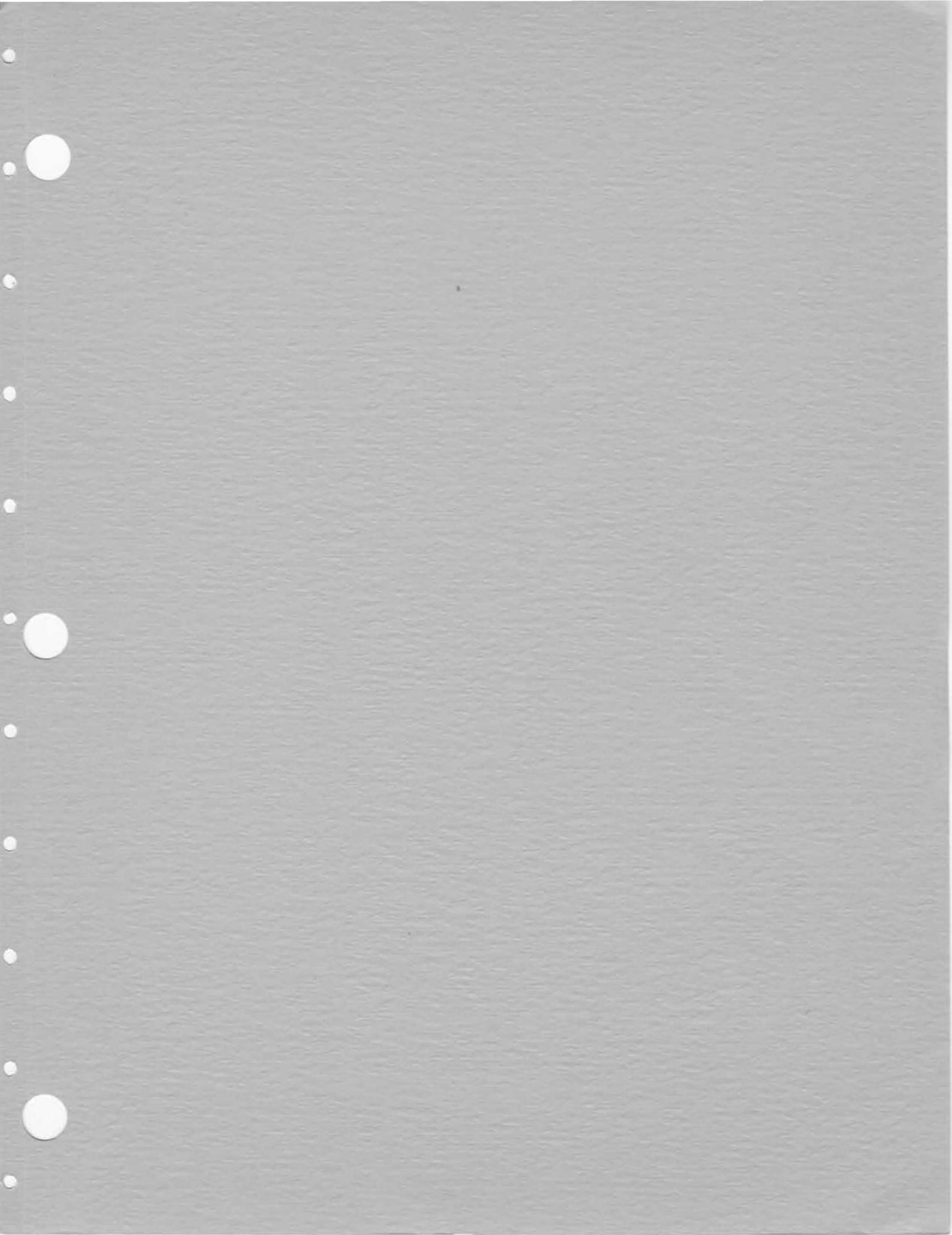
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In summary, the Panama Canal is a major interocean facility through which about 530 million dollars of capital (at book value) and over 10,000 employees provide world commerce with specialized transit services at a toll cost of just over \$100 million in 1972. The estimated value of these services is around \$185 million a year and can be expected to rise to around \$280 million by 1985.

Over the past half century the existence of the Canal has had a significant effect on the volume and pattern of world production and trade. However, the relative impact of the Canal must be measured against the even larger backdrop of total world output and trade. In particular it must be measured against the capacity of the world to adapt to changing technology, markets and costs. In this larger context, the long-run economic role of the Canal will continue to be important, but it cannot in any sense be regarded as either overwhelming or crucial. The empirical estimates of the annual economic value of the Canal derived by the present study both reflect and illustrate this point.

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OFFICE OF THE SECRETARY OF DEFENSE  
WASHINGTON, D. C. 20301

16 APR 1976

MEMORANDUM FOR THE DEPUTY ASSISTANT TO THE PRESIDENT FOR NATIONAL  
SECURITY AFFAIRS

SUBJECT: Panama Canal Treaty Negotiations

In response to your query concerning the Panama Canal Treaty Negotiations, the following information and comments are provided:

Strategic Importance of the Panama Canal. During February 1974, the Joint Chiefs of Staff initiated a study (attachment 1) on the strategic importance of the Panama Canal. The study concluded that:

a. The Panama Canal is a major defense asset, the use of which is necessary to enhance U.S. capability for timely reinforcement in Asia and Europe during periods of conflict. Its strategic advantage lies in the economy and flexibility it provides to accelerate the shift of military forces and logistic support by sea between the Atlantic and Pacific Oceans and to overseas areas.

b. A lock canal or a new sea-level canal will continue to be of importance to national security.

c. Panama has the capability to threaten the Panama Canal itself, but the probability of such action is low at present.

d. A potential threat will continue to exist to the longer alternate ocean lines of communication around Africa and South America. At the present time, the Soviet Union is considered the only nation with such a capability.

The strategic importance of the Panama Canal is under constant review; nonetheless, it is considered that the conclusions of this study remain valid.

Military Necessity for Negotiating a New Treaty with Panama.

A U.S. unilaterally operated and defended Canal is an anachronism in the modern world. To attempt to protect the Canal in a highly probable confrontation with Panama, should negotiations fail,

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SUBJECT TO GENERAL DECLASSIFICATION SCHEDULE OF  
FIVE ORDER 11652. AUTOMATICALLY DOWNGRADED  
AT TWO YEAR INTERVALS. DECLASSIFIED ON 31Dec84

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Sec Def Cont Mr. X- 1191



would require the deployment of thousands of U.S. troops to Panama (thereby invoking the requirements of the War Powers Resolution), would likely result in loss of lives on both sides, and most importantly, would not necessarily guarantee the safety or effective use of the Canal itself. A new treaty relationship with Panama which provides for the participation of Panama in the defense of the Canal will give us the best defense possible.

A new treaty relationship which provides for eventual assumption of operating responsibilities by Panama, coupled with a program of increasing participation of Panamanian management and full guarantees of continued efficient, non-discriminatory transit of U.S. ships at reasonable tolls will result in a partnership that could best insure U.S. strategic interests in the Panama Canal.



M. Stator Holcomb  
Rear Admiral, USN  
Military Assistant

Attachment  
a/s

APPENDIX

THE STRATEGIC MILITARY IMPORTANCE OF THE PANAMA CANAL (U)

A. General

1. (U) The Panama Canal is of military importance to the United States because of its ability to facilitate the movement of military forces between the Atlantic and Pacific Oceans. Ships which pass through the canal avoid the long interoceanic route around Cape Horn and save about 30 days of transit time. The canal was built to serve world trade and US national security. It was a logical step in the growing military and economic power of the United States and was justified on the basis of national interest.

2. (U) Since it was opened in 1914, the Panama Canal has contributed significantly to US security. During World War II, 14,000 vessels, including warships and troop and cargo carriers, passed through the canal. More than 3,300 ships carrying 12 million tons of supplies transited the canal in support of UN Forces during the Korean conflict. The canal served military operations in the Southeast Asia conflict as well. For example, during FY 1968, cargo shipped through the canal in support of US efforts in Southeast Asia was about 7.2 million tons or about 6.8 percent of the total annual cargo tonnage transiting the canal.

3. (U) The Panama Canal makes a major contribution to US strategic mobility, but it is too narrow to permit the passage of aircraft carriers and large tankers. This restriction impacts unfavorably on the facility with which these vessels can be moved between the Atlantic and Pacific Oceans.

Classified by Director, J-5  
SUBJECT TO GENERAL DECLASSIFICATION  
SCHEDULE OF EXECUTIVE ORDER 11652  
AUTOMATICALLY DOWNGRADED AT TWO  
YEAR INTERVALS  
DECLASSIFIED ON DECEMBER 31, 1982

KBH 7/5/89



B. Military Force Deployment and Logistic Support

4. (S) Current US defense strategy relies to an extent on the use of the Panama Canal for the timely surface deployment/redeployment and support of US Forces in the conduct of both European and Pacific operations. The denial of the canal in either case could cause delays and could necessitate changes in the implementation of national strategy.

5. (U) The logistic support requirements for military operations have steadily increased to present levels. Ocean shipping accounts for the vast majority of total overseas deliveries. The volume of the world's ocean cargo tonnage transiting the canal since World War II has been relatively stable. However, during periods of conflict (Korea and Southeast Asia), its increase was highly significant.

6. (U) If the ocean traffic noted above had been denied the use of the Panama Canal and routed around Cape Horn or the Cape of Good Hope, the distance and steaming time would have been significantly increased. Therefore, the advantage of a shorter sea route through the Panama Canal represents not only a monetary saving but an enhancement to the timely delivery of critical supplies in support of allies and deployed US Forces.

7. (S) The military utility of the Panama Canal during wartime under full mobilization conditions can be illustrated by comparison of projected US sealift delivery capabilities in scenarios assuming both the canal opened and closed.

✓  
|  
a. Far East Conflict. For the Far East deployment scenario, loss of the Panama Canal seriously aggravates US delivery capability. Cargo outloaded from the east and gulf coast ports would require more than 1,200 transits through the canal. Canal closure would add nearly 14,000 miles and 30 days to each round trip between Korea and east coast

CONUS ports. With the canal closed during the initial 180- 1  
day period, significant amounts of critical cargo would not 2  
reach the theater of operations within that timeframe. By 3  
about D+45, most surface deliveries of equipment and supplies 4  
to Korea would begin to exhibit the impact of canal closure, 5  
particularly in POL and ammunition. Outloading constraints 6  
at the single west coast ammunition port and the proximity 7  
of ammunition origins to the three east coast ports forces 8  
about 75 percent of the sealifted ammunition to be outloaded 9  
at the east coast ammunition ports. A major source of POL 10  
for support in Korea is in the Caribbean. Therefore, a re- 11  
quirement to reroute tankers around South America for onloads 12  
of POL at Aruba and at the eastern CONUS ports would add a 13  
delay due to the increased distance. The tables and charts 14  
in the Annex hereto illustrate the impact of Panama Canal 15  
closure on cargo deliveries for the Far East conflict. 16

b. European Conflict. Loss of the canal would have 17  
considerably less impact on the logistic support of a 18  
European conflict than a Far East conflict. However, 19  
delivery capability with the canal closed would be lessened 20  
in the early period of the conflict due to increased transit 21  
time for repositioning. This could well be a critical 22  
time period in the European conflict scenario. 23

c. Military Importance of Canal Expansion Options 24

8. (U) Feasible options for canal expansion are the construction 25  
of a third set of locks for the present canal or the construction 26  
of a sea-level canal. A third set of locks would not permit 27  
transit of aircraft carriers and large tankers. However, the 28  
addition of a third set of locks would increase the annual 29  
transit capacity by approximately 8,000 ships. Third locks 30  
construction would not reduce the vulnerability of the lock 31  
canal to interruption by military attack or sabotage. 32

9. (U) A sea-level canal would contribute to US national security by facilitating the movement and support of forces in wartime. Ship passage would be faster, and it could accommodate larger vessels, thus speeding intertheater deployment/redeployment and support of US Forces.

10. (U) The lesser vulnerability to certain threats of a sea-level canal over a lock canal is a distinct advantage in canal defense planning and execution.

11. (U) A sea-level canal would help satisfy the continuing requirement to shift military power to meet changing situations and threats as well as the need for logistic support by sea to overseas forces during peacetime and wartime.

D. Threats Associated with the Panama Canal

12. (S) Potential for Interdiction of Approaches to the Canal and Sea Routes Around Africa and South America by Hostile Naval Forces and Land-Based Aircraft. Alternate trade routes around the Cape of Good Hope and Cape Horn, now used by ships too large to pass through the canal and which would be used by other ships if the canal were closed, will continue to be subject to potential interdiction. The Soviet Union is considered to be the only nation with a capability to pose a potentially effective interdiction threat to these routes. The Soviets could threaten shipping in the Caribbean Sea as well but at the cost of more vulnerability to themselves. The major deterrent to Soviet interdiction operations would be the transit distance from Soviet bases and the resultant requirement for mobile logistic support in a sustained interdiction effort. A limited capability of the Soviet Union to interdict the sea routes around Africa and South America adds to the strategic importance of the only alternate east-west sea route--the Panama Canal.

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E. Panama's Capability for Threatening the Canal

13. (S) Three possible threats to the canal from Panama are:  
(a) a conventional attack by the Panamanian National Guard;  
(b) mob violence directed at the canal; and (c) sabotage efforts.

a. Conventional Attack. The 7,135-man National Guard is an internal security force which also has a military mission. It would face critical problems if required to operate in a military role because of its police orientation, small size, and unsophisticated weaponry. Only 10 small tactical units, with a total of approximately 1,100 men, are trained and equipped for conventional warfare. The National Guard might achieve a temporary initial advantage by a surprise attack on US installations in the Canal Zone, but it could not cope with US defensive forces. Furthermore, hostile action would probably be detected in advance by US elements and quickly neutralized. In any event, an overt conventional attack by the National Guard on the canal itself or vital canal facilities is unlikely.

b. Mob Violence. The Panamanian Government is capable of promoting anti-US demonstrations and mob violence against the Canal Zone. Such action, however, would likely be directed against US military or Canal Zone facilities rather than the waterway.

c. Sabotage. The Panama Canal is vulnerable to sabotage because its banks and vital installations are largely unguarded. A group, or even an individual, could disrupt operations or close the canal by damaging one or more lock components or by causing a landslide at a vital point. A ship could be scuttled in a lock or other vital location, or a lock gate could be damaged by mines or other type explosive from a transiting vessel. By damaging a sensitive spillway,

Gatun Lake could be lowered to a level preventing canal passage for about 1 year to vessels of more than 25-foot draft. Damage resulting in a draining of the lake could close the canal for as long as 2 years. In spite of this vulnerability, however, sabotage by Panamanians would be more likely directed against other US facilities in the Canal Zone rather than the canal or its vital installations.

14. (S) Potential Threat to the Canal from a Possible Leftist-Oriented Government in Panama. Panama may continue to experience a degree of political instability and activism by radical student groups and Communist factions, but an extreme leftist government is unlikely in the foreseeable future. In any event, hostile anti-American actions by pro-leftist groups would probably be directed against US military and commercial facilities in the Canal Zone rather than the canal or installations vital to canal operation.

15. (S) The Military Risks of a Power Vacuum in Panama Should the United States Withdraw. A hypothetical withdrawal of the United States from the Canal Zone would not likely create a power vacuum. Considering Panamanian nationalism, it is most unlikely that another foreign power could easily step into the breach created by a US withdrawal. More likely, Panama itself would, in the short term, occupy the vacuum even though the National Guard, in its present state, could not simultaneously protect the canal and key Panamanian facilities against widespread insurgency. Presently, the United States does not intend to withdraw military protection of the Panama Canal for the duration of any treaty which may be negotiated with Panama. Therefore, any consideration of a power vacuum at this time would appear premature.

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F. Conclusions

16. (U) The Panama Canal is a major defense asset, the use of which is necessary to enhance US capability for timely reinforcement in Asia and in Europe during periods of conflict. Its principal strategic military advantage lies in the economy and flexibility it provides to accelerate the shift of military forces and logistic support by sea between the Atlantic and Pacific Oceans and to overseas areas.

17. (U) A lock canal or a new sea-level canal will continue to be of importance to national security.

18. (S) Panama has the capability to threaten the Panama Canal itself, but the probability of such action is low at present.

19. (S) A potential threat will continue to exist to the longer alternate LOCs around Africa and South America. At the present time, the Soviet Union is considered the only nation with such a capability.

MILLIONS OF SHORT TONS

Chart 1

TOTAL CARGO MOVEMENT FOR KOREAN DEPLOYMENT

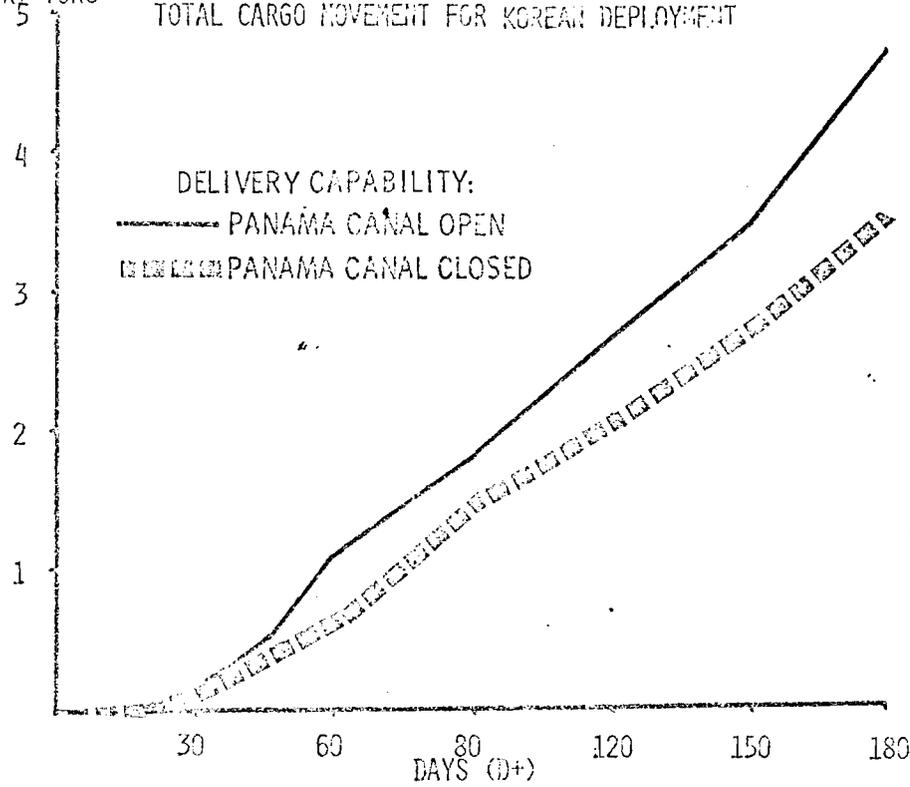


Table 1

Total Cargo Deliveries

KOREAN Deployment (Short Tons)

<u>By D+</u>	<u>Canal Open</u>	<u>Canal Closed</u>	<u>Difference</u>
10	43,742	43,742	0
20	104,108	102,343	-1,765
30	197,405	198,352	+1,027
45	526,455	334,981	-191,474
60	1,071,459	688,346	-383,113
75	1,424,409	1,163,651	-260,758
90	1,780,992	1,507,549	-273,403
120	2,658,970	2,141,054	-517,906
150	3,392,512	2,855,600	-536,912
180	4,703,905	3,530,713	-1,173,192

Chart 2

AMMUNITION MOVEMENTS FOR KOREAN DEPLOYMENT

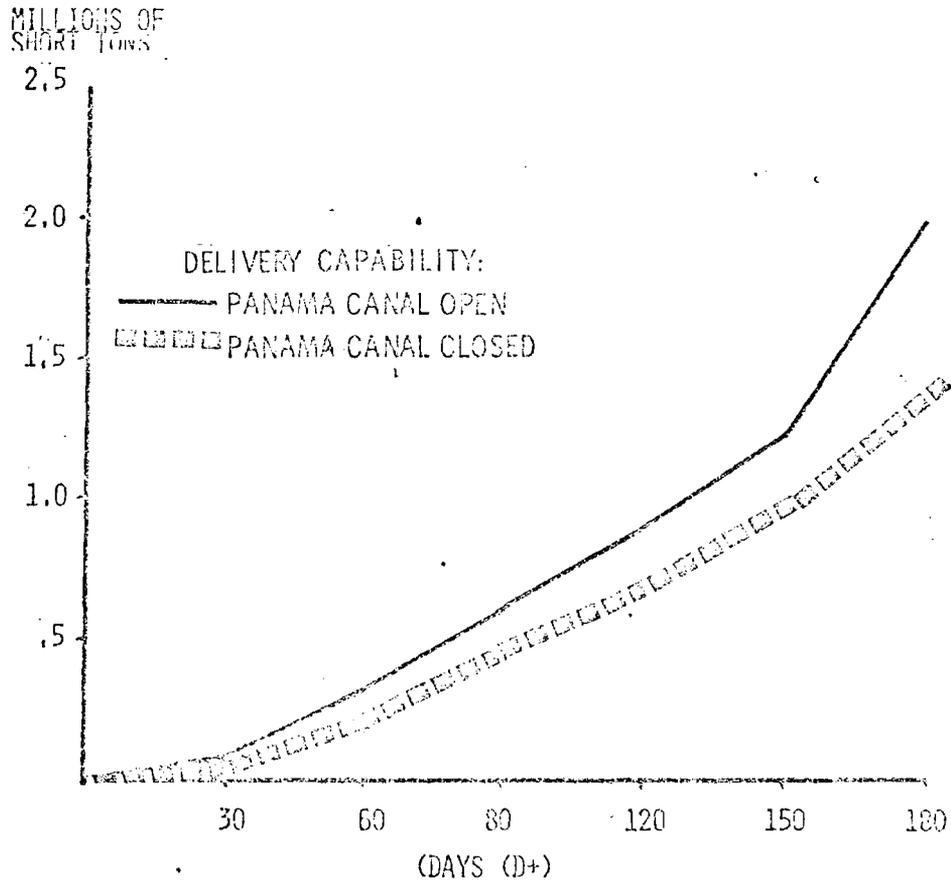


Table 2  
KOREAN Deployment (Short Tons)

By D+	Canal Open	Canal Closed	Difference
10	531	531	0
20	531	531	0
30	2,614	2,621	+7
45	96,959	13,603	-83,356
60	245,044	137,153	-107,891
75	422,260	310,471	-111,789
90	522,152	485,429	-36,723
120	821,330	646,604	-174,726
150	1,189,902	920,924	-268,978
180	1,881,754	1,182,867	-698,887

BULK POL MOVEMENT FOR KOREAN DEPLOYMENT

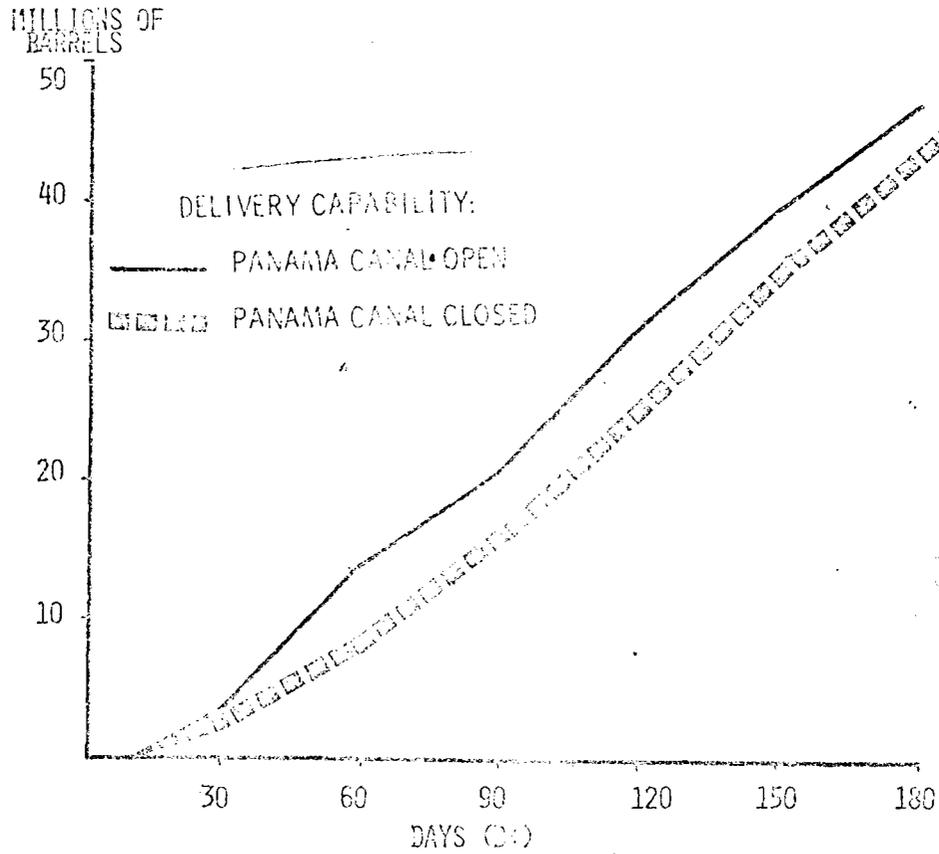


Table 3

KOREAN Deployment (Thousands of Barrels)

<u>By D+</u>	<u>Canal Open</u>	<u>Canal Closed</u>	<u>Difference</u>
10	0	0	0
20	2,153	2,153	0
30	6,640	3,423	0
45	12,727	8,338	-3,211
60	16,645	14,061	-4,389
75	20,541	16,655	-2,584
90	30,646	25,498	-3,986
120	38,841	34,038	-5,148
150	45,186	42,779	-4,803
180			-2,407



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## The Sovereignty and Ownership Question

Statements have been made recently that the Canal Zone is just like Alaska and Louisiana. But the status of the Canal Zone is far more complex than that.

France "ceded" sovereignty over the Louisiana Territory to the U.S.

Russia "ceded" Alaska to the U.S.

But Panama did not cede the Canal Zone to us. Rather, it granted us the "use, occupation, and control of the Zone for the Construction, operation, and maintenance and protection of the Canal." Further, it granted to the U.S. administrative "rights, power, and authority within the [Canal Zone] which the U.S. would possess and exercise if it were the sovereign."

Now just how these rights should be characterized legally is a complex question. But it is clear that to assert that the Canal Zone is just like Alaska or Louisiana is simply incorrect.

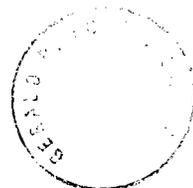
Our international treaties and agreements with Panama place continuing restrictions and obligations on us, and have been amended and revised through previous negotiations with Panama. This is clearly not the case with respect to Alaska or Louisiana. We are obligated by treaty to make a payment to Panama each year as compensation for our rights in the Canal Zone. We are obligated by treaty not to permit the establishment of private businesses in the Canal Zone

unless they have a direct relation to the operation, maintenance, or protection of the Canal. Residence in the Canal Zone is restricted by treaty to persons actually employed there. If a person is no longer employed in the Zone, he and his family must promptly move out. The U.S. has no such continuing obligations to France or Russia with respect to Alaska or Louisiana, nor have we entered into new agreements concerning those territories.

Leaving aside its international status, the U.S. has treated the Canal Zone quite differently from Louisiana or Alaska as a domestic matter.

The U.S. Supreme Court has considered the Canal Zone to be U.S. territory for some purposes, and to be foreign territory for others. I am not aware that the Supreme Court has ever treated Alaska or Louisiana as foreign territory for any purpose.

The Congress of the United States has treated the Canal Zone both as U.S. territory and as foreign territory. Under U.S. law, children born in the Canal Zone are not U.S. nationals unless one of their parents happens to be an American. U.S. statutes define the Canal Zone as a foreign territory for purposes of applying U.S. Customs duties. Again, I doubt that the Congress would consider a State of the United States to be foreign territory for any purpose.



Thus, it is clear that whatever its precise legal status, the Canal Zone is treated substantially different from Alaska or Louisiana or other territory of the U.S.

The courts treat it differently.

Congress treats it differently.

Our international agreements and treaties give it a very different status.

In practice and in law it is an area which is devoted to the operation, maintenance, and defense of the Panama Canal. It can have no permanent population nor any commerce or industry apart from activities related to the Canal.

Thus, it is our national interest in the Panama Canal that we are seeking to protect through our negotiations with Panama. We have no independent interest in the Canal Zone.

To say that altering our arrangements with Panama in any way would be like giving Alaska back to Russia or Louisiana back to France is to ignore both the facts and the real issue involved. That issue is how we can best protect our future interests in the Panama Canal. We have no interest in maintaining the status quo for its own sake.

## International Agreements:

Alaska and Louisiana were "ceded" to the U.S. without any continuing obligations or restrictions.

The 1703 Convention of Cession of Louisiana from France to the United States reads as follows: "the first Consul of the French Republic does hereby cede to the...U.S. forever and in full sovereignty the...territory with all its rights and appurtenances..." That Convention also includes articles which place all public lands in the cession, which provide that all archives, papers, and documents relative to the sovereignty shall be transferred to U.S. possession and which provide that all inhabitants shall enjoy the rights, privileges and immunities of U.S. citizens.

The 1867 cession of Alaska from Russia to the U.S. is stated as follows:

"The Emperor of all Russia agrees to cede to the U.S. by this Convention, immediately upon ratifications thereof, all the territory and dominions now possessed by His Majesty on the Continent of America and the adjacent islands." ...Cession hereby made conveys all rights, franchises and privileges now belonging to Russia in the said territory."

That instrument also had provisions for the inclusion of all public lands in the cession and for the enjoyment of the inhabitants of all rights and privileges of U.S. citizenship unless they elected to return to Russia within three years.

Neither the Alaska or Louisiana cessions provided for a continued annuity as part of the form of payment.

With respect to the Canal Zone, however, the U.S. was granted the use, occupation and control of the Canal Zone in perpetuity under Article II. Article III states:

"The Republic of Panama grants to the U.S. all the rights, power and authority within the zone mentioned and described in Article II of this Agreement and within the limits of auxilliary lands and waters mentioned and described in said Article II which the U.S. would possess and exercise if it were the sovereign of the territory within which said lands and waters are located to the entire exclusion of the exercise by the Republic of Panama of any such sovereign rights, power or authority."

Article XIV of the 1903 Treaty reads as follows:

"As the price or compensation for the rights, powers and privileges granted in this convention by the Republic of Panama to the United States, the Government of the United States agrees to pay to the Republic of Panama the sum of ten million dollars (\$10,000,000) in gold coin of the United States on the exchange of the ratification of this convention and also an annual payment during the life of this convention of two hundred and fifty thousand dollars (\$250,000) in like gold coins, beginning nine years after the date aforesaid.

The provisions of this Article shall be in addition to all other benefits assured to the Republic of Panama under this convention.

But no delay or difference of opinion under this Article or any other provisions of this treaty shall affect or interrupt the full operation and effect of this convention in all other respects."

The annuity to Panama was increased in Article VIII of the 1936 Treaty of Friendship and Cooperation to \$430,000. It was again increased in Article I of the 1955 Treaty of Mutual Understanding and Cooperation to \$1,930,000.

The 1936 Treaty of Friendship and Cooperation imposed conditions on the United States concerning persons who could reside in the Canal Zone and businesses which could be established.

Section (2) of Article III of the 1936 Treaty restricted residency in the Canal Zone as follows:

"(2) No persons who is not comprised within the following classes shall be entitled to reside within the Canal Zone:

(a) Officers, employees, workmen, or laborers in the service or employ of the United States of America, the Panama Canal or the Panama Railroad Company, and members of their families actually residing with them;

(b) Members of the armed forces of the United States of America and members of their families actually residing with them;

(c) Contractors operating in the Canal Zone and their employees, workmen and laborers during the performance of contracts;



(d) Officers, employees, or workmen of companies entitled under Section(5)of this Article to conduct operations in the Canal Zone;

(e) Persons engaged in religious, welfare, charitable, educational, recreational and scientific work exclusively in the Canal Zone;

(f) Domestic servants of all the beforementioned persons and members of the families of the persons in classes (c) (d) and (e) actually residing with them."

Section (5) of Article III of the 1936 Treaty restricted the establishment of new private business enterprises within the Canal Zone as follows:

"(5) With the exception of concerns having a direct relation to the operation, maintenance, sanitation or protection of the Canal, such as those engaged in the operation of cables, shipping, or dealing in oil or fuel, the Government of the United States of America will not permit the establishment in the Canal Zone of private business enterprises other than those existing therein at the time of the signature of this Treaty."

## U.S. Courts

The U.S. courts have considered the Canal Zone to be U.S. territory for some purposes and foreign territory for others.

The U.S. Supreme Court in the case Wilson v. Shaw (204 US 24 (1907)) considered the Canal Zone to be a territory of the U.S. for the purposes of enabling the Federal Government to expend U.S. funds for the construction of an interoceanic ship canal.

Similarly, in the case of U.S. v. Husband R. (Roach), 453 F. 2d 1054 (1971), Cert. Den. 406 U.S. 935 (1972) the Fifth Circuit Court of Appeals equated the Canal Zone with territory of the U.S. for the purpose of authorizing the Governor of the Zone to regulate traffic conditions within the Zone.

However, in the case of Luckenbach S.S. Co. v. United States (280 U.S. 173, 1929), the Supreme Court decided that ports in the Canal Zone should continue to be regarded as foreign ports for purposes of the transportation mail. In that case, Chief Justice Taft said that "whether the grant in the [the 1903] treaty amounts to a complete cession of territory and dominion to the U.S. or is so limited that it leaves at least titular sovereignty in the Republic of Panama is a question which has been the subject of diverging opinions...."



## U.S. Statutory Law

The Congress has considered the Canal Zone as territory of the U.S. for some purposes and as foreign territory for others.

The Congress in 1912 extended to the Canal Zone the laws of the U.S. relating to extradition and the rendition of fugitives from justice (36 Stat. 569). That Act declared that for such purposes "and such purposes only" the Zone should be treated as an organized territory of the U.S.

On the other hand, in 1905 the Congress enacted a provision which treated the Canal Zone as foreign territory for customs purposes.

Chapter 1311 of 33 Stat. 843 reads as follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,  
That all laws affecting imports of articles, goods, wares, and merchandise and entry of persons into the United States from foreign countries shall apply to articles, goods, wares, and merchandise and persons coming from the Canal Zone, Isthmus of Panama, and seeking entry into any State or Territory of the United States or the District of Columbia."

In 1916, the Congress provided that laws of the U.S. relating to seamen of vessels of the U.S. "on foreign voyages" should apply to seamen of all vessels of the U.S. when in the Canal Zone. (39 Stat. 529).

The Congress has not treated the Canal Zone as a territory of the United States for purposes of the citizenship of children born there. Children born within the U.S. or

its territories are automatically citizens of the U.S. regardless of the citizenship of their parents, except for children born to persons present in the U.S. in diplomatic status. Children born in the Canal Zone are not citizens of the U.S. unless one of their parents is a U.S. citizen.

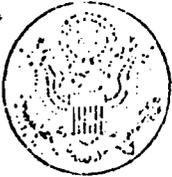
8 USC 1403 provided as follows:

"§1403. Persons born in the Canal Zone or Republic of Panama on or after February 26, 1904.

(a) Any person born in the Canal Zone on or after February 26, 1904, and whether before or after the effective date of this chapter, whose father or mother or both at the time of the birth of such person was or is a citizen of the United States, is declared to be a citizen of the United States.

(b) Any person born in the Republic of Panama on or after February 26, 1904, and whether before or after the effective date of this chapter, whose father or mother or both at the time of the birth of such person was or is a citizen of the United States or by the Panama Railroad Company, or its successor in title, is declared to be a citizen of the United States."





DEPARTMENT OF STATE

Washington, D.C. 20520

Honorable Gene Snyder  
House of Representatives  
Washington, D. C. 20515

Dear Mr. Snyder:

Thank you for your letter of November 14 regarding my recent briefing of the Republican Conference on the Status of the Panama Canal Treaty Negotiations.

As you note, following my remarks your assistant and I had an interesting discussion concerning the legal status of the Canal Zone. The Office of the Legal Adviser has provided the following information in response to the questions concerning that subject which are raised in your letter.

Article II of the 1903 Treaty grants to the United States "the use, occupation and control" of the Canal Zone, and Article III authorizes the United States to exercise therein "all the rights, power and authority . . . which it would possess and exercise if it were the sovereign of the territory . . . to the entire exclusion of the exercise by the Republic of Panama of any such sovereign rights, power or authority." The question posed is whether this grant of rights had the effect, under international law, of transferring the territory comprising the Canal Zone from Panamanian sovereignty to that of the United States. In other words, is the international legal status of the Canal Zone that of Panamanian or of United States territory?

It is clearly established under international law that a state may grant to a foreign state the right to exercise exclusive sovereign powers within portions of its territory without effecting a cession of its own sovereignty over that territory. For example, during the latter part of the 19th Century China's leases of naval bases to France, Germany

and Russia included grants to the lessees of rights to exercise sovereign powers within the leased areas. (I MacMurray, *Treaties and Agreements with and Concerning China, 1894-1919*, at 112, 119, and 128). Similarly, Article III of the U.S.-Cuba Agreement of February 16, 1903 relating to Guantanamo Naval Station provides:

"While on the one hand the United States recognizes the continuance of the ultimate sovereignty of the Republic of Cuba over the above described areas of land and water, on the other hand the Republic of Cuba consents that during the period of the occupation by the United States of said areas under the terms of this agreement the United States shall exercise complete jurisdiction and control over and within said areas..." (TS 418; 6 Bevans 1113).

A more recent example of one nation being granted sovereign rights within the territory of another is found in Article III of the Treaty of Peace with Japan (3 UST 3169; BEAS 2490) which authorized the United States to "exercise all and any powers of administration, legislation and jurisdiction over the territory and inhabitants of [the Ryukyu and Daito islands]" while Japan retained what Secretary Dulles termed "residual sovereignty"\* over those areas. (The rights of the United States under Article III were terminated by the U.S.-Japan Treaty of June 17, 1971).

With respect to the Canal Zone, the United States has consistently recognized that Panama retains "titular" sovereignty over the area.

"...The truth is that while we have all the attributes of sovereignty necessary in the construction, maintenance, and protection of the Canal, the very form in which these attributes are conferred in the treaty [of 1903] seems to preserve the titular sovereignty over the Canal Zone in the Republic of Panama... (Letter from Secretary of War William H. Taft to President Theodore Roosevelt, January 12, 1905.)

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\* Conference for the Conclusion and Signature of the Treaty of Peace with Japan: Record of Proceedings 78 (Department of State Pub. 4392 ((1951)).



In essence, while the United States acquired extensive treaty rights to use the Canal Zone and to exercise sovereign powers within it, the area technically remains part of the territory of the Republic of Panama.

"The rights of the United States in the Panama Canal Zone offer an example of the most complete transfer of jurisdiction over a territory without its being a cession in the technical international law sense..." (Vali, *Servitudes of International Law* (2d ed., 1958) 254.)

This distinction between the right to exercise jurisdiction within the Zone area and its international status was recognized in Article III of the Treaty of Friendship and Cooperation of March 2, 1936 (53 Stat. 1807; TS 948), which refers to the Zone as "territory of the Republic of Panama under the jurisdiction of the United States." (This is the provision I mentioned to which you refer in your letter.)

Perhaps the most clear description of the nature of the rights the U.S. acquired in the 1903 treaty is that of M. Phillipe Bunau-Varilla, the principal drafter of the document:

"I decided to grant to the United States, in the Interior of the zone, all rights, power and authority that she would have if she were sovereign, to the entire exclusion of the use of any such rights, power and authority by the sovereign Republic of Panama.

The United States, without becoming the sovereign, received the exclusive use of the rights of sovereignty, while respecting the sovereignty itself of the Panama Republic," (Italics in original.) (Bunau-Varilla, *From Panama to Verdun* (1940) 158.)"

With respect to the domestic law of the United States, the Canal Zone has been treated in various ways for the purpose of defining the applicability to the Zone of specific legislative provisions. For example, the Canal Zone is considered to be an organized territory of the U.S. for purposes of extradition (37 Stat. 569, 48 USC 1330). On the other hand, it is treated as foreign territory for purposes of customs duties (33 Stat. 843, 19 USC 126) and its ports are considered foreign ports for purposes of the transportation of mail (Luckenbach Steamship Co. v. U.S. 280 U.S. 173 (1930)).



Thus, U.S. domestic legislation and court decisions would not appear to provide a basis for any definitive conclusions with respect to the international status of the Canal Zone, nor are they intended to. Rather, such definitions are made for the sole purpose of extending the effect of a specific provision of U.S. law to the Canal Zone or of exempting the Zone from its application.

The often cited case of Wilson v. Shaw (204 U.S. 24 (1907)) must be considered in this context. That case was taken to the Supreme Court by a taxpayer who maintained that the Federal Government could not continue to expend funds lawfully for the construction of an interoceanic ship canal in Panama. He sought an injunction against any further expenditures on the grounds that the U.S. did not have a sufficient legal interest in the Canal Zone to authorize the expenditure of tax money there. The Supreme Court held that the Federal Government did have broad enough power to encompass expenditure of funds for the construction of the Canal and refused to issue an injunction. In speaking of the legal interest of the U.S. in the Zone, the Court said,

"It is hypercritical to contend that the title of the United States is imperfect, and that the territory described does not belong to this Nation, because of the omission of some of the technical terms used in ordinary conveyances of real estate."

Thus, the Supreme Court did equate the Canal Zone with territory belonging to the United States, but in the context of establishing the authority of the Federal Government to expend funds and to engage in construction work in the Zone. As noted above, the Court has subsequently held the Zone to be foreign territory for other purposes (Luckenbach Steamship Co. v. U.S. (280 U.S. 173 (1930)), and such interpretations of the status of the Canal Zone under domestic U.S. law for the purpose of determining the applicability of specific statutes therein are not determinative as to its international status.

I hope this information respecting the legal status of the Canal Zone is responsive to your questions. I should add, however, that in my judgment the fundamental question which must be addressed in considering whether a new treaty with Panama is desirable is not that of sovereignty. Rather, the question is whether a new treaty would or would not serve

United States interests. The fact that the United States has consistently recognized that the Canal Zone remains territory of the Republic of Panama is no argument in favor of altering our existing treaty relationship with that country. Rather, it is the judgment that that relationship is no longer suited to protecting United States commercial, military and foreign relations interests which has led the United States to enter into negotiations with Panama.

Ambassador Bunker, General Dolvin and I would welcome further opportunities to exchange views on the Canal Negotiations with you. Mr. Kozak of the Office of the Legal Adviser, who is serving as Assistant Negotiator in the Panama Negotiations, is prepared to meet with members of your staff concerning the legal aspects of the matter, should you consider that desirable.

Sincerely,

S. Moxey Bell  
Minister  
Deputy United States  
Negotiator



CONGRESS OF THE UNITED STATES  
HOUSE OF REPRESENTATIVES  
WASHINGTON, D.C. 20515

November 14, 1975

Mr. Morey Bell  
Deputy Negotiator  
Panama Canal Sector  
Department of State  
Washington, D. C.

Dear Mr. Bell:

At the Republican Conference briefing yesterday, in answer to a question by my assistant as to why the State Department could say the Canal Zone is Panamanian territory -- especially in view of the 1907 Supreme Court decision in Wilson v. Shaw -- you said it is because of the terms of the 1936 treaty which is the law of the land, and that the State Department has legal opinions to this effect.

I am not aware of any language in the 1936 treaty, nor is anyone else of my acquaintance, which could provide a basis for opinions you referred to, that would repudiate the perpetual grants to the U.S.A. by Panama of territorial sovereignty over the Canal Zone, or overturn the above-mentioned decision which specifically stated:

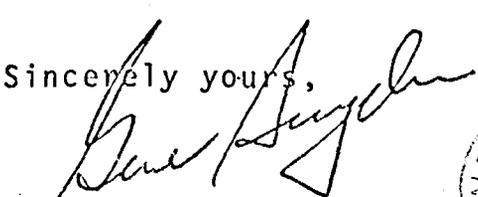
"It is hypercritical to contend that the title of the United States is imperfect, and that the territory described does not belong to this Nation..."

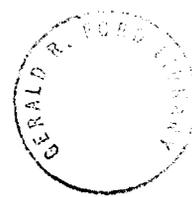
On the contrary, in my opinion, Article II of the 1936 Treaty serves to reinforce that original grant.

Because the State Department's rejection of U. S. sovereignty over the Canal Zone is central to the new treaty it proposes, and to the Congressional debates over that treaty which recently have taken place, and will continue to rage, it is vital that you promptly furnish me with a copy of the legal opinion or opinions to which you referred yesterday.

I will be most grateful for your immediate attention and compliance with this request.

Sincerely yours,

  
Gene Snyder



GS:mjn

November 28, 1971

## Ownership of the Canal Zone

You have requested background on two points concerning the various claims of treaty opponents that the U.S. "owns" the Canal Zone; that the Zone is "U.S. territory"; that the United States is "sovereign over the Canal Zone"; and the like. The first point concerns the holding in the 1907 Supreme Court case of Wilson v. Shaw and its significance in determining the status of the Zone; the second is a comparison of the 1903 Treaty with the treaties under which the U.S. purchased Louisiana from France, and Alaska from Russia, as an aid in determining what was purchased under the 1903 Treaty.

### 1. Wilson v. Shaw

The 1907 case of Wilson v. Shaw was taken to the Supreme Court by a taxpayer who maintained that the Federal Government could not continue to expend funds lawfully for the construction of an interoceanic ship canal in Panama. He sought an injunction against any further expenditures on the ground that the U.S. did not have a sufficient legal interest in the Canal Zone to authorize the expenditure of tax money there. The Supreme Court held that the Federal Government did have broad enough power to encompass expenditure of funds for the construction of the Canal and refused to issue an injunction. In speaking of the legal interest of the U.S. in the Zone the Court said,

"It is hypercritical to contend that the title of the United States is imperfect, and that the territory described does not belong to this Nation, because of the omission of some of the technical terms used in ordinary conveyances of real estate."

It is correct, then, that the Supreme Court did equate the Canal Zone with territory of the United States for the purpose of establishing the authority of the Federal Government to expend funds and engage in construction work in the Zone. However, such interpretations



of the status of the Canal Zone under domestic U.S. law for the purpose of determining the applicability of specific statutes therein are not uncommon.

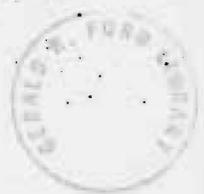
For example, the Canal Zone is considered to be an organized territory of the U.S. for purposes of extradition (37 Stat. 569, 48 USC 1330). On the other hand, it is treated as foreign territory for purposes of customs duties (33 Stat. 843, 19 USC) and its ports are considered foreign ports for purposes of the transportation of mail (Luckenback Co. v. U.S., 280 U.S. 173). Thus, no definitive conclusions may be drawn with respect to the international status of the Zone as a result of such domestic court decisions.

In the case of Wilson v. Shaw the court decided only that our rights and authority over the Canal Zone are close enough to ownership for practical purposes as to present an insignificant difference for the question of whether Federal tax funds could be expended there. Moreover, the holding in the case is not a determination of the nature of U.S. rights in the Zone, but an interpretation of the circumstances under which the Federal Government can spend money abroad. It is doubtful that anyone would argue today that the Federal Government must own the property abroad upon which it expends funds, or have anything even close to ownership.

Thus, Wilson v. Shaw does not even speak to the international legal status of the Canal Zone. Rather, the question addressed by the Court was whether the rights acquired by the U.S. under the 1903 Treaty were sufficient under U.S. domestic law to justify the expenditure of Federal funds there.

With respect to the international legal status of the Zone, the United States has consistently recognized that Panama retains at least "titular" sovereignty over the area.

" . . . The truth is that while we have all the attributes of sovereignty necessary in the construction, maintenance, and protection of the canal, the very form in which those attributes are conferred in the treaty [of 1903] seems to preserve the titular sovereignty over the Canal Zone in the Republic of Panama . . ." (Letter from Secretary of War William H. Taft to President Theodore Roosevelt, January 12, 1905.)



Another example of this interpretation appears in Article III of the 1936 Treaty between the U.S. and Panama, which was duly ratified by the United States. That provision refers to the Canal Zone as "territory of the Republic of Panama under the jurisdiction of the United States."

The weight of scholarly opinion supports the view that the U.S. acquired something less than full sovereignty over the Canal Zone and that Panama retained an interest in the area.

"The rights of the United States in the Panama Canal Zone offer an example of the most complete transfer of jurisdiction over a territory without its being a cession in the technical international law sense . . ." (Vali, Servitudes of International Law (2d ed., 1959) 254)

"There remains a scintilla of sovereignty - a reversionary sovereignty still in the Republic of Panama." (Woolsey) (AJIL, Vol. XX (1926), p. 117.) (Also see Professor Baxter's views, copy attached.)

Perhaps the most clear description of the nature of the rights the U.S. acquired in the 1903 Treaty is that of M. Philippe Bunau-Varilla, the principal drafter of the document:

"I decided to grant to the United States, in the interior of the zone, all rights, powers and authority that she would have if she were sovereign, to the entire exclusion of the use of any such rights, powers and authority by the sovereign Republic of Panama."

"The United States, without becoming the sovereign, received the exclusive use of the rights of sovereignty, while respecting the sovereignty itself of the Panama Republic." (Italics in original.) (Bunau-Varilla, From Panama to Verdun (1940) 158.)

Thus, the treaty opponents' argument that the Statement of Principles, by acknowledging that the Zone is territory

of Panama, was in contravention of the Supreme Court decision in Wilson v. Shaw, is not supported by the case itself, or under the pertinent principles of international and domestic law.

2. What did the U.S. Buy under the 1903 Treaty?

Article XIV of the 1903 Treaty specifies that the United States shall pay Panama \$10 million upon the exchange of ratifications of the Treaty, and \$250,000 per year thereafter, beginning nine years after the ratification of the Treaty. This two-pronged payment is specified as compensation for all the rights, powers, and privileges granted to the United States under the convention. The most important of those rights were, of course, the use, occupation, and control of the land which would comprise the Canal Zone in perpetuity and the exercise of all rights, power and authority over the Zone which the U.S. would exercise if it were the sovereign over the territory. Other significant rights were involved in the grant, however, including Panama's grant to the U.S. of its claim to a reversionary interest, after 1966, in the Panama Railroad, and its claim to \$250,000 per year from the railroad until that reversion in 1966, and Panama's grant of the authority to the United States to exercise the right of eminent domain over Panamanian lands outside the Zone which might be judged necessary for Canal purposes. However, both facets of the compensation payment were in exchange for all these and other rights in the Convention. The \$250,000 annuity payment was, in no manner, specifically linked to any rights the U.S. acquired in the railroad, or its lands, as the treaty opponents argue.

Thus, the United States acquired continuing treaty rights over Panamanian territory - a unique combination of power and authority over the sovereign territory of another country - but not ownership of land under the 1903 Treaty. The U.S. got no ownership rights to land under the Treaty except the right to the reversionary interest in the railroad land. (We acquired the concession right to use of the railroad land until 1966, when we purchased the assets of the New French Canal Company subsequent to the 1903 Treaty.) The rights of other private land owners in the Zone were specifically preserved under Article VI of the Treaty. Panamanian



public lands in what became the Zone were turned over to the use, occupation, and control of the United States, but technically remain public lands of the Republic of Panama subject to U.S. rights.

By way of contrast, the 1703 cession of Louisiana from France to the United States reads as follows:

"The first consul of the French Republic does hereby cede to the . . . U.S. for ever and in full sovereignty the . . . territory with all its rights and appurtenances . . ."

The Convention also has articles which include all public lands in the cession, which provided that all archives, papers and documents relative to the sovereignty shall be transferred to U.S. possession and which provide that all inhabitants shall enjoy the rights, privileges, and immunities of U.S. citizens.

The cession of Alaska from Russia to the United States is stated in similar conclusive terms:

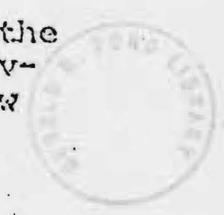
"The Emperor of all Russia agrees to cede to the U.S. by this Convention, and upon ratifications thereof, all the territory and dominions now possessed by his Majesty on the Continent of America and in the adjacent islands."

" . . . the cession hereby made, conveys all rights, franchises and privileges now belonging to Russia in the said territory."

That instrument also had provisions for the inclusion of public lands in the cession and that the inhabitants could either return to Russia within three years or acquire all the rights and privileges of U.S. citizens.

In neither case was there a continuing annuity as part of the form of payment; the agreements also do not contemplate a continuing relationship between the countries involved over the subject matter of the agreements.

Although, as stated, the 1903 Treaty specifically preserved the rights of private property owners in the Zone, it did not endow them with the rights and privileges of U.S. citizenship. In fact, under U.S. law



today, children born of non-U.S. citizen parents in the Canal Zone are not born with U.S. citizenship. Any child born within the United States or its territories automatically acquires U.S. citizenship at birth unless his parents are in a status which carries diplomatic immunity under present U.S. law.

Had the parties intended the 1903 Treaty to work a cession of the Canal Zone to the United States, unquestionably they would have drafted language similar to one of these examples to forestall any question, and presumably would not have provided for a continuing annuity payment.

Attachment:  
As stated