

**1975**

**Report on Survey of U.S.  
Shipbuilding and Repair Facilities**



U.S. DEPARTMENT OF COMMERCE  
Maritime Administration

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## Introduction

In compliance with the requirements of Merchant Marine Act of 1936, as amended,<sup>1/</sup> the Office of Ship Construction conducts an annual survey to obtain information from the shipbuilding and ship repair industry that is used primarily to determine if an adequate mobilization base exists for purposes of national defense and for use in a national emergency. This report on the 1975 survey of U.S. shipyard facilities was prepared by the Division of Production, Office of Ship Construction and is for general use within MarAd and other government agencies.

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### 1/ Section 210

"It shall be the duty of the Secretary of Commerce to make a survey of the American merchant marine, as it now exists, to determine what additions and replacements are required to carry forward the national policy declared in Section 101 of this Act, and the Secretary of Commerce is directed to study, perfect, and adopt a long-range program for replacements and additions to the American merchant marine so that as soon as practicable the following objectives may be accomplished:..... Fourth, the creation and maintenance of efficient shipyards and repair capacity in the United States with adequate numbers of skilled personnel to provide an adequate mobilization base."

### Section 211

"The Secretary of Commerce is authorized and directed to investigate, determine, and keep current records of.....(g) The number, location, and efficiency of the shipyards existing on the date of the enactment of this Act or thereafter built in the United States."

### Section 502(f)

"The Secretary of Commerce, with the advice of and in coordination with the Secretary of the Navy, shall, at least once each year, as required for purposes of the Act, survey the existing privately owned shipyards capable of merchant ship construction, or review available data on such shipyards if deemed adequate, to determine whether their capabilities for merchant ship construction, including facilities and skilled personnel, provide an adequate mobilization base at strategic points for purposes of national defense and national emergency."

The statistical data accumulated by the survey is a major input into the Shipyard Production and Mobilization Model (SPAMM), a quantitative assessment of the nation's ship construction and ship repair capability. This capability is periodically compared with Department of Defense scenarios involving various contingency attrition rates and emergency civilian shipping requirements to determine the adequacy of the shipbuilding mobilization base, including ship repair and reactivation of MarAd and Navy reserve fleets. The report on the mobilization analysis is available on a "need to know" basis from the Director, Office of Ship Construction.

The survey also provides a data base that is used to evaluate the feasibility of proposed shipbuilding programs. Determinations are made as to which existing shipyards might construct proposed ships consistent with ship size and delivery date requirements. The need for construction of new facilities to meet the demands of proposed shipbuilding programs can also be identified. The data gathered by the annual survey is also used extensively in MarAd responses to queries received from a variety of interests, including members of Congress, the Secretary of Commerce, the Department of Defense, and the Office of Management and Budget.

Each year in late spring, Standard Form 17, "Facilities Available for the Construction or Repair of Ships," is mailed to approximately 170 shipyards and ship repair facilities. The form was developed jointly by MarAd and the Navy under the general guideline that all data accumulated would be treated as confidential. A completed Form 17 represents a detailed description of a shipbuilding or ship repair facility. The information requested, and available for official use, can be reviewed on a blank Form 17, shown herein as Appendix A.

Upon receipt of completed Form 17 from industry, MarAd forwards a copy to the Office of the Coordinator for Ship Repair and Conversion which maintains appropriate records of available facilities and capacities of various shipyards and repair plants to enable the Depart-

ment of Commerce and the Department of Defense to use such facilities to the best advantage. Form 17 also serves as a primary data input to the Industry Evaluation Board Summary Analysis conducted by the Bureau of Domestic Commerce in cooperation with MarAd. The Federal Preparedness Agency in the General Services Administration is also a recipient of this information.

### General

The annual survey of 1975 has been completed and all information collected is available for official use. The data has been organized and condensed in the following narrative, exhibits, and tabulations to focus attention on those elements that are most often requested from this Office. Appendix B is an especially valuable statistical abstract of data gathered from those companies responding to the annual survey. It lists the nation's major shipbuilding and ship repair and drydocking yards sorted on a coastal basis. Information is displayed pertaining to the size and type of each building position, pier and berth space, employment, and remarks regarding yard activities.

### Major Shipbuilding Facilities

A major shipyard is defined for purposes of this report as one having at least one building position, either an inclined way, a side-launching platform or a building basin, with the capability to accommodate a minimum ship size of 475 feet length-over-all (LOA) and a beam of 68 feet. These dimensions represent the smallest ship size that would be considered for mass production during a mobilization period. There are presently 25 shipyards classified in this category, which are identified and geographically located in Exhibit 1.

Despite the drastic decline in the shipbuilding market and the present uncertainties in the industry, U.S. shipyards plan to spend approximately \$279 million for improvement of facilities during fiscal year 1976. Since enactment of the Merchant Marine Act of 1970, the U.S. shipbuilding industry has expended \$738.7 million in

capital improvements for new building basins, new floating drydocks, cranes of unprecedented lifting capacity, plus a wide range of new or modernized shops and facilities. Emphasis has been on prefabrication of large subassemblies and preoutfitting of components using modular techniques. Exhibit 2 indicates actual and planned capital investments by major shipyards. Exhibits 3 through 9 are general arrangement plans outlining the new and reconstructed building facilities in seven of these yards. Detailed descriptions of these exhibits are included in this report.

As of July 1, 1975 (see Exhibit 10), MarAd was subsidizing a backlog of 39 large oceangoing ships in eight shipyards with a total contract value of \$2.4 billion. These were in addition to 44 non-subsidized ships under construction or on order. MarAd was also providing mortgage guarantee insurance for 187 ships and 250 LASH lighters under contract in 50 construction facilities throughout the country (see Exhibit 11). The total Title XI guarantee value of these vessels and barges is approximately \$2.27 billion.

Table I has been prepared to satisfy the frequent query: how many building positions are available to build a specified ship.<sup>1/</sup> A single shipway or basin may have several building positions depending on the size of the ships being constructed. For example, the 1,200-foot by 192-foot basin at Bethlehem's Sparrows Point shipyard can accommodate one 265,000 dwt. tanker or four of the smaller mobilization ships. The ship types listed, with the exception of the mobilization ships, are those presently under construction or recently delivered to commercial service. The number of building positions varies from 119 for the small mobilization ship to two for the huge 390,770 dwt. tanker. Length-over-all and beam are given for all ships and deadweight tonnage for the bulk carriers. An important consideration that is ignored in Table I is the common shipbuilding practice of

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<sup>1/</sup> The usual accompanying questions to this query, e.g., when the ships can be delivered and what effect a new proposal will have on the existing program or work under contract, can be answered from SPAMM output.

laying a keel on a building position already occupied by another ship. For example, in a 700-foot basin a complete 610-foot containership and the stern section of a second ship could be constructed simultaneously. This production procedure, analyzed periodically by SPAMM, maximizes the use of shipbuilding facilities, minimizes the construction period, and increases the number of ships that can be produced in a given period of time.

Table II is a somewhat different presentation of the data, meaningful to many requesting information from the annual survey. In lieu of actual ships, maximum ship length is used to determine the number of shipways or basins available. In this tabulation the emphasis is on the number of individual facilities available and not on the number of ships that can be constructed. Again using Sparrows Point as an example, Table II lists the 1,200-foot by 192-foot basin as one facility regardless of what type of ship is constructed in it. Table I indicates that there are eight building positions for a ship 475 feet 10A at Sparrows Point whereas Table II indicates that the yard has five individual shipways capable of constructing a ship 475 feet in length. Exhibit 12 is a histogram displaying the reduction in the number of available shipways as the maximum ship length increases.

There appears to be sufficient U.S. shipyard capacity to handle merchant shipbuilding requirements in the near future. Exhibit 13 indicates when each of the major commercial yards needs new contracts in order to utilize facilities and to maintain current rates of employment. Many of these yards presently have building facilities available to expand employment levels if new contracts can be secured.

Following is a brief description of major U.S. commercial shipyards capable of constructing oceangoing or Great Lakes merchant ships, with a minimum size of 475 feet by 68 feet.

1. Bath Iron Works Corporation

Bath Iron Works Corporation, located on the Kennebec River in Bath, Maine, is an old established shipyard engaging in both Navy and commercial ship construction. The yard has a history of proven diversity, having constructed various types of ships in the past, including containerships, tankers, destroyers and guided missile frigates.

Bath completed a series of five 25,000 dwt. tankers in August 1975 and is currently building four large sophisticated roll-on/roll-off cargo ships (MA Design C7-S-95a) for States Steamship Company, the largest ships ever contracted for at BIW. Also under construction is the OLIVER HAZARD PERRY (FFG-7), the prototype lead ship for the Navy's new series of guided missile frigates which are planned to be built in various U.S. shipyards. Bath also does conversion and topside repair work where drydocking is not necessary.

In 1974, the yard completed a \$14 million modernization program. The upgrading of facilities included the reconstruction of two shipways to accommodate ships of 700 feet in length with a minimum beam of 130 feet, the installation of a 220-ton level luffing crane with sufficient outreach to erect units on all shipways, and new steel fabrication shops and equipment that will double steel throughput capacity.

In addition to the building positions recently modernized, BIW has one other shipway that can accommodate a ship 650 feet in length with a beam of 88 feet. The yard does not have a drydocking facility;<sup>1/</sup> therefore, repair capacity is limited to topside and inboard work.

Two wharves and a pier provide a total of 2,900 linear feet for outfitting and repair work. Each wharf is serviced by a 25-ton rotating crane and the pier by a 90-ton gantry crane.

BIW operates a second facility, the Hardings plant, located three miles from the shipyard, where much of the initial steel fabrication takes place. At this plant steel is blasted and sprayed, cut, straightened or shaped. The steel is then transported to Bath by truck or rail where it is joined together into subassemblies for final erection at the shipway. The yard is not considered to be automated although some numerically controlled burning and one-sided welding equipment is employed.

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<sup>1/</sup> There is a special floating partial drydock used exclusively for the installation and repair of sonar domes.

The current administrative and production work force is approximately 3,675. It is estimated that the yard work force could be expanded to 12,000 employees under conditions of mobilization.

2. Bethlehem Steel Corporation - Sparrows Point

Sparrows Point, the largest of Bethlehem Steel's seven shipyards, is located on the Patapsco River in the Baltimore, Maryland metropolitan area. This yard has been one of the most productive in the nation during the past two decades, specializing in series construction of standard sizes of tankers, plus freighters and container-ships. Sparrows Point has recently completed a series of 120,000 dwt. tankers.

SS MASSACHUSETTS, the first of five 265,000 dwt. tankers contracted for in 1972 and 1973, was completed in October of this year. Four more of these VLCCs are in production. Signing of these contracts signaled the beginning of a new era in the corporation's shipbuilding history. In just five years, the size of tankers ordered at Sparrows Point has jumped more than sevenfold.

To provide a capability for the construction of VLCCs, Sparrows Point has completed a significant facilities improvement program totaling approximately \$30 million. The major components of this modernization program are a new large building basin for the construction of vessels up to 300,000 dwt. and a new panel shop for fabrication of steel. This fabrication shop is capable of constructing panels up to 60 feet square, four feet in depth, and weighing up to 200 tons. It is estimated that this fabrication process can result in a savings approaching two percent of the total labor hours for the 265,000 dwt. tankers presently under contract. Other recent improvements at the yard include a numerically controlled gas plate-cutting machine and automated plate and shape blasting-painting equipment. Exhibit 3 is a general arrangement plan outlining the new VLCC construction facilities.

In addition to the large basin which can accommodate a maximum ship size of 1,200 feet by 192 feet, Sparrows Point has four other shipways in good condition. Two of these ways can accommodate a maximum ship size of 900 feet by 108 feet, and two ways can accommodate ships up to 650 feet by 90 feet. The yard does not have a drydocking facility;1/ therefore, any repair capacity would be limited to topside and inboard work. Four outfitting berths are available with a combined length of 3,970 linear feet of space serviced by a six tower cranes ranging in capacity from 30 to 50 tons. Several locomotive cranes of various capacities are also available.

The total work force at the Sparrows Point yard was 4,270 at mid-1975. It is estimated that yard employment could be expanded to about 15,500 under conditions of mobilization.

3. General Dynamics Corporation - Quincy Shipbuilding Division

The Quincy Shipbuilding Division of General Dynamics Corporation is located on Quincy Bay, eight miles south of Boston, Mass. The yard, which was purchased from Bethlehem Steel Corporation in 1963, delivered 18 ships to the Navy from 1964 to 1973. These included four nuclear submarines, two ammunition ships, six replenishment oilers, two submarine tenders, and four LSDs. In 1973, the last of three revolutionary barge-carrying ships (MA Design C8-S-82a) built for Lykes Brothers was completed. Eight 125,000 cubic-meter LNGs are presently under construction at the Quincy yard, with the first ship scheduled for delivery in November 1976. Additional orders for LNG tankers, identical to those presently under contract, are anticipated in the coming year.

To provide the tools and facilities to efficiently build these LNG tankers in series production, General Dynamics has just completed a major improvement and modernization program totaling \$40 million, of which about \$23 million was expended in fiscal year 1975. In addition to the conversion of two conventional sliding ways to large building basins, other improvements at Quincy include: a steel fabrication facility, materials handling equipment, a 250-ton transporter, a plate cleaning and blasting

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1/ Although vessels may be drydocked in the basin, yard management anticipates usage of the basin solely for new construction.

facility, a double-bed flame planer, a double-bed flat bar stripper, a web cutter with 19 torches in tandem, an angle fabricator, two web stiffener welding gantries, a T-beam fabricator, two plate stiffeners, a butt welding gantry, a panel turnover fixture, and two 40-ton cranes. In addition, a 1,200-ton Goliath crane, the largest in the Western Hemisphere, has been installed for transferring the spherical LNG tanks from the barges on which they will be delivered to the LNG ships under construction.

Especially noteworthy is the ingenious construction schedule planned for the LNGs. Shipways No. 11 and No. 12 have been demolished and new Basins No. 11 and No. 12 erected to accommodate ships up to 860 feet in length and 144 feet in beam. Since the LNGs are 936 feet LOA, hull erection in Basins No. 11 and No. 12 will exclude the bow. Following float-out from No. 11 or No. 12, the ships will be floated into Basin No. 7 for bow erection and sphere installation. Basin No. 7 can accommodate a maximum ship size of 936 feet by 143.5 feet. The bows of the LNGs will be constructed at the inboard end of Basin No. 6 and will be lifted by the 1,200-ton Goliath crane over into No. 7 where they will be attached to the hull. The spheres will be barged into the outboard end of No. 6 and lifted into No. 7 for installation. Basin No. 8, presently not being used, and Basin No. 6 can accommodate ships 860 feet LOA and 123.5 feet in beam. Exhibit 4 is a general arrangement plan showing the new LNG construction facilities.

The Quincy yard has extensive capability to do topside and inboard repair work. Four piers and a wet basin are available with a total dockside accessibility of 4,600 linear feet. Each pier and the wet basin is serviced by adequate crane capacity for outfitting and general repair work. The yard has a 10,000-ton, wood-sectional floating drydock capable of accommodating a maximum ship size of 550 feet by 75 feet. The basins can also be used as drydocks for repair work when not in use for new construction or conversion. Automatic Data Processing, including AUTOKON 71, is being utilized with greater implementation planned for the future.

Employment at General Dynamics - Quincy has increased from 2,800 at mid-1974 to 4,650 at mid-1975. It is estimated that the work force could be expanded to as many as 24,000 employees under conditions of mobilization.

4. Maryland Shipbuilding & Drydock Company

Maryland Shipbuilding & Drydock Company, a subsidiary of Fruehauf Corporation, is located on the south bank of the Patapsco River in Baltimore, Maryland. Although the yard has in recent years been primarily a ship repair and conversion facility, it has a great deal of past shipbuilding experience. The company's Industrial Products Division engages in non-marine work such as (1) the design, manufacture and installation of large steam surface condensers for the utility industry, (2) general machine repairs to pumps, turbines, and other industrial machinery, and (3) heavy structural steel fabrications.

The yard is currently completing construction of a large self-unloading barge which is part of a 25,000 dwt. integrated tug-barge. (Southern Shipbuilding Corporation is building the tug). Other work at Maryland includes the major overhaul of a Navy LSD, merchant ship repair, and fabrication of industrial products.

Maryland is presently completing the final phase of a \$25 million expansion program of which \$3.7 million was expended during fiscal year 1975. The main features of the program are:

- Installation of a new floating drydock 827 feet long by 150 feet between wingwalls with a lifting capacity of 36,000 long tons. The dock, which can handle ships up to 125,000 dwt., will be used for launching newly constructed vessels, as well as for ship repair and conversion work.
- Lengthening of the yard's one building way to permit construction of ships up to 850 feet by 110 feet, compared to the previous maximum of 630 feet by 96 feet.
- Modernization of the panel fabrication system.
- Automatic pre-blast equipment and a new building for blasting and painting, and a totally enclosed final-blast building.
- Computer lofting and a new tape-controlled, automatic burning machine.

In addition to the new floating drydock, Maryland has two other floating drydocks used primarily for repair and conversion work. The maximum ship sizes that the older drydocks can accommodate are 775 feet by 106 feet and 715 feet by 90 feet. There are 5,650 feet of pier side berthing available for topside and inboard repair. Each pier and drydock is served by adequate crane capacity.

The current administrative and production work force is approximately 1,900. It is estimated that the yard could absorb approximately 12,000 men during a mobilization situation.

5. Newport News Shipbuilding and Dry Dock Company

Newport News Shipbuilding and Dry Dock Company, located on the James River in Newport News, Virginia, is the largest single shipbuilding complex in the nation. Founded in 1886, the yard has been a major producer of both Navy and merchant ships including the passenger liner SS UNITED STATES. A wholly-owned subsidiary of Tenneco, Inc., Newport News has built all of the Navy's nuclear aircraft carriers. The yard is currently constructing the following combat vessels for the Navy: eight nuclear attack submarines, four nuclear guided missile cruisers and two nuclear-powered aircraft carriers.

Also under construction or on order are three 125,000 cubic meter LNGs (MA Design LG9-S-94a) and three ULCCs of 390,770 dwt. each (MA Design T11-S-116a), the largest commercial ships ever to be ordered in the United States. These six vessels will be built in Newport News Shipbuilding's entirely new commercial shipyard presently being completed adjacent to the existing yard on 150 acres of land reclaimed from the James River. Ships and shipyard are being constructed simultaneously; and when the new yard is completed, it is estimated that up to four huge ULCCs could be delivered annually.

Approximately \$180 million has been committed for development of this new shipyard, scheduled for completion by mid-1976. In the new building basin 1,600 feet long, 250 feet wide and 44 feet deep, one ULCC or large LNG and part of a second can be built simultaneously.

Supporting platens, a steel preparation building, a panel shop, several steel assembly shops, a 900-ton Goliath gantry crane, and two outfitting berths are also being provided. The Goliath crane serves the new graving dock and final assembly area and has a height of 234 feet overall, a girder clearance of 200 feet and a span between rail centers of 540 feet. Ultimately, the new steel-fabrication complex will have a capacity of about 200,000 tons of steel annually. Exhibit 5 is a general arrangement plan showing the principal construction facilities in the commercial shipyard.

The present Newport News yard, covering some 260 acres exclusive of the new facility, has five inclined shipways, two of which can accommodate a maximum ship size of 940 feet by 125 feet, two a ship size of 715 feet by 93 feet, and one a ship size of 447 feet by 93 feet. This last shipway can be extended to accommodate ships of 649 feet in length. In addition to the shipways, Newport News also has two large basins, 1,100 feet by 140 feet and 960 feet by 128 feet, serviced by one 310-ton gantry crane.

Within the confines of the yard there are 70 production shops for steel processing and fabrication and the manufacture of machinery components. Newport News has one of the largest foundries in the United States. A fairly recent acquisition was a completely automated steel handling facility, including numerical control for lifting and cutting. Other computer applications in the yard include AUTOKON 71 (contracted for from MarAd), PERT, used in planning and scheduling, and automatic data processing in material control and accounting activities.

In addition to the two basins, Newport News also has three graving docks that can be used for new construction, repair, or conversion. The largest of these can accommodate a maximum ship size of 862 feet by 118 feet. Nine piers for outfitting and topside repair are available with a combined berthing space of approximately 12,400 linear feet. These piers are serviced by cranes ranging in capacity from 28 tons to 156 tons.

At mid-1975, the work force at Newport News was 22,400, down from 24,000 at mid-1974. It is estimated that employment in the yard could be increased to 41,000 under mobilization conditons.

6. Seatrain Shipbuilding Corporation

In 1969, Seatrain Shipbuilding Corporation, a subsidiary of Seatrain Lines, Inc., leased the principal facilities of the former Brooklyn Navy Yard to build 225,000 dwt. tankers on an assembly-line basis. Construction contracts were signed for five of these VLCCs (MA Design T10-S-92a) and the first, the BROOKLYN, was delivered in December 1973. The second ship, the WILLIAMSBURGH, was completed in December 1974.

In January 1975, the company fell victim to soaring construction costs under fixed-price contracts and the worldwide depression in the shipping market for large tankers. The contract for one of the five vessels was cancelled, and construction was halted on the two tankers under construction. All but about 175 of the yard's 3,100 employees were furloughed. With the shipyard on the brink of financial disaster, the Commerce Department's Economic Development Administration (EDA) agreed to guarantee a \$40 million working capital loan from two major banks to enable the yard to complete the two ships under construction and to recall about 2,000 of the 3,100 furloughed workers.

In the absence of new tanker contracts, the Brooklyn shipyard has secured a \$23.3 million contract to build eight flat deck 8,300 dwt. oceangoing barges. This move by Seatrain marks a dramatic change from the company's six-year history of building supertankers.

Although the facilities that existed in 1969 included three large fabricating buildings and two massive graving docks to accommodate a maximum ship size of 1,094 feet by 143.5 feet, Seatrain has expended in excess of \$40 million on facility improvements and modernization. The last major improvement was the module painting facility. Automation, including AUTOKON 71, is widely used by the yard in steel processing, and a prototype of an adjustable work platform (Scissor staging) has been assembled.

Steel handling in this yard is extremely efficient and is designed to ensure that substantially all work, except the actual hull erection in the graving dock, is performed indoors in temperature-controlled, protected areas. Raw steel is pre-processed in the plate preparation building

where it is shotblasted, coated, and precision cut with automated numerically-controlled cutting machines. The plate is then transferred to either the flat or curved panel building for fabrication. In the flat panel building, automatic welding machines are used to make up rectangular modules with a maximum weight of 200 tons. Bow and stern shell modules are fabricated in the curved panel building where bending rolls are capable of curving 2-inch plate into cylindrical shapes up to 30 feet in length. The modules are then painted in a temperature-controlled, sheltered building equipped with high volume fans and filters to provide a safe, non-toxic environment for workers. The modules are moved on 200-ton transporters to the graving docks. Exhibit 6 is a general arrangement plan of Seatrain's building basins and piers.

A smaller graving dock has been reactivated and has been used for bottom painting and repair work. This dock can accommodate a maximum ship size of 720 feet LOA and 112 feet in beam. The new deck barges will be assembled in this dock two at a time and floated simultaneously.

Although the yard is presently specializing in new construction, there is over 3,190 feet of berthing space available that could be used for topside repair. Most of this pier space is serviced by several 75-ton capacity whirley cranes working separately or in tandem to lift completed modules into place.

In 1974, Seatrain's total employment was around 3,100 and is expected to level out at nearly 2,000 by the end of 1975. The maximum employment under conditions of mobilization would be approximately 10,000.

7. Sun Shipbuilding & Dry Dock Co.

Sun Ship, located in Chester, Pa., is a complete shipbuilding and manufacturing complex encompassing nearly 200 acres bordering on the Delaware River. In its 59 years of operation, the yard has delivered more than 600 vessels, mainly commercial ships. In recent years, Sun has concentrated on roll-on/roll-off trailerships and medium sized tankers of its own design. In addition to its shipbuilding, conversion and repair activities, the company also engages in the manufacture of heavy industrial equipment including welded pressure vessels, plate work, machinery, and oil refinery and chemical works equipment.

Sun's current backlog of orders for new ship construction consists of two 130,000 cubic meter LNGs, two Sun-design "ecology" class 118,300 dwt. tankers, and one roll-on/roll-off ship.

Sun is the final phase of a \$42 million capital improvement program which will enhance the shipyard's ability to fabricate the larger, more sophisticated ships which are expected to be part of the coming generation of commercial vessels.

When completed early in 1976, the current expansion program will provide Sun ship with a new level "shipbuilding platform", a two-section floating drydock capable of lifting 70,000 tons, an 1,100-foot outfitting pier, a new plate burning shop, and other shipbuilding support facilities. On the new level shipbuilding slab, which is served by three 250-ton cranes, 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. For launching, each half of a large ship will be rolled individually to sections of the new drydock and then welded together in the river. The ship will be brought to the pier for completion.

In addition to the new shipbuilding platform, the company has three active conventional sliding ways in good condition. Two of the ways can handle ships 745 feet by 129 feet and one can handle a ship 700 feet by 92 feet. Besides the new floating drydock, which can accommodate a vessel as large as 1,100 feet by 195 feet, Sun Ship has available a floating drydock suitable for ships up to 1,005 feet by 135 feet. The yard now has a total of 3,900 feet of usable berthing space. Sun's 800-ton barge crane is used for both construction and major repair work. Its heaviest lift to date has been a completely outfitted deckhouse weighing 785 tons.

The shipyard's total work force increased during the past year from 3,675 to 4,450. It is estimated that the mobilization base employment is approximately 35,000.

8. Alabama Dry Dock and Shipbuilding Company

Alabama Dry Dock and Shipbuilding Company (ADDSCO) is located approximately thirty miles from the Gulf of Mexico on Mobile Bay. The yard is situated on Pinto Island across the river from the city of Mobile, Alabama. Although the shipyard constructed 102 tankers and 20 cargo vessels during World War II, it has since been predominantly a repair and conversion facility. During the past year the company continued its facility improvements, primarily to increase its capability to build offshore drill rigs and vessels for the petroleum industry. ADDSCO currently has two semi-submersible rigs and a large pipe-laying barge under construction.

The shipyard has three side-launching shipways, each of which can accommodate a maximum ship size of 523.5 feet by 68 feet, and one inclined shipway which can handle vessels as large as 620 feet by 90 feet. All of these ways are too small to construct today's mammoth ships. ADDSCO also has three floating drydocks that can accommodate maximum ship sizes of 750 feet by 105 feet, 620 feet by 84 feet, and 380 feet by 64 feet. There is also 9,370 feet of berthing space available at seven finger piers for topside and inboard repairs. There are nineteen revolving gantry cranes with capacities varying from 12 tons to 65 tons available to serve the shipway and berthing areas. A 275-ton Goliath bridge crane, which straddles the slip between piers K and L, is used for repair work and for outfitting drill rigs.

ADDSCO, as of mid-1975, had a total work force of about 3,200, a slight increase over the previous year. Based on World War II experience, it is estimated that employment could be increased to 29,000 under conditions of mobilization.

9. Avondale Shipyards, Inc.

Avondale Shipyards, Inc., a subsidiary of Ogden Corporation, is located on the west bank of the Mississippi River, a few miles above New Orleans, La. During the past ten years the yard has expanded from a modest river facility to one of the nation's leading shipbuilders.

Avondale has the distinction of being the only U.S. shipyard to build LASH vessels, 20 having been delivered to various Owners from 1970 to 1975. In addition to the LASHs, the yard has completed three tankers, several cargo ships, Coast Guard cutters and large drill rigs in the past few years, and in 1974 completed the last of 20 destroyer escorts for the Navy.

Avondale is enjoying the greatest backlog in its history. Ships under construction or on order as of October 1, 1975 included three 125,000 cubic meter LNGs (MA Design LG9-S-107a), six 165,000 dwt. tankers for Standard Oil Co. of Ohio, and the jumboizing of two Farrell Lines container ships (MA Design C8-S-85c). In addition, conditional contracts have been signed for construction of three 56,000 dwt. product tankers (MA Design T5-M-119a). The orderbook also included five new semi-submersible drilling rigs and the conversion of two cargo ships to drillships.

Avondale is spending an estimated \$42 million in capital improvements primarily for the LNG construction. The three to five position shipway, used in the destroyer escort program, has been reconstructed to two large positions to accommodate the LNG program. Exhibit 8 is a general arrangement plan of the new shipways and floating drydock. Two ships, each 960 feet by 176 feet, can be built simultaneously in this new facility. A new floating drydock, 900 feet by 260 feet, has been constructed to facilitate launching. This drydock also enables Avondale to take on a larger share of ship conversions, which are becoming popular throughout the industry because of the substantial savings in both steel and shipyard time. Additional buildings and equipment to supplement the yard's mechanized handling and fabrication systems are also part of Avondale's current expansion program scheduled for completion by the end of 1975.

Besides the new building positions for the LNGs, Avondale has a side-launching construction facility that can accommodate ships as large as 1,200 feet by 130 feet and weighing up to 15,600 tons. Three large oceangoing vessels can be constructed simultaneously on this shipway, and as many as six smaller vessels can be constructed simultaneously if they are 600 feet or less in length.

A unique assembly method, whereby large sections of a ship are moved horizontally from different building positions, is employed by Avondale. A ship will be situated and worked on in three different building positions between keel laying and launching. For destroyer escorts, Coast Guard cutters, and other relatively small vessels, the yard has perfected a system of down-hand welding of the hull which is mounted on a rotating jig. Modern construction methods and steel processing facilities have made Avondale one of the nation's most productive shipyards. No U.S. ship-builder has had more success with series production of commercial ships. The yard offers almost 3,600 feet of berthing space, serviced by six 30-ton to 50-ton rotating gantry cranes, for outfitting and repair. A small floating drydock, 378 feet by 68 feet, is also available for repair of smaller ships, river boats, and barges.

Yard employment, at 6,440, has remained substantially unchanged since a year ago. It is estimated that employment can be increased to 18,000 under conditions of mobilization.

10. Bethlehem Steel Corporation - Beaumont Yard

This shipyard, located on the Neches River in Beaumont, Texas, was established in 1916 by Beaumont Shipbuilding and Drydock Company, which in addition to repair and conversion work, built C1-A cargo ships and Navy mine-sweepers during World War II. Bethlehem acquired the yard in 1947, and it has pioneered in the design and production of mobile oil drilling rigs. The Beaumont plant is one of Bethlehem's most successful operations and is one of the world leaders in production of offshore drilling rigs and drill ships. The yard is also an experienced builder of oceangoing barges and is capable of producing large merchant ships. However, it is currently engaging mainly in new construction for the petrochemical industry, with a contract backlog, as of October 1, 1975, of one semi-submersible drilling rig, six jack-up rigs, and one drill ship.

The Beaumont facility is highly mechanized. In 1973, the company completed a multi-million dollar modernization program, including a new panel line and new materials handling facilities. Bethlehem - Beaumont has one side-launching way that can accommodate ships up to approximately

842 feet by 96 feet. The yard also has a smaller side-launching way which is used for barge and module construction. One floating drydock is available which can handle vessels as large as 650 feet by 84 feet. The Beaumont plant has 4,050 feet of berthing space served by adequate crane capacity for outfitting and general repair work.

The current employment is 3,075 and could be increased to about 5,100 for mobilization purposes.

11. Ingalls Shipbuilding Division/Litton Industries, Inc.

The Ingalls Shipbuilding Division, a wholly-owned subsidiary of Litton Industries, Inc., is actually two separate shipyards located on the Gulf of Mexico at Pascagoula, Miss. Ingalls is a diversified shipbuilding complex engaging in the construction, conversion and overhaul of commercial ships and Navy combatants and auxiliaries. In addition, the yard participates in ship systems analysis and design, operational effectiveness analyses, logistic system analyses, and ship design concepts.

The older of the two yards, referred to as the East Bank yard, has been in operation for 37 years, engaging primarily in new construction of commercial cargo ships and tankers, and in January 1974 completed a series of highly productive containerships. The yard has six inclined shipways. Maximum ship sizes which can be accommodated are: four ways 650 feet by 90 feet, one way 690 feet by 85 feet, and one way 550 feet by 80 feet. The East Bank plant has one small graving dock which has been used for construction of nuclear-powered submarines but is currently being used for repair work. A wharf and four piers serviced by cranes with a 50-ton maximum capacity, provide a total of 3,700 feet of berthing space for outfitting and topside repair.

The ultramodern West Bank yard, completed in 1970 at a cost of from \$130 to \$150 million, was designed and equipped for series production using modular construction methods. The yard is geared to assembly-line construction of large Navy and merchant ships and is scheduled to

deliver five LHA amphibious assault ships and 16 Spruance-class (DD963) destroyers by 1977. The West Bank yard does not have conventional inclined shipbuilding ways. Instead, fabricated steel and minor subassemblies are brought from the fabrication, panel and shell shops to the subassembly area where they are erected into major subassemblies, which in turn, move to the module assembly area. These areas are divided into five bays, each of which can produce 225-foot long, 6,000-ton modules. After modules are completed in the module assembly area, they are moved to the integration area where they are erected into a complete ship. The completed ship is then moved onto a launch pontoon which is subsequently floated and moved to a deep water area where it is sunk and the ship launched. The West Bank yard at the present time can launch a maximum ship size of 800 feet by 170 feet. It is estimated that the various assembly and subassembly areas are the equivalent of six conventional inclined ways in terms of the number of ships that could be delivered annually. Approximately 4,400 feet of berthing space, serviced by cranes varying from 25 tons to 200 tons, are available for outfitting.

The total employment at the Ingalls Shipbuilding Division at mid-1975 was 22,500 and could be increased to 25,000 for mobilization purposes.

12. Kelso Marine, Inc.

The Kelso Shipbuilding Division of Kelso Marine, Inc., a Galveston, Texas subsidiary of C. Brewer & Company, Ltd., began operations in 1966. The yard has been primarily a builder of barges and tugs. In 1974, Kelso completed construction of a 35,000 dwt. oceangoing tug-barge unit for Seabulk Tankers, Ltd. and is building a similar tug-barge combination for delivery in 1976 to Port Everglades Towing, Inc., Kelso is willing and able to build tankers up to 35,000 dwt. and small jack-up drilling rigs.

The yard has one building way (side-launching) on which large oceangoing ships can be built, the maximum ship size being 700 feet by 100 feet. A present limitation is that, except at the launch site where the water is approximately 20 feet deep, the water depth on the way to the channel is only about 12 feet. Yard management is expecting to obtain a permit from Federal agencies to dredge to an 18-foot water depth to the channel.

In addition to its large side-launch way, Kelso has four smaller shipways, each of which is served by the yard's syncrolift. Kelso has no drydock, but can arrange for large vessels to be drydocked at the nearby Todd-Galveston facility. The yard has a 600-foot outfitting berth under construction, and the city wharf in Galveston is also available for Kelso's use.

In mid-1975, the Kelso shipyard had a total payroll of 600. For mobilization purposes, employment could be increased to 900.

13. Levingston Shipbuilding Company

Levingston, one of the leading producers of offshore drilling rigs, was founded in 1933. The 100-acre plant is strategically located on the Sabine River at Orange, Texas, approximately 30 miles inland from the Gulf of Mexico. Gulfport Shipbuilding Corporation in Port Arthur, Texas was purchased in 1970 by Levingston to supplement Levingston's construction and repair facilities.

Since 1946 when the offshore oil industry began, most of the yard's work has been related to this industry, primarily in the construction of offshore drilling rigs and related floating equipment. To date, Levingston has built 65 drill barges, 25 tenders, seven drill ships, five jack-ups, and six semi-submersibles. Levingston has designed a sizeable portion of the rigs constructed in the yard. As of October 1, 1975, Levingston's orderbook consisted of one semi-submersible, four jack-up rigs, and three drill ships.

An expansion and modernization program is presently underway at the Orange, Texas yard, with \$3 million having been expended in fiscal year 1974 and close to a million dollars planned for fiscal year 1975. Some of the improvements incorporated in the program are: a new panel ship, numerically-controlled cutting equipment, an automatic blasting and paint shop, a new sub-assembly construction area, and a new gantry crane.

Levingston has one side-launch building way with a maximum ship size of 1,100 feet by 90 feet, on which oceangoing ships could be built in the event of national emergency. In addition, there is a small conventional shipway and four floating drydocks, the largest of which can accommodate a vessel 420 feet by 120 feet. Total usable berthing space is about 2,400 feet.

The current work force at the yard is 2,080 and could be increased to approximately 3,700 for mobilization purposes.

14. Marathon LeTourneau Company - Gulf Marine Division

Marathon Manufacturing Company, the world leader in production of offshore drilling rigs, launched its new Gulf Coast yard, the Gulf Marine Division, in 1971 with a commitment of \$25 million. This shipyard is located on a 133-acre tract with a 2,500 foot frontage on the ship channel at the Port of Brownsville, Texas. In addition to the construction of offshore drilling rigs, the yard has the capability of fabricating and launching drill ships, LNG tankers, work boats, tugs, supply vessels, chemical carriers, and other seagoing ships. Marathon's Vicksburg, Miss. plant and another in Longview, Texas serve as support facilities for the Brownsville yard.

As of September 1, 1975, the Gulf Marine Division and the Vicksburg facility were building or had on order two semi-submersibles and seven jack-up rigs.

The Brownsville yard has one shipbuilding way with a maximum ship size of 1,100 feet by 150 feet on which oceangoing ships could be constructed in the event of national emergency. Modular construction techniques are combined with conventional shipbuilding methods. Large module sections are fabricated on a forming and subassembly slab about 400 feet by 200 feet, which is actually an extension of the yard's building way. A 250-ton gantry crane travels on rails which run the full length of the slab and building way. The crane lifts the subassembly sections from the slab to the launchway, and the sections are joined to form the completed vessel which is then side-launched. For outfitting purposes, there is one 500-wharf.

The total work force at the Brownsville plant is 1,600, which could be expanded to approximately 3,000 during a mobilization situation.

15. Bethlehem Steel Corporation - San Francisco Yard

Bethlehem's San Francisco shipyard, which traces its beginning back to 1849, is the oldest yard in the United States from a standpoint of continuous service. One of the largest repair yards in the country, it offers a complete range of repair and reconditioning services and can handle conversion and jumboizing work, as well as a wide variety of industrial work. It is also capable of constructing large oceangoing ships.

During World War II, the yard, with the help of facilities leased from the Navy, built 72 ships including 52 Navy combat vessels. In addition, approximately 2,500 Navy and commercial vessels were repaired or converted at the yard during that period.

Since World War II, the most noteworthy new construction at the San Francisco yard included: five Mariner class cargo ships; four Title XI oil tankers (33,000 dwt.); one wine tanker; four Navy destroyer escorts; and four Title V cargo ships (MA Designs C4-S-1q and C4-S-1t).

In addition to ship repair and industrial work, the yard is currently engaged in barge construction. The Bethlehem management states that upon completion of these barge contracts in 1976, the Bay Area facility would be interested in production of drill ships or offshore drill rigs.

Bethlehem - San Francisco has one building way. It is a conventional end-launch type and can accommodate ships up to 550 feet by 90 feet. The yard's mammoth floating drydock (maximum vessel size 950 feet by 148 feet) can handle ships up to 230,000 dwt. This drydock, designed by Bethlehem and built at the San Francisco yard, is capable of serving the large tankers that will transport crude oil from Alaska to West Coast ports. This Bay Area facility also has a second floating drydock (maximum vessel size 700 feet by 97 feet) and about 2,170 feet of usable berthing space.

The current work force is 800, a slight increase over the 1974 employment. It is estimated that the mobilization base employment would be approximately 3,300.

16. FMC Corporation - Marine and Rail Equipment Division

FMC Corporation's Marine and Rail Equipment Division, originally called Gunderson Brothers Engineering Corporation, is located on the Willamette River in Portland, Ore. This 76 - acre facility, which is also a major manufacturer of rail cars, is an experienced builder of barges, ferry boats and samll marine craft.

In 1972, the company entered the market for seagoing ships. It presently has under construction six 35,000 dwt. gas turbine powered electric drive tankers, the last of which is scheduled for delivery early in 1978. These ships will be chartered, for use in the domestic trade, to the Chevron Shipping Company, a wholly-owned subsidiary of Standard Oil Company of California.

To expand its shipbuilding capability to include construction of oceangoing ships, FMC has expended \$5.7 million since 1970. Included in this expansion program was the acquisition of 23 acres of land adjacent to its existing facility, purchase of a 200-ton whirley crane, new types of welding equipment, a thousand-ton press, and a computer-operated burning machine for cutting steel plates. FMC can fabricate steel modules weighing up to the 200-ton limit of the crane and transport them to the shipway for erection. Modular living quarters complete with interior decor, carpeting and drapes, are erected to reduce outfitting time and cost. Drydocking and most outfitting is done in the nearby Port of Portland facility.

The yard has one side-launching shipway that can accommodate a maximum ship size of 700 feet by 100 feet. This building position is serviced by one 200-ton and one 50-ton capacity crane.

The total employment at the FMC plant is about 2,000, of which 1,200 are involved in marine work. It is estimated that the total work force could be increased to 3,000 for mobilization purposes.

17. Lockheed Shipbuilding and Construction Company

The Lockheed Shipbuilding and Construction Company, a subsidiary of Lockheed Aircraft Corporation, is located on the southern perimeter of Puget Sound's Elliott Bay at Seattle, Washington. In the past, the 86-year-old yard has concentrated on Navy ships, having constructed a series of destroyers, amphibious transport docks, ammunition ships, and the USNS SEALIFT, a roll-on/roll-off cargo ship operated by the Military Sealift Command. Lockheed has constructed several ferry boats and in 1973 delivered the 640-foot bulk carrier, SUGAR ISLANDER. Ship repair is also an important part of the company's business.

Lockheed currently has under construction two U.S. Coast Guard ice breakers, and in 1974 the yard received a \$252.9 million Navy contract for construction of two 643-foot submarine tenders for delivery in 1978 and 1979.

The yard has three inclined shipways that can accommodate maximum ship sizes of 650 feet by 95 feet, 650 feet by 90 feet, and 700 feet by 100 feet. These ways are serviced by 10 whirley cranes varying in capacity from 28 tons to 50 tons. Three floating drydocks are available that can accommodate maximum ship sizes of 600 feet by 92 feet, 530 feet by 80 feet, and 400 feet by 50 feet, respectively. Also available is 6,500 feet of wharf and pier space that is used for both repair and outfitting. Thirteen whirley cranes ranging in capacity from 17 tons to 50 tons service the wharf and pier area.

The work force, at 1,740, has remained substantially unchanged during the past three years. During conditions of mobilization, the employment level can be expanded to approximately 6,600.

18. National Steel and Shipbuilding Company

National Steel and Shipbuilding Company (NASSCO), jointly owned by the Morrison-Knudsen Company, Inc. and Kaiser Industries Corporation, is located on a 122.5-acre site in San Diego, California. NASSCO, the largest shipbuilding complex on the West Coast, has engaged in both Navy and commercial work, having in the 1970s completed 17 Navy tank landing ships (LSTs), five large cargoliners, two oil/bulk/ore carriers (OBOs), and three 89,700 dwt. tankers.

The following NASSCO-designed ships were under construction or on order at the yard on October 1, 1975: ten San Clemente class (89,700 dwt.) tankers, three Coronado class (38,300 dwt.) tankers, two Catalina Class (150,000 dwt.) tankers, and two San Diego class (190,000 dwt.) tankers. In addition to this backlog of commercial work that will keep the yard busy through March 1980, NASSCO is constructing a large replenishment oiler (AOR) for the U.S. Navy.

During fiscal year 1975, NASSCO expended \$13 million on its current expansion and modernization program. Capital expenditures of \$8.6 million are planned for fiscal year 1976. In the new building dock, scheduled for completion in November 1975, NASSCO can produce ships up to 1,000 feet by 170 feet, compared to a previous maximum size of 900 feet by 106 feet. Exhibit 9 is a general arrangement plan of the existing and new shipbuilding positions.

A new outfitting pier and additional mechanized steel handling and fabricating facilities are also included in the current program.

In addition to the new building dock nearing completion, the yard has three inclined shipways, two of which can accommodate a maximum ship size of 900 feet by 106 feet, and one a ship size of 700 feet by 90 feet. These ways and the new building dock are serviced by eleven gantry cranes ranging in capacity from 45 tons to 175 tons. A small floating drydock and small marine railway are available; also a large graving dock that can accommodate a maximum ship size of 687.5 feet LOA by 90 feet is leased on a use basis from the Unified Port District of San Diego. Ten berths with a total berthing space of approximately 6,175 feet are available for outfitting and topside repair. These berths are serviced by mobile cranes varying in capacity from five tons to 175 tons.

The work force at the yard increased from 4,700 to 5,230 during 1975, and it is estimated that the yard can support 10,000 employees on a mobilization base.

19. Todd Shipyards Corporation - San Pedro

Todd's Los Angeles Division is located at San Pedro, California. The yard was formerly the Los Angeles Shipbuilding and Dry Dock Company and was purchased by Todd in 1946. During the past decade the yard has constructed a series of destroyers for the U.S. Navy and has converted several commercial freighters and containerships. Beginning in 1972, Todd's San Pedro yard moved into the tanker market and in August 1975 completed a series of four "handy-size" 25,000 dwt. tankers. Currently under construction at Todd-San Pedro are four 35,000 dwt. tankers (MA Design T6-M-98a), the last of which is scheduled for delivery in September 1976. In August 1975, Todd signed a \$38 million contract to build a 23,000 dwt. anhydrous ammonia carrier at San Pedro. The yard will build a new forebody, reconstruct the stern section of an existing ship and join the two sections. Construction contracts for eight 89,700 dwt. San Clemente class tankers, to be built at San Pedro, were cancelled in early 1975.

Todd, as a result of the cancellations, has scaled down its current San Pedro facilities expansion program from \$20 million to about \$15 million. The rebuilding and enlarging of its two shipbuilding ways has been halted; but the company is completing the other aspects of the program, including a semi-automated panel line, improvement of heavy lift capabilities, outfitting and related production improvements.

The San Pedro yard presently has two conventional inclined shipways, each capable of launching a ship as large as 800 feet by 84 feet. The panel line, platens and shipways are presently serviced by one 175-ton, two 50-ton and one 25-ton gantry crane. There are two floating drydocks, one of which can accommodate a vessel 665 feet by 85 feet, and the other a vessel 563 feet by 85 feet. A total of 4,800 feet of berthing space is available at six piers for outfitting and topside repair. These are serviced by seven cranes varying in capacity from 25 tons to 50 tons.

Total employment at the yard was 2,460 at mid-1975, down from 3,440 a year earlier. It is estimated that the work force could be increased to 8,000 under mobilization conditions.

20. Todd Shipyards Corporation - Seattle

Todd's Seattle Division is located at the northwest corner of Harbor Island in Elliott Bay. The yard enjoys an outstanding reputation for building vessels for the U.S. Navy. It also does extensive barge building and ship repair work and a large volume of industrial work for the aircraft, aerospace, and hydroelectric industries. During World War II, the Seattle plant built 46 Navy destroyers and three tenders, in addition to ship repair and conversion work. In 1952, the yard embarked on new vessel construction and industrial production, completing a formidable array of tugs, barges, ferries, dredges, pile drivers, floating cranes, etc. In 1964, the yard completed a series of four guided-missile destroyers for the Navy. In the late 1960s and early 1970s, the Seattle Division was lead yard for building 26 destroyer escorts, seven of which were built in Seattle. Currently the yard is building a 22,500 dwt. self-unloading barge, three 250-foot flat deck cargo barges, and a tug supply vessel.

The largest building way at Todd - Seattle can handle a ship up to 550 feet by 96 feet. There is also a double shipway 450 feet by 131 feet. This can build two ships with beams of 50 feet or less simultaneously, or one ship of 60-foot beam or more. A small side-launch building way, maximum vessel size 220 feet by 50 feet, was added last year. The shipyard has three floating drydocks capable of accommodating vessels 650 feet by 85 feet, 550 feet by 92 feet, and 420 feet by 63 feet. Two wharves and four piers, served by eight whirley cranes with a 50-ton maximum capacity, provide a total of more than 5,000 feet of berthing space for outfitting and repair.

Total employment at the Seattle plant is about 1,200, down from 1,765 a year ago. It is estimated that the yard could support 7,200 employees on a mobilization basis.

21. American Ship Building Company - Lorain, Ohio

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22. Since it was formed in 1899 in Lorain, Ohio, the American Ship Building Company has been the leader in the design and construction of ships for the Great Lakes. Under its present organization, the company's AMSHIP Division consists of three yards, in Lorain and Toledo, Ohio and Chicago, Ill. The TAMPA Division consists of only Tampa Ship Repair and Dry Dock Company, and the NABRICO Division consists of only Nashville Bridge Company. These are the only divisions involved in shipbuilding.

During the World War II period, the company built an impressive variety of vessels for the Navy, Army, Maritime Commission, and private interests. Since World War II, American Ship has continued its leadership in the shipbuilding industry on the Great Lakes, specializing in the construction of ore carriers, plus ship repair and conversion, steel fabrication, and industrial work.

In 1971, the company completed an extensive modernization and improvement program at its Lorain, Ohio shipyard, including new computer control programs and management information systems.

In the Lorain facility, one side-launching way is available for construction of vessels up to 700 feet by 75 feet. The large graving dock (maximum ship size 1,000 feet by 105 feet) is used for new construction. The Lorain yard has three 1,000-foot Great Lakes ore carriers under construction, one for National Steel Corp. and two for Pickands Mather and Company. The yard's other graving dock, which can handle ships up to 730 feet by 75 feet, is being used for drydock work. A total of about 1,800 feet of berthing space is available. Current employment at Lorain is 820, but the work force could be expanded to approximately 3,600 during a mobilization situation.

The AMSHIP Division's Toledo, Ohio yard utilizes the headquarters engineering staff located at Lorain, Ohio, for all work requiring a technical staff.

Like the Lorain yard, the Toledo facility has two graving docks. One is capable of accommodating a vessel 666 feet by 75 feet, the other a vessel 540 feet by 64 feet. There are about 1,600 feet of berthing space available. The total work force is around 200 and could be increased to approximately 2,000 for mobilization purposes.

23. Bay Shipbuilding Corporation

Bay Shipbuilding Corporation, located in Sturgeon Bay, Wisconsin, is a subsidiary of the Manitowoc Company, Inc. As a result of purchasing Bay Shipbuilding and Dry Dock Company in 1968 and the adjoining Christy Corporation property in 1970, Bay Shipbuilding now has 31 acres of waterfront property. The new combined facilities at Sturgeon Bay have channel access from both Lake Michigan and Green Bay and provide ample dock space for Great Lakes vessel repair and new construction.

Seven self-unloading ore carriers are under construction or on order at the yard, including four 1,000-footers. These contracts will provide the yard with work until 1980.

Bay Shipbuilding has embarked on a \$15 million facilities expansion program which is enabling the company to build 1,000-foot Great Lakes bulk carriers. Under construction is a new graving dock which can accommodate a vessel as large as 1,100 feet by 130 feet, the largest such dock on the Lakes. It will be served by a 100-ton gantry crane and several crawler-type lift cranes. The graving dock is scheduled for completion in December 1976, but the yard can begin fabrication of a 1,000-foot ship while the new basin is being finished. Also included in the modernization program is a \$2 million plate fabrication and burning shop, which was completed in 1975.

Bay has three side-launching ways that can accommodate maximum ship sizes of 750 feet by 105 feet, 600 feet by 80 feet, and 400 feet by 70 feet. One floating drydock is available which can handle ships up to 640 feet by 70 feet. There are 7,090 feet of berthing space in the yard.

The total employment is around 1,100 and could be increased to about 2,500 under mobilization conditions.

24. Defoe Shipbuilding Company

The Defoe Shipyard, established 1905, is located on the Saginaw River in Bay City, Michigan. This yard is experienced in the construction of ships, boats, barges, and many types of water craft. During World War II, Defoe constructed commercial ships for service on the Lakes, as well as vessels for the U.S. Coast Guard. In the 1950s and 1960s, Defoe built several bulk carriers, several destroyer escorts and guided missile destroyers for the Navy, and two oceanographic research vessels.

The yard's current backlog of orders consists of a major bulk carrier conversion and the construction of one barge; however, the Defoe management is negotiating contracts for major ship conversion work.

The Defoe plant has two large side-launching ways for ship construction, one of which can accommodate a ship 900 feet by 92 feet, and the other a ship 600 feet by 60 feet. Berthing space for repair and outfitting totals 2,756 feet. There are no drydocking facilities. When necessary, Defoe has used AMSHIP's drydocks at Lorain and Toledo, Ohio.

The current work force at Defoe is around 300. It is estimated that the plant could absorb 4,000 employees under mobilization conditions.

25. Fraser Shipyards, Inc.

The Fraser shipyard, located on Howards Bay in Superior, Wis., was founded in 1890 as the American Steel Barge Company. Since then the plant has had a succession of owners. Although now principally a ship conversion and repair facility, the yard has had a history of ship construction including oceangoing cargo vessels. The Fraser yard is currently jumboizing three Great Lakes ore carriers; and in view of the shipbuilding boom on the lakes, the management is giving some thought to re-entering the ship construction business. This plant has the basic organization and general experience to build major ships.

The yard has two graving docks suitable for ship construction, repair or conversion work. One basin can accommodate a vessel 825 feet by 82 feet, and the other a vessel 620 feet by 62 feet. A small graving-type drydock, 131 feet by 80 feet, was added in 1973 to build new mid-body sections for the bulk ore freighters under contract for lengthening at the Fraser plant. There are 4,450 feet of berthing space, in addition to pier space available on the site of the dismantled building slips which are no longer used for ship construction.

Fraser's work force was 400 in the summer of 1975. Employment could be increased to approximately 5,000 for mobilization.

## Manpower

As indicated in Exhibit 14, there were approximately 223,300 employees engaged in the shipbuilding and ship repair industry, including Navy shipyards, as of April 1975. This is an increase over 1974 of about 13,300 workers. Employment in the 25 major U.S. commercial shipyards rose to 92,100, or about 58 percent of the work force in all commercial yards, which totaled 159,900.

Manpower requirements for skilled shipbuilding occupations are expected to increase about seven percent per year from June 1975 through June 1977.<sup>1/</sup> A major impediment to planned expansion, particularly for shipyards in the Atlantic and Gulf Coast regions, will be the limited availability of skilled personnel in several local labor markets. Shortages will probably develop or be intensified in most labor markets with concentrated ship construction activity. The most severe shortages are expected to be for the shipfitter, welder, machinist, and pipefitter trades.

During the 1974 Congressional hearings before the Seapower Subcommittee of the House Armed Services Committee, it was revealed that there is a serious national problem in assuring an adequate supply of skilled craftsmen for U.S. shipyards to support our national needs. Since present programs to develop, provide, and retain skilled manpower in the required numbers do not appear adequate, a government-sponsored program involving the Navy, the Maritime Administration, and the Department of Labor was initiated to develop a plan of action for addressing the problem. In the meantime, steps are being taken to establish a pilot training program in the Gulf area under the management of MarAd's Central Region Director. Funding is being requested from the Job Opportunities Program, Title X of the Public Works and Economic Development Act of 1965.

The past year demonstrated some of the skills retention problems endemic in shipbuilding. The reduction in tanker demand caused cancellation of construction contracts resulting in the furloughing of skilled shipbuilders.

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<sup>1/</sup> According to a summation of shipyards' manpower demands derived from the Shipyard Production and Mobilization Model (SPAMM), which was created by the Division of Production to analyze the production capabilities of the U.S. shipbuilding Industry.

The seven percent manpower increase is predicated on a continuing shipbuilding program by the Navy and the Maritime Administration; however, many major shipyards will be forced to lay off substantial numbers of skilled craftsmen unless new contracts are acquired in the near future. Experience has indicated that a large number of these men would be lost to the shipbuilding industry forever, thus reducing the capability of the industry to respond quickly and effectively to a commercial or mobilization requirement.

### Material Shortages

In contrast to the serious material shortages of 1974, producers of basic materials by mid-1975, continued to report decreases in lead times. Lead times for raw materials have continued to decrease due to diminished aggregate consumer demand whereas decreased lead times for specialty castings and forgings are the result of greater availability of raw material. Lead times for ship components have generally tended to increase slightly or remain unchanged. Earlier ordering of ship components is necessary to ensure timely deliveries.

MarAd is continuing to request DO-A3 priority ratings for both Title V Construction-Differential Subsidy (CDS) ships and Title XI - Ship Financing Guarantee vessels. The priority rating system, under the Defense Priority System and the Defense Materials System, continues to be an integral part of our national defense-related ship construction program, given the unpredictable nature of material and component procurement in the shipbuilding industry.

### Shipyard Pollution Abatement Requirements

Adherence, to the extent practicable, to Federal and State pollution abatement regulations has made the U.S. shipbuilding industry one of the cleanest when compared with other heavy industries. Furthermore, the industry is continually striving to better its anti-pollution record. Shipyards have made capital investments in upgrading the anti-pollution aspects of existing facilities, and capital expenditures for new facilities have incorporated features designed to meet future as well as present anti-pollution requirements. To augment this posture, the Society of Naval Architects and Marine

Engineers (SNAME) has established the shipyard Environmental Effects Panel (SP-3), which consists largely of facilities managers and engineers who meet regularly to exchange information.

The final shipbuilding product, a ship, is both clean and non-hazardous provided it is operated properly. To this end, the MarAd pollution abatement program is directed toward achieving our national goals of eliminating intentional pollution by ships by 1975 and minimizing accidental pollution by the end of the decade. MarAd has supported this effort by increasing its participation in the United Nations Intergovernmental Maritime Consultative Organization (IMCO) activities and by developing backup economic and technical studies advancing the cause of the U.S. Anti-Oil Spill Policy.

During the actual construction process, shipyards retain a low profile as pollution generators. A shipyard's principal source of energy is electrical, and except in isolated instances, the electric power is purchased and not generated onsite. However, practically all shipyards have power plants for process and heating steam and in some cases, supplemental electrical generation. Many shipyards have incinerators, and in some instances these incinerators generate steam to afford energy conservation. Formerly shipyards were noise polluters, but modern shipbuilding has reduced noise by almost completely replacing riveting by welding. However, the chipping hammer remains a localized source of noise which requires the workers to wear ear plugs in the immediate area.

Combustion gases released to the atmosphere are limited to exhausts of motorized equipment and the aforementioned power plants and incinerators. Airborne fumes and vapors have in the past caused problems, but these have been significantly reduced by airless spraying, precoating in shops using filter systems, and judiciously choosing compatible weather conditions. Dust resulting from abrasive blasting remains a problem especially in ship repair facilities, but tremendous strides are being taken to reduce this form of airborne pollution, especially by use of closed-cycle blasting equipment.

Spillage of oil or other non-toxic substances which may find their way into adjacent waterways does not occur frequently, as the spillage is localized immediately, cleaned up, and disposed of safely. Sources of thermal water pollution, as well as human wastes generated by the relatively labor-intensive shipbuilding industry, are diverted into municipal or local sewage treatment plants.

### Ship Repair Facilities

The ship repair industry is a composite of many organizations of varying capabilities. The smaller of these organizations, usually referred to as "topside" yards, do not have drydocks, employ a limited number of people (sometimes less than 100), and specialize in work that can be accomplished without extensive shop facilities. The larger organizations have drydocks and employment usually numbering in the thousands and combine repair and conversion with new shipbuilding capabilities. Presently, the Maritime Administration holds master repair contracts with 76 ship repair facilities. Thirty-nine are located on the East Coast, 18 along the Gulf Coast, 18 on the West Coast, and one on the Great Lakes.

The ship repair business was on a general decline for several years until 1973. Unlike the shipbuilding situation, merchant ship repairing in 1974 remained stable. In some instances, profits on commercial ship repair work offset ship construction losses. During 1974, there was a significant increase in foreign work in U.S. ship repair yards. This increase in repair work on foreign-flag vessels appears to be due primarily to the devaluation of the dollar coupled with significant foreign inflation which has increased foreign costs. Another contributing factor may be the general increase in world fleets which appears to have occurred without a comparable increase in ship repair capacity.

Ship repair yards over the last few years have actively been seeking business from other industries that use steel fabrication and pipe work, such as petrochemicals, with varying success. The advent of larger ships has affected the ability of some yards with smaller drydocks to maintain their old clients. In general, the ship repair yard often commands excellent prices for urgently needed repairs and can control its overhead closely. Ship repairing is considered within the industry as more profitable than ship construction, with the exception of certain areas such as the New York Harbor complex.

At present the future of the ship repair industry, like that of the shipbuilding industry, is undergoing reappraisal, particularly with respect to investment in repair docks capable of accommodating very large tankers.

#### Major Drydocking Facilities

Major drydocking facilities are defined as those yards engaging primarily in repair or reconstruction and having at least one drydock that can accommodate ships 300 feet in length or over. These yards do not usually engage in new construction of large oceangoing vessels, although the capability does exist if the situation demanded it.

Appendix B tabulates information updated through 1975 on 41 of these yards on a coastal basis. Additional data is available for official use in the Office of Ship Construction.

#### Major Topside Repair Facilities

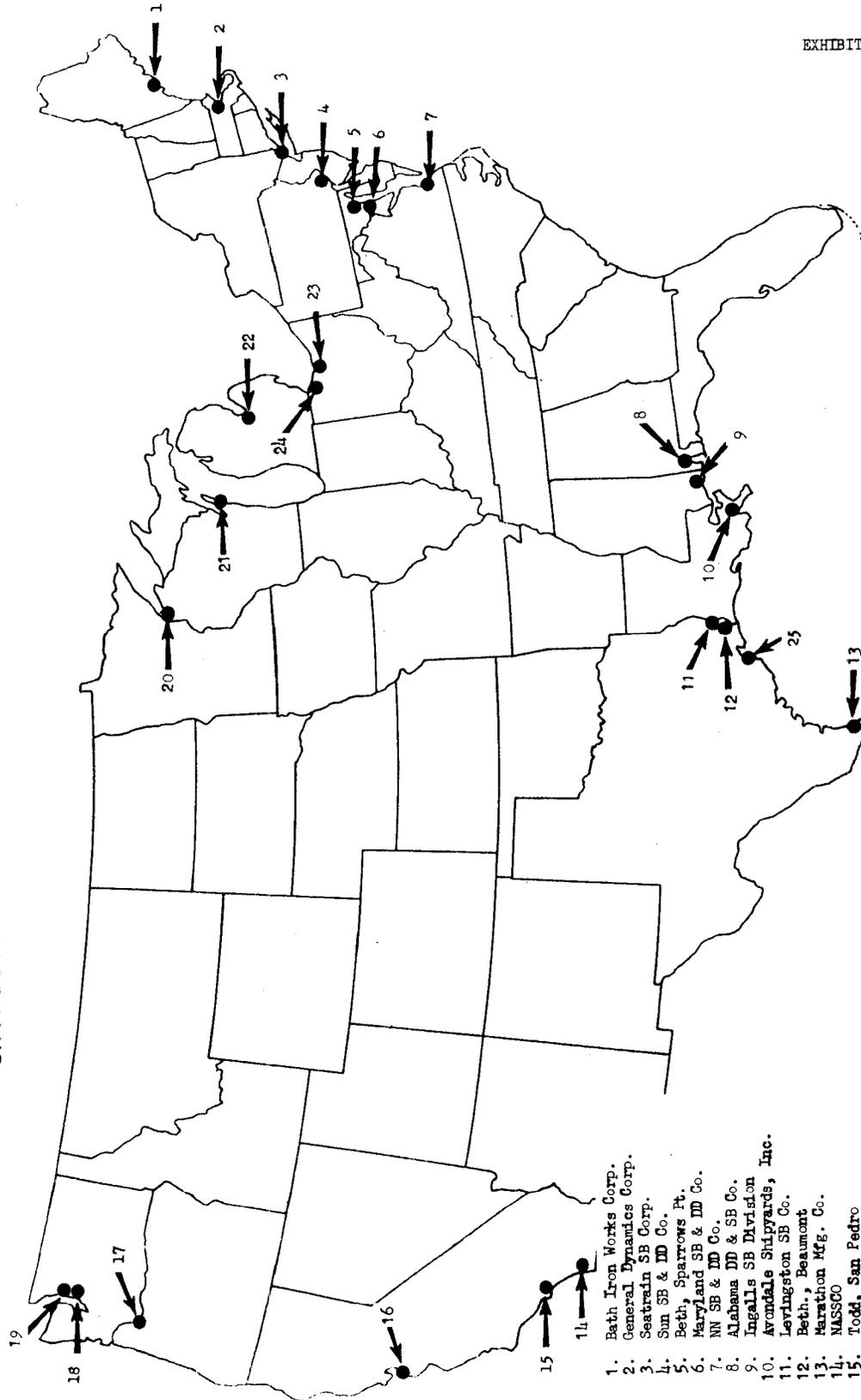
Major topside repair facilities are those that have the capability to provide repair service to oceangoing ships when the work can be accomplished without taking the ships out of the water. The "topside" yards continue to get their share of large ship business. These facilities usually lease pier space on a job basis and do not

have any type of drydocking installations. Services rendered by these firms vary from a simple repair job to a major topside overhaul. In many instances a shop will send its personnel and equipment to provide voyage repairs while the ship is working cargo at a commercial marine terminal. Several yards which normally build and repair only smaller vessels and barges are also capable of performing topside repair work on oceangoing ships.

Appendix C is a list of 94 major topside repair facilities, 41 of which are located on the East Coast. No attempt has been made to tabulate their machinery and equipment due to the variance of the type of work an individual firm will engage in. Detailed data for most of the facilities has been obtained during the annual survey and is available for official use.

# SHIPBUILDING INDUSTRY IN THE UNITED STATES

EXHIBIT 1



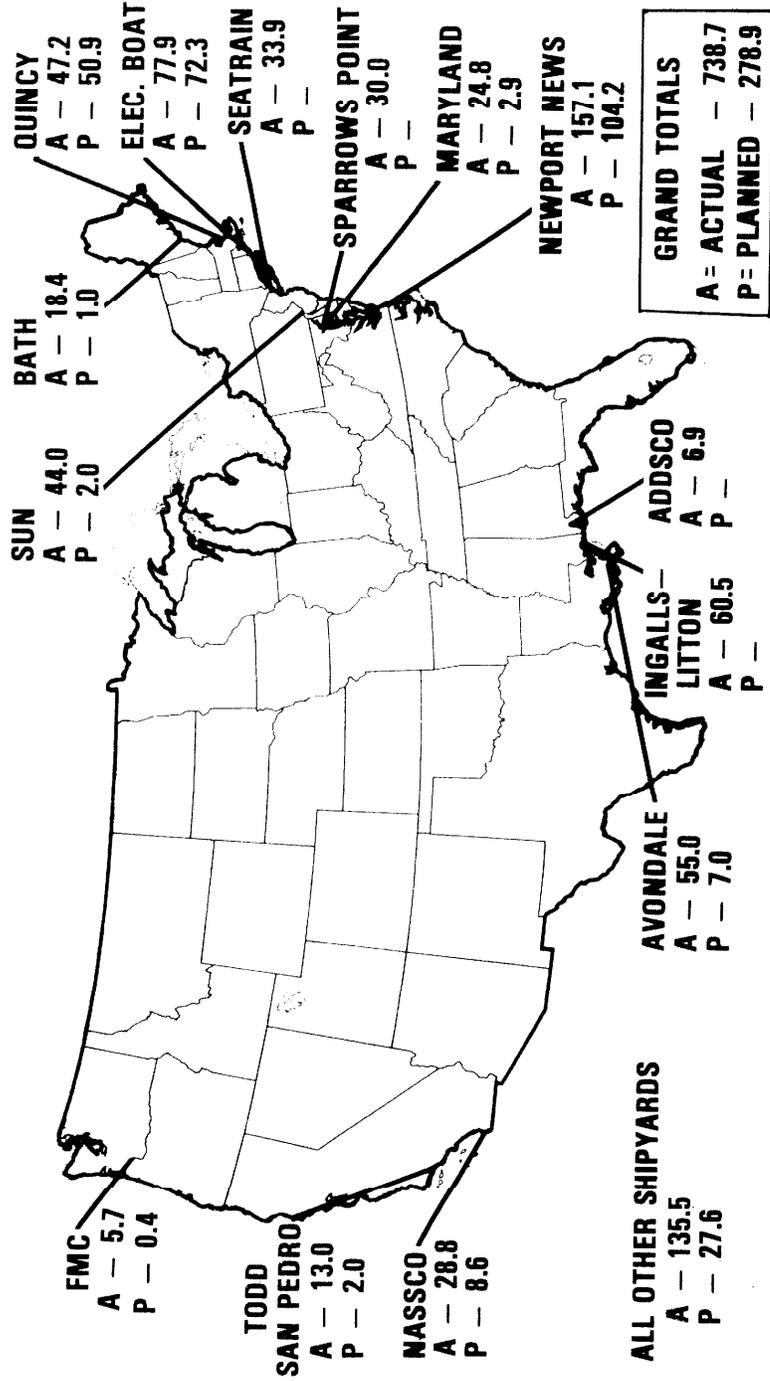
MAJOR AMERICAN SHIPYARDS  
BUILDING CAPACITY - SHIPS 175 FEET IN LENGTH OR OVER

1. Bath Iron Works Corp.
2. General Dynamics Corp.
3. Seatrain SB Corp.
4. Sun SB & DD Co.
5. Beth, Sparrows Pt.
6. Maryland SB & DD Co.
7. NN SB & DD Co.
8. Alabama DD & SB Co.
9. Ingalls SB Division
10. Avondale Shipyards, Inc.
11. Levingston SB Co.
12. Beth., Beaumont
13. Marathon Mfg. Co.
14. NASSCO
15. Todd, San Pedro
16. Beth., San Francisco
17. FMC Corp.
18. Lockheed SB & Constr. Co.
19. Todd, Seattle
20. Fraser Shipyards
21. Bay SB Corp.
22. Defoe SB Co.
23. American SB Co., Lorain
24. American SB Co., Toledo
25. Kelso Marine

# CAPITAL EXPENDITURES BY U.S. SHIPYARDS

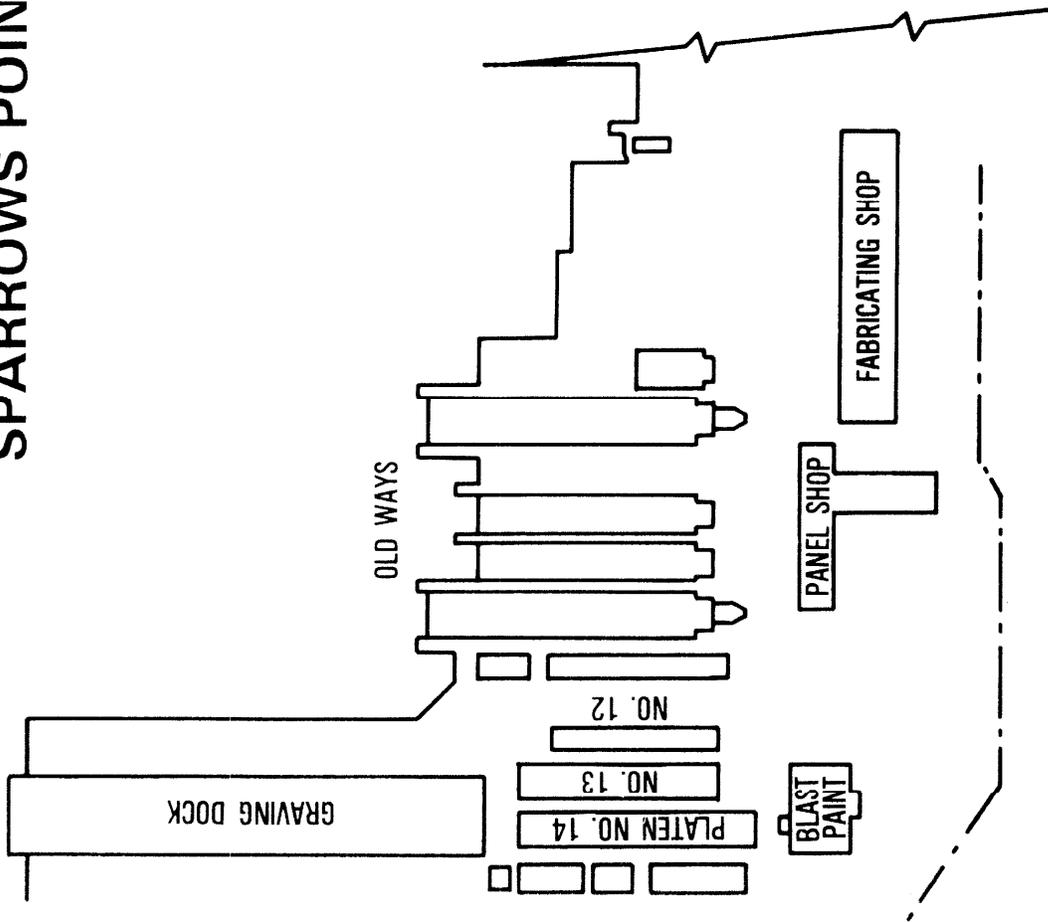
## Since 1970 Act, Actual & Planned

(As of July 1, 1975)  
(Dollars in Millions)



# BETHLEHEM STEEL CORPORATION SPARROWS POINT YARD

EXHIBIT 3



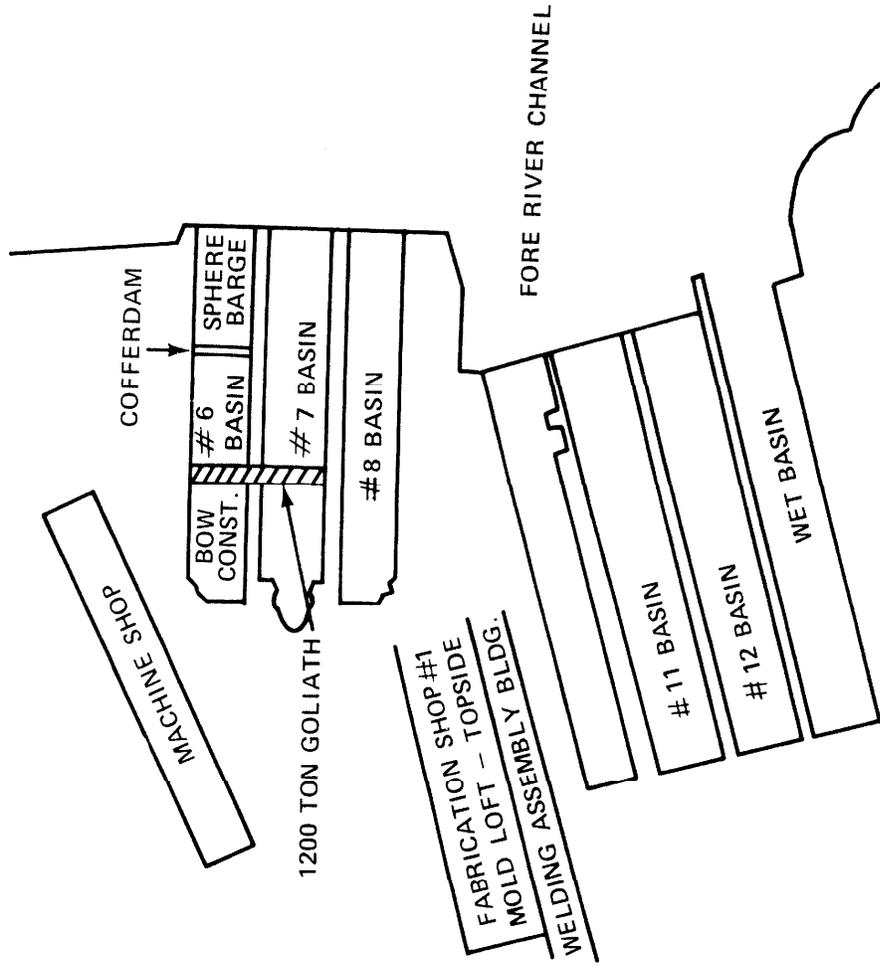
40



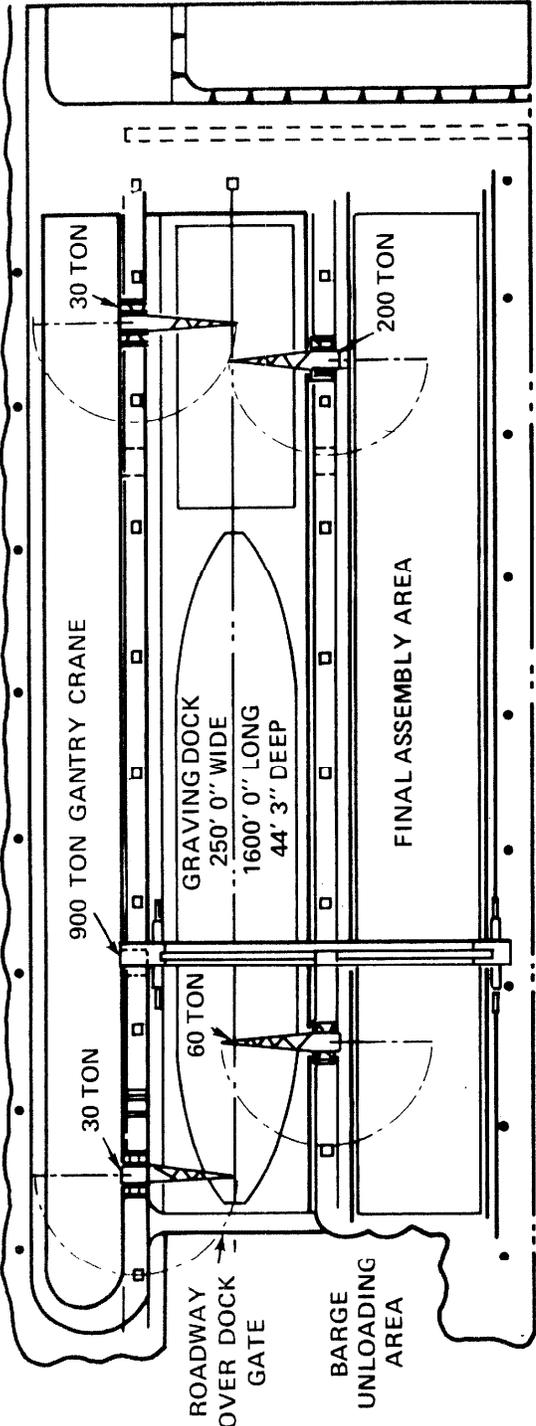
- 11. Avondale SB Division
- 12. Levingston Shipyards, Inc.
- 13. Bethlehem Steel Co.
- 14. Marathon Mfg. Co.
- 15. NASSCO
- 16. Todd

# GENERAL DYNAMICS — QUINCY

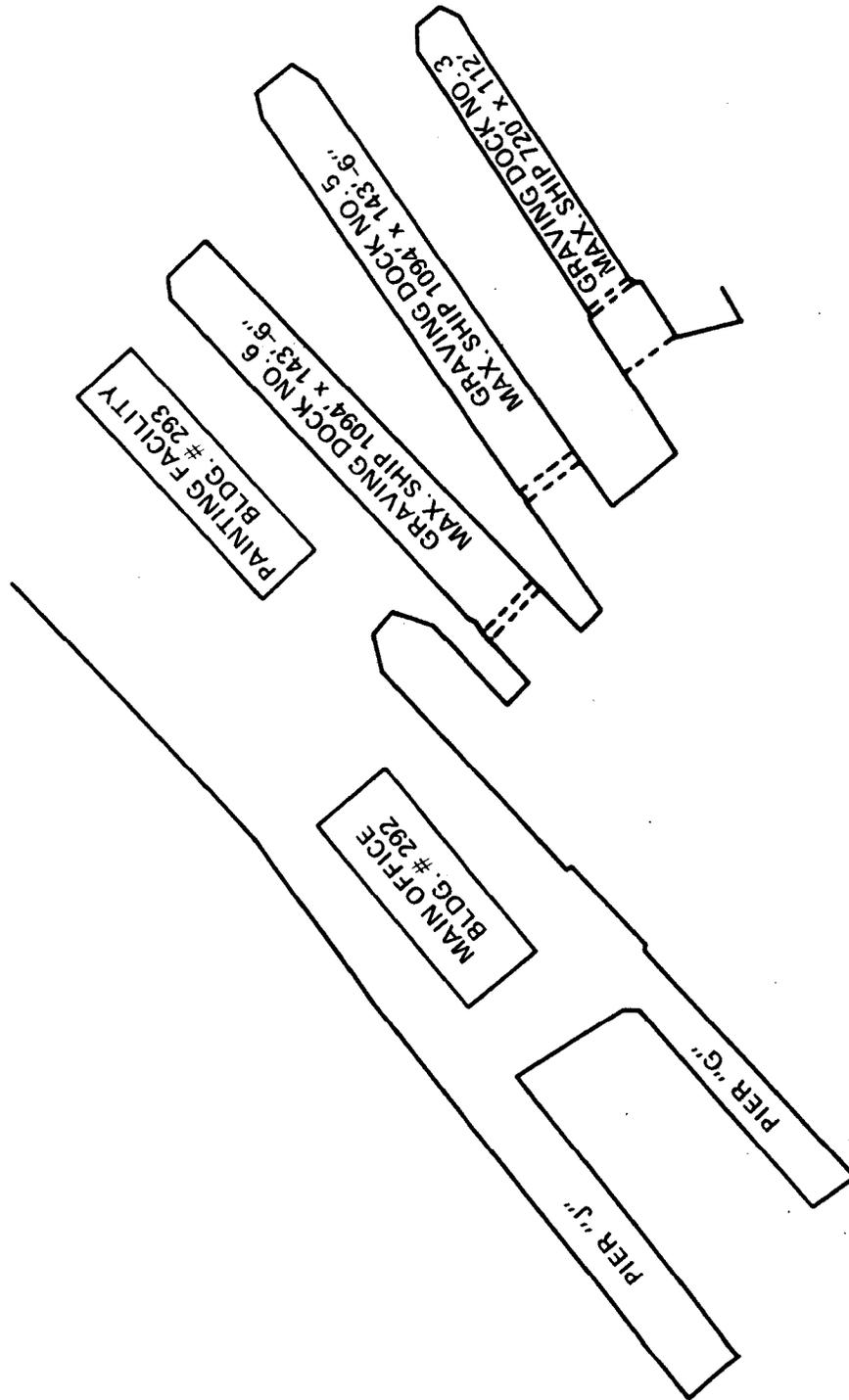
EXHIBIT 4



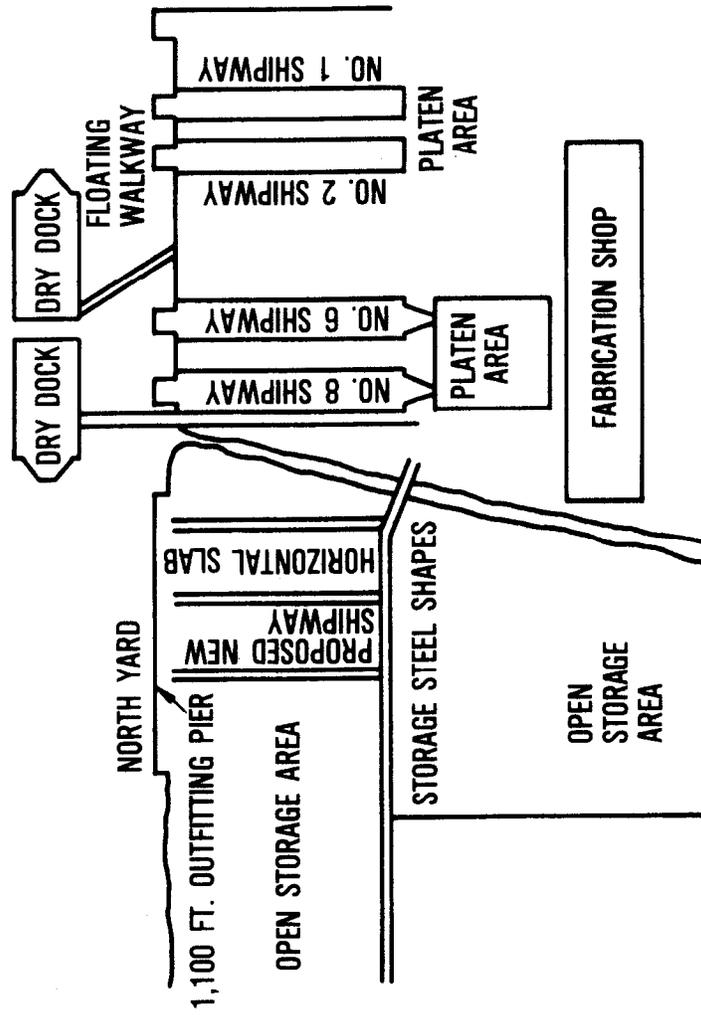
# NEWPORT NEWS



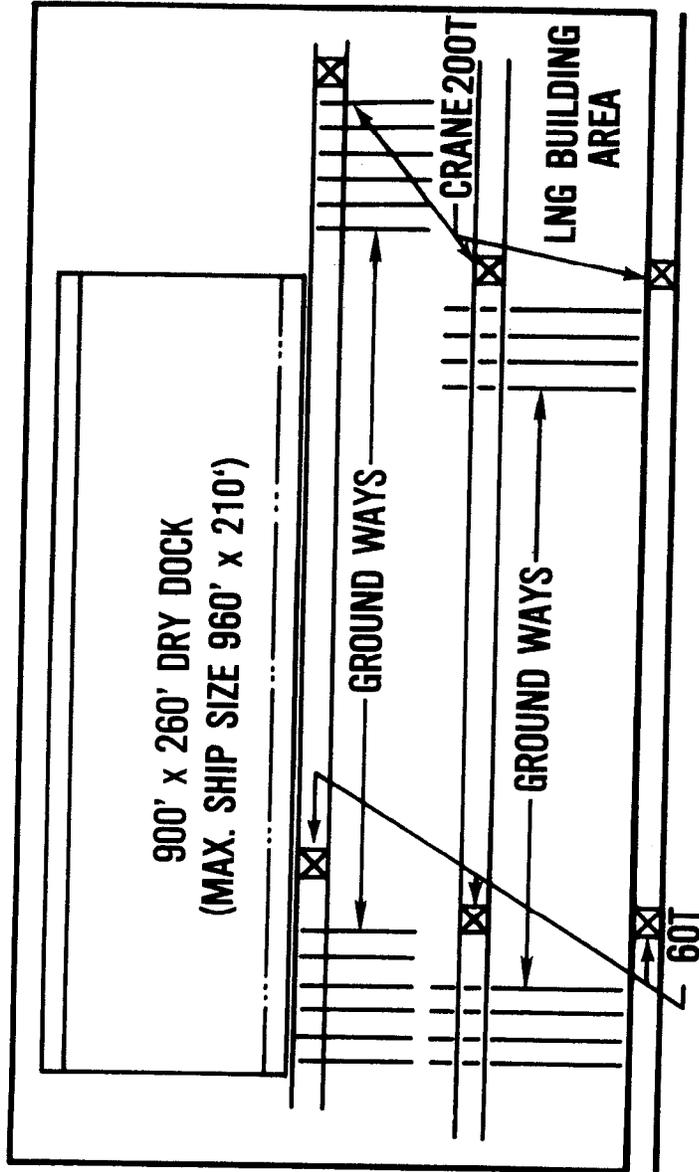
# SEATRAN SHIPBUILDING CORP.



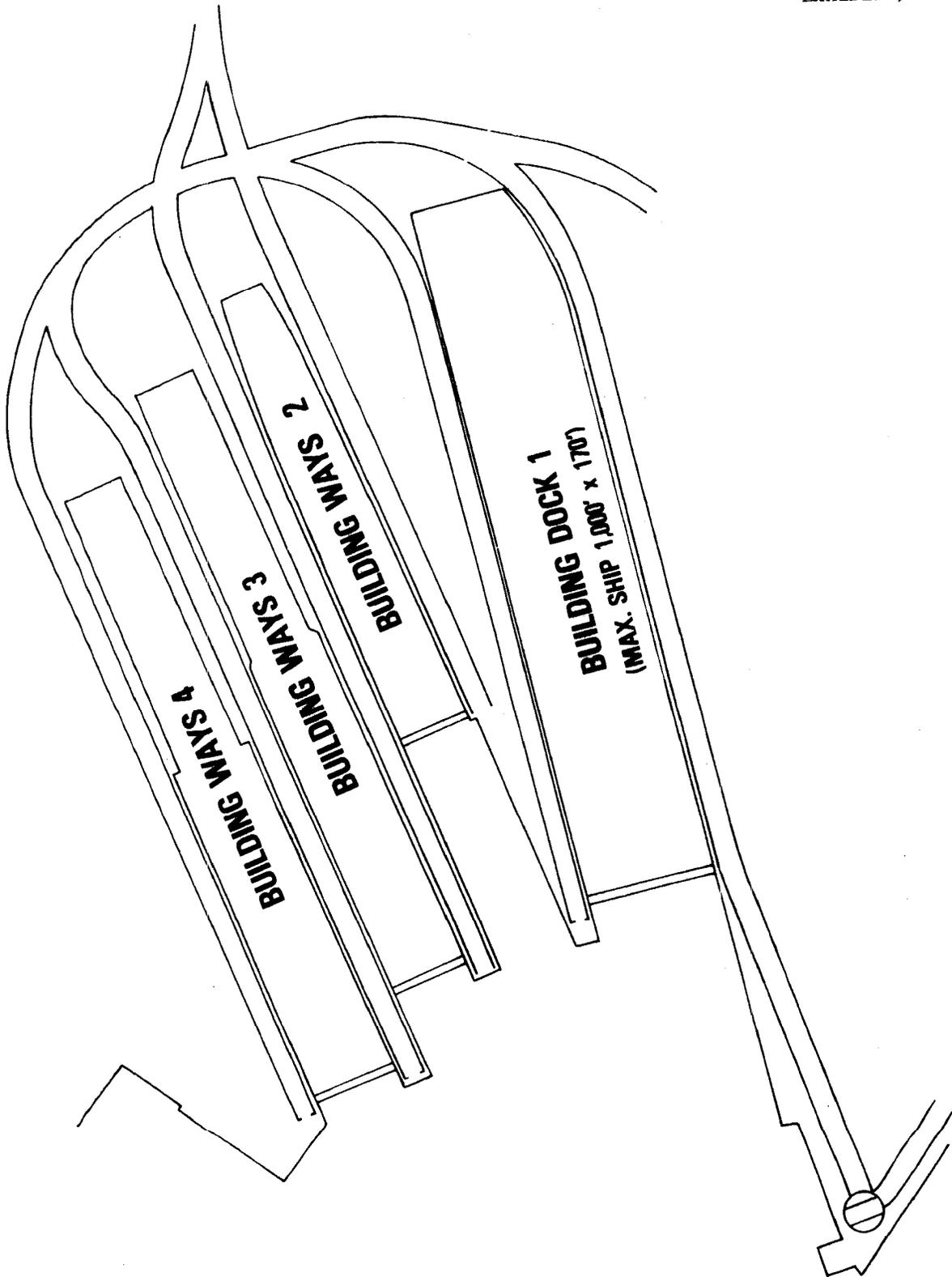
# SUN SHIPBUILDING & DRYDOCK CO.



# AVONDALE SHIPYARDS, INC.

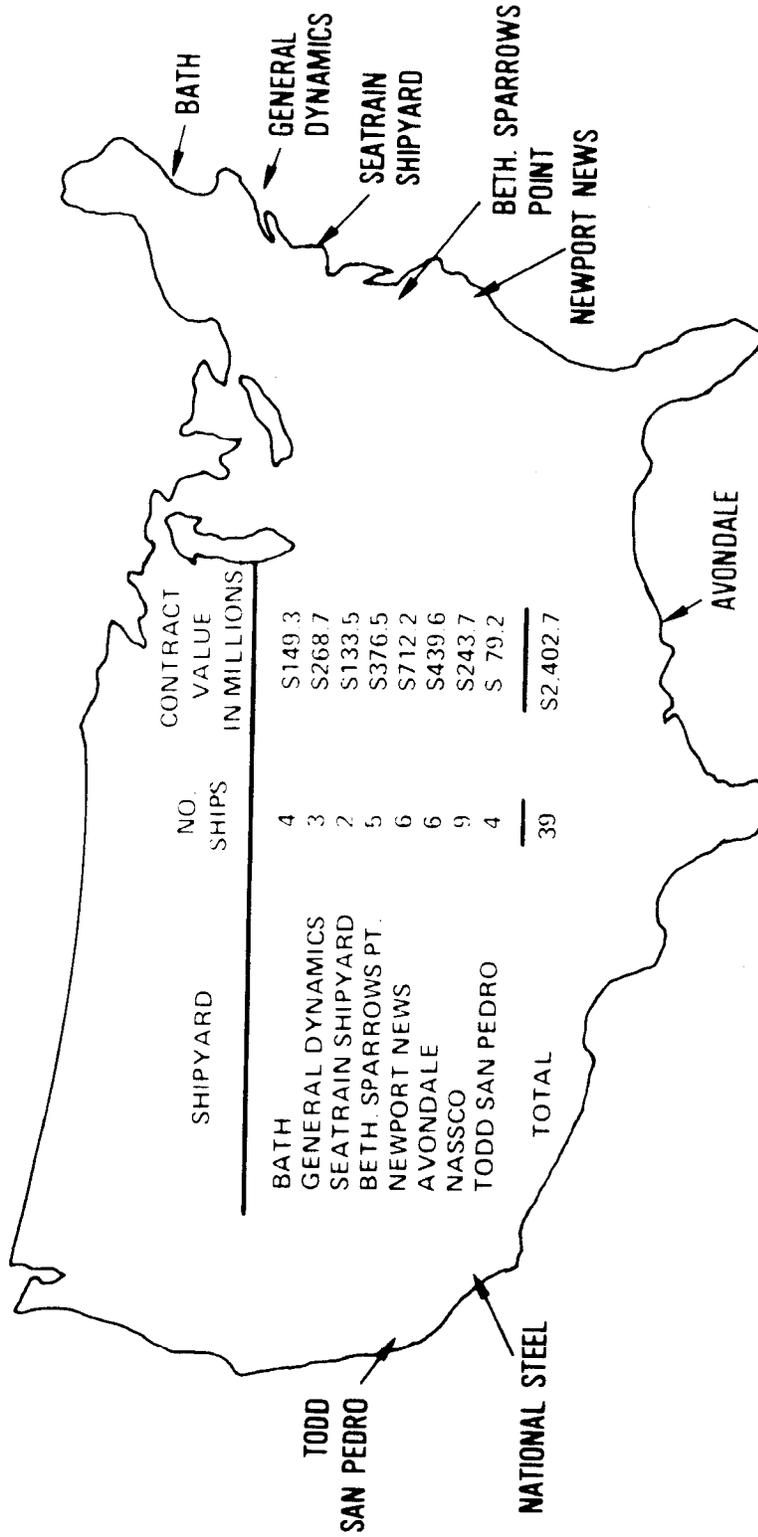


# NASSCO



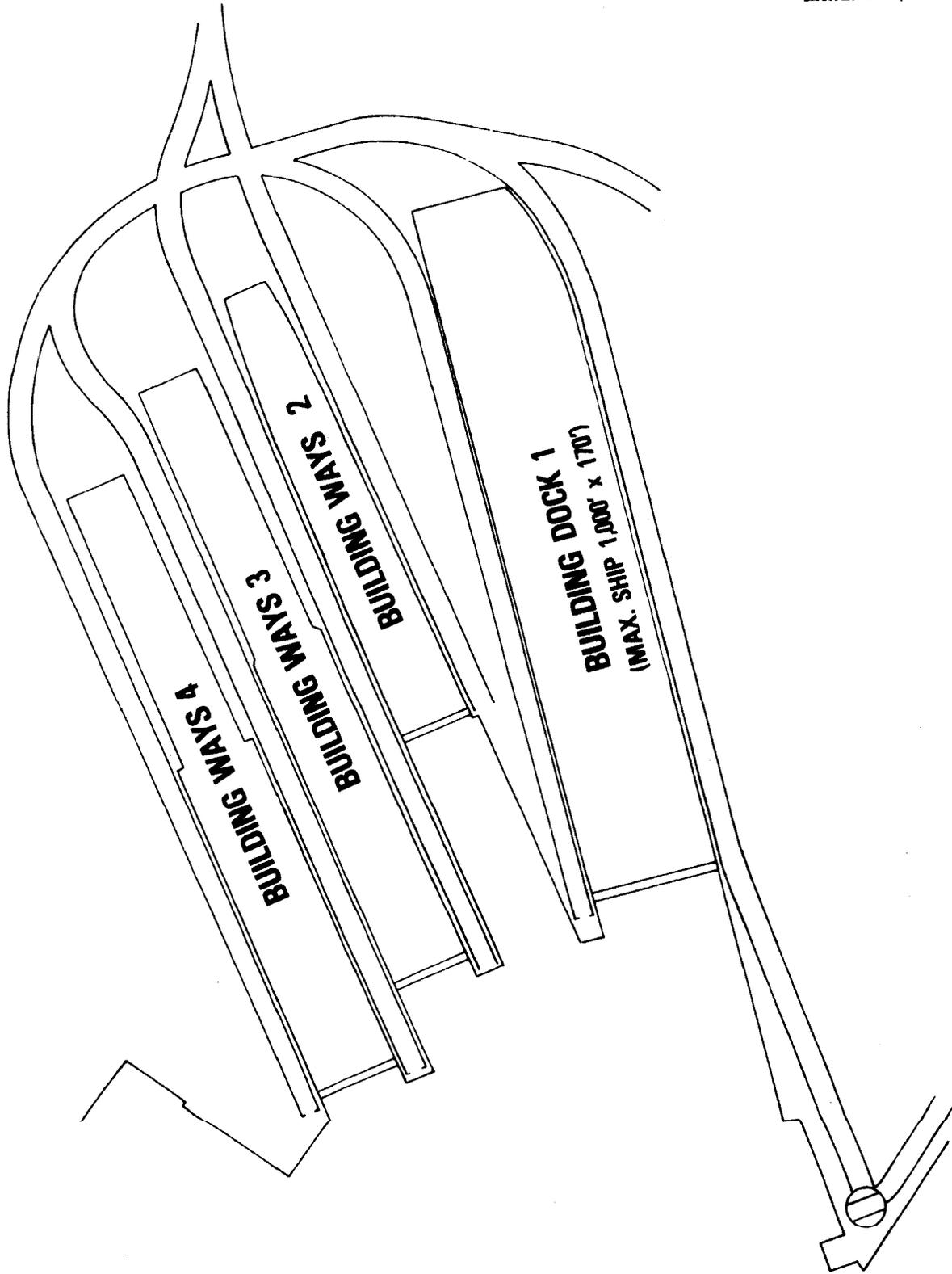
**SHIPBUILDING PROGRAM (TITLE V)  
OFFICE OF SHIP CONSTRUCTION**

**SHIPS UNDER CONTRACT JULY 1, 1975  
TOTAL CONTRACT VALUE, UNDELIVERED SHIPS**

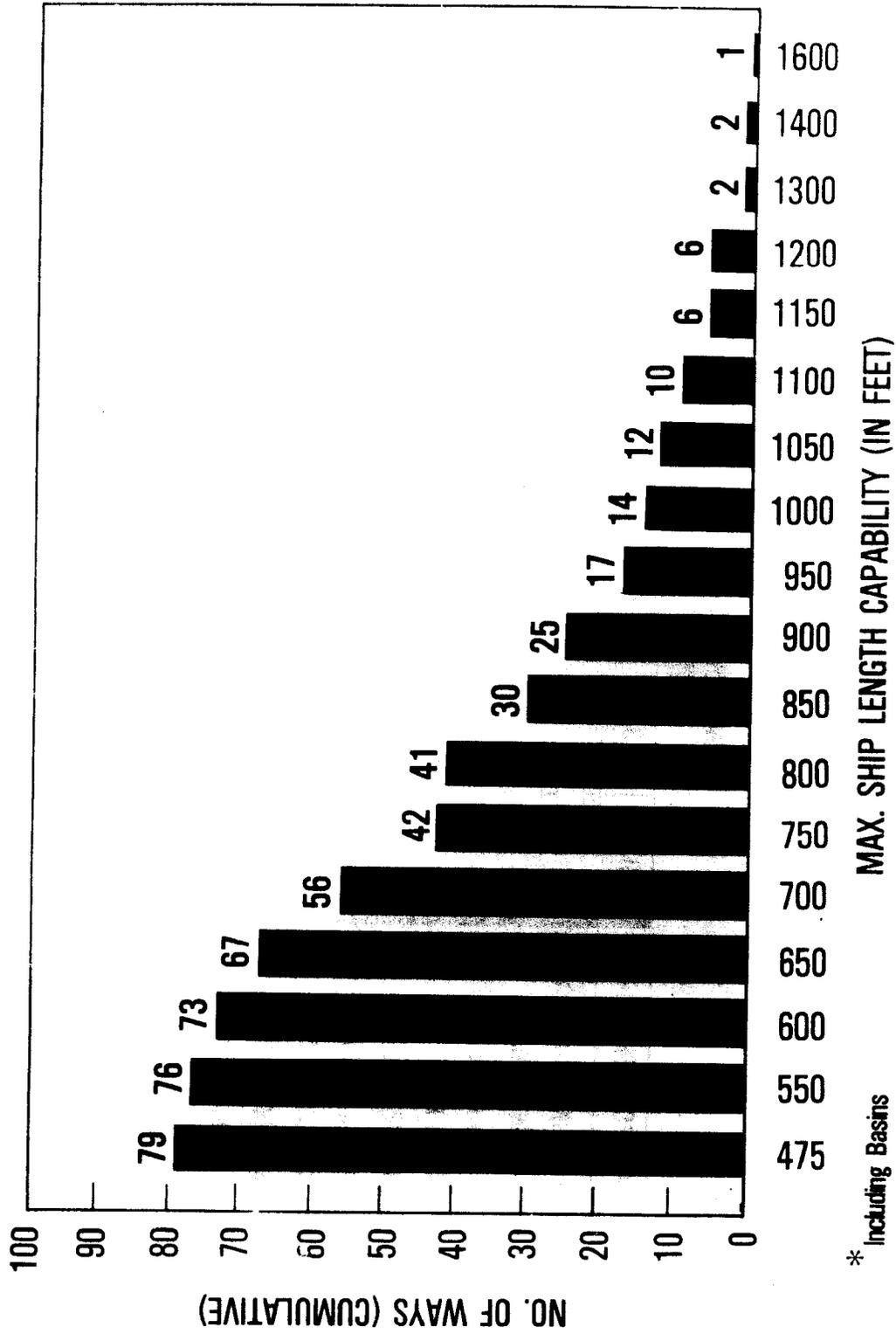


**SHIP FINANCING GUARANTEE CONSTRUCTION PROGRAM (TITLE XI)  
OFFICE OF SHIP CONSTRUCTION**

**NASSCO**



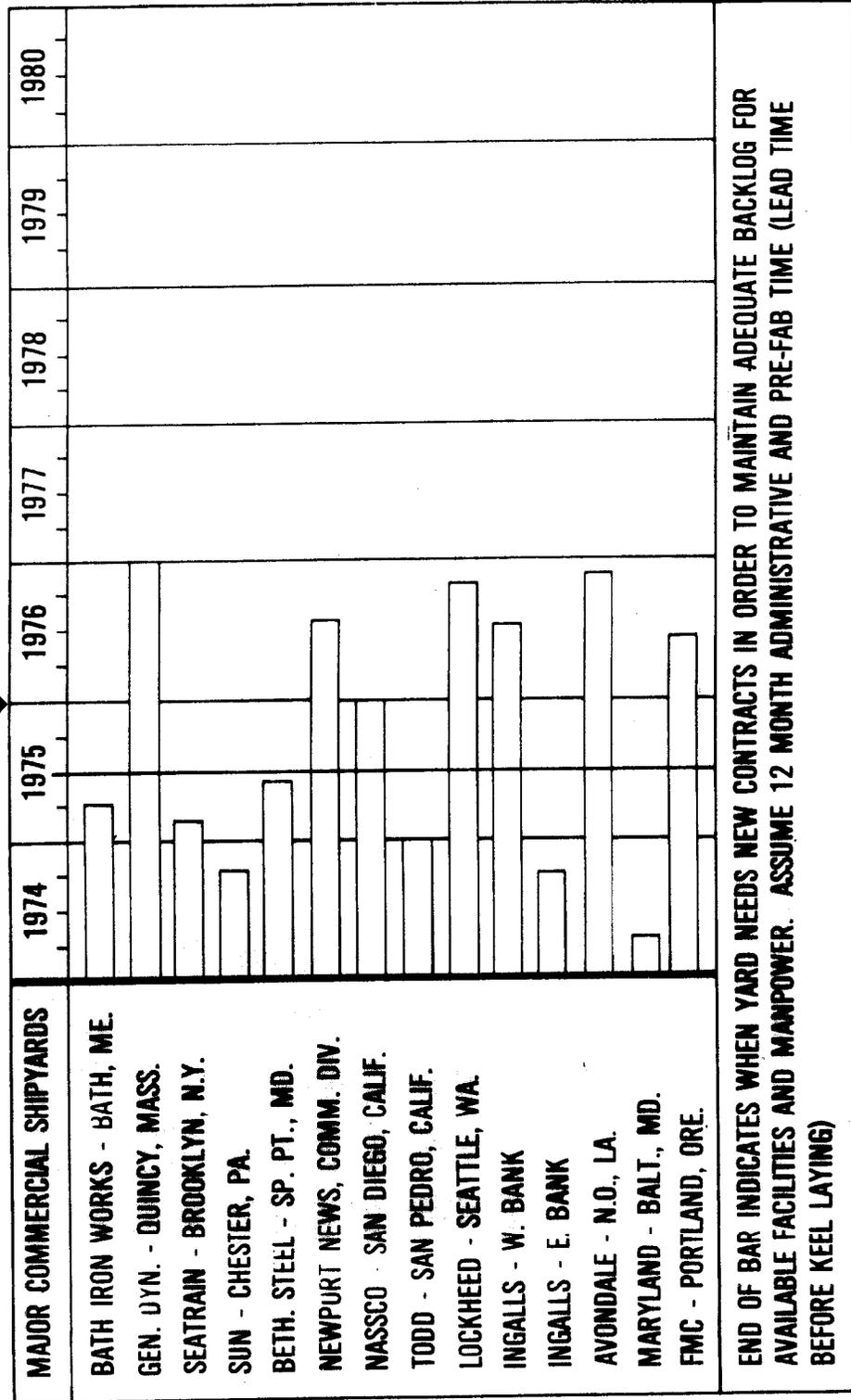
**MAJOR U.S. PRIVATE SHIPYARDS**  
**\* NUMBER OF SHIPWAYS BY MAXIMUM LENGTH CAPABILITY**  
 (November 1, 1975)



# SHIPYARD STATUS: NEED FOR NEW BUSINESS

U.S. DEPARTMENT OF COMMERCE  
MARITIME ADMINISTRATION

TIME NOW 



# U. S. SHIPYARD EMPLOYMENT

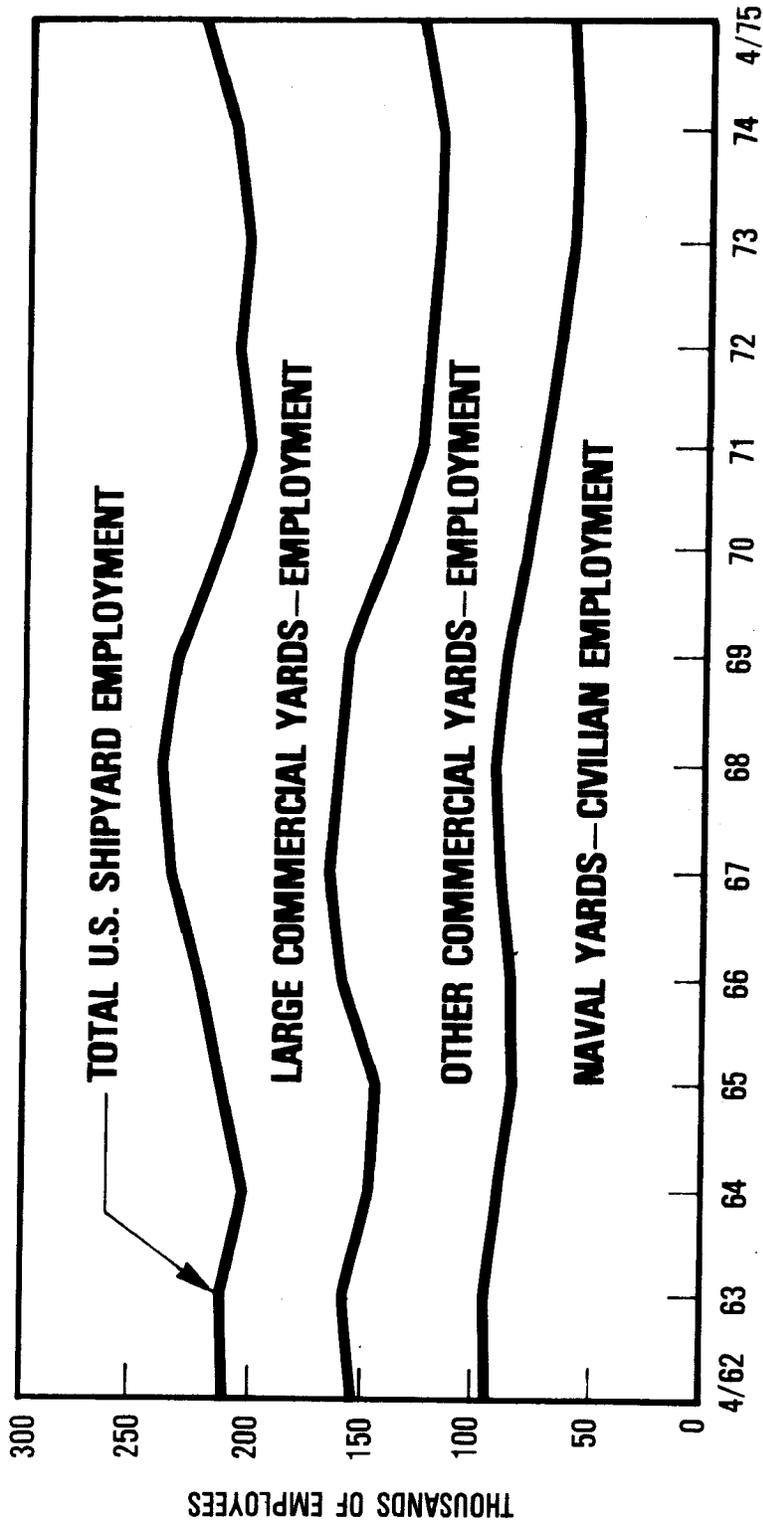


TABLE I

SHIP CONSTRUCTION CAPABILITY  
BY SHIP TYPE

DATA FROM SOURCE  
GEN. DYN. - QUINCY, MASS.  
SEATRAN - BROOKLYN, N.Y.

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk		
				Mob. Cargo 475 x 68	Container 610 x 90	RO/RO 684 x 102	LASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 x 106		
EAST	Bath Iron Works	A	650 x 88	1	1	0	0	0	0	1	0	0	
		B	700 x 130	1	1	1	0	0	1	1	1	0	
		C	700 x 130	(3)	(3)	(2)	(0)	(0)	(3)	(2)	(0)	(0)	
	Bethlehem Steel Sparrows Pt.	7	900 x 108	1	1	1	1	0	0	1	1	1	
		8	650 x 90	1	1	0	0	0	0	1	0	0	
		9	650 x 90	1	1	0	0	0	0	1	0	0	
		10	900 x 108 1200 x 192	4	3	2	1	1	4	1	1	1	
	General Dynamics, Quincy	6	860 x 123	(8)	(7)	(4)	(3)	(1)	(8)	(5)	(3)	(3)	
		7	860 x 123	2	1	1	0	0	1	1	0	0	
		8	860 x 123	2	1	1	0	0	1	1	1	1	
11		860 x 144	2	1	1	0	0	1	1	1	0		
12		860 x 144	2	1	1	0	0	1	1	1	0		
Maryland S/B & D/D	1	850 x 110	(10)	(5)	(5)	(1)	(0)	(5)	(5)	(1)	(1)		
			1	1	1	0	0	1	1	0	0		
Newport News S/B & DD	6	715 x 93	1	1	0	0	0	1	0	0	0		
	7	715 x 93	1	1	0	0	0	1	0	0	0		
	8	940 x 125	2	1	1	1	1	1	1	1	1		
	9	940 x 125	2	1	1	1	1	1	1	1	1		
	10	960 x 128	2	2	1	1	1	2	1	1	1		
	11	1100 x 140	3	2	1	1	1	2	1	1	1		
	CSD	1600 x 240	9	5	4	1	1	9	2	2	1		
			(20)	(13)	(8)	(5)	(3)	(14)	(6)	(5)	(5)		

Region	Shipyard	Shipway or Basin	Maximum Ship size	General Cargo						Dry Bulk		
				Web. Cargo 475 x 68	Container 610 x 90	RO/NO 684 x 102	IASH 893 x 100	Container 947 x 106	22,300 570 x 75	51,000 600 x 105	100,000 900 x 106	
	Seatrain S/B Corp.	3	720 x 112	1	1	1	0	0	1	1	0	
		5	1094 x 143	3	2	1	1	1	3	2	1	
		6	1094 x 143	3	2	1	1	1	3	2	1	
				(7)	(4)	(3)	(2)	(2)	(7)	(4)	(2)	
	Sun S/B & D/D	1	700 x 92	1	1	1	0	0	1	1	0	
		6	745 x 129	1	1	1	0	0	1	1	0	
		8	745 x 129	1	1	1	0	0	1	1	0	
	Slab A	2	700 x 195	2	2	1	1	1	2	1	1	
	Slab B	2	700 x 195	(7)	(7)	(5)	(1)	(1)	(7)	(5)	(1)	
				56	41	26	12	7	15	22	12	
	TOTAL EAST COAST											
GULF	Alabama D/D & S/B	1	523 x 68	1	0	0	0	0	0	0	0	
		2	523 x 68	1	0	0	0	0	0	0	0	
		4	523 x 68	1	0	0	0	0	0	0	0	
		5	620 x 90	1	1	0	0	0	1	0	0	
				(4)	(1)	(0)	(0)	(0)	(1)	(0)	(0)	
	Avondale	1	960 x 176	8	2	2	2	2	4	2	2	
		2	1200 x 130	6	5	3	3	3	6	5	3	
				(14)	(7)	(5)	(5)	(5)	(10)	(7)	(5)	
	Beth. Besumont	1	842 x 96	1	1	1	0	0	1	0	0	
				(1)	(1)	(1)	(0)	(0)	(1)	(0)	(0)	
	Kelso Marine	5	700 x 100	1	1	0	0	0	1	0	0	
				(1)	(1)	(0)	(0)	(0)	(1)	(0)	(0)	
	Levingston	1	1100 x 90	2	1	0	0	0	1	0	0	
				(2)	(1)	(0)	(0)	(0)	(1)	(0)	(0)	

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo					Dry Bulk			
				Mob. Cargo 475 x 68	Container 610 x 90	RO/HO 684 x 102	IASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 x 106	
TOTAL GULF COAST	Litton/Ingalls	1	690 x 85	1	1	0	0	0	1	0	0	
		2	550 x 80	1	0	0	0	0	0	0	0	
		7	650 x 90	1	1	0	0	0	0	0	0	
		8	650 x 90	1	1	0	0	0	0	0	0	
		9	650 x 90	1	1	0	0	0	0	0	0	
		10	650 x 90	1	1	0	0	0	0	0	0	
		WB	800 x 170	6	2	0	0	0	0	0	0	0
				(12)	(11)	(6)	(0)	(0)	(11)	(6)	(0)	(0)
				4	1	1	1	1	1	1	1	1
			Marathon	1	1100 x 150	(4)	(1)	(1)	(1)	(1)	(1)	(1)
WEST	Beth. San Francisco	4	550 x 90	38	23	12	5	5	26	14	6	
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
				1	1	0	0	0	0	0	0	
				(1)	(1)	(0)	(0)	(0)	(1)	(0)	(0)	
			FMC Corporation	4	700 x 100	1	1	0	0	1	0	0
				(1)	(1)	(0)	(0)	(0)	(1)	(0)	(0)	
			Lockheed S/B	1	650 x 95	1	0	0	0	0	0	0
				3	1	1	0	0	1	0	0	0
				21	1	1	0	0	1	0	0	0
				(3)	(2)	(0)	(0)	(0)	(3)	(0)	(0)	(0)
National Steel & S/B	1	1000 x 170	4	1	1	1	1	1	2	1	1	
	2	700 x 90	1	1	0	0	0	0	1	0	0	
	3	900 x 106	1	1	1	1	1	1	1	1	1	
	4	900 x 106	1	1	1	1	1	1	1	1	1	
		(7)	(4)	(3)	(3)	(3)	(3)	(5)	(3)	(3)		

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo						Dry Bulk		
				Container 610 x 90	RO/RO 664 x 102	IASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 x 106		
Totid, San Pedro		1	800 x 84	1	0	0	0	0	1	0	0	
		2	800 x 84	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	1 (2)	0 (0)	0 (0)	
Totid, Seattle	JA	1A	550 x 96	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
		TOTAL WEST COAST		15	7	3	3	1	11	2	3	
GREAT LAKES	American S/B-Lorain	4	700 x 75	1	0	0	0	0	1	0	0	
		GD2	730 x 75	1	0	0	0	0	1	0	0	
		GD3	*730 x 78	(3)	(0)	(0)	(0)	(0)	(3)	(0)	(0)	
		2	664 x 75	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	
		3	*730 x 78	1	1	0	0	0	1	0	0	
Bay S/B Corp.		4	700 x 78	1	1	0	0	0	1	0	0	
		5	600 x 70	1	0	0	0	0	0	0	0	
		TOTAL	(3)	(2)	(0)	(0)	(0)	(2)	(0)	(0)	(0)	
Defoe S/B Co.		1	*730 x 78	2 (2)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	

\*Controlling Ship Size for Saint Lawrence Seaway

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk		
				Mob. Cargo 475 x 68	Container 610 x 90	RO/RO 684 x 102	IASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 x 106		
	Fraser Shipyards	1	*730 x 78	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	
<b>TOTAL GREAT LAKES</b>				10	2	0	0	0	8	0	0	0	
<b>TOTAL ALL YARDS</b>				119	73	44	21	14	90	49	21		

\* Controlling Ship Size for Saint Lawrence Seaway

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers							OBO						
				25,000 620 x 75	38,000 688 x 90	39,000 694 x 105	120,000 920 x 138	125,000 Cu Ft 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143				
EAST	Bath Iron Works	A	650 x 88	1	0	0	0	0	0	0	0	0	0	0	0	0	
		B	700 x 130	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		C	700 x 130	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Bethlehem Steel Sparrows Point	7	900 x 108	1	1	1	0	0	0	0	0	0	0	0	0	0	0
		8	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	900 x 108	1	1	1	0	0	0	0	0	0	0	0	0	0	0
	General Dynamics, Quincy		1200 x 192	3	2	1	1	1	1	1	1	1	1	1	1	1	1
		6	860 x 123	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		7	936 x 143	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		8	860 x 123	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		11	860 x 144	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		12	860 x 144	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Maryland S/B & D/D	1	850 x 110	1	1	0	0	0	0	0	0	0	0	0	0	0	
				1	1	0	0	0	0	0	0	0	0	0	0	0	
	Newport News S/B & D/D	6	715 x 93	1	1	0	0	0	0	0	0	0	0	0	0	0	
		7	715 x 93	1	1	1	0	0	0	0	0	0	0	0	0	0	
		8	940 x 125	1	1	1	0	0	0	0	0	0	0	0	0	0	
		9	940 x 125	1	1	1	0	0	0	0	0	0	0	0	0	0	
		10	960 x 128	1	1	1	0	0	0	0	0	0	0	0	0	0	
		11	1100 x 140	2	1	1	1	1	1	1	1	1	1	1	1	1	1
		OSD	1600 x 240	6	4	2	1	1	1	1	1	1	1	1	1	1	1
		(13)	(10)	(6)	(2)	(2)	(2)	(2)	(2)	(2)	(1)	(1)	(1)	(3)	(2)		

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers							OBO								
				25,000 620 x 75	25,000 620 x 90	25,000 620 x 105	120,000 920 x 135	125,000 932 x 140	225,000 1100 x 140	265,000 1100 x 175	390,770 1204 x 225	5,000	886 x 106	140,000 998 x 143					
GULF	Seatrain S/B Corp.	3	720 x 112	1	1	0	0	0	0	0	0	0	0	0	0	0	0		
		5	1094 x 143	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
		6	1094 x 143	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	Sun S/B & D/D	1	700 x 92	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		6	745 x 129	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		8	745 x 129	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Slab A	700 x 195	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	
	Slab B	700 x 195	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
<b>TOTAL EAST COAST</b>				<u>11</u>	<u>32</u>	<u>13</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>	<u>7</u>		
GULF	Alabama D/D & S/B	1	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		2	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		4	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		5	620 x 68	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Avondale	1	960 x 176	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	2	1200 x 130	5	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	
				(9)	(5)	(5)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	
Beth Beaumont	1	842 x 96	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
Kelso Marine	5	700 x 100	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	

\*Sun Ship has capability of building a ship of this deadweight tonnage if deeper draft to compensate for shipways' beam limitation of 195 feet.

Region	Shipyard	Shipway or Basis	Maximum Ship Size	25,000	30,000	35,000	40,000	45,000	50,000	55,000	60,000	65,000	70,000	75,000	80,000	85,000	90,000	95,000	100,000	105,000	110,000	115,000	120,000	125,000	130,000	135,000	140,000	145,000	150,000
	Levinston	1	1100 x 90	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Littton/Infalls	1	690 x 85	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	550 x 80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		WB	800 x 170	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Marathon	1	1100 x 150	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	TOTAL GULF COAST			25	15	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
WEST	Beth. San Francisco	4	550 x 90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	FMC Corporation	4	700 x 100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Lockheed S/B	1	650 x 95	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		21	700 x 100	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1



Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers								ORO		
				25,000 620 x 75	38,000 688 x 90	49,000 896 x 105	700,000 928 x 138	1,250,000 cu. Ft. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 888 x 106	160,000 998 x 143	
	Defoe S/R Co.	1	*730 x 78	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Fraser Shipyards	1	*730 x 78	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
<b>TOTAL GREAT LAKES</b>				<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>TOTAL ALL YARDS</b>				<b>85</b>	<b>53</b>	<b>22</b>	<b>11</b>	<b>11</b>	<b>7</b>	<b>3</b>	<b>2</b>	<b>20</b>	<b>8</b>	<b>8</b>

\*Controlling Ship Size for Saint Lawrence Seaway

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

SUMMARY

REGION	GENERAL CARGO						DRY BULK			
	Mob. Cargo 465 x 68	Container 610 x 90	RO/RO 684 x 102	LASH 893 x 100	Container 947 x 106		21,300 570 x 75	51,000 600 x 105	100,000 900 x 106	
East Coast	56	41	28	12	7		45	32	12	
Gulf Coast	38	23	13	6	6		26	14	6	
West Coast	15	7	3	3	1		11	3	3	
Great Lakes	10	2	0	0	0		8	0	0	
<b>TOTAL POSITIONS</b>										
<b>ALL YARDS</b>	119	73	44	21	14		90	49	21	

REGION	TANKERS										OBO	
	25,000 620 x 75	38,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228		80,000 886 x 106	160,000 998 x 143	
East Coast	41	32	13	7	7	6	3	2		13	6	
Gulf Coast	25	15	6	3	3	1	0	0		6	1	
West Coast	11	6	3	1	1	0	0	0		1	1	
Great Lakes	8	0	0	0	0	0	0	0		0	0	
<b>TOTAL POSITIONS</b>												
<b>ALL YARDS</b>	85	53	22	11	11	7	3	2		20	8	

TABLE II

MAJOR U.S. PRIVATE SHIPYARDS  
NUMBER OF SHIPBUILDING WAYS BY LENGTH  
(MAXIMUM SHIP SIZE)

TABLE II

MAJOR U.S. PRIVATE SHIPYARDS

NUMBER OF SHIPBUILDING WAYS BY LENGTH (MAX. SHIP SIZE)

Length OA (In Feet):	475	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1300	1400	1600	
<u>ATLANTIC COAST</u>																			
Bath Iron Works	3	3	3	3	2														
Beth-Sparrows Point	5	5	5	5	3	3	3	3	3	1	1	1	1	1	1				
General Dynamics, Quincy	5	5	5	5	5	5	5	5	1										
Maryland SB & DD	1	1	1	1	1	1	1	1											
Newport News SB & DD	6	6	6	6	6	4	4	4	4	2	1	1	1	1	1	1	1	1	1
Newport News - GSD	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Seatrains SB Corp	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sun SB & DD	5	5	5	5	5	2	2	2	2	1	1	1	1	1	1	1	1	1	1
TOTAL	(29)	(29)	(29)	(29)	(26)	(18)	(18)	(17)	(12)	(7)	(6)	(6)	(4)	(3)	(3)	(2)	(2)	(2)	(1)
<u>GULF COAST</u>																			
Alabama DD & SB	4	1	1	5	5	5	5	5	5	5	3	3	3	3	3				
Avondale	8	8	8	1	1	1	1	1											
Beth-Beaumont	1	1	1	1	1	1	1	1											
Ingalls-E. Bank	6	6	6	5	6	6	6	6											
Ingalls-W. Bank	6	6	6	6	6	6	6	6											
Kelso Marine	1	1	1	1	1	1	1	1											
Levingston SB Co.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Marathon	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TOTAL	(28)	(25)	(24)	(20)	(15)	(14)	(14)	(7)	(7)	(7)	(5)	(5)	(5)	(3)	(3)	(2)	(2)	(2)	(1)

MAJOR U.S. PRIVATE SHIPYARDS

NUMBER OF SHIPBUILDING WAYS BY LENGTH (MAX. SHIP SIZE)

Length OA (In Feet):	475	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1300	1400	1600
<u>PACIFIC COAST</u>																		
Beth-San Francisco	1	1	1	1	1													
FMC Corporation	1	1	1	1	1													
Lockheed SB	3	3	3	3	3													
National Steel & SB	4	4	4	4	4	3	3	3	3	1	1							
Todd-San Pedro	2	2	2	2	2	2	2											
Todd-Seattle	1	1																
TOTAL	(12)	(12)	(10)	(10)	(8)	(5)	(5)	(3)	(3)	(1)	(1)							
<u>GREAT LAKES*</u>																		
American SB-Lorain	3	3	3	3	3	1	1	1	1	1	1							
American SB-Todedo	1	1	1	1	1													
Bay SB Corp.	3	3	3	2	2	2	1	1	1	1	1	1	1					
Defoe SB Co.	2	2	2	1	1	1	1	1	1									
Fraser Shipyards	1	1	1	1	1	1	1											
TOTAL	(10)	(10)	(10)	(8)	(7)	(5)	(4)	(3)	(3)	(2)	(2)	(1)	(1)					
Grand Total	79	76	73	67	56	42	41	30	25	17	14	12	10	6	6	2	2	1
All Coasts and Great Lakes																		

\*Maximum size ship that can exit St. Lawrence Seaway locks is 730' x 78'.

APPENDIX A

STANDARD FORM 17

FACILITIES AVAILABLE FOR THE CONSTRUCTION

OR REPAIR OF SHIPS





PRINCIPAL SHOPS AND BUILDINGS										ALL OTHER SHOPS (List names and dimensions, include mold loft, if any)
NAME OF SHOP OR BUILDING	DIMENSIONS OF SHOP OR BUILDING	MATERIALS PROCESSED (See note)	LARGEST EXIT		WEIGHT OF MATERIAL OR NUMBER AND SIZE OF UNITS PRODUCED PER 8 HOURS (See note)					
			Width	Height						
Fabricating										
Plate			X X X X	X X X X						
Sheet metal										
Subassembly										
Carpenter			X X X X	X X X X	X X X X X X X					
Woodworking			X X X X	X X X X	X X X X X X X					
Boat assembly or molding										
Machine		X X X X X X	X X X X	X X X X	X X X X X X X					
Electrical		X X X X X X	X X X X	X X X X	X X X X X X X					
Electronic		X X X X X X	X X X X	X X X X	X X X X X X X					
Pipe										
Galvanizing										
Foundry										
Rigger		X X X X X X	X X X X	X X X X	X X X X X X X					
NOTE.—Indicate materials as steel, aluminum, reinforced plastic, wood, plywood, sheet metal, etc.										
SHOP OR YARD CRANES (5 tons or over)										STATIONARY, RAIL OR MOBILE
Cap. (Std. tons)	Max. span	Height of hook	Area/shop serviced	Type	Cap. (Std. tons)	Max. reach	Capacity at reach	Boom length	Height hinge	

MAJOR ITEMS OF MACHINE TOOLS AND EQUIPMENT (List briefly such of the large items as will indicate the capacities of all important shops in maximum work piece size, e.g., 30" plate bending rolls, 10" plate shears, 400 ton Hyd. press, 30" plate furnace, engine lathe 36" x 20" b.c., etc.)

STORAGE SPACE (Sq. ft.) FOR COMPONENTS AND MATERIALS (Less boat storage) (List dimensions for each area, plus type material stored)

--	--

RAW STEEL STORAGE (Sq. ft.)	WELDING AND ASSEMBLY (Sq. ft.)
<b>ACREAGE LEGALLY CONTROLLED</b>	
IN USE	TOTAL (including undeveloped)
DEVELOPED (including in use)	TOTAL (including undeveloped)
EXISTING LOCAL ORDINANCES LIMITING PRODUCTIVE USE	
LIMITATIONS IMPOSED BY PROPERTY ZONING CLASSIFICATION	
YARD LAYOUT—PLEASE FURNISH A PLOT PLAN OF YARD OR PLANT, IF AVAILABLE	

PROJECTS UNDER CONSTRUCTION WHICH WILL ALTER NAVIGATIONAL RESTRICTIONS (Specify projects and state effect and estimated completions)

LOCATION OF PRODUCTION FACILITIES FOR PRODUCTS LISTED IN ITEM 11. OF STD. FORM 129 ON WATERFRONT  Yes  No

EMPLOYMENT	CURRENT	CURRENT NO. SHIFTS	MOBILIZATION—SHIFTS
Management, administration			
Professional, engineering			
Professional, technical (All others)			
Production, skilled			
Production, semiskilled			
Production, unskilled			
Nonproduction			
Total		x x x x x x	x x x x

NUMBER OF PRODUCTION PERSONNEL PRESENTLY ENGAGED IN SHIP AND/OR BOAT IN SHIP OR BOAT REPAIR CONSTRUCTION

APPROXIMATE TOTAL EMPLOYMENT OF ALL AFFILIATED CONCERNS ONLY LISTED IN ITEM 8. OF STD. FORM 129 (NOTE—An affiliate is a concern that directly, or indirectly through one or more intermediaries controls, or is controlled by, or is under common control with, the reporting firm. Common ownership of stock by individuals does not in itself, constitute affiliation.)

DISTANCE TO NEAREST RAILROAD CONNECTION

DISTANCE TO NEAREST AIRPORT—IDENTIFY

LARGEST CONVEYANCE AVAILABLE AND MAXIMUM DIMENSIONS OF LOAD, FOR OVERLAND TRANSPORTATION OF FINISHED PRODUCTS (Not to exceed limitations imposed by local ordinances)

NAVIGATIONAL RESTRICTIONS (INDICATE ALL AT M.L.W.)

MINIMUM CHANNEL TO TIDEWATER

MINIMUM HORIZONTAL AND VERTICAL BRIDGE CLEARANCES TO TIDEWATER (Identify structures)

LIMITING LOCK DIMENSIONS TO TIDEWATER (Identify locks)

DESCRIPTION OF TYPES OF WORK NORMALLY SUBCONTRACTED

PRODUCTION EXPERIENCE (List at least three of the largest and the most complex ships or boats constructed, indicating (1) date completed, (2) hull length, beam, and molded depth, (3) type propulsion unit (fully described), (4) horsepower, (5) electrical and/or electronic installation, (6) special piping features, (7) size and tensile strength of plates, if steel, or type hull material, if other than steel, (8) special annealing, heat treating, or stress relieving problems encountered, plus, (9) any other important problems resolved). (NOTE.—If no previous construction experience give detailed description of major conversion or industrial manufacturing work considered comparable to ship or boat construction.)

APPENDIX B

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

LEGEND: Remarks Column

1/ Type of work usually engaged in

2/ Employment - current/mobilization

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES <sup>a/</sup>

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
<u>EAST COAST</u>				
<u>SHIPBUILDING YARDS</u>				
Bath Iron Works Corp. Bath, Maine	(2) 650 (+) x 88 SW (2) 700 x 130 SW	<u>850</u> 2900	<u>1/</u> <u>2/</u>	Construction, conversion, and repairs-all types of vessels. 3675/12000  Has floating bow drydock for sonar domes.
Beth. Steel Corp. Sparrows Point, Maryland	(2) 650 x 90 SW (2) 900 x 108 SW 1200 x 192 GD	<u>1260</u> 3968	<u>1/</u> <u>2/</u>	New ship construction - to vessels 1200' in length. 4270/15500
General Dynamics Corp. Quincy SB Division Quincy, Mass.	(2) 860 x 123 GD 936 x 143 GD (2) 860 x 144 GD 550 x 75 FD	<u>823</u> 4621	<u>1/</u> <u>2/</u>	Construction, conversion and repairs - all types of vessels to 1000' feet in length. 4650/24000
Maryland SB and DD Co. Baltimore, Md.	850 x 110 SW 775 x 106 FD 715 x 90 FD 900 x 145 FD	<u>1902</u> 5651	<u>1/</u> <u>2/</u>	Construction, conversion and repairs - all types of vessels. 1900/12000
Newport News SB & DD Co. Newport News, Va.	(2) 715 x 93 SW (2) 940 x 125 SW 960 x 128 GD* 1100 x 140 GD* 650 x 92 GD 862 x 118 GD 458 x 72 GD 1600 x 240 GD**	<u>1078</u> 12430	<u>1/</u> <u>2/</u>	Construction, conversion and repairs - all types of vessels. 22400/41000  *Used for construction. **Located in Commercial Ship Division. This GD is scheduled for completion in early 1976.

<sup>a/</sup> Shipbuilding: for ships 475' x 68' or above  
Repair: drydocking facilities for ships 300' in length or above

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
Seatrain SB Corp. Brooklyn, N.Y.	720 x 112 GD (2) 1094 x 143 GD	1200 3190		1/ Construction of supertankers 2/ 2000/10000
Sun SB and DD Co. Chester, Pa.	700 x 92 SW (2) 745 x 129 SW (2) 700 x 195 SW* 1005 x 135 FD 1100 x 195 FD	1100 3900		1/ Construction, conversion and repairs - all types of vessels. 2/ 4450/35000  *Shipbuilding platform. Maximum ship 1400' x 195' or two ships 700' x 195' simultaneously.
<u>EAST COAST</u>				
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>				
Beth. Steel Corp. Baltimore, Md.	520 x 83 FD 775 x 108 FD 675 x 95 FD 585 x 78 GD 450 x 58 GD	964 12944		1/ Ship repairs and conversion 2/ 1740/9900
Beth. Steel Corp. East Boston, Mass.	670 x 90 FD 523 x 85 FD	1020 3111		1/ Ship Repairs and conversion 2/ 270/800
Beth. Steel Corp. Hoboken, N.J.	443 x 63 FD 685 x 103 FD 549 x 87 FD 640 x 90 FD	923 2994		1/ Ship repairs and conversion 2/ 650/7300
Brewer DD Co. Staten Island, N.Y.	400 x 75 FD 500 x 75 FD	653 2606		1/ Ship repairs and conversion 2/ 200/1700
Bromfield Corp. United SB Division East Boston, Mass.	376 x 40 FD	430 790		1/ Ship repairs and conversion 2/ 95/700
Ira S. Bushey & Sons, Inc. Brooklyn, N.Y.	455 x 71 FD 300 x 66 FD	786 4086		1/ Ship repairs and conversion 2/ 215/720

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
Coastal DD & Repair Corp. Brooklyn, N.Y.	349 x 66 GD 479 x 90 GD 700 x 110 GD	<u>575</u> 1150	<u>1/</u> Ship repairs and conversion <u>2/</u> 250/2000	
Colonna's Shipyard Inc. Norfolk, Va.	300 x 40 MR 360 x 65 MR	<u>900</u> 2200	<u>1/</u> General Ship repairs <u>2/</u> 135/305	
Detyens Shipyards Mt. Pleasant, S.C.	560 x 82 FD 305 x 87 FD	<u>300</u> 600	<u>1/</u> General ship repairs <u>2/</u> 460/700	
Jacksonville Shipyards Jacksonville, Fla.	530 x 85 FD (2) 633 x 93 FD* 400 x 56 FD* 827 x 144 FD	<u>680</u> 4184	<u>1/</u> Ship repairs and conversion. Construction of small vessels. <u>2/</u> 2385/2835 *Leased from Navy	
Munro Drydock Inc. Chelsea, Mass.	350 x 60 MR	<u>300</u> 955	<u>1/</u> General ship repairs <u>2/</u> 40/500	
Norfolk SB & DD Corp. Norfolk, Va.	500 x 85 SW 670 x 84 FD 316 x 64 FD 441 x 64 MR	<u>1420</u> 10172	<u>1/</u> Ship repairs and conversion. Construction of small vessels. <u>2/</u> 2150/3600	
Perth Amboy DD Co. Perth Amboy, N.J.	400 x 70 FD	<u>400</u> 2130	<u>1/</u> Ship repairs and conversion. <u>2/</u> 150/650	
Puerto Rico DD & Marine Terminals San Juan, P.R.	644 x 81 GD	<u>1000</u> 1000	<u>1/</u> Ship Repairs <u>2/</u> 55/N.A.  Leases Naval Industrial Reserve Shipyard	

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers	Remarks
		Usable length in feet  Longest Total linear feet	
Rodermond Industries Jersey City, N.J.	360 x 58 FD	<u>842</u> 842	<u>1/</u> Ship repairs <u>2/</u> 120/170
Savannah Machine and Shipyards Co. Savannah, Ga.	520 x 72 GD	<u>382</u> 1563	<u>1/</u> Ship repairs and conversion. <u>2/</u> 430/800
Todd Shipyards Corp. Brooklyn, N.Y.	716 x 89 GD 622 x 92 FD 755 x 96 FD 460 x 96 FD	<u>1152</u> 7653	<u>1/</u> Ship repairs and conversion. <u>2/</u> 590/4000
Tracor Marine, Inc. Port Everglades, Fla.	360 x 80 (Syncrolift with 400' transfer system)	<u>1080</u> 1880	<u>1/</u> Ship repairs <u>2/</u> 330/500
<u>GULF COAST</u>			
<u>SHIPBUILDING</u> <u>YARDS</u>			
Alabama DD & SB Co. Mobile, Ala.	(3) 523 x 68 SW 620 x 90 SW 620 x 84 FD 750 x 105 FD 380 x 64 FD	<u>1132</u> 9370	<u>1/</u> Ship construction, conversion, and repairs. Also drill rig construction. <u>2/</u> 3200/29000
Avondale Shipyards, Inc. New Orleans, La.	*(2) 960 x 176 SW **1200 x 130 SW 378 x 68 FD 300 x 50 MR 960 x 210 FD	<u>1625</u> 3565	<u>1/</u> Ship construction, conversion, and repairs. Also drill rig construction. <u>2/</u> 6440/18000  *Two vessels up to 960' x 176' can be constructed simultaneously. Completion of shipway scheduled for October 1975.  **Three vessels can be in different stages of con- struction simultaneously (or up to 6 vessels if total lengths of each pair do not exceed 1200')

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
Beth. Steel Corp. Beaumont, Texas	842 x 96 SW 650 x 84 FD	<u>1100</u> 4050		<u>1/</u> Construction of barges and drilling rigs. Also ship repairs and conversion.  <u>2/</u> 3075/5100
Ingalls SB Div., Litton Systems, Inc. Pascagoula, Miss.	690 x 85 SW 550 x 80 SW (4) 650 x 90 SW *800 x 170 FD 460 x 60 GD	<u>2650</u> 8090		<u>1/</u> Construction, conversion, overhaul - all types of vessels.  <u>2/</u> 22500/25000  *West Bank can launch ship up to 800' x 170'. Equivalent of six conventional inclined ways in terms of ships delivered annually.
Kelso Marine Galveston, Texas	700 x 100 SW	None*		<u>1/</u> Construction of barges, tugs, and ocean-going integrated tug-barge units.  <u>2/</u> 600/ 900  *City wharf in Galveston is available
Levingston SB Co. Orange, Texas	1100 x 90 SW 350 x 62 FD 420 x 120 FD	<u>520</u> 2430		<u>1/</u> Construction of offshore drilling rigs, related floating equipment, and general ship repairs.  <u>2/</u> 2080/3700
Marathon LeTourneau Co. Gulf Marine Division Brownsville, Texas	1100 x 150 SW	<u>500</u> 500		<u>1/</u> Construction of offshore drilling rigs and drill ships. Yard has capability of building large oceangoing ships.  <u>2/</u> 1600/3000

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
<u>GULF COAST</u>				
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>				
Bender Welding & Machine Co. Mobile, Ala.	414 x 55 FD	<u>617</u> 1667		<u>1/</u> Ship repairs and construction up to 200' long.  <u>2/</u> 295/870
Bludworth Shipyard Houston, Texas	300 x 74 FD 300 x 75 MR	<u>400</u> 1450		<u>1/</u> Construction and repair of boats and barges.  <u>2/</u> 300/600
Saucer Marine Service New Orleans, La.	(2) 300 x 50 FD	<u>300</u> 750		<u>1/</u> Construction and repair of small vessels and barges.  <u>2/</u> 75/160
Southern SB Corp. Slidell, La.	350 x 54 GD	<u>200</u> 300		<u>1/</u> Construction and repair of vessels up to 350' in length and not drawing over 15' of water.  <u>2/</u> 325/2660
Tampa Ship Repair & DD Co. Tampa, Fla.	550 x 75 GD	<u>1200</u> 2695		<u>1/</u> Ship repairs and conversion.  <u>2/</u> 400/1100
Todd Shipyards Corp. Galveston, Texas	614 x 86 FD	<u>1086</u> 5035		<u>1/</u> Ship repairs and conversion. Also nuclear related work.  <u>2/</u> 905/4000
Todd Shipyards Corp. Houston, Texas	600 x 95 SW 600 x 100 FD	<u>1844</u> 3271		<u>1/</u> Ship repairs and conversion. Construction of barges and vessels up to 600' in length.  <u>2/</u> 800/2175
Todd Shipyards Corp. New Orleans, La.	661 x 90 FD 604 x 80 FD	<u>1725</u> 4956		<u>1/</u> Ship repairs and conversion.  <u>2/</u> 415/2500

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
<u>WEST COAST</u>				
<u>SHIPBUILDING YARDS</u>				
Beth. Steel Corp. San Francisco, Calif.	550 x 90 SW 700 x 97 FD 950 x 148 FD	<u>813</u> 3200	<u>1/</u> Ship repairs and conversion. Can build C3 and C4 type vessels.  <u>2/</u> 800/3310	
FMC Corporation Portland, Oregon	700 x 100 SW	<u>600</u> 600	<u>1/</u> Construction of vessels up to 700' in length.  <u>2/</u> 2000/3000  Leases drydocks and berths from Port of Portland as required.	
Lockheed SB & Construction Co. Seattle, Wash.	650 x 95 SW 650 x 90 SW 700 x 100 SW 400 x 50 FD 530 x 80 FD 600 x 92 FD	<u>800</u> 6500	<u>1/</u> Ship construction, conversion and repairs.  <u>2/</u> 1740/6600	
National Steel and SB Co. San Diego, Calif.	1000 x 170 GD* 700 x 90 SW (2) 900 x 106 SW 350 x 50 FD 687 x 90 GD**	<u>950</u> 9470	<u>1/</u> Construction, conversion and repairs - all types of vessels.  <u>2/</u> 5230/10000  *Scheduled completion November 1975  **Leased from Unified Port District of San Diego.	
Todd Shipyards Corp. San Pedro, Calif.	(2) 800 x 84 SW 563 x 85 FD 665 x 85 FD	<u>680</u> 4800	<u>1/</u> Construction, repairs, and conversion - all types of vessels.  <u>2/</u> 2460/8000	

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
Todd Shipyards Corp. Seattle, Washington	550 x 96 SW 650 x 85 FD 420 x 63 FD 550 x 92 FD	1137 4850		1/ Ship Construction, repairs and conversion.  2/ 1200/7200
<u>WEST COAST</u>				
REPAIR YARDS WITH DRYDOCK FACILITIES				
Dillingham Marine & Mfg. Co. (formerly Albina Eng. & Machine Works) Portland, Oregon				1/ Ship repairs and conversion  2/ 321/7000  Leases drydocks and berths from Port of Portland as required.
Beth. Steel Corp. San Pedro Yard Terminal Island, Calif.	530 x 86 FD 680 x 94 FD	1800 4175		1/ Ship repairs and conversion  2/ 460/7500
Calif. SB & DD Co. Long Beach, Calif.	330 x 68 FD	600 1700		1/ Ship Repairs and conversion. Also construction up to 250' x 60'.  2/ 107/560
Campbell Industries - Marine Division San Diego, Calif.	(2) 360 x 50 FD	575 1975		1/ Construction of fishing boats and ferry boats. Also ship repairs.  2/ 950/1300  Graving dock is leased from Unified Port District of San Diego. (Listed under NASSCO)
Dillingham Shipyard Honolulu, Hawaii	370 x 53 FD	550 750		1/ Ship repairs and conversion.  2/ 206/300
Lake Union DD Co. Seattle, Washington	340 x 56 FD	1000 4235		1/ Ship repairs and conversion.  2/ 95/1200

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)	Berths/Piers	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Usable length in feet  Longest Total linear feet	
Merritt Ship Repair Co. Oakland, Calif.	320 x 52 FD	$\frac{600}{1155}$	<u>1/</u> Ship and barge repairs <u>2/</u> 40/240
Northwest Marine Iron Works Portland, Ore.	500 x 100 SW (Barge construction only)		<u>1/</u> Ship repairs, conversion and barge construction. <u>2/</u> 580/2500  Leases drydocks and berths from Port of Portland as required.
Port of Portland Swan Island Ship Repair Yard Portland, Oregon	633 x 85 FD 525 x 90 FD 810 x 106 FD	$\frac{750}{6360}$	<u>1/</u> Ship repairs and conversion
San Diego Marine Construction Corporation San Diego, Calif.	380 x 80 FD	$\frac{700}{1855}$	<u>1/</u> Construction of ships, boats and barges up to 200' in length. Also repairs. <u>2/</u> 592/800
Todd Shipyards Corp. San Francisco Division Alameda, Calif.	523 x 68 FD 900 x 135 FD	$\frac{800}{2485}$	<u>1/</u> Ship repairs and conversion. <u>2/</u> 650/4000
Willamette Iron & Steel Co. Portland, Oregon		$\frac{1232}{1232}$	<u>1/</u> Ship repairs and conversion. <u>2/</u> 1200/2235  Leases drydocks and berths from Port of Portland as required.
Willamette Iron & Steel Co. Richmond, Calif.	740 x 80 GD 583 x 80 GD (3) 570 x 80 GD	$\frac{1560}{1560}$	<u>1/</u> Ship repairs and conversion. <u>2/</u> 515/2170

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)	Berths/Piers		Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Usable length in feet	Longest Total linear feet	
<u>GREAT LAKES</u>				
<u>SHIPBUILDING YARDS</u>				
(Maximum size ship that can exit St. Lawrence Seaway locks is 730' x 78')				
American SB Co. Lorain, Ohio	700 x 75 SW 730 x 75 GD 1000 x 105 GD	<u>900</u> 1825	<u>1/</u> Ship construction, repairs and conversion. <u>2/</u> 820/3600	
American SB Co. Toledo, Ohio	666 x 75 GD 540 x 64 GD	<u>800</u> 1610	<u>1/</u> Ship construction, repairs and conversion. <u>2/</u> 200/2000	
Bay SB Corp. Sturgeon Bay, Wisconsin	750 x 105 SW 600 x 80 SW 400 x 70 SW 640 x 70 FD 1100 x 130 GD*	<u>820</u> 7090	<u>1/</u> Ship construction, conversion and repairs. <u>2/</u> 1100/2500  *Under construction-scheduled completion December 1976 .	
Defoe SB Co. Bay City, Mich.	900 x 92 SW 600 x 60 SW	<u>1200</u> 2756	<u>1/</u> Ship construction, conversion and repairs. <u>2/</u> 300/4000	
Fraser Shipyards Superior, Wis.	825 x 82 GD 620 x 62 GD	<u>900</u> 4450	<u>1/</u> Ship construction, conversion and repairs. <u>2/</u> 400/5000	
<u>GREAT LAKES</u>				
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>				
American SB Co. Chicago, Ill.	710 x 75 GD 525 x 56 GD	<u>850</u> 1300	<u>1/</u> Ship repairs and conversion. <u>2/</u> 125/350	
Peterson Builders Sturgeon Bay, Wis.	342 x 39 FD	<u>550</u> 2515	<u>1/</u> Construction and repair of ships and boats. <u>2/</u> 470/1200	

APPENDIX C

MAJOR TOPSIDE REPAIR FACILITIES

SHIPS 300 FEET IN LENGTH AND OVER

MAJOR TOPSIDE REPAIR FACILITIES, SHIPS 300 FEET

IN LENGTH AND OVER

EAST COAST

Ardell Marine Corporation  
Brooklyn, New York

Atlantic Repair Co., Inc.  
Brooklyn, New York

Auto Marine Sales Corp.  
Ft. Lauderdale, Fla.

Berkley Shipbuilding & Drydock Corp.  
Norfolk, Virginia

Cardinal Engine & Boiler Works, Inc.  
Brooklyn, New York

Carolina Marine & Drydock Co.  
Wilmington, N.C.

Diesel Injection Sales & Service  
Norfolk, Virginia

General Ship Repair Corporation  
Baltimore, Maryland

Hudson Engineering Company  
Hoboken, New Jersey

Marine Electric Corporation  
Brooklyn, New York

A. Moe & Co., Inc.  
Philadelphia, Pennsylvania

Munro Drydock Inc.  
Chelsea, Mass.

Stephen Ransom, Inc.  
Port Newark, New Jersey

Promet Corporation  
East Providence, R.I.

Merrill-Stevens DD Company  
Miami, Florida

Port Marine Company, Inc.  
Ft. Lauderdale, Fla.

Seahol Contracting Company  
Charleston, S.C.

Braswell Shipyards, Inc.  
Mt. Pleasant, S.C.

Arnessen Electric Company, Inc.  
Brooklyn, New York

Banks Ship Rigging Corporation  
Brooklyn, New York

Best Repair Company  
Norfolk, Virginia

Caddell Drydock and Repair Co.  
Staten Island, New York

Consolidated Service Inc. of Charleston  
Charleston, S.C.

Electric Motor and Contracting Co.  
Norfolk, Virginia

Horne Brothers, Inc.  
Newport News, Virginia

Moon Engineering Company, Inc.  
Norfolk, Virginia

Nordic Diesel & Machine Co., Inc.  
Brooklyn, New York

Reynolds Shipyards Corporation  
Staten Island, New York

Surless Ship Repair Corporation  
Brooklyn, New York

J-Y Industrial Corporation  
Brooklyn, New York

South Portland Shipyard & Marine  
Railway Corp.  
South Portland, Maine

Industrial Welding & Machine, Inc.  
Portland, Maine

Kurt's Marine Diesel, Inc.  
Ft. Lauderdale, Fla.

Thames Shipyard & Repair Co.  
New London, Conn.

Tickle Engr. Works, Inc.  
Brooklyn, New York

Marine Contractors Co., Inc.  
East Boston, Mass.

#### GULF COAST

American Marine Corporation  
New Orleans, LA

J. A. Gerrets, Inc.  
New Orleans, La.

Dixie Machine Welding & Metal Works  
New Orleans, La.

Hahn & Clay  
Houston, Texas

Harrisburg Machine Co., Inc.  
Houston, Texas

McDonough Iron Works  
Galveston, Texas

Slocum Iron Works, Inc.  
Mobile, Ala.

Sherman Shipyard  
Panama City, Fla.

Coastal Iron Works, Inc.  
Corpus Christi, Texas

Norlantic Diesel, Inc.  
Fairhaven, Mass.

General Ship & Engine Works, Inc.  
East Boston, Mass.

Williams & Manchester Shipyard  
Newport, R.I.

Wilmington Iron Works, Inc.  
Wilmington, North Carolina

Metro Machine Corporation  
Norfolk, Virginia

Lone Star Marine Salvage Co.  
Houston, Texas

Boland Marine and Mfg. Co.  
New Orleans, La.

Coastal Marine Service of Texas, Inc.  
Port Arthur, Texas

Farmer's Marine Copper Works, Inc.  
Galveston, Texas

Hendry Corporation  
Tampa, Florida

Gulf - Tampa Drydock Co.  
Tampa, Florida

Buck Kreihs Co., Inc.  
New Orleans, La.

Runyan Machine & Boiler Works, Inc.  
Pensacola, Florida

Marine Repairs, Inc.  
Houston, Texas

WEST COAST

Cavanaugh Machine Works  
Wilmington, California

Franklin Machine Works, Inc.  
San Francisco, California

Honiron, Division of Ward Foods, Inc.  
Honolulu, Hawaii

Dockside Machine and Ship Repair  
Wilmington, California

Ets-Hokin & Galvan Electric Co.  
San Diego, Calif.

Fulton Shipyard  
Antioch, Calif.

Plant Bros. Corp.  
San Francisco, Calif.

Pacific Marine & Supply Company, Inc.  
Honolulu, Hawaii

Rowe Machine Works, Inc.  
Seattle, Washington

Triple "A" Machine Shop, Inc.  
San Francisco, California

Triple "A" South  
San Diego, California

General Engineering & Machine Works  
San Francisco, California

West Winds, Inc.  
San Francisco, California

Colberg, Inc.  
Stockton, California

Duwamish Shipyard, Inc.  
Seattle, Washington

Harbor Boat Building Company  
Terminal Island, California

Electro-Mechanical Co.  
Portland, Oregon

Coastal Marine Engineering Co.  
San Francisco, Calif.

Wilmington Welding & Boiler Works  
Wilmington, Calif.

Martinolich Shipbuilding Corp.  
Tacoma, Washington

Port Welding & Machine Works, Inc.  
Wilmington, California

Service Engineering Company  
San Francisco, California

Marine Iron Works, Shipyard Division  
Tacoma, Washington

Tacoma Boatbuilding Co., Inc.  
Tacoma, Washington

San Diego Marine Construction Corp.  
San Diego, Calif.

Pacific Dry Dock & Repair Co.  
Oakland, California

GREAT LAKES

William Ferrel, Inc.  
Toledo, Ohio

Lower Lake Dock Company  
Sandusky, Ohio

Oldman Boiler Works, Inc.  
Buffalo, New York

Nicholson Terminal & Dock Co.  
River Rouge, Michigan

Niagara Industries, Inc.  
Erie, Pennsylvania

G. W. Industries, Inc.  
Cleveland, Ohio

Nicholson & Hall Corporation  
Buffalo, New York

Pittsburgh & Conneaut Dock Company  
Conneaut, Ohio

Perry Shipbuilding Corp.  
Erie, Pennsylvania

Hansen Welding Co., Inc.  
Toledo, Ohio

