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# Report on Survey of U.S. Shipbuilding and Repair Industry

U.S. DEPARTMENT OF COMMERCE  
Maritime Administration

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REPORT ON SURVEY OF U.S.  
SHIPBUILDING AND REPAIR INDUSTRY

\* 1974 \*

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Division of Production  
Office of Ship Construction

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# STATUS OF THE U.S. SHIPBUILDING AND SHIP REPAIR INDUSTRY

## Introduction

In compliance with the requirements of the 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. The purpose of this paper is to report on the 1974 survey of shipyard facilities. This is the second annual survey report published by the Division of Production, Office of Ship Construction. In addition to updating all data from 1973, the report has been expanded to describe 25 major shipbuilding facilities as well as to provide discussion and new exhibits relating to significant issues that emerged during 1974 such as the

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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 purpose of national defense and national emergency."

material and manpower shortages. A report on the annual survey will be prepared each year for general use within MarAd and other government agencies.

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 160 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, attached as Appendix A.

Upon receipt of a 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 Department 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 Office of Preparedness in the General Services Administration is also a recipient of this information.

## General

The annual survey for 1974 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. Emphasis within MarAd during 1974 was placed on the successful continuation of the new maritime program and this is reflected in the report by the amount of consideration given to shipyards capable of new ship construction.

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 maximum 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.

The U.S. shipbuilding industry is continuing to expand its capacity at an accelerating rate. Spurred by the nation's new maritime program embodied in the Merchant Marine Act of 1970 and by the soaring demand for energy carriers, the U.S. shipbuilding industry has expended approximately \$371 million for capital improvements in the past four years. Shipbuilders also plan to spend about \$342 million during the next three years, continuing their heavy investments in new and improved facilities. Exhibit 2 indicates actual and planned investments by each of the major shipyards. Exhibits 3 through 9 are general arrangement plans outlining the new and reconstructed building facilities in seven of these yards. A detailed description of these Exhibits is included in the text below.

As of July 1, 1974 (see Exhibit 10), MarAd was subsidizing a backlog of 52 large oceangoing ships in eight shipyards with a total contract value of \$2.8 billion. These were in addition to 44 non-subsidized ships under construction or on order. MarAd was also providing mortgage guarantee insurance for 218 ships and 673 LASH lighters under contract in 40 construction facilities throughout the country (see Exhibit 11). The total Title XI guarantee value of these vessels and barges is approximately \$2.36 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 dependent 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 12 $\frac{1}{2}$  for the small mobilization ship to three for the huge 390,200 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 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 LOA 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 commercial shipbuilding requirements in the near future. Exhibit 13 indicates the dates when major yards absolutely require additional business commitments

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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.

to maintain current employment rates. Many of these yards presently have building facilities available to expand employment levels if new contracts can be secured. The major deficiency in U.S. shipbuilding capabilities is in the area of ULCCs. Only three yards have a facility large enough to build 390,200 dwt tankers and only two of these would seriously consider doing so. This deficiency is graphically shown in Exhibit 12.

Following is a brief description of major U.S. 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

Located on the Kennebec River in Bath, Me., the Bath Iron Works Corporation (BIW) is an old established shipyard engaged in both Navy and commercial ship construction. The yard has a history of proven diversity having constructed various ship types in the past, including containerships, tankers, destroyers, and guided missile frigates. They are presently constructing five 25,000 dwt tankers for Marine Ship Leasing Corporation and four roll-on/roll-off ships (MA Design C7-S-95a) for States Steamship Company. BIW also engages in some conversion and topside repair work where drydocking is not necessary.

The yard has recently 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 maximum 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.

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

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 are employed.

The current administrative and production work force is approximately 3,840; up from the 1973 average daily employment of 2,240. 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, Md. metropolitan area. This yard has been the most productive in the nation during the past two decades, specializing in series construction of standard sizes of tankers, plus freighters and containerships. Sparrows Point has recently completed a series of 120,000 dwt tankers and currently has in production or under contract a total of five 265,000 dwt tankers. 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 substantially 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 shipways in good condition. Two of these ways can accommodate a maximum ship size of 900 feet by 108 feet, and two ways 650 feet by 90 feet. The yard does not have a drydocking facility;<sup>1/</sup> therefore, any repair capacity

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

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 six tower cranes ranging in capacity from 15 to 50 tons. Several locomotive cranes of various capacities are also available.

The current work force at the Sparrows Point yard is 3,650. 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 the General Dynamics Corporation is located on Quincy Bay, eight miles south of Boston, Mass. The yard was purchased from Bethlehem Steel Corporation in 1963 and was used for several years thereafter in the construction of auxiliary vessels for the U.S. Navy. Seven 125,000 cubic meter LNGs are presently under construction or on order at the Quincy yard, with an eighth to be contracted for in the near future.

To provide the tools and facilities to efficiently build these LNG tankers in series production, General Dynamics has undertaken a major improvement and modernization program totaling \$40 million, of which \$15.8 million was expended in fiscal year 1974. In addition to reconstruction of two building basins, other improvements at Quincy include: a steel fabrication facility, materials handling equipment, a 250-ton transporter, plate cleaning and blasting facility, double-bed flame planer, double-bed flat bar stripper, web cutter with 19 torches in tandem, angle fabricator, two web stiffener welding gantries, T-beam fabricator, two plate stiffeners, butt welding gantry, panel turnover fixture, and two 40-ton cranes. In addition, a 1,200-ton Goliath crane will be installed for transferring the spherical LNG tanks from the barges on which they will be delivered to the LNG ships under construction.

It is worth noticing the ingenious construction schedule planned for the LNGs. Shipways No. 11 and No. 12 are presently being demolished and new Basins No. 11 and No. 12 are being 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 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 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 2,440 at mid-1973 to 2,800 at mid-1974, with further increases likely as the LNG construction progresses. It is estimated that the work force could be expanded to as many as 24,000 employees under conditions of mobilization.

#### 4. Maryland Shipbuilding and Drydock Company

The Maryland Shipbuilding and Drydock Company, a subsidiary of Fruehauf Corporation, is located on the south bank of the Patapsco River in the Port of Baltimore, Md. Although the yard has been primarily a ship repair and conversion facility in recent years, it has a great deal of past shipbuilding experience. Maryland also engages in a considerable amount of non-marine work including construction of steam surface condensers, cranes, bridges, steel tunnels, gas turbines, compressors, pumps, fractioning towers and other pressure vessels.

Maryland is proceeding with the final phase of its current \$25 million expansion program of which \$16.4 million was expended during fiscal year 1974. The main features of the program are:

- Lengthening of 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.
- Purchase of a new floating drydock, with a lifting capacity of 45,000 tons, which can accommodate ships as large as 900 feet by 140 feet.
- Modernization of panel fabrication plant.
- Addition of pre-blast building, final-blast building and automatic burning building.

Besides the new floating drydock, Maryland has two other floating drydocks used primarily for repair and conversion work. The maximum ship size that the older drydocks can accommodate are 775 feet by 106 feet and 715 feet by 90 feet. There is 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 1,720. Additional contracts generated by the facility improvement program will hopefully increase employment during the next year. It is estimated that the yard could absorb approximately 12,000 men during a mobilization situation.

5. Newport News Shipbuilding & Dry Dock Company

The largest shipbuilding and repair facility in the nation is located on the James river in Newport News, Va. Since 1886, the yard has been a major producer of commercial and military ships, including the passenger liner SS UNITED STATES and all of the Navy's nuclear aircraft carriers. The yard is currently constructing seven nuclear submarines and four nuclear guided missile destroyers. Two nuclear-powered aircraft carriers are under construction and one is on order.

In September 1972, contracts were awarded to Newport News for the construction of three 125,000 cubic meter LNGs (MA Design LG9-S-94a); and in June 1974 the yard received a \$414.5 million contract to build three ULCCs of 390,200 dwt each (MA Design T11-S-116a). These tankers will be built in a new facility under construction adjacent to the present Newport News yard. One hundred-fifty million dollars has been committed for this entirely new commercial yard which is scheduled for completion by the end of 1975. A building basin 1,600 feet long, 230 feet wide and 44 feet deep is being constructed, wherein one ULCC or LNG tanker and part of a second can be built simultaneously. Lengthening the basin to 1,800 feet is also being considered. A steel preparation building, panel shop, subassembly areas and a 900-ton gantry crane will also be provided. Exhibit 5 is a general arrangement plan showing the new VLCC/LNG construction facilities.

The present Newport News yard 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. 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.

The work force at Newport News is currently 24,000 but is expected to increase when construction of the LNGs and ULCCs gets underway. It is estimated that employment in the yard could be increased to 41,000 under mobilization conditions.

#### 6. Seatrains Shipbuilding Corporation

In 1969 Seatrain Lines, Inc. agreed to take over the former Brooklyn Navy Yard to build 225,000 dwt tankers on an assembly-line basis. The first of these VLCCs was delivered in December 1973, and the yard presently has four more under construction or on order, one of which was scheduled to be delivered as this report was going to press.

Although the facilities that existed in 1969 included three large fabricating buildings and two massive graving docks to accommodate a maximum ship size of 1094 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 then transported on assembly line conveyors through the outfitting building for required piping, electrical work, mechanical equipment, sheet metal work and joiner work before being moved to the graving docks. Exhibit 6 is a general arrangement plan of Seatrain's building basins and piers.

A smaller basin, in need of repair, is also available which can accommodate a maximum ship size of 720 feet LOA and 112 feet in beam. 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 cranes. The basins are serviced by four 200-ton and four 75-ton capacity whirley cranes working separately or in tandem to lift completed modules into place.

The shipyard's employment increased from 2,725 in 1973 to 3,130 in 1974. The maximum employment level under conditions of mobilization has not yet been determined.

7. Sun Shipbuilding & Dry Dock Company

Sun is an established, diversified shipyard bordering the Delaware River at Chester, Pa. In its fifty-eight years of operation the yard has been engaged primarily in the construction of commercial vessels. In recent years, it has concentrated on roll-on/roll-off ships and medium sized tankers of its own design. In addition to its shipbuilding, conversion, and repair activities, the yard 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 118,300 dwt tankers and two RO/ROs.

Sun has embarked on a \$40 million expansion program to be completed in 1975. The expansion will give the yard the capability of building 400,000 dwt ships. Two major features of the expansion are: (1) a new floating drydock divided into two sections, and (2) a new level shipbuilding platform capable of being used to build simultaneously two halves of a ship 1,600 feet long or two smaller ships, 800 feet in length or less, simultaneously. The platform will be serviced by three 250-ton cranes. In addition, an 1,100 foot outfitting pier will be constructed and fabrication capabilities increased accordingly. Exhibit 7 is a general arrangement plan of Sun's new VLCC/LNG construction facilities.

At present there are three shipways in good condition. The maximum ship sizes capable of being constructed on these ways vary from 700 feet by 92 feet to 745 feet by 129 feet. Larger vessels may be built in two sections and then joined together in the floating drydock which is suitable for ships up to 1,005 feet by 135 feet. The largest vessel built to date at Sun was the MOBIL ARCTIC, a 126,000 dwt tanker measuring 930 feet by 132 feet.

Five piers with a total usable length of 2,800 feet are available for outfitting and topside repair. These wet docks are serviced by seven 21-ton gantry cranes, each with a maximum reach of 105 feet.

The work force engaged in marine work decreased during the past year from 4,080 to 3,675. It is anticipated, however, that an increase of about 1,000 men will result from work generated by the current expansion program. 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 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, Ala. 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 ADDSCO spent \$3,325,092 on capital improvements, primarily to increase their capability to build offshore drill rigs and vessels for the petroleum industry. ADDSCO currently has three semi-submersible rigs under construction.

The shipyard has five side-launching shipways, four of which can accommodate a maximum ship size of 523.5 feet by 68 feet and one a ship size of 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, respectively. 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 currently has a total work force of about 2,930 and has undertaken a recruitment drive to fill 2,000 additional jobs to carry out contracts on their heavy backlog of work, consisting mainly of the construction of offshore drill rigs, and vessels and barges for the petroleum industry. 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 the Huey Long Bridge in New Orleans, La. During the past ten years the yard has expanded from a modest river facility to a major shipbuilding yard, increasing its work force five-fold. Avondale has the distinction of being the only U.S. shipyard to build LASH vessels, 20 having been ordered since 1967. 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 will complete a series of 20 destroyer escorts for the Navy by late 1974. The yard was awarded a contract for three 125,000 cubic meter LNGs (MA Design LG9-S-107a) in June 1973, to be delivered in 1976 and 1977. Avondale's current orderbook also includes six semi-submersible drill rigs and the conversion of a C4 cargo ship to a drill ship.

Avondale will spend an estimated \$40 million in capital improvements for the LNG construction. The present three to five position shipway, used in the destroyer escort program, is being reconstructed to two 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 225 feet, is being constructed to facilitate launching. Additional buildings and equipment to supplement the yard's mechanized handling and fabrication systems are also part of Avondale's current expansion program which is scheduled for completion in April 1975.

Besides the new building positions for the LNGs, Avondale has a side-launching construction facility that can accommodate maximum ship sizes of 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 the destroyer escorts, Coast Guard cutters, and other relatively smaller 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. shipbuilder has had more success with series production of 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 Navy ships, river boats, and barges.

Yard employment was reduced from 7,330 in mid-1973 to 6,350 in mid-1974. 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, Tex., 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 minesweepers during World War II. Bethlehem acquired the yard in 1947 and 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 constructing large merchant ships. However, it is currently concentrating on new construction for the petrochemical industry, with a contract backlog of three semi-submersible drilling rigs, four jack-up rigs, and one drill ship.

The Beaumont facility is highly mechanized. In 1973, it 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 3,450 feet of berthing space served by adequate crane capacity for outfitting and general repair work.

The current employment is 2,844 and could be increased to about 5,080 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 36 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 was completed in 1970, costing in the range of \$130 to \$150 million. The yard was constructed primarily for Navy work and is scheduled to deliver five LHA amphibious assault ships and 16 Spruance-class (DD963) destroyers by early 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 150 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 is approximately 18,890 and could be increased to 21,000 for mobilization purposes. Due to the long term Navy commitment, this high level of employment should continue for the next several years.

12. Kelso Marine Inc.

The Kelso Shipbuilding Division of Kelso Marine, Inc., the Galveston, Tex. 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 1975 to Port Everglades Towing, Inc. Kelso is also currently considering a move into the tanker market.

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 hopeful of obtaining a permit from Federal Government agencies to dredge to an 18 foot water depth to the channel. Another limiting factor is that Kelso is not presently geared to major machinery installation work. Machinery for the Seabulk tug was installed by a subcontractor.

In addition to their 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 no berths or piers but is planning to build an outfitting berth in 1975. The city wharf in Galveston is also available for Kelso's use.

In mid-1974, the Kelso yard had a total payroll of 440.

13. Levingston Shipbuilding Company

Levingston, one of the leading producers of offshore drilling rigs, was organized in 1933. It is strategically located on the Sabine River at Orange, Tex. approximately 30 miles inland from the Gulf of Mexico. Gulfport Shipbuilding Corporation in Port Arthur Tex. was purchased in 1970 by Levingston to supplement Levingston's construction and repair facilities. Levingston is engaged primarily in the construction of offshore drilling rigs, related floating equipment, and general ship repairs. As of mid-November 1974, Levingston's orderbook consisted of two semi-submersibles, four jack-up rigs, three drill ships, and the conversion of a cargo vessel to a drill ship. In the event of a national emergency, however, the yard would be capable of producing oceangoing ships up to 1,100 feet in length.

Since its beginning in 1933, Levingston has built the following types of vessels: tanker barges, towboats, drill barges, pipe laying barges, ferry boats, jack-up rigs, semi-submersible rigs, and drilling ships.

Levingston's Orange yard has one side-launch building way with a maximum ship size of 1,100 feet by 90 feet. 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 1,850 and could be increased to approximately 3,700 for mobilization purposes.

14. Marathon Manufacturing Company - Gulf Marine Division

Marathon Manufacturing Company, the world leader in production of offshore drilling rigs, launched it's 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, Tex. 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, Tex. serve as support facilities for the Brownsville yard.

The Gulf Marine Division is currently concentrating on the construction of jack-up rigs. As of mid-November 1974, the Brownsville yard, together with the Vicksburg facility, were building or had on order (including letters of intent) three semi-submersibles and 18 jack-up rigs.

The Brownsville yard combines modular construction techniques 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 1,400 by 200-foot 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 building way, and the sections are joined to form the completed vessel which is then side-launched. For outfitting purposes, there is one 500-foot wharf.

The Brownsville plant employs about 2,000 men. No mobilization employment figure is available.

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 ocean-going ships.

During World War II, the yard, with the help of facilities leased from the Navy, built 72 ships including 52 naval combat vessels. In addition, approximately 2,500 naval 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 was: 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 Design CH-S-1q and CH-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, their 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 facility, 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 2,100 feet of usable berthing space.

The current work force is 570, a slight increase over the 1973 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 (formerly Gunderson, Inc.) is located on the Willamette River in Portland, Ore. This facility, which is a major manufacturer of rail cars, has only recently re-entered the market for seagoing ships. They can also build barges and small marine craft, but at present they are concentrating on the construction of six 35,000 dwt tankers that will be chartered, for use in the domestic trade, to the Chevron Shipping Company, a wholly-owned subsidiary of the Standard Oil Company of California. The last of these tankers is scheduled for delivery late in 1977.

To accommodate the expanded shipbuilding work, FMC committed \$4 million in an improvement program in 1972, including acquisition of 23 acres of land adjacent to their existing facility, a 200-ton capacity whirley crane, new types of welding equipment, 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 carpets and bed spreads 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 650 feet by 105 feet. This building position is serviced by one 200-ton and one 40-ton capacity crane. A total of 1,060 feet of pier space, serviced by four 10-ton truck cranes, is available for outfitting and repair.

The total employment at the FMC plant is about 1,850. It is estimated that this level could increase 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, Wash. In the past, the 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 recently delivered the 640-foot bulk carrier, SUGAR ISLANDER. In November 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 690 feet by 90 feet, 600 feet by 90 feet and 595 feet by 86 feet, respectively. 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 1,900, has remained substantially unchanged during the past two years. During conditions of mobilization, the employment level can be expanded to approximately 6,600.

18. National Steel & Shipbuilding Company

National Steel and Shipbuilding Company, jointly owned by the Morrison-Knudsen Company, Inc. and Kaiser Industries Corporation, is located on a 96-acre site at San Diego, Calif. It is the largest shipbuilding complex on the West Coast. The yard engages in both Navy and commercial work, having in recent years completed 17 tank landing ships (LSTs) five large cargoliners, and two oil/bulk/ore carriers (OBOs). NASSCO is currently marketing several standard bulk carriers and as of mid-1974 had on order: five Coronado-class (38,300 dwt) tankers, and 13 San Clemente-class (89,700 dwt) tankers. In addition to this backlog of commercial work that will keep the yard busy through mid-1978, NASSCO is also constructing a large replenishment oiler (AOR) for the U.S. Navy.

During fiscal year 1974, NASSCO expended approximately \$6.8 million on its current \$20 million expansion and modernization program to enable the yard to build ships of 150,000 dwt capacity. In the new building basin, scheduled for completion in 1975, NASSCO can produce ships up to 965 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 shipways. A new outfitting pier and additional mechanized steel fabricating facilities are also included in the current program. At present, NASSCO has no plans for LNG ship construction.

In addition to the new graving dock now under construction, 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 graving dock are serviced by eight 125-ton and eight 60-ton gantry cranes. Two small drydocks are available for repair and a larger graving dock that can accommodate a maximum ship size of 700 feet LOA by 87 feet can be leased on a use basis from the Unified Port District of San Diego. Eight piers with a total berthing space of approximately 9,500 feet are available for outfitting and topside repair. These piers are serviced by 10 cranes varying in capacity from 5 to 25 tons.

The work force at the yard increased from 3,300 to 4,700 during 1974, and total employment of close to 6,000 is projected for 1975. It is estimated that the yard can support 6,000 employees on a mobilization basis.

19. Todd Shipyards Corporation - San Pedro

Todd's Los Angeles Division is located at San Pedro, Calif. 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 converted several commercial freighters and containerships. Beginning in 1972, Todd's San Pedro yard moved into the tanker market. Currently they have four 25,000 dwt tankers, four 35,000 dwt tankers, and eight 89,700 dwt tankers on order or in production. The last of these 16 ships is scheduled for delivery in 1979. Todd is proceeding with the final phase of a \$20 million program to increase the capability of its San Pedro yard. Two shipbuilding ways are being enlarged to accommodate vessels up to 100,000 dwt. Upon completion in December 1975, the maximum ship size the yard can build will have increased from 800 feet by 84 feet to approximately 950 feet by 126 feet. Also included in the yard expansion are heavy lift capabilities, outfitting, and other related production improvements.

In addition to two building ways, two floating drydocks are available that can accommodate ships no larger than 665 feet by 85 feet and 563 feet by 85 feet, respectively. A total of 4,800 feet of berthing space is available at six piers for outfitting and topside repair. These piers are serviced by seven cranes varying in capacity from 25 tons to 50 tons.

Total employment at the San Pedro yard is 3,440, up from 1,350 in 1973. 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 in the State of Washington. 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, turning out a formidable array of tugs, barges, ferries, dredges, pile drivers, floating cranes, etc. In 1964, the yard completed a program of building 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 two 22,500 ton barges and 12 tug supply vessels.

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, has been added this 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, respectively. 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 1,765, an increase of 1,200 from 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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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 dry-dock work. There are about 1,800 feet of berthing space. Current employment at Lorain is 930, 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 325 and could be increased to approximately 2,000 for mobilization purposes.

23. Bay Shipbuilding Corporation

Bay Shipbuilding Corporation, located in Sturgeon Bay, Wis., 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.

Three large ore carriers are under construction or on order at the yard. In addition, letters of intent have been signed for construction of three 1,000-foot self-unloading ore carriers, two for Bethlehem Steel Corporation and one for American Steamship Company.

Bay Shipbuilding has embarked on a \$12 million facilities expansion program which will enable the yard to build 1,000 foot Great Lakes bulk carriers. A new graving dock 1,150 feet long is under construction, which will be served by a 100-ton gantry crane and several crawler-type lift cranes. The graving dock is scheduled for completion in 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 is more than half completed.

Bay has four side-launching ways that can accommodate maximum ship sizes of 770 feet by 100 feet, 700 feet by 80 feet, 600 feet by 70 feet, and 200 feet by 100 feet respectively. One floating drydock is available which can handle ships up to 640 feet by 70 feet. There are 7,095 feet of berthing space in the yard.

The total employment is around 800 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, Mich. 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 only a bulk carrier conversion and the construction of one barge, but the Defoe management is negotiating contracts for major ship construction work.

The Defoe plant has two large side-launching ways for ship construction, one of which can accommodate a ship 1,145 feet by 100 feet, and the other a ship 1,200 feet by 70 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 or Toledo, Ohio.

The current work force at Defoe is around 100 but is expected to increase to 450 by the spring of 1975. It is estimated that the plant could absorb approximately 7,000 employees under mobilization conditions.

25. Fraser Shipyards, Inc.

The Fraser shipyard, located on Howards Bay in Duluth-Superior harbor, 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 Superior, Wis. yard presently has contracts to jumboize five Great Lakes ore carriers; and, in view of the shipbuilding boom on the Lakes, the Fraser 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 midbody 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 is around 475, the highest in several years. Employment could be increased to approximately 5,000 for mobilization purposes.

### Manpower

As indicated in Exhibit 14, there were approximately 210,000 employees engaged in the shipbuilding and ship repair industry, including naval shipyards, as of April 1974. This is an increase over 1973 of about 7,000 employees. Employment in the 25 major U.S. commercial shipyards rose to 90,100, or about 61 percent of the work force in all commercial yards, which totaled 147,700.

Manpower requirements for skilled shipbuilding occupations are expected to increase eight to twelve percent per year from June 1973 through June 1975.<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 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, has been initiated with plans being formulated in conjunction with major shipyards to take necessary action to respond to this shipbuilding manpower problem. It must be added, however, that this demand is predicated on a continuing shipbuilding program sponsored by the Maritime Administration. Many major

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<sup>1/</sup> According to a Mark Battle Associates, Inc. study conducted for the Maritime Administration under the auspices of the Assistant Administrator for Commercial Development.

shipyards will be forced to lay off substantial numbers of skilled craftsmen unless new contracts are acquired in the very near future. Experience has indicated that a large number of these skilled 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 (Especially Steel)

Serious material shortages began developing in the latter part of 1973, first with steel plate, then pipe, fittings, valves, castings and other materials. Manufacturing lead times also began to increase, and virtually all shipbuilding material and machinery components now require longer lead times than before. The Defense Priority System and Defense Materials System have consequently become critically important and are in great demand. Until recently, MarAd had requested DO-A3 priority ratings on Title V, Construction-Differential Subsidy (CDS) ships only. However, this procedure has been expanded to include ships under the Title XI Mortgage Guarantees Insurance program. MarAd is currently awaiting action on unanswered requests to the Department of Defense (DOD) for priority ratings for 59 vessels.

In February 1974, MarAd conducted a nationwide survey of 135 shipbuilding and ship repair facilities to determine if the steel situation was having any adverse effect on employment, production scheduling, and the ability of yards to contract for new orders. Almost half of the yards surveyed indicated that they had experienced delays or anticipated delays in the future if the availability of steel did not improve. As the situation has worsened since February, it is highly probable that most of the U.S. shipbuilding industry is currently affected. Steel shortages have already resulted in manpower reductions in some shipyards and have caused a general feeling of instability in the entire industry.

#### Shipyard Pollution Abatement Requirements

Strict adherence to Federal and State pollution abatement regulations has made the U.S. shipbuilding industry one of the cleanest in the nation. When compared with some other heavy industry output, the final shipbuilding product, ships, are both clean and non-hazardous.

During the actual construction process, shipyards retain a low profile as pollution generators, using many existing utilities. For example, electric power which is a principal form of energy used by modern ship construction facilities is completely clean and non-polluting. Known in the past as an offender in the area of noise pollution, modern shipbuilding may be considered as a quiet industry since the welding rod has almost completely replaced the riveting hammer. No toxic fumes or even plain smoke is emanated during the shipbuilding process. The only combustion gases released into the atmosphere are limited to exhausts of motorized equipment, which are minimal.

Spillage of oil or other non-toxic substances which may find their way as run-offs into adjacent waterways do not occur frequently, as the spillage is immediately localized, cleaned up, and safely disposed of. 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, never affecting the ecology of adjacent areas.

#### 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 can repair or rebuild any part of a ship. Employment numbers in the thousands and repair may be combined with shipbuilding capabilities. Presently, the Maritime Administration holds master repair contracts with 77 ship repair facilities. Thirty-six are located on the East Coast, 18 along the Gulf Coast, 22 on the West Coast, and one on the Great Lakes.

The business of repair yards has been on a general decline the last nine years, with a minor upswing noted for 1973, the last year for which data is available at this time.

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 more closely. Ship repairing is considered within the industry as more profitable than ship construction, with the exception of certain troubled areas such as the New York Harbor complex.

There has been an increase in foreign work in U.S. ship repair yards in recent years that has been encouraging. During 1974 this type of work appears to have increased by 50 percent and contributed to full employment in many yards for the first time since the Southeast Asia program. The cause of this increase in foreign repair work 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.

#### 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 at least 300 feet in length. 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 1974 on 39 of these yards on a coastal basis. Additional data is available for official use in the Office of Ship Construction.

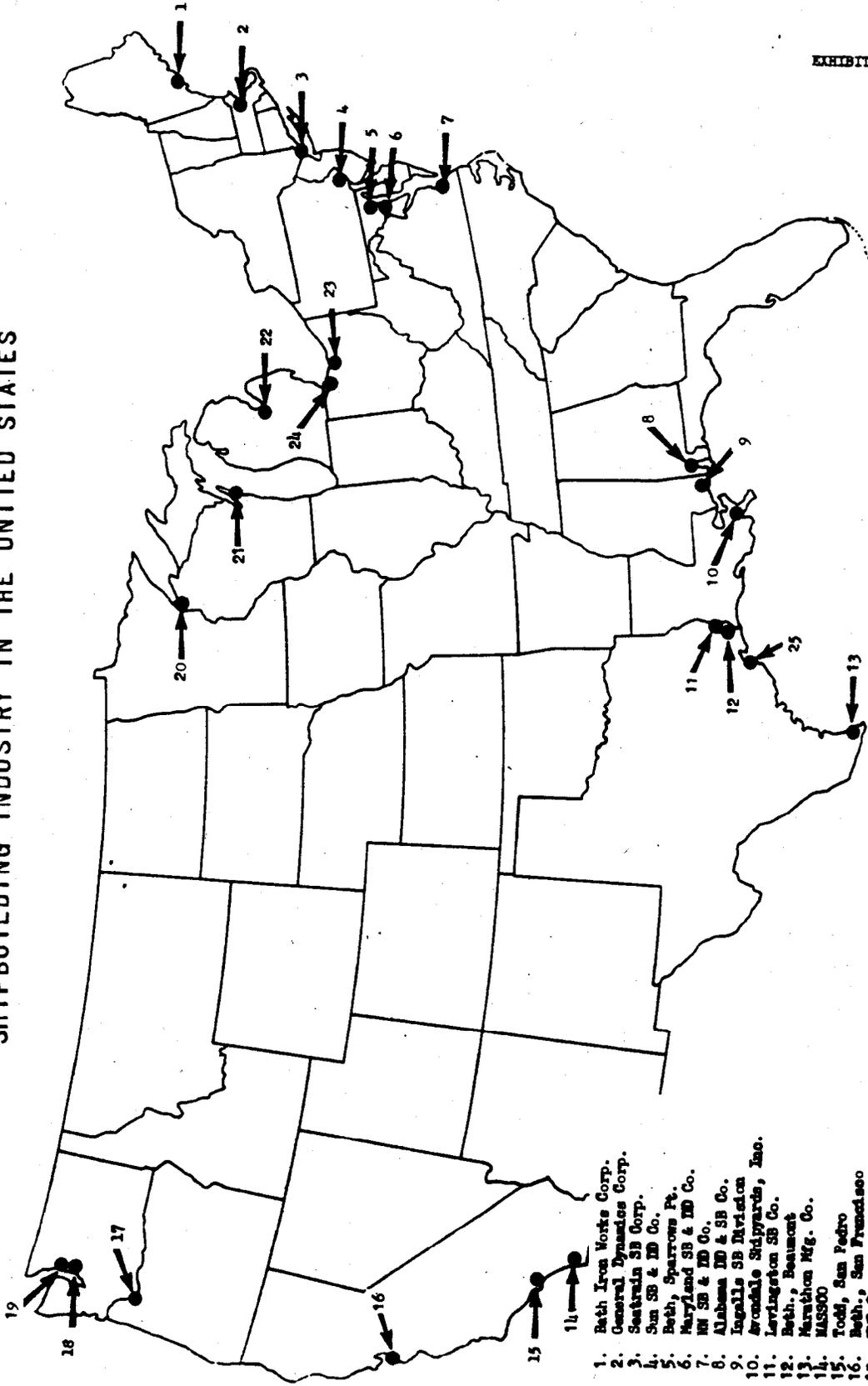
#### Major Topside Repair Facilities

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 ship will send its personnel and equipment to provide voyage repairs while the ship is working cargo at a commercial marine terminal.

Appendix C is a list of 72 topside repair facilities. 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 many of the facilities has been obtained during the annual survey and is available for official use.

# SHIPBUILDING INDUSTRY IN THE UNITED STATES

EXHIBIT 1

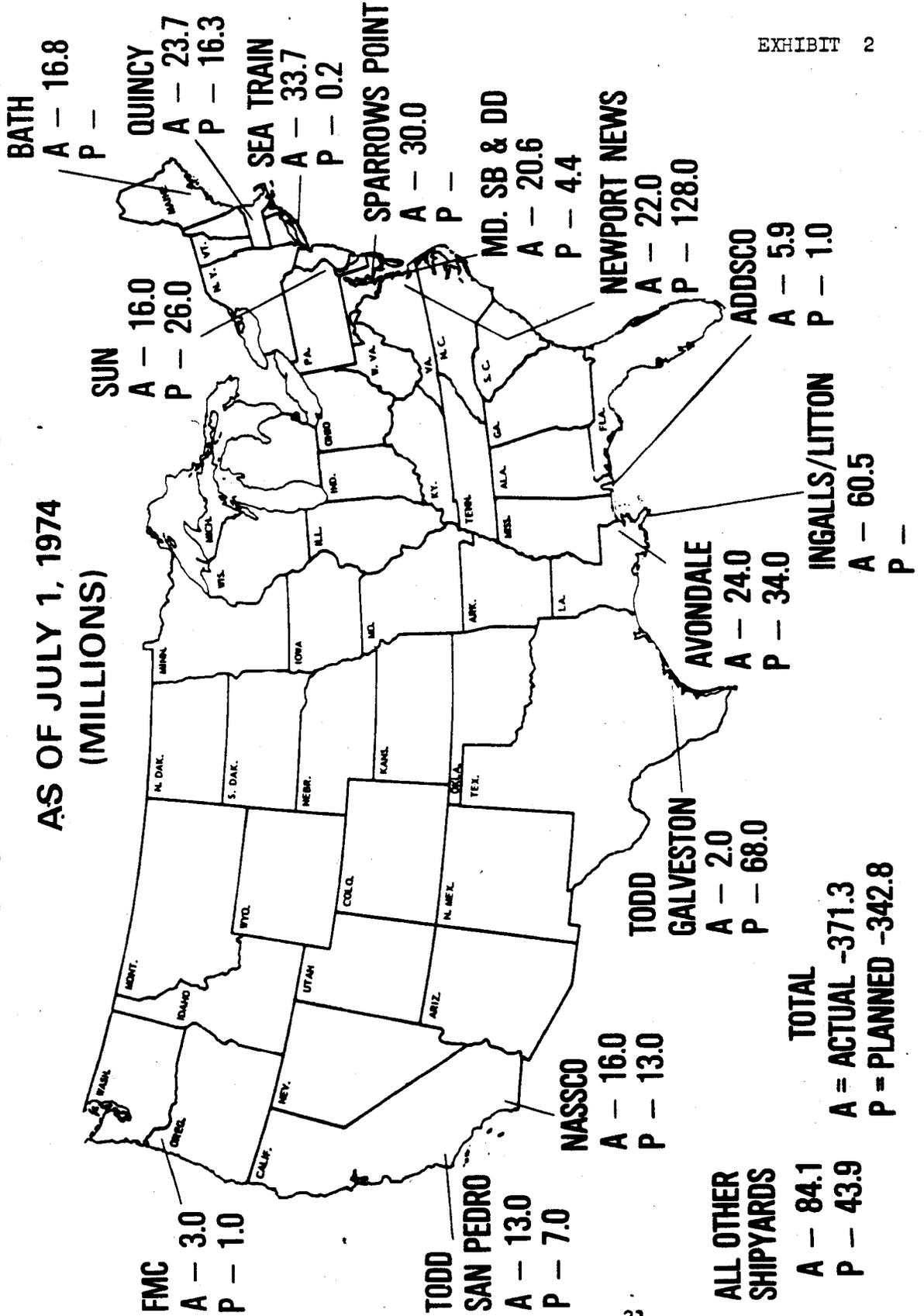


MAJOR AMERICAN SHIPYARDS  
BUILDING CAPACITY - SHIPS 475 FEET IN LENGTH OR OVER

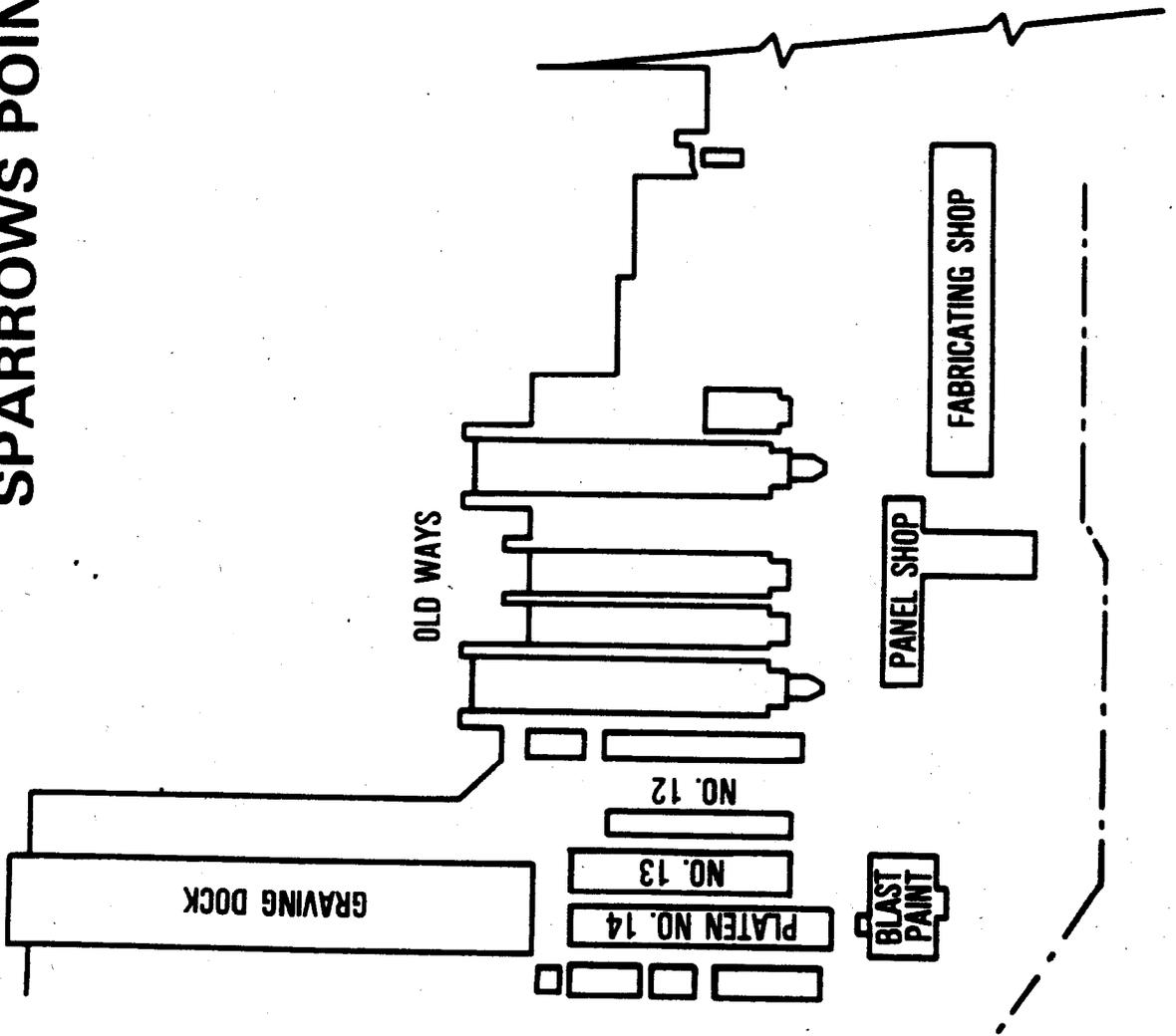
1. Bath Iron Works Corp.
2. General Dynamics Corp.
3. Seatrain SB Corp.
4. Sun SB & ID Co.
5. Bath, Sparrows Pt.
6. Maryland SB & ID Co.
7. IN SB & ID Co.
8. Alabama ID & SB Co.
9. Ingalls SB Division
10. Avondale Shipyards, Inc.
11. Livingston SB Co.
12. Bath, Beaufort
13. Marathon Mfg. Co.
14. MSSCO
15. Todd, San Pedro
16. Bath, San Francisco
17. F&B Corp.
18. Lockheed SB & Constr. Co.
19. Todd, Seattle
20. Fraser Shipyards
21. Ray SB Corp.
22. Defoe SB Co.
23. American SB Co., Lorain
24. American SB Co., Toledo
25. Boise Marine

# NEW SHIPYARD INVESTMENT ACTUAL & PLANNED

AS OF JULY 1, 1974  
(MILLIONS)

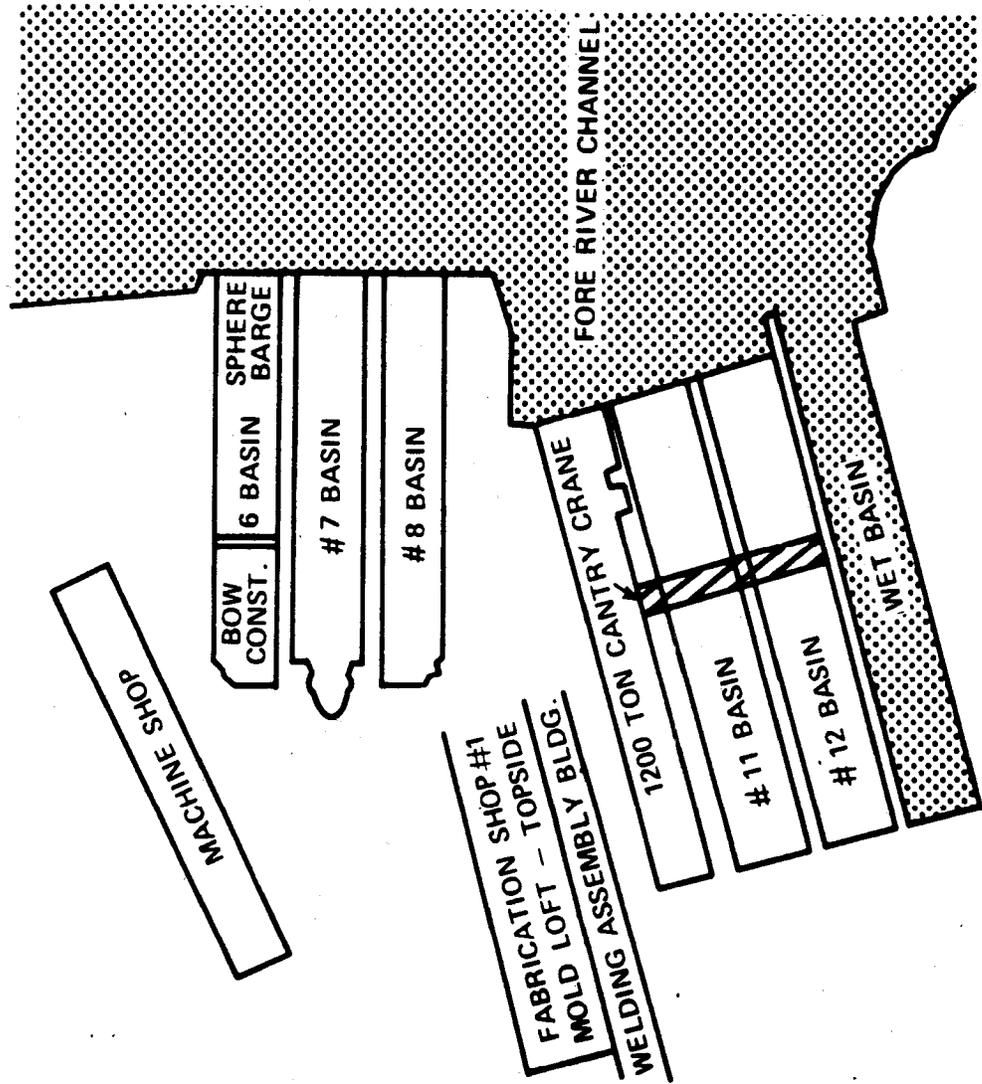


# BETHLEHEM STEEL CORPORATION SPARROWS POINT YARD



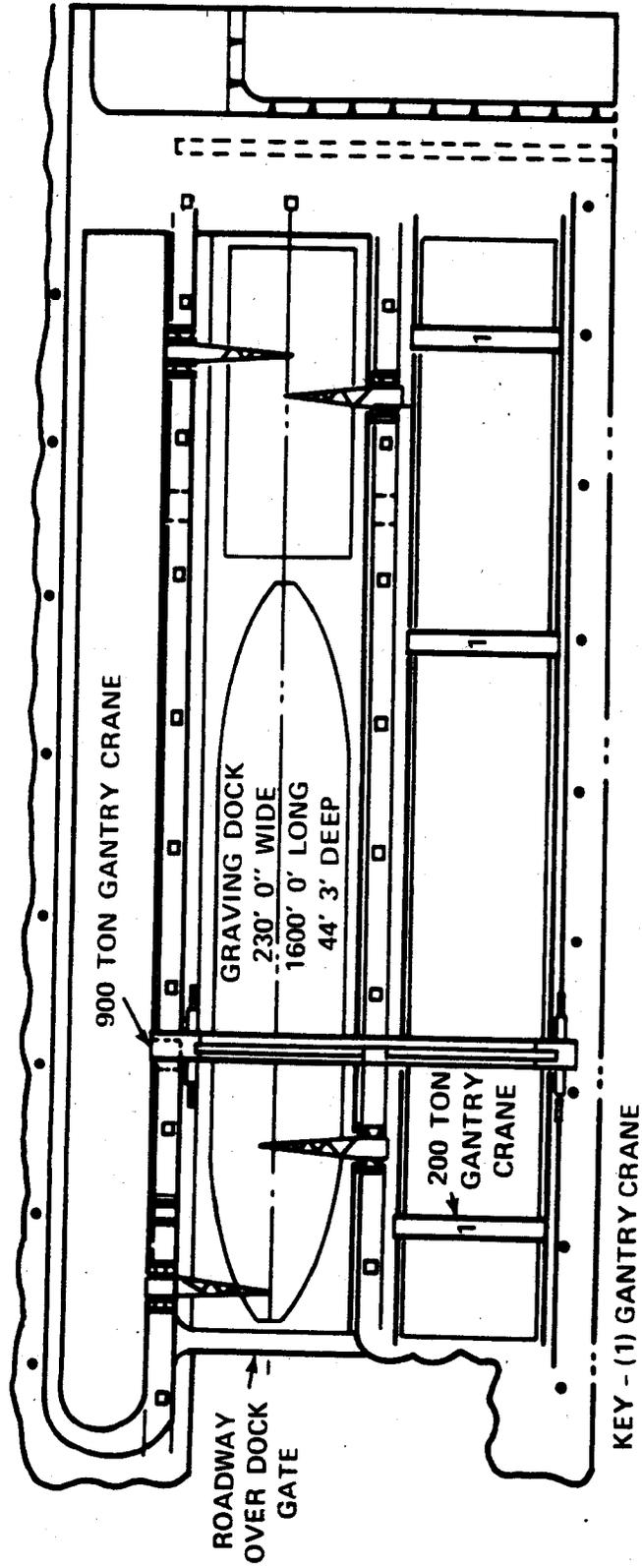
# GENERAL DYNAMICS — QUINCY

EXHIBIT 4



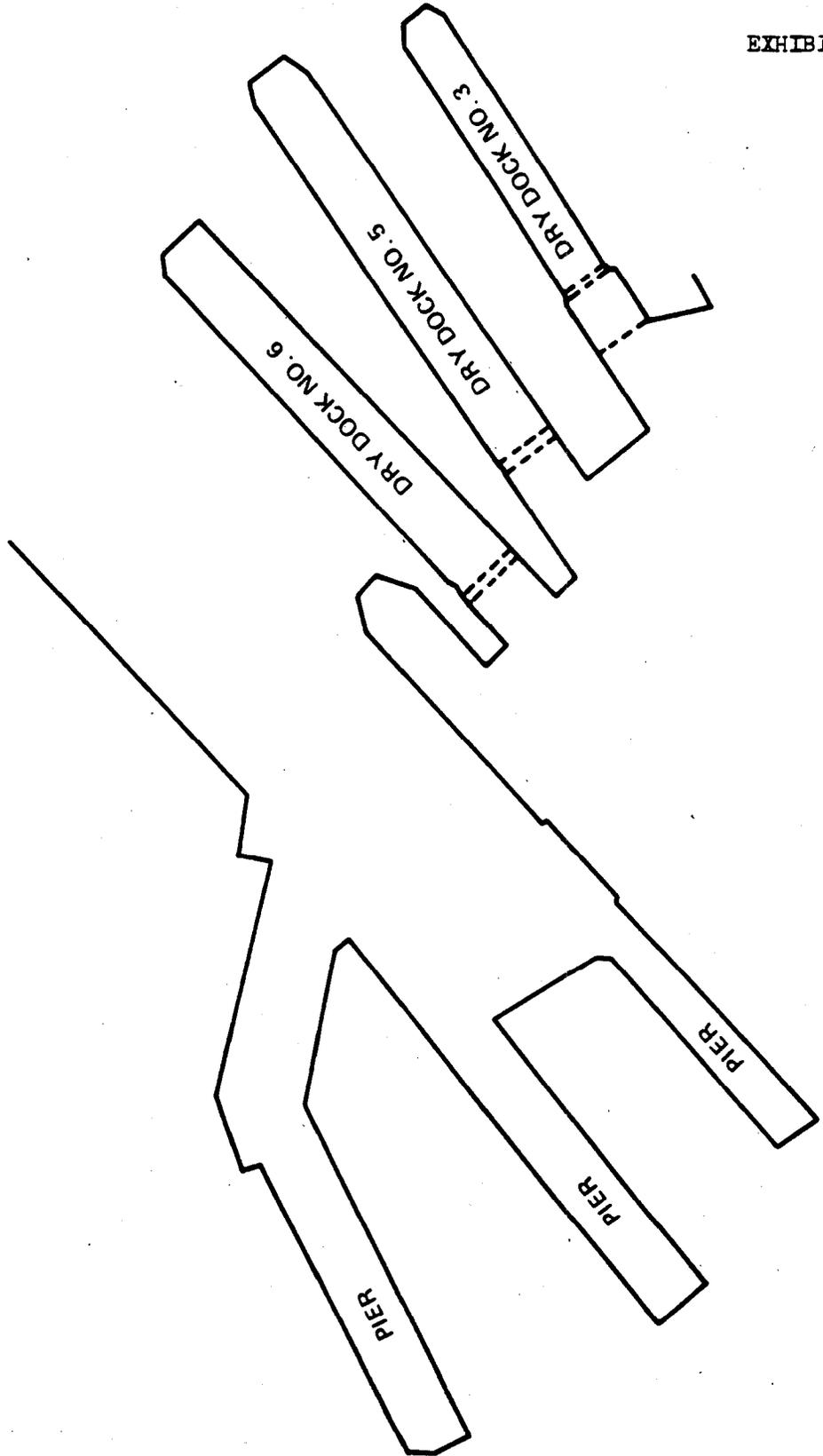
# NEWPORT NEWS

EXHIBIT 5

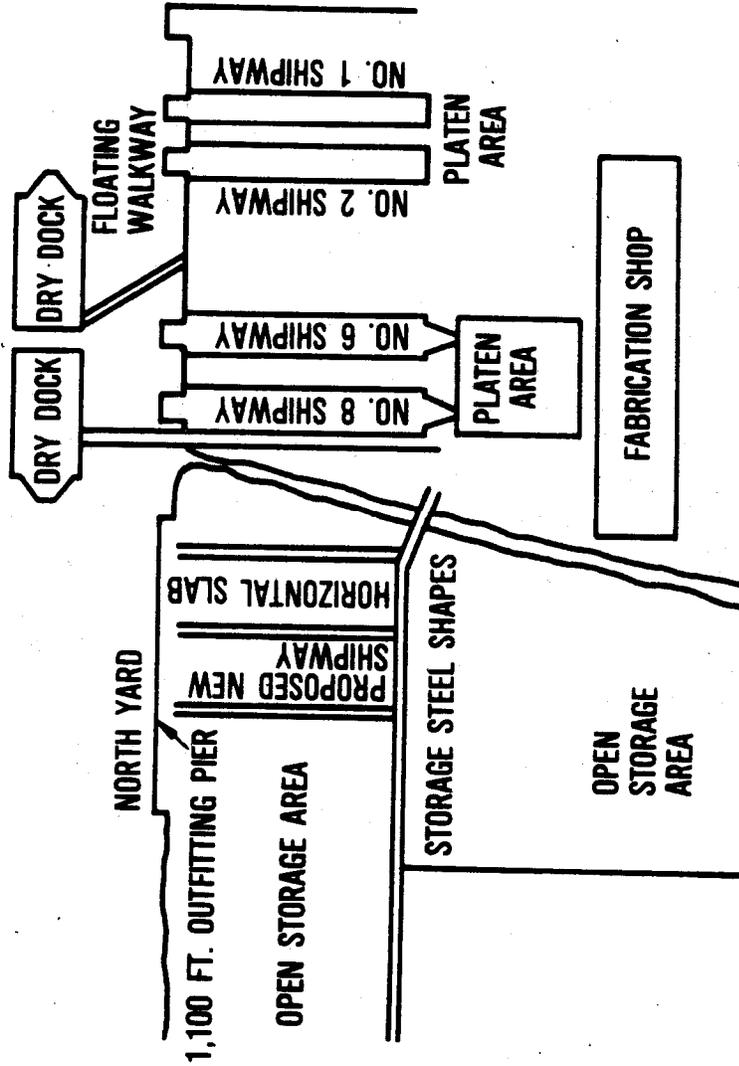


# SEATRAN SHIPBUILDING CORP.

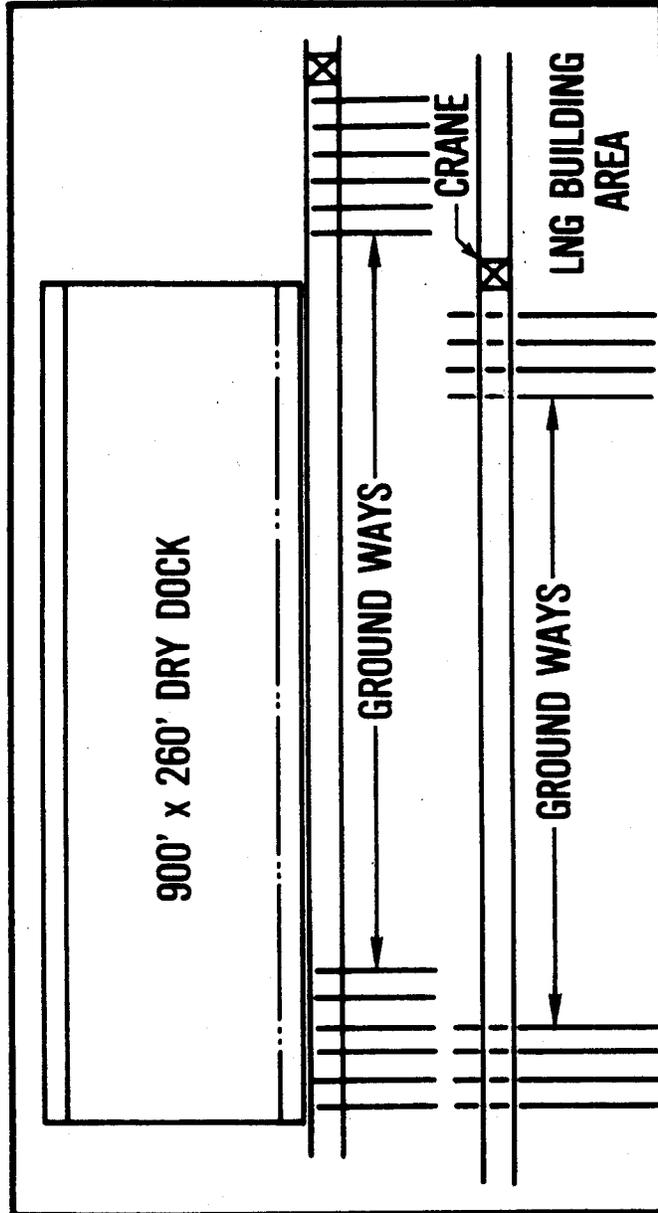
EXHIBIT



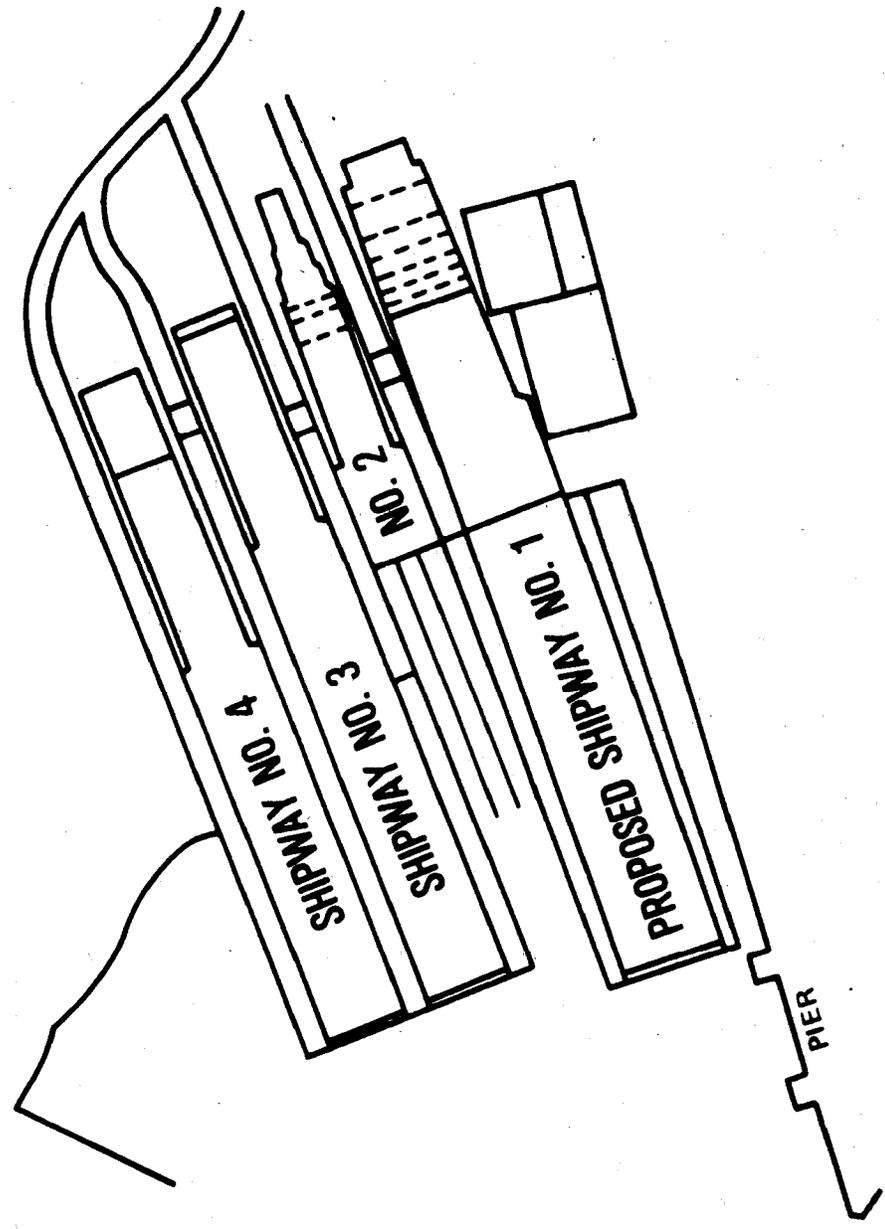
# SUN SHIPBUILDING & DRYDOCK CO.



# AVONDALE SHIPYARDS, INC.

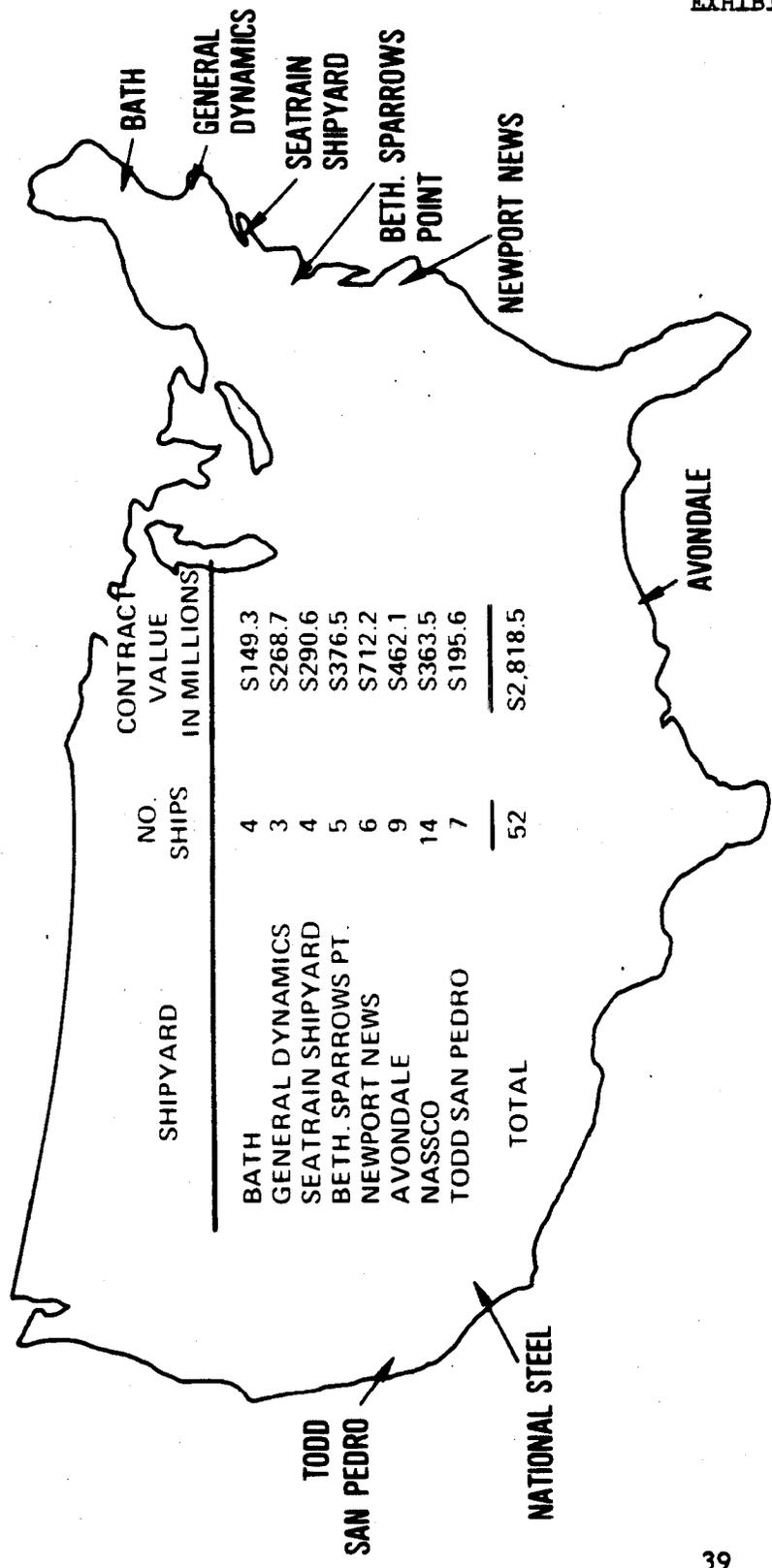


# NASSCO



# SHIPBUILDING PROGRAM (TITLE V) OFFICE OF SHIP CONSTRUCTION

SHIPS UNDER CONTRACT JULY 1, 1974  
TOTAL CONTRACT VALUE, UNDELIVERED SHIPS



SHIPYARD	NO. SHIPS	CONTRACT VALUE IN MILLIONS
BATH	4	\$149.3
GENERAL DYNAMICS	3	\$268.7
SEATRIN SHIPYARD	4	\$290.6
BETH. SPARROWS PT.	5	\$376.5
NEWPORT NEWS	6	\$712.2
AVONDALE	9	\$462.1
NASSCO	14	\$363.5
TODD SAN PEDRO	7	\$195.6
<b>TOTAL</b>	<b>52</b>	<b>\$2,818.5</b>

SHIP FINANCING GUARANTEE CONSTRUCTION PROGRAM (TITLE XI)  
 OFFICE OF SHIP CONSTRUCTION  
 WORK UNDER CONTRACT JULY 1, 1974

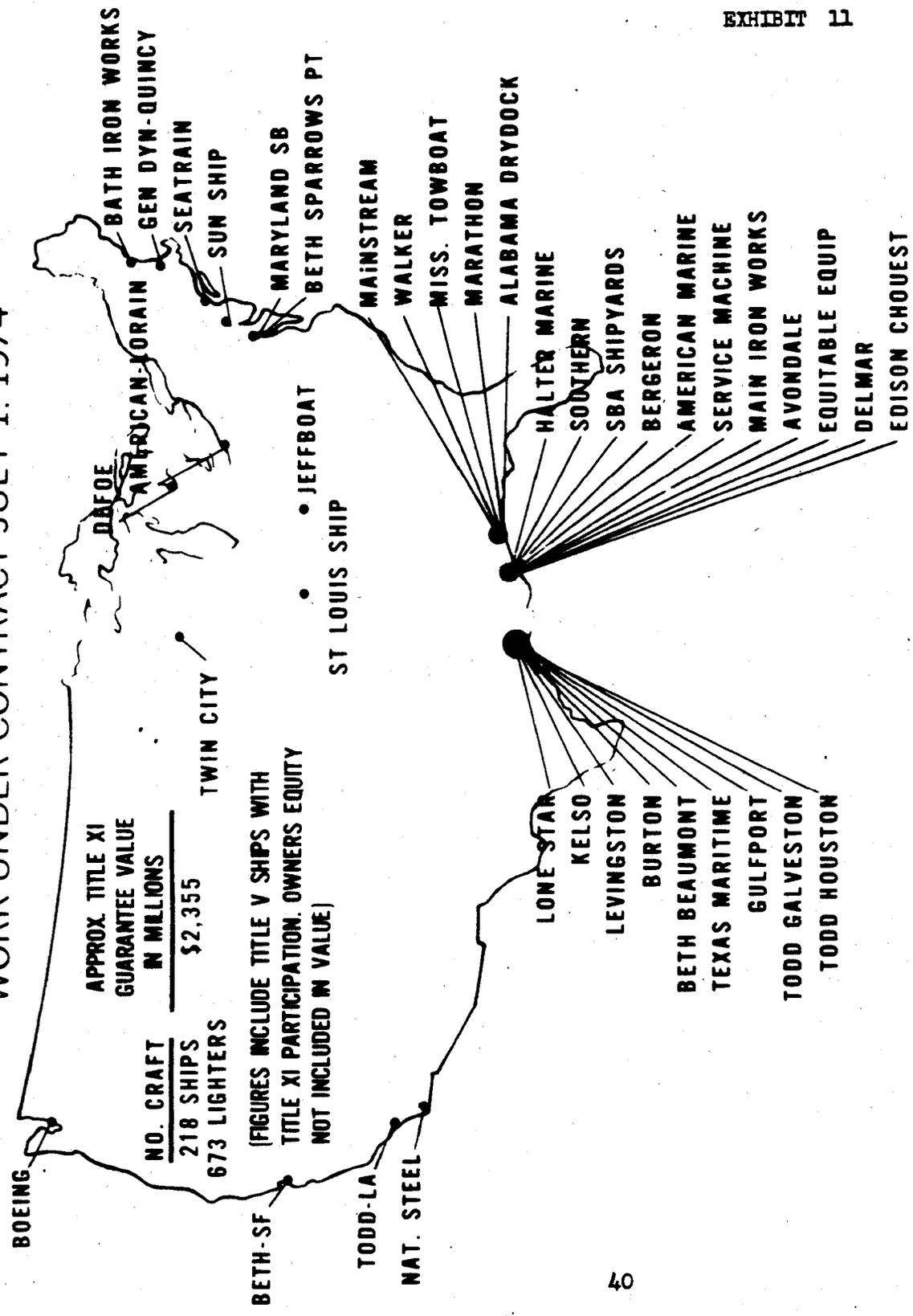
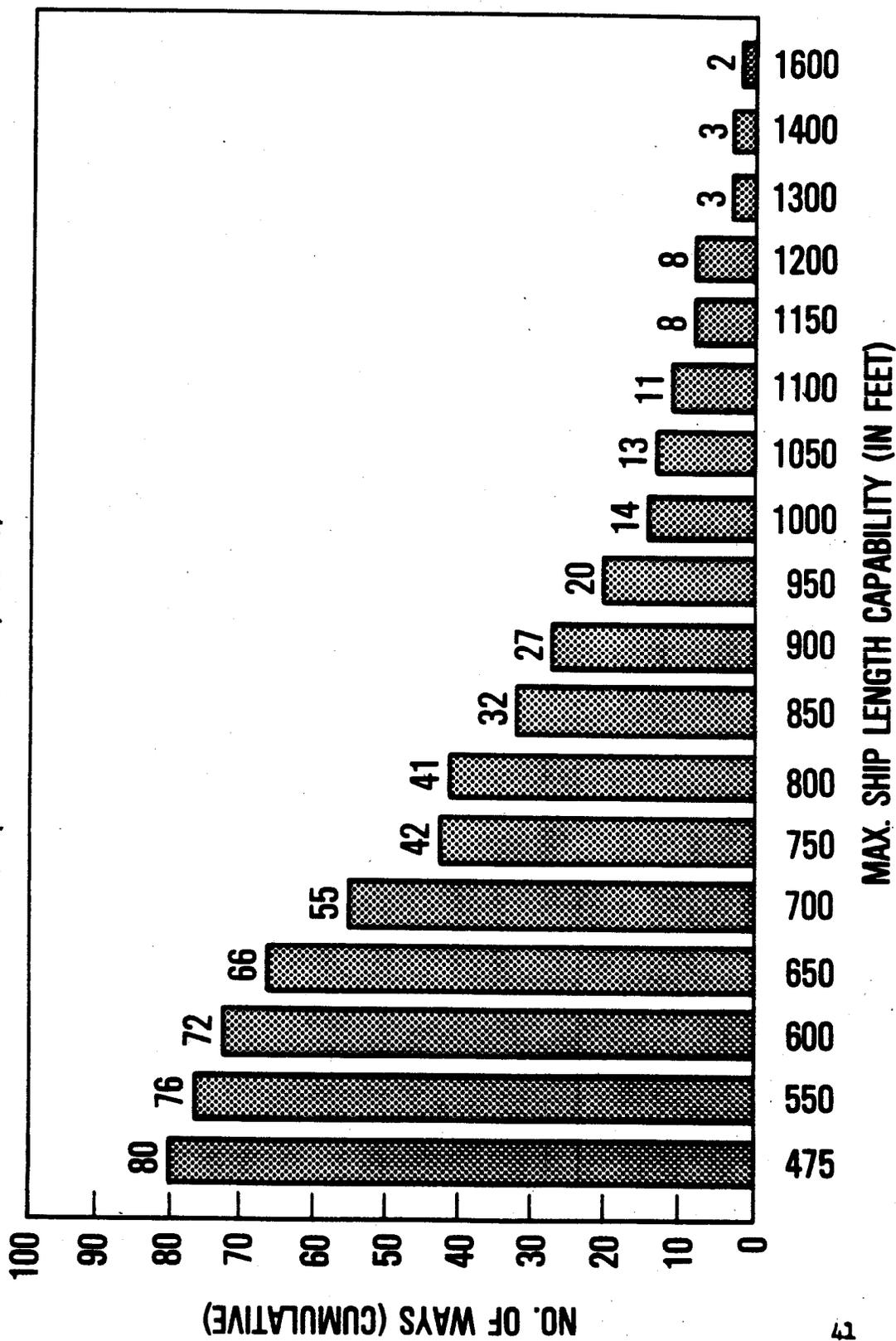


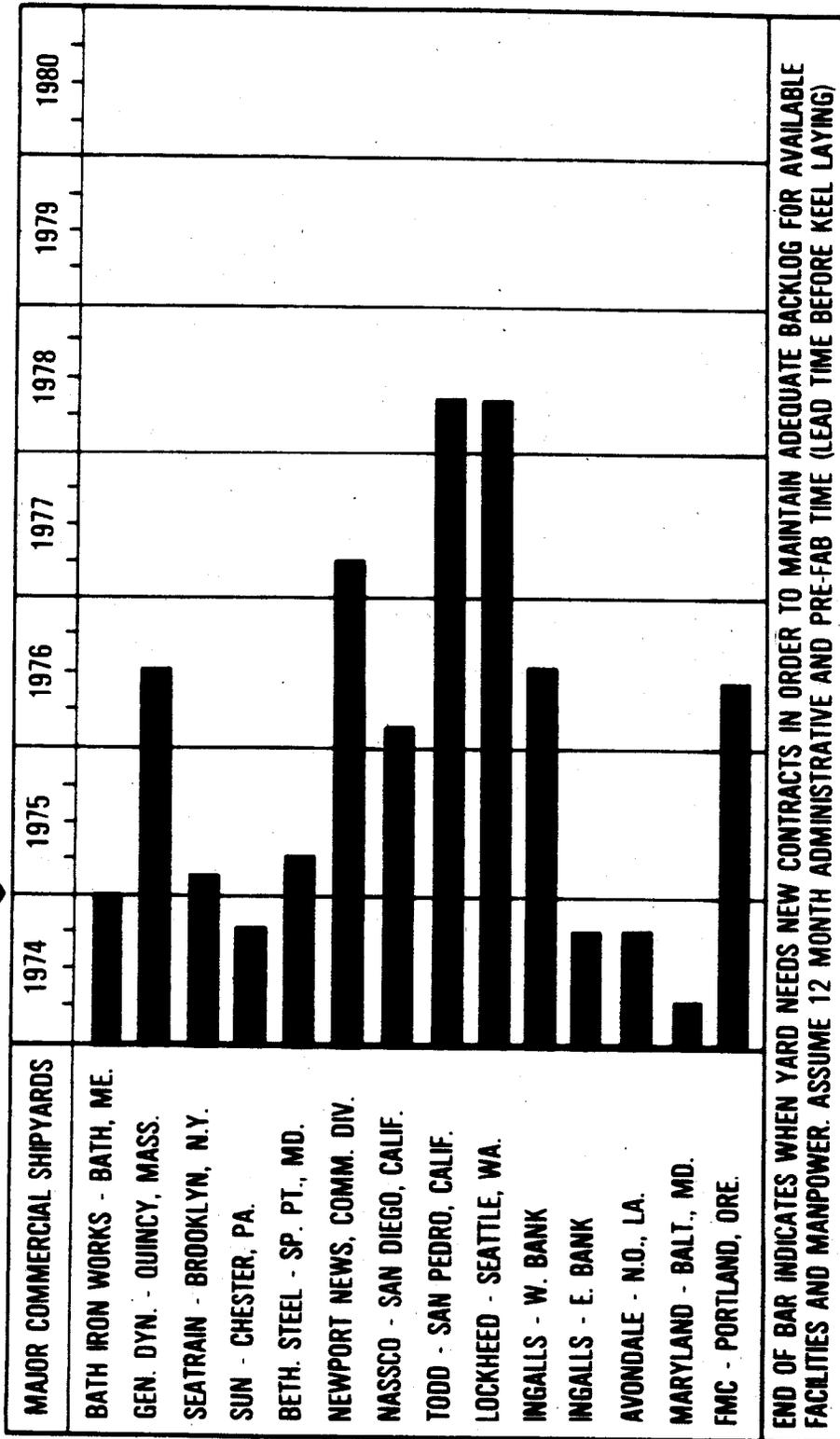
EXHIBIT 11

**MAJOR U.S. PRIVATE SHIPYARDS**  
**NUMBER OF SHIPWAYS BY MAXIMUM LENGTH CAPABILITY**  
**(DECEMBER 1, 1974)**



**SHIPYARD STATUS: NEED FOR NEW BUSINESS**  
**U.S. DEPARTMENT OF COMMERCE**  
**MARITIME ADMINISTRATION**

TIME NOW 



# U.S. SHIPYARD EMPLOYMENT

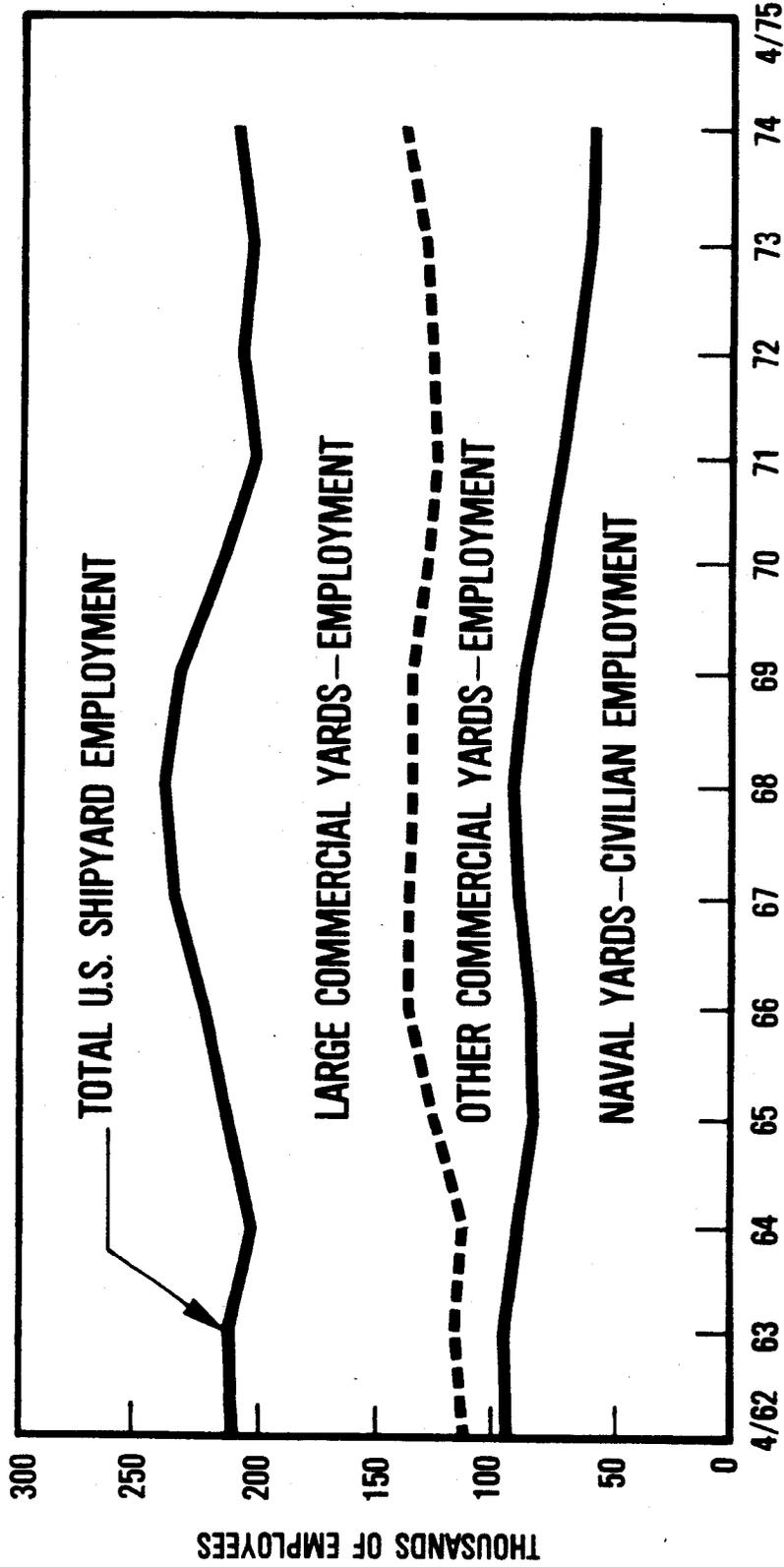


TABLE I

SHIP CONSTRUCTION CAPABILITY  
BY SHIP TYPE

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk				
				Hob. Carrgo 475 x 68	Container 610 x 90	RO/RO 684 x 102	LASH 893 x 100	Container 947 x 106	22,300	570 x 75	52,000	600 x 105	100,000		
EAST	Bath Iron Works	A	650 x 88	1	1	0	0	0	0	1	0	0	0	0	
		B	700 x 130	1	1	1	0	0	0	1	1	1	0	0	
		C	700 x 130	(3)	(3)	(2)	(0)	(0)	(3)	(3)	(2)	(0)	(0)	(0)	
	Bethlehem Steel Sparrows, Pt.	7	900 x 108	1	1	1	1	0	0	0	1	1	0	1	
		8	650 x 90	1	1	0	0	0	0	1	1	0	0	0	
		9	650 x 90	1	1	1	1	0	0	1	1	0	0	0	
		10	900 x 108	1	1	1	1	0	0	1	1	1	0	0	
	General Dynamics, Quincy	6	1200 x 192	4	3	2	1	1	1	1	4	3	3	1	1
				(8)	(7)	(4)	(3)	(1)	(8)	(5)	(5)	(3)	(3)	(3)	
		7	860 x 123	2	1	1	0	0	0	0	1	1	1	1	0
936 x 143			2	1	1	1	1	1	1	1	1	1	1	1	
860 x 123			2	1	1	1	0	0	0	1	1	1	1	0	
860 x 144			2	1	1	1	0	0	0	1	1	1	1	0	
11	860 x 144	2	1	1	1	0	0	0	1	1	1	1	0		
	860 x 144	(10)	(5)	(5)	(1)	(1)	(1)	(5)	(5)	(5)	(1)	(1)	(1)		
Maryland S/B & D/D	1	850 x 110	1	1	1	0	0	0	1	1	1	1	0		
			(1)	(1)	(1)	(0)	(0)	(1)	(1)	(1)	(1)	(0)	(0)		
Newport News S/B & DD	6	715 x 93	1	1	0	0	0	0	0	1	0	0	0		
		715 x 93	1	1	0	0	0	0	0	1	0	0	0		
	8	940 x 125	2	1	1	1	1	1	1	1	1	1	1		
		960 x 128	2	2	1	1	1	1	1	1	1	1	1		
	10	960 x 128	2	2	1	1	1	1	1	2	2	2	2		
		1100 x 140	3	2	1	1	1	1	1	2	2	2	2		
	11	1100 x 140	3	5	4	1	1	1	1	6	4	4	4		
1600 x 230		9	(20)	(8)	(5)	(3)	(14)	(9)	(5)	(1)	(1)	(5)			



Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo						Dry Bulk		
				Mod. Cargo 475 x 68	Container 610 x 90	RC/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	
	Litton/Ingalls	1	690 x 85	1	1	0	0	0	0	1	0	0
		2	550 x 80	1	1	0	0	0	0	0	0	0
		7	650 x 90	1	1	0	0	0	0	1	0	0
		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	650 x 90	1	1	0	0	0	0	1	0	0
		WB	800 x 150	6	6	6	0	0	0	6	6	0
				(12)	(11)	(6)	(0)	(0)	(0)	(11)	(6)	(0)
	Marathon	1	1400 x 200	4	4	4	1	1	1	4	4	1
				(4)	(4)	(4)	(1)	(1)	(1)	(4)	(4)	(1)
				22	26	16	6	6	6	22	17	6
TOTAL GULF COAST												
West	Beth. San Francisco	4	550 x 90	1	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	FVC Corporation	4	650 x 105	1	1	0	0	0	0	1	1	0
				(1)	(1)	(0)	(0)	(0)	(0)	(1)	(1)	(0)
	Lockheed S/B	1	600 x 90	1	0	0	0	0	0	1	0	0
		3	595 x 86	1	0	0	0	0	0	1	0	0
		21	690 x 90	1	1	0	0	0	0	1	0	0
				(3)	(1)	(0)	(0)	(0)	(0)	(3)	(0)	(0)
	National Steel & S/B	1	965 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)	(1)	(1)	(5)	(3)	(3)

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk		
				Mob. Cargo 475 x 63	Container 610 x 90	RO/RO 664 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		
Todd, San Pedro		1	950 x 126	2	1	1	1	1	1	1	1	1	
		2	950 x 126	(4)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Todd, Seattle		1A	550 x 96	1	0	0	0	0	0	0	0	0	
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
TOTAL WEST COAST				17	3	5	5	5	2	11	6	5	
GREAT LAKES	American S/B-Lorain	4	700 x 75	1	0	0	0	0	0	0	0	0	
		GD2	730 x 75	1	0	0	0	0	0	0	0	0	
		GD3	*730 x 79	1	0	0	0	0	0	0	0	0	
				(3)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
		2	666 x 75	1	0	0	0	0	0	0	0	0	0
Bay S/B Corp.		3	*730 x 79	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)
		4	700 x 79	1	1	0	0	0	0	0	0	0	(0)
		5	600 x 70	1	1	0	0	0	0	0	0	0	0
				(3)	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
		1	*730 x 79	2	1	0	0	0	0	0	0	0	0
Defoe S/B Co.		2	*730 x 79	(4)	(2)	(2)	(0)	(0)	(0)	(2)	(0)	(0)	

\* Controlling Ship Size for Saint Lawrence Seaway

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk		
				Mot. Cargo 475 x 69	Container 610 x 90	RO/FO 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 79	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	
TOTAL GREAT LAKES				12	2	0	0	0	0	2	0	0	
TOTAL ALL YARDS				124	80	48	23	16	24	54	23		

\* Controlling Ship Size for Saint Lawrence Seaway



Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers							OBO					
				25,000 620 x 75	36,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000 cu. ft. 932 x 170	225,000 1100 x 170	245,000 1100 x 178	390,200 1204 x 228	83,000	160,000 998 x 173			
GULF	Seatrain S/R Corp.	3	720 x 112	1	1	0	0	0	0	0	0	0	0	0	0	
		5	1094 x 143	2	1	1	1	1	0	0	0	0	0	1	1	1
		6	1094 x 143	(4)	(3)	(2)	(2)	(2)	(0)	(0)	(0)	(0)	(0)	(2)	(2)	(2)
	Sun S/R & D/D	1	700 x 92	1	1	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
		8	745 x 129	1	1	0	0	0	0	0	0	0	0	0	0	0
	Slab-1	2	800 x 200	2	2	1	1	1	1	1	1	1	1	1	1	1
		Slab-2	800 x 200	2	2	1	1	1	1	1	1	1	1	1	1	1
TOTAL EAST COAST				41	32	13	7	7	6	3	2	12	6	6	6	
GULF	Alabama D/D & S/B	1	523 x 68	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	
		3	523 x 68	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
		5	620 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0
GULF	Avondale	1	960 x 176	4	2	2	2	2	0	0	0	0	1	0	0	
		2	1200 x 130	5	3	3	0	0	0	0	0	0	3	0	0	
GULF	Beth Beaumont	1	842 x 96	1	1	0	0	0	0	0	0	0	0	0	0	
		2	1200 x 130	(9)	(5)	(5)	(2)	(2)	(0)	(0)	(0)	(0)	(4)	(0)	(0)	
GULF	Kelso Marine	1	700 x 100	1	1	0	0	0	0	0	0	0	0	0	0	
		5	700 x 100	(1)	(1)	(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 200 feet.

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers										OBO			
				25,000 620 x 75	38,000 488 x 90	89,000 894 x 105	120,000 920 x 138	125,000 <sup>000</sup> . 932 x 140	225,000 1100 x 170	265,000 1100 x 178	390,200 1204 x 228	80,000 888 x 106	160,000 998 x 143				
	Levingston	1	1100 x 90	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	Litton/Ingalls	1	690 x 85	0	0	0	0	0	0	0	0	0	0	0	0	0	
		2	550 x 80	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
		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	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		WB		850 x 150	1 (1)	6 (6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Marathon	1	1400 x 200	4 (4)	4 (4)	3 (3)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	
<b>TOTAL GULF COAST</b>				28	18	8	2	2	1	1	1	1	1	2	5	1	
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)	
	PNC Corporation	4	650 x 105	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)	
	Lockheed S/B	1	600 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	
		3	595 x 88	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		21	690 x 90	1 (1)	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)

\*Marathon has capability of building a ship of this deadweight tonnage if deeper draft to compensate for shipway's beam limitation of 200 feet.

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers										ORO				
				25,000 620 x 75	30,000 748 x 90	39,000 894 x 105	120,000 920 x 138	125,000 cu. Ft. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,200 1204 x 228	80,000 886 x 106	160,000 998 x 143					
National Steel & S/B		1	945 x 170	2	1	1	1	1	1	1	0	0	0	0	0	1	0	
		2	700 x 90	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	900 x 106	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		4	900 x 106	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Todd, San Pedro		1	950 x 126	1	1	1	0	0	0	0	0	0	0	0	0	1	0	
		2	950 x 126	1	1	1	0	0	0	0	0	0	0	0	0	1	0	
Todd, Seattle		1A	550 x 96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL WEST COAST				11	7	5	1	1	1	0	0	0	0	0	2	1	0	
GREAT LAKES	American S/B-Lorain	4	700 x 75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		GD2	730 x 75	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		GD3	*730 x 79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
American S/B -Toledo		2	666 x 75	1	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)	
Bay S/B Corp.		3	*730 x 79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		4	700 x 79	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		5	700 x 70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
				(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)		

\*Controlling Sun 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	89,000 894 x 105	120,000 920 x 138	125,000 Gr. Pt. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,200 1204 x 228	80,000 886 x 106	160,000 998 x 143			
Defoe S/B Co.		1	*730 x 79	1	0	0	0	0	0	0	0	0	0	0	0	
		2	*730 x 79	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Fraser Shipyards		1	*730 x 79	1	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)
TOTAL GREAT LAKES				2	0	0	0	0	0	0	0	0	0	0	0	
TOTAL ALL YARDS				89	57	26	11	11	7	4	2	21	8			

\*Controlling Ship Size for Saint Lawrence Seaway

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

SUMMARY

REGION	GENERAL CARGO						DRY BULK			
	Mob. Cargo 475 x 68	Container 610 x 90	HO/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	27	12	7		45	31	12	
Gulf Coast	39	26	16	6	6		29	17	6	
West Coast	17	8	5	5	3		11	6	5	
Great Lakes	12	5	0	0	0		9	0	0	
<b>TOTAL POSITIONS ALL YARDS</b>	<b>124</b>	<b>80</b>	<b>48</b>	<b>23</b>	<b>16</b>		<b>94</b>	<b>54</b>	<b>23</b>	

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 Cu. Ft. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,200 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	28	18	8	3	3	1	1	1	5	1		
West Coast	11	7	5	1	1	0	0	0	3	1		
Great Lakes	9	0	0	0	0	0	0	0	0	0		
<b>TOTAL POSITIONS ALL YARDS</b>	<b>89</b>	<b>57</b>	<b>26</b>	<b>11</b>	<b>11</b>	<b>7</b>	<b>4</b>	<b>3</b>	<b>21</b>	<b>8</b>		

TABLE II

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

December 1, 1974

TABLE II  
MAJOR U.S. PRIVATE SHIPTYARDS

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 SR & DD	6	6	6	6	6	4	4	4	4	2	1	1	1						
Newport News - CSD	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						
Sun SB & DD	5	5	5	5	5	2	2	2	1	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)	(2)
<u>GULF COAST</u>																			
Alabama DD & SB	5	1	1	5	5	5	5	5	5	5	3	3	3	3					
Avondale	8	8	1	1	1	1	1	1											
Beth-Beamont	1	1	1	1	1	1	1	1											
Ingalls-E. Bank	6	6	5	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	1	1	1	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	(29)	(25)	(24)	(20)	(15)	(14)	(14)	(7)	(7)	(7)	(5)	(5)	(4)	(4)	(4)	(1)	(1)	(1)	(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																
FMC Corporation	1	1	1	1														
Locheed SB	3	3	2	1														
National Steel & SB	4	4	4	4	4	3	3	3	3	1								
Todd-San Pedro	2	2	2	2	2	2	2	2	2	2								
Todd-Seattle	1	1																
<b>TOTAL</b>	(12)	(12)	(9)	(8)	(6)	(5)	(5)	(5)	(5)	(5)	(3)							
<u>GREAT LAKES*</u>																		
American SB-Lorain	3	3	3	3	3	1	1	1	1	1	1							
American SB-Toddo	1	1	1	1														
Bay SB Corp.	3	3	3	2	2	1												
Defoe SB Co.	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1			
Fraser Shipyards	1	1	1	1	1	1	1											
<b>TOTAL</b>	(10)	(10)	(10)	(9)	(8)	(5)	(4)	(3)	(3)	(3)	(3)	(2)	(2)	(1)	(1)			
<b>Grand Total</b>	80	76	72	66	55	42	41	32	27	20	14	13	11	8	8	3	3	2
All Coasts and Great Lakes																		

\* Maximum size ship that can exit St. Lawrence Seaway locks is 730' x 79'.

APPENDIX A

STANDARD FORM 17

FACILITIES AVAILABLE FOR THE CONSTRUCTION

OR REPAIR OF SHIPS



SHIPS' BERTHS (PIERS, WHARVES, BULKHEADS, MOORING DOLPHINS (M.L.W.))											
NO.	TYPE	LENGTH (Actual and usable)	WATER DEPTH		HEIGHT OF DOCK	USE REPAIR AND/OR OUTFITTING	SERVICE AVAILABLE (Use abbreviations of services and units of measure notated under legend)	CRANES SERVING BERTHS, ETC.		LIFT CAPACITY (Standard tons)	
			Inboard	Outboard				No.	Type (Hook height above M.L.W.)		
	Act. Use.									Lift Reach	
	Act. Use.									Lift Reach	
	Act. Use.									Lift Reach	
	Act. Use.									Lift Reach	
	Act. Use.									Lift Reach	
	Act. Use.									Lift Reach	
	Act. Use.									Lift Reach	
	Act. Use.									Lift Reach	
	Act. Use.									Lift Reach	
	Act. Use.									Lift Reach	
	Act. Use.									Lift Reach	

DRYDOCKS (mean HIGH water) (List building decks under building ways)															
DOCK NO.	MATERIAL CONSTD. OF — TYPE Floating—(FD); Graving—(GD); Marine Railway—(MR)	MAXIMUM SHIP SIZE ACCOMMODATED LENGTH OA-BEAM	Overall	LENGTH		At coping (GD); on pontoons (FD)	At keel blocks; on cradle (MR)	CLEAR WIDTH		At keel blocks	Over sill (GD)	DEPTH/DRAFT		Over keel blocks	LIFTING CAPACITY (Ten 2,240 lbs.)
				At coping (GD); on pontoons (FD)	At top; cradle (MR)			Over floor	Over keel blocks						

LEGEND: (Abbreviations of Services)  
 Fresh water..... F.W.—G.P.M.—P.S.I.  
 Salt water..... S.W.—G.P.M.—P.S.I.  
 Steam..... Steam  
 Air..... Air  
 S-P/HR.—P.S.I. .... S-P/HR.—P.S.I.  
 A-C.F.M.—P.S.I. .... A-C.F.M.—P.S.I.  
 Electric power..... Electric power  
 E-V-AC-AMP..... E-V-AC-AMP  
 Fire protection..... Fire protection  
 Sanitary sewer..... Sanitary sewer  
 FR.—G.P.M.—P.S.I. .... FR.—G.P.M.—P.S.I.  
 SS.—G.P.M.—P.S.I. .... SS.—G.P.M.—P.S.I.

PRINCIPAL SHOPS AND BUILDINGS										ALL OTHER SHOPS All other shops and dimensions, (List name 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 x					
Woodworking			x 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 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 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 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 x x x					

NOTE.—Indicate materials as steel, aluminum, reinforced plastic, wood, plywood, sheet metal, etc.

SHOP OR YARD CRANES (5 tons or over)											
BRIDGE TYPE					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	Area serviced	Height of hook above base at out reach

**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.)

**ACREAGE LEGALLY CONTROLLED**

IN USE      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

LOCATION OF PRODUCTION FACILITIES FOR PRODUCTS LISTED IN ITEM 11, OF STD. FORM 129		ON WATERFRONT	
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

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

DESCRIPTION OF TYPES OF WORK NORMALLY SUBCONTRACTED

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 ALL W.)

MINIMUM CHANNEL TO TIDEWATER

MINIMUM HORIZONTAL AND VERTICAL BRIDGE CLEARANCES TO TIDE WATER (Identify structures)

LIMITING LOCK DIMENSIONS TO TIDEWATER (Identify locks)

**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, if steel, 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)	Berths/Piers	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Usable length in feet  Longest Total linear feet	
<u>EAST COAST</u>			
<u>SHIPBUILDING YARDS</u>			
Bath Iron Works Corp. Bath, Maine	650 (+) x 88 SW (2) 700 x 130 SW	<u>850</u> 2900	1/ Construction, conversion, and repairs-all types of vessels.  2/ 3840/12000  Has floating bow drydock for sonar domes.
Beth. Steel Corp. Sparrows Point, Md.	(2) 650 x 90 SW (2) 900 x 108 SW 1200 x 192 GD	<u>1260</u> 3968	1/ New ship construction - to vessels 1200' in length.  2/ 3560/15500
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	1/ Construction, conversion and repairs - all types of vessels to 1000' feet in length.  2/ 2800/24000  *Under construction
Maryland SB and DD Co. Baltimore, Md.	850 x 110 SW 775 x 106 FD 715 x 90 FD 900 x 140 FD	<u>1904</u> 5651	1/ Construction, conversion and repairs - all types of vessels.  2/ 1720/12000
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 230 GD**	<u>1078</u> 12430	1/ Construction, conversion and repairs - all types of vessels.  2/ 24000/41000  *Used for construction **Located in Commercial Ship Division. This GD is scheduled for completion in early 1975.

<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)		Berths/Piers		Remarks
	SW--Shipway		Usable length in feet	Longest Total linear feet	
Seatrain SB Corp. Brooklyn, N.Y.	720 x 112	GD	1200		1/ Construction of supertankers
	(2) 1094 x 143	GD	3190		2/ 3135/N.A.
Sun SB and DD Co. Chester, Pa.	700 x 92	SW	600		1/ Construction, conversion and repairs - all types of vessels.
	(2) 745 x 129	SW	2800		2/ 3675/35000
	1600 x 200	SW*			
	1005 x 135	FD			* New "shipbuilding platform" is under construction
<u>EAST COAST</u>					
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>					
Beth. Steel Corp. Baltimore, Md.	520 x 83	FD	964		1/ Ship repairs and conversion
	775 x 108	FD	12944		2/ 1860/9900
	675 x 95	FD			
	585 x 78	GD			
	450 x 58	GD			
Beth. Steel Corp. East Boston, Mass.	670 x 90	FD	1020		1/ Ship Repairs and conversion
	523 x 85	FD	3111		2/ 270/800
Beth. Steel Corp. Hoboken, N.J.	443 x 63	FD	923		1/ Ship repairs and conversion
	685 x 103	FD	2994		2/ 650/7300
	549 x 87	FD			
	640 x 90	FD			
Brewer DD Co. Staten Island, N.Y.	400 x 75	FD	653		1/ Ship repairs and conversion
	500 x 75	FD	2606		2/ 200/1700
Bromfield Corp. United SB Division East Boston, Mass.	376 x 40	FD	430		1/ Ship repairs and conversion
			1143		2/ 95/500
Ira S. Bushey & Sons, Inc. Brooklyn, N.Y.	455 x 71	FD	786		1/ Ship repairs and conversion
	300 x 66	FD	4086		2/ 215/720

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	
Coastal DD & Repair Corp. Brooklyn, N. Y.	349 x 66 479 x 90 700 x 121	GD GD GD	<u>575</u> 1150	1/ Ship repairs and conversion 2/ 250/2500
Colonna's Shipyard Inc. Norfolk, Va.	300 x 40 360 x 65	MR MR	<u>900</u> 2200	1/ General ship repairs 2/ 135/305
Detyens Shipyards Mt. Pleasant, S.C.	500 x 82	FD	<u>340</u> 600	1/ General ship repairs 2/ 290/700
Jacksonville Shipyards Jacksonville, Fla.	530 x 85 (2) 633 x 93 400 x 56 827 x 144	FD FD* FD* FD	<u>647</u> 3629	1/ Ship repairs and conversion. Construction of small vessels. 2/ 2400/4840  * Leased from Navy
Munro Drydock, Inc. Chelsea, Mass.	350 x 60	MR	<u>300</u> 955	1/ General ship repairs 2/ 40/500
Norfolk SB & DD Corp. Norfolk, Va.	500 x 85 670 x 84 316 x 64 441 x 64	SW FD FD MR	<u>1420</u> 10172	1/ Ship repairs and conversion. Construction of small vessels. 2/ 1825/3400
Perth Amboy DD Co. Perth Amboy, N.J.	336 x 70	FD	<u>400</u> 2130	1/ Ship repairs and conversion. 2/ 150/650
Puerto Rico DD & Marine Terminals San Juan, P. R.	644 x 81	FD	<u>N.A.</u> 1220	1/ Ship Repairs 2/ 55/N.A.  Leases Naval Industrial Reserve Shipyard

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)	Berths/Piers Usable length in feet	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway		
Rodermond Industries Jersey City, N.J.	360 x 58 FD	<u>842</u> 842	1/ Ship repairs 2/ 120/170
Savannah Machine and Shipyards Co. Savannah, Ga.	520 x 72 GD	<u>382</u> 1563	1/ Ship repairs and conversion. 2/ 400/800
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	1/ Ship repairs and conversion. 2/ 620/4000
Tracor Marine, Inc. Port Everglades, Fla.	360 x 80 (Syncrolift with 400' transfer system)	<u>1080</u> 1880	1/ Ship repairs 2/ 330/500
<u>GULF COAST</u>			
<u>SHIPBUILDING YARDS</u>			
Alabama DD & SB Co.	(4) 523 x 68 SW 620 x 90 SW 620 x 84 FD 750 x 105 FD 380 x 64 FD	<u>1132</u> 9370	1/ Ship construction, conversion, and repairs. Also drill rig construction. 2/ 2930/29000
Avondale Shipyards, Inc. New Orleans, La.	*960 x 176 SW **1200 x 130 SW 378 x 68 FD 300 x 50 MR 960 x 220 FD	<u>1625</u> 3565	1/ Ship construction, conversion, and repairs. Also drill rig construction. 2/ 6350/18000  * Two vessels up to 960' x 176' can be constructed simultaneously. Completion of shipway scheduled for April 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)	Berths/Piers	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Usable length in feet  Longest Total linear feet	
Beth. Steel Corp. Beaumont, Texas	842 x 96 SW 650 x 84 FD	<u>1100</u> 3450	1/ Construction of barges and drilling rigs. Also ship repairs and conversion.  2/ 2840/5080
Ingalls SB Div., Litton Systems, Inc. Pascagoula, Miss.	690 x 85 SW 550 x 80 SW (4) 650 x 90 SW *800 x 150 FD 460 x 60 GD	<u>2650</u> 8090	1/ Construction, conversion, overhaul - all types of vessels.  2/ 18890/21000  * West Bank can launch ship up to 800' x 150'. Equivalent of six conventional inclined ways in terms of ships delivered annually.
Kelso Marine Galveston, Texas	700 x 100 SW	None*	1/ Construction of barges, tugs, and ocean-going integrated tug-barge units.  2/ 440/N.A.  * 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	1/ Construction of offshore drilling rigs, related floating equipment, and general ship repairs.  2/ 1850/3700
Marathon Mfg. Co. Gulf Marine Division Brownsville, Texas	1400 x 200 SW	<u>500</u> 500	1/ Construction of offshore drilling rigs and drill ships. Yard has capability of building large oceangoing ships.  2/ 2000/N.A.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)	Berths/Piers Usable length in feet	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway		
<u>GULF COAST</u>			
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>			
Bender Welding & Machine Co. Mobile, Ala.	414 x 55 FD	$\frac{617}{1667}$	1/ Ship repairs and construction up to 200' long. 2/ 300/N.A.
Saucer Marine Service New Orleans, La.	(2) 300 x 59 FD	$\frac{300}{750}$	1/ Construction and repair of small vessels and barges. 2/ 75/160
Southern SB Corp. Slidell, La.	350 x 54 GD	$\frac{200}{300}$	1/ Construction and repair of vessels up to 350' in length and not drawing over 15' of water. 2/ 325/2660
Tampa Ship Repair & DD Co. Tampa, Fla.	550 x 75 GD	$\frac{1200}{2695}$	1/ Ship repairs and conversion. 2/ 450/1100
Todd Shipyards Corp. Galveston, Texas	614 x 86 FD	$\frac{1086}{4835}$	1/ Ship repairs and conversion. Also nuclear related work. 2/ 880/4000
Todd Shipyards Corp. Houston, Texas	600 x 95 SW 600 x 100 FD	$\frac{1844}{3271}$	1/ Ship repairs and conversion. Construction of barges and vessels up to 600' in length. 2/ 1020/2600
Todd Shipyards Corp. New Orleans, La.	661 x 90 FD 604 x 80 FD	$\frac{1725}{4956}$	1/ Ship repairs and conversion. 2/ 430/2500

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)		Berths/Piers		Remarks
	SW--Shipway		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	813	2172	1/ Ship repairs and conversion Can build C3 and C4 type vessels.  2/ 570/3310
FMC Corporation Portland, Oregon	650 x 105	SW	600	1060	1/ Construction of vessels up to 650' in length  2/ 1850/3000  Leases drydocks and berths from Port of Portland as required.
Lockheed SB & Construction Co. Seattle, Wash.	600 x 90	SW	800	6500	1/ Ship construction, conversion, and repairs.  2/ 1900/6600
National Steel and SB Co. San Diego, Calif.	965 x 170	GD*	950	9574	1/ Construction, conversion and repairs - all types of vessels.  2/ 4700/6000  * scheduled completion June 1975  ** Leased from Unified Port District of San Diego.
Todd Shipyards Corp. San Pedro, Calif.	(2) 950 x 126	SW*	680	4800	1/ Construction, repairs, and conversion - all types of vessels.  2/ 3440/8000  * Scheduled completion December 1975.

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 5030		1/ Ship construction, repairs and conversion. 2/ 1765/7200
<u>WEST COAST</u>				
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>				
Albina Engine & Machine Wks. Portland, Ore.				1/ Ship repairs and conversion. 2/ 335/7000  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/ 415/7500
Calif. SB & DD Co. Long Beach, Calif.	330 x 68 FD	600 1700		1/ Ship Repairs and conversion. 2/ 78/560
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/ 880/1300  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/ 150/300
Lake Union DD Co. Seattle, Washington	340 x 56 FD	1000 4235		1/ Ship repairs and conversion. 2/ 150/1200

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	
Merritt Ship Repair Co. Oakland, Calif.	320 x 52 FD	<u>600</u> 1155	<u>1/</u> Ship and barge repairs <u>2/</u> 40/240	
Northwest Marine Iron Works Portland, Ore.			<u>1/</u> Ship repairs and conversion. <u>2/</u> 260/900  Leases drydocks and berths from Port of Portland as required.	
San Diego Marine Construction Corporation San Diego, Calif.	380 x 80 FD	<u>700</u> 1855	<u>1/</u> Construction of ships, boats and barges up to 200' in length. Also repairs.  <u>2/</u> 630/800	
Todd Shipyards Corp. San Francisco Division Alameda, Calif.	523 x 68 FD 900 x 135 FD	<u>800</u> 2585	<u>1/</u> Ship repairs and conversion.  <u>2/</u> 600/5300	
Willamette Iron & Steel Co. Portland, Oregon		<u>1232</u> 1232	<u>1/</u> Ship repairs and conversion.  <u>2/</u> 1190/2235  Leases drydocks and berths from Port of Portland as required.	
Willamette Iron & Steel Co. Richmond, Calif.	570 x 80 GD 740 x 80 GD 583 x 80 GD (2) 570 x 80 GD	<u>1560</u> 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 79')				
American SB Co. Lorain, Ohio	700 x 75 SW 730 x 75 GD 1000 x 105 GD	900 1825	1/ 2/	Ship construction, repairs and conversion. 930/3600
American SB Co. Toledo, Ohio	666 x 75 GD 540 x 64 GD	800 1610	1/ 2/	Ship construction, repairs and conversion. 325/2000
Bay SB Corp. Sturgeon Bay, Wis.	770 x 100 SW 700 x 80 SW 600 x 70 SW 640 x 70 FD	820 7095	1/ 2/	Ship construction, conversion and repairs. 800/2500
Defoe SB Co. Bay City, Mich.	1145 x 100 SW 1200 x 70 SW	1200 2756	1/ 2/	Ship construction, conversion and repairs. 100/7000
Fraser Shipyards, Superior, Wis.	825 x 82 GD 620 x 62 GD	900 4450	1/ 2/	Ship construction, conversion and repairs. 475/5000
<u>GREAT LAKES</u>				
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>				
American SB Co. Chicago, Ill.	710 x 75 GD 525 x 56 GD	850 1300	1/ 2/	Ship repairs and conversion. 125/350
Peterson Builders Sturgeon Bay, Wis.	342 x 39 FD	550 2515	1/ 2/	Construction and repair of ships and boats. 430/1200

APPENDIX C

FACILITIES AVAILABLE FOR PERFORMING

TOPSIDE REPAIRS ON SHIPS

300 FEET IN LENGTH AND OVER

FACILITIES AVAILABLE FOR PERFORMING TOPSIDE REPAIRS ON SHIPS

300' IN LENGTH AND OVER

EAST COAST

Ardell Marine Corporation Brooklyn, New York	Arnessen Electric Company, Inc. Brooklyn, New York
Atlantic Repair Co., Inc. Brooklyn, New York	Banks Ship Rigging Corporation Brooklyn, New York
Berkley Shipbuilding & Drydock Corp. Norfolk, Virginia	Best Repair Company Norfolk, Virginia
Cardinal Engine & Boiler Works, Inc. Brooklyn, New York	Charlton Marine, Inc. Jersey City, New Jersey
Diesel Injection Sales & Service Norfolk, Virginia	Electric Motor and Contracting Co. Norfolk, Virginia
General Ship Repair Corporation Baltimore, Maryland	Horne Brothers, Inc. Newport News, Virginia
Hudson Engineering Company Hoboken, New Jersey	Metro Machine Corporation Norfolk, Virginia
Marine Electric Corporation Brooklyn, New York	Moon Engineering Company, Inc. Norfolk, Virginia
A. Moe & Co., Inc. Philadelphia, Pennsylvania	Nordic Diesel & Machine Co., Inc. Brooklyn, New York
Munro Drydock Inc. Chelsea, Mass.	Reynolds Shipyards Corporation Staten Island, New York
Port Engineering Services Corp. Ft. Lauderdale, Florida	Surless Ship Repair Corporation Brooklyn, New York
Stephen Ransom, Inc. Newark, New Jersey	J-Y Industries Corporation Brooklyn, New York

Tickle Engr. Works, Inc.  
Brookly, New York

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

Norlantic Diesel Inc.  
Fairhaven, Mass.

GULF COAST

American Marine Corporation  
New Orleans, LA

Champion Machine Works, Inc.  
New Orleans, LA

Dixie Machine Welding & Metal Works  
New Orleans, LA

Frolich Iron Works, Inc.  
New Orleans, LA

Harrisburg Machine Co., Inc.  
Houston, Texas

McDonough Iron Works  
Galveston, Texas

Slocum Iron Works, Inc.  
Mobile, Ala.

WEST COAST

Cavanaugh Machine Works  
Wilmington, California

Ets-Hokin Corporation  
San Francisco, California

Franklin Machine Works, Inc.  
San Francisco, California

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

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

General Engineering Works.  
Philadelphia, Penn.

Wilmington Iron Works, Inc.  
Wilmington, North Carolina

Bludworth Shipyard, Inc.  
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

Gulf - Tampa Drydock Co.  
Tampa, Florida

Buck Kreihls Co., Inc.  
New Orleans, LA

Runyan Machine & Boiler Works, Inc.  
Pensacola, Florida

Colberg, Inc.  
Stockton, California

Duwamish Shipyard, Inc.  
Seattle, Washington

Ets-Hokin Corporation  
Wilmington, California

Harbor Boat Building Company  
Terminal Island, California

Pacific Marine & Supply Company, Inc.  
Honolulu, Hawaii

Rowe Machine Works, Inc.  
Seattle, Washington

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

Coastal Marine Engineering Co.  
San Francisco, California

General Engineering & Machine Works  
San Francisco, California

West Winds, Inc.  
San Francisco, California

Martinolich Shipbuilding Corporation  
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

#### 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



