

MARAD '77

U.S. DEPARTMENT
OF COMMERCE
Maritime
Administration



MARAD '77

The Annual Report of the
Maritime Administration
for Fiscal Year 1977



MAY 1978

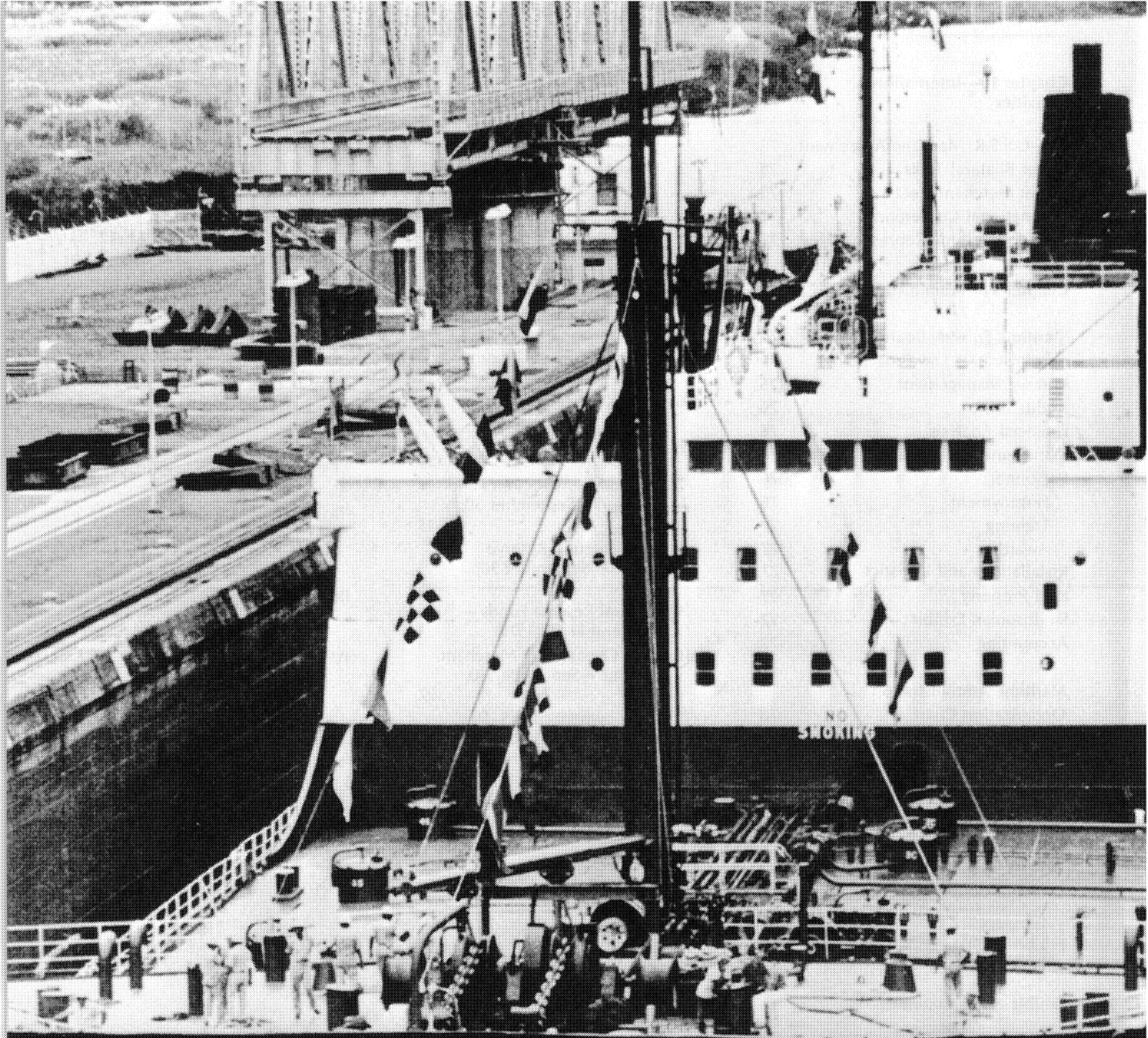
U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

MARITIME ADMINISTRATION
Robert J. Blackwell,
Assistant Secretary
for Maritime Affairs

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THE SECRETARY OF COMMERCE
Washington, D.C. 20230

Sirs:

It is my honor to submit the annual report of the Maritime Administration for fiscal year 1977.

While the report describes in detail all of the Agency's efforts to promote and maintain a strong American merchant marine, your special attention is invited to the following highlights:

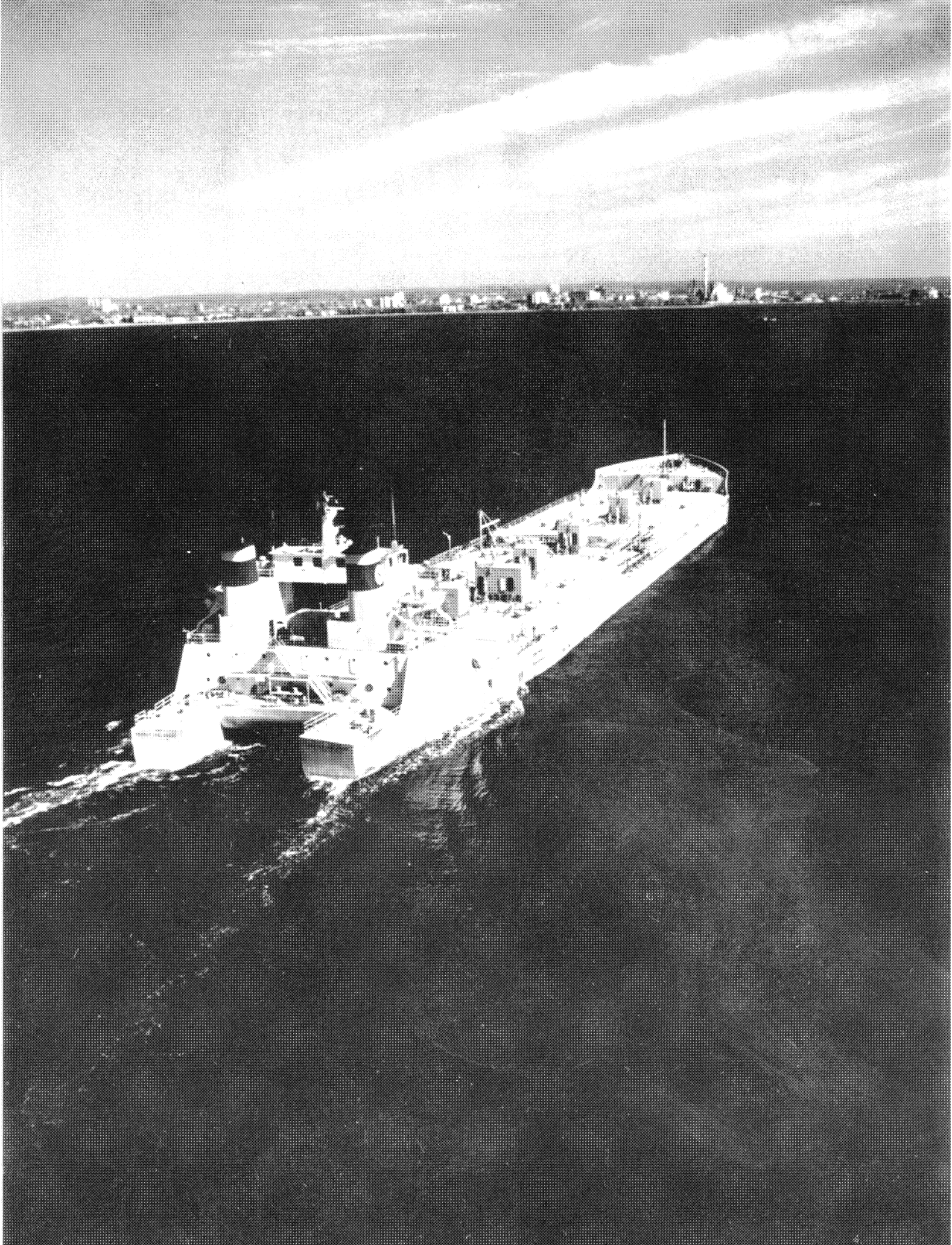
- o The U.S. shipbuilding orderbook on September 30, 1977, comprised 60 deep-draft vessels totaling 5.6 million deadweight tons and valued at \$3.9 billion.
- o During this reporting period construction-differential subsidy was awarded for nine new vessels with a total contract value of nearly \$459 million, increasing new construction awards under the Merchant Marine Act of 1970 to 68 vessels valued at \$3.5 billion with a total carrying capacity of 6 million deadweight tons.
- o In the Agency's continuing efforts to reduce dependence by U.S.-flag ship operators on subsidy, agreements were reached with several firms to eliminate certain types of subsidy. These changes will save the Government an estimated \$9 million in calendar year 1978.
- o The opening of the trans-Alaska pipeline and the beginning of the Strategic Petroleum Reserve program resulted in new opportunities for employment of the U.S.-flag tanker fleet. In the first 4 months of the pipeline's operation American-flag vessels moved 74.6 million barrels of Alaskan crude oil from Valdez to the lower 48 states.
- o The Ready Reserve Fleet, a joint program of the Maritime Administration and the U.S. Navy designed to upgrade reserve ships for mobilization within 5 to 10 days, was implemented during the period under review.

The American shipping and shipbuilding industries continued to place heavy emphasis on capital improvements to increase their productivity.

Sincerely,


Juanita M. Kreps

The President
President of the Senate
Speaker of the House of Representatives



INTRODUCTION

BY ROBERT J. BLACKWELL

ASSISTANT SECRETARY FOR MARITIME AFFAIRS

The economic repercussions stemming from the 1973-74 oil crisis and subsequent quadrupling of oil prices continued to afflict the world's shipping and shipbuilding industries during fiscal year 1977. The high cost of energy was a major constraint to consumption and 35 million deadweight tons (dwt.) tanker capacity were in lay-up throughout the world. This surplus capacity kept tanker freight rates at depressed levels. In addition, the world's shipyards, which had been heavily dependent on tanker construction, saw their orderbooks decline to critical levels.

While American maritime interests have also been affected by these developments, the impact has been far less severe. As a result of U.S. maritime policies and recent developments, prospects for the American-flag tanker fleet are particularly bright. The U.S. shipbuilding industry, although also faced with a reduction of its commercial orderbook, had the second largest backlog of contracts in the world at the end of the fiscal year.

Shipbuilding

Subsidized ship construction contracts for nine vessels were awarded during fiscal year 1977. Of their total contract value of \$458.7 million, \$149.8 million will be paid

*SEABULK CHALLENGER, 41,800-dwt.,
Catamaran-Tug tanker, one of two ships
of this unusual integrated design
in U.S. merchant fleet.*

by the Government to equalize the disparity between U.S. and foreign shipbuilding costs and cover the national defense features to be incorporated in the ships.

In addition, subsidized contracts for the conversion of eight existing vessels were awarded and non-subsidized shipbuilding contracts for the construction of two ships were let during the year.

The nine subsidized new construction contracts brought the number of ships ordered under the Merchant Marine Act of 1970 to 68. These awards have a contract value of \$3.5 billion and aggregate 6 million dwt.—equivalent to 33 percent of the carrying capacity of the active U.S.-flag fleet.

As of September 30, 1977, subsidized contracts covering the construction of 25 new ships and the conversion of 10 existing ships were in force.

During the fiscal year 11 subsidized and 8 nonsubsidized vessels were delivered by American shipyards.

At the end of the fiscal year 60 deepdraft vessels totaling 5.6 million dwt. and valued at \$3.9 billion were under construction or on order. A year earlier the orderbook comprised 75 ships totaling 7 million dwt. with contract value of \$4.4 billion.

Title XI Guarantees

During the fiscal year, under the Federal Ship Financing (Title XI) Program, the Maritime Administration conditionally approved guarantees of privately held ship construction and mortgage loans totaling \$988 million. These guarantees covered 18 deepdraft merchant ships, 65 oceangoing tugboats and barges, 229 river vessels, and 8 tug/supply vessels to service the offshore drilling industry.

As of September 30, 1977, Title XI contracts in force covered 2,172 vessels and 2,665 shipboard lighters with an outstanding principal balance of nearly \$5.8 billion.

CCF & CRF Programs

To help vessel operators to accumulate capital for construction or reconstruction of fleet units, the Maritime Administration administers the Capital Construction Fund (CCF) and Construction Reserve Fund (CRF) programs.

The CCF program enables ship-owners operating in the foreign, Great Lakes, and noncontiguous domestic trades to defer Federal income taxes on vessel and investment earnings and capital gains deposited in their CCFs. During the fiscal year \$375 million was deposited in these accounts. Since the inception of this program in the fall of 1971, \$1.2 billion has been deposited in CCF accounts and over \$700 million has been utilized for vessel reconstruction projects. As of September 30, 1977, the CCF balance totaled over \$477 million.

The CRF program, which is used primarily by inland waterway and domestic coastwise operators, permits operators to defer taxation on capital received from the sale or disposition of a vessel provided that the net proceeds are invested in a new vessel within 3 years.

CRF withdrawals during the fiscal year amounted to \$1.2 million. As of September 30, 1977, nine companies had a total of \$6 million in their CRF accounts.

Ship Operations

The Maritime Administration continued its efforts to reduce dependence of U.S.-flag ship operators on subsidy. Agreements were reached with several operators to eliminate some types of subsidy expenses, especially on newer and more efficient ships. These changes are expected to save the Government an estimated \$9 million in calendar year 1978.

Operating-differential subsidies totaling \$344 million were paid by the Agency during fiscal year 1977, at the end of which 21 U.S.-flag companies held 22 long-term subsidy agreements covering 186 vessels.

Short-term agreements with 41 companies covering 79 vessels for the carriage of U.S. grain to the Soviet Union also were in effect on September 30, 1977.

International Agreements

During the year representatives of the United States and the Soviet Union met on several occasions to ensure effective implementation of the U.S.-U.S.S.R. Maritime Agreement, under which the bilateral ocean trade is conducted. The delegations approved a basic charter rate of \$16 per long ton for heavy grains to be carried by U.S.-flag vessels from U.S. Gulf to Soviet Black Sea ports in 1978.

In February 1977 a U.S. Government delegation to Argentina held discussions which helped restore cargo-booking procedures satisfactory to all shipping lines serving the Argentine trade.

During the fiscal year the foundation also was laid for a 3-year extension of a maritime agreement between this country and Brazil.

Research and Development

The Agency's research and development commitments, which have expanded significantly under the Merchant Marine Act of 1970, totaled \$18.2 million in fiscal year 1977. Emphasis continued on the joint funding of research by industry and advancing the primary objectives of the Computer-Aided Operations Research Facility (CAORF).

As a part of the cooperative effort to advance the technology and increase maritime productivity, American companies committed \$9 million in private funds under MarAd's cost-sharing concept. The combined FY 1977 R&D commitment thus was in excess of \$27 million.

At the Agency's National Maritime Research Center in Kings Point, N.Y., CAORF underwent its first full year of operation. The CAORF ship operations simulator is equipped with a full-scale mockup of a ship's bridge and computer-generated displays to achieve a real-life effect. In the first series of CAORF operational exercises, masters and pilots were utilized in simulating the navigation of tankers to and from the port of Valdez, Alaska, in transporting oil south to the lower 48 States, and the effectiveness of collision-avoidance equipment in actual navigating situations was analyzed.

U.S.-Flag Support

The Maritime Administration conducted a comprehensive marketing program to increase the carriage of the Nation's foreign waterborne trade by U.S.-flag operators during the fiscal year. A new market development office was opened in Atlanta, Ga., bringing the number of these regional service centers to 10.

Altogether, the Agency's marketing representatives contacted officials of more than 2,000 U.S. companies engaged in the import/export trade in promoting the "Ship American" program sponsored by MarAd and the National Maritime Council.

Total tonnage carried by U.S.-flag ships in the liner trade has shown a 5-year increase of 57 percent—from 9.8 million tons in 1972 to 15.5 million tons in 1976.

Domestic Shipping

In domestic ocean shipping, a major development during fiscal year 1977 was the opening of the trans-Alaskan pipeline and the movement of Alaskan oil from Valdez to ports on the West Coast and, via the Panama Canal, to refineries on the Gulf and East Coasts. U.S.-flag tankers transported more than 74.6 million barrels of Alaskan crude oil to the lower 48 States in the first 4 months of the pipeline's operation.

On the Nation's Fourth Seacoast, MarAd continued its work with other agencies to determine the feasibility of an extended shipping season on the Great Lakes and St. Lawrence Seaway through the Winter Navigation Demonstration Program.

On America's inland waterways traffic totaled more than 605 million tons during calendar year 1976, with cargoes consisting mainly of energy products, raw materials, and agricultural commodities.

Ports

Increased emphasis was placed on cost-sharing in the Agency's continuing programs to help the port and shipping industries modernize and improve marine ports and terminals.

During FY 1977 regional port studies were begun in the 17-State Mississippi River Basin-Gulf and the eight-State Great Lakes regions and work continued on a Florida port study begun the previous year.

MarAd also initiated a number of major projects to help port authorities and terminal operators develop and improve equipment and facilities and thus increase their productivity and competitiveness.

Civil Rights

The employment of minorities and women and the use of minority suppliers and vendors in the maritime industries increased during the reporting period. MarAd's annual survey of the U.S. shipbuilding industry (representing 30 major shipyards with 80 percent of the total workforce) indicated that the employment of women and minorities increased by 2,121 in calendar year 1976. Similar gains were posted in ship operations.

In the Maritime Administration Minority Business Program, maritime

companies placed \$17.9 million in business with minority entrepreneurs during the fiscal year, compared to \$11 million in FY 1976.

Yearly totals were estimated at less than \$1 million prior to 1974, when MarAd's promotional effort was begun.

Maritime Training

The U.S. Merchant Marine Academy at Kings Point, N.Y., graduated a 1977 class of 225 officers, including 117 who were licensed as third mates, 91 as third assistant engineers, and 17 officers who completed the dual deck/engine program. Within 6 weeks, 79 percent of the graduates were at sea in the merchant marine, the U.S. Navy, or the U.S. Coast Guard.

In June 1978 Kings Point will become the first of the Federal service academies to graduate women.

During fiscal year 1977 MarAd's five radar training centers and two firefighting-damage control schools provided training for more than 5,500 seafaring personnel. As the year ended, the Agency was in the process of locating new firefighting and damage control schools in the Central and Great Lakes regions, adding to the facilities currently available in Earle, N.J., and San Francisco, Calif.

Defense Needs

The National Defense Reserve Fleet (NDRF) anchorages in Virginia, Texas, and California consisted of 333 vessels on September 30, 1977.

The fleet is maintained as a ready source of ships for military logistics support.

MarAd works closely with the U.S. Navy and other agencies in the interest of national security and emergency preparedness involving waterborne shipping. The Ready Reserve Fleet, a joint Navy-MarAd program, was implemented during the year. Seven NDRF vessels were activated or in the process of being upgraded to Ready Reserve Fleet status—capable of being mobilized within 5 to 10 days in an emergency.



Chapter 1

Shipbuilding

Contract Awards

During fiscal year 1977 the Maritime Administration (MarAd) entered into construction-differential subsidy (CDS) contracts for nine new, highly productive vessels, which had a total contract value of \$458.7 million. Of this amount, the Government will assume \$149.8 million of the cost, including national defense features incorporated in the ships. These ships included two 125,000-cubic meter liquefied natural gas (LNG) carriers, two 16,343-dwt. containerships, three 2,220-dwt. breakbulk cargo ships, and two 2,953-dwt. heavy-lift cargo ships.

In addition, MarAd awarded CDS contracts for reconstruction work on eight existing vessels involving the conversion of four LASH vessels to containerships and increasing the cargo-carrying capacities of four containerships. (See Table 1 for FY 1977 contract awards and vessels under CDS contracts on September 30, 1977.)

Private contracts were awarded for the nonsubsidized construction of two vessels, a 23,300-dwt. self-

unloading Great Lakes bulk carrier for Oglebay Norton Co., and a 389-foot-long self-propelled pipelaying vessel for Santa Fe International Corp. (see Table 2).

As of September 30, 1977, there were 60 new merchant ships, with a total of 5.6 million dwt. on U.S. shipyard orderbooks, compared to 75 vessels a year earlier. Of these 60 vessels with a contract value of \$3.9 billion, 26 were being built with both CDS and Federal Ship Financing (Title XI) Guarantees. Of the remaining 34 privately financed vessels, 14 carried Title XI guarantees. Although there were fewer ships on order in American shipyards than a year earlier, the orderbook at the close of fiscal year 1977 showed a more varied mix of vessel types and reflected an adjustment to the worldwide curtailment of tanker orders due to the depressed level of tanker freight rates.

As of September 30, 1977, 15 offshore oil-drilling rigs were on order or in production in 5 U.S. shipyards, as compared to 10 units a year earlier.

Construction Subsidy

To equalize the cost disparity which exists between U.S. and foreign shipbuilding prices, MarAd is authorized to pay a construction-differential subsidy. (See Appendix I for CDS expenditures since 1936.) To be eligible for CDS, a vessel must be built in an American shipyard, owned by American citizens, manned by an American crew, and operated under the U.S. flag in the Nation's essential foreign commerce.

As of September 30, 1977, CDS was being paid for the construction of 26 new ships and the reconstruction of 9 existing vessels (see Table I). Construction costs for these vessels totaled almost \$2.1 billion, of which \$653.4 million will be paid by the Government. The new vessels being built with CDS include 10 liquefied natural gas carriers (LNGs), 5 tankers, 4 containerships, 3 general cargo vessels, 2 heavy-lift cargo vessels, and 2 integrated tug/barge vessels. The nine ships being reconstructed included four LASH vessels being transformed to full containerships and five ships being modified to increase their container lift and stowage capacities.

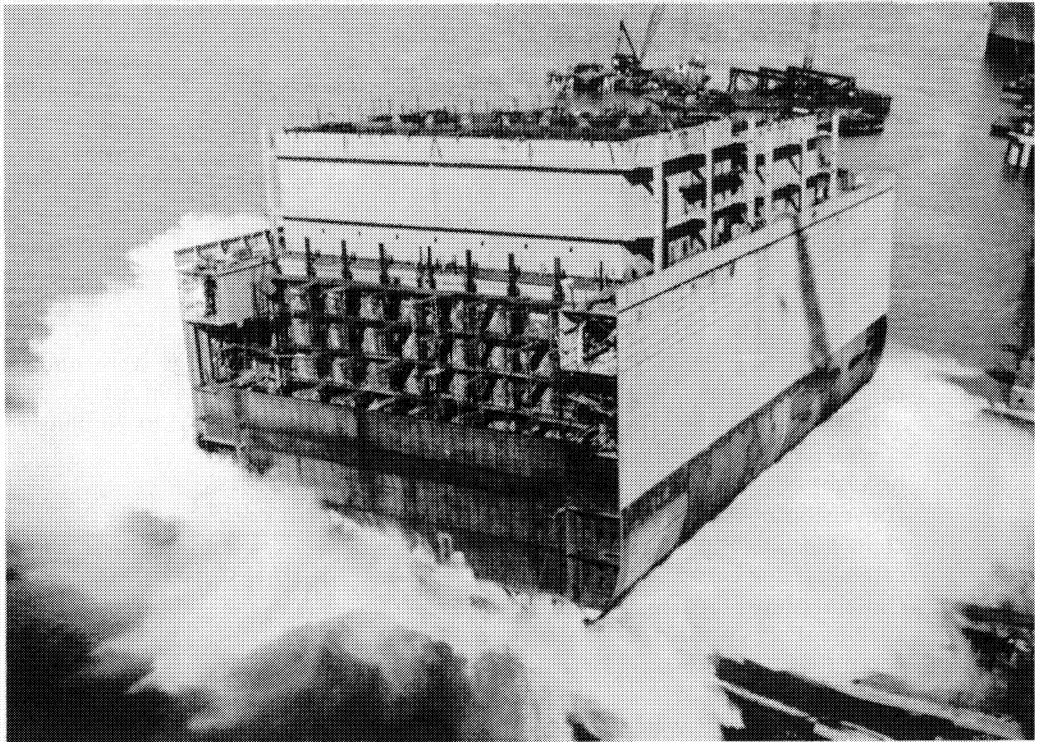
There were 53 applications for CDS pending on September 30, 1977, for more than 150 new vessels. The proposed vessels consisted of 73 tankers, 30 LNGs, 10 tug/barges, 7 very large crude carriers (VLCCs), 6 ore/bulk/oil (OBO) carriers, 6 dry-bulk carriers, 5 liquid bulk carriers, 3 or 4 Roll-On/Roll-Off (RO/RO) vessels, 3 self-propelled RO/RO barges, 3 breakbulk cargo vessels, 3 Lighter-Aboard-Ship (LASH) vessels, 1 mini-LASH vessel, 1 heavy-lift cargo vessel, and 1 semi-submersible barge carrier.

EL PASO ARZEW, second of three liquefied natural gas (LNG) carriers to be built at Newport News (Va.) Shipbuilding, has capacity of 125,000 cubic meters; will be used to bring LNG from Algeria to U.S. East Coast.

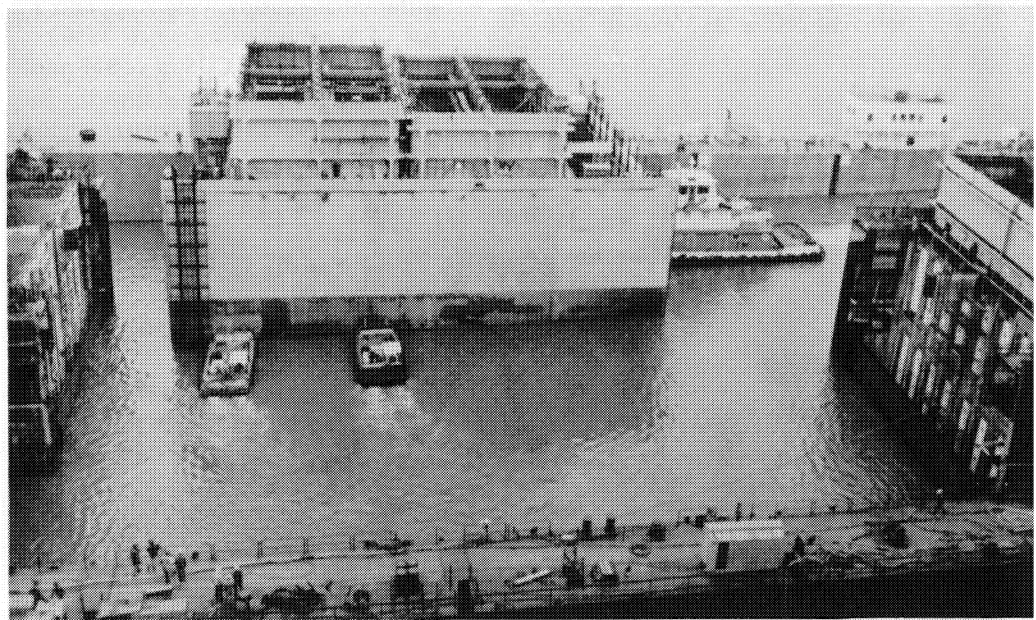
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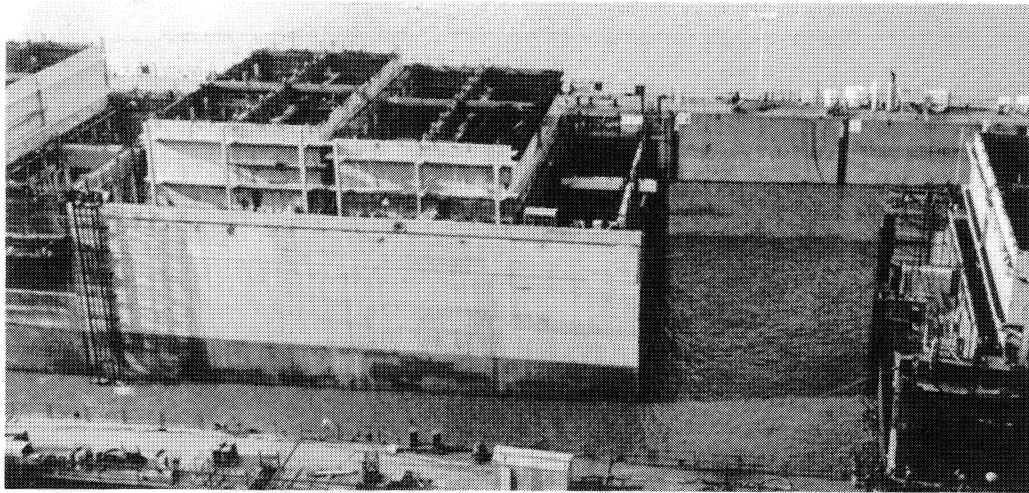


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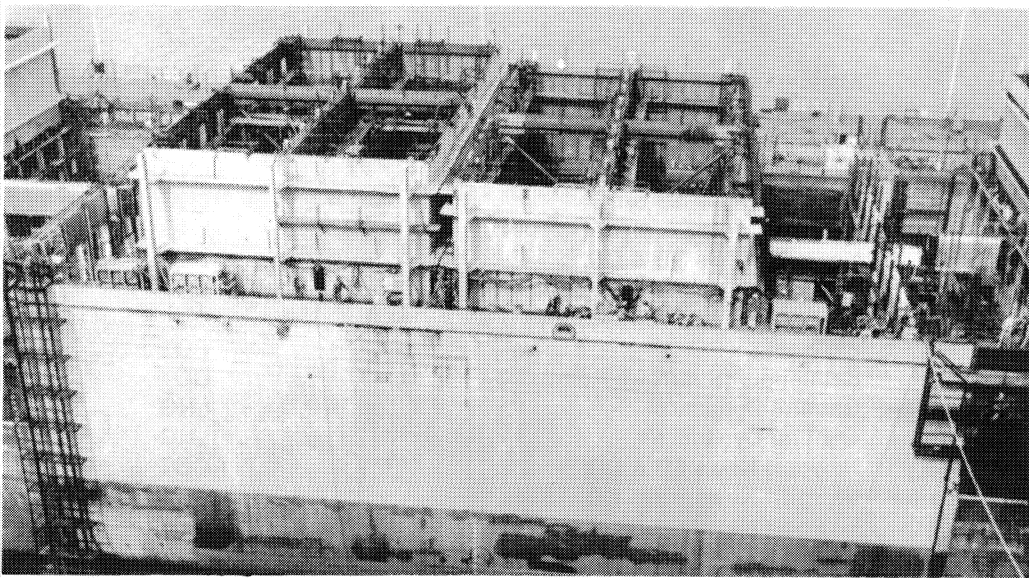


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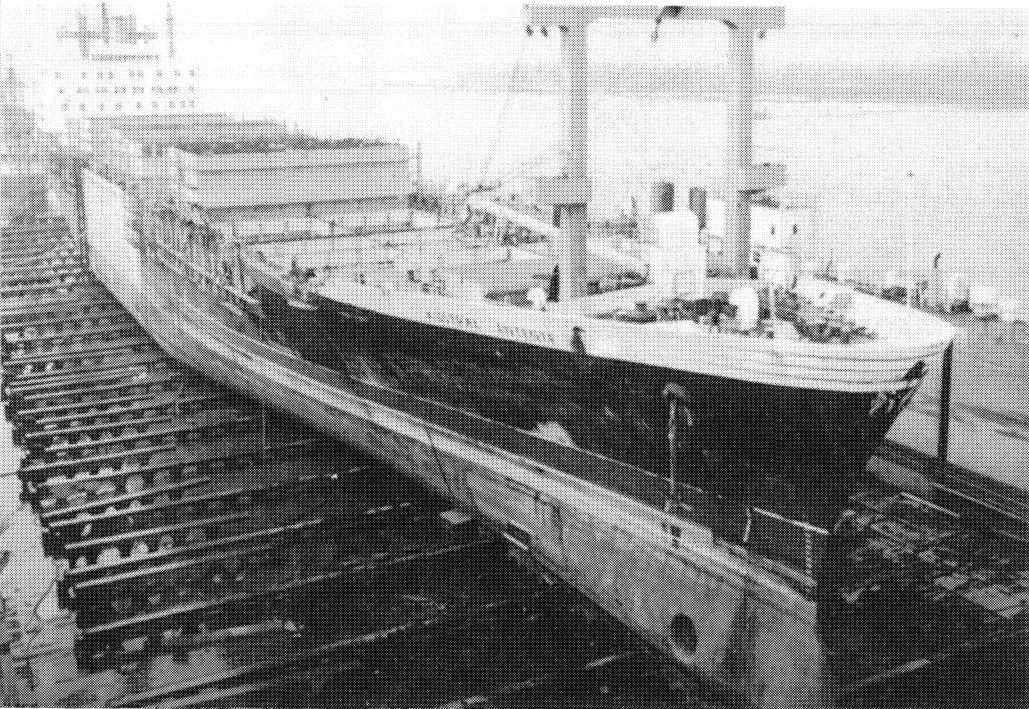




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SS AUSTRAL ENTENTE, one of two Farrell Lines containerships to be "jumboized" for increased refrigerated container capacity, is shown: 1. At Port of Newark before enlargement at Avondale Shipyard, New Orleans; 2. Launching of prefabricated, 144-foot midbody at Avondale; 3. Maneuvering midbody into place inside drydock; 4. Attaching midbody to aft section of the bisected AUSTRAL ENTENTE; 5. Final joining of midbody—fore and aft; 6. The ship in drydock after midbody insertion.

Table 1: SHIPS UNDER CDS—SEPTEMBER 30, 1977

Owner	Shipbuilder	Ship Type
Contracts Awarded in FY 1977:		
American Atlantic Shipping	Equitable Shipyards	BBC
American Export Lines	Bath Iron Works	CN
American Heavy Lift	Peterson Builders	HL
American President Lines	Triple "A" Machine Shop	CN
Lachmar	General Dynamics	LNG
Pacific Far East Line	Bethlehem (San Francisco)	CN
Total (FY 1977)		
Undelivered Vessels Under Contracts Awarded prior to FY 1977:		
Coordinated Caribbean Transport	Manhattan Barge/Marinette	TB
El Paso Arzew	Newport News SB & DD	LNG
El Paso Columbia	Avondale	LNG
El Paso Cove Point	Avondale	LNG
El Paso Howard Boyd	Newport News SB & DD	LNG
El Paso Savannah	Avondale	LNG
El Paso Southern	Newport News SB & DD	LNG
Farrell Lines	Avondale	CN
Farrell Lines	Bethlehem (Sparrows Point)	CN
Fillmore Tanker	Seatrain	COT
Gulf Oil	Bethlehem (Sparrows Point)	COT
Liquegas Transport	General Dynamics	LNG
LNG Transport	General Dynamics	LNG
VLCC I	Newport News SB & DD	COT
VLCC II	Newport News SB & DD	COT
Zapata Ocean Carriers	Newport News SB & DD	COT
Total (Prior to FY 1977)		
Total All Ships Under CDS September 30, 1977		

Table 2: PRIVATE CONSTRUCTION CONTRACTS AWARDED IN FY 1977

Owner	Shipbuilder	Type	No.	Total Dwt. Tonnage	Estimated Completion Date	Total Estimated Cost (Millions)
Oglebay Norton	Bay SB	Bulk Carrier	1	23,300	1979	\$20.0
Santa Fe International	Todd-Galveston	Pipelaying Vessel	1	N.A.	1978	\$28.8
Total Private Contracts, FY 1977			2	23,300		\$48.8

No. of Ships	Total DWT	Estimated Completion Date	Total Estimated Cost ¹ (Millions)	Estimated CDS (Millions)	Estimated Cost NDF (Thousands)
3	6,660	7-79	\$ 28.7	\$ 13.9	\$195
2	32,686	5-80	86.4	42.8	182
2	5,906	11-78	33.6	14.1	54
4 ²	82,856	2-77	3.1	1.3	-0-
2	127,200 ³	3-80	310.0	79.0	-0-
4 ²	178,424	1-78	20.5	8.7	-0-
17	433,732		\$482.3	\$159.8	\$431
2	13,542	9-78	42.4	16.2	-0-
1	63,460 ³	8-78	96.8	24.8	17
1	63,170 ³	6-78	106.0	17.5	20
1	63,170 ³	11-78	100.0	16.5	20
1	63,460 ³	2-79	94.2	24.1	18
1	63,170 ³	9-78	103.0	17.0	20
1	63,460 ³	1-78	106.6	27.3	17
1 ²	27,480	11-77	20.1	7.4	50
2	54,680	11-78	156.8	77.8	72
1	225,000	3-78	70.6	28.8	63
1	265,000	10-77	81.5	33.3	151
1	63,600 ³	12-77	89.6	21.2	20
1	63,600 ³	12-77	89.6	21.2	20
1	390,770	12-78	139.7	54.1	66
1	390,770	5-79	138.2	53.5	58
1	390,770	8-79	136.6	52.9	59
18	2,265,102		\$1,571.7	\$493.6	\$671
35	2,698,834		\$2,054.0	\$653.4	\$1,102

¹Total contract cost including CDS and National Defense Features (NDF), but excluding engineering and change orders.

²Reconstruction.

³125,000 cubic meters.

Key to Ship Types: CN = containership, COT = crude oil tanker, LNG = liquefied natural gas carrier, TB = integrated tug/barge vessel, BBC = breakbulk carrier, HL = heavy lift cargo vessel

Ship Deliveries

Nineteen new vessels, aggregating 1.3 million dwt., were delivered by American shipyards during fiscal year 1977 (see Table 3). In addition, subsidized reconstruction work was completed on the following ships: the AUSTRAL ENTENTE, owned by Farrell Lines, Inc.; the PACIFIC BEAR, owned by Pacific Far East Line; and the PRESIDENTs JOHNSON, PIERCE, JEFFERSON, and MADISON, owned by American President Lines.

The following 10 new subsidized vessels were delivered during the fiscal year:

- The 20,000-dwt. RO/RO vanships NEVADA and ILLINOIS to States Steamship Co., for U.S. Pacific/Far East service;
- The 265,000-dwt. crude oil tanker AMERICAN SPIRIT to Gulf Oil Corporation, for worldwide service;
- The 125,000-cubic-meter liquefied natural gas (LNG) carrier LNG AQUARIUS to Wilmington Trust Co. (for bareboat charter to Bethel Marine, Inc. for temporary service between Indonesia and Japan.
- The 35,000-dwt. product tankers ZAPATA COURIER and ZAPATA ROVER to Zapata Products Tankers, Inc., for worldwide operations;
- The 34,000-dwt. product tanker MORMACSKY to Wilmington Trust Co., (for bareboat charter to Moore-McCormack Bulk Transport, Inc.), to serve restricted-draft ports of the U.S. Atlantic and Gulf Coasts;
- The 89,700-dwt. crude oil tankers CHESTNUT HILL and KITTANNING to Girard Trust Bank (for bareboat charter to Chestnut Shipping), for worldwide operations;
- The 89,700-dwt. crude oil tanker AMERICAN HERITAGE to First Pennsylvania Bank (for bareboat charter to Atlas Marine, Inc.), for worldwide operations.

An 11th vessel built with subsidy, the 225,000-dwt. crude oil tanker STUYVESANT, was delivered in FY 1977 to U.S. Trust Co. of California (for bareboat charter to Queensway Tankers, Inc.) for temporary Alaska-U.S. West Coast service. Owners of the STUYVESANT were permitted to repay the construction subsidy to the Government and use the vessel in the domestic trade, including the shipment of Alaskan oil, under an action by the Maritime Administration on August 30, 1977. Litigation contesting that action was pending in Federal court at the end of the fiscal year.

Delivery of these 11 vessels brought to 42 the number of subsidized ships contracted for and completed since enactment of the Merchant Marine Act of 1970.

U.S. shipyards also delivered the following eight vessels built without subsidy during the fiscal year:

- Two 35,000-dwt. product tankers for bareboat charter to Chevron Shipping Co., for the U.S. Pacific Coast trade;
- One 89,700-dwt. crude oil tanker for bareboat charter to First Shipmor Associates, for Alaska-U.S. West Coast service;
- One 17,300-dwt. RO/RO van ship to an affiliate of Sun Ship, for Alaska/U.S. West Coast service;
- One 62,000-dwt. self-unloading bulk carrier to Armstrong Steamship Co., for the Great Lakes trade;
- One 25,000-dwt. integrated tug- barge to Bulk Food Carriers, Inc., for U.S. intercoastal operations;
- One 40,000-dwt. integrated tug- barge to Hvide Shipping, Inc., for the U.S. coastal trade; and
- One 59,000-dwt. self-unloading bulk carrier to Interlake Steamship Co., for the Great Lakes trade.

Deliveries of merchant vessels by major shipbuilding nations during fiscal year 1977 are shown in Table 4.

Title XI Guarantees

Under the Federal Ship Financing Program established pursuant to Title XI of the Merchant Marine Act of 1936, the Maritime Administration is authorized to guarantee debt obligations made to finance or refinance American-flag commercial vessels constructed or reconstructed in American shipyards. In the event of default by the vessel owner, the U.S. Government guarantees payment in full to the lender of the unpaid interest and principal of the obligation.

During fiscal year 1977 the Agency conditionally approved Title XI guarantees of \$988 million covering 320 vessels (see Table 5).

Based on previous Title XI commitments, guarantees also were placed on 535 vessels and 203 lighters during FY 1977.

As of September 30, 1977, Title XI guarantees in force amounted to nearly \$5.8 billion. Pending applications on that date represented an estimated \$4.8 billion in additional guarantees (see Table 6). However, the statutory ceiling on the total amount of unpaid principal the Agency is empowered to guarantee is \$6,950,000,000.

The Revolving Fund of the Federal Ship Financing Fund received \$28.9 million in net income during the fiscal year, making the Fund's retained income \$117.1 million. This Fund is used to underwrite the Government's guarantees and to pay the Maritime Administration's cost of the program.

Table 3: NEW SHIPS DELIVERED IN FY 1977—U.S. SHIPYARDS

Owner ¹	Builder	Type	Vessels
Subsidized			
States Steamship	Bath Iron Works	Roll-on/Roll-off	2
Girard Trust Bank (Chestnut Shipping)	National Steel & SB	Crude Oil Tankers	2
First Pennsylvania Bank (Atlas Marine)	National Steel & SB	Crude Oil Tankers	1
Zapata	Todd (Los Angeles)	Product Tankers	2
Wilmington Trust Co. (Moore-McCormack)	National Steel & SB	Product Tankers	1
Gulf Oil Corp.	Bethlehem (Sparrows Point)	Crude Oil Tanker	1
Wilmington Trust Co. (Bethel Marine)	Gen. Dynamics (Quincy)	LNG Carrier	1
U.S. Trust Co. of California (Queensway Tankers)	Seatrain SB	Crude Oil Tanker ²	1
Total Subsidized Deliveries			11
Nonsubsidized			
United California Bank (Chevron Shipping)	FMC Corp.	Product Tanker	1
Bank of California (Chevron Shipping)	FMC Corp.	Product Tanker	1
Bulk Food Carriers	Maryland SB/Southern SB	Tug/Barge	1
Hvide Shipping	Galveston SB	Tug/Barge	1
Sun Ship Affiliate	Sun SB & DD	Roll-on/Roll-off	1
Manufacturers Hanover Trust Co. (First Shipmor Associates)	National Steel & SB	Crude Oil Tanker	1
Interlake Steamship Co.	American SB	Bulk Carrier	1
Armstrong Steamship Co.	Bay SB	Bulk Carrier	1
Total Nonsubsidized Deliveries			8
Total New Ships Delivered FY 1977			19

¹ Bareboat Charterer is shown in parentheses if the owner is a bank.

² This vessel, the STUYVESANT, was built with CDS but was delivered following a MarAd action permitting the owners to pay back the subsidy to the Government.

Table 4: SHIP DELIVERIES—JULY 1, 1976-JUNE 30, 1977—WORLDWIDE (TONNAGE IN THOUSANDS)

Country of Construction	Total All Types		Combination Pass. & Cargo		Freighters		Bulk Carriers		Tankers	
	No.	Dwt.	No.	Dwt.	No.	Dwt.	No.	Dwt.	No.	Dwt.
Total	1,290	51,735.7	7	22.6	594	6,532.8	409	16,239.6	280	28,940.7
United States	16	1,284.5	—	—	3	55.5	—	—	13	1,229.0
Brazil	20	711.2	—	—	12	133.5	4	291.7	4	286.0
Denmark	28	1,294.4	—	—	14	100.3	8	431.4	6	762.7
France	18	1,790.4	1	7	6	91.5	—	—	11	1,698.2
Germany, East	28	352.4	—	—	25	282.4	3	70.0	—	—
Germany, West	95	3,378.1	1	3.0	61	684.0	14	697.3	19	1,993.8
Italy	14	708.3	—	—	6	70.3	1	105.0	7	533.0
Japan	631	24,581.8	—	—	243	3,046.2	290	10,789.5	98	10,746.1
Korea, South	32	1,345.7	—	—	20	364.0	7	119.9	5	861.8
Netherlands	41	1,031.5	—	—	30	98.8	1	69.7	10	863.0
Norway	40	691.7	—	—	19	97.3	3	168.8	18	425.6
Poland	32	540.9	2	11.0	18	186.5	6	173.0	6	170.4
Spain	55	3,000.6	—	—	35	361.6	7	210.9	13	2,428.1
Sweden	38	5,207.7	—	—	1	6.1	8	885.2	29	4,316.4
United Kingdom	49	2,278.1	—	—	21	322.5	15	572.0	13	1,383.6
U.S.S.R.	29	476.8	—	—	19	141.1	6	126.0	4	209.7
Yugoslavia	15	1,077.5	1	1.5	2	30.0	8	671.6	4	374.4
All Others	109	1,984.1	2	6.4	59	461.2	28	857.6	20	658.9

Table 5: SHIP FINANCING GUARANTEES—COMMITMENTS APPROVED IN FY 1977

Number	Type	Company	Amount Guaranteed
Deepdraft Vessels:			
2	Container Vessels	American Export Lines <i>EDS</i>	\$ 34,915,000
2	RO/RO Vessels	American Export Lines <i>- EDS</i>	8,423,000
1	RO/RO Vessel	666 Leasing Co.	33,646,000
1	Container Vessel	Matson Navigation Co.	54,818,750
4-3*	Reconstruction—Cargo	Pacific Far East Line <i>- EDS</i>	10,380,000
3	Cargo	American Atlantic Shipping <i>- EDS</i>	14,077,000
1	Tanker	Shipco 668, Inc.	56,242,000
1	Tanker	Shipco 669, Inc.	59,569,000
1	Tanker	Shipco 2295, Inc.	75,460,000
1	Tanker	Shipco 2296, Inc.	76,625,000
1	Tanker	Shipco 2297, Inc.	73,434,000
1	Tanker	Shipco 2298, Inc.	75,047,000
2	LNG Tankers	Lachmar <i>- EDS</i>	212,201,400
1	Bulk Carrier	Armstrong Steamship Co.	36,900,000
18		Total Deepdraft Vessels	\$821,738,150
Other Types:			
Ocean:			
16	Barges	Radcliff Materials, Inc.	\$ 4,189,000
1*	Barge-Reconstruction	Bulk Food Carriers, Inc.	1,152,000
3	Barges	Lykes Bros. Steamship	780,000
4	Barges	Foss Launch & Tug	7,419,791
2	Tugs	Foss Launch & Tug	2,531,766
1	Barge	Young Brothers, Ltd.	1,218,000
2	Tugs	Hawaiian Tug & Barge Co.	3,935,000
1	Barge	McAllister Brothers, Inc.	1,960,000
2	Tugs	McAllister Brothers, Inc.	3,500,000
15	Barges	The Harbor Tug & Barge Co.	25,026,046
5	Tugs	The Harbor Tug & Barge Co.	12,766,911
1	Barge	F & S Offshore	1,220,000
3	Barges	Interstate Marine Transport	8,905,000
4	Tugs	Interstate Towing Co.	7,148,000
1	Tug	Bayou Marine Corp.	1,700,000
3	Tugs	Moran Trade Corp.	6,438,594
2	Tugs	Moran Trade Corp.	2,804,333
65		Total Ocean	\$ 92,694,441
Other Types:			
River:			
15	Barges	National Marine Service	\$ 4,639,350
2	Tugs	American Commercial Lines	4,339,000
210	Barges	American Commercial Lines	32,788,000
2	Tugs	Foss Launch & Tug	2,513,443
229		Total River	\$ 44,279,793
Drilling Service Vessels:			
6	Tug/Supply Vessels	Zapata Marine	\$ 28,693,000
1	Tug/Supply Vessel	Marine Transportation Services	327,000
1	Tug/Supply Vessel	Southern Transport Service, Inc.	331,000
8		Total Drilling Service	\$ 29,351,000
		Total Guaranteed	\$988,063,384

* Not included in ship count; involved second mortgage.

Table 6: TITLE XI FEDERAL SHIP FINANCING GUARANTEES PROGRAM SUMMARY

Principal Liability on September 30, 1977 (Statutory Limit \$6.950 Billion)

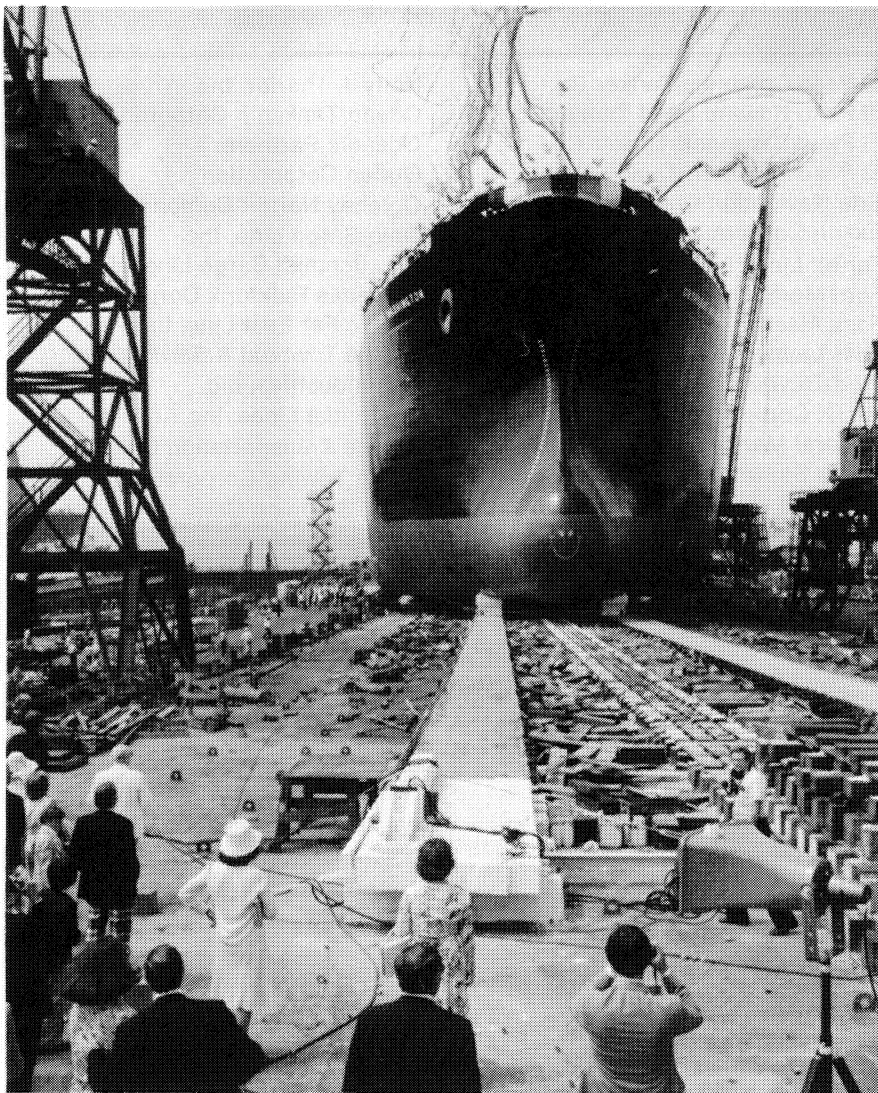
	Contracts in Force		Applications Pending	
	Vessels Covered	Principal Amount	Vessels Pending	Principal Amount
Vessel Types				
Deepdraft Vessels:				
Tankers	68	\$1,356,670,980	14	\$ 724,202,000
Cargo	182	1,026,738,840	31	557,760,900
LNGs	16	1,352,302,400	21	2,317,928,750
Bulk/OBOs	15	230,712,231	22	423,271,750
Total	281	\$3,966,424,451	88	\$4,023,163,400
Other Types:				
Drilling Rigs/Ships	44	\$ 651,748,156	15	\$ 243,210,240
Tugs/Barges/Drilling Service	1,839	989,682,086	373	374,526,077
Miscellaneous	8	60,673,564	11	126,169,491
Total	1,891	\$1,702,103,806	399	\$ 743,905,808
TOTAL VESSELS	2,172	\$5,668,528,257	487	\$4,767,069,208
SHIPBOARD LIGHTERS	2,665	103,098,535	250	8,380,000
TOTAL	4,837	\$5,771,626,792	737	\$4,775,449,208

Table 7: CAPITAL CONSTRUCTION FUND HOLDERS—SEPTEMBER 30, 1977

Aeron Marine Shipping Co.	El Paso Columbia Tanker Co.	Nolty J. Theriot, Inc.
Alaska Aggregate Corporation	El Paso Howard Boyd Tanker Co.	Ocean Tankship Corporation
Amak Towing Co., Inc.	El Paso Savannah Tanker Co.	Oceanic Partners
American Export Lines, Inc.	El Paso Southern Tanker Co.	Ogden Corporation
American President Lines	Erie Navigation Company	Oglebay Norton Company
Aquarius Marine Company	Exxon Corporation	Ohio Barge Line, Inc.
Ashland Oil, Inc.	Farrell Lines Incorporation	O.L. Schmidt Barge Lines, Inc.
Atlantic Richfield Company	Ford Motor Company	Overseas Bulktank Corp.
Bankers Trust N.Y. Corp.	Foss Alaska Line, Inc.	Pacific Far East Line, Inc.
Bethlehem Steel Corporation	Foss Launch and Tug Co.	Pacific Towboat & Salvage Co.
Boblo Company	Fred Devine Diving & Salvage, Inc.	Pott Industries, Inc.
Bultema Dock & Dredge Co.	GATX Corporation	Prudential Lines, Inc.
Campbell Towing Company	General Marine, Inc.	Ritchie Transportation Co.
Cement Transit Company	Globe Seaways, Inc.	Robin Towing Corporation
Central Gulf Lines, Inc.	Great Lakes Towing Co.	S & E Shipping Corp.
Citimarlease (Burmah I), Inc.	Hannah Brothers	Seabulk Tankers Limited
Citimarlease (Burmah LNG Carrier)	Hannah Inland Waterways Corp.	Sun Company, Inc.
Citimarlease (Burmah Liquegas), Inc.	Inland Steel Company	Tidewater Marine Service, Inc.
Citimarlease (Fulton), Inc.	Intercontinental Bulktank Corp.	Transway International Corporation
Citimarlease (Whitney), Inc.	International Ocean Transport Corp.	Union Oil of California
Cleveland-Cliffs Iron Co.	Interstate Marine Transport Co.	United States Lines, Inc.
Coastal Barge Line, Inc.	Interstate Towing Co.	United States Steel Corp.
Cook Inlet Tug & Barge Co., Inc.	Luedtke Engineering Co.	United Tanker Corporation
Crowley Maritime Corporation	Lykes Bros. Steamship Co., Inc.	Warrior & Gulf Navigation Co.
Delta Steamship Lines, Inc.	Marine Leasing Corporation	Washington Island Ferry Line
Dillingham Tug & Barge Corp.	Matson Navigation Company	Waterman Steamship Company
El Paso Arzew Tanker Co.	Moore-McCormack Resources, Inc.	Young Brothers, Limited
El Paso Cove Point Tanker Co.	National Gypsum Co.	Zidell, Inc.
	Neuman Boat Line, Inc.	

Table 8: CONSTRUCTION RESERVE FUNDS—SEPTEMBER 30, 1977

Company	Balance
Central Gulf Steamship Corp.	\$ 1,000
Kathleen Turecamo, Inc.	681
Gulf Mississippi Marine Corp.	100
Chas. Kurz & Co., Inc.	3,111,499
Keystone Tankship Corp.	423,376
Blue Danube Inc. (dba Campbell Barge Line, Inc.)	140,495
NMS Chemical Corp.	678,079
National Marine Service Inc.	1,400,016
Joan Turecamo, Inc.	332,500
Total September 30, 1977	\$6,087,746
Net Increase Fiscal Year 1977	\$4,136,570



SS OVERSEAS WASHINGTON, 90,000-dwt. San Clemente class tanker built for Overseas Shipbuilding Group Inc., glides into San Diego Bay at National Steel and Shipbuilding Company's San Diego yard.

including large containerships and tankers, sophisticated LNG vessels, self-unloading Great Lakes bulk carriers, integrated tug/barge units, offshore supply vessels, passenger and ferry vessels, and numerous tugs and barges of varying horsepower and capacity.

The total value of construction projects planned by the 85 fundholders (see Table 7) over the next 20 years is \$6.9 billion. By operating area, \$5.5 billion of construction is projected for the U.S. foreign commerce, \$764 million for the Great Lakes trade, and \$601 million for the noncontiguous domestic trade.

Construction Reserve Fund

To encourage the upgrading of the U.S.-flag fleet, the Construction Reserve Fund (CRF) permits eligible parties to defer the taxation of gain on the sale or other disposition of a vessel, if the net proceeds from the transaction are deposited in a CRF and reinvested in a new vessel within 3 years. Because the benefits of the CRF are somewhat similar to but not as broad as the benefits of the CCF program, the CRF is used predominantly by vessel owners who operate on the inland waterways or in other trades not eligible for the CCF program.

At the beginning of fiscal year 1977, eight companies maintained CRFs with a total balance on deposit of approximately \$2 million. Five companies deposited a total of approximately \$5.3 million during the fiscal year. Of the depositors, one company opened a new CRF, one company reactivated its CRF, and three companies increased balances. Two companies made withdrawals during the year; one firm completed its CRF objectives and exhausted its Fund. Withdrawals totaled

Capital Construction Fund

Since the first Capital Construction Fund (CCF) agreements were executed in the fall of 1971, the CCF has become one of the major Federal aid programs extended to the U.S. merchant marine. The CCF assists operators in accumulating capital to build, acquire, and reconstruct vessels through the deferment of Federal income taxes on eligible deposits. With today's high costs for ship construction, the availability of the CCF as a source of capital has taken on increasing importance.

During the fiscal year CCF holders deposited \$375 million into their accounts. Since the inception of the program, qualified deposits of \$1.2 billion have been made in the CCF accounts and qualified withdrawals have been made as follows: \$372 million for progress payments on new construction, \$95 million for reconstruction of existing vessels, \$133 million for payment of debt obligations on existing vessels, and \$136 million for acquisition of ships. As of September 30, 1977, the CCF balance was \$477 million.

The CCF program has broad applicability. Through it operators may build vessels for the U.S. foreign commerce, the Great Lakes trade, or the noncontiguous domestic trade. Thus, the vessels built with the program span a wide spectrum

approximately \$1.2 million. At the close of fiscal year 1977, nine companies maintained CRF balances totaling approximately \$6 million (see Table 8).

Capital Reserve Fund

Table 9 presents the status of the remaining Capital Reserve Fund held by a U.S. ship operator as of September 30, 1977. This program will be phased out in fiscal year 1978, as required by the Merchant Marine Act of 1970.

Ship Design and Engineering

The Agency continued work on the development of standby ship designs suitable for rapid series construction in the event of a national emergency. Construction would provide needed wartime shipping capacity and would provide for replacement of ship losses to meet postwar trading requirements.

A technical paper was presented to the American Society of Naval Engineers soliciting further comments on three versatile general cargo designs developed previously by MarAd. Further development of one of the three—the middle-sized 550 COMBINATION ship design—will consider incorporating features suggested in discussions of the technical paper and comments from the Department of Defense. Although designed to handle a variety of general breakbulk cargoes, the vessel will also have the flexibility to handle containerized cargoes.

A study was also begun to investigate the utility of the tug-barge concept as a mobilization ship design for emergency construction.

During fiscal year 1977 the Agency provided the following ship-design assistance to other Government agencies:

- A 120-foot fisheries research vessel was designed for the National Oceanic and Atmospheric Administration (NOAA) and a Request for Proposal package developed. MarAd will also provide assistance in the evaluation and selection of a shipbuilder, the monitoring of construction, and the acceptance trials.

- An 1,800-ton Small Waterplane Area Twin Hull (SWATH) vessel was designed to commercial standards for the Naval Sea Systems Command for towing a sonar for undersea surveillance. The superior seakeeping qualities of the SWATH make it a good candidate for such an all-weather mission, and the commercial standards result in significant cost savings over a ship built to military specifications.

- Ship designs were prepared for the Bureau of Indian Affairs (BIA) for an Alaskan village resupply operation. The BIA has an aging Victory ship, the NORTH STAR III, presently in that service. MarAd developed seven design alternatives including new ship systems, conversion of the existing ship, and refurbishment of the existing ship.

In response to a recommendation made at the National Assessment and Planning Conference on U.S.-Flag Bulk Shipping at Hyannis, Mass., the Agency prepared the preliminary design for a prototype bulk carrier with alternative options for propulsion machinery and cargo-handling gear. This work confirmed the feasibility of the design, provided a basis for estimating construction cost, and provided a baseline from which prospective owners could begin the development of a detailed design suitable for their specific needs.

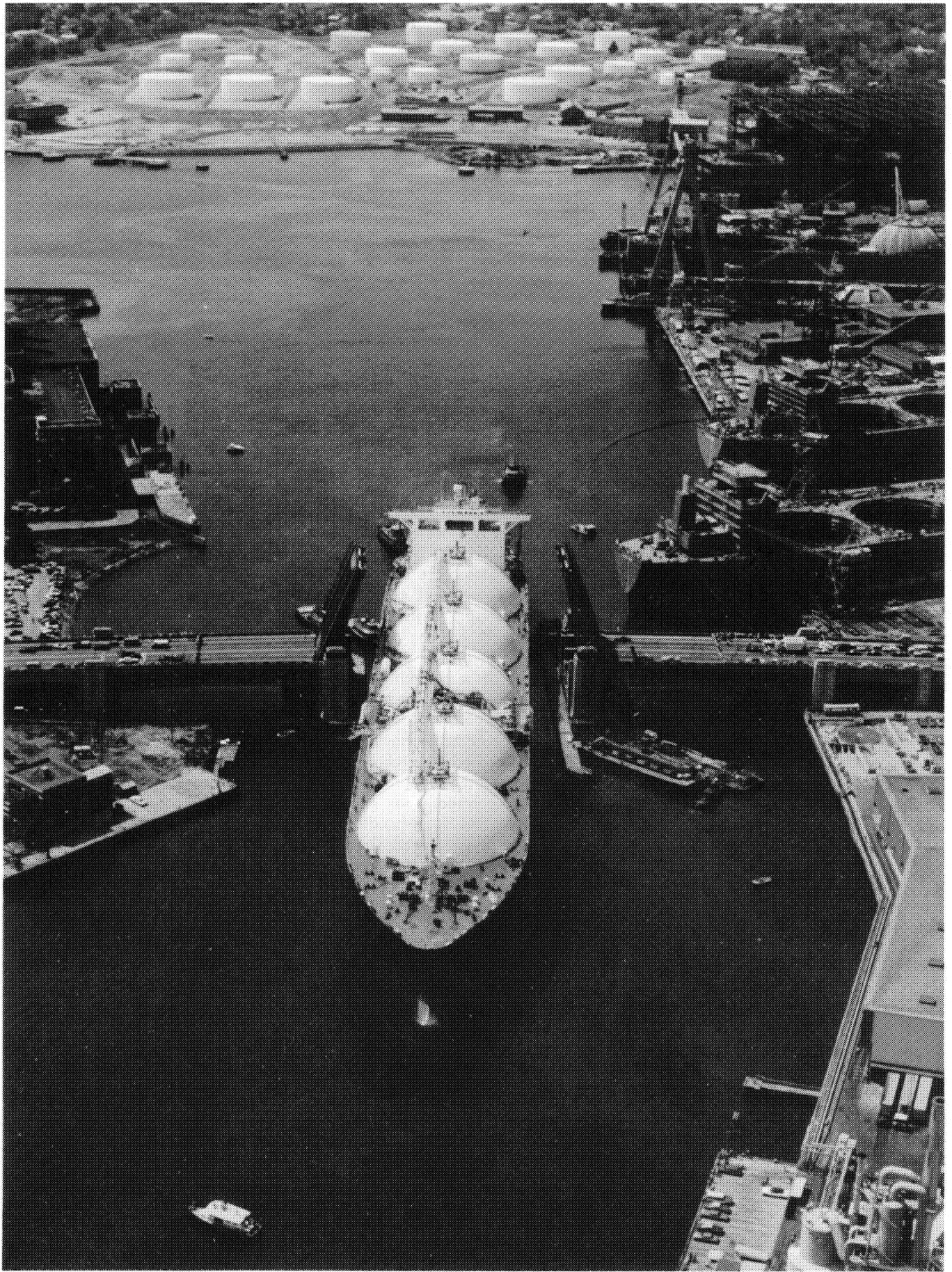
At the end of the fiscal year plans were being formulated to contract for a team of naval architects, marine engineers, and shipbuilders to review existing bulk carrier designs and identify the one most suitable for a U.S.-flag construction program.

MarAd during the fiscal year published a Tanker Pollution Abatement Report which examined various ship design features and operations techniques such as hull design and construction, ship propulsion and maneuverability, safety of navigation, pollution abatement systems and equipment, and crew standards and training. The report presented alternatives to regulations proposed by the U.S. Coast Guard and presented the benefits and costs of these alternatives as they relate to tankers constructed under CDS.

MarAd assisted in a study evaluating the impact of retrofitting segregated ballast on existing oil tankers in the 20,000 to 70,000-dwt. range. The results of this study, performed in conjunction with the U.S. Coast Guard and American Bureau of Shipping, were presented to the Marine Environment Protection Committee of the Intergovernmental Maritime Consultative Organization.

The Maritime Administration contributed heavily to two Navy projects: (1) a project to ensure that merchant ships are capable of communicating effectively with Navy vessels and to determine the merchant ship communications equipment needed to accomplish this, and (2) a study to assess the feasibility, suitability, and availability of increased civilian manning of Navy auxiliary vessels.

During the fiscal year the Navy transferred caretakership of the GLOMAR EXPLORER to MarAd, which developed the technical details and safety criteria for towing this deep sea mining/salvage vessel to the Suisun Bay Reserve Fleet.



As part of the Office of Ship Construction's effort to help promote emergency readiness, engineering assistance was provided to design a radio communications facility to support the Ready Reserve Fleet.

The Maritime Subsidy Board approved and cleared the way for the domestic development of the slow-speed diesel engine. This development is a major breakthrough for American shipbuilders and operators.

Finally, the Agency worked closely with the Institute of Electrical and Electronic Engineers (IEEE) Committee on Marine Transportation to revise IEEE Standard 45, "IEEE Recommended Practice for Electric Installations on Shipboard."

Value Engineering

By promoting the development and application of design and engineering innovations, MarAd's Value Engineering Program attempts to lower the cost of ship construction without impairing essential vessel design characteristics.

Potential savings of \$875,000 were achieved in fiscal year 1977. Since the program's inception in 1957, cumulative savings have amounted to \$32 million—an average of more than \$1.5 million per year.

Shipyard Improvements

Since enactment of the Merchant Marine Act of 1970, the American shipbuilding and ship repair industry has invested approximately

LNG AQUARIUS, first liquefied natural gas tanker completed in U.S., moves through drawbridge following completion at General Dynamics' Quincy, Mass., shipyard.

\$1.3 billion in facilities modernization and capital improvements, of which \$135 million was expended during fiscal year 1977.

Despite continuing economic uncertainties in the worldwide shipbuilding market, U.S. shipyards plan to spend approximately \$167 million for facility improvements during fiscal year 1978.

The following are selected examples of expansion and modernization programs completed in recent years at five major shipyards:

Newport News Shipbuilding & Dry Dock Co., Newport News, Va.—In early 1977 Newport News completed construction of an entirely new multimillion-dollar commercial shipyard adjacent to its existing yard. The most important of the new facilities is a large building basin 1,600 feet long, 250 feet wide, and 44 feet deep—the largest graving dock in the United States. Other new installations include a steel production plant, with automatic panel lines and supporting equipment, with an annual steel capacity of 200,000 tons. A new 900-ton Goliath gantry crane, one of the largest in the world, can handle complete subassemblies.

Avondale Shipyards, Inc., New Orleans, La.—In late 1975, Avondale completed a significant facilities improvement and expansion program centered around construction of two new building ways on which three ships up to 1,050 feet in length by 174 feet in beam can be constructed simultaneously. For launching new ships and for major conversion work, the company also added a 900-by-260-foot floating drydock with a lifting capacity of 81,000 long tons.

General Dynamics Corp., Quincy Shipbuilding Division, Quincy, Mass.—To enable this facility to construct large LNGs in series production, General Dynamics in 1975 complete a major improvement and modernization program. Two conventional inclined shipways were converted to large building basins. Steel production and material-handling capabilities were upgraded; and a 1,200-ton Goliath crane, the largest in the Western

Hemisphere, was installed. Other capital investments included expenditures for new tools, machinery, and buildings at the company's newly acquired Charleston, S.C., plant, where spherical aluminum tanks are fabricated for the LNG carriers.

Sun Shipbuilding & Dry Dock Co., Chester, Pa.—Completion of its facilities-expansion program in 1976 provided Sun Ship with the capacity to build ships as large as 400,000 dwt. On the new level "shipbuilding platform," two halves of a ship as large as 1,400 feet by 195 feet can be constructed, or two smaller vessels 700 feet in length or less can be built simultaneously. Sun's new, two-section floating drydock, with a lifting capacity of 75,000 long tons, can accommodate ships as wide as 195 feet.

National Steel and Shipbuilding Co., San Diego, Calif.—In early 1976 NASSCO completed a multimillion-dollar expansion and modernization program which enabled the yard to build ships as large as 190,000 dwt. In its new building basin, NASSCO can produce ships up to 980 feet by 170 feet, compared to the previous maximum of 900 feet by 106 feet.



SS AMERICAN SPIRIT, first of two 265,000-dwt. tankers built at Bethlehem Steel Corp.'s Sparrows Point (Md.) Shipyard for Gulf Oil Corp., sails down Chesapeake Bay on her trials.

EEO In Shipyards

The Maritime Administration is responsible for ensuring that Government contractors in the maritime industries provide equal employment opportunities (EEO) to all Americans regardless of race, color, religion, sex, or national origin. Through its Office of Civil Rights, MarAd conducts EEO compliance reviews at contractor facilities to audit employment practices and affirmative action programs. Where discriminatory practices are encountered, corrective programs are initiated. The ship construction and repair facilities

monitored by MarAd account for 80 percent of the U.S. shipbuilding industry's total employment.

While total shipyard employment between 1969 and 1977 increased by 13.4 percent to 126,412 employees, minority group employment rose by 62.5 percent to 35,627 employees. Minorities represented 28.1 percent of shipyard employment in 1977 compared to 19.6 percent in 1969. The employment of women increased by 150.6 percent to 10,491 and now accounts for 8.3 percent of the 1977 workforce, as compared to 3.7 percent in 1969.

Minority representation in skilled jobs and white-collar salaried jobs—both indicators of progress in the quality of jobs held—also improved. In 1977 minority employees accounted for 31.5 percent of the skilled workforce as compared to 17.8 percent in 1969. The numerical increase translates into a gain of 82.9 percent by minority workers, while the total skilled category increased by only 3.2 percent. Minority white-collar salaried representation increased to 11 percent in 1977 from 4.1 percent in 1969. The numerical gain translates into a 209.3 percent increase for minorities while the total category increased by only 16.3 percent.

In the post-World War II era women were virtually excluded from blue-collar jobs. In 1969, 160 women represented 0.2 percent of blue-collar workers. By 1974 women held 2,381 blue-collar jobs representing 3 percent of blue-collar workers. In 1977 women accounted for 4,920 blue-collar jobs, which equated to 5.4 percent of the total.

The ranks of women in skilled craft jobs increased from 62 in 1969 (0.1 percent) to 1,243 in 1977 (2.1 percent). Women in semiskilled jobs increased from 33 in 1969 (0.1 percent) to 2,428 in 1977 (10.3 percent).

Traditionally, minorities and women in the white-collar salaried workforce were concentrated in the office and clerical categories. Between 1969 and 1977 minorities and women made substantial gains in the white-collar nonclerical jobs. The following chart displays the data for the white-collar salaried workforce, excluding clerical positions:

	1969	1977	Change in Number 1969-77	Change in Percent 1969-77
Total	23,540	29,125	5,585	23.7
Women	442	1,406	964	218.1
Percent	1.9	4.8		
Minority	790	2,558	1,768	223.8
Percent	3.4	8.8		

Minority Business Enterprise Program

The Maritime Administration Minority Business Enterprise Program, begun in 1974, encourages shipbuilding and shipping companies to use minority suppliers and vendors and advises the minority community of the opportunities for sales to the maritime industry. When the program began there was little or no record-keeping by the companies with respect to their minority business purchases. It is estimated that less than \$1 million per year of business was transacted by maritime companies with minority entrepreneurs prior to 1974. By FY 1976 the industry was doing more than \$11 million worth of business annually with minority firms and in FY 1977 the total increased to \$17.9 million.

The program is coordinated closely with the Office of Minority Business Enterprise, MarAd's sister agency in the Department of Commerce. One of the joint efforts of the agencies was to publish and distribute a minority business directory to procurement officials of the maritime industry.

As part of its ongoing effort, MarAd plays a leading role in the Federal Executive Board Minority Business Programs. MarAd personnel have acted as chairpersons on the Federal Executive Board Programs in New Orleans and San Francisco, and of the Minority Business Opportunity Committee in Cleveland.

Through the efforts of the Maritime Administration a black-owned stainless steel company has more than tripled its shipyard sales which now account for nearly \$1 million a year. A Mexican-American welding supply company quadrupled its shipyard sales to well over \$2 million annually.



C.M. STAG HOUND
NEW YORK

Chapter 2

Ship Operations

The privately owned U.S. merchant marine (see Table 10) comprised 579 oceangoing merchant vessels of 16.9 million deadweight tons (dwt.) on September 30, 1977. The number of ships was identical one year earlier but, indicative of a trend toward larger vessels, the fleet's carrying capacity increased by more than 1 million dwt. during the fiscal year. The privately owned segment of the fleet included 544 active vessels and 35 in inactive status. They had an average deadweight of 29,188 tons, an average age of 17 years, and an average speed of 18 knots.

Employment of the U.S.-flag oceangoing merchant fleet as of September 30, 1977, is shown in Table 11. The fleet maintained its 10th place rank in size, on the basis both of the number of ships and deadweight tonnage, among the merchant fleets of the world, as indicated in Table 12

In calendar year 1976, a Maritime Administration survey of American-flag shipping operators indicated, 45 companies reported combined revenues of \$2.4 billion and net profits from shipping operations totaling \$158.3 million. The combined

condensed financial statements of responding operators are presented in Appendix II.

Also in calendar year 1976, U.S. oceanborne foreign trade reached a record 699 million tons with a record value of \$148 billion. The U.S.-flag share increased in both tonnage and dollar value, compared to calendar year 1975, but the U.S.-flag share, as a percentage of the total tonnage, declined from 5.1 to 4.8 percent. Commercial cargoes carried in U.S. oceanborne foreign trade from 1966 through 1976 are shown in Table 13.

U.S.-flag service between the Great Lakes and the Mediterranean and Africa was expanded in FY 1977, as Lykes Bros. Steamship Co., Inc., and Farrell Lines, Inc., increased their sailings in response to increased trade on those routes.

Operating Subsidy

The Maritime Administration is authorized to pay operating-differential subsidy (ODS) to U.S. shipping companies to offset the higher cost of operating a vessel in foreign trade, compared to operating costs under a foreign flag. In past years this form of promotional aid generally covered wages, insurance, maintenance and repairs not compensated by insurance, and subsistence of officers and crews on passenger ships. However, to reduce the industry's dependence upon subsidy, one contract executed

during fiscal year 1977 excluded subsidy for hull and machinery insurance premiums and maintenance and repairs not compensated by insurance. These exclusions, as well as others executed since 1975, are expected to result in savings of \$9 million during calendar year 1978.

All modern cargo vessels, including bulk carriers, that operate in an essential foreign trade are eligible for ODS. Total payments during fiscal year 1977 amounted to \$344 million. Operating-differential subsidy accruals and expenditures from January 1, 1937, through September 30, 1977, are summarized in Table 14, while accruals and outlays by shipping lines for the same period are shown in Table 15.

Regular ODS

On September 30, 1977, 21 operators (10 liner and 11 bulk) held 22 long-term ODS agreements with the Agency (see Table 16). Of 186 vessels covered under these agreements, 182 were in operation and the other four were under construction or on order.

Payments during fiscal year 1977 pursuant to these regular ODS agreements totaled \$309.6 million. ODS accruals from January 1, 1937, to September 30, 1977, totaled \$5,067.3 million; recapture amounted to \$238.2 million, leaving a net accrual of \$4,829.1 million. Of the net accrual, \$4,759.1 million has been paid out, leaving an estimated balance of \$70 million.

Table 9: CAPITAL RESERVE FUNDS¹—SEPTEMBER 30, 1977

Operator	Cash	Securities	Balance
States Steamship Co.	\$3,045.14	\$4,379,167.87	\$4,382,213.01

¹ Cash, approved interest bearing securities, and common stocks under approved common stock trust or deposit in the statutory Capital Reserve Fund of a subsidized operator.

NOTE: All Special Reserve Funds have been closed. The one remaining Capital Reserve Fund will be phased out as required by the Merchant Marine Act of 1970.

C.V. STAG HOUND, 16,000-dwt. container vessel operated by American Export Lines, Inc., steams into port.

One long-term (20-year) ODS agreement was executed in the fiscal year for operations by Waterman Steamship Corporation on Trade Routes 12 and 22 (linking U.S. Atlantic and Gulf Coast with Far East ports). This agreement was suspended on May 18, 1977, after Waterman advised MarAd that it was not prepared at that time to meet a ship-replacement obligation, but it was subsequently reinstated when the replacement obligation was resolved.

Contract Awards

American President Lines, Ltd. was awarded a 1-year ODS contract, effective January 1, 1977, (subject to a 1-year extension at the discretion of the Maritime Subsidy Board) for service from U.S. Atlantic, Gulf, and Pacific ports to the Far East. The short-term agreement replaced a contract which expired December 31, 1976.

Pending Applications

Thirteen ODS applications from nonsubsidized operators were pending on September 30, 1977.

In addition, seven companies with existing ODS contracts applied either for renewals of existing contracts for operating subsidy to provide for additional sailings or new contracts for other services as follows:

- American Export Lines, Inc.—for services from U.S. Atlantic and Gulf ports to ports in India, the Persian Gulf, and Red Sea (Trade Route 18).

- American President Lines, Ltd.—for a long-term renewal of its ODS agreement for transpacific freight service (Trade Route 29); and for round-the-world westbound service.
- Lykes Bros. Steamship Co., Inc.—for a long-term renewal of its ODS agreement for service from U.S. ports to ports in the United Kingdom and Continent (Trade Route 21), the the Mediterranean (Trade Route 13), the Far East (Trade Route 22), South and East Africa (Trade Route 15-B), and to the West Coast of South America (Trade Route 31); from South Atlantic ports to the Mediterranean (Trade Route 13); and from U.S. Great Lakes ports to ports in the Mediterranean, India, and the Persian Gulf, and the Red Sea (Trade Route 4), Lykes also has applied for a new long-range contract for services between U.S. Atlantic and Gulf ports and ports in India, the Persian Gulf, and the Red Sea, and ports in the Mediterranean (Trade Routes 10 and 18). In addition, Lykes has applied for a 1-year contract covering existing services. This would permit the company to maintain the continuity of these services until proceedings are complete with respect to its long-term application.
- Pacific Far East Line, Inc.—for a long-term renewal of its ODS agreement for service from U.S. Pacific ports to ports in Australia for passenger/cargo service only (Trade Route 27) and for extended transpacific freight service (Trade Route 29).
- Prudential Lines, Inc.—for a long-term renewal of its ODS agreement for service from U.S. Atlantic ports to the West Coast of South America (Trade Route 2), U.S. Atlantic ports to the Caribbean (Trade Route 4), U.S. Pacific ports to the Caribbean and East Coast of Mexico, the East Coast of South America, and the Wests Coasts of Mexico, and Central and South America, respectively (Trade Routes 23, 24, and 25), with

requests for additional ports in each of these trade routes. Prudential's application also covers service from U.S. North Atlantic ports to the Mediterranean (Trade Route 10), U.S. South Atlantic to the Mediterranean and Black Sea (Trade Route 13), and additional service from U.S. North and South Atlantic ports to the Atlantic Coast of Spain north of Portugal (Trade Routes 5-7-8-9-11). In addition, Prudential has applied for a new long-range contract for services between U.S. Atlantic and Gulf ports and ports in India, the Persian Gulf, and the Red Sea (Trade Route 18).

- States Steamship Co.—for a long-term renewal of its ODS agreement for Transpacific Far East service (Trade Route 29). States also has applied for a 1-year contract covering its existing services to permit the company to maintain the continuity of its services until proceedings are complete with respect to its long-term application.
- Waterman Steamship Corp.—for services from U.S. Gulf ports to the United Kingdom and Continent (Trade Route 21), from U.S. North Atlantic ports to the United Kingdom and Continent (Trade Routes 5, 7, 8, 9), U.S. North Atlantic ports to Scandinavia and the Baltic (Trade Route 6), and from U.S. South Atlantic ports to the United Kingdom and Europe north of Portugal (Trade Route 11). Waterman also has applied for an increase in sailings from 40 to 70 annually on its service from U.S. Atlantic and Gulf ports to ports in India, the Persian Gulf, and the Red Sea (Trade Route 18).

Subsidy Index

The Subsidy Index System embodied in the 1970 Act provides for the payment of wage subsidies in per diem amounts. The rate of change in the index, computed annually by the Bureau of Labor Statistics, is used as the measure of change in seafaring employment costs. Since the collection of foreign cost data takes several months, the Maritime Subsidy Board establishes tentative subsidy rates within 90 days of the beginning of each fiscal year. The tentative fiscal year 1977 rates for all subsidized vessels were completed in September 1976. Tentative rates for fiscal year 1978 were completed in August 1977.

MarAd completed all final 1974 subsidy rates applicable to liner and passenger vessels in liner service. In the Soviet Grain Program, 140 of 305 final rates have been completed since the inception of the program in fiscal year 1973.

Soviet Grain ODS

The United States and the Soviet Union have signed two maritime agreements, a 3-year accord in October 1972 and a 6-year accord in December 1975.

Since the 1972 agreement was signed, U.S.-flag ships have participated in the carriage of more than 47.4 million metric tons of grain purchased by the Soviet Union. During this period American-flag ships, carrying 11.9 million tons of grain, made 333 voyages to the Soviet Union.

As of September 30, 1977, 41 operators held short-term ODS agreements covering 79 vessels for the carriage of agricultural commodities from U.S. ports to ports in the U.S.S.R. (see Table 17).



Payments made during fiscal year 1977 under the special Soviet grain subsidy agreements totaled \$34.3 million (see Table 14). Thirty-eight U.S. bulk vessels were fixed for 64 voyages during fiscal year 1977, and accrued \$32 million in operating-differential subsidy.

These ODS agreements allow operators up to 1 year after termination of a grain voyage to submit their actual subsidizable costs for audit in order to determine the total subsidy due on each completed voyage. On September 30, 1977, 184 audits of cost submissions had been completed for voyages terminated through the same date, permitting the determination of final subsidy rates and payments to the operators.

Since the program was begun in FY 1973, operators have accrued \$135.4 million in ODS. Of this accrual, \$119.8 million has been paid, leaving an estimated unpaid balance of \$15.6 million.

In addition to exporting grain cargoes, these vessels have the capacity to import substantial amounts of crude oil and petroleum products on return voyages.

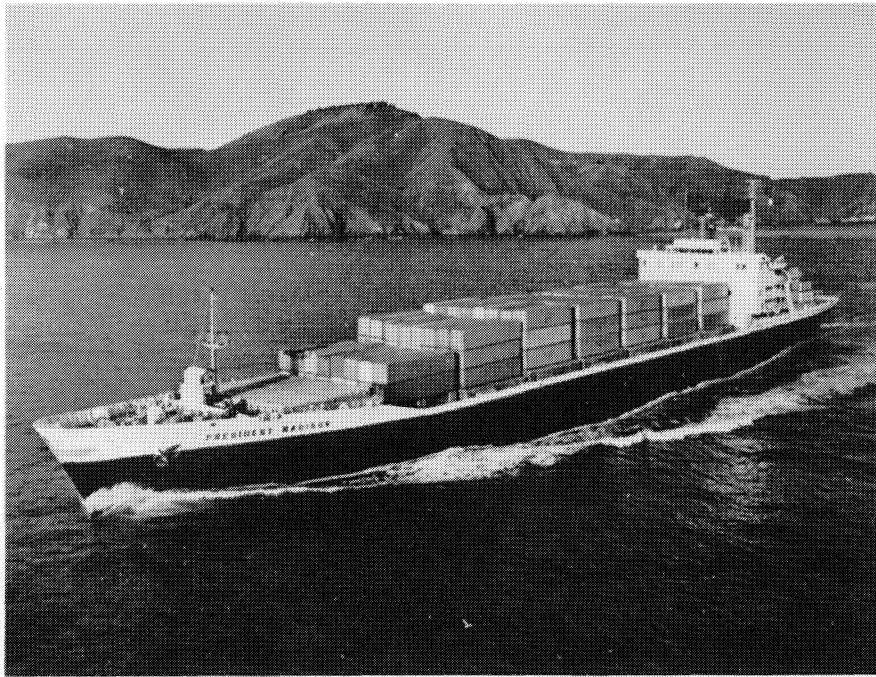
A 5-year grain trade agreement, effective October 1, 1976, calls for the Soviet Union to purchase at least 6 million metric tons of grain per

SS PACIFIC BEAR, one of four LASH (lighter- aboard-ship) vessels converted or scheduled for conversion to container-ships by Pacific Far East Line, Inc.

year from U.S. supplies with the option, within certain guidelines, of increasing this purchase to 8 million metric tons per year. The U.S.-U.S.S.R. Maritime Agreement, described in Chapter 10, provides U.S. vessels with the opportunity to carry at least one-third of total grain cargoes.

Grain Rates

A new U.S.-U.S.S.R. freight rate agreement, which went into effect March 25, 1977, provides for a \$16.47 rate to be paid U.S.-flag vessels transporting grain to the Soviet Union through December 31, 1977. The base freight rate is \$16 per long ton. The extra 47 cents per ton represented additional freight owed U.S.-flag vessels for cargoes not carried during 1976.



SS PRESIDENT MADISON sails as part of American President Lines, Ltd.'s, containership fleet in transpacific service.

Contract Awards

During fiscal year 1977 two new operators with two ships were awarded short-term ODS contracts under the Soviet Grain Program. In addition, two operators with existing contracts added 10 vessels to their contracts. Four existing operators with eight ships terminated their ODS contracts and seven existing operators withdrew 13 vessels from the program. A net loss of two operators and nine vessels was recorded during the fiscal year.

Passenger Ships

The passenger liner SS UNITED STATES, acquired by the Maritime Administration under Public Law 92-296 on February 5, 1973, remained in lay-up in the National Defense Reserve Fleet at Norfolk, Va. In October 1976, Congress passed legislation, subsequently signed by the President, to amend Public Law 92-296 to allow the use of the vessel as a floating hotel on, or in, the

navigable waters of the United States. An Invitation to Bid on the purchase of the ship was issued on December 1, 1976, but, as in all previous instances, all bids were determined to be unresponsive to the invitation and were rejected.

On September 30, 1977, the active U.S.-flag passenger fleet consisted of the SS MONTEREY and SS MARIPOSA, operated by Pacific Far East Line, Inc., in the Pacific trade, and four combination passenger/cargo vessels, the SSs SANTA MAGDALENA, SANTA MARIA, SANTA MARIANA, and SANTA MERCEDES operated by Prudential Lines, Inc., in the South American trade.

The MONTEREY and MARIPOSA, recipients of operating-differential subsidy, were approaching the end of their 25-year statutory economic lives as FY 1977 came to a close, with ODS termination dates of December 18, 1977, and April 3, 1978, respectively.

Limited passenger service (approximately 12 passengers per vessel) was continued in FY 1977 by seven U.S.-flag operators: Farrell Lines, Inc.; Moore-McCormick Lines, Inc.; Lykes Bros. Steamship Co., Inc.; American President Lines, Ltd.; Waterman Steamship Corp.; Delta Steamship Lines, Inc.; and United States Lines, Inc.

Section 804 Activities

Section 804 of the Merchant Marine Act, 1936, as amended, makes it unlawful for a contractor receiving ODS or any holding company, subsidiary, affiliate or associate of such contractor, directly or indirectly to own, charter, act as agent or broker for, or operate any foreign-flag vessels which competes with an essential American-flag service, without the prior approval of the Secretary of Commerce. The prohibition also applies to any officers, directors, agents, or executives of such an organization.

During fiscal year 1977 the following waivers were granted under Section 804:

- Keystone Shipping Co. and affiliates—to permit the establishment of a joint husbanding service agency between Kurz New York Agency, Inc., and Moran Shipping Agencies, Inc., to provide ship husbanding services for foreign-flag vessels in the Port of New York area.
- Berger Group Companies—to permit Avon Steamship Co., Inc., an affiliated company, to act as husbanding agent for certain foreign-flag vessels managed by Allied Shipping International Corp.
- The following Section 804 waivers were granted in connection with the transport of grain to the Soviet Union:
 - Albatross Tanker Corp.—to permit Seatrain Lines, Inc. ultimate parent of Albatross, and subsidiaries of Seatrain to own, charter, and/or operate foreign-flag vessels.
 - Fredericksburg Shipping Co.—to permit affiliates of Fredericksburg to continue to own, charter, and operate foreign-flag vessels.

In addition, waivers previously granted to 37 companies were updated and renewed, allowing them to continue operation in the special Soviet Grain ODS Program.

Trade Routes

No changes were made in the number or description of routes and services determined to be essential to foreign commerce of the United States. Emphasis continued to be given to surveillance over the continuing essentiality of and requirements for U.S.-flag service on those routes and services where applications were pending for new or amended ODS contracts.

A revised Manual of Procedures and Criteria for Determining the Essentiality of U.S. Foreign Trade Routes and Requirements for U.S.-Flag Service was completed and approved during the year.

EEO In Ship Operations

In 1969 the Maritime Administration assumed responsibility for monitoring compliance by American

ship operators with Federal equal employment opportunity (EEO) statutes. EEO progress in this segment of the industry is measured by considering as a data base those major ship operators accounting for 80 percent of the total U.S. shore-side nancasual employment.

Between 1969 and 1977 total employment in ship operations rose to 8,646 employees, an increase of 23.1 percent while minority employment rose to 1,583, an increase of 116.8 percent. Minorities now

Table 10: U.S. OCEANGOING MERCHANT MARINE—SEPTEMBER 30, 1977¹

	Privately Owned		Government-Owned		Total	
	Ships	Deadweight Tons (000)	Ships	Deadweight Tons (000)	Ships	Deadweight Tons (000)
Active Fleet:						
Combo Pass./Cargo	6	50	5	38	11	88
Freighters	140	1,932	13	126	153	2,058
Bulk Carriers	17	513	0	0	17	513
Tankers	233	9,882	2	21	235	9,903
Intermodal	143	2,799	0	0	143	2,799
Tug/Barges	5	182	0	0	5	182
Total Active Fleet	544	15,358	20²	184	564	15,543
Inactive Fleet:						
Combo Pass./Cargo	0	0	51	316	51	316
Freighters	6	74	175	1,841	181	1,915
Bulk Carriers	1	17	0	0	1	17
Tankers	24	1,394	12	164	36	1,557
Intermodal	4	74	4	47	8	121
Tug/Barges	0	0	0	0	0	0
Total Inactive Fleet	35	1,558	242³	2,367	277	3,926
Total Active and Inactive by Type:						
Combo Pass./Cargo	6	50	56	354	62	404
Freighters	146	2,006	188	1,967	334	3,973
Bulk Carriers	18	529	0	0	18	529
Tankers	257	11,276	14	185	271	11,461
Intermodal	147	2,873	4	47	151	2,920
Tug/Barges	5	182	0	0	5	182
Total American Flag	579	16,916	262	2,552	841	19,469

¹Vessels of 1,000 gross tons and over, excluding privately owned tugs, barges, etc.

²Includes 3 vessels in bareboat charter and 10 vessels in custody of other agencies.

³National Defense Reserve Fleet consists of 241 vessels of which 32 are scrap candidates. Excluded are 63 vessels owned by the Navy Department which are in the custody of MarAd's Reserve Fleet.

NOTE: Tonnage figures may not be additive due to rounding.

Table 11: EMPLOYMENT OF U.S.-FLAG OCEANGOING MERCHANT FLEET—SEPTEMBER 30, 1977¹

Status and Area of Employment	Vessel Type							
	Total		Combination Pass./Cargo		Freighters		Tankers	
	No.	Dwt. (000)	No.	Dwt. (000)	No.	Dwt. (000)	No.	Dwt. (000)
Grand Total	841	19,468	62	404	504	7,446	275	11,618
Active Vessels	564	15,542	11	88	314	5,394	239	10,060
Foreign Trade ²	262	6,179	5	44	219	4,101	38	2,034
Nearby Foreign	22	705	0	0	7	124	15	581
Great Lakes-Seaway Foreign	6	81	0	0	6	81	0	0
Overseas Foreign	234	5,393	5	44	206	3,896	23	1,453
Foreign to Foreign	19	638	0	0	16	191	3	447
Domestic Trade	214	7,442	1	6	43	640	170	7,796
Coastwise	125	3,931	0	0	8	137	117	3,794
Intercoastal	15	401	0	0	0	0	15	401
Noncontiguous	74	3,110	1	6	35	503	38	2,601
Other U.S. Agency Operations	69	1,283	5	38	36	462	28	783
MSC Charter	49	1,099	0	0	23	337	26	762
Bareboat & Other Custody	20	184	5	38	13	125	2	21
Inactive Vessels	277	3,926	51	316	190	2,052	36	1,558
Temporarily Inactive	21	885	0	0	3	44	18	841
Merchant Types	21	885	0	0	3	44	18	841
Military Types	0	0	0	0	0	0	0	0
Laid-Up (Privately Owned)	14	673	0	0	8	120	6	553
Laid-Up (MarAd-Owned)								
Pending Disposition	1	10	1	10	0	0	0	0

¹Excludes vessels operating exclusively on the inland waterways, Great Lakes and those owned by the United States Army and Navy and special types such as cable ships, tugs, etc.

²Nearby Foreign includes Canada, Central America, West Indies, North Coast of South America, and Mexico.

³Excludes vessels owned by the Navy Department which are in the custody of MarAd's Reserve Fleet.

Table 12: MAJOR MERCHANT FLEETS OF THE WORLD¹—JUNE 30, 1977

Country	No. of Ships	Rank by ² No. Ships	Dwt. (Thousands)	Rank by Dwt.
Liberia	2,722	1	154,292	1
Japan	2,097	3	67,837	2
United Kingdom	1,526	6	56,012	3
Norway	1,003	7	51,946	4
Greece	1,969	4	41,617	5
Panama	1,699	5	26,385	6
France	461	15	20,660	7
U.S.S.R.	2,439	2	19,754	8
Italy	627	9	17,805	9
United States (Privately Owned)	577	10	16,520	10
Germany (West)	652	8	15,124	11
Sweden	335	—	14,204	12
Spain	481	13	10,919	13
Singapore	485	12	10,012	14
Denmark	374	—	8,514	15
All Others ³	6,455	—	95,114	—
Total	23,902	—	626,715	—

¹Oceangoing merchant ships of 1,000 gross tons and over.

²By number of ships, Cyprus ranks 11th with 533 vessels aggregating 4,120,000 dwt., and the Netherlands ranks 14th with 472 vessels aggregating 8,285,000 dwt.

³Includes 269 United States Government-owned vessels 2,593,000 dwt.

represent 18.3 percent of ship operations employment, as compared with 10.4 percent in 1969. The employment of women in ship operations rose in 1977 to 3,293, an increase of 45.8 percent from 1969. Women accounted for 38 percent of the 1977 ship operations' total workforce—up from 32.1 percent in 1969.

Ship operations employees are essentially white-collar workers. Of the 7,025 employed in the white-collar, salaried workforce in 1969, minority representation was 730, or 10.3 percent. Moreover, 597, or 82 percent of the minorities in this white-collar, salaried workforce in 1969 were employed in the office and clerical category while only 106, or 4.5 percent, were employed in the top three categories combined—technicians, professionals, and officials and managers. By 1977, however, the presence of minorities

in the top three categories had increased to 382, or 10.3 percent of total employed in the top three.

The status of women in white-collar salaried employment in ship operations also showed continued improvement. In 1977 they occupied 413 position in the top three categories, compared with 48 in 1969. Women now account for 11.2 percent of the total employed in these categories.

Foreign Transfers

During the fiscal year the Maritime Administration approved the transfer to foreign firms of 34 ships of 1,000 gross tons and over (see Table 18). Nineteen of the vessels were undocumented or registered under foreign flags although owned by U.S. citizens. Eight were sold for scrapping abroad.

Approvals also were granted for the foreign transfer of 434 vessels of less

than 1,000 gross tons, including 256 commercial and 178 pleasure crafts.

Approved for charter to aliens were 112 U.S.-owned ships over 1,000 gross tons and 68 under 1,000 gross tons.

Pursuant to Public Law 89-346 and General Order 107, MarAd approved the retention of 42 banks on the Roster of Approved Trustees. One new bank was approved as trustee.

Approval also was granted for one U.S. corporation to transfer part interest in its shipyard to an alien.

During FY 1977 there were 64 sale violations involving privately owned ships, of which 47 were mitigated.

User charges for filing applications for foreign transfers and similar actions totaled \$46,450.

Table 13: U.S. OCEANBORNE FOREIGN TRADE/COMMERCIAL CARGO CARRIED
Tonnage (Millions)

Calendar Year	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Total-Tons	392.3	387.6	418.6	427.5	473.2	457.4	513.6	631.6	628.9	615.6	698.8
U.S.-Flag Tons	26.2	20.5	25.0	19.8	25.2	24.4	23.8	39.9	40.9	31.4	33.8
U.S. Percent of Total	6.7	5.3	6.0	4.6	5.3	5.3	4.6	6.3	6.5	5.1	4.8
Liner Total Tons	49.9	47.9	46.1	41.9	50.4	44.2	44.6	51.3	51.4	44.3	49.8
Liner U.S.-Flag Tons	11.4	10.6	11.1	9.7	11.8	10.1	9.8	13.2	15.3	13.6	15.4
Liner U.S. Percent	22.9	22.2	24.0	23.1	23.5	22.9	21.9	25.8	29.8	30.7	30.9
Non-Liner Total Tons	189.5	190.4	209.5	212.1	240.7	220.7	242.6	281.9	282.7	275.3	289.6
Non-Liner U.S.-Flag Tons	6.9	5.4	6.4	4.6	5.4	4.8	3.8	4.5	5.0	3.8	4.9
Non-Liner U.S. Percent	3.6	2.8	3.0	2.2	2.2	2.1	1.6	1.6	1.8	1.4	1.7
Tanker Total Tons	152.8	149.3	163.1	173.5	182.1	192.5	226.4	298.4	294.8	296.0	359.4
Tanker U.S.-Flag Tons	7.9	4.5	7.5	5.5	8.0	9.5	10.2	22.2	20.5	14.0	13.6
Tanker U.S. Percent	5.2	3.0	4.6	3.2	4.4	4.9	4.5	7.4	7.0	4.7	3.8
Dollar Value (\$ Billions)											
Total Value	36.4	36.6	41.1	41.9	49.7	50.4	60.5	84.0	124.2	127.5	148.4
U.S.-Flag Value	8.2	7.9	8.5	8.1	10.3	9.9	11.1	15.9	22.0	22.4	26.5
U.S. Percent of Total	22.5	21.7	20.7	19.3	20.7	19.6	18.4	18.9	17.7	17.5	17.8
Liner Total Value	24.8	24.8	26.8	27.2	33.5	32.4	37.4	49.6	63.4	64.0	75.8
Liner U.S.-Flag Value	7.5	7.4	7.8	7.5	9.7	9.2	10.3	14.4	19.4	20.0	23.9
Liner U.S. Percent	30.4	29.8	29.0	27.6	28.8	28.4	27.7	29.1	30.6	31.2	31.5
Non-Liner Total Value	8.2	8.6	10.8	11.1	12.2	13.2	17.4	25.2	34.7	36.6	38.2
Non-Liner U.S.-Flag Value	.4	.4	.5	.4	.4	.4	.4	.7	.8	1.0	1.1
Non-Liner U.S. Percent	4.9	4.5	4.6	3.6	3.3	3.1	2.4	2.5	2.3	2.8	2.8
Tanker Total Value	3.4	3.2	3.4	3.6	4.0	4.9	5.7	9.2	26.0	26.9	34.4
Tanker U.S.-Flag Value	.3	.2	.2	.2	.2	.3	.4	.8	1.8	1.4	1.5
Tanker U.S. Percent	7.7	4.8	6.6	5.6	5.6	5.5	6.2	9.1	6.9	5.1	4.2

NOTE: Includes Government-sponsored cargo; excludes Department of Defense cargo and U.S./Canada trans-lakes cargo.

Table 14: ODS ACCRUALS AND OUTLAYS—JANUARY 1, 1937, TO SEPTEMBER 30, 1977

Calendar Year of Operation	Accruals			Outlays		Net Accrued Liability
	ODS	Recapture	Net Accrual	In FY 1977	Net ODS Paid	
1937-1955	\$ 682,457,954	\$157,632,946	\$ 524,825,008	\$ -0-	\$ 524,825,008	\$ -0-
1956-1960	751,430,098	63,755,409	687,674,689	-0-	687,674,689	-0-
1961	170,884,261	2,042,748	168,841,513	-0-	168,841,513	-0-
1962	179,727,400	4,929,404	174,797,996	(31,606)	174,467,393	330,603
1963	189,119,876	(1,415,917)	190,535,793	-0-	190,535,793	-0-
1964	220,334,818	674,506	219,660,312	-0-	219,660,312	-0-
1965	183,913,236	1,014,005	182,899,231	-0-	182,899,231	-0-
1966	202,734,069	3,229,471	199,504,598	-0-	199,504,598	-0-
1967	220,579,702	5,162,831	215,416,871	-0-	215,416,871	-0-
1968	222,763,009	3,673,790	219,089,219	-0-	219,089,219	-0-
1969	233,201,233	2,217,144	230,984,089	-0-	228,038,947	2,945,142
1970	232,686,761	(1,908,643)	234,595,404	-0-	234,449,812	145,592
1971	200,723,160	(2,821,259)	203,544,419	2,400,565	203,286,360	258,059
1972	189,564,830	-0-	189,564,830	(424,563)	188,090,409	1,474,421
1973	221,308,574	-0-	221,308,574	6,655,534	217,323,766	3,984,808
1974	222,135,148	-0-	222,135,148	2,732,737	207,430,497	14,704,651
1975	249,743,224	-0-	249,743,224	3,465,258	246,439,173	3,304,051
1976	274,280,624	-0-	274,280,624	100,909,322	257,298,126	16,982,498
1977	219,725,581	-0-	219,725,581	193,850,823	193,850,823	25,874,758
Total Regular ODS	\$5,067,313,558	\$238,186,435	\$4,829,127,123	\$309,558,070	\$4,759,122,540	\$70,004,583
Soviet Grain Programs	\$ 135,446,393	\$ -	\$ 135,446,393	\$ 34,317,451	\$ 119,815,808	\$15,630,585
Total ODS	\$5,202,759,951	\$238,186,435	\$4,964,573,516	\$343,875,521	\$4,878,938,348	\$85,635,168

**Table 15: OPERATING-DIFFERENTIAL SUBSIDY ACCRUALS AND OUTLAYS BY LINES
JANUARY 1, 1937, TO SEPTEMBER 30, 1977**

Lines	Accruals			ODS Paid	Net Accrued Liability
	ODS	Recapture	Net Accrual		
Aeron Marine Shipping	\$ 7,043,569	\$ -	\$ 7,043,569	\$ 5,214,857	\$ 1,828,712
American Banner Lines ¹	2,626,512	-	2,626,512	2,626,512	-
American Diamond Lines ¹	185,802	28,492	157,310	157,310	-
American Export Lines	663,328,726	10,700,587	652,628,139	639,842,294	12,785,845
American Mail Line ²	158,604,994	7,424,901	151,180,093	148,838,241	2,341,852
American President Lines ²	653,025,686	17,676,495	635,349,193	625,629,615	9,719,578
American Shipping	1,797,429	-	1,797,429	1,227,659	569,770
American Steamship	111,751	-	111,751	76,462	35,289
Aquarius Marine Co.	1,542,661	-	1,542,661	1,238,620	304,041
Aries Marine Shipping	6,853,221	-	6,853,221	5,779,639	1,073,582
Atlantic & Caribbean S/N ¹	63,209	45,496	17,713	17,713	-
Atlas Marine Co.	1,008,419	-	1,008,419	570,389	438,030
Baltimore Steamship ¹	416,269	-	416,269	416,269	-
Bloomfield Steamship ¹	15,588,085	2,613,688	12,974,397	12,974,397	-
Chestnut Shipping Co.	1,711,794	-	1,711,794	1,115,233	596,561
Delta Steamship Lines	199,585,255	8,185,313	191,399,942	186,593,520	4,806,422
Ecological Shipping Co.	3,960,657	-	3,960,657	2,843,232	1,117,425
Farrell Lines	284,564,040	1,855,375	282,708,665	278,239,173	4,469,492
Prudential Lines ³	515,071,038	24,223,564	490,847,474	486,080,645	4,766,829
Gulf & South American Steamship ⁴	34,471,780	5,226,214	29,245,566	29,245,566	-
Lykes Bros. Steamship	650,205,099	52,050,599	598,154,500	593,841,030	4,313,470
Margate Shipping	11,159,460	-	11,159,460	9,233,026	1,926,434
Moore-McCormack Bulk Transport	5,023,111	-	5,023,111	3,367,254	1,655,857
Moore-McCormack Lines	504,000,829	17,762,445	486,238,384	482,607,592	3,630,792
N.Y. & Cuba Mail Steamship ¹	8,090,108	1,207,331	6,882,777	6,882,777	-
Oceanic Steamship ⁵	112,071,235	1,171,756	110,899,479	110,800,925	98,554
Pacific Argentina Brazil Line ¹	7,963,939	270,701	7,693,238	7,693,238	-
Pacific Far East Line	274,026,936	23,479,204	250,547,732	246,545,112	4,002,620
Pacific Shipping Inc.	1,397,221	-	1,397,221	918,656	478,565
Prudential Steamship ¹	26,098,640	1,680,796	24,417,844	24,417,844	-
Sea Shipping ¹	25,819,800	2,429,102	23,390,698	23,390,698	-
South Atlantic Steamship ¹	96,374	84,692	11,682	11,682	-
States Steamship	210,925,389	5,110,997	205,814,392	201,569,321	4,245,071
U.S. Lines ⁶	584,187,406	54,958,689	529,228,717	529,228,717	-
Waterman Steamship	87,367,004	-	87,367,004	84,839,433	2,527,571
Worth Oil Transport	1,886,498	-	1,886,498	1,560,365	326,133
Zapata Products	5,433,612	-	5,433,612	3,487,524	1,946,088
Total Regular ODS	\$5,067,313,558	\$238,186,435	\$4,829,127,123	\$4,759,122,540	\$70,004,583
Soviet Grain Programs⁷	\$ 135,446,393	\$ -	\$ 135,446,393	\$ 119,815,808	\$15,630,585
TOTAL ODS	\$5,202,759,951	\$238,186,435	\$4,964,573,516	\$4,878,938,348	\$85,635,168

¹No longer subsidized or combined with other subsidized lines.

²APL merged its operations with AML, October 10, 1973.

³Changed from Prudential-Grace Lines, Inc., August 1, 1974.

⁴Purchased by Lykes Bros. Steamship Co.

⁵Purchased by Pacific Far East Line, Inc.

⁶Ceased to be a subsidized line, November 1970.

⁷Includes 41 subsidized operators.

Table 16: ODS CONTRACTS IN FORCE—SEPTEMBER 30, 1977

Operator and Contract No.	Contract Duration	Number of Subsidized Ships	Service	Annual Sailings	
				Minimum	Maximum
A. Liner Trades:					
American Export Lines FMB-87	1-01-60	24	U.S. Atlantic/Mediterranean (TR 10)	65	95
	to		U.S. Atlantic/Far East (TR 12)	20	30
	12-31-79		U.S. Atlantic/India (TR 18)	18	25
			U.S. North Atlantic/Western Europe (TR 5-7-8-9)	40	55
American President Lines, Ltd. MA/MSB-386	1-01-77	10	Transpacific Service (TR 29)	32	54
	to		Taiwan Feeder	—	—
	12-31-77 ¹		Round-the-World Westbound Atlantic/Straits (TR 17)	24 ²	24
American President Lines, Ltd. for the American Mail Line Div. FMB-76	1-01-59	12	Transpacific Service (TR 29) as extended	54	80
	to		Southeast Asia-Persian Gulf Feeder	—	—
Delta Steamship Lines, Inc. MA/MSB-353	1-01-76	11	U.S. Gulf/East Coast South America (TR 20)	43	Overall Maximum Not to exceed 79
	to		U.S. Gulf/West Africa (TR 14-2)	24	
Farrell Lines Incorporated MA/MSB-352	1-01-76	16	U.S. Atlantic/South & East Africa (TR 15-A)	20	(30)
	to		U.S. Atlantic/West Africa (TR 14-1)	20	Overall Maximum not to exceed 89
	12-31-95		U.S. Atlantic & Gulf/Australia & New Zealand (TR 16)	16	
			U.S. West Coast/Australia & New Zealand (TR 27)	14	
Lykes Bros. Steamship Co., Inc. FMB-59 ³	1-01-58	41	U.S. Gulf/U.K.-Continent (TR 21)	24	42 ⁴
	to		U.S. Gulf/Mediterranean (TR 13)	42	48
	12-31-77		U.S. Gulf/Far East (TR 22)	48	60
			U.S. Gulf/South & East Africa (TR 15-B)	18	24
			U.S. Gulf/West Coast South America (TR 31)	30	36
			U.S. Great Lakes/Med., India, Persian Gulf, Red Sea (Trade Area 4)	3	10
Moore-McCormack Lines, Incorporated MA/MSB-338	1-01-75	13	U.S. Atlantic/East Coast South America (TR 1)	50	86
	to		U.S. Atlantic/South & East Africa (TR 15-A)	20	30 ⁵
Pacific Far East Line, Inc. FMB-81	1-01-59	6	U.S. Pacific/Australia-Combination (TR 27)	12	16
	to		Transpacific Freight Service as extended (TR 29)	20	36

Table 16: (Continued)

Operator and Contract No.	Contract Duration	Number of Subsidized Ships	Service	Annual Sailings	
				Minimum	Maximum
Prudential Lines, Inc. FMB-49	1-01-58	18	U.S. Atlantic/West Coast South America (TR 2)	48	62
	to		U.S. Pacific/South America, Caribbean, Central America and Mexico (TR 23-24-25)	25	42
	12-31-77		U.S. Atlantic/Caribbean (TR 4)	26	40
			U.S. North Atlantic/Mediterranean (TR 10)	41	50
States Steamship Corporation FMB-62	1-01-58	7	Washington-Oregon/Far East (TR 29)	10	16 ^e
	to		Washington-Oregon-California/Far East (TR 29)	20	41
	12-31-77		California/Far East (TR 29)	22	38
Waterman Steamship Corporation MA/MSB-115	6-04-71 to 6-03-91	7	U.S. Atlantic-Gulf/India, Pakistan, Persian Gulf and Red Sea (TR 18)	30	40
Total Liner Trades		165		893	1,312

B. Bulk Trades:

Operator	ODS Contract Number		Number Subsidized Ships 9-30-77	Service	Annual Sailings Minimum No. of Days
	Contract No. (Effective Date)	Contract Termination Date			
Aeron Marine Shipping Company	MA/MSB-166 (10-10-74)	10-09-94	2	Worldwide Bulk Trade	335
American Shipping, Inc.	MA/MSB-272 (4-14-76)	4-13-96	1	Worldwide Bulk Trade	335
Aquarius Marine Company	MA/MSB-309 (10-15-75)	10-14-95	1	Worldwide Bulk Trade	335
Aries Marine Shipping Company	MA/MSB-129 (8-9-73)	8-08-93	2	Worldwide Bulk Trade	335
Atlas Marine Company	MA/MSB-274 (12-30-76)	12-29-96	1	Worldwide Bulk Trade	335
Chestnut Shipping Company	MA/MSB-299 (12-1-76)	11-30-96	2	Worldwide Bulk Trade	335
Margate Shipping Company	MA/MSB-134 (12-28-73)	12-27-93	3	Worldwide Bulk Trade	335
Moore-McCormack Bulk Transport, Inc.	MA/MSB-295 (12-10-75)	12-09-95	3	Worldwide Bulk Trade	335
Pacific Shipping, Inc.	MA/MSB-273 (7-24-76)	7-23-95	1	Worldwide Bulk Trade	335
Worth Oil Transport Company	MA/MSB-271 (2-20-76)	2-19-96	1	Worldwide Bulk Trade	335
Zapata Products Tankers, Inc.	MA/MSB-167 (4-3-76)	4-02-96	4	Worldwide Bulk Trade	335
Total Bulk Trades			21		

¹Subject to extension to 12-31-78 at discretion of Maritime Subsidy Board.

²American President Lines combined minimum Round-the-World & TR 17-42 sailings.

³Per Addendum No. 121 of Lykes Contract No. FMB-59 overall maximum not to exceed 246.

⁴To the extent that Seabee vessels are not used on TR 21, sailings may be made with conventional vessels on the basis that two sailings are the equivalent of one Seabee vessel sailing and the maximum shall be 84 sailings annually.

⁵Moore-McCormack has requested a minimum-maximum of 15-25 sailings on TR 15-A, Sea-Land has petitioned for the Board to deny Moore-McCormack's request. Both Moore-McCormack's request and Sea-Land's petition are pending final disposition by the Board.

⁶States is not required to make any sailings on TR 29, Service A, during Calendar Year 1977.

Table 17: SOVIET GRAIN ODS CONTRACTS IN EFFECT—SEPTEMBER 30, 1977

Company	Date Approved	Vessel
Academy Tankers	12-07-72	THOMAS Q
	5-01-73	THOMAS M
Albatross Tanker	3-08-77	ERNA ELIZABETH
American Eagle Tanker	1-31-73	AMERICAN EAGLE
American Trading Transportation	12-14-72	WASHINGTON TRADER
	12-23-75	
Atlantic Richfield	7-14-74	ARCO ANCHORAGE
		ARCO PRUDHOE BAY
	11-13-75	ARCO ENTERPRISE
		ARCO HERITAGE
	5-18-76	ARCO ENDEAVOR
		ARCO FAIRBANKS
		ARCO JUNEAU
		ARCO PRESTIGE
		ARCO SAG RIVER
Blackships	2-09-73	GULFKING
		GULFKNIGHT
		GULFPRINCE
		GULFQUEEN
	11-09-76	GULFCREST
		GULFDEER
		GULFLION
		GULFOIL
		GULFPRIDE
		GULFSOLAR
		GULFSPRAY
		GULFSUPREME
		GULFTIGER
Chas. Kurz	11-22-72	TULLAHOMA
	4-27-76	SPIRIT OF LIBERTY
Connecticut Transport	11-24-72	CONNECTICUT
Cove Tankers	10-06-75	MOUNT EXPLORER
		MOUNT NAVIGATOR
	7-13-76	COVE COMMUNICATOR
Empire Transport	3-09-73	POTOMAC
Fredericksburg Shipping	12-16-76	FREDERICKSBURG
Globe Seaways	11-24-72	OVERSEAS ANCHORAGE
Ingram Ocean Systems	4-27-76	MARTHA R. INGRAM
Intercontinental Bulktank	12-05-72	OVERSEAS ALASKA
International Ocean Transport	1-18-73	ALLEGIANCE
		BRADFORD ISLAND
		FORT HOSKINS
	5-03-73	BANNER
James River Transport	3-09-73	JAMES
Keystone Shipping	11-22-72	PERRYVILLE
Keystone Tankship	11-22-72	GOLDENGATE
	3-01-74	

Table 17: (Continued)

Company	Date Approved	Vessel
Manhattan Tankers	11-28-72	MANHATTAN
Mathiasen's Tanker Industries	12-13-72	SOHIO INTREPID
	9-24-75	SOHIO RESOLUTE
		JOSEPH D. POTTS
Mobil Oil Corporation	5-18-76	MOBIL AERO
		MOBIL ARTIC
		MOBIL LUBE
		MOBIL MERIDIAN
Mohawk Shipping	3-09-73	MOHAWK
Monticello Tanker	4-17-73	MONTICELLO VICTORY
Montpelier Tanker	2-20-73	MONTPELIER VICTORY
Mount Vernon Tanker	12-18-72	MOUNT VERNON VICTORY
Mount Washington Tanker	12-18-72	MOUNT WASHINGTON
Newport Tankers	3-05-73	ACHILLES
Ocean Clippers	1-22-73	OVERSEAS TRAVELER
Ocean Tankships	11-15-72	OVERSEAS NATALIE
	12-05-72	OVERSEAS VIVIAN
Ocean Transportation	11-24-72	OVERSEAS ALEUTIAN
		OVERSEAS ULLA
Ogden Merrimac Transport	3-09-73	MERRIMAC
Ogden Sea Transport	3-09-73	COLUMBIA
Overseas Bulktank	12-05-72	OVERSEAS ARTIC
	2-15-77	OVERSEAS JUNEAU
Overseas Oil Carriers	11-24-72	OVERSEAS JOYCE
Penn Tanker	1-03-73	OGDEN CHALLENGER
		OGDEN CHAMPION
Rio Grande Transport	3-09-73	YELLOWSTONE
Sea Tankers	1-22-73	OVERSEAS ALICE
	3-23-76	OVERSEAS VALDEZ
Sea Transport	11-29-72	EAGLE TRAVELER
United Tanker	11-29-72	EAGLE CHARGER
		EAGLE LEADER
Wabash Transport	11-24-72	OGDEN WABASH
Willamette Transport	11-24-72	OGDEN WILLAMETTE

Table 18: FOREIGN TRANSFER APPROVALS—FY 1977

U.S. Privately Owned:

	Pursuant to Sections 9 and 37 (U.S. owned and U.S. documented)			Pursuant to Section 37 (Only) (U.S. owned, not U.S. documented)			Combined Totals		
	No. of Vessels	Gross Tons	Average Age	No. of Vessels	Gross Tons	Average Age	No. of Vessels	Gross Tons	Average Age
Tankers	4	44,828	33.2	8	357,730	19.5	12	402,558	29.0
Cargo	3	33,269	25.0	6	37,041	26.2	9	70,310	26.0
Cargo/Passenger	0	0	0	0	0	0	0	0	0
Miscellaneous	8	17,394	17.1	5	36,220	18.3	13	53,614	17.4
Total	15	95,491	23.0	19	430,991	22.1	34	526,482	23.0

U.S. Government Owned:

Cargo ship (for scrapping)	1	3,860	32.0	0	0	0	1	3,860	32.0
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U.S. Privately Owned:

Country of Registry	Sections 9 and 37		Section 37 (Only)		Combined Totals	
	Number	Gross Tons	Number	Gross Tons	Number	Gross Tons
Algeria	2	2,567	0	0	2	2,567
Argentina	0	0	1	4,800	1	4,800
Bahrain	1	1,469	0	0	1	1,469
Greece	0	0	3	40,657	3	40,657
Liberia	0	0	3	152,974	3	152,974
Mexico	0	0	1	1,620	1	1,620
New Zealand	1	1,063	0	0	1	1,063
Norway	0	0	2	36,760	2	36,760
Panama	1	4,448	6	161,600	7	166,048
Saudi Arabia	1	3,587	0	0	1	3,587
Venezuela	1	1,061	0	0	1	1,061
Total	7	14,195	16	398,411	23	412,606
Sale Alien for Scrap or Nontransportation Use	8	81,296	3	32,580	11	113,876
Grand Total	15	95,491	19	430,991	34	526,482

U.S. Government Owned:

Cargo ship (for scrapping)	1	3,860	0	0	1	3,860
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Chapter 3

Domestic Operations

The domestic segment of the U.S. merchant marine transports more than one billion tons of cargo annually. The domestic trades include the Great Lakes, inland waterways, and the noncontiguous ocean, intercoastal, and coastwise trades.

A major FY 1977 development, with significant impact upon the domestic ocean commerce, was the beginning of operations of the trans-Alaska pipeline and the movement of Alaskan oil from the Port of Valdez to the lower 48 States.

Great Lakes

The U.S. Great Lakes fleet declined slightly in number during the fiscal year, from 171 to 169, but its total deadweight increased from 2.6 million to 2.7 million tons (see Table 19).

The most urgent problem inhibiting growth of domestic and international trade on the Great Lakes is the annual freeze-up of most connecting rivers and large portions of some of the lakes. The Maritime Administration serves on the Winter Navigation Board, which coordinates a demonstration program by Federal and State agencies to extend the shipping season on the Great Lakes and St. Lawrence Seaway. Despite the extreme winter of 1976-77, vessels operated in the Upper Lakes until January 18, 1977, and resumed in April. In the Lower

Lakes, coal was shipped through ice-covered water for all but 4 weeks of the winter.

Deeper draft, longer, and wider vessels are replacing the smaller, older tonnage on the Great Lakes. As a result, a number of serious trends have developed. Some of the older tonnage has been sold to Canadian interests and the new tonnage has been dedicated to domestic service. This has increased Canadian domination of U.S.-Canada bulk trades. Canadian ships now carry 93 percent of this tonnage. At the same time, many shallow-draft river ports in the United States can no longer obtain ship service since they cannot accommodate the larger, new vessels.

MarAd is working with tug-barge operators and major shippers to encourage multi-tow systems using improved linkage, and also is encouraging domestic operators to participate in the U.S.-Canada trade.

Inland Waterways

More than 605 million tons of traffic moved on the inland waterways of the United States in calendar year 1976. This traffic consisted primarily of energy products, raw materials, and agricultural commodities.

The Maritime Administration's promotion of inland waterway transportation accelerated in FY 1977. The Agency strengthened its support to and coordination with the towing industry and increased its participation in other Federal programs which affect inland waterway transportation. Topics of major concern during the year were the proposed imposition of waterway user charges and the construction of a new Lock and Dam 26 at Alton,

Ill. A study conducted during the year under the joint sponsorship of MarAd and the inland waterway carriers focused on practical guidelines to reduce energy consumption and aid in promoting energy conservation in river shipping operations.

A joint MarAd-U.S. Coast Guard study of interim repairs to tank barges entered phase three: Field testing of actual use of recommended repair material began under closely monitored conditions.

During the year, MarAd also awarded a contract to examine the state-of-the-art of bow steering units on the inland waterways. The project is designed to improve the maneuverability of large tows.

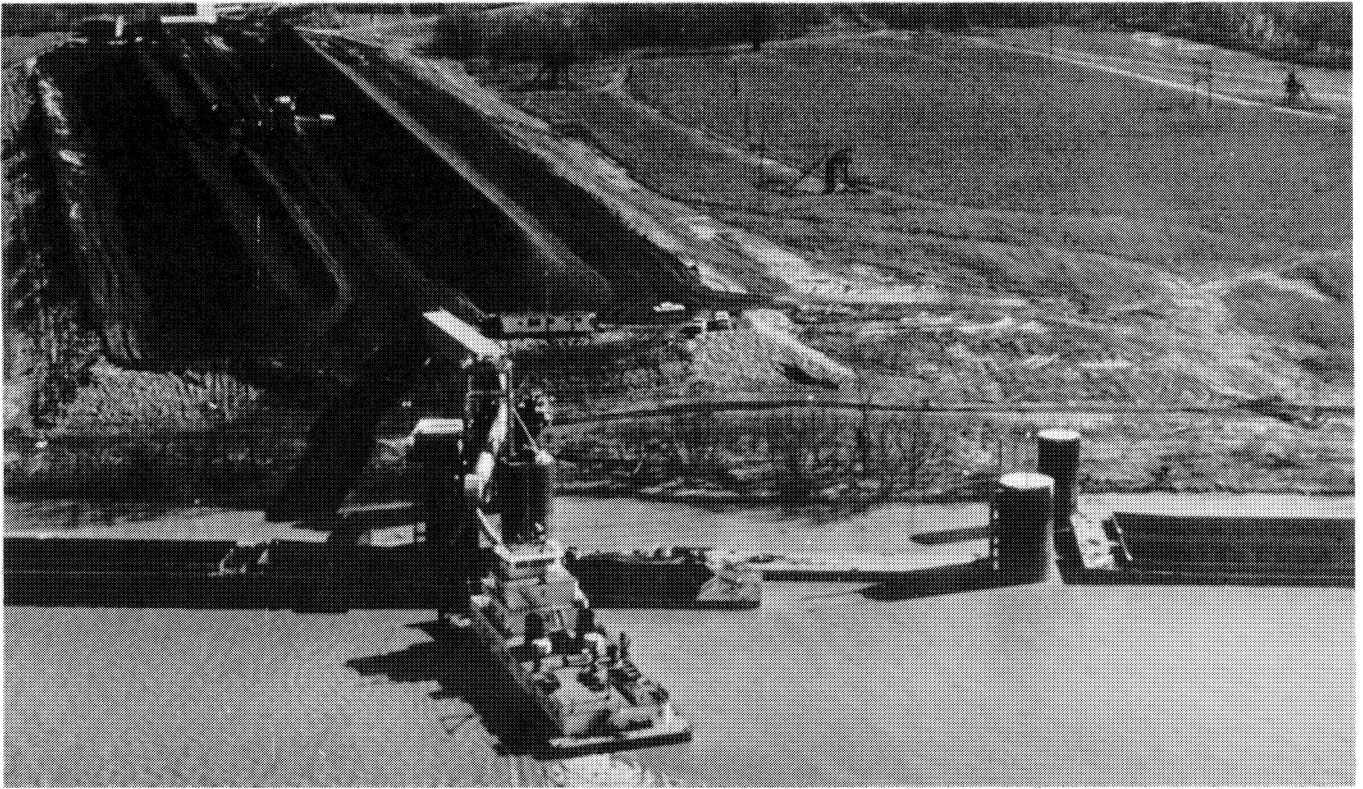
Domestic Ocean Trades

Several major studies were conducted in domestic ocean shipping. Topics included tanker fleet adequacy, feeder service opportunities, marine transportation in the Puerto Rican trade, and shipping for Alaskan natives.

The initiation of trans-Alaska pipeline operations in July 1977 generated significant requirements for domestic tanker capacity.

The impact of this event was anticipated in a MarAd study, "The U.S.-Flag Tanker Fleet and Domestic Carrier Requirements." Using production and delivery criteria supplied by the Federal Energy Administration (now part of the new Department of Energy), the Agency assessed the adequacy of the U.S. tanker fleet to meet Alaskan carriage demands, including the disposition of Alaskan oil not required on the West Coast. The study also evaluated the adequacy of the fleet to meet the transportation needs of the billion-barrel Strategic Petroleum Reserve (see Chapter 4).

SOHIO INTREPID, carrying some 600,000 barrels of North Slope Alaskan crude oil, steams out of Port Valdez bound for San Francisco Bay-area refinery.



American Commercial Barge Line Co. towboat maneuvers barge taking on cargo at Overland Coal dock on Ohio River near Uniontown, Ky. Coal shipments account for nearly one-fourth of U.S. inland waterways tonnage.

Great Lakes ore carrier enters Sault (Soo) Ste. Marie, Mich., Lock at sunset.

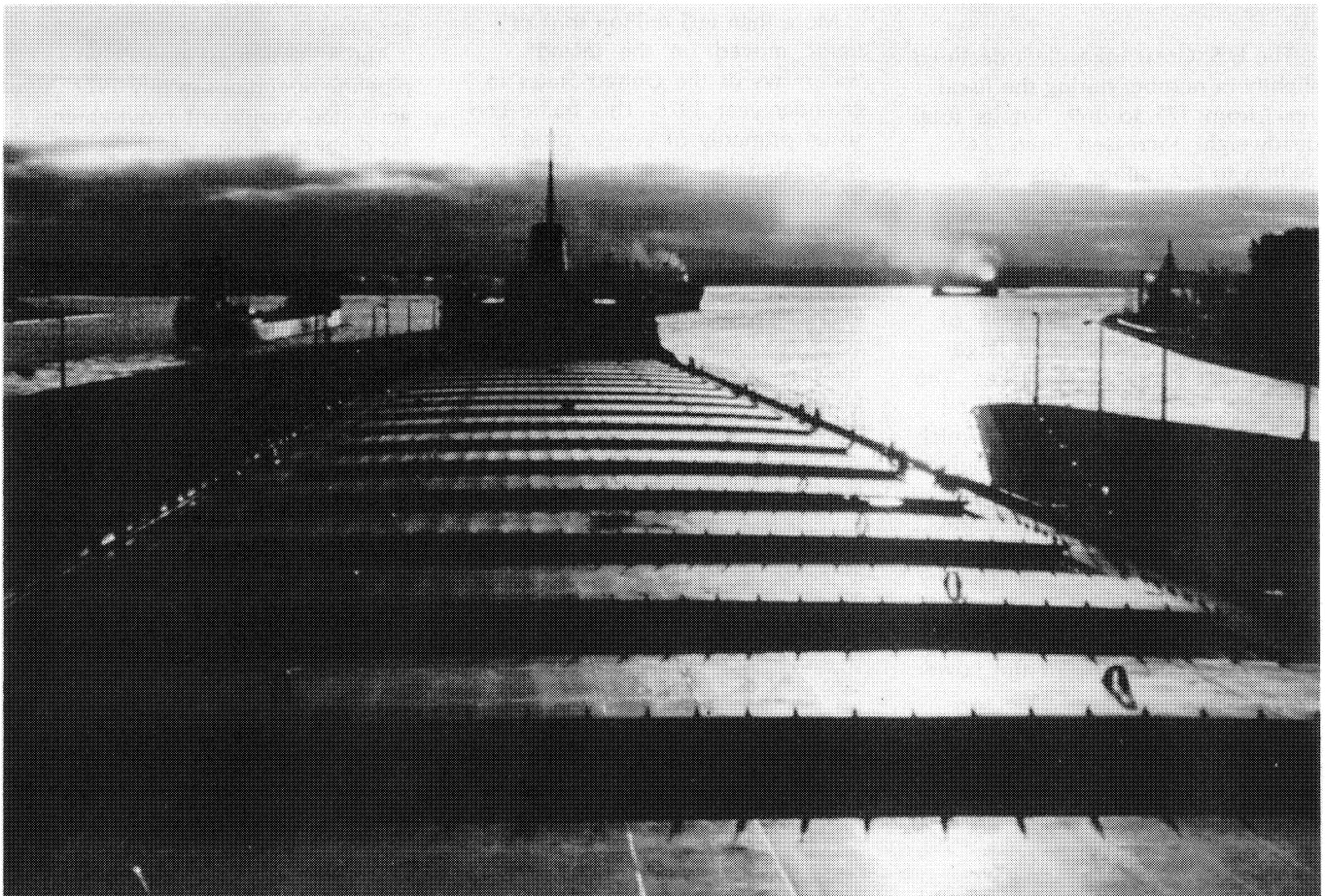


Table 19: U.S. GREAT LAKES FLEET¹—SEPTEMBER 30, 1977

	Vessels	Gross Registered Tons	Estimated Dwt.
Total	169	1,626,832	2,730,361
Bulk Carriers	150	1,560,449	2,674,361
Tankers	9	31,989	55,450
Others	10 ²	33,394	³

¹Self-propelled vessels of 1,000 gross registered tons and over.

²Includes railroad car ferries, auto ferries.

³Not available.



Motor Vessel BELLE RIVER, built by Bay Shipbuilding Corp. for American Steamship Co., a subsidiary of GATX Corp., under Title XI program, was among vessels delivered to U.S. Great Lakes fleet in FY 1977.

Under a MarAd contract, Sea-Land Service studied the development of a domestic waterborne feeder system for East and Gulf Coast ports. The study found that a feeder system for domestic shipments is not cost competitive with overland modes but for international shipments it could be competitive with direct calls by linehaul vessels and with overland modes for certain ports.

In collaboration with the Federal Maritime Commission, MarAd contributed heavily to a transportation study performed as part of the work of the Interagency Study Group on the Puerto Rican Economy, chaired by the Secretary of Commerce.

At the request of the Department of the Interior, the Agency provided project management and technical support for a study of alternative systems for meeting the marine transportation requirements for the Alaska Resupply Operation, which serves Alaskan native communities by sea.

A statistical publication, "Domestic Waterborne Trade of the United States 1968-1975," was prepared and distributed to the public.



Chapter 4

Market Development

The Maritime Administration conducts a comprehensive marketing program designed to increase the U.S.-flag carriage of the Nation's oceanborne foreign trade by:

- Developing and disseminating market information and cargo data to aid U.S.-flag ship operators in their own sales efforts;
- Maintaining contact with the country's export and import communities to familiarize them with the benefits of using U.S.-flag ships for the transportation of the cargoes; and
- Planning and executing, in conjunction with U.S.-flag operators, trade associations, and other industry groups, marketing programs which assure better communications and response between carriers and shippers.

Marketing Program

In fiscal year 1977 MarAd opened a marketing office in Atlanta, Ga., bringing the number of these regional service centers to 10. The fast-growing industrial and distribution center of Atlanta has also attracted representatives from seven American shipping companies, with whom MarAd activities are coordinated.

States Steamship Co.'s Roll-on/Roll-off vessel ARIZONA, under voyage charter to Central Gulf Lines, Inc., takes on cargo of buses at Alabama State Docks, Port of Mobile. Vehicles were part of 1,600-bus shipment by Ward Industries of Conway, Ark., under \$68 million contract with Arab Republic of Egypt.

Marketing representatives in the four MarAd regions made direct contact with policymaking officials of over 2,000 firms engaged in foreign commerce during the fiscal year. Through such contacts, more than 850 U.S. companies have now issued policy directives in support of the Agency's "Ship American" program. Active support of this MarAd campaign and other maritime promotion and marketing activities also was continued during the year by the National Maritime Council (NMC), the American Institute of Merchant Shipping, the Navy League of the United States, and other national and regional organizations.

The National Maritime Council, a 37-member nonprofit organization representing major segments of the American maritime industry, was formed in 1971 to promote greater utilization of U.S.-flag ships by U.S. exporters and importers. MarAd's Office of Market Development serves as Executive Secretariat for the NMC, both nationally and in each of the NMC's four regions.

Active, direct communications with exporters and importers regarding their shipping requirements and the capabilities of the U.S.-flag cargo fleet continued to occupy a high NMC priority in fiscal year 1977. The Council held seminars, forums, and workshops in 58 cities representing 30 States. The NMC also co-sponsored a series of seapower symposiums with the Navy League to provide an increased awareness of the importance of the American merchant marine to the national security and defense.

Under its "New Ventures" program, the Great Lakes Region sought to interest more ship operators and investors in establishing full or partial container service between the Lakes and North Europe. New Venture opportunities in domestic RO/RO, U.S.-Canada RO/RO, integrated tug-barge, and domestic shallow-draft, self-unloader trades also were explored.

Unsolicited reports from shippers and carriers over the past 4 years indicate that, as a result of the MarAd marketing program, over \$110 million in ocean freight revenue which accrued to U.S.-flag operators would otherwise have gone to foreign shipping interests.

During FY 1977 U.S.-flag shipping companies significantly increased their utilization of MarAd's Computerized Shipper Information and Market Lead Systems, which provide a competitive marketing advantage to the American merchant marine. The Shipper Information System furnishes trade intelligence about U.S. exporters and their commodities, based on interviews conducted by market development personnel of the regional offices. The Market Lead System identifies and tracks business opportunities for U.S.-flag carriers. Increased data retrieval and sorting capabilities of the latter system now permit computer-identified leads to be tailored to particular markets or to specific requests of U.S.-flag carriers.

MarAd continued its joint participation with other Federal and local agencies in trade shows, forums, and other programs promoting U.S.-flag shipping. Marketing representatives prepared ocean transportation sections or articles for numerous Department of Commerce foreign trade business reports and service publications designed to reach one or more specialized markets.



Containers arriving by ship are transferred to railroad flatcars for transcontinental shipment.

A 7-minute color film entitled "Ship American—It Costs No More" was produced in conjunction with MarAd's Office of Public Affairs. The film has been widely shown before U.S. shipper groups and is used in cassettes for continuous showing at trade fairs and exhibits.

MarAd coordinated and participated in three panel sessions attended by marketing executives of the U.S.-flag carriers in FY 1977. Held in Washington, New Orleans, and San Francisco, these meetings enabled Government, industry, and citizen representatives to explore mutual interests and problems, review priorities, and define industrywide solutions for increasing the U.S.-flag liner fleet cargo volume. One result was the establishment by MarAd of a nationwide

Commodity Target approach under which MarAd and U.S.-flag carriers will jointly concentrate on increased U.S.-flag participation in the movement of selected commodities.

The U.S.-flag liner market share has increased from 21.9 percent by tonnage in 1972 to 30.9 percent in 1976. Actual U.S.-flag liner tonnage carried increased 57 percent—from 9.8 million in 1972 to 15.5 million tons in 1976.

The National Assessment and Planning Conference on U.S.-Flag Bulk Shipping, held in July 1976 as part of MarAd's marketing effort, has become the touchstone of extensive efforts throughout the Agency. In FY 1977 MarAd further examined possible legislative and administrative remedies for 16 dry-bulk problem areas identified by the conference.

Table 20: GOVERNMENT-SPONSORED CARGOES¹—CALENDAR YEAR 1976**Public Law 664 Cargoes:**

Shipper	U.S.-Flag Revenue (\$1,000)	Total Long Tons	U.S.-Flag Long Tons	Percentage U.S.-Flag
Agency for International Development:				
▪ Loans and Grants	²	3,294,000	919,000	28
▪ P.L. 480—Title II	69,400	997,924	750,838	75
Department of Agriculture:				
▪ P.L. 480—Title I	111,943	4,125,054	2,108,552	51
▪ Other Agriculture Programs	52	108	81	75
Department of Commerce	23	108	78	72
Department of Defense:				
▪ Foreign Military Credit Sales	20,533	125,117	69,099	55
Inter-American Development Bank	²	12,924	7,449	58
Department of the Interior:				
▪ Bonneville Power Administration	153	5,163	2,456	48
▪ Bureau of Reclamation	174	1,066	972	91
▪ Geological Survey	49	194	181	93
Department of Justice	33	75	66	88
Department of State (other than AID)	5,907	8,700	7,519	86
Department of Transportation	17	19	18	95
Department of the Treasury	10	21	17	81
National Aeronautics & Space Administration	136	416	376	90
Smithsonian Institution:				
▪ International Exchange Service	40	179	144	80
▪ Other Programs	8	19	17	89
Tennessee Valley Authority	318	2,045	1,732	85
U.S. Information Agency	1,100	4,407	4,134	94
Other ³	43	91	83	91

Public Resolution 17 Cargoes:

	Total Freight Revenue	U.S.-Flag Freight Revenue	Percentage U.S.-Flag
Export-Import Bank	\$180,485,415	\$141,319,923	78.3

¹Civilian agencies plus Department of Defense Foreign Military Credit Sales Program (other Department of Defense cargoes not included).²U.S.-flag revenue not available.³Cargoes of agencies which generate less than 100 long tons of cargo per year.



Containers are loaded aboard vessel of American Export Lines, Inc.

Foreign Trade Forecasting Program

MarAd's foreign trade forecasting program concentrated on the development of computer-based trade information systems to support the long-range planning activities of the Agency and the U.S. maritime industry.

Expansion of the U.S. merchant marine and its market share of U.S. trade rely upon comprehensive operational and investment planning and evaluation. As an important aid to these programs, the foreign trade forecasts utilize econometric techniques to develop data on commodities, trading regions, and national economic conditions.

During this reporting period the Agency readied for publication the first in a series of long-term forecasts on U.S. waterborne foreign trade. This series will be available through the Superintendent of Documents.

U.S.-U.S.S.R. Bilateral Liner Cargoes

During fiscal year 1977 direct shipping service to the Soviet Union was maintained by three U.S.-flag liner operators. U.S.-flag container services to the Soviet Union also are available to shippers for transshipment under terms of the U.S.-U.S.S.R. Maritime Agreement.

In calendar year 1976, the U.S. accountable liner share amounted to \$26,641,288 as compared to a Soviet share of \$26,179,337.

(Additional details on the implementation of the U.S.-U.S.S.R. Maritime Agreement are included in Chapter 10.)

Preference Cargoes

The Cargo Preference Act (Public Law 83-664) requires that at least 50 percent of all Government-generated cargo subject to the law be shipped on privately owned U.S.-flag commercial vessels to the extent such vessels are available at fair and reasonable rates.

The Maritime Administration monitors the shipping activities of more than 60 Federal agencies, the Export-Import (Ex-Im) Bank, and the Foreign Military Credit Sales program to assure that applicable cargo-preference statutes are followed.

A computer-aided system and concentrated interagency liaison permitted MarAd to process about 24,000 ocean bills-of-lading covering shipments of these cargoes in calendar year 1976. This represented a 30-percent increase over 1975.

Under an interagency agreement in October 1975, the Maritime Administration placed increased emphasis on enforcing U.S.-flag shipping and reporting procedures under the Foreign Military Credit Sales program. The program, while subject to P.L. 664, parallels quite closely the Export-Import Bank program. Loans and guaranteed credits are provided chiefly by the Department of Defense and the Federal Financing Bank to eligible foreign nations.

During calendar year 1976, the first full year of MarAd's involvement in this program, 55 percent of the total tonnage was carried by U.S.-flag vessels. This tonnage generated \$20.5 million in freight revenue for U.S.-flag carriers. While data concerning U.S.-flag participation in this program is not available

prior to 1976, indications are that the share of tonnage carried and revenues earned by U.S.-flag vessel operators was substantially higher in 1976 than in previous years.

U.S.-flag participation in the shipment of these and other Government-sponsored cargoes during calendar year 1976 is summarized in Table 20.

Due to a lack of available U.S.-flag service, two agencies—the Agency for International Development (AID) (loans and grants program) and Bonneville Power Administration—failed to meet the minimum 50 percent U.S.-flag requirement of the Cargo Preference Act.

The U.S. Department of Agriculture (USDA) and AID continued to ship most of the cargo subject to Public Law 664.

While the 4.1 million tons of USDA cargo generated in 1976 under the Public Law 480, Title I, program was some 600,000 tons less than in 1975, the AID loans and grants program in 1976 generated over 3.3 million tons—almost double the tonnage moved in 1975.

MarAd also administers Public Resolution 17, 73rd Congress (P.R. 17), which requires all Export-Import Bank-generated cargoes to be shipped on U.S.-flag vessels, unless a statutory or general waiver is granted by MarAd.

In calendar year 1976 the bank generated more than \$180 million in freight revenue; due to P.R. 17, the U.S.-flag share was 78 percent, or \$141 million.

Strategic Petroleum Reserve

The Department of Energy's Strategic Petroleum Reserve (SPR) program became operational during fiscal year 1977. The Maritime Administration worked closely with the Federal Energy Administration (one of DOE's predecessors) and continues to assist the new department regarding U.S.-flag tanker requirements for SPR under Public Law 664. The SPR program is designed to create a stockpile of 500 million barrels of imported oil by the end of 1980 and 1 billion barrels sometime between 1983 and 1985.

Under the Cargo Preference Act at least 50 percent of these Government cargoes must be shipped in U.S.-flag tankers to the extent such vessels are available at fair and reasonable rates. Because of the complexities of this program, special procedures will have to be developed to assure that U.S.-flag carriers are equitably used as intended by P.L. 664.

The first SPR oil was stored during the fiscal year in salt domes on the Gulf Coast.



Chapter 5

Port and Intermodal Development

During fiscal year 1977 the Maritime Administration continued its coordination of national, regional, State, and local efforts to support the American port industry and foster intermodal transportation.

Port studies completed or underway during the reporting period dealt with port economic impacts, planning and development, and port and terminal operations.

The Agency also continued its port and intermodal equipment and facilities program, which provides technical assistance in the areas of terminal facilities, inventory, services, and assessments; and facility and cargo protection.

Increased emphasis was placed on cost-sharing in both port studies and technical assistance programs.

Through its regional offices, MarAd also served as technical consultant on port projects administered by the Economic Development Administration (EDA), another agency in the Department of Commerce. EDA grants and loans for port-related public works have totaled more than \$162 million since 1965.

Port Planning

The Maritime Administration shares the costs and actively participates in master planning initiated by regional port associations and State agencies. Three major cooperative port planning studies begun in the past 4 years have been completed; three others were underway and five in the planning stage in FY 1977. Altogether these projects encompass plans for all or parts of 24 States. Basic objectives of each are to estimate future cargo movements and then match port facility requirements for the region.

Cooperative port plans were completed previously by the Washington (State) Public Ports Association and the City of Portland, Ore.; Northern California Ports and Terminals (San Francisco); and East-West Gateway Coordinating Council, which developed a primer on inland waterway ports through a study of the Port of St. Louis, Mo.

Work continued in FY 1977 on the Florida Port System Study begun jointly in FY 1976 by MarAd and the State of Florida Department of Transportation and Ports Council. Initiated were two new cooperative efforts involving ports in the Mississippi River Basin and Gulf Coast region and the eight Great Lakes States. A unique objective of the 17-State Mid-America Study is to develop an interface between Gulf Coast and Mississippi River ports. Special goals of the Great Lakes Cooperative Port Planning Study will include the development of port marketing strategies and a comprehensive traffic data system.

The Maritime Administration plans future port studies in cooperation with agencies in Alaska, Hawaii, Oregon, and Texas, and with the six-State New England River Basins Commission.

MarAd-funded port studies underway at the end of the fiscal year, with their objectives, included:

Economic Impact of U.S. Ports—calculation of the economic significance of the entire U.S. port industry to the Nation;

Current Trends in Port Pricing Policy—analysis of port pricing as a potential marketing and development resource;

Port Development Planning Manual—a step-by-step guide to the development of a port plan;

Emergency Berth Utilization System—a computerized system of assigning vessels to berths during times of national emergency; and

Assessment of U.S. Port Capabilities—estimation of port system capacities, cargo demands, and overall port characteristics.

Future analyses are planned in the following areas: Port Liability Insurance; Local Port Economic Impact Methodology; and Great Lakes Capital Attraction. The latter study would determine public and private reasons for investing in Lakes port facilities.

Aerial view of the busy Port of Corpus Christi.



Stevedores use guide ropes to position locomotive being loaded aboard SS HOWELL LYKES at New Orleans for shipment to Peru.



Curtis Bay Towing Co.'s CAPE HENRY and CAVALIER assist SS SEA-LAND MARKET during docking in Hampton Roads.

MarAd's port planning program utilizes research and development funds in its cost-shared efforts to extend the port-planning art and improve the planning tools available through MarAd to State agencies and the ports. Each cooperative study aims at 50-50 cost sharing with the State or local agency. In the first three studies completed in this series MarAd funding totaled \$246,500 and State/local funding \$224,500.

Equipment & Facilities Program

MarAd also helps American port authorities and terminal operators to develop equipment and facilities to increase their competitiveness. This technical assistance is designed to reduce the port segment of the costs of ocean and domestic waterborne transportation. As in port development, MarAd shares program costs with others, including industry.

Major projects/objectives included:

Vessel In-Port Locator System—a computerized information system to coordinate in-port operation of vessels;

Improved Productivity for Bulk Facilities in the Great Lakes Area—an assessment of costs and benefits for alternative means of upgrading or constructing bulk facilities;

Tanker Berthing Evaluation—a comparison of alternative tug types and docking techniques through full-scale tests and simulations;

Terminal Facility Guidelines for RO/RO Service—specifications and unit-cost estimates for RO/RO terminal construction;

Improved Port Fendering Systems—development and publication of design specifications and cost estimates for improved pier fendering;

Tug Fire-Fighting Module—demonstration of a portable equipment system to enable tugs to be used as auxiliary fireboats in a fire emergency; and



Marine Terminal Automated Management System—demonstration of a computerized system to expedite movement of containers through a public terminal.

Equipment and facilities projects (completed, underway, or planned) encompass total funding of nearly \$1.3 million by MarAd and some \$805,000 by industry and others.

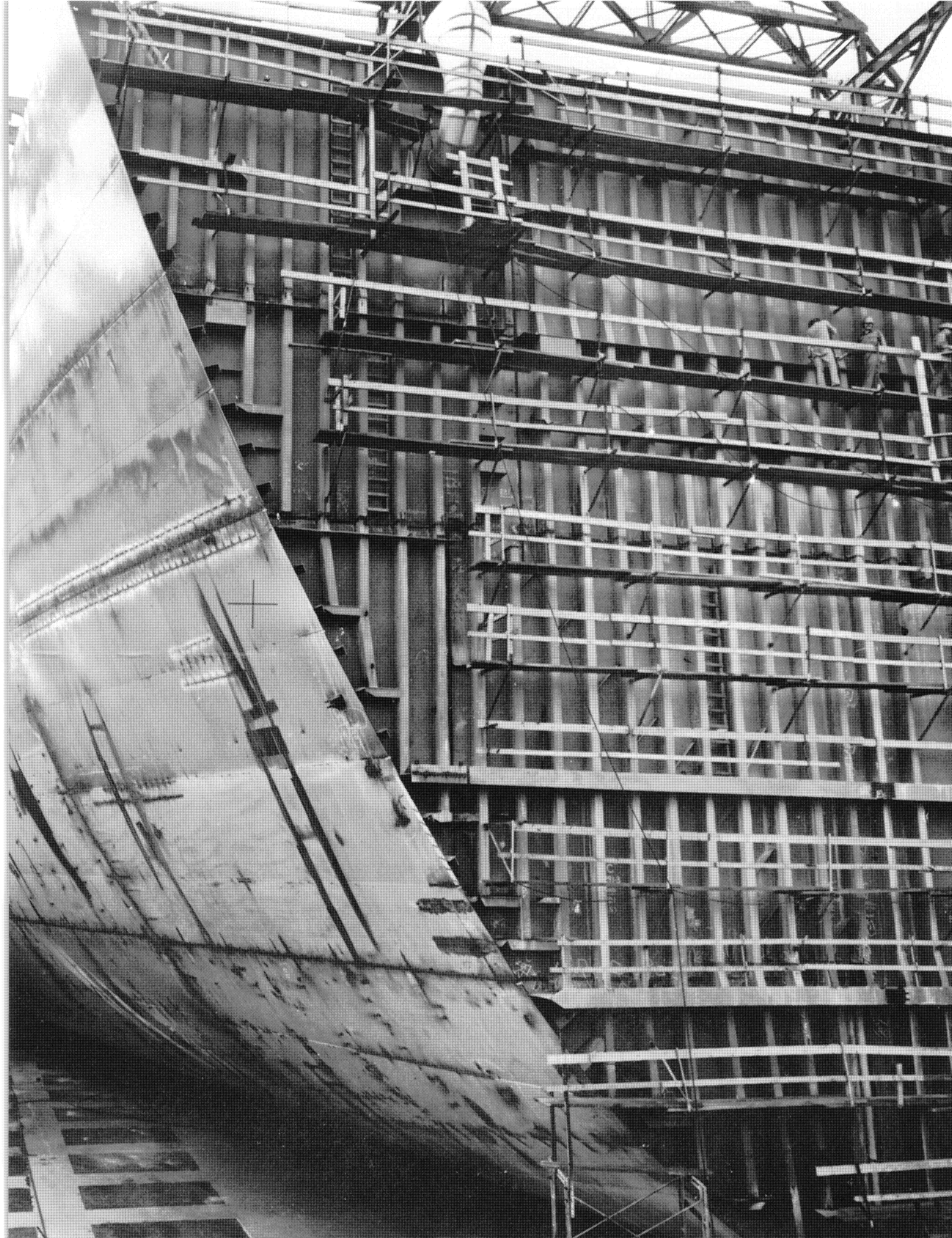
MarAd has committed more than \$3 million, and State and local agencies and others comparable sums in the port planning and equipment areas. The result is a growing body of reliable, computerized data and technologies for use by ports and terminals in their development and operations.

Cotton is among major cargoes handled at The Port of Long Beach.

warning and preparedness; the Western Region did advance planning for the upcoming port studies in Alaska, Hawaii, and Oregon; and the Great Lakes Region Office worked with local and State officials and industry in advancing the Lakes port planning study, and in arranging for the first review meeting in Cleveland, Ohio, of the progress being made in carrying out a 5-year program formulated by Government and maritime industry representatives at a planning conference in Dearborn, Mich., in April 1976.

Regional Activities

MarAd's four regional offices continued to support the port planning program, including survey data and analyses, terminal capacity assessment, and capital expenditures for the national port capability study noted earlier in this chapter. The Eastern and Central Region Offices reviewed applications for a number of port development projects funded by the Economic Development Administration; the Central Region continued its work on hurricane



Research and Development

The objective of research and development (R&D) programs at the Maritime Administration is to develop methods, equipment, and systems to make the U.S. shipbuilding and ship operating industries more efficient, competitive, and productive. The Agency works closely with industry and through contracted research projects to develop new equipment and techniques to improve all aspects of marine transportation.

Government-industry cost sharing is a key element of the cooperative program built up over the last several years. During the fiscal year MarAd committed \$18.2 million to research projects. Industry contributed an additional amount, equivalent to almost 50 percent of the Agency's total obligation for R&D.

Appendix III shows the wide range of FY 1977 R&D projects awarded by MarAd in FY 1977.

Transverse section of liquefied natural gas vessel under construction at General Dynamics, Quincy, Mass., used in demonstration of photogrammetry in shipbuilding. Technique involved measuring and interpreting photographic images of this section of hull to obtain accurate field dimensions for mating 900-ton bow unit (not shown). Demonstration project is part of National Shipbuilding Research Program, a cooperative effort between MarAd and U.S. shipbuilding industry.

Shipbuilding

Since the Shipbuilding Research Program was begun 6 years ago, MarAd has conducted 90 projects in cooperation with leading U.S. shipyards. Most of these projects have been or soon will be put into actual practice.

The areas of research include facility improvement, the design of ships for ease of producibility, and shipbuilding automation.

The largest facility improvement project is welding research, which accounts for approximately 20 percent of shipbuilding costs. During the year work was completed with four major steel companies to develop better steels for use in ships, particularly for improved weldability. In the past the steels required in certain parts of a vessel subjected to low temperatures could only be welded with low-heat input processes. Those steels required up to 17 passes to make a satisfactory joint. New steels developed in this project can now absorb much higher heat inputs. At year's end the American Bureau of Shipping was in the process of requesting the U.S. Coast Guard to eliminate a requirement for production tests of welds when the new steels are utilized. Waiver of the tests would reduce ship construction costs substantially.

During FY 1977 all major shipyards used some form of computer-aided steel fabrication system, with the six yards using the AUTOKON system procured through the Shipbuilding Research Program.

Planning was begun during the year for a computerized pipe fabrication facility.

Ship's Machinery and Control

During the year MarAd's ship's machinery and ship control programs were merged.

Work continued on efforts to improve the reliability and efficiency of shipboard equipment. Preliminary designs were completed for a high-pressure, high-temperature reheat steam turbine. The use of reheated steam in the turbine cycle would increase the fuel efficiency of the system considerably. In FY 1977 also, a small-scale prototype mass-recirculation burner was successfully tested. The burner uses combustion air more efficiently than conventional burners. A full-scale version will be tested in the next phase of this project. As a complement to this effort, work was begun on a laser diffraction device to measure the automation of conventional marine burners and improve their performance.

A contract was awarded for a steam propulsion control system to monitor and adjust boilers, turbines, and all the auxiliary equipment associated with steam-powered ships for maximum continuous performance.



Member of workforce at Seatrain Shipyard in Brooklyn receives training in new welding techniques, one of many technological advances which have increased productivity in U.S. shipbuilding.

Nuclear Ships

In FY 1977 MarAd began phasing out the nuclear ship program initiated in 1970. The Agency now has determined almost all of the engineering needed to establish the feasibility of the nuclear propulsion system. No specific proposals for nuclear merchant ship construction were received from industry during this reporting period. All of MarAd's analyses have been carefully documented and will be available if a firm proposal surfaces in the future.

During the year work continued on institutional issues to be solved before nuclear ships can operate freely between the world's ports. Environmental analyses were completed for the use of nuclear power aboard containerships, dry-bulk vessels, and icebreaking tankers. The latter were added to an earlier environmental study on nuclear-powered Ultra Large Crude Carriers.

Competitive Shipping

MarAd's R&D effort to improve the competitiveness of U.S. shipping is directed toward completing the Shipping Operations Information System (SOIS), a computer-based management-control system designed to improve the day-to-day operations of U.S.-flag ocean carriers. When completed, SOIS will have 53 separate modules which will deal with operations ranging from accounts receivable to ship scheduling.

During the year several modules were added to the system. These include a corporate fleet planning module which generates cost and revenue budgets and uses an on-line voyage simulator for projecting voyage profitability for different vessel itineraries; a European accounts-receivable module which produces accounting data on-site in several European cities and transmits the processed data to computers in New York; and a manifest-processing module which produces a manifest from the information contained in the Bills of Lading.

MarAd and industry shared costs to complete further work on the International Data Communications System (IDCS) and Ship Data Communications System (SDSC) Projects. These highly efficient information transfer networks will improve cargo control and fleet management, respectively.

Cargo Handling

Several projects to improve the cargo-handling systems in the U.S. merchant fleet were completed in FY 1977. Included were studies to:

- Look at the possibilities for new cargo-handling systems on liner vessels.
- Determine modifications needed to a LASH barge to make it suitable to carry a broad range of heavy-lift cargoes.

- Evaluate the market for a specialized cargo unit called "Sea Shed" which, as a drop-in module, can readily convert most standard containerships so that they can provide "tween deck" vehicular and breakbulk stowage areas.
- Find ways to make commercial ships more adaptable to the needs of military transport in time of a national emergency.

Navigation/Communications

MARISAT, a commercial marine satellite system which was an outgrowth of MarAd R&D, began full world service during the fiscal year with the launching of a third satellite over the Indian Ocean. Ships located anywhere between latitudes 75 degrees north and 75 degrees south are now within range of the system.

Closer to home, the Great Lakes Automated VHF Radiotelephone System was expanded to full Lakes-wide service. Fourteen shore stations now are relaying messages between some 100 Lakes vessels and the commercial telephone network ashore.

The Marine Radar Interrogator Transponder, a collision-avoidance device that identifies similarly equipped ships on a radar screen and automatically transmits their course and speed, underwent initial ship-board tests in FY 1977. Legislation pending in Congress would require transponders to be used aboard all tankers entering U.S. waters by 1983.

Advanced Ship Systems

In FY 1977 MarAd continued to analyze new ship types for U.S.-flag service.

A low-cost mini-trailer ship was studied for possible use in the Great Lakes and Caribbean trades. Larger ships also were studied in efforts to develop standardized vessels for the



Participants in symposium at MarAd's Computer-Aided Operations Research Facility (CAORF), Kings Point, N.Y., view Control Center where professional operator monitors navigational experiment underway. Situation displays show all variables in exercise.

offshore trades. A third study proceeded jointly with liner operators to develop the next generation of cargo liners—a basic ship type which could meet all of their needs. A similar study is underway to develop a standardized design for the bulk trades.

Several other projects looked at possible future trades, including the possibility of moving by ship the oil coming from proposed new oil fields off Northwest Alaska near the Bering Strait and the various possibilities of exporting coal in slurry form.

Work was completed during the year on a standardized stern project.

Marine Science

During the year experiments were conducted with a Very Large Crude Carrier (VLCC) to determine its maneuvering characteristics in shallow water. This project, carried out in cooperation with the U.S. Coast Guard and the American Institute of Merchant Shipping, is expected to help ship designers make future VLCCs more maneuverable—and thus safer to operate—in the critical, shallow water confluence zones.

Several Great Lakes projects in the marine sciences were begun during the year. One of these is a theoretical study seeking better ways of monitoring and analyzing stresses imposed on Lakes ships. A compartmentation study will investigate various Great Lakes ship design alternatives for watertight subdivision, their degrees of safety, and their relative costs.

Seven Great Lakes shipping companies, led by Pickands Mather and Co., joined MarAd in funding a \$230,000 project to develop an improved bow design which will enable bulk carriers to increase their ice-transiting capability without decreasing their cargo carrying capacity. The research will help demonstrate the economic feasibility of extended winter navigation.

CAORF

The Computer-Aided Operations Research Facility had its first full year of operation in fiscal year 1977. The facility uses a full-scale bridge mockup fitted with contemporary bridge controls to simulate, through

sight and sound, a wide range of navigational situations under any number of environmental or traffic conditions. Computer-generated images are projected on a 240-degree screen.

During this reporting period the CAORF staff:

- Analyzed the effectiveness of collision-avoidance equipment in actual navigating situations, testing the responses of the equipment, and the people using the equipment, in a range of situations that could not be safely carried out in actual practice;
- Analyzed the ramifications of the Coast Guard's new navigation rule number 17, concerning passing vessels;
- Conducted operational exercises using masters and pilots operating in the Port of Valdez, Alaska, in conjunction with the opening of the trans-Alaska pipeline.

Market Analysis

Two analyses were completed in FY 1977 to help American-flag operators increase the U.S. market share and develop planning strategies for future commercial requirements. One was an analysis of opportunities for the movement of general and neo-bulk cargoes to the Mid-Eastern OPEC nations and the other was a market study for U.S.-flag heavy-lift vessels.



Chapter 7

The Marine Environment and Energy Conservation

To preserve the quality of the marine environment and conserve energy in the maritime industry during this reporting period, the Agency:

- Assisted in the Government's projects to eliminate ocean dumping by supporting an incineration-at-sea program.
- Continued efforts to assure compliance with MarAd standards for pollution abatement in subsidized tankers.
- Prepared training materials on standards for the shipboard control and avoidance of pollution.
- Participated in a number of international conferences and technical meetings on ocean pollution-abatement and control (see Chapter 10—International Conferences).
- Worked with the maritime industry to assure more efficient use of energy.
- Reduced the consumption of electricity and diesel fuel in maintenance of the National Defense Reserve Fleet.

Environmental Protection

The Maritime Administration, in conjunction with other Federal agencies, national, and international organizations, continued its efforts during fiscal year 1977 to promote and maintain a pollution-free marine environment in inland waters and at sea.

A manual produced by the Agency—*Shipboard Guide to Pollution Free Operations*—was received with great interest both in this country and abroad. MarAd's Eastern Region served as project office for the publication, which had a first printing of 5,000 copies.

The initial distribution included U.S.-flag liner and tanker operators, Federal and State maritime academies, maritime union training facilities, the American Institute of Merchant Shipping, and such Federal agencies as the Coast Guard, the Navy, the National Oceanic and Atmospheric Administration, and the Environmental Protection Agency. Demand for the guide was so great that two additional printings of 5,000 copies each were required.

In June 1977 the manual was presented to the Intergovernmental Maritime Consultative Organization (IMCO) in London and a new wave of requests for copies started from a score of foreign countries. Hundreds of other requests were received from individuals in all segments of the maritime industry, including ship operating personnel, barge and ferry operators, design and engineering consultants, and vessel equipment manufacturers. Many requests also were received from private citizens.

Also during the year, MarAd's Western Region, in cooperation with the California Maritime Academy, installed a sewage treatment plant aboard the Training Ship GOLDEN BEAR. The plant was successfully operated during the sea training cruise, January through March 1977.

Environmental Impact Statements

Ocean dumping is a serious threat to the marine environment. The Secretary of Commerce is authorized by the Marine Protection Research and Sanctuaries Act to support measures to eliminate this practice. One such measure is the develop-

Towboat crewman aboard petroleum products barge signals captain as tow moves along river.



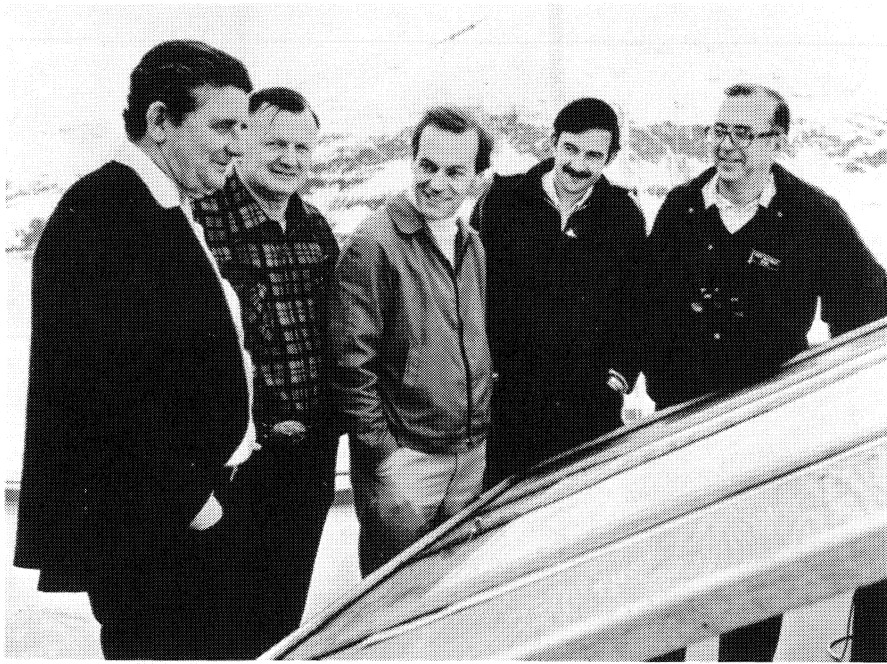
CLEAN SOUNDER undergoes operational tests. Oil-spill recovery vessel was built by Marine Construction & Design Co. of Seattle.

ment of a chemical-waste incinerator ship. An Environmental Impact Statement (EIS) on this project was submitted by the Maritime Administration to the Council on Environmental Quality, approved by the Council and officially released to the public in FY 1976. MarAd then let a contract to study the economics and environmental viability of a U.S.-flag chemical incinerator ship.

During this reporting period MarAd also reviewed and commented on EISs from other agencies, on such subjects as ocean dumping criteria, LNG terminals, and various sites for the U.S. Strategic Petroleum Reserve.

Construction Standards

MarAd continued to monitor the status of the Pollution Abatement Program to ensure compliance with Docket A-75, under which the Maritime Subsidy Board stipulated that all tanker vessels receiving construction-differential subsidy must comply with MarAd's Standard Specifications for Merchant Ship Construction. Vessels built with subsidy incorporated all required features into the original CDS contract specification. Operators and/or owners of vessels not meeting these specifications were in the process of making the necessary changes during the period of this report.



Safe tanker navigation is topic of conversation as experienced captains aboard SS PRINCE WILLIAM SOUND check chart during sea trials introducing them to Alaskan waters prior to opening of trans-Alaska pipeline. Ship was chartered for exercise by a subsidiary of SOHIO, whose senior marine advisor Captain Clive S. G. Lewis, is in center of picture. Others left to right, all with Keystone Shipping Co., are Capt. Tom Cunningham, John McIntyre, Alan Putnam, and Robert DeLambily.

MarAd Tanker Study

In response to a rash of oil tanker accidents, the Maritime Administration reassessed its mandatory pollution abatement standards for the CDS tanker construction program and for those features related to existing tankers.

The study analyzed a wide range of tanker construction, design, equipment, and operating features related to the abatement of tanker pollution and compared them with U.S. initiatives as proposed by President Carter and his March 17, 1977, message to the Congress.

In addition, certain features relating to areas other than conventional tanker construction and operations were analyzed.

In July 1977 the Agency published the *Tanker Pollution Abatement Report—A Study of Tanker Construction, Design, Equipment and Operating Features Relating to Improved Pollution Abatement* in two volumes, an executive summary and a detailed report. Copies were made available to all interested Government agencies, as well as the industry and international maritime safety organizations.

The report analyzes—for both cost and environmental benefits—pollution abatement features in hull design and construction, ship propulsion and maneuverability, safety of navigation, pollution abatement systems and equipment, and crew standards and training.

Energy Conservation

The Maritime Administration continued to stress the importance of energy conservation in dealing with the maritime industry's energy-related economic problems.

The cooperative Government-industry program seeks to identify and develop new opportunities for energy conservation, as well as to design, monitor, and improve the operation and management of current programs.

Major recognition was given to the essential role of maritime industry trade associations in achieving voluntary energy conservation goals.

MarAd officials met with representatives of numerous Federal and State agencies to advocate and help promote and implement innovative energy management initiatives within the integrated maritime industry.

During the year the Agency developed and completed basic editorial work on a series of publications to promote energy conservation in the U.S. maritime industry. The illustrated series, to be published in fiscal year 1978, covers both shipboard and shoreside segments of the industry.

Reserve Fleet Savings

In FY 1977 MarAd continued its effort to reduce the consumption of electricity and diesel fuel at National Defense Reserve Fleet (NDRF) sites. Compared with the base year, FY 1973, electricity consumption in FY 1977 was reduced by 2,606,106 kilowatt hours or 45.5 percent. NDRF diesel fuel use also declined.



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Chapter 8

Maritime Manpower

Maritime Administration manpower programs help provide well-trained personnel for the U.S. merchant marine; help coordinate maritime labor policies with national and international organizations; aid in the conduct of peaceful labor relations; and set manning levels for subsidized vessels.

Seamen's Training

MarAd operates Radar Training Centers in New Orleans, New York, San Francisco, Seattle, and Toledo. Trainees include qualified merchant seamen, inland waterways and offshore drilling and mining vessel operators, maritime academy students, and personnel of the National Oceanic and Atmospheric Administration, U.S. Coast Guard, U.S. Army Corps of Engineers, and U.S. Naval Reserve.

During the fiscal year 2,640 students received training in navigation, collision-avoidance radar, gyrocompass, and LORAN at the five schools—a 24 percent increase over FY 1976.

Firefighting and damage control courses were conducted at Earle, N.J., and Treasure Island (San Francisco) by the Maritime Adminis-

tration in cooperation with the U.S. Navy's Military Sealift Command (MSC). A total of 2,898 seafarers completed that training during the year.

In anticipation of new Coast Guard requirements for merchant seamen, MarAd is currently expanding its firefighting training program. Plans for this expansion include additional training capability at the Earle facility and the establishment of standardized firefighting training facilities at locations on the Great Lakes and the Gulf Coast. Public hearing on site selections were conducted in those two regions during the fiscal year.

A standard firefighting handbook, being developed by the Agency under contract, is expected to be completed in fiscal year 1978.

MarAd actively participated during the year in activities of the Maritime Training Advisory Board's (MTAB) Subcommittees for the Development of Effective Firefighting Training and for Educational Coordination. The subcommittee on firefighting began developing new training films. The MTAB Subcommittee for Educational Coordination developed maritime training material for a new reference booklet. Funded by the Maritime Administration and published by the Maritime Research Information Service (MRIS) of the National Academy of Science, the booklet is entitled *Abstracts of Maritime Education and Training Publications*.

MarAd also provided technical assistance to the governments of Ecuador, Egypt, Kuwait, and Iran in developing maritime training programs.

Merchant Marine Academy

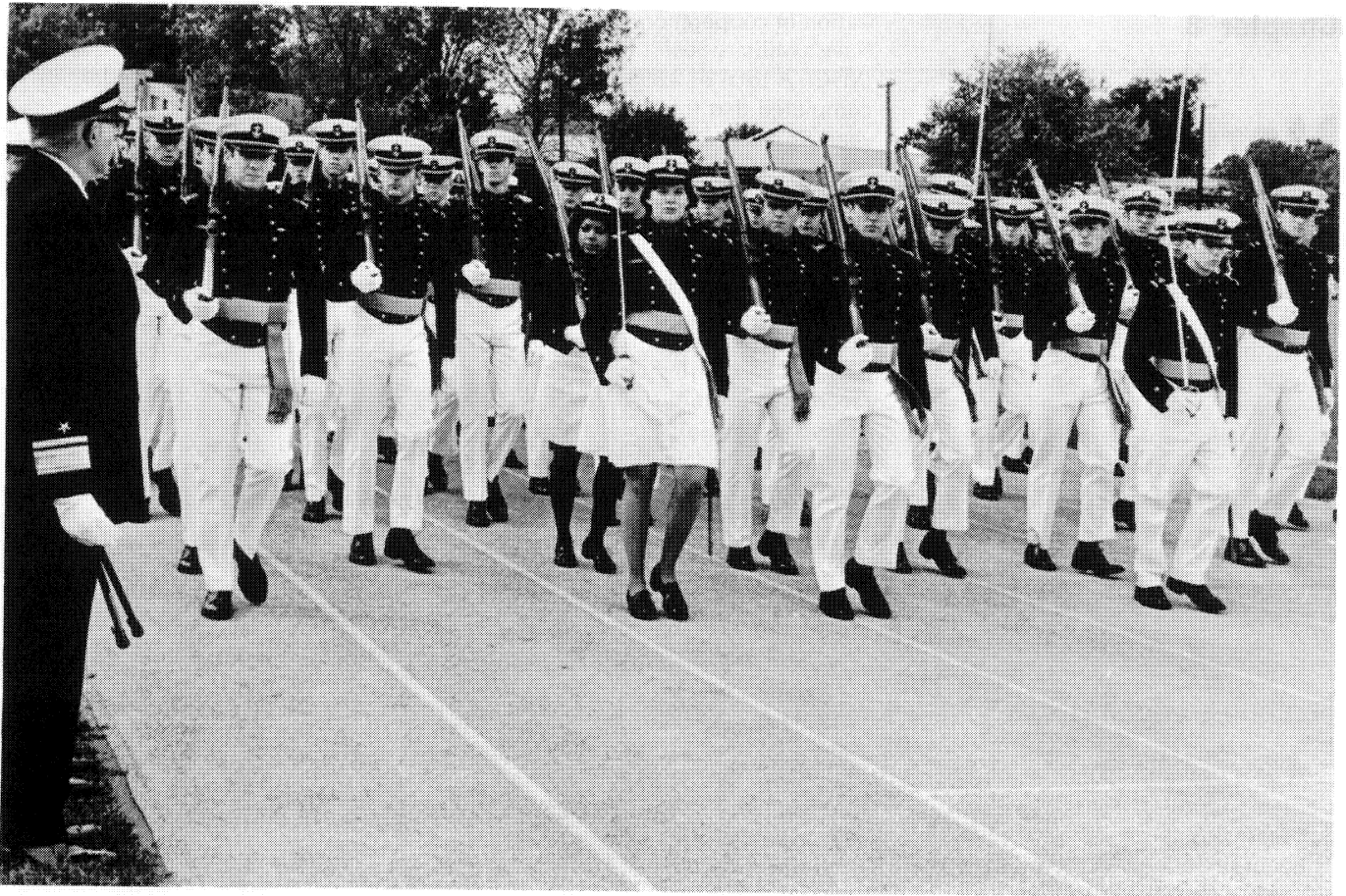
The U.S. Merchant Marine Academy at Kings Point, N.Y., trains young men and women to be merchant marine officers and leaders in the American maritime industry. The Academy offers courses in marine and nautical sciences, oceanography, naval architecture, business administration, computer science, nuclear engineering, mathematics, the humanities, and transportation. In addition to 3 years of classroom training, midshipmen spend a year at sea on American-flag vessels.

All graduates receive U.S. Coast Guard licenses, Bachelor of Science degrees, and if offered, must accept commissions as Ensigns in the U.S. Naval Reserve. About 95 percent of all Kings Point graduates are commissioned.

The Class of 1977 included 117 third mates, 91 third assistant engineers, and 17 graduates who completed the dual deck/engine program.

Within 6 weeks after the June commencement, 79 percent of the 225 graduates had found employment at sea or were serving on active duty in the Navy and Coast Guard. This employment upsurge was brought about mainly because of increased retirements from the active seagoing workforce.

Midshipman Frances Yates, one of eight women in Class of 1978 at U.S. Merchant Marine Academy—first women ever scheduled to graduate from a Federal service academy, "shoots the sun" aboard LASH TURKIYE, Prudential Lines, Inc., vessel, during sea training.



Midshipmen pass in review at U.S. Merchant Marine Academy.

Members of Congress nominated 2,625 constituents for the Class of 1981. From these nominations, 358 appointments were made, with all but five States being represented.

Average enrollment at the Academy during the year was 975.

At the start of the 1977-78 school year the Regiment of Midshipmen included 57 women. Eight women are scheduled for graduation in June 1978 and will become the first alumnae of any Federal academy—a result of MarAd's landmark decision to admit women to Kings Point in 1974 two years before the other Federal service academies.

In FY 1977 the General Accounting Office completed a review of Federal and State academies and issued a report entitled *The Federal Role in Merchant Marine Officer Education* which contained recommendations on job placement goals and naval science training.

State Maritime Academies

In June 1977, 429 merchant marine officers were graduated from the six State maritime academies located at Vallejo, Calif.; Castine, Maine; Buzzards Bay, Mass.; Traverse City, Mich.; Fort Schuyler, N.Y.; and Galveston, Tex. In addition to U.S. Coast Guard licenses, graduates of five academies received Bachelor of Science degrees (Associate Degrees are awarded at the Michigan

Academy) and, if qualified, were commissioned as Ensigns in the U.S. Naval Reserve.

The U.S. Navy and the Maritime Administration reviewed the Naval Science Departments at the maritime academies as a first step to assure quality naval science curricula at the schools. The Navy also evaluated NROTC units at the Maine Maritime Academy and the State University of New York Maritime College (Fort Schuyler) and decided to retain them.

Table 21: MARITIME MANPOWER AVERAGE MONTHLY EMPLOYMENT

	Average Monthly Employment	
	1976	1977
Seafaring:		
Shipboard Jobs (all sectors)	26,889	26,831
Shipyard:¹	97,154	115,971
Production Workers	78,228	92,459
Management and Clerical	18,926	23,512
Longshoremen	58,888	56,515

¹Commercial yards able to construct ships 475 by 68 feet.

Labor Data

Average monthly seafaring employment in all sectors—private, Government contract, and Great Lakes—declined 0.2 percent to 26,831 jobs in fiscal 1977, compared to the fiscal 1976 average of 26,889 (see Table 21).

Employment in the Soviet Grain Program decreased 18 percent, from 224,705 worker-days in FY 1976 to 184,125 in FY 1977.

The total workforce in selected commercial shipyards increased 19.4 percent, from 97,154 in fiscal 1976 to 115,971 in fiscal 1977. This increase, however, was due to the addition of General Dynamics/Groton to the list of selected shipyards during the year.

Average longshore employment declined from 58,888 in 1976 to 56,515 in 1977.

The Agency completed an analysis of the active seafaring workforce in calendar year 1976. Using the MarAd computer-based Seamen's Employment Analysis System, which draws upon information gathered by the U.S. Coast Guard, analysis indicated that nearly 71,000 merchant seamen found full or part-time employment aboard U.S.-flag vessels during the year. The total did not include civil service personnel aboard MSC ships or those working on inland waterways other than the Great Lakes.

A new edition of *Deck and Engine Officers In the U.S. Merchant Marine, Supply and Demand, 1976-1985* was released in March 1977. This study, a significant improvement over earlier analyses, covered the entire maritime industry, including officer supplies and demands for deep sea,

Great Lakes, offshore oil exploration, coastal and ocean towing, inland waterways, and government employment.

The study indicates that the gap between deck and engine officer supply and nationwide officer demand will close rapidly through the remainder of the decade and some shortage of deck and engine officers toward the end of the decade may occur if current trends continue.



Chapter 9

National Security

To ensure that U.S. merchant marine is capable of meeting America's waterborne shipping needs in times of national emergency, the Maritime Administration maintains the National Defense Reserve Fleet (NDRF) as a ready source of vessels for military logistic support and works closely with the U.S. Navy and other agencies on other national security matters.

Reserve Fleet

Vessels of the NDRF are available for use in both military and non-military emergencies, such as commercial shipping crises. They include nonactive merchant ships as well as naval auxiliaries anchored at three locations—James River, Va.; Beaumont, Tex.; and Suisun Bay, Calif. (see Table 22).

On September 30, 1977, the National Defense Reserve Fleet comprised 333 ships, (excluding 6 vessels which had been sold but not delivered). During the fiscal year 16 ships were added to the fleet and 24 were withdrawn. Ten of the latter were sold for scrapping or non-transportation use.

The number of ships in the Fleet Preservation Program—which involves conventional preservation, dehumidification, and cathodic protection—declined from 242 to 215 during the year.

The number of vessels in the National Defense Reserve Fleet at the end of fiscal years 1945 through 1977 is shown in Table 23.

Ready Reserve Fleet

At the beginning of FY 1977 the U.S. Navy transferred to the Maritime Administration \$5.2 million to begin a new program upgrading selected ships of the National Defense Reserve Fleet to Ready Reserve Fleet (RRF) status.

The initial plan for the Ready Reserve Fleet proposed that 30 World War II Victory ships be upgraded. However, the trade-in of five C-3 breakbulk ships constructed in 1960-61 provided a more modern base for the RRF program. In addition, as the program progressed, the "SEATRAN" series of ships in the NDRF (mostly former T-2 tankers which had been converted to intermodal carriers) presented to the military planners a more efficient way to transport vehicles and helicopters than was offered by the Victory class. Therefore, in consultation with the Navy, the Ready Reserve Fleet goal was changed. The new goal is to provide the Department of Defense with a sealift capability of at least 340,000 measurement tons and with RRF ships capable of activation within 5 to 10 days for deployment during national emergencies.

In FY 1977 seven ships were prepared or were in the process of being prepared to meet RRF standards. Six of the RRF ships are at James River and the other at Beaumont. One ship, the SS WASHINGTON (ex-SEATRAN WASHINGTON), was given an extended sea trial by steaming from Norfolk, Va., to Rotterdam, The Netherlands, and returning to the Gulf Coast in support of Exercise REFORGER-77.

The GLOMAR EXPLORER

The Maritime Administration accepted custody of the GLOMAR EXPLORER from the U.S. Navy at Long Beach, Calif., on October 1, 1976, following the Navy's decision to place the oceanographic research vessel in inactive reserve status at Suisun Bay.

MarAd contractors removed the GLOMAR EXPLORER's derrick and docking legs (so that the vessel could clear San Francisco Bay bridges) and prepared the vessel for towing to Suisun Bay. She was prepared for lay-up at Hunters Point Shipyard in San Francisco Bay and on January 17, 1977, was delivered to the NDRF.

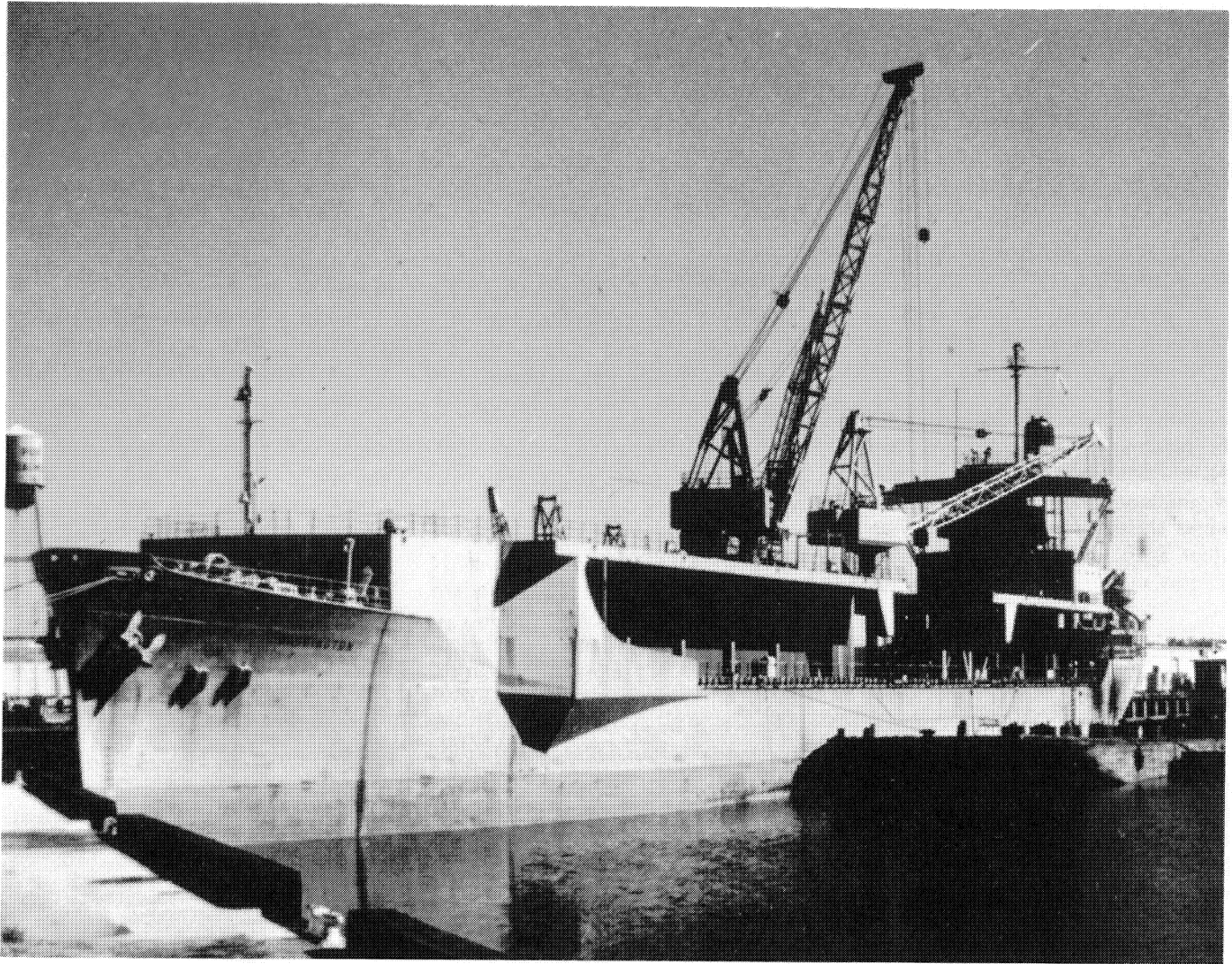
Material Control

Marine equipment valued at \$786,213 was on loan to shipyards and other marine industries and warehouse inventories were valued at \$4.26 million on September 30, 1977.

Ship Sales

Under its authority to dispose of NDRF vessels, the Maritime Administration sold 21 Government-owned ships for a total of \$2.6 million for scrap or nontransportation purposes during the fiscal year. Sixteen vessels were sold from NDRF anchorages for \$2,081,276 and the other five from nonfleet locations for \$529,550.

From 1958 through 1977, 2,270 vessels were sold for scrap or nontransportation purposes, with a return to the Government of \$192.2 million.



SS WASHINGTON, with two cranes amidship, is well-equipped to participate in Exercise Reforger-77. Ship, first of seven to enter new Ready Reserve Fleet, steamed from Gulf Coast to Rotterdam to return Air Force materials in support of annual military operation.

War-Risk Insurance

MarAd's war-risk insurance program insures operators and seamen against losses caused by hostile actions under circumstances for which commercial insurance is not available on fair and reasonable terms. During the fiscal year the Agency resumed granting insurance for war-risk and certain marine liability on U.S.-flag vessels and cargoes, as authorized by Title XII of the Merchant Marine Act of 1936, as amended. The Title XII program, which had expired September 7, 1975, was restored and extended for 3 years under provisions of Public Law 94-523 approved by Congress and signed by the President in October 1976. The current extension ends September 30, 1979.

In addition to renewing the Title XII program, the new law required the Secretary of Commerce to consider the characteristics, employment, and general management of a vessel in determining whether to grant insurance to foreign-flag vessels. The law also required all insured vessels to comply with vessel-location reporting requirements which may be established by the Secretary of Commerce, and extended coverage to containers by including loaded or empty containers in the term "cargo."

All interim binders on U.S.-flag vessels were reinstated on March 8, 1977, by publication of a notice in the *Federal Register* and new applications were accepted from that date.

Interim binders on foreign-flag vessels were not reinstated and applications for binders were not accepted pending the development of criteria for eligibility. Coverages under the new criteria will be initiated during FY 1978.

As of September 30, 1977, outstanding binders to cover ship-owners during the 30-day period after termination of their commercial war-risk insurance included 610 for war-risk hull insurance, 606 for war-risk protection and indemnity insurance, and 516 for war-risk insurance on crew life and personal effects.

From the inception of the program in 1952 until September 30, 1977, binder fees totaled \$1.26 million and expenses totaled \$1.23 million, of which \$481,817 was paid as fees and expenses of the underwriting agent appointed by MarAd to process the binders.

War-risk builder's risk insurance for the prelaunching construction period was written on 164 ships from the inception of the program in 1953 through September 30, 1977. Premiums totaled \$3.5 million. From October 1962 through September 30, 1977, 52 policies were issued for war-risk builder's risk insurance for the postlaunching construction period. No war-risk builder's risk insurance policies have been issued or reinstated since enactment of the new law.

MarAd also administers a standby war-risk cargo-insurance program which is implemented when the Assistant Secretary of Commerce for Maritime Affairs finds that insurance adequate for the needs of the U.S. waterborne commerce cannot be obtained from commercial sources at reasonable terms and conditions. Commercial underwriting agents are employed to write this insurance and, as of September 30, 1977, 38 were under contract.

At the request of the U.S. Navy, war-risk insurance is provided without premium charge but on a reimbursable basis for losses incurred as authorized under Section 1205 of the 1936 Act. As of September 30, 1977, second seamen's war-risk insurance was provided for the crews of 4 Government-owned tankers operated for the account of the Military Sealift Command (MSC) and on 14 privately owned U.S.-flag vessels and their crews while under bareboat charter to MSC.

Net premium savings to the Department of the Navy under these two programs, from their inceptions in 1954 and 1964, respectively, to September 30, 1977, were estimated at \$1.12 million after deducting claims payments of \$110,740.

Under authority of Section 1208(a) of the 1936 Act, money in the war-risk insurance revolving fund may be invested in U.S. securities or in securities on which the United States guarantees principal and interest. From 1962, when the initial investment was made, through September 30, 1977, earned interest totaled \$3.8 million.

Marine Insurance

The Maritime Administration continued to act as the insuring agent for Government-owned ships during the fiscal year. On September 30, 1977, four marine protection and indemnity claims were outstanding with total settlement value

estimated at \$360,000. These claims arose from operations in Vietnam and have an estimated reimbursement value of \$356,000 from commercial insurance in effect during the Vietnam build-up. The \$4,000 difference in estimated values represents deductibles of \$1,000 under the insurance policy for each outstanding claim.

MarAd assures that contract requirements are met on all insurance placed in commercial markets by mortgagors of vessels on which the Government holds or insures mortgages, by charterers of Government-owned vessels, and by subsidized vessel operators.

Insurance amounts approved during fiscal year 1977 are shown in Table 24.

Emergency Readiness

The National Defense Reserve Fleet provides the only surge shipping capacity available to meet military contingency requirements without withdrawing commercial ships from trade. In previous years this capacity had consisted mainly of World War II Victory ships. The addition of five C-3 breakbulk ships to the NDRF as the nucleus of the new Ready Reserve Fleet—as noted earlier in this chapter—thus marked a significant development in the Agency's emergency planning and readiness program. Development of the Ready Reserve component of the NDRF moved ahead of schedule in the first year of a 5-year program.

The renewed Title XII insurance program (also noted above) requires that all ships granted interim insurance binders make position reports under the U.S. Merchant Ship Locator Filing System (USMER). USMER, which provides information needed for the marshalling of ships in emergencies, was incorporated as a standing procedure in Defense Mapping Agency Hydrographic Publication 117.

Table 22: NATIONAL DEFENSE RESERVE FLEET—SEPTEMBER 30, 1977

Fleets ¹	Retention	Scrap Candidates	Special Programs	Total
James River, Va.	85	18	40	143
Beaumont, Tex.	39	4	7	50
Suisun Bay, Calif.	91	25	24	140
Total	215	47	71	333²

¹Vessels maintained for emergency activation under the fleet preservation program.

²Excludes 6 ships sold but not delivered.

The first increment of the revised MarAd Plan for Emergency Operations, incorporating a realistic approach to ensuring continuity of National Shipping Authority (NSA) operations under nuclear attack, was published in FY 1977. A pamphlet, *Emergency Shipping Operations of the National Shipping Authority*, was issued to tell the shipping industry what actions might be expected should the President direct the requisitioning of ships.

The concept for emergency operations of Government-owned and Government-chartered ships was both broadened and simplified, and a new, comprehensive General Agency Agreement covering operation of both categories of ships was developed.

The plan for emergency port management was clarified. Under the revised plan, the Federal Port Controller function will be performed by port authorities under contract to the National Shipping Authority rather than by individual National Defense Executive Reservists.

The wartime essential bulk import requirement was analyzed and plans were made for wartime management of shipping to carry bulk commodities. Design work was begun for the National Shipping Authority's emergency shipping

operations management system, an automated system which is necessary to enable the NSA to respond to war demands in the time-frame of today's strategy.

In North Atlantic Treaty Organization (NATO) planning, the United States hosted a training session for designees to the NATO wartime civil shipping management agency, from which emerged useful ideas for modernizing NATO shipping plans and procedures. Significant progress also was made in coordinating the availability of European NATO ships for support of military reinforcement operations.

The U.S. shipping industry and military authorities cooperated in development of an updated worldwide shipping plot for use in strategic and operational models for future planning and training activities. In conjunction with an international military-civil readiness exercise, the first comprehensive emergency communications test with all U.S. ships at sea and in port was conducted.

MarAd and the U.S. Navy also conducted a successful communications test between a merchant ship off the coast of Recife, Brazil, and a Navy vessel west of Hawaii.

The Maritime Administration cooperated with national and NATO military authorities on logistic war plans and studies of operational problems and procedures.

In its Western Region, MarAd joined the U.S. Navy's Third Fleet in a March 7-18, 1977, exercise entitled ROLLER COASTER. ROLLER COASTER, as an extension of an exercise begun in the previous year, further prepared Naval Control of Shipping officers for their roles as controllers of merchant ships on secured routes during times of emergency.

In the Western Region also, the ongoing Running Mate Program was joined by American President Lines, Pacific Far East Line, Matson Navigation Company, and States Steamship Co. This exchange of officers between the merchant marine and U.S. Navy was begun by ship commanders in FY 1976.

The Maritime Administration, in cooperation with the Department of Defense, took steps to revitalize the Industrial Preparedness Planning (IPP) program. IPP's primary objective is to ensure that the marine industrial production base would satisfy U.S. material and equipment requirements in the event of a national emergency. During FY 1977 planning was extended to the subcontractor and vendor levels, and as of September 30, 1977, 1,600 Industrial Preparedness Planning Agreements had been negotiated with approximately 350 marine-related firms.

Table 23: NATIONAL DEFENSE RESERVE FLEET 1945-1977

Fiscal Year	Ships	Fiscal Year	Ships
1945	5	1962	1862
1946	1421	1963	1819
1947	1204	1964	1739
1948	1675	1965	1594
1949	1934	1966	1327
1950	2277	1967	1152
1951	1767	1968	1062
1952	1853	1969	1017
1953	1932	1970	1027
1954	2067	1971	860
1955	2068	1972	673
1956	2061	1973	541
1957	1889	1974	487
1958	2074	1975	419
1959	2060	1976	348
1960	2000	1977	333
1961	1923		

Table 24: MARINE AND WAR-RISK INSURANCE APPROVED IN FY 1977

Kind of Insurance	Total Amount	Percentage	
		American	Foreign
Marine Hull	\$ 5,278,373,000	57	43
Marine Protection & Indemnity	13,464,221,000	19	81
War-Risk Hull	4,609,845,000	52	48
War-Risk Protection & Indemnity	4,609,845,000	52	48



Chapter 10

International Activities

Of continuing international significance were bilateral talks related to the U.S.-U.S.S.R. Maritime Agreement and with Argentina and Poland; the work of Agency's five Foreign Maritime Representatives (FMRs); and MarAd participation in international conferences and organizations, including those concerned with labor and environmental policy.

U.S.-U.S.S.R. Maritime Agreement

Designated representatives of the Governments of the United States and the Soviet Union met several times in FY 1977 for consultations to ensure effective implementation of the December 29, 1975, U.S.-U.S.S.R. Maritime Agreement.

Under the terms of a Memorandum of Understanding signed in Moscow on March 25, 1977, the designated representatives agreed that under-carriages by U.S.-flag vessels of grain cargoes in 1975 and 1976 amounted to 1,150,000 tons and that this quantity of grain cargoes would be provided to U.S.-flag vessels on a rateable basis during 1977, consistent with the availability of U.S.-flag vessels and cargo. With respect to other bulk cargoes, primarily oil and ore, they agreed that in addition to the normal U.S. share for 1977, U.S.-flag vessels would be offered an additional 377,741 tons of

oil and 189,622 tons of ore from the first bilateral cargoes available in 1977 to compensate for under-carriage accumulated in 1975 and 1976.

For fixtures of U.S.-flag vessels made between January 1, 1977, and December 31, 1977, both sides agreed that the freight rate payable to the U.S.-flag vessel operators for the carriage of 3,283,000 tons of grain from U.S. Gulf ports to the Soviet Black Sea ports would be \$16.47 per long ton. The charter rate for the carriage of grain cargoes in excess of 3,283,000 tons would be \$16 per long ton.

Under the terms of a Memorandum Concerning Bulk Cargo Movement, the mutually acceptable U.S. Gulf-Soviet Black Sea Charter rate also was set at \$16 per long ton for fixtures for heavy grain made during the period January 1, 1978, through December 31, 1978.

During the fiscal year the American and Soviet maritime delegations also discussed the difficulties experienced by U.S. underwriters in obtaining an equitable and substantial share of marine cargo insurance for bilateral trade.

Other Bilateral Talks

Assistant Secretary Blackwell led a delegation to Buenos Aires in February 1977 for 2 days of discussions on implementation of Argentine Cargo Preference Laws. The Argentine Government had implemented a resolution which gave first refusal rights to Argentine vessels and interfered with the traditional rights of shippers to book cargoes directly with carriers. The U.S. pointed out the severe difficulties this caused and the Argentine Government agreed to take steps designed to meet U.S. Government objectives. Subsequently Argentina's shipping representative in New York issued instructions to shippers

restoring the booking procedures previously in effect, and satisfying all shipping lines serving the trade.

An Argentine delegation, headed by Captain Carlos N. A. Guevara, Secretary for Maritime Interests, paid a return visit to Washington in August 1977.

In September 1977 a U.S. maritime delegation traveled to Warsaw and Gdansk and met with Polish trade and shipping officials. Topics discussed at these meetings included the third-flag bill, the UNCTAD Code of Conduct for Liner Conferences, port access problems, and the possibility of technical exchanges in shipbuilding technology. Each side agreed to exchange itineraries and agenda for reciprocal visits of experts. In connection with this Assistant Secretary Blackwell plans a visit to Poland in 1978.

Soviet Merchant Marine

A major study of the Soviet merchant marine, *Expansion of the Soviet Merchant Marine into the U.S. Maritime Trades*, was published in FY 1977.

The report outlines the rapid growth of the Soviet merchant marine since 1965 and forecasts its continued growth through 1985.

Between 1965 and 1975 the Soviet merchant fleet nearly doubled in both deadweight tonnage and number of vessels and by 1980 is expected to exceed 23 million deadweight tons.

The study also indicated a major trend toward intermodalism in the U.S.S.R. fleet, with new deliveries in the next decade expected to triple the 30 vessels listed in its intermodal fleet as of 1976.

Containers shipped by Allis-Chalmers Manufacturing Co. are swung aboard ship at Port of Milwaukee.

International Conferences

MarAd representatives participated in 36 regularly scheduled international conferences and attended *ad hoc* discussions on various international shipping matters during FY 1977.

The Intergovernmental Maritime Consultative Organization (IMCO), the Organization for Economic Cooperation and Development (OECD), and the U.N. Conference on Trade and Development (UNCTAD)—all specialized agencies of the United Nations—convene regularly to discuss different aspects of maritime transport also important to the U.S. merchant fleet.

MarAd representatives attended IMCO-sponsored conferences dealing with maritime safety, stability and load lines, pollution prevention, standards of training and watch-keeping, liability of owners of seagoing ships, and maritime satellites.

The Sixth Session of the Third United Nations Conference on the Law of the Sea was held in New York from May 23 to July 25, 1977, with a Maritime Administration representative in attendance. Of significant interest was the establishment of a new Informal Composite Negotiating Text (ICNT) which incorporated key articles concerning pollution from ocean vessels, enforcement by coastal and port States of marine pollution standards, freedom of navigation, international straits, and territorial sea standard-setting.

The Joint U.S./U.S.S.R. Task Group on Prevention and Cleanup of Pollution of the Marine Environment from Shipping met in the Soviet Union May 29 through June 12, 1977. The Task Group visited a variety of pollution control facilities, port authorities, research centers, and engineering institutes for technical discussions, presentations, and equipment demonstrations.

Between December 1976 and February 1977 a series of tanker accidents caused major oil spills in or near U.S. waters. These accidents resulted in a message from the President to the Congress on March 17, 1977, calling for an international tanker conference to consider new tanker safety standards, improvement in tanker inspections, and upgrading of crew standards. As a result of the President's initiative, IMCO scheduled three preparatory Intersessional Working Group meetings on Tanker Safety in May, June, and July 1977 and an International Conference on Tanker Safety and Pollution Prevention in February 1978.

In addition, IMCO approved President Carter's proposal concerning an upcoming IMCO Conference on Standards of Training and Qualifications of Seafarers, which suggested that the conference identify and discuss additional crew requirements. If not included in the conference agenda, the President said such requirements may be imposed unilaterally by the United States after 1978 on the crews of all ships calling at American ports. MarAd activities in both the International Labor Organization (ILO) and IMCO were related directly to this objective.

MarAd was a member of the U.S. delegation to two sessions of the IMCO Marine Environment Protection Committee (MEPC), held in London from November 29 to

December 3, 1976, and from June 20 to 24, 1977. Of primary interest to MarAd were items concerning segregated ballast existing tankers, provision of shore-reception facilities, oil discharge and monitoring equipment, and sewage treatment plants.

MarAd also participated in a session of the IMCO Maritime Safety Committee (MSC) held in London from April 18 to 22, 1977. The U.S. delegation convinced the MSC that additional international initiatives were necessary to increase tanker safety at outlined in President Carter's message to the Congress.

The IMCO Subcommittee on Bulk Chemicals, a subsidiary of both MSC and MEPC, held its second session in London from January 24 to 28. MarAd's primary interest is the activities of this subcommittee in the prevention of pollution from ships carrying dangerous chemicals and noxious liquid substances.

The Second Consultative Meeting of Contracting Parties to the Ocean Dumping Convention was held at IMCO headquarters in London September 26-30, 1977. Of interest to MarAd was the recommendation that governments should implement as soon as possible draft technical guidelines on the control of incineration of wastes at sea.

Another international antipollution effort in which MarAd has taken an active role is the Global Investigation of Pollution in the Marine Environment (GIPME). In this program, the Intergovernmental Oceanographic Commission conducts a wide range of studies on marine pollution. GIPME's comprehensive plan includes an ongoing review of the health of the oceans, the promotion of

regional studies, baseline studies, and analyses of pollutants in the marine environment and their processes of transfer.

The U.S. GIPME Subpanel, which is responsible for implementing the comprehensive plan in this country, is currently chaired by NOAA, another Commerce Department agency.

MarAd also participated during fiscal year 1977 in the 5-year review of the Joint US-Canada Great Lakes Water Quality Agreement.

In this reporting period, the Agency also took part in meetings of the Marine Transport Committee of the OECD. These sessions included discussions of assistance to shipping and shipbuilding, and flags-of-convenience and Eastern Bloc shipping.

The Maritime Administration was represented at the 8th session of the UNCTAD Committee on Shipping which was held in Geneva, Switzerland, in April 1977 at which port problems were discussed.

MarAd representatives also attended other UNCTAD shipping meetings and European Economic Community meetings on container transport; sessions of the NATO Planning Board for Ocean Shipping plenaries and NATO working groups on freight rates, shipping war losses,

civil emergency planning and military sealifts; the 9th meeting of the Organization of American States (OAS) Permanent Technical Committee on Ports; meetings of the International Standardization Organization; the National Marine Conference on Domestic Shipping sponsored by the Canadian Marine Transport Administration; the International LNG Conference in Dusseldorf, Germany; and annual meetings of the Society of Naval Architects and Marine Engineers, and the Pan American Congress of Navy Engineers.

In October 1976 Assistant Secretary Blackwell served as chairman of the U.S. Delegation to the 62nd session of the ILO in Geneva.

Substandard vessels, particularly those registered under flags of convenience, were discussed during this session, and a convention concerning the improvement of standards in merchant ships and a recommendation concerning the improvement of standards in merchant ships were adopted. These resolutions are aimed at improving the levels of safety, crew competency, and working conditions on merchant ships in accordance with international standards.

The ILO convention, if finally adopted by the required number of nations, also will permit, under certain conditions, investigations by nations of conditions on ships of other flags calling at their ports.

Foreign Maritime Representatives

The Maritime Administration is represented abroad by Foreign Maritime Representatives (FMRs) located in Tokyo, London, Rome, Brussels, and Rio de Janeiro. Together they virtually cover the world. Among their primary responsibilities is the collection of foreign cost data of critical importance to U.S. maritime subsidy programs based on the differential between foreign and domestic costs.

The FMRs also provide marketing support for U.S. carriers overseas through extensive contacts with both foreign and American manufacturers and shippers, and they help coordinate international maritime matters concerning exporters and importers and U.S.-flag carriers.



Administration

Maritime Subsidy Board

The Maritime Subsidy Board (MSB), by delegation from the Secretary of Commerce, awards, amends, and terminates subsidy contracts for construction and operation of vessels in the foreign commerce of the United States. Its functions are implemented through fact-finding investigations, compilation of domestic and foreign trade statistics and cost data, and public hearings. MSB decisions, opinions, orders, rulings, and reports are final unless the Secretary of Commerce undertakes review of its actions.

The Assistant Secretary of Commerce for Maritime Affairs, as ex officio Maritime Administrator, is Board Chairman. Other members are the Deputy Assistant Secretary and the Agency's General Counsel. The Secretary of the Maritime Administration acts as an alternate member in the absence of any one of the three permanent members.

In FY 1977 the Board met 51 times. It considered and acted on 380 items and issued 21 formal opinions, rulings, and orders. It also published 117 notices in the *Federal Register* on required statutory hearings and the development and adoption of rules and regulations in the implementation of the Merchant Marine Act of 1936, as amended.

Robert J. Blackwell (center), Assistant Secretary of Commerce for Maritime Affairs, is flanked (on his right) by William F. Mussenden, Vice President and Secretary, Bath (Maine) Iron Works Corp., and Michael J. Esposito, Executive Vice President, American Export Lines, Inc., at signing of \$86.4 million contract under which Bath is building two large containerhips for AEL.

The Board's ruling on December 28, 1976, in Docket No. A-109, was of particular interest to U.S.-flag operators. Lykes Bros. Steamship Co., Inc., had petitioned the Board to adopt three rules or orders relating to so-called "minibridge services" offered by companies subsidized under Title VI of the Act. Under the rules minibridge services would have been treated generally the same as all-water services within certain provisions of the Act. The Board denied the petition, holding that the Act in pertinent part was addressed to ocean shipping services between the United States and foreign markets and not overland services, and that the proposed rules would encumber the subsidized fleet to the benefit of foreign-flag carriers.

The FY 1977 ruling in which most people expressed interest was a decision of August 9, 1977, in Docket No. A-118, on the "Buy American" requirement of Title V of the Act as it applied to slow-speed marine diesel engines. The Board reaffirmed its decision of May 4, 1976, not to withhold approval of vessel designs incorporating slow-speed diesels solely because they used foreign components. The decision, made under authority of the "so far as practicable" exception to the "Buy American" requirement, applies for a period of time reasonably required for the development of slow-speed engines entirely from domestic sources. The ruling was based on the lack of domestically manufactured slow-speed diesel engines.

Administrative Law Proceedings

MarAd's Administrative Law Judges, in conjunction with the Executive Staff, conduct public hearings necessitated by merchant marine and shipping statutes and then prepare initial or recommended decisions. Cases are referred by the Assistant Secretary of Commerce for Maritime Affairs or the Maritime Subsidy Board.

At the beginning of the fiscal year 28 proceedings were pending before the Administrative Law Judges. Of these, 17 involved operating-differential subsidy (ODS) matters, and 11 concerned appeals of final decisions of contracting officers in disputes between ship owners or shipyards and the Maritime Administration, including the MSB.

In the course of the year, 14 more ODS cases and 5 more contract appeal cases were referred for hearing. Of the total docket, 6 initial decisions were issued, and 11 hearings were completed. Ten proceedings were either settled, withdrawn, or dismissed, and five were returned to the MSB for administrative proceeding. Twenty-three cases were pending on September 30, 1977.

Internal Management

During fiscal year 1977 MarAd instituted a simplified procedure for gathering and reviewing data needed to approve maintenance and repair subsidy payments. This new streamlined procedure improved the utilization of manpower and automatic data processing resources and reduced paperwork in the maritime industry.

The Agency also reorganized its Office of Subsidy Administration, raising to "Office" status four program areas which have grown in scope and magnitude—subsidy contracts, ship financing guarantees, ship operating costs, and trade studies and statistics. This eliminated a supervisory level and improved communications.

Audits

Seven internal audit reports were submitted to MarAd by the U.S. Department of Commerce's Office of Audits. These were the Audit of Activities Administered by the Office of Maritime Manpower; the Audit of Control and Deposit of Cash Receipts and Investment of Selected Revolving and Escrow Funds; the Review of Prior Year Maritime Construction-Differential Subsidy Agreement; the Audit of Payment of Subsidy for Carriage of Preference Cargoes; the Review of Obligations for the Todd-Hawaiian Ship Construction Contracts; and separate audits on the control over capitalized assets in MarAd's Eastern and Western Region Offices.

The General Accounting Office submitted four audit reports—on the National Defense Reserve Fleet, Ship Sales Program, Federal Role in Merchant Marine Officer Education, and Title XI Federal Ship Financing Program.

With minor exceptions, MarAd agreed with the recommendations in these audit reports and is currently implementing them.

Financial Analysis

Productivity in the Agency's review of Title XI applications was further improved with computer programs. Financial reporting requirements for nonlinear companies

were simplified, resulting in more timely submission of statements and cost savings to the respondents and MarAd.

Management Information

The Maritime Administration expanded the use of automation in the management and support of its many programs. Over 50 computer terminals now are being used actively by headquarters organizations and regional offices for a variety of automated tasks.

The year was highlighted by the rapidly expanding employment of a generalized data base management system called Management Data Query. This permits personnel without automated data processing backgrounds to obtain (through terminals) comprehensive trade and ship automated information for use in producing analytical studies and reports and in responding to inquiries.

Two new automated programs yielding significant benefits in MarAd's market development program are the Shipper Information and Market Lead Systems described in Chapter 4.

The information included in the Supplemental Unitized Cargo Container Report (MA Forms 578-A) is now being converted into automated form through computer-assistance techniques. Edits, automated reference tables, and immediate conversions to coded data all are accomplished by the use of computer programs. As a result, the time to process each form has decreased markedly.

In other FY 1977 actions, the Agency:

- Brought up to full operation a new system which generates automated standard reports containing data needed for subsidy rate hearings;
- Installed a summarized trade data base for use in developing special reports and analyses; and
- Completed another new computerized system to provide information about cargo diverted through Canadian ports.

Personnel

Employment

Total employment in the Maritime Administration decreased from 1,457 to 1,451 in fiscal year 1977. There was a 7 percent decrease in the total number of supervisors, while the percentage of minority supervisors remained the same.

The number of female employees increased 9 percent during the fiscal year. On September 30, 1977, women constituted 40 percent of the total MarAd workforce; held 8 percent of GS-12 and above positions (an increase of 1 percent over FY 1976); and occupied 6 percent of the supervisory positions.

Minority employment decreased from 26 to 23 percent of the total workforce and as of September 30, 1977, represented 9 percent of the GS-12 and above positions.

Training

During the fiscal year Maritime Administration employees attended over 1,600 formal, Agency-supported training programs.

The MarAd Executive Development Program, established in fiscal year 1976, was expanded to include a core series of programs. Steps also were taken to expand the offering of technical programs directly related to the maritime industry, with programs offered on petroleum tankship operations and ship chartering.

Some 50 MarAd employees participated in a general maritime industry orientation coordinated by the New York State Merchant Marine Academy at Ft. Schuyler, N.Y. This program will be expanded in fiscal year 1978.

Awards

During the fiscal year 17 MarAd employees received honor awards. Two employees received the Department of Commerce Gold Medal, the highest Departmental award, and two employees received the second highest award, the Department's Silver Medal. Eight others received Bronze Medals, MarAd's top award. In addition, four employees were honored for their contributions to the Equal Employment Opportunity Program, and one employee was honored by the Arthur S. Fleming Foundation for contributions in the field of administration.

Installations and Logistics

Real Property

At year's end the Maritime Administration's real property included the Reserve Fleet sites at Suisun Bay, Calif.; Beaumont, Tex.; and James River, Va.; a warehouse at Kearny, N.J.; the U.S. Merchant Marine Academy at Kings Point, N.Y.; and the Wilmington, N.C., Maritime Facility.

Radar training schools are operated at Pier 1, Fort Mason, San Francisco, Calif.; New Orleans, La.; Toledo, Ohio; Seattle, Wash.; and New York, N.Y. Regional Offices are operated in San Francisco; Cleveland, Ohio; New Orleans; and New York City. Market Development Offices are maintained in Long Beach, Calif.; Chicago, Ill.; Seattle, Wash.; Houston, Tex.; Atlanta, Ga.; Detroit, Mich.; and in the four regional headquarters.

The Agency maintains the National Maritime Research Center at Kings Point, N.Y., and a Reserve Fleet support facility in Norfolk, Va.

MarAd's Hoboken, N.J., terminal continued under lease to the Port Authority of New York and New Jersey.

Smithsonian Exhibit

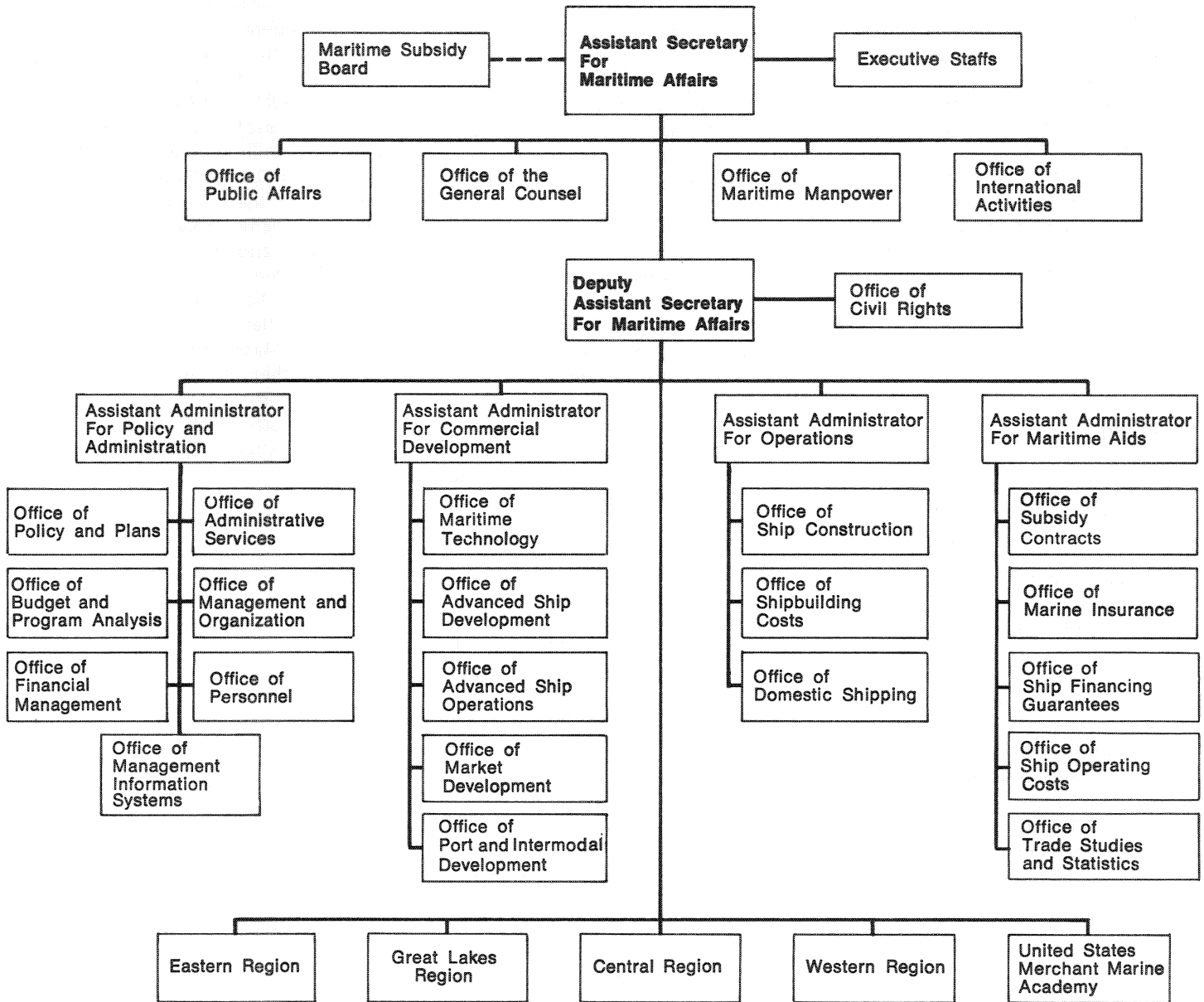
During fiscal year 1977 MarAd continued to provide information and assistance to the Smithsonian Institution on its plans to design and open the new Hall of American Maritime Enterprise.

Accounting

The accounts of the Maritime Administration for the period were maintained on an accrual basis and in conformity with generally accepted accounting principles and standards, and with related requirements prescribed by the Comptroller General. The cost of combined operations of the Maritime Administration in FY 1977 totaled \$499 million. This included \$476.1 million for ODS and CDS, \$15.9 million for research and development, \$25.5 million for administrative expenses, \$10.8 million for operation of the U.S. Merchant Marine Academy, \$8.5 million for maintenance and preservation of National Defense Reserve Fleet vessels, and \$4.8 million for financial assistance to State maritime academies. MarAd received \$42.6 million in other operating income, net of expenses.

Financial statements of the Maritime Administration appear in Exhibits 1-3.

Maritime Administration Organization Chart



Maritime Administration Field Organization



FINANCIAL STATEMENTS

U.S. Department of Commerce—Maritime Administration

Exhibit 1. Statement of Financial Condition

September 30, 1977, and September 30, 1976

Assets

	September 30	
	1977	1976
Selected Current Assets		
Fund Balances with Treasury:		
Budget Funds	\$ 679,931,322	\$ 853,713,418
Deposit Funds	860,879	2,708,218
Allocation from Other Agencies	4,671,687	340,414
Budget Clearing Accounts	21,602	21,602
	<u>685,485,490</u>	<u>856,783,652</u>
Federal Security Holdings	<u>137,275,000</u>	<u>104,970,000</u>
Accounts Receivable:		
Government Agencies	3,361,501	2,182,879
The Public	4,991,640	5,925,400
Allowances (—)	—171,216	—867,987
	<u>8,181,925</u>	<u>7,240,292</u>
Advances To:		
Government Agencies	74,907	82,584
The Public	96,723	56,410
	<u>171,630</u>	<u>138,994</u>
Total Selected Current Assets	<u>831,114,045</u>	<u>969,132,938</u>
Loans Receivable:		
Repayable in Dollars	55,278,428	35,262,282
Allowances (—)	—10,756,550	—10,756,550
	<u>44,521,878</u>	<u>24,505,732</u>
Inventories		
Raw Material and Supplies	4,568,983	5,895,505
Real Property and Equipment:		
Land	5,898,348	5,841,348
Structures and Facilities	37,129,392	35,321,414
Equipment and Vessels	1,386,943,120	1,439,355,598
Leasehold Improvements	92,119	92,119
Allowances (—)	—1,320,262,527	—1,382,915,225
	<u>109,800,452</u>	<u>97,695,254</u>
Other Assets:		
Work-in-Process, Contractors	3,955,322	2,628,695
Materials and Supplies, Other	622,121	553,543
Deferred Charges	749,544	749,244
Allowances (—)	—749,244	—749,244
	<u>4,577,743</u>	<u>3,182,238</u>
Total Assets	<u>\$ 994,583,101</u>	<u>\$1,100,411,667</u>

The notes and schedules to financial statements are an integral part of this statement.

FINANCIAL STATEMENTS

U.S. Department of Commerce—Maritime Administration

Liabilities	September 30	
	1977	1976
Selected Current Liabilities (Note 2):		
Accounts Payable (including Funded		
Accrued Liabilities):		
Government Agencies	\$ 134,695	\$ 286,167
The Public	101,311,869	147,049,625
	<u>101,446,564</u>	<u>147,335,792</u>
Advances From:		
Government Agencies	4,905,370	3,556,901
The Public	21,828,495	21,655,367
	<u>26,733,865</u>	<u>25,212,268</u>
Total Selected Current Liabilities	<u>128,180,429</u>	<u>172,548,060</u>
Deposit Fund Liabilities	<u>860,879</u>	<u>2,708,214</u>
Unfunded Liabilities:		
Accrued Annual Leave	<u>2,567,422</u>	<u>2,521,532</u>
Other Liabilities:		
Vessel Trade-in-Allowance	<u>372,887</u>	<u>372,887</u>
Total Liabilities	<u>131,981,617</u>	<u>178,150,697</u>
Government Equity		
Unexpended Budget Authority:		
Unobligated	369,058,728	455,544,543
Undelivered Orders	374,392,977	438,519,054
	<u>743,451,705</u>	<u>894,063,597</u>
Unfinanced Budget Authority (—):		
Contract Authority	<u>—41,408,692</u>	<u>—101,226,206</u>
Invested Capital	<u>160,528,747</u>	<u>128,474,310</u>
Receipt Account Equity	<u>29,724</u>	<u>949,269</u>
Total Government Equity	<u>862,601,484</u>	<u>922,260,970</u>
Total Liabilities and Government Equity	<u>\$ 994,583,101</u>	<u>\$1,100,411,667</u>

The notes and schedules to financial statements are an integral part of this statement.

FINANCIAL STATEMENTS

U.S. Department of Commerce—Maritime Administration

Exhibit 2. Statement of Equity of U.S. Government

For Years Ended September 30, 1977,
and September 30, 1976

Years Ended September 30

	1977	1976
Balance Beginning of Fiscal Year	\$ 922,260,970	\$ 963,368,504
Additions:		
Funds Appropriated by Congress	456,200,000	673,074,000
Property Capitalized without Use of Funds	—	16,896,190
Property Transferred	—6,199,945	—
	<u>1,372,261,025</u>	<u>1,653,338,694</u>
Deductions:		
Net Cost of Combined Operations (Exhibit 3)	499,000,008	712,383,784
Payments into General Fund Receipts	10,663,203	18,502,833
Unobligated Balances Withdrawn or Restored (—)	—3,670	191,107
	<u>509,659,541</u>	<u>731,077,724</u>
Balance, Close Accounting Period (Exhibit 1)	\$ 862,601,484	\$ 922,260,970

The notes and schedules to financial statements are an integral part of this statement.

FINANCIAL STATEMENTS

U.S. Department of Commerce—Maritime Administration

Exhibit 3. Statement of Operations

For Years Ended September 30, 1977,
and September 30, 1976

	Years Ended September 30	
	1977	1976
OPERATIONS OF MARITIME ADMINISTRATION:		
Net Costs of Operating Activities		
Reserve Fleet Programs:		
Depreciation on Vessels	\$ 9,012,093	\$ 12,117,482
Maintenance and Preservation	8,508,005	5,567,885
	<u>17,520,098</u>	<u>17,685,367</u>
Maritime Training Program	10,801,392	12,670,724
Maintenance of Shipyard and Warehouses	22,227	34,606
	<u>28,343,717</u>	<u>30,390,697</u>
Direct Subsidies and National Defense Cost:		
Operating-Differential Subsidies	328,181,751	373,090,832
Construction-Differential Subsidies	147,924,311	267,360,126
Cost of National Defense Features	893,507	1,053,575
	<u>476,999,569</u>	<u>641,504,533</u>
Administrative	25,507,627	31,502,143
Research and Development	15,943,740	24,486,676
Financial Assistance to State Marine Schools	4,837,763	4,630,908
	<u>46,289,130</u>	<u>60,619,727</u>
Other Costs (—Income)		
Depreciation on Vessels—Prior Years	—	6,381,690
Income on Sale of Obsolete Vessels	—889,097	—7,715,046
Income on Sale of Other Assets	—40,021	—66,323
Inventory and Property Adjustments	—21,448,872	—24,753
Interest Income	—767,857	—532,301
Miscellaneous (Net)	—115,122	3,272,683
	<u>—23,260,969</u>	<u>1,315,950</u>
Net Cost of Maritime Administration Operations	528,371,447	733,830,907
OPERATIONS OF REVOLVING FUNDS:		
Vessel Operations Revolving Fund	—7,757	201,365
War Risk Revolving Fund	—477,713	—501,678
Federal Ship Financing Fund, Revolving Fund	—28,885,969	—21,146,810
	<u>—29,371,439</u>	<u>—21,447,123</u>
Net Costs of Combined Operations (Exhibit 2)	\$499,000,008	\$712,383,784

The notes and schedules to financial statements are an integral part of this statement.

U.S. Department of Commerce—Maritime Administration

Notes to Financial Statements—September 30, 1977, and September 30, 1976

1. The preceding financial statements include the assets, liabilities, income, and expenses of the Maritime Administration; the Vessel Operations Revolving Fund; the War-Risk Revolving Fund; and the Federal Ship Financing Fund, Revolving Fund.

2. The Maritime Administration was contingently liable under agreements insuring mortgages and construction loans payable to lending institutions totaling \$4,716,772,258 on September 30, 1977, and \$3,590,508,399 on September 30,

1976. Commitments to insure additional loans and/or mortgages amounted to \$1,054,853,533 on September 30, 1977, and \$1,360,642,090 on September 30, 1976. U.S. Government securities and cash of \$489,972,220 on September 30, 1977, and \$395,341,141 on September 30, 1976, were held in escrow by the Government in connection with insurance of loans and mortgages which were financed by the sale of bonds to the general public. There were no conditional liabilities

for prelaunching War-Risk Builder's Risk Insurance on September 30, 1977.

On September 30, 1977, and September 30, 1976, the U.S. Treasury held in safekeeping for the Maritime Administration \$130,000 and \$130,000 respectively, of U.S. Government securities which had been accepted from vessel charterers, subsidized operators, and other contractors as collateral for their performance under contracts.

One ore carrier trails another through broken ice as winter navigation season is extended on Great Lakes.



Appendix I: MARITIME STUDY OUTLAYS—1936–1977

Fiscal Year	CDS	Reconstruction Subsidy	Total	ODS	Total ODS & CDS
1936-1955	\$ 248,320,942 ¹	\$ 3,286,888	\$ 251,607,830	\$ 341,109,987	\$ 592,717,817
1956-1960	129,806,005	34,881,409	164,687,414	644,115,146	808,802,560
1961	100,145,654	1,215,432	101,361,086	150,142,575	251,503,661
1962	134,552,647	4,160,591	138,713,238	181,918,756	320,631,994
1963	89,235,895	4,181,314	93,417,209	220,676,685	314,093,894
1964	76,608,323	1,665,087	78,273,410	203,036,844	281,310,254
1965	86,096,872	38,138	86,135,010	213,334,409	299,459,419
1966	69,446,510	2,571,566	72,018,076	186,628,357	258,646,433
1967	80,155,452	932,144	81,087,566	175,631,860	256,719,426
1968	95,989,586	96,707	96,086,293	200,129,670	296,215,963
1969	93,952,849	57,329	94,010,178	194,702,569	288,712,747
1970	73,528,904	21,723,343	95,252,247	205,731,711	300,983,958
1971	107,637,353	27,450,968	135,088,321	268,021,097	403,109,418
1972	111,950,403	29,748,076	141,698,479	235,666,821	377,365,300
1973	168,183,937	17,384,604	185,568,541	226,710,926	412,279,467
1974	185,060,501	13,844,951	198,905,452	257,919,080	456,824,532
1975	237,895,092	1,900,571	239,795,663	243,152,340	482,948,003
1976 ²	233,826,424	9,886,024	243,712,448	386,433,994	630,146,442
1977	203,479,571	15,052,072	218,531,643	343,875,521	562,407,164
Total	\$2,525,872,920	\$190,077,184	\$2,715,950,104	\$4,878,938,348	\$7,594,888,452

¹Includes \$131.5 million CDS adjustments covering the World War II Period, \$105.8 million equivalent to CDS allowances which were made in connection with the Marine Ship Construction program and \$10.8 million for CDS in fiscal years 1954 to 1955.

²Includes totals for FY 1976 and the Transition Quarter ending September 30, 1976.

**Appendix II: COMBINED CONDENSED FINANCIAL STATEMENTS
OF SUBSIDIZED AND UNSUBSIDIZED OPERATORS¹**
(See Notes)

Statement A—Combined Condensed Balance Sheets December 31, 1976 (Amounts Stated in Thousand Dollars)

	Subsidized	Unsubsidized	
		Tanker	Cargo
ASSETS			
Current Assets:			
Cash	\$ 70,356	\$ 32,724	\$ 5,466
Marketable Securities	83,626	—	63,651
Accounts Receivable	322,087	15,100	76,583
Other Current Assets	41,903	15,454	27,702
Total Current Assets	517,972	63,278	173,402
Special Funds and Deposits	163,024	52,600	28,279
Investments	61,041	12,501	15,293
Deferred ODS Receivable (See Contra)	11,244	—	—
Property and Equipment Less Depreciation:			
Vessels	1,125,291	201,238	269,453
Other Property and Equipment	71,096	3,173	76,566
Other Assets	84,891	81,763	10,986
Voyages in Progress-Net	—	217	—
TOTAL ASSETS	\$2,034,559	\$414,770	\$573,979
LIABILITIES AND NET WORTH			
Liabilities:			
Current Liabilities:			
Accounts and Notes Payable	\$ 206,370	\$ 24,452	\$ 64,745
Current Long-Term Debt	18,546	15,797	5,864
Other Current Liabilities	125,023	18,553	49,288
Total Current Liabilities	349,939	58,802	119,897
Voyages in Progress-Net	75,077	2,727	17,824
Long-Term Debt	640,054	168,732	159,116
Recapture ODS (See Contra)	11,244 ²	—	—
Other Liabilities	125,783	63,343	72,676
Total Liabilities	1,202,097	293,604	369,513
Net Worth:			
Capital Stock	108,421	29,392	22,802
Surplus:			
Paid in Capital	213,266	39,056	135,439
Retained Earnings	510,775	52,718	46,225
Total Surplus	724,041	91,774	181,664
Total Net Worth	832,462 ³	121,166	204,466
TOTAL LIABILITIES AND NET WORTH	\$2,034,559	\$414,770	\$573,979

NOTES TO STATEMENTS A AND B

¹The data were obtained from Forms MA-172 filed by (1) 18 subsidized operators owning 181 vessels and chartering 42 others (2) 24 unsubsidized operators owning 28 tankers and chartering 6 tankers and (3) 3 unsubsidized liner cargo vessel operators owning 51 vessels and chartering 21 others. A few Forms MA-172 for unsubsidized operators covered fiscal years ending prior to December 31, 1976.

²Represents the Government's share of recapturable subsidy (ODS) deducted from subsidy payments pending settlement of complete 10-year subsidy recapture periods.

³Income Taxes in the amount of \$12,531 for the subsidized operators have been deferred for payment through accelerated depreciation and other tax shelter provisions of the Internal Revenue Code.

⁴For transportation of grain to the U.S.S.R.

Appendix II (Continued)
(See Notes)

Statement B—Combined Condensed Income and Surplus Accounts Year Ending December 31, 1976
(Amounts Stated in Thousands of Dollars)

	Subsidized	Unsubsidized	
		Tanker	Cargo
Shipping Operations:			
Revenue:			
Terminated Voyages	\$1,588,121	\$110,156	\$634,603
Other Shipping Operations	18,933	7	23,867
Total Revenue	<u>1,607,054</u>	<u>110,163</u>	<u>658,470</u>
Expenses:			
Terminated Voyage Expense			
Wages, Payroll Taxes, Welfare Contributions	348,780	33,273	110,574
Subsistence	15,656	1,312	3,304
Maintenance and Repair	91,210	10,809	24,651
Insurance (Hull and P and I)	97,668	8,160	44,441
Total	<u>553,314</u>	<u>53,554</u>	<u>182,970</u>
Less: Operating-Differential Subsidy (ODS)	285,532	21,223 ⁴	—
Total	<u>267,782</u>	<u>32,331</u>	<u>182,970</u>
Other Vessel Expense	369,271	27,862	59,699
Voyage Expense	611,634	16,558	275,031
Total Terminated Voyage Expense	<u>1,248,687</u>	<u>76,751</u>	<u>517,700</u>
Other Shipping Operations Expense			
Overhead	156,728	5,236	59,754
Depreciation on Shipping Property	64,526	13,726	24,498
Other Miscellaneous Shipping Expense	24,896	4,550	3,100
Total Expense	<u>1,494,837</u>	<u>100,263</u>	<u>605,052</u>
Gross Profit from Shipping Operations	<u>112,217</u>	<u>9,900</u>	<u>53,418</u>
Interest and Other Income	59,069	3,486	7,007
Interest and Other Deductions	55,357	12,347	19,091
Net Profit from Shipping Operations	<u>115,929</u>	<u>1,039</u>	<u>41,334</u>
Non-Shipping Operations-Net Profit (Loss)	(5)	(656)	17
Ordinary Income before Federal Income Taxes	<u>115,924</u>	<u>383</u>	<u>41,351</u>
Provisions for Federal Income Taxes	32,643	(357)	13,285
Ordinary Income After Taxes	<u>83,281</u>	<u>740</u>	<u>28,066</u>
Extraordinary and Prior Period Items:			
Extraordinary Items-Net Income (Net Expense)	8,024	311	—
Federal Income Taxes Thereon (Net Expense)	(2,364)	—	—
Total	<u>5,660</u>	<u>311</u>	<u>—</u>
Net Income (Loss)			
Add: Paid in Capital and Retained Earnings	88,941	1,051	28,066
Beginning of Year	687,102	95,854	154,237
Total Surplus Available	<u>776,043</u>	<u>96,905</u>	<u>182,303</u>
Surplus Changes:			
Cash Dividends	51,998	4,748	13,250
Other (Net)	4	383	(12,611)
Total	<u>52,002</u>	<u>5,131</u>	<u>639</u>
SURPLUS (CAPITAL AND EARNED) END OF YEAR	\$ 724,041	\$ 91,774	\$181,664

Appendix III: RESEARCH AND DEVELOPMENT CONTRACTS—FISCAL YEAR 1977

(note: "Amount" = MarAd funding in FY77; asterisk (*) indicates project is cost-shared.)

Project	Task	Vendor	Contract Number	Amount
Advanced Ship Development				
Competitive Shipbuilding:				
Surface Preparation & Coatings of Ship Steel *	Develop improved materials, equipment, and techniques for steel surface preparation and coatings.	Avondale Shipyards, Inc. New Orleans, La.	5-38071	\$630,000
Welding Methods & Materials *	Improve shipyard pipe and laser welding techniques and materials and evaluate new materials.	Bethlehem Steel Corp. Sparrows Point, Md.	2-36214	450,000
Outfit and Protection Aids *	Improve planning, materials, and production aids for the outfitting phase of ship construction through the use of multiplexing and photogrammetry.	Todd Shipyards Corp. Seattle, Wash.	2-36233	400,000
Marine Electric-Cable Performance Standards *	Develop specifications for electrical cables suitable as an industry standard and Government regulations including a list of cables which meet performance standards.	Todd Shipyards Corp. Seattle, Wash.	2-36233	105,000
Hull Steel Improvement	Evaluation improved steels in the shipyards to determine whether increased transverse toughness results in more productive welding processes.	National Bureau of Standards Boulder, Colo.	400-79008	50,000
Interaction Parts and Computerized Sheet Metal Template Development (REAPS)*	Develop an advanced, automated manufacturing capability, including computer software, electronically controlled heavy manufacturing equipment, and control devices.	Newport News Shipbuilding and Dry Dock Co. Newport News, Va.	7-38061	402,920
Research & Engineering for Automation and Productivity in Shipbuilding (REAPS)*	Coordinate technical activities of Autokon users in development and dissemination of advanced manufacturing methods.	IITRI Chicago, Ill.	5-38072	302,815
Ship-Cost Estimating Phase I *	Develop and demonstrate a computer-aided estimating capability for shipbuilding, including computer programs for estimating ship costs and documentation to install, use, and service the computer software.	National Steel and Shipbuilding Co. San Diego, Calif.	7-38052	360,000
Ship Machinery Outfitting:				
COGAS Power Plant Equipment *	Identify the requirements and availability of off-the-shelf equipment for use in high-efficiency, combined-cycle power plants; analyze COGAS plants as alternative to steam-turbine systems.	George G. Sharp, Inc. New York, N.Y.	7-38009	146,722

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Marine Bunker Fuels Assessment	Assess the relative impact of various political, social, economic and environmental factors on the price of marine bunker fuels; project bunker prices and alternatives available for reducing the impact of high fuel costs on vessel productivity.	Mortada International Dallas, Texas	7-38015	\$102,000
Astern Power Requirements	Determine the technical and economic impacts of astern power requirements on marine steam-turbine propulsion systems in order to determine the potential for improving the maneuverability and stopping distance of merchant ships.	DeLaval Turbine, Inc. Trenton, N.J.	7-38027	98,255
Diesel-Combustion Improvement Techniques	At-sea test and evaluation of devices and fuel additives to determine their effectiveness in reducing fuel consumption and boiler maintenance in medium-speed diesel engines when burning heavy marine fuel oils.	Seaworthy Engine Systems Essex, Conn.	7-38058	144,196
High-Performance Marine Burner, Phase III ***	In-service evaluation of the overall, long-term effectiveness of low-excess air boiler operation in reducing fuel oil consumption and corrosion/deposition of heat transfer surfaces.	Hague International South Portland, Maine	7-38046	147,800
Marine Burner Atomizer Optimization *	Develop a technique for measuring the automization effectiveness of marine burners; to be used as a design tool for manufacturing more efficient marine combustion equipment.	Combustion Engineering Windsor, Conn.	7-38010	172,039
Improved Marine Boiler Reliability Study	Improve boiler-water and feed-water quality maintenance by providing marine industry with a comprehensive compilation of present water-treatment technology and developing quality standards.	Combustion Engineering Windsor, Conn.	6-38088	95,149
Protective Covering System for Steel Propellers, Phase I	Develop and demonstrate an adequate protective covering system for steel propellers in order to replace bronze propellers on ships and thereby reduce both manufacturing and operating costs.	Daedalean Woodbine, Md.	7-38048	149,491

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Propeller Coatings Model Tests *	Perform model testing of various coatings/cladding in support of project effort to reduce propeller damage and develop low-cost steel propellers.	USN-NSRDC Carderock, Md.	400-69016	52,000
Contrarotating Propulsion Model Testing	Test Roll-On/Roll-Off hull-powered model of the contrarotating transmission system to determine fuel consumption savings prior to installation onboard ship.	USN-NSRDC Carderock, Md.	400-79006	135,000
Contrarotating Propulsion Model Testing	Model-test the stretched Ponce de Leon class RO/RO with a contrarotating propeller arrangement.	Sun Shipbuilding & Dry Dock Co. Chester, Pa.	7-38068	142,072
Model Test Rig for Contrarotating, Hydrodynamically Coupled Propellers	Provide test rig in development of data on hydrodynamically coupled contrarotating propellers to determine economic factors for full-scale applications.	Transmission Technology Fairfield, N.J.	7-38072	39,567
Planetary Marine Transmission System	Develop and fabricate a standardized marine transmission with reversing capabilities.	Curtiss-Wright Wood-Ridge, N.J.	3-36247	82,378
Improved Pump Impeller Materials for Salt Water Service	Develop an improved protective covering system against cavitation erosion damage for ships' salt-water pump impellers.	Bell Aerospace Buffalo, N.Y.	7-38044	121,343
Elimination of Electrostatic Tanker Explosions *	Evaluate the shipboard at-sea performance of an electro-mechanical device designed to dissipate electrostatic charges generated in a cargo oil tank by tank-cleaning equipment.	Cinco-Tech Corp. Los Angeles, Calif.	4-37065	28,561
Steering Systems Reliability *	Analyze shipboard steering systems; recommend ways to improve system reliability and performance and in upgrading existing regulations for system design and installation.	J.J. Henry, Inc. New York, N.Y.	7-38018	142,882
Clean Ballast Tanker Design	Investigate, through alternative design configurations, the economic penalty for crude carriers to meet IMCO requirements.	Newport News Shipbuilding & Dry Dock Co. Newport News, Va.	7-38054	173,225
Operational Guide for Tuning Steam Turbines	Develop a manual for use by shipboard engineers to assure maximum performance and efficiency of steam-turbine propulsion systems.	Seaworthy Engine Essex, Conn.	7-38067	69,067

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Bulk Carrier Safety Enhancement Phase II	Develop criteria and guidelines (manuals) for the design, construction, and safe operation of tank-washing, inerting, and ventilating systems for bulk carriers.	Southwest Research San Antonio, Tex.	5-38044	\$137,627
Centralized Propulsion Control Systems	Develop methodology for analyzing safety characteristics of centralized propulsion control system designs.	American President Lines Oakland, Calif.	7-38038	295,800
Hull Monitoring System, Phase II	Develop prototype of an automated system to monitor dynamic and static ship conditions to improve safety and efficiency in ship operation.	United States Lines, Inc. New York, N.Y.	4-37119	42,437
Hull Monitoring System Tests and Evaluation, Phase III	Test and evaluate hull monitoring system aboard SS AMERICAN LANCER.	United States Lines, Inc. New York, N.Y.	4-37119	53,641
Prototype Shipboard M&R System	Extend the prototype maintenance and repair system being evaluated onboard the MV SUGAR ISLANDER from engineroom systems and equipment to a total-ship system.	Pacific Gulf Marine New Orleans, La.	7-38014	48,618
Nuclear Ship:				
Consolidated Nuclear Steam Generator (CNSG)	Audit adjustments covering 1972-73 design project involving a CNSG for a very large crude carrier.	Babcock & Wilcox Lynchburg, Va.	2-36216	127,577
Licensing and Regulations:				
NRC Licensing for CNSG Reactor *	Revise Preliminary Safety Analysis Report submitted to the Nuclear Regulatory Commission to obtain a license to manufacture a nuclear merchant-ship reactor.	Babcock & Wilcox Lynchburg, Va.	4-37067	335,902
Mathematical Model for a Gillage Type of Analysis	Develop a mathematical model for the analysis of the gillage type of protection barrier for the reactor compartment of nuclear commercial ships.	Hydronautics, Inc. Laurel, Md.	6-38081	37,716
Nuclear Ship-Related Accident Studies	Analyze accident data required for submittal to the Nuclear Regulatory Commission to evaluate the operational safety of nuclear ships.	George G. Sharp, Inc. New York, N.Y.	7-38028	96,272
Licensing and International Standards for Nuclear-Powered Merchant Ships	Provide engineering support for development of international standards for nuclear-powered merchant ships, specifically proposed IMCO Code of Practice for Nuclear Ships.	Todd R&T Division Galveston, Tex.	7-38016	61,082

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Quality Assurance Development, Phase II	Revise, interpret, and develop positions for MarAd Quality Assurance Manual required for licensing of nuclear propulsion units.	Todd R&T Division Galveston, Tex.	6562	\$ 13,217
Nuclear Ship Safety Criteria	Review existing and proposed national and international nuclear merchant ship safety criteria.	NUS Corporation Rockville, Md.	6-38160	11,243

Advanced Ship Operations

Shipping Operations Information System (SOIS):

Financial Information and Retrieval System (FIRST)	Provide technical assistance, improve data entry subsystems, and modify selected FIRST standard reports.	Peat, Marwick, Mitchell Washington, D.C.	7-38075	14,600
Barge Equipment Control System *	Design, develop, operate, test, and evaluate a mini-computer-based cargo equipment inventory and control system for barge-carrying and partial-container ships for U.S.-flag ship operators.	Lykes Brothers Steamship Co., Inc. New Orleans, La.	5-38040	149,579
Network Installation/ Industry Utilization	Expanded utilization by U.S.-flag ocean carriers of computer-based modules developed in the SOIS program through a dial-up commercial network computer service and increased information materials.	General Electric Co. Arlington, Va.	7-38049	219,968
Operational Evaluation of Containership Loading	Evaluation by an experienced containership/terminal operator under operating conditions of a computer program developed to determine the desired sequencing of loading/unloading containers; compare results with present system.	Matson Terminals, Inc. San Francisco, Calif.	7-38002	35,000
Purchasing/Inventory/ Cost Control System	Design, develop, test, and evaluate a computer-based inventory and cost-control system for ship stores, supplies, equipment, and services.	Moore-McCormack Lines, Inc. New York, N.Y.	7-38063	453,308
Long-Range Planning, Vessel Configuration System *	Develop a system to increase competitiveness of U.S.-flag ocean carriers over foreign-flag vessels on various trade routes.	Farrell Lines, Inc. New York, N.Y.	7-38080	60,000
Marine Terminal Automatic Container Identification System *	Design, develop, test, and evaluate an advanced cargo identification system.	Computer Identics Westwood, Mass.	3-36255	85,085

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Cargo Handling:				
LASH Sea Shed/Sea Vat Containers *	Develop plans and specifications and assess market for a LASH/Rail-compatible general cargo container (Sea Shed) and a tank-tainer (Sea Vat) capable of supporting both liquid and dry-bulk cargoes.	Prudential Lines, Inc. New York, N.Y.	7-38005	\$ 50,000
Ship Automation:				
Automated Multiship Collision-Avoidance Concept	Develop collision-avoidance maneuver logic for multiple-ship and restricted-waters encounters (for CAORF and other experiments).	Systems Control Palo Alto, Calif.	7-38047	125,272
Human Factors in Ship Control, Phase II	Evaluation of advanced display concepts for standardized conning stations to reduce accidents and operating costs of U.S. merchant vessels.	Eclectech Associates North Stonington, Conn.	7-38011	143,000
Navigation & Communications:				
Digital Selective Calling (Selcall)	Update the Maritime Digital Selective Calling System and provide technical support to teleprinter error correction project.	Institute of Telecommunications Sciences Boulder, Colo.	400-79012	60,000
Radio Technical Commission-Marine	Cooperative development between Federal agencies and industry for communications and navigation requirements.	Federal Communications Commission Washington, D.C.	400-79000	12,500
Ship Control Engineering and Technical Requirements	Provide technical analysis, evaluation, and engineering related to ship control of maritime satellite and advanced navigation projects.	Mitre Corp. McLean, Va.	7-38042	191,155
International Maritime Satellite System (INMARSAT)	Study communications radio-determination, broadcast, collision-avoidance, and safety services needed from INMARSAT to improve ship operations in the merchant marine.	Washington Focus Co. Absecon, N.J.	5-0011	19,771
INMARSAT Engineering	Provide engineering tasks required for national satellite system studies and preparatory committee activities for INMARSAT.	Washington Focus Co. Washington, D.C.	7-38030	16,695
INMARSAT Benefit Cost Study	Analyze cost benefits of a national satellite system and related communications.	Computer Sciences Corp. Falls Church, Va.	5-0041	66,703

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
INMARSAT Radio Determination, Phase II	Assess costs and benefits accruable to the U.S.-flag fleet through the addition of a radio determination capability to the projected INMARSAT maritime communication satellite system.	Computer Sciences Corp. Falls Church, Va.	2-4308	\$ 59,168
Demonstrate SITOR Adaption of SELCALL	Demonstrate the effectiveness of SITOR and adaption of SELCALL; complete review of recommendations on the teleprinter correction project and Inland Waterway Communications System.	Office of Telecommunications Boulder, Colo.	400-79004	24,500
Advanced Steering Navigation Systems, Phase I	Examine the productivity potential of advanced steering and navigation systems.	Eclectech Associates North Stonington, Conn.	5-0021	52,276
Maritime Technology				
Shipping Requirements:				
Tug-Barge Study	Update and compile for publication previously developed tug-barge design data.	University of Michigan Ann Arbor, Mich.	7-15121	9,545
Northwest Alaskan Tanker Transportation System Study	Evaluate the marine transportation alternatives for moving oil from Northwest Alaska, including ice-breaking tankers, various tug-barge configurations, and environmental issues.	Global Marine, Inc. San Diego, Calif.	6-38164	28,350
Fleet Forecast—1980	Develop model for a 25-year forecast of the size and composition of the U.S. merchant fleet.	Temple, Barker & Sloane Wellesley Hills, Mass.	6-38091	18,911
Standardized Design for a U.S.-Flag Dry-Bulk Carrier *	Conduct a design competition among shipbuilders to develop a standardized dry-bulk carrier for the U.S.-flag offering the benefits of lower cost and shorter construction time through series production and the application of advanced technology.	M. Rosenblatt & Son Arlington, Va.	7-38053	281,203
Arctic Ship-Powering and Development	Identify research activities needed to develop technology for arctic marine transportation system.	Arctec, Inc. Columbia, Md.	7-15248	8,281
Barge-Mounted Industrial Processing Plants	Develop economic and technical information on the feasibility of shipyard construction of barge-mounted industrial processing facilities.	Pace Marine Houston, Tex.	7-15414	7,500

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Mobilization Ship Design Model Tests	Conduct preliminary hull form tests of the PD-214 combination emergency mobilization ship design.	NSRDC Carderock, Md.	400-79015	\$200,000
Next Generation Cargo-Liner *	Assist the ship operating industry in defining the characteristics of the next generation cargo-liner— (a standardized vessel offering the benefits of series production).	J.J. Henry Co. New York, N.Y.	6-38060	57,130
Marine Sciences:				
Maritime Transportation Research Board (MTRB) Studies *	Co-sponsor studies by industry committees through the National Academy of Sciences to identify technological requirements and the utilization of research resources and technological developments.	Office of Naval Research Arlington, Va.	400-79001	175,000
Maritime Research Information System (MRIS) *	Collect and disseminate maritime technical information.	National Academy of Sciences Washington, D.C.	5-38005	200,000
MRIS Foreign Technology Input	Identify sources for and qualify and quantify foreign technology literature for input into MRIS.	Franklin Institute Philadelphia, Penn.	7-15099	8,238
Tandem-Propeller Design Tests *	Conduct model tests of a commercial ship with tandem propellers to determine the energy efficiency of the design.	NSRDC Bethesda, Md.	400-79014	99,000
Highly Skewed Propeller/ Cavitation Erosion *	Test and evaluate a highly skewed propeller on the AEL DEFIANCE; investigate propeller cavitation erosion and develop a technique for its early detection.	American Export Lines, Inc. New York, N.Y.	3-36288	40,277
Ship Structures Committee *	Jointly sponsor maritime technology research related to ship design, fabrication methods and materials, structural loads, stress instrumentation and data analysis.	U.S. Coast Guard Washington, D.C.	400-79007	150,000
Great Lakes Carriers Hull Stress Warning System	Identify technological and operational requirements for the development of a stress warning system to avoid overstraining of the hull girder on ships in the Great Lakes bulk carrier service.	Webb Institute Glen Cove, N.Y.	7-38035	75,580

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Compartmentation of Great Lakes Bulk Carriers	Investigate the technical, economic, and safety requirements for compartmentation of bulk carriers and self-unloaders operating on the Great Lakes; identify design alternatives and make design recommendations for safety levels of new construction and existing ships.	R.A. Stearn, Inc. Sturgeon Bay, Wisc.	7-38055	\$125,355
Ship Maneuvering	Develop a computer program to aid in determining ship maneuvering coefficients ranging from deep- to shallow-water operational depths.	M.I.T. Cambridge, Mass.	5-38073	36,500
High-Power Single-Screw Propulsion	Identify and investigate increasing costs in the design, construction, and operation of merchant ships associated with the continuing increases in horsepower developed on a single shaft.	Hydronautics, Inc. Laurel, Md.	7-38023	142,300
Bow Steering for River Vessels *	Conduct research to improve the maneuverability of inland river tows; identify the economics of and technological requirements for bow steering units and determine performance characteristics through full-scale towboat/ barge tests.	Dixie Carriers Houston, Tex.	7-38012	58,612
Hull Form and Performance Test Data Retrieval—MarAd Standard Series	Develop a computer program for the rapid retrieval of deep-water ship powering data and ship design data available from model tests of the MarAd standard series single-screw bulk carrier design.	Hydronautics, Inc. Laurel, Md.	5-38074	10,270
VLCC Shallow-Water Trials Maneuvering *	Obtain full-scale VLCC maneuvering data to increase operational efficiency in shallow water and reduce the possibility of collisions and pollution.	Exxon International Co. Florhan Park, N.J.	7-38025	192,940
Concepts for Improving Tank Ship Control, Phase I	Develop an analytical method for determining the role of maneuvering in accidents in restricted or shallow waters, to determine whether improved ship maneuverability would reduce accidents.	Hydronautics, Inc. Laurel, Md.	8-3004	127,030
Ice-Transiting Bow Form for Great Lakes Bulk Carriers	Test and analyze a new bow configuration for ice-transiting the Great Lakes.	Pickands Mather & Co. Cleveland, Ohio	6-38055	35,200
Application of Air-cushion Configuration Vehicles (ACVs)	Develop theory and design procedures for using ACVs in commercial ice-breaking applications; evaluate several commercial configurations for the Great Lakes and the Arctic.	J.L. Decker Potomac, Md.	7-38036	25,876

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Ship Springing Research *	Investigate ship springing on the Great Lakes—through experiments, theoretical development and full-scale data validation—to develop design standards incorporating springing stresses.	American Bureau of Shipping New York, N.Y.	7-38060	\$ 99,015
Market Analysis:				
Assessment of the Market for U.S.-Flag Transportation of Perishable Imports and Exports	Define the market for U.S. perishable commodities and determine the segment of the market available to U.S.-flag operators.	Manalytics San Francisco, Calif.	7-38004	102,325
Market Study of the U.S. Ship Repair Industry	Identify and analyze international competitive opportunities and factors influencing the future workload of the worldwide ship repair industry; evaluate alternative strategies for increasing U.S.-repair yard penetration.	International Maritime Associates Washington, D.C.	7-38056	105,793
Market Assessment for Trade with Developing Countries	Provide regional maritime transportation requirements for trade with developing countries over the next 10 years, based on projected export and import commodity movements classified by competitive potential for U.S. shipping.	CACI, Inc. Arlington, Va.	7-38062	149,960
Operators' Competitive Itinerary Marketing System (OCIMS)	Provide U.S.-flag operators and MarAd personnel with current foreign competition data for market analysis.	Marine Management Systems, Inc. Stamford, Conn.	6-38069	49,461
Effects of Bilateralism on U.S. Maritime Commerce	Examine the effects on U.S. maritime commerce cargo alternatives abroad.	Manalytics San Francisco, Calif.	7-38087	111,820
Energy Conservation:				
Velocity Paint Testing	Continue, for 12 months, velocity paint testing as part of a joint MarAd-Navy program.	Todd R&T Division Galveston, Tex.	7-39003	30,000
Energy Transportation:				
Cryogenic Research Program	Expand on current liquefied natural gas (LNG) data to assist designers and shipbuilders; provide more accurate measurement equipment to reduce the error in cargo custody accounting.	National Bureau of Standards Boulder, Colo.	400-79005	150,000
Cryogenic Single-Point Mooring (SPM) Concept *	Conduct analytical and design studies for a cryogenic SPM concept for near-shore LNG transfer.	Donaldson Associates Rancho Palos Verdes, Calif.	7-38026	52,000

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Preliminary Engineering Design for OTEC Pilot Plant	Develop preliminary design as a base for demonstration of an ammonia-generation plant ship using ocean thermal energy conversion (OTEC).	Naval Sea Systems Command U.S. Department of the Navy Arlington, Va.	400-79011	\$200,000
SS MANHATTAN Arctic Marine Project	Make available to U.S. maritime industry the data and results of the SS MANHATTAN Arctic operations.	Arctec, Inc. Columbia, Md.	7-38085	115,745
Management Strategies for Liquefied Gas Carriers (LGCs)	Provide potential owners of LGCs economic design and management options to avoid underutilization of the vessels.	M.I.T. Cambridge, Mass.	7-38083	80,000
Pollution Abatement:				
Oil-Water Monitor Test and Evaluation	Test and evaluation of oil-water monitor for shipboard use.	Todd R&T Division Galveston, Tex.	6562	7,875
Viability Assessment of a U.S.-Flag Toxic Chemical Incineration Ship	Assess the economic and environmental viability for development of U.S.-flag ships to incinerate chemical wastes at sea.	Global Marine, Inc. Newport Beach, Calif.	7-38029	59,352
Marine Cargo Hazards Study *	Determine and alleviate deficiencies relating to ability to respond effectively to marine cargo hazards on an emergency basis.	U.S. Navy Arlington, Va.	400-79013	20,000
National Maritime Research Center				
Exploratory Research:				
Accident Data Bank Development & Analysis	Complete development of the Accident Data Base; increase the productivity, safety morale, and efficiency of U.S.-flag personnel by reducing human factors that lead to accidents and illness.	Marine Index Bureau New York, N.Y.	72765	74,799
Machine Condition Monitoring Techniques	Perform research on techniques for detecting deterioration of ship's machinery to provide greater flexibility between machinery surveys and reduce unscheduled machinery down time.	Foxboro Trans-Sonics Foxboro, Mass.	72762 & 72797	17,733
Heavy Weather Damage-Avoidance System (HWDAS) Evaluation, Phase II *	Assist in the utilization of commercial vessels operating in the North Atlantic trade as R&D platforms for needed work on the marine environment.	Prudential Lines, Inc. New York, N.Y.	5-0019	48,000

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Heavy Weather Damage-Avoidance System Test and Implementation, Phase II	Develop HWDAS Phase II installation modification specifications and plans; at each North Atlantic voyage return, receive data, check system performance and evaluate data for completeness and utility in ship operations; transmit data for analysis, and instruct ship personnel in system requirements.	Maritime Engineering Service Dix Hills, N.Y.	5-0023	\$ 11,728
Heavy Weather Damage-Avoidance System Data Analysis and Performance Evaluation, Phase IIa	Analyze data and evaluate at-sea performance of vessels using HWDAS. Determine the reliability, utility, and effectiveness of the system in improving ship performance under adverse weather conditions.	Webb Institute Glen Cove, N.Y.	5-0027	35,900
Computer-Aided Operations Research Facility (CAORF):				
CAORF Maintenance, Repair, Engineering and Logistics	Provide engineering, logistics, and technical support to maintain the Computer-Aided Operations Research Facility at the NMRC, Kings Point, N.Y.	Sperry Marine Systems, Inc. Great Neck, N.Y.	6-38000	990,075
CAORF Programming	Provide additional computer required to improve CAORF ship operations simulation.	Sperry Marine Systems, Inc. Great Neck, N.Y.	6-38000	36,189
CAORF Ship's Course and Rudder Angle Recorder	Automatically record helmsman's reaction to issued orders for incorporation into the CAORF system.	Sperry Marine System, Inc. Great Neck, N.Y.	6-38000	18,959
CAORF Equipment Interface	Integrate special equipment into the CAORF simulation program for LORAN C simulator, Pelorus heading indicators, Complot plotter, and Textronix data terminal.	Sperry Marine Systems, Inc. Great Neck, N.Y.	6-38000	49,890
CAORF Management and Operation	Manage and operate CAORF; develop methods to improve the operating efficiency of merchant ships, reduce ship collisions, and other operations research to enhance the competitive position of the U.S. Merchant Marine.	Grumman Systems Corp. Bethpage, N.Y.	5-38003	1,262,608
Containership Maneuvering characteristics for CAORF	Develop maneuvering coefficients for a containership to allow the CAORF bridge system to operate for containership as well as tanker research.	J.J. Henry Co. New York, N.Y.	2-4339	174,224

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Test Subjects for CAORF Experiments	Provide seagoing test subjects, masters, mates, and pilots for CAORF experiments from various geographic areas.	Grumman Systems Corp. Bethpage, N.Y.	2-4320	\$ 59,148
CAORF M&R, Logistics and Engineering	Increase maintenance from 40 to 60 hours for three additional projects—Santa Barbara data base, "Own Ship's" maneuvering characteristics, and Rule 17.	Sperry Systems Management Great Neck, N.Y.	6-38000	135,000
LNG Tanker Mathematical Model for CAORF	Develop maneuvering coefficients for an LNG 80,000-ton tanker; perform large amplitudes horizontal PMM tests in two shallow water depths-to-draft to obtain hydrodynamics coefficients for forward and backing motion.	Hydronautics, Inc. Laurel, Md.	2-4326	102,500
CAORF Tug Forces	Provide realistic dynamic effects of tug forces to the maneuvering dynamics of Own Ship, including variable tug forces and contact points.	Sperry Systems Management Great Neck, N.Y.	5-0032	198,457
CAORF Transponder Display	Provide a Marine Radar Interrogator Transponder (MRIT) display for CAORF experiments and selected hardware module prototype development.	Sperry Systems Management Great Neck, N.Y.	70356	198,511
CAORF Eidophor Projectors Modifications	Upgrade of Eidophor projectors for CAORF.	Conrac West Caldwell, N.J.	7-39033	656,720
CAORF Wind Speed and Direction Indicators	Install wind speed and wind direction indicators on the CAORF bridge and at the control station, to provide realism in carrying out research experiments in the presence of aerodynamic wind effects.	Sperry Systems Management Great Neck, N.Y.	2-4361	30,739

Port and Intermodal Development

Equipment and Facilities:

Marine Fire Protection *	Define and evaluate the costs and benefits to ship operators and port administrations for regional firefighting teams as provided for under pending legislation.	SRI International Menlo Park, Calif.	7-38008	271,508
Improved Fendering Systems for Shallow and Deep-Draft Berths, Phase I *	Analyze the operational environment creating damage to current fender systems and develop a plan for technical design specification and guidelines.	Van Houten Associates, Inc. New York, N.Y.	7-38031	45,426

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Automated Control System for U.S. Public Marine Terminals, Phase I	Develop a conceptual design, identify potential problems, and select operations and test sites for an automatic control system for public marine terminals.	Arinc, Inc. Annapolis, Md.	8-3006	\$117,369
Tanker Berthing Evaluation *	Reduce the probability of spill damage during tanker berthing, utilizing the CAORF simulator with full-scale test data.	DT-NSRDC Bethesda, Md.	400-79017	100,000
Port Planning:				
Economic Impact of U.S. Ports, Phase II	Develop an input-output model to measure the economic impact of port activities in the United States, providing a comprehensive analysis of port impact on gross national product, employment, industries, foreign trade, tax revenues, and other facets of the national economy.	Port Authority of New York and New Jersey New York, N.Y.	6-38024	124,049
Mid-America Port Plans *	Inventory port facilities and capacities on Mid-America's Mississippi River system; project cargo demand through 2000 A.D. and estimate port facilities required in the several States to ensure the movement of expected tonnages and commodities.	Tippet, Abbetts, McCarthy, Stratton New York, N.Y.	7-38006	197,000
Port Facilities Inventory Data Base Modifications	Enhance the overall value and capability of the Port Facilities Inventory System by including U.S. river port facilities and capacities in the data base.	GRC Data New York, N.Y.	6-38062	9,968
Great Lakes/Seaway Port Development & Shipper Conference *	Determine needs and priorities of U.S. Great Lakes/Seaway port industry in a cooperative government, industry, and labor effort.	A.T. Kearney, Inc. Chicago, Ill.	6-38045	13,233
Great Lakes Traffic and Competition Assessment	Identify traffic flow of commodities in Great Lakes region; analyze competitive factors that determine transport modes and routings used; and evaluate impact of alternative marketing strategies.	Simat, Helliesen & Eichner Newton Center, Mass.	7-38059	249,558
Current Trends in Port Pricing	Determine trends in pricing policy in U.S. ports on both quantitative and philosophical bases as a response to noticeable shifts in the availability of developmental dollars from traditional sources.	Amundsen Vero Beach, Fla.	7-38034	20,000

* Cost-shared.

Appendix III: (Continued)

Project	Task	Vendor	Contract Number	Amount
Cooperative Great Lakes Regional Port Study, Phases I and II	Develop a long-range, port development program plan for meeting cargo potentials and marketing strategies for the eight States in the Great Lakes area.	Frederic R. Harris, Inc. Lake Success, N.Y.	7-38057	\$150,616

Agency Support

Fire Protection:

Standardized Merchant Vessel Firefighting Field Exercise Training Facility Design	Provide a basic standardized curriculum and design of a field exercise firefighting facility for training U.S. merchant seamen in firefighting.	John F. Connell Consultants, Ltd., and Beatty & Beatty, AIA Great Neck, N.Y.	6-38167	77,925
Firefighting and Fire Safety Manual	Develop and print a standardized firefighting manual for use aboard merchant vessels.	Brady Co. Bowie, Md.	60071	14,200

* Cost-shared.

Appendix IV: STUDIES AND REPORTS RELEASED IN FY 1977

The following studies or reports were released by the Maritime Administration during fiscal year 1977.

A limited number of copies of publications marked [MarAd] are available from the Office of Public Affairs, Maritime Administration. Publications marked [GPO] are available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Those labelled [NTIS] may be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161.

MARAD 1976, (Report of the Maritime Administration for fiscal year 1976 and the transition quarter ending September 30, 1976), 116pp, \$1.70 [GPO]

Emergency Shipping Operations of the National Shipping Authority, July 1977, 9pp [MarAd]

Service Guide—Ship Your Cargo on U.S. Flag Ships, January 1977, 8pp [MarAd]

Expansion of the Soviet Merchant Marine Into the U.S. Maritime Trades, August 1977, 82pp [GPO]

Criteria and Requirements for Port Development and Operations, prepared by Massachusetts Institute of Technology, October 1977, 50pp [MarAd]

Conferences on U.S. Port Industry Data Requirements—Final Report, Chicago, Illinois, September 21-22, 1976, Washington, D.C. May 11-12, 1977, [MarAd]

The Maritime Aids of the Six Major Maritime Nations, prepared by Temple, Barker & Sloane, Inc., and Chase Econometric Associates, Inc., September 1977, 372pp PB-273013/AS \$12.50 [NTIS]

A Long-Term Forecast of U.S. Waterborne Trade, 1976-2000, April 1977, 291pp PB-274601/AS [NTIS]

Impact of User Charges Applied to Inland Waterways, prepared by Simat, Helliesen & Eichner, Inc., February 1977, 147pp PB-268459/AS \$6 [NTIS]

Forecasting Marine Transportation Requirements for Oil Imports to Middle Eastern Oil-Exporting Countries: 1976-1985, prepared by CACI, Inc., May 1977

Volume 1: Executive Summary—A Business Proposal for U.S.-Flag Operations 16pp PB-265046/AS \$3.50

Volume 2: Final Report 200pp PB-265047/AS \$7.50

Volume 3: Appendix 326pp PB-265049/AS \$10

Volume 4: Supplement to Volume 1 84pp PB-265048/AS \$5

Complete Set PB-265045/Set \$22.50.

Study of the Port of Metropolitan St. Louis, prepared by A.T. Kearney, March 1977 [NTIS]

Volume 1: A Primer on Inland Waterways Ports 172pp PB-261527/AS \$7.75

Volume 2: Executive Summary 33pp PB-261528/AS \$4

Volume 3: Appendix A—Profile of the Port 285pp PB-261529/AS \$9.25

Volume 4: Appendix B—Commodity Market Analysis 55pp PB-261530/AS \$4.50

Volume 5: Appendix C—Port Operations Analysis 80pp PB-261531/AS \$5

Volume 6: Atlas (Microfiche only) PB-261532/AS \$3

Economic Impact of the U.S. Merchant Marine and Shipbuilding Industries: An Input-Output Analysis, prepared by the Port Authority of New York and New Jersey, 272pp May 1977 PB-272518/AS \$10.75 [NTIS]

An Analysis of Cyclical and Other Fluctuations in Commercial Shipbuilding in the United States, 1950-1974, 225pp PB-264609/AS \$7.75 [NTIS]

Forecasting Marine Transportation Requirements for Imports to Middle Eastern Countries: 1976-1985, prepared by CACI, Inc., May 1977 [NTIS]

Volume 1: Executive Summary 22pp PB-268461/AS \$3.50

Volume 2: Research Findings 114pp PB-268462/AS \$5.50

Volume 3: Appendices 487pp PB-268463/AS \$12.50 Complete Set PB-268460/AS \$20

Metric Conversion Study for the Maritime Administration—Final Report, prepared by J.J. Henry, Inc., June 1977, 49pp PB-271096/AS [NTIS]



Sponsor and other principals are barely visible in champagne shower at naming ceremony for SS OVERSEAS OHIO, 90,000-dwt. tanker built for Overseas Shipholding Group, Inc., at National Steel and Shipbuilding Co. in San Diego.

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