

**1981**

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



**U.S. DEPARTMENT of TRANSPORTATION  
Maritime Administration**

\* 1981 \*

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

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Prepared by:

Office of Ship Construction  
Division of Production

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## Introduction

In compliance with 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 to be used primarily to determine if an adequate mobilization base exists for national defense and for use in a national emergency. This report on the 1981 survey of U.S. shipyard facilities was prepared by the Division of Production, Office of Ship Construction, and is for general use within the Maritime Administration (MarAd) and other Government agencies.

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### 1/Section 210

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



The statistical data accumulated by the survey is a major input into the Shipyard Production and Mobilization Model (SPAMM), a quantitative assessment of the Nation's ship construction and ship repair capability. This capability is periodically compared with Department of Defense scenarios involving various contingency attrition rates and emergency civilian shipping requirements to assess the adequacy of the shipbuilding mobilization base, including ship repair and reactivation of the Maritime Administration reserve fleet and the U.S. Navy reserve fleet.

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 Transportation, the Department of Defense, the Office of Management and Budget, and other Government agencies.

Each year in late spring, Standard Form 17, "Facilities Available for the Construction or Repair of Ships," is mailed to some 220 U.S. shipyards and ship repair facilities. The survey form was developed jointly by MarAd and the Navy. A completed Form 17 represents a detailed description of a shipbuilding or ship repair facility. The information requested, and available for official use, can be reviewed on a blank Form 17 shown herein as Appendix A. A graving drydock characteristics summary and a floating drydock characteristics summary are appended to Standard Form 17 to better identify the characteristics of the facilities.

Upon receipt of a completed Form 17 from a shipyard, MarAd forwards a copy to the Office of the Coordinator for Ship Repair and Conversion which maintains records of available facilities and capacities of various shipyards and repair plants so that the Department of Transportation and the Department of Defense can 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 Office of Industrial Resource Administration (Department of Commerce) with MarAd. The Federal Emergency Management Agency (FEMA) in the General Services Administration also receives this information.

### General

The annual shipyard survey of 1981 has been completed; and the information collected has been organized and condensed in

the following narrative, exhibits, and tabulations to focus attention on those elements that are most often requested from this office. Appendix B is an especially valuable statistical abstract of data gathered from those companies responding to MarAd's annual survey. It lists the Nation's major shipbuilding, ship repair, and drydocking yards sorted on a coastal basis and displays information with respect to the size and type of each building position, drydock, and berth space, employment, and remarks regarding principal shipyard activities.

MarAd has examined drydock data submitted by shipyards in the 1981 survey. In preparing Appendix B, the following criteria were developed to establish the maximum ship size that could be accommodated in each drydock:

For floating drydocks, the maximum ship length is as given by the shipyard. The maximum width was determined by allowing a 2-foot (.6 m) clearance at at each side between the ship and wing wall.

For graving docks, the maximum ship length was determined by allowing a 2-foot (.6 m) clearance at each end between the ship and the inside of the dock at the floor. The maximum width was determined by allowing a 2-foot (.6 m) clearance on each side between the ship and each side of the dock entrance at the sill.

There are several types of floating drydocks and graving docks, and under certain circumstances additional clearance would be necessary between the ship and the dock body. Permissible ship sizes requiring additional clearance may be determined by simple calculation from the above criteria.

### Major Shipbuilding Facilities

A major shipyard is defined in this report as one having at least one building position, either an inclined way, a side-launching platform or a building basin, with the capability to accommodate a minimum ship size of 475 feet (145 m) length overall and a beam of 68 feet (21 m). There are presently 30 shipyards in this category, which are identified and geographically located in Exhibit 1.

Despite the continuing worldwide shipping recession, uncertain near-term future prospects, and declining commercial orderbooks, the U.S. shipbuilding and ship repair industry in FY 1981 invested some \$190 million in facilities modernization and expansion and as of July 1, 1981, planned to spend an additional \$280 million during the

year ending June 30, 1982, mainly for larger drydocks and support facilities to increase vessel conversion, overhaul, and repair capabilities. Several yards have plans for gearing up for the anticipated increase in naval ship construction.

Since enactment of the Merchant Marine Act of 1970, the U.S. shipbuilding and ship repair industry has invested approximately \$2.3 billion in plant modernization and improvements. These investments have significantly increased the capacity, capability, and productivity of the industry. With the slump in ship construction, the emphasis in recent years has been expansion of ship repair and conversion facilities. Exhibits 2 through 33 are general arrangement plans outlining shipbuilding and repair facilities in 29 of the major yards. Detailed descriptions of these exhibits are included in this report.

As of October 1, 1981 (see Exhibit 34), MarAd was subsidizing a construction backlog of 12 merchant ships and the major reconstruction of 15 large commercial vessels. These were in addition to 24 nonsubsidized deep-draft merchant ships under construction in U.S. shipyards. There were 78 offshore drilling rigs on order with an estimated contract value of \$2.7 billion, representing 35 percent of all offshore drilling rigs on order worldwide. MarAd was providing Title XI financing guarantees for a wide variety of commercial vessels, barges, and offshore drilling rigs under construction in 66 American shipyards (see Exhibit 35). Exhibit 36 illustrates the continuing overall decline since the mid-1970's in both the numbers and gross tonnage of merchant ships being built in U.S. shipyards.

Table 1 has been prepared to answer the frequent question as to how many building positions are available to build a specified ship.<sup>1/</sup> A single shipway or basin may have several building positions depending on the size of the ships being constructed. For example, the 1,200-foot by 192-foot (366 m by 59 m) basin at Bethlehem's Sparrows Point shipyard can accommodate one 265,000-dwt. tanker or four of the smaller 475-foot by 68-foot (145 m by 21 m) cargo ships. With the exception of the mobilization ship, the ship types listed are mainly those presently under construction or recently delivered to commercial service. The number of building positions varies from 119 for the small cargo ship to one for the huge 390,770-dwt. tanker. Length overall and beam are given for all ships and, in addition, deadweight tonnage is indicated for the bulk carriers. An important

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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.

consideration that is ignored in Table 1 is the common shipbuilding practice of laying a keel on a building position already occupied by another ship. For example, in a 700-foot (213 m) basin, a complete 610-foot (186 m) 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 2 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 2 lists the 1,200-foot by 192-foot (366 m by 59 m) basin as one facility regardless of what type of ship is constructed in it. Table 1 indicated that there are six building positions for a ship 475 feet (145 m) LOA at Sparrows Point, whereas Table 2 indicates that the yard has three individual shipways capable of constructing a ship 475 feet (145 m) in length. Exhibit 37 is a histogram displaying the reduction in the number of available shipways as the maximum ship length increases.

Following is a brief description of 30 major U.S. commercial shipyards capable of constructing oceangoing or Great Lakes merchant ships, with a minimum size of 475 feet by 68 feet (145 m by 21 m).

#### 1. Alabama Dry Dock and Shipbuilding Company

Alabama Dry Dock and Shipbuilding Company (ADDSCO) has been in operation for 65 years. It is located on Pinto Island across the river from Mobile, AL, approximately 30 miles from the Gulf of Mexico. During World War II, this shipyard constructed 102 tankers and 20 cargo ships and has since built a variety of ships, barges and drilling rigs. For several years, the yard has been predominantly a repair and conversion facility. During the past three years, the company has continued its facility improvements, mainly the upgrading and modernization of existing drydocks, piers, shops and equipment.

Supplementing its booming ship repair and overhaul business, ADDSCO, as of October 1, 1981, was building three semisubmersible offshore drill rigs for Diamond M Company. The yard is aggressively seeking other construction contracts, especially for offshore drill rigs. In October of this year, ADDSCO completed a \$21 million contract for the overhaul of the destroyer tender YOSEMITE (AD-19).

Alabama Dry Dock operates four side-launching shipways, each of which can accommodate a maximum ship size of 523 feet by 68 feet (220 m by 21 m) and one sliding way which can handle vessels as large as 620 feet by 90 feet (189 m by 27 m). ADDSCO also operates two floating drydocks, the largest of which can accommodate a ship size of 750 feet by 100 feet (229 m by 30 m). There are also 9,370 feet (2856 m) of berthing space available at seven finger piers for topside and inboard repairs. There are 19 revolving gantry cranes with capacities up to 65 tons (59 metric tons) available to service the shipways and berthing areas. A 275-ton (250 metric ton) Goliath bridge crane, which straddles the slip between piers K and L, is used for repair work and outfitting. A twin-boom luffing derrick with 300-foot (91 m) high booms and a capability of handling 1,500 tons (1400 metric tons) at a working radius of 175 feet (53 m), which is located on the bank of the Mobile Ship Channel, is used for new construction and ship repair.

ADDSCO, as of July 1981, employed a labor force of 2,019, down from 2,300 a year earlier.

Exhibit 2 is a current general arrangement of the yard's facilities.

## 2. The American Ship Building Company - Lorain, Ohio

Since it was founded in 1899 in Lorain, Ohio, The American Ship Building Company has been a 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, Illinois. The TAMPA Division consists of only Tampa Shipyards, Inc., and the NABRICO Division consists of only Nashville Bridge Company. These are the 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 continued its leadership in the shipbuilding industry on the Great Lakes, specializing in the construction of ore carriers, besides building seven Coast Guard cutters, two naval auxiliaries, and a fisheries research vessel.

AMSHIP yards possess a high degree of sophistication in production methods. In 1971, the company completed an extensive modernization and improvement program at its Lorain shipyard, including new computer control programs and management information systems. This yard has large machine shops which can accommodate almost any type of machining operation within the marine industry. These shops can handle industrial as well as marine work. The

Lorain plant is one of two shipyards on the Great Lakes capable of building ships up to 1,000 feet (305 m) in length. The Lorain yard is the major source for new construction work, with the company's Toledo and Chicago yards supplying various components.

The JAMES R. BARKER, the first of two 1,000-foot (305 m) self-loading Great Lakes ore carriers for Pickands Mather and Co., was completed at Lorain in 1976. The MESABI MINER, a sistership of the BARKER, was delivered to Pickands Mather in 1977; and a third 1,000-footer, the GEORGE A. STINSON, was delivered in 1978. Through closely coordinated efforts among the AMSHIP Division's three yards (Lorain, Toledo, and Chicago), the company is in a position, under normal conditions, to deliver five of such vessels every three years.

In September 1980, the 1,000-foot (305 m) self-loading bulk carrier, EDGAR B. SPEER, was delivered to the United States Steel Corporation; and in May 1981, a similar vessel, the WILLIAM J. DeLANCEY, was delivered to the Interlake fleet of Pickands Mather. In July 1981, The American Ship Building Company was awarded a \$73 million contract to convert four Moore McCormack general cargo ships to larger self-sustaining breakbulk/container vessels. Most of the work will be done at the Lorain yard and at the company's subsidiary, Tampa Shipyards, Inc. With no major new construction work on order, AMSHIP is in active discussion for future construction of Great Lakes bulk carriers, oceangoing ships and barges, self-loading conversions, and repair work.

Repair and conversion work has for several years been an important source of revenue at Lorain. Repair work on Great Lakes vessels laid up for the winter has been at a high level at AMSHIP's Lorain and Toledo yards.

In the Lorain facility, graving dock No. 3, with a maximum ship size of 1,021 feet by 121 feet (311 m by 37 m) is used for new construction. The yard's other graving dock which can handle ships up to 708 feet by 78 feet (216 m by 24 m), is used for repair and overhaul work. A total of about 1,800 feet (549 m) of berthing space is available for repair and outfitting.

At mid-1981, the total payroll at Lorain was approximately 100, compared to 930 at mid-1980.

Exhibit 3 is a current plot plan of facilities at the Lorain plant.

### 3. The American Ship Building Company - Toledo, Ohio

In 1947, The American Ship Building Company purchased this shipyard from the Toledo Shipbuilding Company. Like the Lorain

yard, the Toledo plant is a complete, modern, full-service shipyard, equipped for new construction, conversion, repairs, and general heavy fabrication and machine work.

In addition to repair, overhaul and conversion work, Toledo in the 1960's and 1970's built the following vessels: an oceanographic survey ship, a naval patrol escort, a Coast Guard cutter, and three Great Lakes ore carriers, the last of which was the self-unloader, ROGER M. KYES, delivered in 1973.

Repair and overhaul work on Great Lakes vessels during the winter lay-up is an important source of business. Besides repair and overhaul, the Toledo plant in the late 1970's fabricated midbody sections and bow units for large bulk carriers under construction at Lorain. In September 1980, the yard completed the conversion of the ELTON HOYT II from a straight deck ore carrier to a self-unloader for Interlake Steamship Company; and the Cleveland Cliffs ore carrier EDWARD B. GREENE was redelivered in April 1981 after conversion to a self-unloader.

The Toledo yard is currently engaged in the construction of midbodies for The American Ship Building Company's \$73 million contract to jumboize four Moore McCormack cargo ships. The yard is also heavily booked for repair and overhaul work during this coming winter.

The AMSHIP Division's Toledo yard utilizes the headquarters engineering staff located at Lorain for work requiring a technical staff. Toledo, like the Lorain plant, has large machine shops which can accommodate almost any type of machining operations within the marine industry. These shops can also handle industrial work. Complete facilities for repair of ships' propellers are available. Toledo also operates a fleet of repair craft for work away from the shipyard.

The company maintains two graving docks at Toledo. One can accommodate vessels up to 680 feet by 78 feet (207 m by 24 m), and the other, vessels as large as 540 feet by 68 feet (165 m by 21 m). Usable berthing space totals about 1,600 feet (488 m).

Total employment at mid-1981 was 90, down from 330 in the summer of 1980.

Exhibit 4 is a current layout of AMSHIP's Toledo yard.

#### 4. Avondale Shipyards, Inc.

Avondale Shipyards, a subsidiary of Ogden Corporation, is located on the west bank of the Mississippi River approximately

nine miles upstream of New Orleans, LA. Avondale has developed into one of the largest and most diversified shipyards in the country. The yard has constructed dry cargo ships, tankers, Navy ships, Coast Guard cutters, offshore drilling rigs and drill ships and has the distinction of being the only American shipyard to have constructed LASH vessels. A total of 22 have been delivered to various U.S. shipowners, and all 22 were built with the aid of construction-differential subsidy. Ships completed during the first nine months of 1981 were: one LASH ship, three integrated tug/barge chemical/oil tankers, one 42,000-dwt. product tanker, one oceangoing diesel-propelled hopper dredge, and two fleet oilers (AO's) for the U.S. Navy.

As of October 1, 1981, commercial ships in production or on order at Avondale were: three large containerships for American President Lines, one 42,000-dwt. Ogden Marine product tanker, three 42,500-dwt. product tankers for Exxon, two oceangoing diesel-propelled hopper dredges, and a large cement barge. Also under construction were three fleet oilers (AO's) for the Navy.

In 1975, Avondale completed a multimillion-dollar facilities improvement program primarily for the construction of large LNG ships. The shipbuilding area previously used for series production of Navy destroyer escorts was restructured and expanded into two large positions to accommodate vessels of up to 1,020 feet (311 m) in length by 174 feet (53 m) in beam. The major part of one ship can be erected along with the stern section of a second ship on Position No. 1 while a third hull is being finalized on position No. 2. Avondale's large floating drydock is 900 feet (274 m) long, 260 feet (79 m) wide and 78 feet (24 m) high, with 220 feet (67 m) clear width inside the wing walls. It can accommodate ships as large as 1,000 feet (305 m) in length by 216 feet (66 m) wide, and the lifting capacity is 81,000 long tons (82296 metric tons). The dock is serviced by gantry cranes of up to 200 tons (182 metric tons) capacity which are mounted on the supporting wharf, two 50-ton (45 metric ton) gantry cranes on the drydock floor, and a 600-ton (610 metric ton) floating lifting device. In addition to its use as a launching platform for new construction, this drydock has given the company the capability of performing a variety of conversion and major repair work. Additional buildings and equipment to supplement the yard's mechanized material-handling, fabrication and blasting/painting systems are also part of Avondale's recent expansion program.

Besides its "upper yard" building positions, Avondale has a side-launching construction area that can accommodate ships as large as 1,200 feet by 126 feet (366 m by 38 m) with a light weight of approximately 16,000 long tons (16026 metric tons). Up to five large vessels, greater than 600 feet (183 m) LOA, can be under construction simultaneously in this "lower yard" area.



Avondale employs a unique transfer method, whereby large sections of a ship, or entire ships, are move horizontally to different building positions. A ship might be situated and worked on in four different building positions between keel laying and launching. For relatively small vessels, e.g., destroyer escorts, the yard perfected a rotating jig to allow for the maximum use of downhand welding of the hull. Modern construction methods and steel processing facilities have made Avondale one of this country's most productive shipyards. No U.S. shipbuilder has had more success with series production of commercial ships. The yard offers approximately 3,800 feet (1158 m) of berthing space, serviced by gantry cranes. Use of the 600-ton (610 metric ton) floating lifting device is available along the entire length of the berths.

Scheduled for construction, with a completion date of June 1982, is a 1,710-foot (521 m) extension to the downriver end of wet dock No. 3. Avondale will soon begin construction of an additional floating drydock 650 feet (198 m) long by 150 feet (46 m) wide and a lifting capacity of 23,000 tons (23368 metric tons). This new drydock is scheduled to begin operation in late 1982.

Avondale's nearby Westwego, LA, facility is capable of building vessels 450 feet (137 m) long by 90 feet (27 m) in beam. A floating drydock with a lifting capacity of 3,800 long tons (3861 metric tons) is available at Westwego for repair of small ships, river boats and barges.

In July 1981, the total labor force was 7,300, compared to about 7,500 a year earlier.

Exhibit 5 is a current arrangement plan of Avondale's main plant.

## 5. Bath Iron Works Corporation

Bath Iron Works Corporation, a subsidiary of Fibac Corporation, is located on the Kennebec River in Bath, ME. The small iron foundry which was established on this site in 1826 become Bath Iron Works, Ltd. in 1884, and the first shipbuilding began in 1889. This experienced shipyard has engaged in both Navy and commercial ship construction, as well as Navy overhaul and repair work. The yard has a history of proven diversity, having constructed various types of ships including roll-on/roll-off cargo vessels, container-ships, tankers, barges, fishing vessels, destroyers, and guided-missile frigates. Bath has built a total of 168 destroyers for the Navy. In the late 1960's and early 1970's, six containerships were delivered to American Export Lines; and in 1975, the yard

completed a series of five 25,000-dwt. tankers. In 1977, the company completed the last of four large sophisticated roll-on/roll-off cargoliners (MA Design C7-S-95a) for States Steamship Company. In 1978, a containership was delivered to Matson Navigation Company; and in 1980, the second of two containerships (MA Design C5-S-73b) was delivered to Farrell Lines. Currently in the commercial ship construction field, Bath is building a large seagoing diesel-propelled hopper dredge for the Corps of Engineers and a 37,000-dwt. oceangoing barge for C&H Sugar Company. Both of these projects were subcontracted to BIW by Sun Ship. In January 1981, BIW was awarded a contract for the construction of two 34,000-dwt. product tankers (MA Design T6-M-136a) to be built with the aid of CDS for Falcon I Sea Transport Company.

Bath Iron Works is one of the industry leaders in design, construction, and modernization of destroyer-type vessels for the U.S. Navy. BIW is the lead shipbuilder for the Navy's guided-missile frigate (FFG-7 Class) program. The lead ship, the OLIVER HAZARD PERRY, was completed in 1977; and the Navy has awarded the company follow-on contracts for the construction of 19 additional FFG-7 Class guided-missile frigates, the last of which is scheduled for delivery in 1985. As of October 1, 1981, there were 13 of these ships on order or in various stages of construction. Now at the peak of production on the FFG program, the Bath shipyard is launching an FFG approximately every 3½ months. Also swelling the backlog of work were the major overhauls of three Navy ships.

In 1974, Bath completed a major expansion and modernization program. The upgrading of facilities included the reconstruction of two shipways to accommodate ships of 700 feet (213 m) in length between perpendiculars (LBP) with a maximum beam of 130 feet (40 m), or two ships per way with a beam of 54 feet (16 m) each; the installation of a 220-ton (200 metric ton) level-luffing crane with sufficient outreach to erect units on all shipways; and new steel fabrication shops and equipment that have increased steel throughput capacity by 50 percent. To accommodate its accelerated naval shipbuilding program, BIW in 1979 began its latest expansion and facilities improvement program which will continue into 1981. Included in the earlier stage of this program were: expansion of the main assembly building to double the interior work area, installation of additional computer-aided lofting and burning equipment, and expanded machine shop and pipe shop capability. In the current stage of this program, the main assembly building is being extended by another 412 feet (126 m). Also under construction are an additional blast and paint facility and two 300-foot by 60-foot (91 m by 18 m) platens with movable covers.

Complementing its shipbuilding activities, BIW has a fully staffed Overhaul Division and Industrial Products Division. These divisions account for a surprising percentage of the shipyard's annual revenues.

In addition to the two upgraded building positions, Bath operates one other shipway that can accommodate a ship 650 feet (198 m) in length with a beam of 88 feet (27 m). For drydock work, there is an 8,400-ton (8534 metric ton) floating drydock that can handle ships up to 550 feet by 88 feet (168 m by 27 m). Two wharves and a pier provide a total of 2,900 linear feet (884 m) for outfitting and repair work.

BIW operates a supporting facility, the Hardings plant, located three miles (4.8 km) from the shipyard at East Brunswick, where 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 plant has been highly mechanized and computerized, and much of the work is automated.

BIW plans to begin construction in early 1982 on a new \$46.7 million ship repair and overhaul facility in Portland, ME. The new shipyard, which will include a 24,000-ton (24384 metric ton) floating drydock, will be used initially for repair and outfitting of Navy and commercial vessels and is expected to employ 1,000 people by 1986.

As of mid-1981, the company's administrative and production work force totaled 6,565, its highest employment since World War II. Employment in June 1980 was 6,000.

Exhibit 6 is a current plot plan of the Bath Iron Works facilities.

## 6. Bay Shipbuilding Corporation

Bay Shipbuilding Corporation, located in Sturgeon Bay, WI, is the largest shipbuilder on the Great Lakes. Its parent company, The Manitowoc Company, Inc., purchased Sturgeon Bay Shipbuilding and Dry Dock Company in 1968 and the adjoining Christy Corporation property in 1970. These two facilities were combined to form the Bay Shipbuilding Corporation. The present plant has channel access from both Lake Michigan and Green Bay and provides ample dock space for Great Lakes vessel repair and for new construction.

Bay Shipbuilding has built more modern self-unloading ships than any other shipyard in the United States. From 1978 through 1979, the following self-unloading ore carriers were completed: the CHARLES E. WILSON, H. LEE WHITE, SAM LAUD, ST. CLAIR, JOSEPH L. BLOCK, BELLE RIVER, BUFFALO, LEWIS W. FOY, EDWIN H. GOTT, FRED R. WHITE JR., and INDIANA HARBOR. Four of these were 1,000-foot (305 m) self-unloading vessels. These were constructed in

two sections. The bow portion of the ship is built from prefabricated sections and side launched, and the stern section is built in the graving dock and later joined to the bow portion. During 1980, Bay Shipbuilding completed the self-unloading ore carriers AMERICAN MARINER and BURNS HARBOR and a large tanker barge. In May 1981, two more Great Lakes self-unloaders were delivered -- the AMERICAN REPUBLIC to American Steamship Company and the COLUMBIA STAR to Oglebay Norton.

Bay Ship is actively competing in the salt water ship construction market, including offshore drilling rig components and assemblies. Two large deep-notch ocean petroleum and chemical barges were delivered in 1980. Currently in production are two more deep-notch seagoing barges for coal and grain, and a 42,000-dwt. self-unloading phosphate barge. Ship repair, especially during the winter months, is an important part of the yard's activities.

Production methods at Bay Shipbuilding are highly sophisticated. The company in 1977 completed a major facilities expansion program that has enabled the shipyard to build 1,000-foot (305 m) Great Lakes bulk carriers. The new graving dock can accommodate a vessel as large as 1,100 feet by 136 feet (335 m by 41 m) and is the largest such dock on the Lakes. It is serviced by a 200-ton (182 metric ton) traveling gantry crane and several crawler cranes. Recently completed capital expenditures were made on the following facilities and equipment: additional 2,400 linear feet (732 m) of new dock wall; a 30,000 square-foot (2787 m<sup>2</sup>) expansion to the fabrication shop with 100-ton (91 metric ton) bridge crane capacity; new pipe shop, carpenter shop, and stores distribution center; shot blast and prime surface treatment line; one-side panel welder; computer lofting and numerically-controlled plasma arc burning machine; and expanded in-house design capabilities. Steel fabrication capacity for ship construction is estimated to be 36,000 tons (32681 metric tons) per year.

Bay operates a side-launching way that can accommodate a maximum ship size of 750 feet by 105 feet (229 m by 32 m), and one floating drydock is available which can handle ships up to 650 feet by 66 feet (198 m by 20 m). There is 7,090 feet (2161 m) of berthing space for repair and outfitting. The 14 available piers are serviced by crawler cranes of up to 100 tons (91 metric tons) capacity each.

At mid-1981, total employment was 1,500, approximately the same as a year earlier.

Exhibit 7 is a current general arrangement plan showing Bay Shipbuilding's facilities.

## 7. Bethlehem Steel Corporation - Beaumont Yard

This shipyard, located on the Neches River in Beaumont, TX, was established in 1917 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 offshore drilling rigs and offshore facilities needed to find and produce oil and gas from under the world's continental shelves. The Beaumont plant has been one of Bethlehem's most successful operations and is one of the world leaders in production of offshore drilling rigs and drillships. It is also an experienced builder of barges, primarily of the sophisticated tank type required by Gulf Coast industries for the transportation of liquid and bulk chemicals.

In August 1981, Bethlehem-Beaumont delivered the 50th jackup drilling unit commissioned by the Beaumont yard since it built its first jackup rig in 1954. This delivery also marked the 87th offshore rig delivered by Bethlehem shipyards. As of October 1, 1981, the yard had 12 offshore jackup rigs under construction or on order.

The Beaumont plant is highly mechanized. In 1973, the company completed a multimillion-dollar modernization program, including a new panel line and new materials-handling facilities; and currently there is also an ongoing program of facilities improvement. Bethlehem-Beaumont has one side-launching way that can accommodate ships up to approximately 800 feet by 96 feet (244 m by 29 m) and also operates a smaller side-launching way which is available for barge or module construction and repair work.

This shipyard maintains a complete repair service with the capability to perform virtually every phase of ship repair and reconditioning work. Major facilities include a 17,500-ton (17,780 metric ton) capacity floating drydock which can handle vessels as large as 650 feet by 84 feet (198 m by 26 m). There are 4,050 feet (1234 m) of fully-serviced piers and wharves and mobile equipment for servicing ships or other vessels at pier-side or anchorage. With a 500-ton (508 metric ton) lift capacity, the company's barge-mounted "Big Bessie" is the largest floating derrick in Port of Beaumont.

Employment at Bethlehem-Beaumont totaled 2,300 at mid-1981, up from 2,177 of mid-1980.

Exhibit 8 is a current layout of the plant and facilities.

## 8. 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 standpoint of continuous service. One of the largest and most versatile repair yards in the country, it offers a complete range of ship repair and reconditioning services and can handle conversion and jumboizing work, as well as wide range of industrial work. It is also capable of constructing large oceangoing ships.

During World War I, as a subsidiary of Bethlehem Steel, this shipyard delivered destroyers at the rate of three a month. In the huge shipbuilding, repair and conversion programs of World War II, the yard, with the help of facilities leased from the Navy, built 72 ships including 52 Navy combat vessels. In addition, about 2,500 Navy and commercial vessels were repaired or converted at the yard during the World War II period.

In the 1950's, ship repairs, conversions and special industrial work were followed by construction of two destroyer escorts, five C4 Mariner class cargo ships, a wine tanker, and four medium-size oil tankers.

Bethlehem-San Francisco demonstrated its flexibility in the 1960's. Shipbuilding continued with the construction of four C4 cargo ships, two Navy destroyer escorts, and a number of oil and rail barges; but the yard's management believes its greatest accomplishment was the fabrication of 57 sections of trans-bay underwater tube for the San Francisco Bay Area Rapid Transit (BART), the longest sunken-tube tunnel in the world.

In the 1970's, the yard's specialty was barge design and construction. In 1976, activity was highlighted by the completion of a three-year program to build 22 large 400-foot by 100-foot (122 m by 31 m) barges. During 1977 and 1978, in addition to repair work, the company converted four LASH vessels to full containerships for Pacific Far East Line.

In July 1980, the yard completed the last of six combination grain/petroleum barges for Crowley Maritime Corporation; and in 1981, two large deck cargo barges were delivered to a subsidiary of Crowley. Currently, the barge AGATTU is being rebuilt for another Crowley subsidiary, with delivery scheduled for early 1982.

Bethlehem-San Francisco operates one building way, a conventional end-launch type that can accommodate ships up to 600 feet by 90 feet (183 m by 28 m). The yard's larger floating drydock with a maximum vessel size of 950 feet by 144 feet (290 m by 44 m) has a lifting capacity of 65,000 long tons

(66040 metric tons). This drydock, designed by Bethlehem and built at the San Francisco yard, is capable of serving the largest tankers that transport crude oil from Alaska to West Coast ports. The company also maintains a second floating drydock, with a maximum vessel size of 700 feet by 94 feet (213 m by 29 m), and about 3,200 linear feet (975 m) of usable berthing space along four piers, all fully serviced with utilities and by cranes of up to 50 tons (45 metric tons) capacity.

The total work force at mid-1981 was approximately 500, down from 890 a year earlier.

Exhibit 9 is a current plot plan of the Bethlehem-San Francisco plant and facilities.

#### 9. Bethlehem Steel Corporation - Sparrows Point Yard

Sparrows Point, the largest of Bethlehem Steel's six shipyards, is located on the Patapsco River in the Baltimore, MD, metropolitan area. Established in 1891, the yard became part of the Bethlehem organization in 1916 and served as a major shipbuilder during two world wars. During World War II, Sparrows Point constructed 101 vessels of 16 different classes. During the 1950's and 1960's, it was among the most active yards in the Nation, specializing in series construction of standard sizes of Bethlehem-design tankers, as well as freighters and container-ships. Sparrows Point is primarily a shipbuilding yard, and in its building basin, the second largest in the United States, it is capable of constructing oil tankers of sizes up to about 300,000 dwt.

In November 1977, the yard completed the last of a series of five 1,100-foot (335 m) crude carriers (MA Design T10-S-101b), among the largest ever built in the United States.

With a dip in the tanker market, the yard turned its expertise to building containerships. The first of two of these ships (MA Design C8-S-85d) was delivered to Farrell Lines in December 1979, and second containership, the AUSTRAL PURITAN, was completed in November 1980.

Work under contract at Sparrows Point as of October 1, 1981, comprised the following: six 47,000-dwt. oceangoing tug/barge CATUG tankers (construction of the tugs is subcontracted to Halter Marine), and four jackup drilling rigs.

With its range of skills, tools, and facilities, this yard is called upon regularly by various industries to produce large-

scale fabricated steelwork, weldments, and a variety of specialized assemblies.

To provide the capability for construction of supertankers at Sparrows Point, millions of dollars were invested in facilities improvements: establishing new production and materials-handling methods, installing new and sophisticated systems and equipment, and developing new design concepts and engineering techniques. The major components of this program, completed in 1974, were the building basin for construction of ships as large as 1,200 feet by 192 feet (366 m by 59 m) and a 68,000-square-foot (6317 m<sup>2</sup>) panel shop for fabrication of steel. This fabrication shop is capable of constructing panels weighing up to 200 tons (182 metric tons). Other improvements included the structural strengthening of pier No. 1, a numerically controlled gas plate-cutting machine, automated plate and shape blasting-painting equipment, and expanded machine shop and pipe shop capability.

Complementing the large construction basin, which is served by four 200-ton (182 metric ton) tower cranes, Sparrows Point maintains two active building ways, each of which can accommodate a maximum ship size of 900 feet by 108 feet (274 m by 33 m). Two smaller sliding ways are being used as platen areas and would require extensive refurbishing to reactivate. The yard does not have drydocking facilities except for the building basin which is currently used for construction work. Four outfitting berths are available with a combined length of 3,970 linear feet (1210 m) of space serviced by four tower cranes with lifting capacities up to 50 tons (45 metric tons). Several locomotive cranes of various capacities are also available.

The total labor force at the Sparrows Point yard was 2,964 at mid-1981, up from 2,866 a year earlier.

Exhibit 10 is a current plot plan outlining the company's construction facilities.

#### 10. FMC Corporation - Marine and Rail Equipment Division

FMC Corporation's Marine and Rail Equipment Division, originally known as Gunderson Bros. Engineering Corporation, is located on the Willamette River in Portland, OR. This facility, also a major manufacturer of railroad freight cars, is an experienced builder of tankers, tugs, barges, ferry boats, small military craft, and wide range of marine structures.

In 1977, FMC completed a series of five gas turbine-powered electric-drive tankers. These "handy size" product carriers are under charter to Chevron Shipping Company, a wholly owned subsidiary of Standard Oil Company of California.



In 1978, the company turned to barge construction. In recent years, FMC has built triple-deck RO/RO barges, 580 feet by 105 feet (177 m by 32 m), and a series of 400 feet by 100 feet (122 m by 30 m) deck cargo and oil tank barges, plus several smaller barges. Currently under construction are three combination oil/deck barges for service to Alaska.

To expand its shipbuilding capability to include construction of oceangoing ships, FMC in 1970 undertook a major improvement program. Included in this expansion program was the purchase of a 200-ton (182 metric ton) whirley crane, new types of welding equipment, a 1,000-ton (908 metric ton) press, and numerically controlled burning equipment which is fed by tapes generated by computerized lofting. The panel line and subassembly buildings are amply serviced by several overhead cranes with capacities up to 40 tons (36 metric tons). FMC can fabricate steel modules weighing up to the 200-ton (182 metric ton) limit of the crane and transport them to the ship for erection. Modular living quarters complete with interior decor, carpeting and drapes, can be erected to reduce outfitting time and cost.

The yard operates one set of side-launch ways that, with minor modifications, can accommodate a maximum ship size of 750 feet by 130 feet (229 m by 40 m). The launching ways are serviced by one 200-ton (182 metric ton) capacity whirley crane.

FMC has one 1,100-foot (335 m) outfitting dock serviced by a 50-ton (45 metric ton) whirley crane. Drydocking is done in the nearby Port of Portland facility.

At mid-1981, the labor force involved in marine work totaled 300, unchanged from mid-1980.

Exhibit 11 is a current general arrangement drawing of FMC's ship construction facilities.

#### 11. Fraser Shipyards, Inc.

The Fraser yard, the only major American shipyard and drydock operation on the Western end of the Great Lakes, is located on Howards Bay in Superior, WI. Since it was founded in the 1890's by Capt. Alexander McDougall, who built 42 of his famous "whaleback" steamers and barges there, this plant has had a succession of owners. From 1900 to 1926, Superior Shipbuilding Co. operated the yard and built more than 50 large Great Lakes ore carriers and oceangoing ships. The yard became a repair facility of The American Ship Building Co. from 1926 to 1945 and then became known as Knudsen Bros. Shipbuilding and Dry Dock Co.

Fraser-Nelson Shipbuilding & Dry Dock Co. took over the plant in 1955, and the present name was adopted in 1964. In August 1977, the yard was sold to Reuben Johnson & Son, Inc., a Superior, WI, contracting and construction firm, but business continues under the Fraser name.

Since World War II, this complete shipbuilding and ship repair facility has specialized in vessel repair and ship modernization including lengthenings, repowering and engine room automation, and self-unloader conversions. In the past nine years, Fraser has performed most of the major ship lengthening work on the Great Lakes. At this shipyard, general ship repair is also an important source of revenue.

In early 1981, Fraser completed the \$14.2 million conversion of the CHARLES M. BEEGHLY from a straight-deck bulk carrier to a self-unloading bulker for Interlake Steamship Company. Currently, Fraser Shipyards has a contract to convert three ships of U.S. Steel Corporation's Great Lakes fleet -- the ARTHUR M. ANDERSON, CASON J. CALLAWAY, and PHILLIP R. CLARKE -- to self-unloaders, with deliveries scheduled for 1982.

Fraser operates two graving docks suitable for ship construction, repair and conversion work. One basin can accommodate a vessel 825 feet by 82 feet (251 m by 25 m), and the other a vessel 620 feet by 61 feet (189 m by 19 m). A small graving-type drydock was added in 1973 to build new midbody sections for the bulk ore freighters under contract for lengthening. There is 4,450 feet (1356 m) of pierside berthing. Fraser's 10 mobile cranes, ranging from 15 tons (14 metric tons) to 150 tons (136 metric tons) can service any building dock and outfitting and repair berths and also can be floated on a crane lighter for work afloat. The company also operates an "outside" repair fleet, totaling 12 units -- tugs, work launches and floats -- capable of performing repairs on vessels while they are loading or unloading cargoes in Duluth-Superior harbor and adjacent ports.

The yard's work force totaled 390 at mid-1981, up from 211 a year earlier.

Exhibit 12 is a current plot plan of Fraser's shipbuilding and ship repair facilities.

## 12. Galveston Shipbuilding Company

Galveston Shipbuilding Company, formerly a division of Kelso Marine, Inc., covers 25 acres of waterfront on Galveston Island's bay side adjacent to the Intracoastal Canal in Galveston, TX.

This Gulf Coast yard began operations in 1966 and has been primarily a builder of barges and tugs, although it has the capability of building medium-size tankers. Galveston Shipbuilding has probably built more oceangoing deep-notch barge units than any other yard in the country, including some of the most sophisticated vessels serving the petroleum and chemical industries.

During the first nine months of 1981, this shipyard completed five large oceangoing barges, including a 55,000-dwt. deep-notch petroleum barge for Belcher Oil Company. On October 1, 1981, four barges were under construction -- two deep-notch petroleum carriers, one dry-bulk barge, and one deck barge.

Galveston Shipbuilding has one building way (side-launching) on which oceangoing ships or barges can be built, the maximum vessel size being about 700 feet by 120 feet (213 m by 37 m). A present limitation is that, except at the launch site where the water is approximately 20 feet (6 m) deep, the water depth on the way to the channel is only about 12 feet (4 m). However, by means of pontoons (sectional barges fitted together), a vessel with up to 18-foot (5 m) draft could be floated out to Galveston harbor. Launching weights of hulls are kept as low as possible with final installation of equipment done at the Galveston municipal pier. Since the yard is not geared to major machinery installation work, machinery is usually installed by a subcontractor.

In addition to its large side-launch way, Galveston Shipbuilding has four smaller shipways served by an 800-ton (813 metric ton) syncrolift. In the absence of a drydock, arrangements must be made to drydock large vessels at Todd-Galveston or Levingston Shipbuilding Company. Since Galveston Shipbuilding does not have an outfitting berth, outfitting is done at the municipal pier in Galveston.

In mid-1981, Galveston Shipbuilding Company's total work force was 400, up slightly compared to a year earlier.

Exhibit 13 is a current general arrangement drawing of the yard's ship construction facilities.

### 13. General Dynamics Corporation - Electric Boat Division

This shipyard, located in Groton, CT, is privately owned but is engaged exclusively in construction of submarines for the U.S. Navy.

#### 14. General Dynamics Corporation - Quincy Shipbuilding Division

The Quincy Shipbuilding Division of General Dynamics Corporation is located on the Fore River in Quincy, MA. This shipyard, which was purchased from Bethlehem Steel Corporation in 1964, delivered 18 ships to the Navy from 1964 to 1973. These included four nuclear-powered submarines, two ammunition ships, six replenishment oilers, two submarine tenders, and four dock landing ships. In 1973, the last of three revolutionary barge-carrying ships (MA Design C8-S-82a) built for Lykes Bros., was completed.

General Dynamics is the world's principal builder of liquefied natural gas (LNG) carriers; but in September 1980, Quincy delivered the last in a series of 10 high technology, 125,000-cubic-meter LNG carriers. The first of these 935-foot (285 m) long sisterships, the LNG AQUARIUS (MA Design LG8-S-102a), was completed in 1977 and was the first LNG ship built in the United States. Although the company continues to be cautiously optimistic about the long-term prospects for building additional LNG carriers, it could be some time before Quincy can obtain new firm orders. In the meantime, the company is aggressively pursuing shipbuilding and repair work in order to keep its skilled labor force intact.

As of October 1, 1981, Quincy's new construction backlog consisted of three large deep-notch oil barges, a 36,000-dwt. coal-fired collier, and a Waterman Steamship Corporation RO/RO containership being built for Sun Ship.

To provide the tools and facilities to efficiently build LNG tankers in series production, General Dynamics in 1975 completed a major expansion and modernization program. In addition to the conversion of two conventional sliding ways to large construction basins, other improvements at Quincy included: a steel fabrication facility, materials-handling equipment, two 200-ton (188 metric ton) transporters, a double-bed flat bar stripper, a web cutter with 19 torches in tandem, an angle fabricator, two web stiffener welding gantries, a T-beam fabricator, two plate stiffeners, a one-sided butt welding gantry, and two 40-ton (36 metric ton) cranes. In addition, a 1,200-ton (1089 metric ton) Goliath crane, the largest gantry in the Western Hemisphere, was installed for transferring the spherical LNG tanks from the barge, on which they are delivered one at a time, to the LNG ships under construction. The company in 1975 also expended several millions of dollars for tools, machinery and buildings at its newly acquired Charleston, SC, facility for fabrication of the 800-ton (726 metric ton) spherical aluminum tanks for the LNG's constructed at Quincy. General Dynamics is currently building drilling rigs at this Charleston plant.

The five building positions at Quincy include three assembly basins and two new construction basins. Especially noteworthy is the ingenious construction schedule for the LNG carriers. Since Basins No. 11 and 12 can only accommodate ships up to 860 feet (262 m) in length and 144 feet (44 m) in beam, and since the LNG vessels were 935 feet (285 m) LOA, hull erection in Basins No. 11 and 12 excluded the bow section. Following float-out from No. 11 or No. 12, the ships were 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 feet (285 m by 44 m). The 900-ton (817 metric ton) bow units of the LNG's were constructed at the inboard end of Basin No. 6 and were lifted by the 12,000-ton (1089 metric ton) Goliath crane over into No. 7 where they were attached to the hull. The spheres were barged into the outboard end of No. 6 and lifted into No. 7 for installation. Basins No. 6 and 8 can each accommodate ships 870 feet by 123 feet (262 m by 37 m).

The yard also 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 (1402 m). Each pier and the wet basin is serviced by adequate crane capacity for outfitting and general repair work. The building basins can be used as drydocks for repair work when not in use for new construction or conversion. In addition to ship construction, the yard also manufactures and fabricates a large range of industrial products and non-ship components.

The total workforce at Quincy at mid-1981 was 2,700, down from about 3,650 a year earlier.

Exhibit 14 is a current layout of the Quincy Shipbuilding Division's plant and facilities.

#### 15. Ingalls Shipbuilding Division/Litton Systems, Inc.

The Ingalls Shipbuilding Division is actually two separate shipyards. Located on the Gulf of Mexico at Pascagoula, MI, Ingalls is a diversified shipbuilding complex experienced 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 analysis, logistic system analysis, and ship design concepts. Ingalls was a pioneer in the application of modular construction in the U.S. shipbuilding industry.

Although the construction of combatant ships for the U.S. Navy was the company's principal activity during 1981, Ingalls as of October of this year had 13 offshore drilling rigs on order

or in production. Fabrication and assembly of railroad cars has also been a thriving business at Ingalls. From 1979 until July 1, 1981, a total of 2,463 chemical and grain hopper cars had been delivered.

Three guided-missile destroyers, the KIDD (DDG-993), the CALLAGHAN (DDG-994), and the SCOTT (DDG-995) were completed in 1981; and the CHANDLER (DDG-996) was slated for delivery in January 1982. Also under construction at Ingalls as of October 1, 1981, were one Spruance class destroyer, and two Ticonderoga class guided-missile cruisers, each to be equipped with the Aegis weapons system.

The older of the two Ingalls yards is referred to as the East Bank yard. It has been in operation for 43 years, engaging primarily in new construction of commercial cargo ships and tankers, and in 1974 completed a series of highly productive containerships, the last commercial ships built at Ingalls. The yard maintains six inclined shipways. Maximum ship sizes which can be accommodated are: four ways 650 by 90 feet (198 m by 27 m), one way 690 feet by 85 feet (210 m by 26 m), and one way 550 by 80 feet (168 m by 24 m). The East Bank plant has one small graving dock which has been used for construction of nuclear-powered submarines but is currently being used mainly for repair work. A wharf and four piers serviced by cranes with a 50-ton (45 metric ton) maximum capacity provide a total of 3,700 feet (1128 m) of berthing space for outfitting and topside repair.

The newer West Bank yard, completed in 1970, was designed and equipped for series production using modular construction methods. The yard is geared to assembly-line construction of large Navy and merchant ships. The West Bank plant 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 6,000-ton (5447 metric 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 (floating drydock) which is subsequently floated and moved to a deep water area where it is sunk and the ship launched. The West Bank yard can launch a maximum ship size of 800 feet by 173 feet (244 m by 53 m). 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 (1341 m) of berthing space, serviced by cranes up to 200 tons (182 metric tons) are available for outfitting.

The company has an ongoing capital investment and improvement program to continually upgrade its facilities to utilize the latest available technology.

Ingalls Shipbuilding Division at mid-1981 employed a total labor force of 12,700, compared to 11,170 a year earlier.

Exhibits 15 and 16 are current general arrangement plans of facilities in the Ingalls East Bank and West Bank yards.

#### 16. Levingston Shipbuilding Company

Levingston Shipbuilding Company, one of the leading producers of offshore drilling rigs, was founded in 1933. This 100-acre shipyard is strategically located on the Sabine River at Orange, TX, approximately 30 miles (48.3 km) inland from the Gulf of Mexico. Gulfport Shipbuilding, in Port Arthur, TX, was purchased in 1970 by Levingston to supplement Levingston's construction and repair facilities at the Orange plant. From 1975 to 1980, Levingston was a wholly owned subsidiary of Ashland Oil, Inc., and tug and barge construction was effectively abandoned for the building of larger vessels and offshore drilling rigs.

In May 1981, Levingston officials announced the formation of a new corporate organization, Levingston Industries, Inc., headquartered in Orange, TX. Wholly owned subsidiaries are Levingston Shipbuilding Company, Orange, TX; Texas Gulfport Shipbuilding Company (formerly Gulfport Shipbuilding), Port Arthur, TX; and Levingston Marine Corporation.

Levingston combines commercial ship construction with its traditional offshore industry work, with a solid base of ship repair and some industrial fabrication. Levingston has built more than 700 vessels of all types since it started steel ship construction in 1933. Of this total, 164 were for the offshore industry -- including drillships, semisubmersibles, jackup rigs, and barges and tenders of various types. The company has also built 167 vessels for the U.S. Government, including frigates, a surface-effect ship, and 162 tugs and coastal vessels. For the commercial marine industry, Levingston has built a total of 373 vessels (mostly barges) as well as tankers, small roll-on/roll-off ships and ferries.

In May 1981, Levingston's Orange, TX, plant delivered the 36,000-dwt. bulk carrier PRIDE OF TEXAS to Asco-Falcon I Shipping Company; and two more of these 612-foot (187 m) ships are also presently under construction with the aid of CDS. The PRIDE OF TEXAS was the largest ship ever built at this yard and the first ship to be built in the United States to a Japanese design and

with the technical assistance of Japanese shipbuilding experts. As of October 1, 1981, two offshore jackup drilling rigs were also in production.

An expansion and modernization program was completed this year at the Orange, TX, yard, to increase steel throughput from about 25,000 tons (22695 metric tons) per year to approximately 50,000 tons (45390 metric tons) per year. Some of the improvements incorporated in the program were: a new flat panel fabrication line, numerically controlled plasma-arc cutting equipment, an automatic blasting and paint shop, a new subassembly construction area, and a new gantry crane. In 1982, the company plans to extend the craneway in order to extend the panel line flow to a 3-dimensional unit by installing webs, frames, and bulkheads.

A ship approximately 700 feet by 100 feet (213 m by 31 m) can be constructed on Levingston's side-launch building way, which measures 1,100 feet (335 m) in length. A 200-foot (61 m) extension to this shipway is feasible and is being considered. In addition, there is a small conventional shipway and three floating drydocks, the largest of which can accommodate a vessel 420 feet by 122 feet (128 m by 37 m). Total usable berthing space is about 2,400 feet (732 m).

In July 1981, the total work force at the Orange plant was 2,014, about the same level as a year earlier.

Exhibit 17 is a current general arrangement drawing showing construction facilities at Levingston's Orange, TX, yard.

#### 17. Lockheed Shipbuilding and Construction Company

Lockheed Shipbuilding and Construction Company, a wholly owned subsidiary of Lockheed Corporation, is located in Seattle, WA, on the southern perimeter of Puget Sound's Elliott Bay. This 92-year-old company was known as Puget Sound Bridge and Drydock Company when acquired in 1959 by Lockheed. In 1965, the yard's name was changed to Lockheed Shipbuilding and Construction Company. It is now the largest privately owned shipyard in the Pacific Northwest.

A wide variety of vessels have been constructed, including light cruisers, destroyers, patrol frigates, ammunition ships, amphibious transport docks, oil drilling vessels, a hydrofoil, a large bulk carrier, a roll-on/roll-off ship, and several ferries. In 1976 and 1977, Lockheed delivered two U.S. Coast Guard icebreakers, the POLAR STAR and POLAR SEA, the world's most powerful non-nuclear icebreakers.



With the scarcity of commercial ship orders, the Navy has again become Lockheed's best customer. In March 1979, the yard delivered its first naval vessel in six years, the submarine tender EMORY S. LAND (AS-39). A second tender, the FRANK CABLE (AS-40), was delivered in September 1979; and a third, the McKEE (AS-41), was completed in July 1981.

Currently under construction at Lockheed is a "first of a class" amphibious dock landing ship (LSD-41), scheduled for delivery to the Navy in November 1984. In July 1981, the Navy exercised its option for procurement by Lockheed of long lead time items for LSD-42.

The following are the yard's principal sources of ship repair and overhaul business: naval vessels, Alaska fleet barges and supply vessels, and maintenance and overhaul contracts for Washington and Alaska ferries. Lockheed drydocks, repairs, and overhauls some 200 vessels a year.

Lockheed Shipbuilding's Industrial Products and Services Division is equipped to do heavy custom steel work, including structural and plate work, and a wide range of fabrication work.

Lockheed builds and outfits ships in two yards adjacent to Seattle's deepwater port. The yards offer a full range of facilities, engineering, and craft skills. To improve shipbuilding technology to meet requirements for construction of naval vessels, Lockheed has upgraded its production facilities and has accomplished system changes. To handle the increased production rate, Lockheed installed a modernized, numerically controlled steel cutting system and a semi-automatic steel fabrication panel line.

The yard operates three inclined shipways, two of which can accommodate ships up to 650 feet by 88 feet (198 m by 27 m), and one which can handle a ship as large as 690 feet by 90 feet (210 m by 28 m). These building ways are serviced by 10 whirley cranes varying in capacity from 28 tons (25 metric tons) to 50 tons (45 metric tons). Lockheed maintains three floating drydocks, the largest of which can accommodate a maximum ship size of 643 feet by 96 feet (196 m by 29 m). Also available is 6,500 feet (1981 m) of wharf and pier space that is used for both repair and outfitting. Whirley cranes up to a capacity of 50 tons (45 metric tons) service the wharf and pier areas. Multiple crane lifts and locally available floating cranes routinely provide capacities up to 400 tons (363 metric tons).

Lockheed's labor force, at mid-1981 totaled 2,230, up from 1,700 at mid-1980.

Exhibits 18 and 19 are current general arrangement drawings of the Seattle yard's Plant No. 1 and Plant No. 2.

## 18. Marathon LeTourneau Company - Gulf Marine Division

Marathon Manufacturing Company, the world leader in production of offshore drilling rigs, launched its new Gulf Coast shipyard, the Gulf Marine Division, in 1972 with a commitment of several millions of dollars. This shipyard is located in the Port of Brownsville, TX, and has a 2,500-foot (762 m) frontage on the ship channel. In addition to the construction of offshore drilling rigs, the yard has the capability of fabricating and launching drillships, barges, work boats, tugs, supply vessels, and large merchant ships. Marathon's Vicksburg, MS, plant and another in Longview, TX, serve as support facilities for the Brownsville yard.

As of October 1, 1981, the Gulf Marine Division was building a total of 12 jackup drilling rigs. Three were delivered during the first nine months of this year.

The Brownsville yard operates one shipbuilding way with a maximum ship size of 1,100 feet by 150 feet (335 m by 46 m) on which oceangoing ships could be constructed in the event of national emergency. Modular construction techniques are combined with conventional shipbuilding methods. Large module sections are fabricated on a forming and subassembly slab about 400 feet by 200 feet (122 m by 61 m), which is actually an extension of the yard's building way. A 250-ton (227 metric ton) gantry crane travels on rails which run the full length of the slab and building way. The crane lifts the subassembly sections from the slab to the launchway, and the sections are joined to form the completed vessel which is then side-launched. Usable berthing space for outfitting and repair totals 1,100 feet (335 m). Estimated steel throughput at this shipyard is from 750 tons (681 metric tons) to 1,000 tons (908 metric tons) a month.

At mid-1981, the total work force at the Brownsville plant was 1,300, slightly higher than a year earlier.

Exhibit 20 is a plot plan of the yard's construction facilities.

## 19. Maryland Shipbuilding & Drydock Company

Maryland Shipbuilding & Drydock Company, a subsidiary of Fruehauf Corporation, is located on the south bank of the Patapsco River in Baltimore, MD. This yard, which has been in business for 59 years, offers full facilities for ship construction, conversion, overhaul, and repair. Although primarily a repair and conversion yard, Maryland built the following vessels during the 1960's and 1970's: two containerships, one oceanographic research vessel, one hydrofoil, one tug/barge, and two trawler/factory ships,

which were the first stern ramp fish-processing trawlers to be built in the United States. The company's Industrial Products Division engages in nonmarine work such as: 1) the design, manufacture and installation of large steam surface condensers for the utility industry; 2) general machine repairs to pumps, turbines, and other industrial machinery; and 3) heavy structural steel fabrications.

From 1968 to the present time, Maryland has completed repair or overhaul work on 32 naval vessels of many different types. This was in addition to the yard's workload of commercial ship repair.

Six ships were reconstructed during 1980 and 1981 under MarAd's construction-differential subsidy program. These vessels consisted of four Moore McCormack Mariner class cargo ships and two U.S. Lines containerships.

Maryland Shipbuilding has a good backlog of repair and overhaul work; and prospects continue to be bright for commercial and Navy ship repairs, as well as for the company's Industrial Products Division.

In 1978, Maryland completed a major modernization and expansion program, the main features of which are:

- o Installation of a new floating drydock 827 feet (252 m) long by 150 feet (46 m) between wing walls with a lifting capacity of 36,000 long tons (36576 metric tons). This dock is used for launching newly constructed vessels from the building way, as well as for ship repair and conversion work; and
- o Lengthening of the yard's one building way to permit construction of ships up to 850 feet by 110 feet (259 m by 34 m) compared to the previous maximum of 630 feet by 96 feet (198 m by 29 m).

In addition to the new floating drydock, Maryland operates three other floating drydocks, the largest of which can accommodate ships up to 775 feet by 110 feet (236 m by 34 m). There are 5,650 feet (1722 m) of pierside berthing available for outfitting and above water repairs.

The total administrative and production work force at mid-1981 was approximately 1,720, compared to about 1,800 at mid-1980.

Exhibit 21 is a current plot plan of Maryland's facilities.

## 20. National Steel and Shipbuilding Company

National Steel and Shipbuilding Company (NASSCO) is a wholly owned subsidiary of Morrison-Knudsen Company, Inc., and is located in San Diego, CA. NASSCO, the largest shipbuilding complex on the West Coast, has had experience in both commercial and Navy construction.

The company was established in 1905 as an iron works and entered the marine field in 1945 with the construction of small fishing vessels. During the next 12 years, NASSCO produced a series of 65-foot (20 m) passenger/cargo vessels, tugs, mine-sweepers, cable tenders, and oceanographic research vessels. Rapid expansion was required in 1957 when this San Diego yard entered the "big ship" market, building 13 large cargoliners, 17 Navy tank landing ships (LST's), and seven combat supply ships (AFS's).

From 1973 through 1980, the yard completed two San Clemente class oil/bulk/ore carriers (OBO's), six Coronado class tankers, 13 San Clemente class tankers, and four San Diego class tankers. In 1976, NASSCO delivered a large fleet replenishment oiler (AOR-7) to the Navy. In May 1980 the first of four Gompers class destroyer tenders (AD-41) was completed, and a sistership (AD-42) was delivered in June 1981. Also completed in 1981 were two Carlsbad class product tankers for Union Oil Company of California.

As of October 1, 1981, the following merchant ships were under construction or on order: one Carlsbad class product tanker, five Ingram class product tankers, and also three La Jolla class product carriers. Under construction for the Navy were two Gompers class destroyer tenders (AD-43 and AD-44) and a cable repair ship (T-ARC-7).

Since San Deigo is the home port for the major portion of the Pacific Fleet, NASSCO obtains a significant amount of Navy repair and overhaul work; but over the years the yard's military and commercial work has been about equal.

In 1976, NASSCO completed a major facilities expansion and modernization program. In the new building dock, the shipyard can now produce ships up to 980 feet by 170 feet (299 m by 52 m), compared to a previous maximum of 900 feet by 106 feet (274 m by 32 m). Also included in the program was a new modern digital controlled mold loft, a new 1,090-foot (332 m) outfitting pier, a new semi-automatic panel line that welds steel plate into panel sections, additional heavy-duty whirley cranes, land development, and an advanced production control system.

In addition to the new building dock, the yard operates three inclined shipways, two of which can accommodate a maximum

ship size of 900 feet by 106 feet (274 m by 32 m), and one a ship size of 690 feet by 90 feet (210 m by 27 m). These ways and the large building dock are serviced by 11 gantry cranes ranging in capacity from 45 tons (41 metric tons) to 175 tons (159 metric tons). A small 2,800-ton (2845 metric ton) floating drydock and a large graving dock that can handle a maximum ship size of 687 feet by 90 feet (209 m by 27 m) are leased on a use basis from the Unified Port District of San Diego. There are ten berths with a total berthing space of approximately 7,075 feet (2156 m) for outfitting and repair. These berths are serviced by mobile and gantry cranes varying in capacity from five tons (4.5 metric tons) to 175 tons (159 metric tons).

At mid-1981, the total labor force was 6,775, compared to 6,600 at mid-1980.

Exhibit 22 is a current NASSCO plot plan.

## 21. Newport News Shipbuilding and Dry Dock Company

Newport News Shipbuilding & Dry Dock Company, located at the Port of Hampton Roads in Newport News, VA, is the largest shipbuilding complex in the Free World. The company, founded in 1886, is a subsidiary of Tenneco, Inc. Newport News has built 22 aircraft carriers, 30 nuclear-powered submarines, and 121 other surface ships for the U.S. Navy. Commercial vessels delivered by the yard include 71 cargo ships, 83 tankers, 62 passenger ships (most notably the famed superliner UNITED STATES), and more than 60 other vessels. Newport News was a pioneer in the field of jumboizing ships, and since 1957 has completed 32 such operations. The company is also engaged in various industrial and marine product lines.

Newport News is the Nation's foremost builder of Navy nuclear warships. The yard, as of October 1, 1981, was at work on two Nimitz-class aircraft carriers and ten attack submarines. Newport News is currently reconstructing and jumboizing the last of four large oil tankers, having completed three of these during the past few months. Three tanker retrofits were completed this year, and the yard is presently working on two others. Overhaul and repair of nuclear-powered submarines is another current activity at Newport News.

The North yard, completed in 1977, is adjacent to the South yard on land reclaimed from the James River. This facility, designed for high production and efficiency, has the capability to handle large components from fabricating areas to final erection. Data storage and retrieval systems control material storage and work flow. The building basin, the largest in the Nation, is 1,600

feet (488 m) long, 250 feet (76 m) wide, and 44 feet (13 m) deep. In this graving dock, one ULCC or large LNG and part of a second can be built simultaneously. A two-position intermediate gate is being utilized to further expand the multi-ship construction capability of this dock, permitting simultaneous ship construction and repair. A 900-ton (817 metric ton) 23-story Goliath gantry crane, one of the largest in the world, can handle completely outfitted assemblies. This crane services the graving dock and the final assembly platen and has a height of 234 feet (71 m) overall, a girder clearance of 200 feet (61 m) and a span between rail centers of 540 feet (165 m). The North yard has one 1,670-foot (509 m) outfitting berth and one 950-foot (290 m) outfitting berth.

The South yard has four inclined shipways, the two largest of which can accommodate a maximum ship size of 940 feet by 125 feet (287 m by 38 m). The South yard has six graving docks. Two are serviced by a 310-ton (281 metric ton) gantry crane and can accommodate ships up to 1,100 feet by 130 feet (335 m by 40 m) and 960 feet by 118 feet (293 m by 36 m). The remaining three docks can be used for new construction, repair, or conversion. The largest of these can accommodate a maximum ship size of 862 feet by 108 feet (263 m by 33 m). Eight piers for outfitting and topside repair are available with a combined berthing space of approximately 12,000 linear feet (3658 m). These piers are serviced by cranes with capacities of up to 50 tons (45 metric tons) and are supplemented by locomotive cranes and floating derricks with capacities to 67 tons (61 metric tons).

Newport News Shipbuilding also has the following facilities which are utilized in ship construction and repair, manufacturing, and industrial work:

- o A steel fabrication shop where various types of steel and other metals ranging in thickness from 1/8 inch (3 mm) to six inches (152 mm) up to 45 feet (14 m) long and weighing as much as 17½ tons (16 metric tons) are cut and shaped to design specifications employing automated processes;
- o A fully-equipped wood pattern shop facility;
- o One of the largest foundries in the Nation where steel castings weighing as much as 145,000 lbs. (65772 kg) and alloy steels, copper, nickel, aluminum, brass and other nonferrous alloys are poured;
- o A machining complex with over 250 machines including a 42-foot (13 m) boring mill, and lathes with maximum

swing of 124 inches (3150 mm) diameter and lengths up to 68 feet (21 m) between centers;

- o A large pipe fabrication facility with machines capable of bending pipe up to 12 inches (305 mm) in diameter, horizontal boring mills, automatic welding machines, cleaning equipment and nondestructive and hydrostatic testing capabilities;
- o A large sheet metal facility capable of manufacturing sheet metal components required for outfitting ships and other similar applications;
- o Electrical switchboard and panel shops capable of manufacturing large as well as small electrical switchboards and panels; and
- o A computer center, testing laboratories, and a 106,000 sq. ft. (9847 m<sup>2</sup>) automated material storage facility.

The total labor force at Newport News increased from 22,900 in mid-1980 to 24,000 in mid-1981.

Exhibits 23 and 24 are current general arrangement drawings showing major facilities in both the South yard and the North yard.

## 22. Norfolk Shipbuilding & Drydock Corporation

Norfolk Shipbuilding & Drydock Corporation (Norshipco) is comprised of three plants, the Berkley Plant, Brambleton Plant, and the smaller Southern Plant. The yards are located on the Southern and Eastern branches of the Elizabeth River in Norfolk, VA. One of the largest ship repair facilities on the East Coast, Norshipco is also capable of constructing large oceangoing vessels.

This company has sophisticated new construction experience, as demonstrated in the construction of two U.S. Coast and Geodetic Survey (now National Ocean and Atmospheric Administration) vessels in the late 1960's and a Navy patrol frigate in 1975. Modern modular construction techniques are used in all construction and conversion work, including oceangoing vessels, barges, dredges, and fabricated midbodies.

Under construction at Norshipco is the barge portion of an integrated tug/barge, being completed for the Maritime Administration following removal and transfer from the now-closed Seatrain Shipbuilding Corporation. Delivery of this RO/RO barge is scheduled for January 1982. Norfolk Shipbuilding is also building for their own use a 2,800-ton (2845 metric ton) floating drydock.

The yard's principal activity, however, is ship repairs and overhaul, and its work is about equally split between Navy and commercial work. Norshipco's shipyards are among the best equipped on the East Coast. Available ship repair functions include tank cleaning and coating, machinery, electrical, carpentry, steel, piping, nondestructive testing, blasting and painting. The company also offers a full range of repair service for ships located away from its yards. Norshipco also has experience and expertise in all types of conversions. Its steel throughput is approximately 50 tons (45 metric tons) per day.

A multi-faceted expansion program emphasizing repair operations was completed in 1979 at the Berkley Plant, the company's main facility. The centerpiece of the project is a steel floating drydock, among the largest and most modern in the world. The drydock is 950 feet (290 m) long, 192 feet (59 m) wide and 160 feet (49 m) between the wingwalls. The drydock has a lifting capacity of 54,250 long tons (55118 metric tons).

A new concrete pier, 1,030 feet (314 m) in length, to be used for repair and servicing of ships as long as 1,200 feet (366 m), was completed in 1977 at the Berkley Plant. This new pier is used for mooring the new floating drydock. A giant Kroll K-1800 hammerhead jib trolley crane is located on the new pier and spans the width of the floating drydock. The crane is also able to service the outboard side of the new pier.

For major ship construction, the company's Berkley Plant operates a building way which can accommodate ships as large as 475 feet (145 m) in length by 85 feet (26 m) wide. The vessels are constructed on the flat building position and end-launched in one piece hydraulically into a floating drydock. In addition to the new floating drydock, there are two older floating drydocks, the largest of which can handle vessels up to 650 feet by 83 feet (198 m by 56 m). The largest of the company's marine railways, located in the Brambleton plant, can accommodate a vessel 441 feet by 60 feet (134 m by 18 m) with a lifting capacity of 5,500 long tons (5580 metric tons).

A total of 12,170 feet (3709 m) of berthing space is available at several piers for outfitting and repair.

Norshipco's payroll totaled 3,381 in July 1981, up from 2,544 a year earlier.

Exhibit 25 is a current plan of the Berkley Plant, the largest of the company's three plants.



### 23. Sun Ship, Inc.

Sun Ship, located in Chester, PA, is a complete shipbuilding and manufacturing complex bordering on the Delaware River. In its 62 years of operation, the yard has designed and constructed more than 650 vessels, mainly commercial ships. In recent years, the yard has specialized in the design and construction of RO/RO ships and medium-size tankers. In addition to its shipbuilding, conversion, and repair capabilities, the company also is experienced in the manufacture of a wide variety of heavy industrial equipment.

In January 1981, Sun announced its decision to phase out its new ship construction business and concentrate on ship repair and conversion, in addition to the manufacture of a wide range of heavy industrial equipment including welded pressure vessels, plate work, machinery, oil refinery equipment, and bridge structures.

The only major construction contracts underway as of October 1, 1981, were three RO/RO containerships for Waterman Steamship Corporation, one of which is being built for Sun at General Dynamics, Quincy, MA. Sun Ship is also converting the Matson trailership LURLINE from a full RO/RO to a combination container RO/RO vessel.

New construction commitments subcontracted by Sun to other shipyards were: one oceangoing sugar barge for C&H Sugar Company to Bath Iron Works and one diesel-propelled dredge for the U.S. Army Corps of Engineers, also to Bath Iron Works.

In 1976, Sun completed a major capital improvement program which enhanced the shipyard's ability to fabricate larger, more sophisticated ships. This expansion and modernization program provided Sun Ship with a new level shipbuilding platform, a two-section floating drydock capable of lifting 75,000 long tons (76200 metric tons), a 1,100-foot (335 m) outfitting pier, and other shipbuilding support facilities. The new level shipbuilding slab has two sections. On Slab "A", a ship 1,000 feet by 195 feet (305 m by 59 m) can be built; and on Slab "B", a ship 700 feet by 195 feet (213 m by 59 m) can be built. At Sun, a ship as large as 1,100 feet (335 m) in length and 195 feet (59 m) wide can be constructed. This is the maximum limit of the floating drydock into which ships built on the two-section shipbuilding platform are launched. Two halves of a large ship can be built on this platform and each half can be rolled individually to the drydock and then welded together. The ship is brought to the pier for outfitting completion. Sun's drydock, which is capable of handling vessels up to about 400,000 dwt., is one of the world's largest

floating drydocks. It is serviced by two 25-ton (23 metric ton) gantry cranes, two 10-ton (9 metric ton) gantry cranes, two 25-ton (23 metric ton) truck cranes, and an 800-ton (813 metric ton) barge crane, which can be used for both construction and major repair work.

A new modernization and expansion program, completed in 1980, improved the yard's fabrication shop facilities, which are now capable of approximately a 60,000-ton (54468 metric ton) annual steel throughput.

In addition to the two-section shipbuilding platform, the company has two conventional sliding ways that can handle ships as large as 745 feet by 129 feet (227 m by 39 m). The yard has a total of about 3,900 feet (1189 m) of usable berthing space with modern pierside facilities.

The shipyard's total work force at mid-1981 was 2,158, down from 4,100 a year earlier.

Exhibit 26 is the latest available layout of plant and facilities at Sun Ship.

#### 24. Tampa Shipyards, Inc.

Founded in 1948, Tampa Shipyards, Inc. (formerly Tampa Ship Repair and Dry Dock Co.), is a full service yard and is the largest ship repair facility on the West Coast of Florida. It is located at Hooker's Point on Tampa Bay in Tampa, FL. During World War II, the company built Navy auxiliary vessels and C2 cargo ships for the Maritime Commission.

Since World War II, Tampa Ship has been a major Gulf Coast repair yard, serving many of the tanker fleets operating on the Gulf and repairing cargo ships, dredges, and a wide range of oceangoing vessels. In 1972, the facility was purchased by The American Ship Building Company.

Tampa Ship, despite its capability to construct large oceangoing ships, is primarily a repair and conversion yard. Since 1975, this shipyard has been building barges to complement its repair business.

In July 1981, Tampa's parent company, The American Ship Building Company, was awarded a \$73 million contract to convert four Moore McCormack general cargo ships (with the aid of CDS) to larger self-sustaining breakbulk/container vessels. Most of the work will be done at Tampa Ship and at the AMSHIP Division's Lorain, Ohio, shipyard.

The first phase of the most significant facility expansion in the company's recent history was completed in 1978. The centerpiece of the program was a new 900-foot by 150-foot (274 m by 46 m) graving dock with all necessary ancillary equipment and services. This drydock, leased from the Tampa Port Authority, is used only for repair and overhaul work. With its expanded repair facilities, Tampa has become a major ship repair operation not only in the Gulf but also for the entire Eastern United States.

Phase II of the company's overall expansion program is underway and is scheduled for completion in early 1982. Two existing slips, each measuring 1,200 feet by 80 feet (366 m by 24 m), are being reconstructed into a combination wet berth/ graving dock facility. A finger of land is being removed to create two large wet berths. Two gates will be placed on each side of the remaining portions, thereby creating two additional graving docks for construction or repair of small ships and large barges simultaneously. The new facility, which is within the company's main complex, will increase Tampa Ship's ship-handling capability up to nine vessels at one time.

The yard currently operates one sliding way which can accommodate a maximum ship size of about 500 feet by 105 feet (152 m by 32 m). This building way is serviced by three 40-ton (36 metric ton) gantry cranes. In addition to the large graving dock, the company maintains a graving dock that can handle vessels up to 542 feet by 72 feet (165 m by 22 m). Usable berthing space in the yard totals about 1,800 feet (549 m).

Mid-1981 employment at this Florida shipyard was down to 600, compared to about 700 in July 1980.

Exhibit 27 is a general plan of Tampa Ship's main plant showing drydocks, piers, and wet berths under construction, as well as existing facilities. Since the large building way is located approximately one-half mile (800 m) north of the main plant, it is not shown on this plan. This building way, like the graving docks, is leased from the Tampa Port Authority.

25. Texas Gulfport Shipbuilding Company (formerly Gulfport Shipbuilding)

This Port Arthur, TX, shipyard, formerly the Gulfport Division of Levingston Shipbuilding Company, became a wholly owned subsidiary of the newly formed corporation, Levingston Industries, Inc., in May 1981 and has been renamed Texas Gulfport Shipbuilding Company. The yard has the capability of building ships up to about 550 feet

(168 m) long by 80 feet (24 m) in width. This facility is strategically located on the busy intracoastal canal with a portion of the plant extending south of the Gulfgate bridge, allowing unlimited vertical clearance to the Gulf of Mexico.

Since the yard was founded in 1932, it has built a variety of small vessels, such as tugs, dredges, and ice-breakers. Beginning in 1970, when it was purchased by Levingston, this shipyard has constructed drilling rigs and other vessels for the oil drilling industry. Presently, in addition to repair work, it has one jackup rig under construction.

An expansion and modernization program is currently underway at Texas Gulfport which includes a general upgrading of facilities, enlargement of drydocks, and development of new outfitting facilities downstream from the main portion of the yard.

Adjacent to the large side-launching way on which a ship 550 feet by 80 feet (168 m by 24 m) can be constructed, the yard maintains a smaller, side-launching way. Of the three floating drydocks, two can handle vessels as large as 325 feet by 68 feet (99 m by 21 m). There is a total of 1,270 feet (387 m) of pierside berthing.

The mid-1981 work force at Texas Gulfport was 464, up from about 337 a year earlier.

Exhibit 28 is a plot plan of the main portion of the yard. Because of the attenuated shape of the yard as a whole, this plan does not show downstream outfit and repair berths or tank-cleaning and gas-freeing facilities.

## 26. Todd Shipyards Corporation - Galveston Division

Todd-Galveston is located on Pelican Island, directly across the Galveston Ship Channel from the city of Galveston, TX. This shipyard was founded in 1934 and is a fully-integrated ship construction, repair, and conversion complex with a work force experienced in custom industrial steel fabrications. For its outstanding accomplishments in the field of ship repair during World War II, Todd-Galveston was given the Navy's "E" Award.

In recent years, the yard has become an important part of the Gulf Coast oil drilling industry, turning out an impressive list of modern oil-related ships, barges, and specialized craft. The most noteworthy of these vessels was the APACHE, a large self-propelled pipelaying reel ship for Santa Fe International Corporation. Completed in 1979, this was the first ship of its kind ever built.

Hundreds of ships, mainly foreign-flag, enter this yard every year for repair, overhaul, and drydocking; but conversion work has also been a mainstay of the company. From 1967 to 1973, 23 major conversions were completed. In 1981, Todd-Galveston delivered one large oceangoing tank barge and one derrick barge. Two large bulk coal barges are currently under construction for Dixie Carriers.

With regard to ship and barge construction, vessels up to 475 feet by 85 feet (145 m by 26 m) can be built under roof on a launching pontoon and then launched into the yard's floating drydock. Manufacturing space for Todd's Galveston Division totals 228,766 square feet (21252 m<sup>2</sup>).

The Galveston Division operates a floating drydock with 15,000 tons (15240 metric tons) lifting capacity. This drydock can handle ships or barges as large as 670 feet by 86 feet (204 m by 26 m). There are four piers in the main yard, serviced by seven rail-mounted revolving gantry cranes, ranging from five tons (4.5 metric tons) to 75 tons (68 metric tons), which also service the platen areas. For use throughout the yard, two rubber-tired truck cranes with lifting capacities of up to 50 tons (45 metric tons) are available. Also available, are two rubber-tired straddle carriers, each with a lifting capacity of up to 50 tons (45 metric tons). In the main yard, usable berthing for outfitting and repair work totals about 6,400 linear feet (1950 m).

Supplementing the main yard is Galveston's Southwest Plant, located about a mile (1.6 km) away, which provides more than 90,000 square feet (8361 m<sup>2</sup>) of covered manufacturing space. This facility is serviced by two 200-ton (182 metric ton) overhead cranes which combine to make 400-ton (362 metric ton) lifts possible. The Southwest Plant is used principally for steel fabrication and hull erection and has a 200-foot by 86-foot (61 m by 26 m) slip of which 160 feet (49 m) is covered.

Todd Shipyards Corporation has under construction a new 40,000-ton (40640 metric ton) drydock for the Galveston Division. The new drydock will provide repair and maintenance services to vessels up to about 225,000 dwt. and will be placed in operation in late March 1982.

In July 1981, Todd-Galveston's work force totaled 773, up from about 740 a year earlier.

Exhibit 29 is a current plan of the main yard.

## 27. Todd Shipyards Corporation - Houston Division

This shipyard, located on the Houston (Texas) ship channel, has since 1949 specialized in the design and construction of barges, towboats, dredges, crewboats, drilling structures, and other equipment for the offshore petroleum industry. During this 32-year period, more than 600 barges and vessels of diversified types have been built at Todd-Houston. Although ship and barge construction has been the principal business of this shipyard, it has also been active in conversion and repair work. As of October 1, 1981, the new construction backlog consisted of a large cement barge and three sets of caissons for submersible drilling rigs under construction at Vemar, Inc. According to Todd management, the outlook for new construction in the months ahead appeared encouraging. In addition to the continuing demand for vessels to support the offshore industry, there is an increasing need for towboats and barges for the inland waterways trade.

In mid-1982, Todd-Houston plans to put in operation a 14,000-ton (14224 metric ton) floating drydock. This is part of a major facilities improvement program scheduled for the yard.

The Houston Division has one side-launch building way on which ships or barges up to 475 feet by 125 feet (145 m by 38 m) can be launched. However, for construction of longer vessels, the hull can be launched in two pieces and joined in the yard's floating drydock which can accommodate vessels as large as 600 feet by 96 feet (183 m by 29 m). This is the maximum size ship or barge that can be constructed at Todd-Houston. Servicing the launchway are two 100-ton (91 metric ton) crawler cranes and a smaller crawler crane.

In addition to warehouses, there are 212,800 square feet (19769 m<sup>2</sup>) of covered shops and manufacturing space. The three piers in this Todd facility are serviced by three rail-mounted revolving gantry cranes with lifting capacities of up to 60 tons (54 metric tons). Usable pier space totals approximately 3,200 linear feet (975 m).

Todd Houston's total work force in July 1981 was 492, about the same as a year earlier.

Exhibit 30 is a general arrangement plan of the yard.

28. Todd Pacific Shipyards Corporation - Los Angeles Division

Todd's Los Angeles Division is located on San Pedro Bay. This facility was formerly the Los Angeles Shipbuilding and Dry Dock Company and was purchased by Todd in 1947.

Since reentering the ship construction field in the late 1950's, the yard has built two guided-missile frigates and seven destroyer escorts for the U.S. Navy, as well as five large break-bulk cargo ships and four product tankers. The Los Angeles Division also completed the major reconstruction of several commercial and naval vessels.

In 1977, the Los Angeles and Seattle Divisions were combined to form Todd Pacific Shipyards Corp. Rebounding from several disastrous tanker cancellations in the mid-1970's, Todd-LA in 1976 won its first contracts under the Navy's current guided-missile frigate (FFG) program. On October 1, 1981, the yard had on order or under construction a total of 12 of these sophisticated guided-missile frigates (FFG 7 class) which will provide employment to mid-1985. Three frigates have been delivered to the Navy with the remaining 12 to follow at about 4-month intervals. Todd-LA generates about 80 percent of its revenues from naval construction and the balance from repair and overhaul of Navy and commercial vessels.

The yard has undergone a major upgrading and expansion of its facilities in recent years. New equipment includes two 175-ton (159 metric ton) whirley cranes, totally contained sandblasting facilities, automated cutting and burning operations, and a sophisticated production line for fabrication and movement of modules from automatic welding units to the building ways area. There were also improvements to the existing building ways, dry-docks, piers and shops. Looking ahead, the parent organization is continuing to make substantial capital investments to further improve the effectiveness of this shipyard.

For the Los Angeles Division, construction has begun on a land level ship repair facility which will use a syncrolift platform 655 feet (200 m) long by 105 feet (32 m) wide having a lifting capacity of 21,942 long tons (22293 metric tons) to raise vessels to land level where they will be transferred to a work bay via a rail system. The completed facility will accommodate a minimum of five vessels simultaneously. Several other capital improvements are in the planning stage.

The yard presently has two conventional inclined shipways, each capable of launching a ship as large as 800 feet by 84 feet (244 m by 25 m). The panel line, platens and shipways are serviced by two 175-ton (159 metric ton), and six smaller whirley cranes. There are two floating drydocks, one of which can accommodate a

vessel 700 feet by 86 feet (213 m by 26 m), and the other a vessel 470 feet by 82 feet (143 m by 25 m).

With 4,255 feet (1297 m) of berthing space available at six wharves, and a full complement of shops and related facilities, this Todd shipyard can carry out all types of repairs and conversions, in addition to new construction.

Total employment at the yard was 5,241 at mid-1982, up from 4,570 a year earlier. The current manpower level is this shipyard's highest since World War II.

Exhibit 31 is a plant map of the Los Angeles Division's facilities.

## 29. Todd Pacific Shipyards Corporation - Seattle Division

Todd's Seattle Division is located at the northwest corner of Harbor Island in Elliot Bay, less than 10 minutes from downtown Seattle, WA. From 1898 until 1916, when the William H. Todd Company of New York bought the shipyard, a variety of vessels were produced, including the world's first 6-masted barkentine and (at that time) the world's fastest single-screw steamer.

The yard has an unrivaled heritage on the West Coast as a prime supplier of fighting ships for the U.S. Navy. During World War II, Todd operated three shipyards in the Seattle-Tacoma area, mainly turning out destroyers and aircraft carriers. More than 57,000 persons worked three shifts building naval vessels during the war years.

For several years after the war, Todd-Seattle was primarily a repair facility with employment dipping as low as 700 people. In the early 1950's, the yard embarked on new vessel construction and industrial production, completing a formidable array of tugs, barges, ferries, dredges, pile drivers, floating cranes, etc. In 1964, the company delivered the last of four guided-missile destroyers to the Navy. In the late 1960's and early 1970's, the Seattle Division was lead yard for a class of 26 frigates, seven of which were built in Seattle. During this period, the yard also built the Navy's only catamaran oceanographic vessel.

Prospects for the Seattle Division were bleak during the mid-1970's until the Navy awarded Todd its first contracts under the guided-missile frigate (FFG) program in early 1976. As of October 1, 1981, the Seattle yard had delivered four of these frigates and had nine more in production or on order. Two of these nine ships are for the Royal Australian Navy. The last of the FFG's on order is slated for delivery in mid-1985.



This shipyard also has a thriving ship repair and overhaul operation that annually works on some 500 commercial and naval vessels.

The yard continues to modernize with the recent addition of a dynamic balancing machine, waterscreened spray painting facility, and a valve and pump repair and test facility. Contracts have been let for major improvements to be in place by mid-1982, and include a 1,000-foot (305 m) pier, 44,000-ton (44704 metric ton) floating drydock to replace a smaller floating drydock retired in 1980, and a 150-ton (137 metric ton) whirley crane. In addition, the Seattle Division has added a slow-speed diesel repair capability, including service agreements with both Sulzer and B&W.

The largest building way at Todd-Seattle can handle a ship up to 600 feet by 96 feet (183 m by 29 m). It can also be used as a dual launchway for construction of two ships with beams of 50 feet (15 m) or less, simultaneously. A small side-launch building way was added in 1974. The shipyard currently has two floating drydocks, the largest of which is capable of accommodating vessels up to 650 feet by 83 feet (198 m by 25 m). Between March 1980 and March 1981, 64 vessels were drydocked for repairs. The new floating drydock, which will be transferred from Todd-San Francisco in 1982, will accommodate vessels up to 900 feet by 135 feet (274 m by 41 m), large enough to dock major naval combatants and auxiliaries.

Two wharves and four piers provide a total of about 4,850 feet (1478 m) of berthing space for outfitting and repair. The yard is serviced by nine 45-ton (41 metric ton) whirley traveling cranes and a number of smaller portable units.

In July 1981, total employment at the Seattle plant was about 4,780, slightly higher than a year earlier.

Exhibit 32 is a current plot plan of Todd-Seattle's facilities.

### 30. Triple A Shipyards, Division of Triple A Machine Shop, Inc.

Triple A Machine Shop was in business in San Francisco, CA, from 1945 to 1976 as a small ship repair facility, engaging in overhaul and topside work on Navy and commercial vessels.

In 1976, the company leased the shipbuilding and ship repair facilities at the Hunters Point Naval Shipyard which had been closed and idle for almost two years. Triple A, since leasing the Hunters Point facility, has become a full-service repair yard and the predominant ship repair organization in the San Francisco Bay Area.

Until 1980, business at the yard prospered, with ship repair, conversion, and overhaul contracts from commercial clients and the U.S. Navy. However, as of mid-1981, the only major work in progress was the overhaul of the USS FORT FISHER (LSD-40), scheduled for completion in September. The commercial tanker MANHATTAN was in the yard for extensive repairs during September. Along with most other San Francisco Bay Area shipyards, Triple A is having serious problems obtaining a sufficient volume of repair work to support the high maintenance costs of the yard.

The sprawling Hunters Point yard has a multi-drydock capability that is highlighted by the largest private graving dock on the West Coast. This dock can accommodate ships as large as 1,092 feet by 140 feet (333 m by 43 m), and there are five other graving docks available. Additionally, the large land area, office buildings, numerous fully-equipped shop buildings, warehouses, and other special purpose buildings provide Triple A with a facility for exceeding that of any other private West Coast ship repair yard.

With regard to crane service, the alongside weight-handling facilities at Hunters Point have the largest capacity, and are the most versatile within the Bay Area ship repair community. With pier space totaling about 24,000 linear feet (7315 m), this Triple A yard has the largest deep-water berthing complex of any West Coast shipyard.

As of September 1, 1981, employment at the yard totaled about 450, but the labor force fluctuates depending upon available repair work.

Exhibit 33 is a current yard plan outlining the Triple A facilities at Hunters Point.

## Employment

Total employment during the past five years in privately owned U.S. shipbuilding and ship repair yards (Bureau of Labor Statistics figures) is shown in the following table:

1977 Average	174,100
1978 Average	172,000
1979 Average	171,600
1980 Average	170,400
1981 January	173,000
1981 February	174,200
1981 March	175,300
1981 April	180,500
1981 May	178,700
1981 June	177,900
1981 July	176,500
1981 August	178,100
1981 September (Preliminary)	179,800

The Maritime Administration monitors employment in the 26 major U.S. privately owned shipyards in the Active Shipbuilding Base (as identified in Exhibit 38) on a monthly basis. The Active Shipbuilding Base is defined as that group of shipyards actively constructing new commercial or naval ships and/or seeking new construction orders. The main purpose of monitoring employment in the Active Shipbuilding Base is to provide a single universal data base for use by MarAd, the Naval Sea Systems Command (NAVSEA), and the shipbuilding community for assessing the current status of shipbuilding and for forecasting future requirements.

As shown in Exhibit 41, the most recent industry workload projection, prepared by MarAd's Office of Ship Construction, presents a gloomy outlook for employment in the 26 major yards in the Active Shipbuilding Base through mid-1983, during which it is anticipated that several thousand production workers could be laid off. However, beginning in mid-1983 and continuing through 1986, shipyard employment is expected to show an overall improvement. This projection is contingent upon future economic conditions and other factors.

## Material Shortages

The shipbuilding and repair industry is heavily dependent upon its supporting industrial base for timely delivery of quality products and materials. Depending upon the type of ship, from 40 percent to 70 percent of its cost is represented by products, materials, and services procured from the supporting industries.

In November 1981, the steel industry was operating at about 60 percent of capacity, down from 80 percent a year earlier. Supplies were adequate and are expected to continue to be plentiful in the foreseeable future. Lead times for most basic materials remained generally stable during 1981.

Lead times for finished ship components, with a few exceptions, were also stable during the year. However, several marine-related manufacturers reported delays in procurement of valves, pipe tubing, and large forgings. A continuation of the recession in shipbuilding will inevitably result in a diminishing of the industry's component supply base. As shipbuilding contracts continue to decline, some manufacturing industries allied with shipbuilding and ship repair will shift emphasis to non-marine work in order to maintain a stable workload. There are already some signs of a gradual erosion of the existing supporting industrial base.

MarAd is continuing to request D0-A3 priority ratings for ships built with the aid of construction-differential subsidy (CDS). The priority rating system, under the Defense Priority System and the Defense Materials System, continues to be an integral part of our national defense-related ship construction program, given the unpredictable nature of material and component procurement in the shipbuilding industry.

### Shipyard Pollution Abatement

During the past year, the shipbuilding and ship repair industry continued to strive for pollution abatement. The efforts of the industry in this endeavor are to an extent monitored and coordinated by the Society of Naval Architects and Marine Engineers (SNAME) and the Shipbuilders Council of America (SCA).

SNAME contributes to these efforts by means of its Shipyard Facilities and Environmental Effects Panel, SP-1, of its Ship Production Committee. SCA contributes to these efforts via its Environmental Control Committee and its Ad Hoc Committee on Asbestos. The committees and panel focus their attention toward the control within shipyards of pollutants such as oil, sewage, solid waste, toxic and hazardous materials, noise, and hydrocarbon air emissions. Part of the complexities of the deliberations of these committees is a result of the number of organizations impacting on shipyard pollution abatement. These include organizations within local and State governments as well as the Federal Government.

Fiscal Year 1981 saw within the committees a continuation of 1980 activities. In addition during the past year, many shipyards tested spent abrasives and then analyzed these materials using EPA guidelines to determine whether the abrasives and abraided materials

were hazardous wastes. In all instances, and in all shipyards conducting these studies, all results were negative.

### Ship Repair Facilities

The ship repair industry is a composite of many organizations of varying capabilities. More than 200 privately owned American firms repair ships, but only 71 yards are capable of drydocking vessels 300 feet in length or over. For ships this size, the U.S. shipbuilding and repair industry is currently operating a total of 85 floating drydocks, 54 graving docks, and several marine railways. However, some of these graving docks are committed to new construction. The large organizations which have drydocks generally use extensive waterfront acreage and are capable of all types of ship repair and maintenance. Major shipyards usually combine repair, overhaul, and conversion with shipbuilding capabilities, and employment usually numbers in the thousands. It is difficult to draw a sharp line between shipbuilding yards and ship repair yards, as many of the two engage in both types of work.

The smaller repair organizations, usually referred to as topside repair yards, have no drydocks and usually have only shops and pier facilities. These yards can perform many types of above-water ship and barge repair, and if necessary, can generally transport labor and material to the work site. Topside yards often employ less than 100 people.

The Maritime Administration currently holds master repair contracts with 82 ship repair facilities.

With the scarcity of shipbuilding orders, several shipyards have in recent years expanded or upgraded ship repair and conversion facilities to improve their efficiency and competitive posture. The following are examples of recent, current, and planned plant expansion and modernization programs:

o Newport News Shipbuilding:

A major ongoing program is highlighted by construction of a new graving dock and support facilities for the overhaul, repair, and refueling of nuclear-powered submarines. Other improvements include replacement of outfitting piers, construction of a new paint and blast facility, and installation of larger capacity cranes.

o Norfolk Shipbuilding & Dry Dock Corporation:

An expansion program, completed in 1979, consisting of

a new 950-foot (290 m) floating drydock with a clear width of 160 feet (29 m) and a lifting capacity of 54,250 long tons (55118 metric tons), a new 1,030-foot (314 m) concrete pier to be used for repair and servicing of ships as long as 1,200 feet (366 m), and other facilities to increase the company's repair and conversion capability.

o Port of Portland (Oregon):

A floating drydock, 982 feet (300 m) in length overall and 192 feet (59 m) between wing walls. Lifting capacity is approximately 81,000 long tons (82296 metric tons). This drydock, which became operational in 1979, is the largest floating drydock on the U.S. West Coast.

o Avondale Shipyards:

Avondale will soon begin construction of a new floating drydock at its main yard. This drydock, scheduled for completion in late 1982, will be 650 feet (198 m) in length and 150 feet (46 m) wide with a lifting capacity of about 23,000 tons (23368 metric tons). The new drydock and support facilities are expected to double the yard's repair capacity.

o Bath Iron Works:

BIW plans to begin construction in early 1982 on a new \$46.7 million ship repair and overhaul facility in Portland, ME. The new shipyard, which will include a 24,000-ton (24384 metric ton) floating drydock, will be used initially for repair and outfitting of Navy and commercial vessels and is expected to employ 1,000 people by 1986.

o Todd Shipyards Corporation:

Todd's New Orleans Division, in March 1981, placed in service a new 3,500-ton (3556 metric ton) lift capacity floating drydock measuring 285 feet by 65 feet (87 m by 20 m).

Todd's Galveston Division, in early 1982, will install a new floating drydock capable of accommodating ships up to 225,000 dwt. This drydock, built in Japan, will be 853 feet (260 m) long with an inside width of 160 feet (49 m) and a lifting capacity of 40,000 tons (40640 metric tons), the largest unit of its kind in the Western Gulf area.

Todd's Houston Division, in mid-1982, will put in operation a 14,000 displacement ton (14224 metric ton) floating drydock. This is part of a major facilities improvement program scheduled for the yard.

Todd has unveiled plans for installation of a multi-million dollar syncrolift drydocking system at its Los Angeles Division. This 13,500 displacement ton (13760 metric ton) system will allow the yard to perform up to five drydockings with one lifting system.

Todd's facility upgrading program also calls for the transfer of a 40,000 displacement ton (40640 metric ton) floating drydock from its San Francisco Division to its Seattle Division where it will be modified to accommodate naval combatants and auxiliaries, as well as commercial ships.

The ship repair market has taken on added importance as orders for new ships have declined, and a number of large yards are seeking to increase their repair business. Ship repair is considered within the industry as generally more profitable than ship construction, and it is also seen as a means to maintain a skilled labor force. The repair yard often commands excellent prices for urgently needed repairs and can control its overhead closely. Ship repair yards over the last few years have also been actively soliciting non-ship industrial work requiring skills such as steel fabrication, welding, boiler repairs, and motor overhauls, typical in ship repair.

Repair of naval ships has become a matter of vital importance requiring the highest skill and dedication; and as the complexity and sophistication of warships grow, so must the capabilities of U.S. repair yards. This country's privately owned ship repair industry is an essential national resource in the planning and execution of the maintenance and upkeep of these complex naval ships. Private U.S. shipyards are continuing to receive at least 30 percent of the funds available for repairs, alterations, and conversion of naval vessels. Projected ship alteration and repair programs essential to maintain these ships at a high level of material readiness are expected to result in a future workload increase for both naval and private shipyards. However, because of the large size and the complexity of Navy combatant ships, participation in this Navy work will be restricted to a limited number of private yards.

The ship repair business in the United States is relatively strong with the exception of certain areas of the country. Some firms in the industry are readying their yards for greater future participation in both naval and commercial repair markets.

Figures compiled by the Shipbuilders Council of America illustrate the continuing growth of the ship repair business in private U.S. shipyards. For commercial vessels, the dollar volume of work has grown from \$484 million in 1972 to an estimated total of \$960 million in 1981. For naval ships, the increase is from \$387 million in 1972 to an expected total of \$1.2 billion in 1981.

### Major Drydocking Facilities

Major drydocking facilities are defined in this report as those yards engaging primarily in repair, overhaul, or construction and having at least one drydock that can accommodate vessels 300 feet (91 m) in length or over. These yards do not usually engage in new construction of large oceangoing vessels, although the capability often does exist if the situation would demand it.

Appendix B tabulates information updated through 1981 on 50 of these repair yards on a coastal basis. Additional data is available 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 a substantial 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. It is common practice for a shop to send its personnel and equipment to provide voyage repairs while the ship is at anchor or working cargo at a commercial marine terminal. There is an increasing trend worldwide to send ship repairers to the ship rather than to bring the ship to the shipyard, thus calling for greater mobility of ship repair personnel. This is particularly applicable to highly skilled technicians as against the hull trades. Several yards which normally build or repair only smaller vessels and barges are also capable of performing topside repair work on oceangoing ships.

Appendix C is a list of 138 major topside repair facilities, 62 of which are located on the East Coast. No attempt has been made to tabulate their machinery and equipment due to the variance of the type of work an individual firm will engage in. Detailed data for most of the facilities has been obtained during the MarAd annual shipyard survey and is available in the Office of Ship Construction



## Active Shipbuilding Base

The Active Shipbuilding Base comprises the 26 privately owned U.S. shipyards currently engaged in or seeking contracts for the construction of naval ships and/or major oceangoing or Great Lakes merchant ships. Exhibit 38 identifies and geographically locates these 26 yards. Exhibit 39 tabulates the number and contract value of commercial vessels and barges, large and small, under construction or on order as of September 30, 1981, in these shipyards; and Exhibit 40 indicates when each of the yards in the Active Shipbuilding Base needed new contracts, as of October 1, 1981, in order to maintain an adequate backlog for available facilities and work force. Estimates of need for new business are determined by the Maritime Administration based on methodologies developed for the Shipyard Production and Mobilization Model (SPAMM). Most of these yards presently have building facilities available to expand employment levels if new contracts could be secured.

The principal purpose of monitoring employment in the Active Shipbuilding Base is to provide a single universal data base for use by MarAd, the Naval Sea Systems Command (NAVSEA), and the shipbuilding community for assessing the current status of shipbuilding and for forecasting future requirements.

Employment projections for equivalent production workers is shown by Exhibit 41. This data is generated by overlaying Navy and private projected five-year shipbuilding programs onto the estimated work force required to complete the work on order. Work force levels have been steady but are expected to decline through mid-1983, followed by a modest upturn in shipyard employment through 1986. This projection is contingent upon future economic conditions and other factors.

Exhibit 41 also indicates that in 1980 the industry experienced a short but pronounced drop in employment before recovering late in 1980 and early 1981. Employment has been fairly stable as a whole in the first three quarters of 1981. This entire development differs from previous forecasts where a slow, steady drop had been predicted through 1981. Investigation of this has yielded several causes for the steep drop and even steeper recovery:

- o During the third quarter of 1980, one major shipyard was affected by a strike of approximately 3,000 production workers;
- o In one coincidental case, one major shipbuilder had rapidly declining employment through 1980 before employment leveled off, while another large shipbuilder had a large increase in employment late in 1980;

- o Ship repair work grew by approximately 3,000 production workers from early 1980 through 1981; and
- o Several shipyards experienced declines in employment followed by employment surges that were apparently needed to complete long-term projects on schedule or recently acquired short-term projects.

# SHIPBUILDING INDUSTRY IN THE UNITED STATES

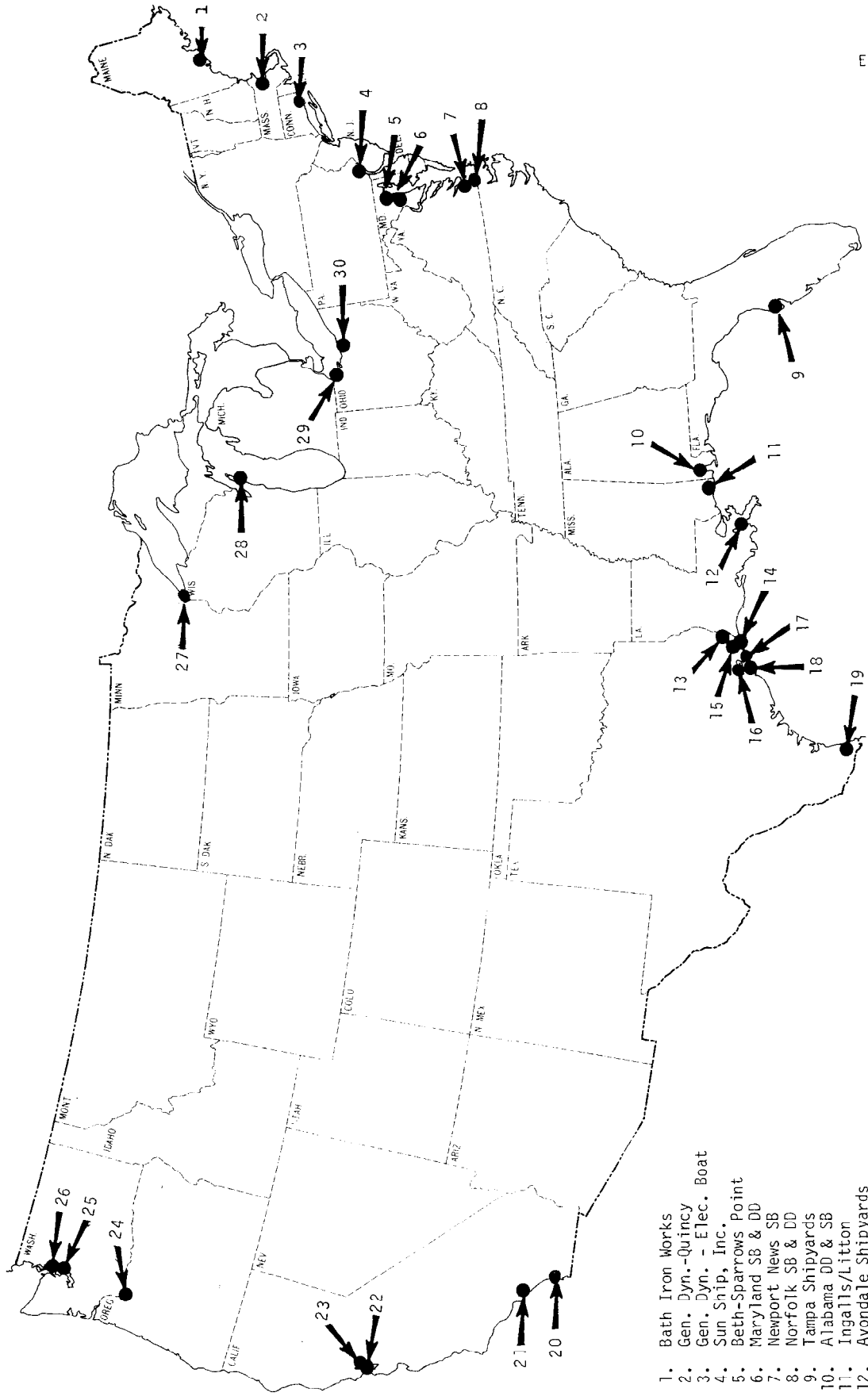
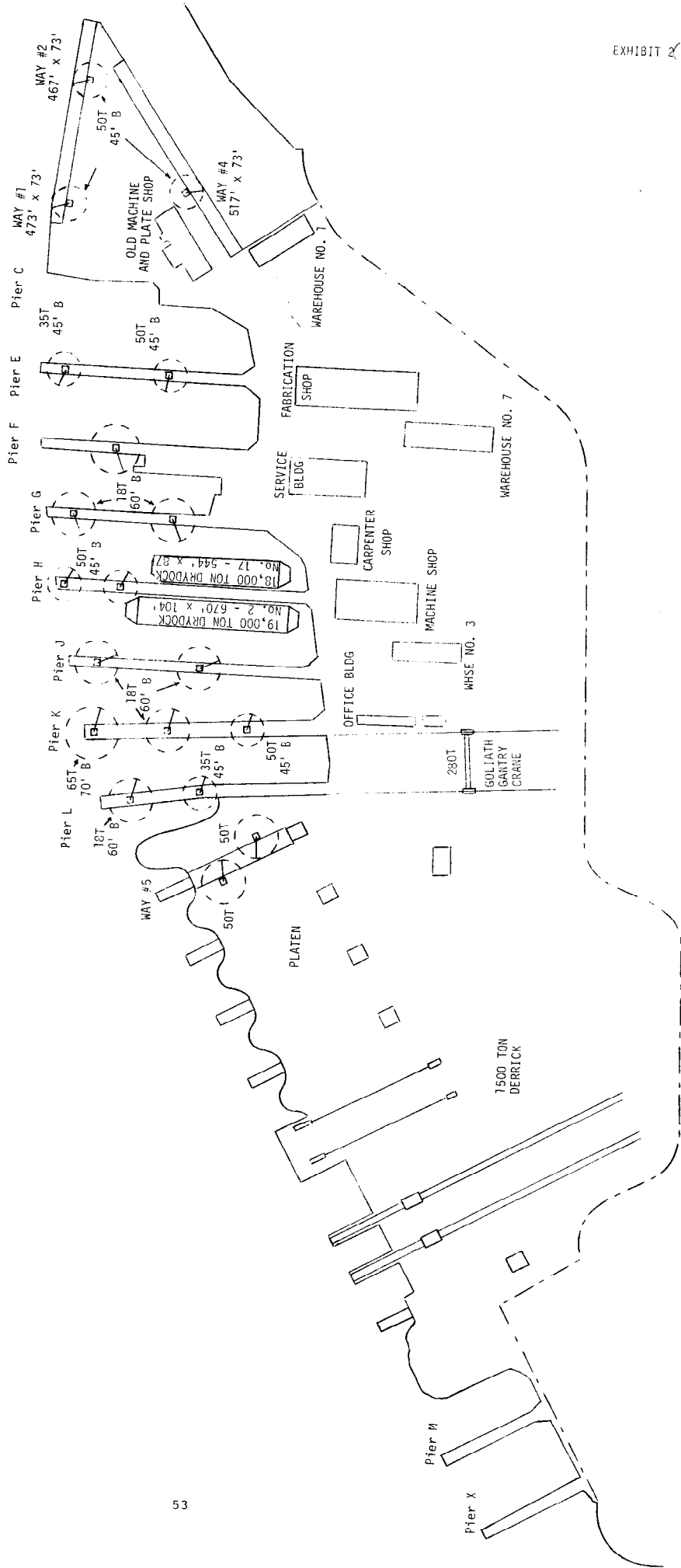


EXHIBIT 1

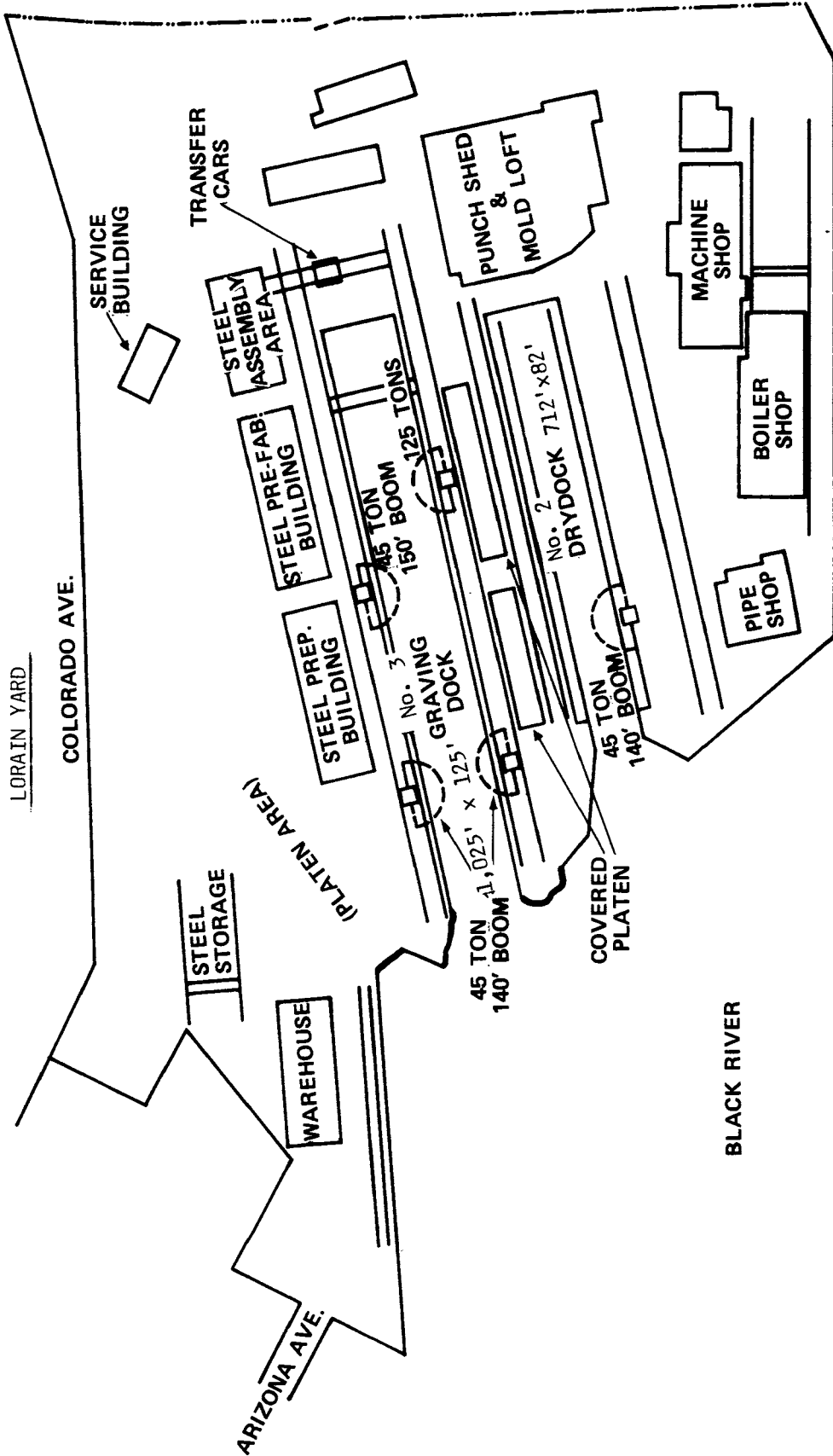
1. Bath Iron Works
2. Gen. Dyn.-Quincy
3. Gen. Dyn. - Elec. Boat
4. Sun Snip, Inc. Point
5. Beth-Sparrows Point
6. Maryland SB & DD
7. Newport News SB
8. Norfolk SB & DD
9. Tampa Shipyards
10. Alabama DD & SB
11. Ingalls/Litton
12. Avondale Shipyards
13. Livingston (Orange, TX)
14. Levingston (Gulfport)
15. Beth-Beaumont
16. Todd-Houston
17. Todd-Galveston
18. Galveston SB Co.
19. Marathon LeTourneau
20. NASSCO
21. Todd-LA
22. Beth-San Francisco
23. Triple A
24. FMC Corporation
25. Lockheed SB
26. Todd-Seattle
27. Fraser Shipyards
28. Bay Shipbuilding
29. American SB-Lorain
30. American SB-Toledo

MAJOR U.S. SHIPYARDS  
 BUILDING CAPACITY - SHIPS 475 FEET IN LENGTH OR OVER

**ALABAMA DRYDOCK & SHIPBUILDING CO.**

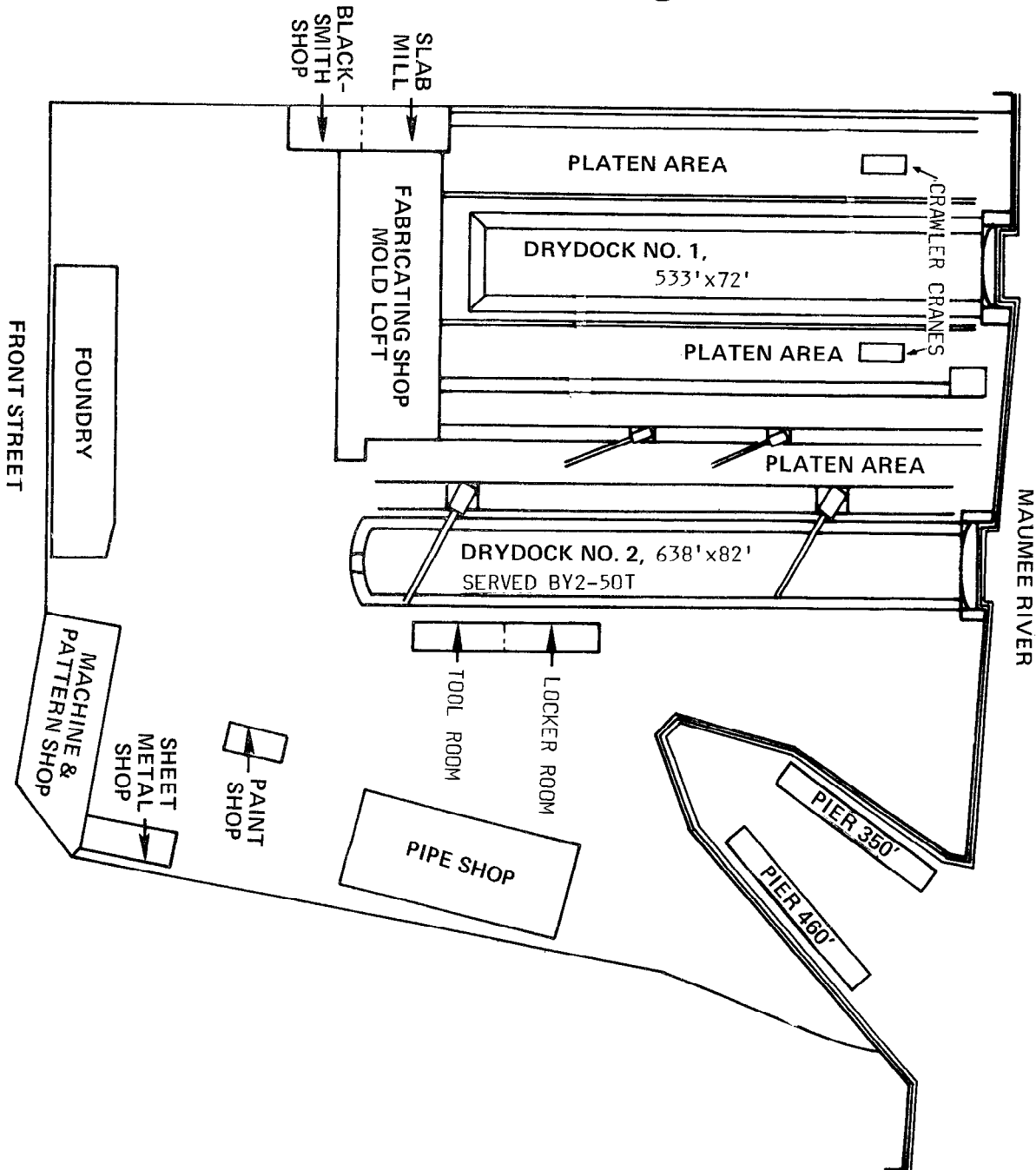


# AMERICAN SHIP BUILDING CO.

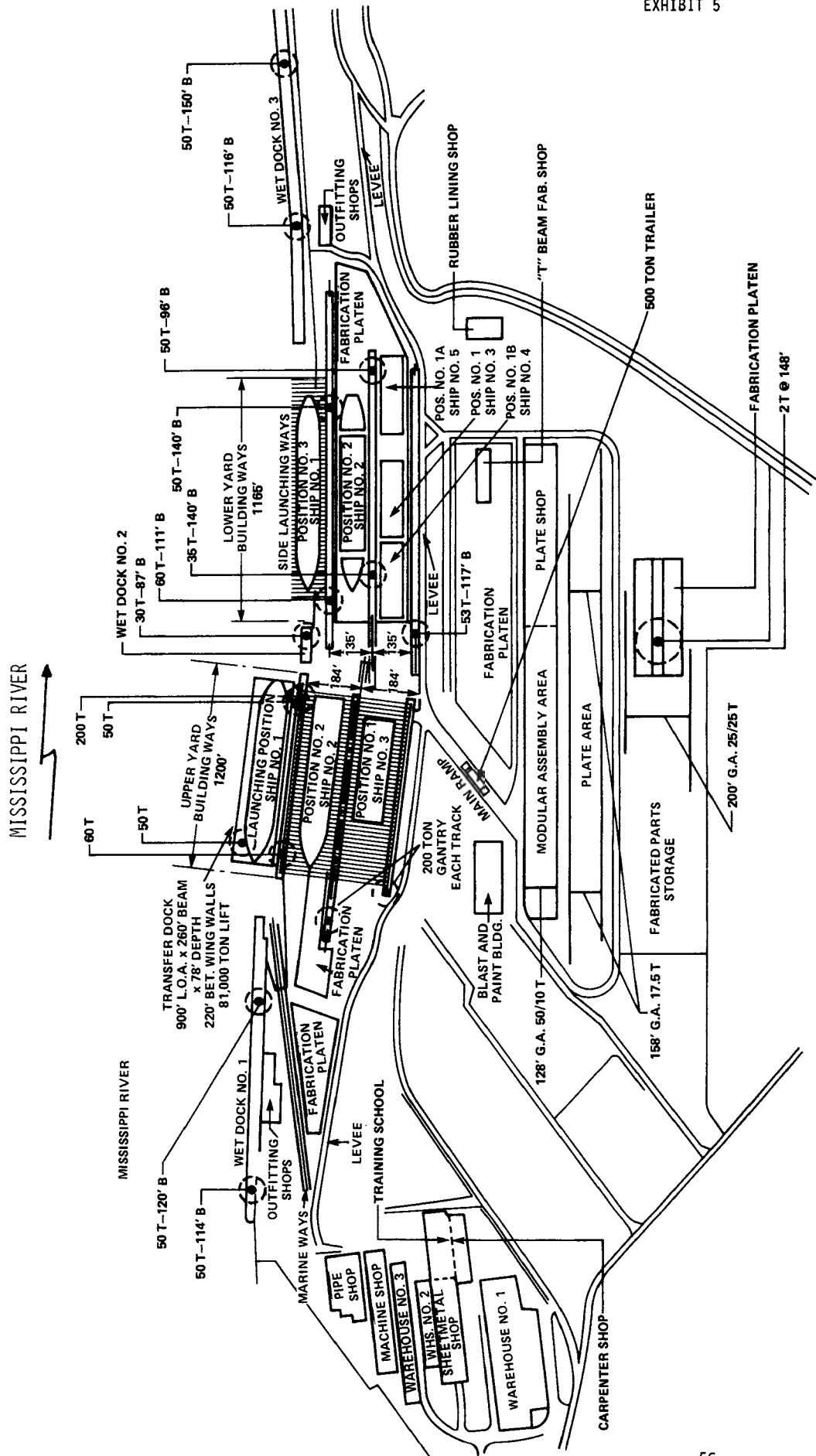


# AMERICAN SHIP BUILDING CO. TOLEDO

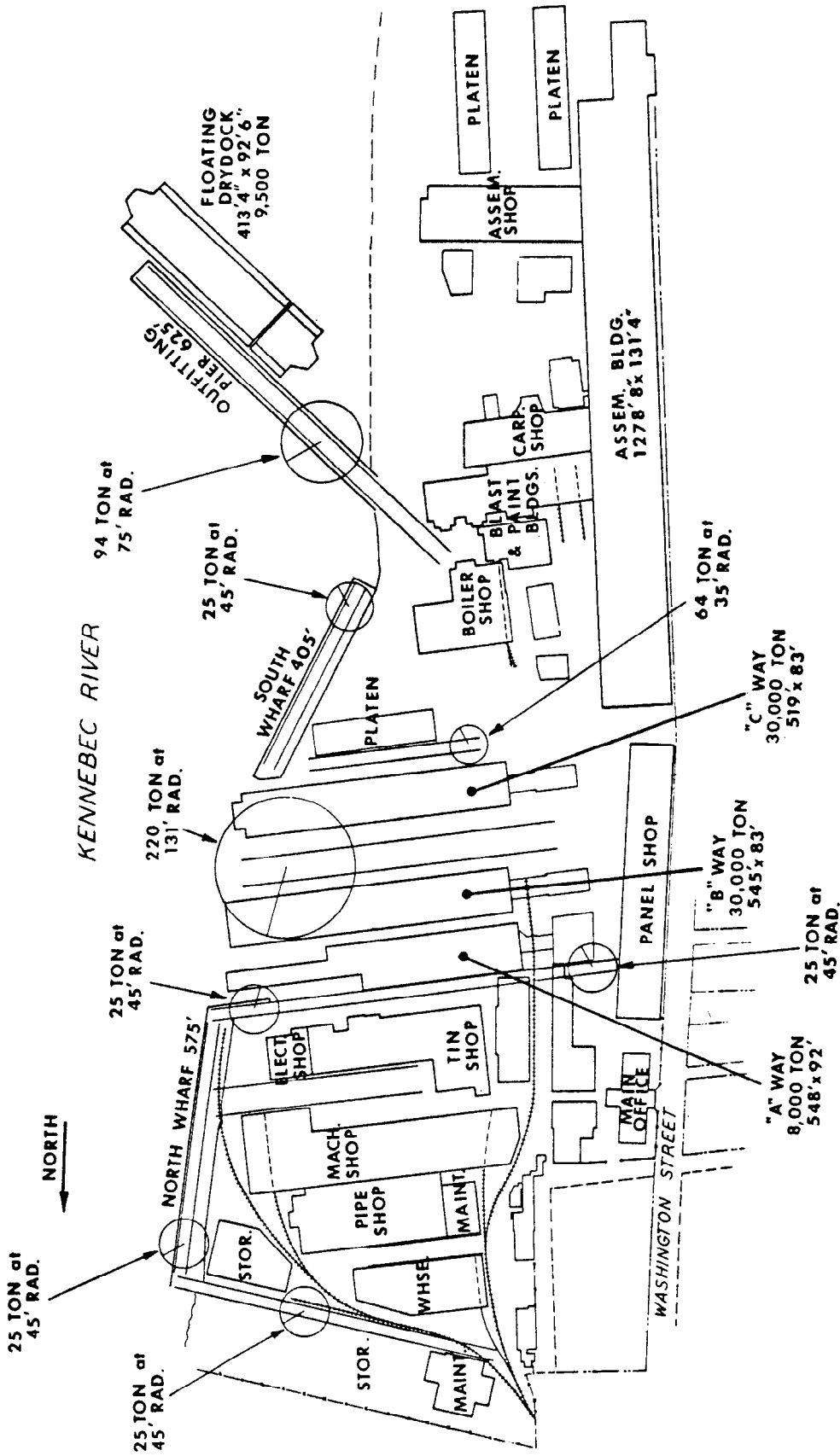
EXHIBIT 4



# Avondale Shipyards, Inc.

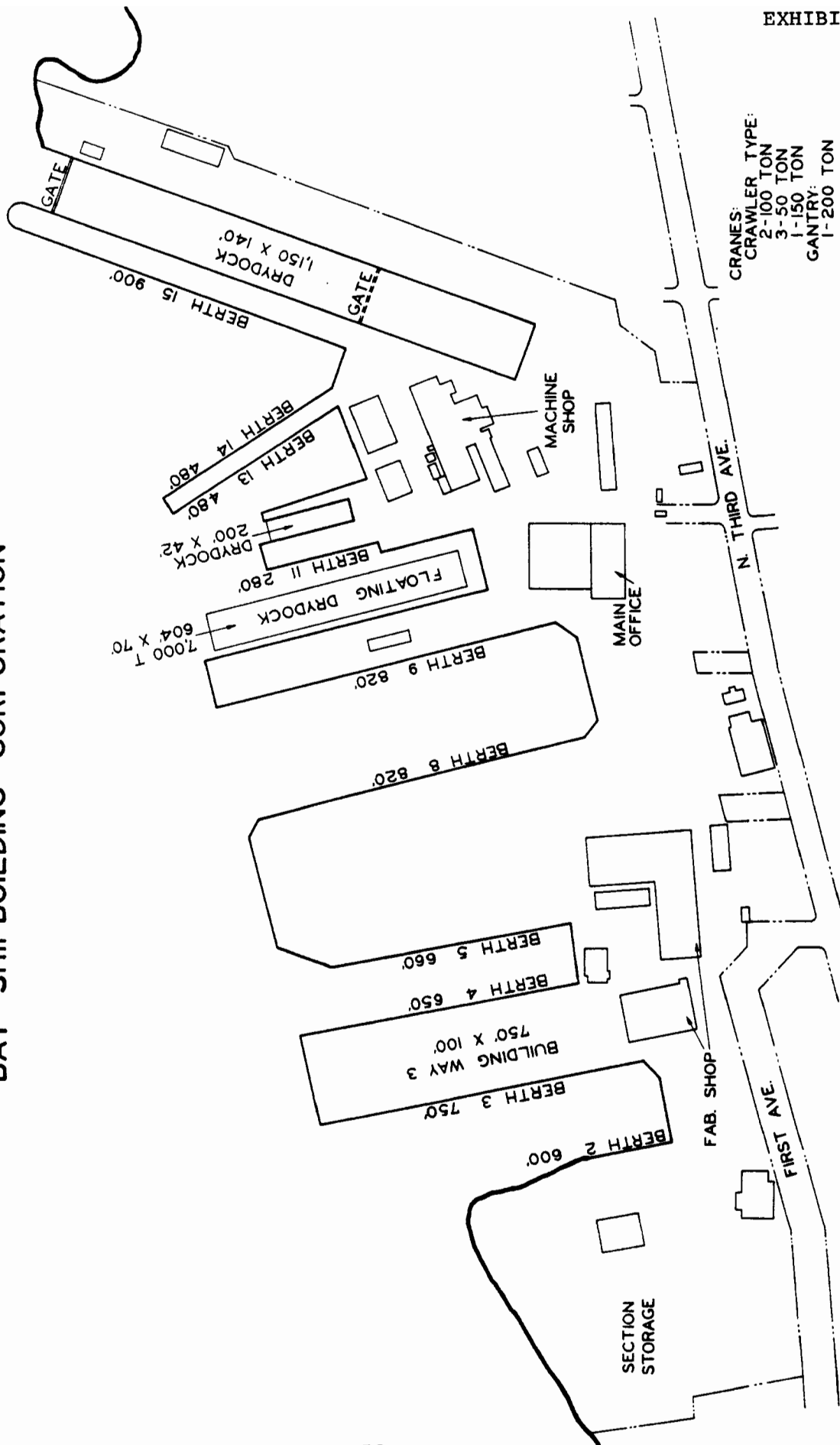


# BATH IRON WORKS CORP.

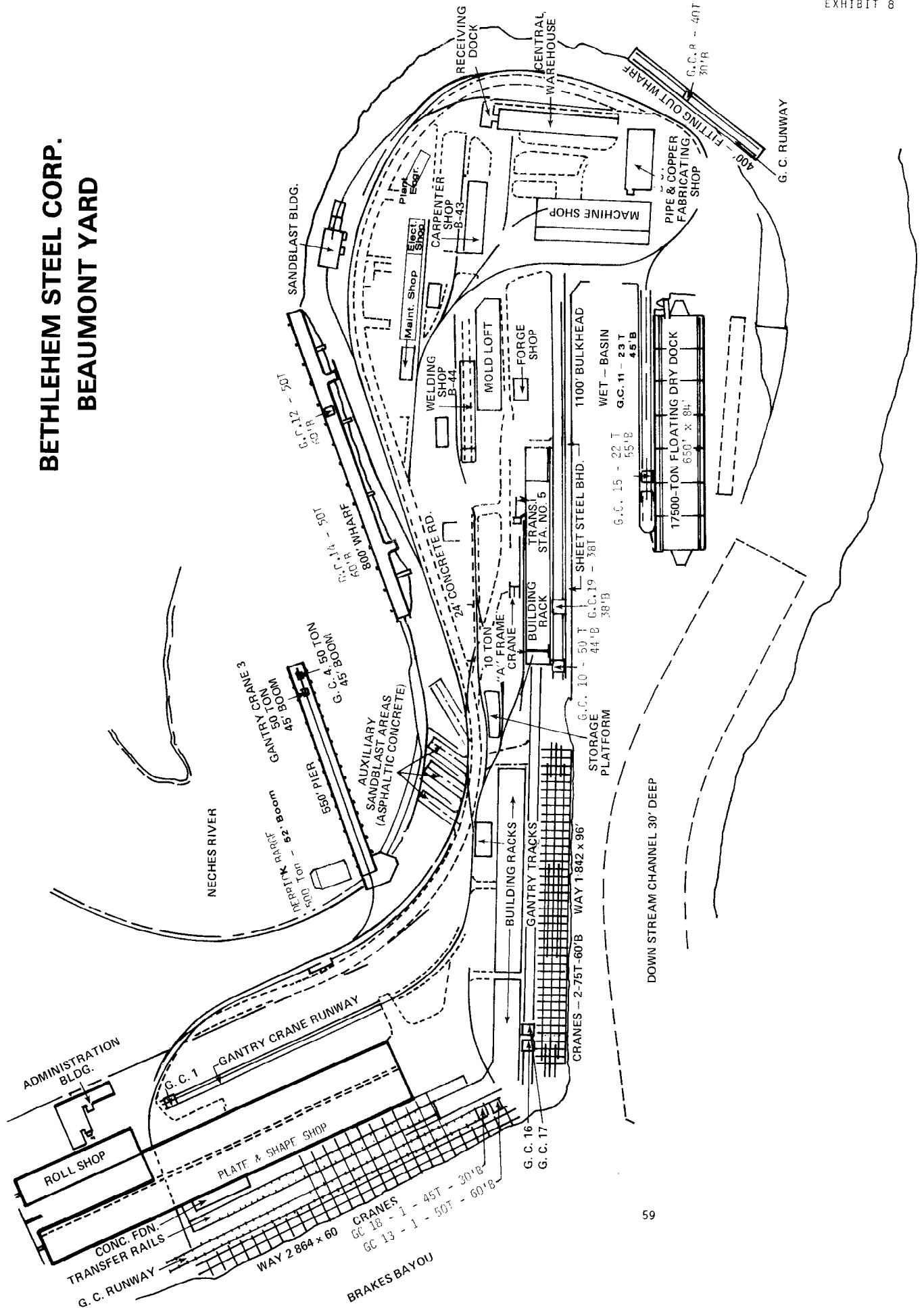




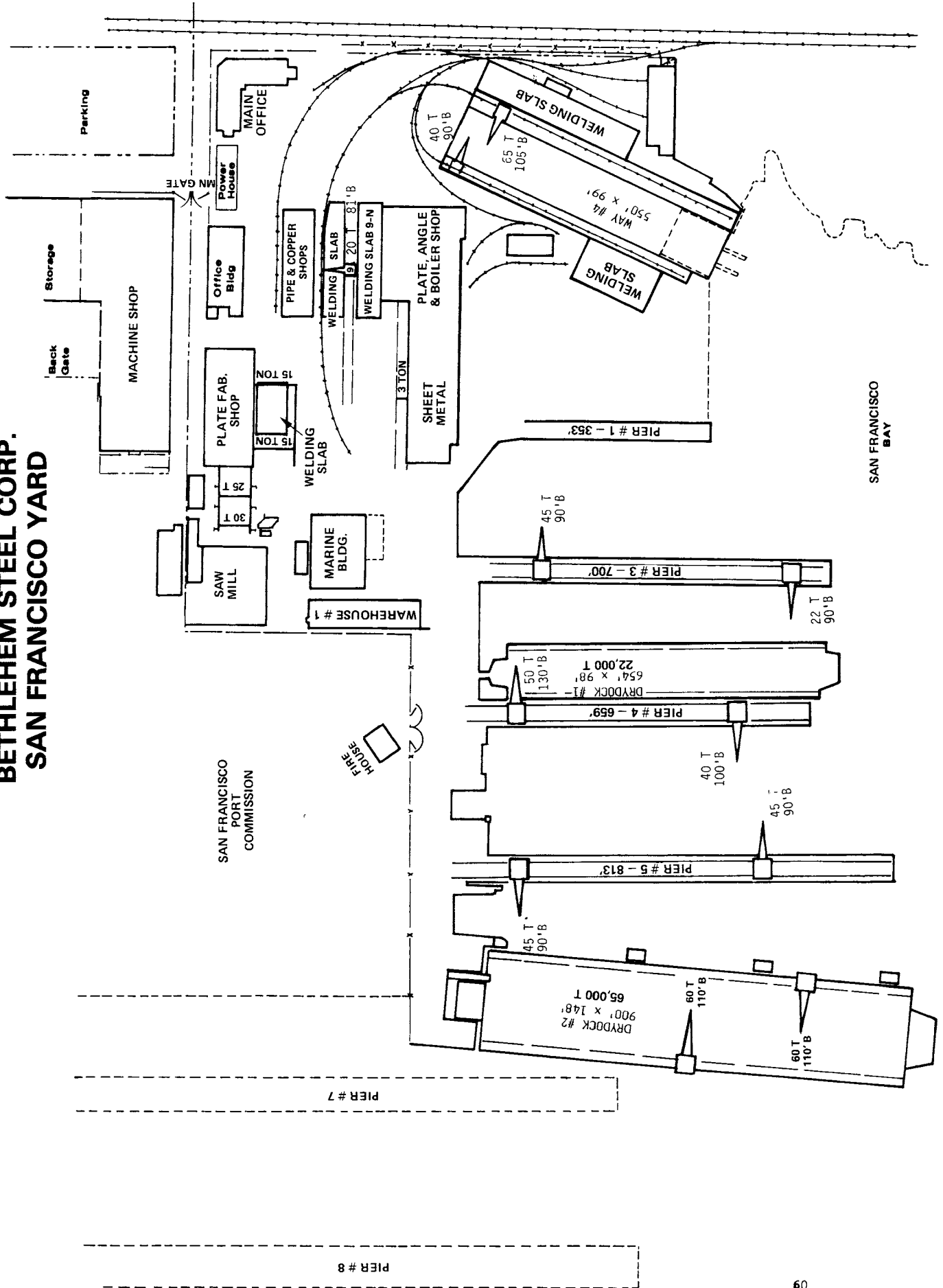
BAY SHIPBUILDING CORPORATION



# BETHLEHEM STEEL CORP. BEAUMONT YARD

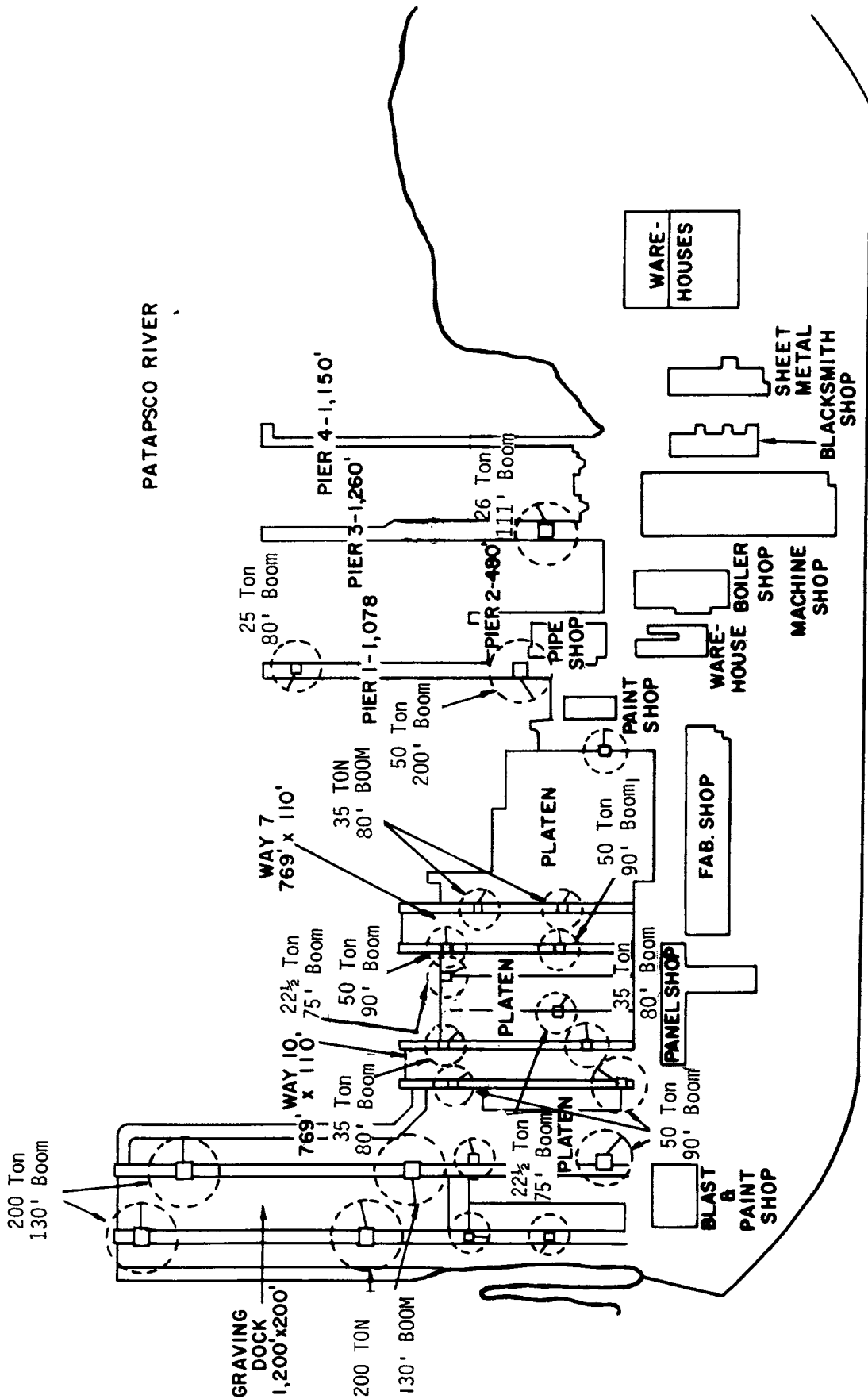


# BETHLEHEM STEEL CORP. SAN FRANCISCO YARD

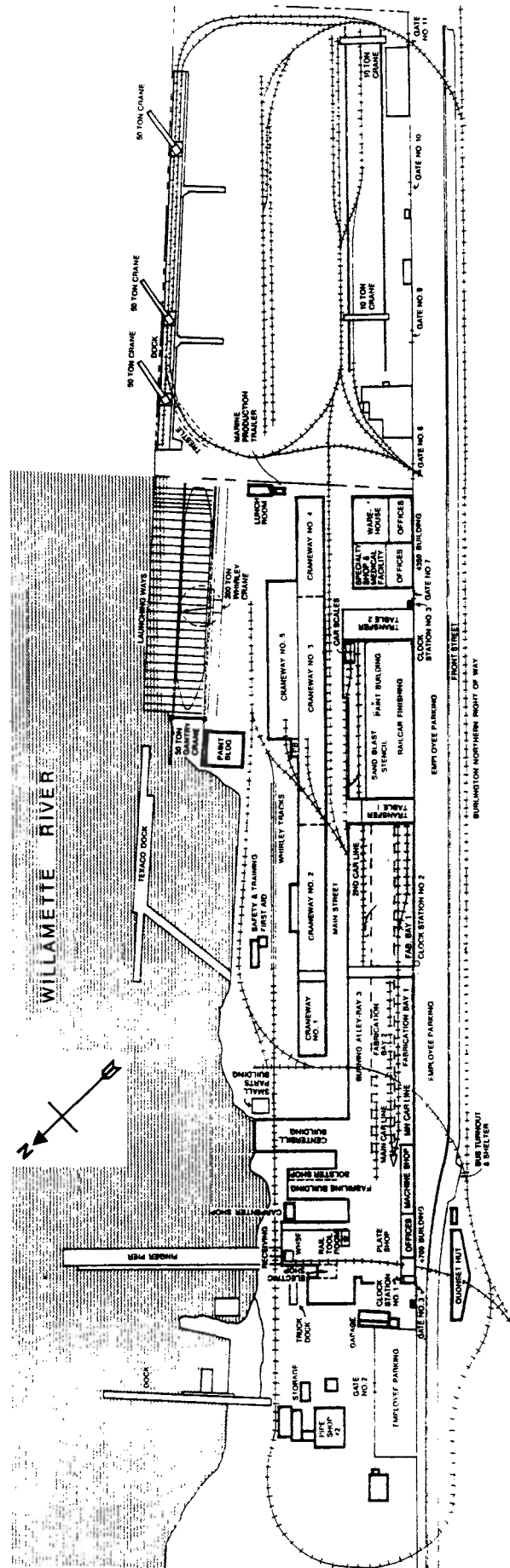


# BETHLEHEM STEEL CORPORATION

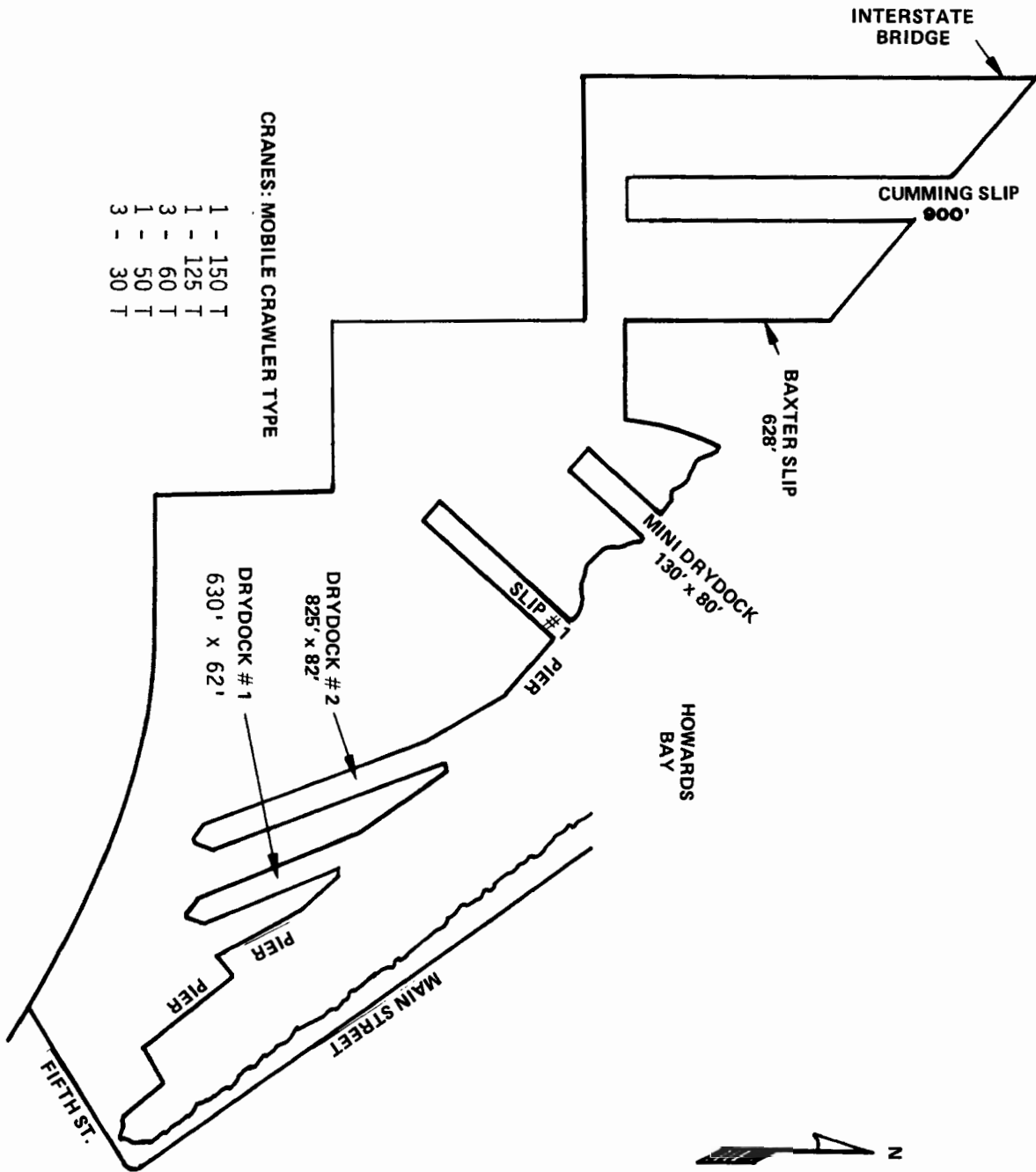
## SPARROWS POINT YARD

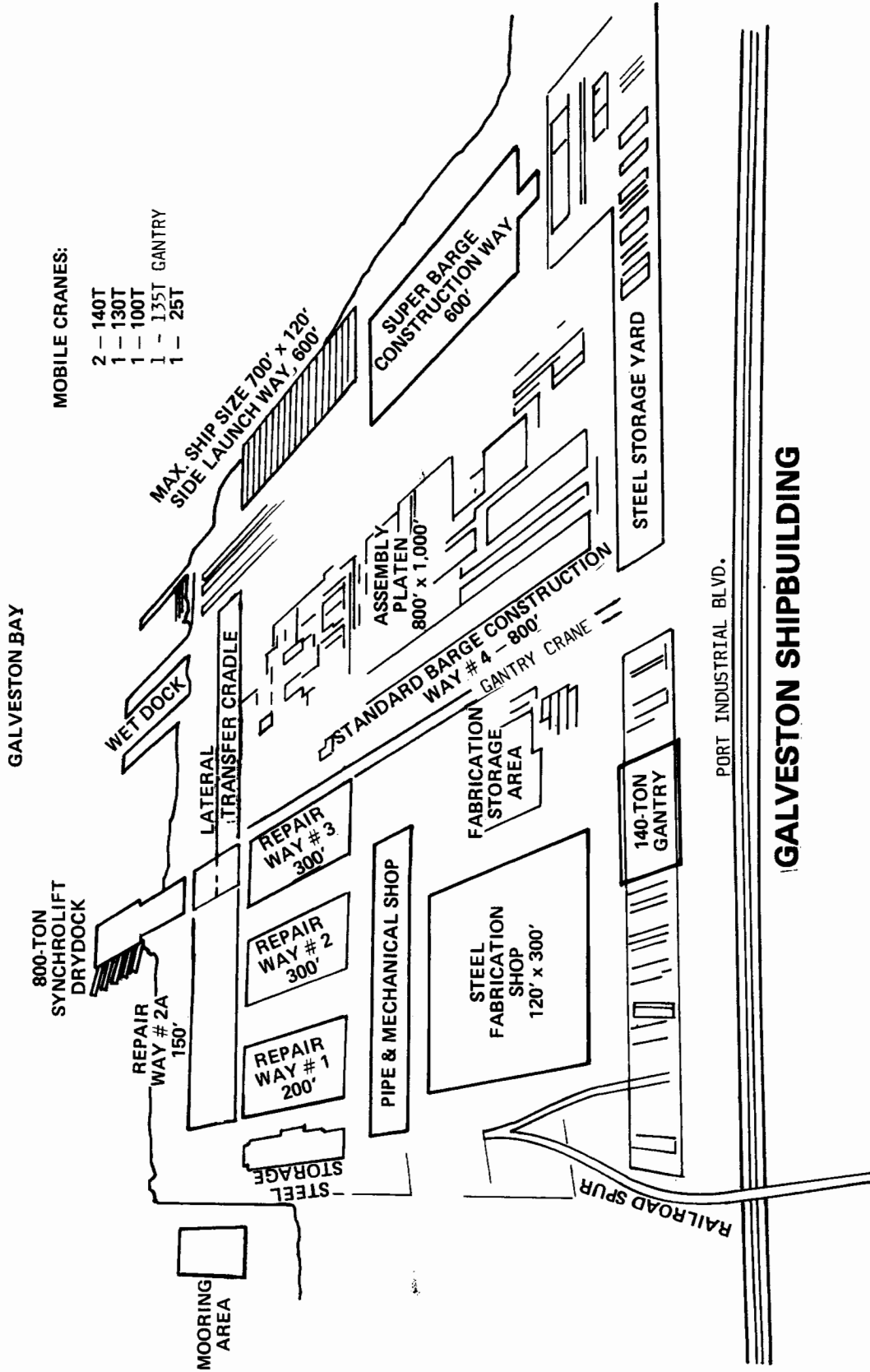


**FMC CORPORATION**  
**Marine & Rail Equipment Division**  
**Portland, Oregon**



# FRASER SHIPYARDS, INC. SUPERIOR, WISCONSIN





- MOBILE CRANES:**
- 2 - 140T
  - 1 - 130T
  - 1 - 100T
  - 1 - 135T GANTRY
  - 1 - 25T

GALVESTON BAY

800-TON SYNCHROLIFT DRYDOCK

REPAIR WAY # 2A 150'

REPAIR WAY # 1 200'

REPAIR WAY # 2 300'

REPAIR WAY # 3 300'

PIPE & MECHANICAL SHOP

STEEL FABRICATION SHOP 120' x 300'

FABRICATION STORAGE AREA

STANDARD BARGE CONSTRUCTION WAY # 4 - 800'

GANTRY CRANE

ASSEMBLY PLATEN 800' x 1,000'

140-TON GANTRY

STEEL STORAGE YARD

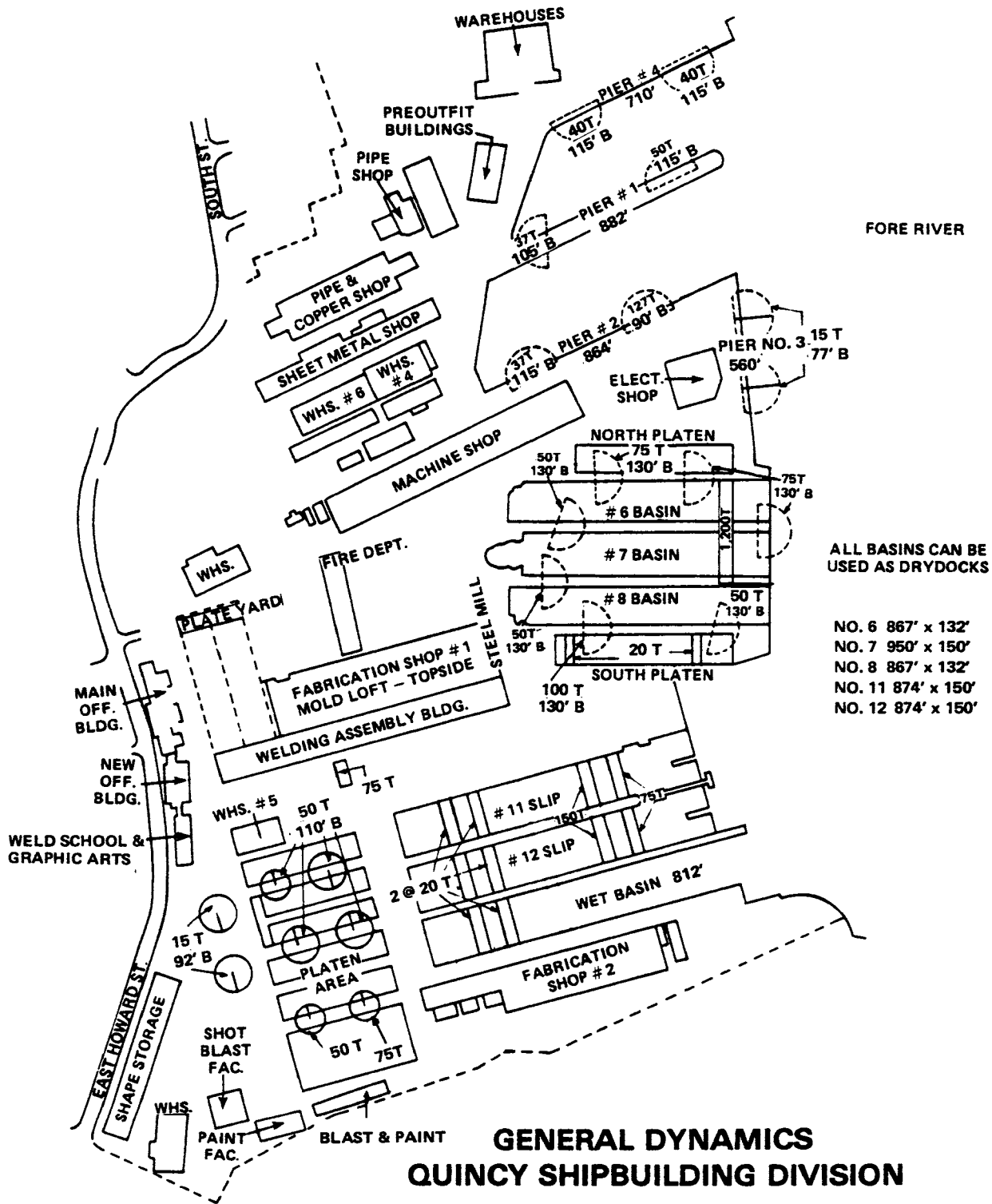
SUPER BARGE CONSTRUCTION WAY 600'

MAX SHIP SIZE 700' x 120' SIDE LAUNCH WAY, 600'

PORT INDUSTRIAL BLVD.

**GALVESTON SHIPBUILDING**

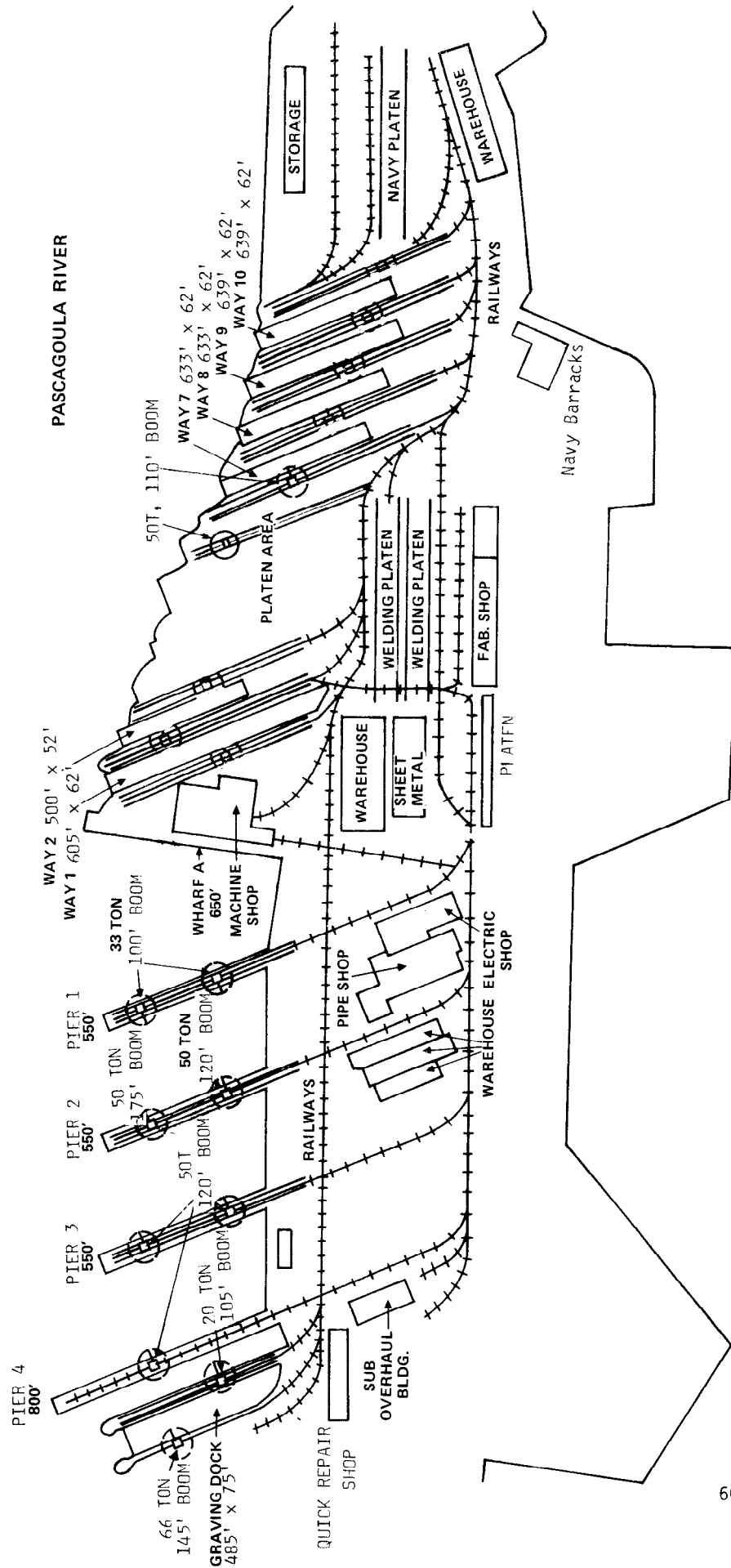
RAILROAD SPUR





# INGALLS SHIPBUILDING

DIVISION OF LITTON INDUSTRIES  
EAST BANK FACILITY

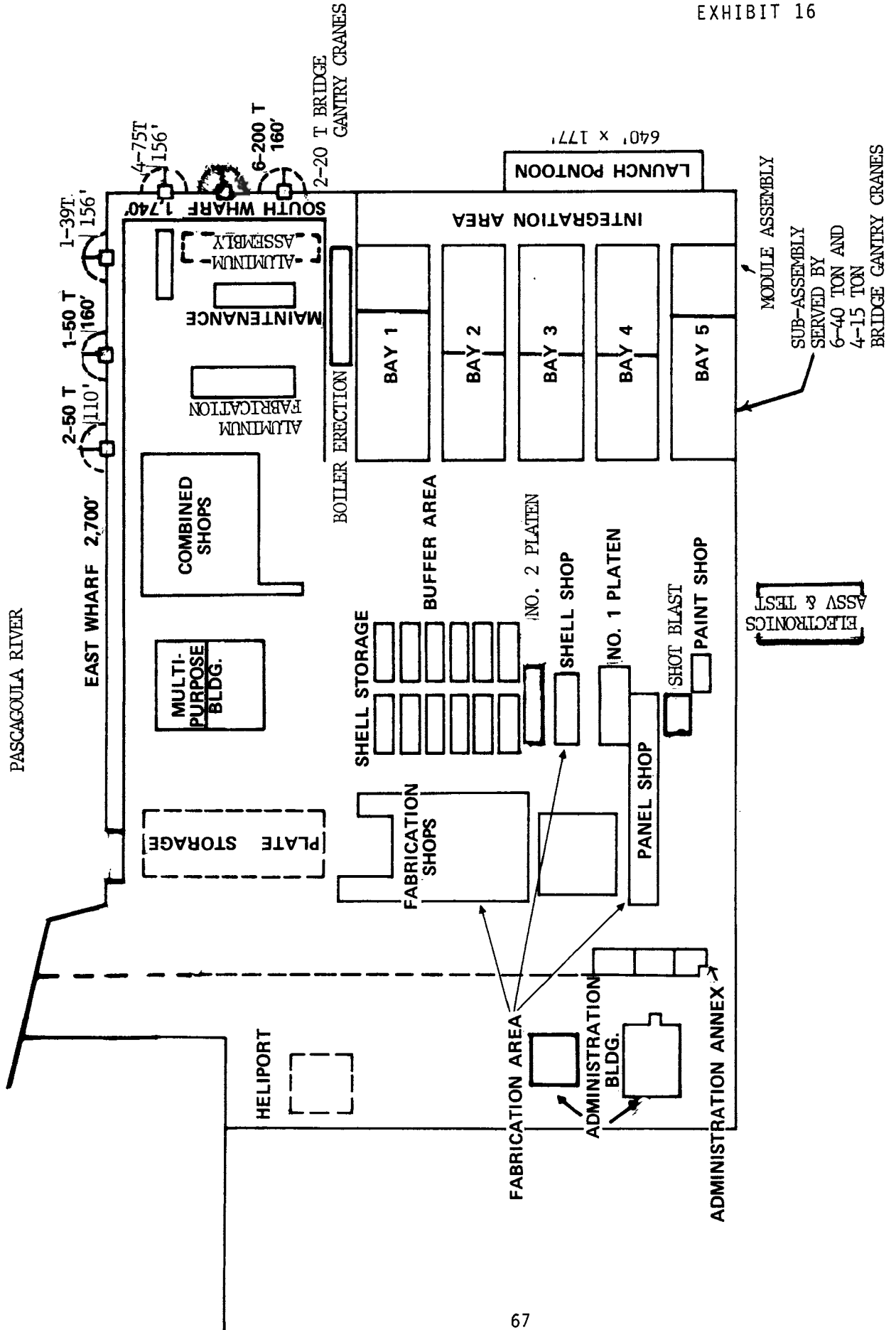


# INGALLS SHIPBUILDING

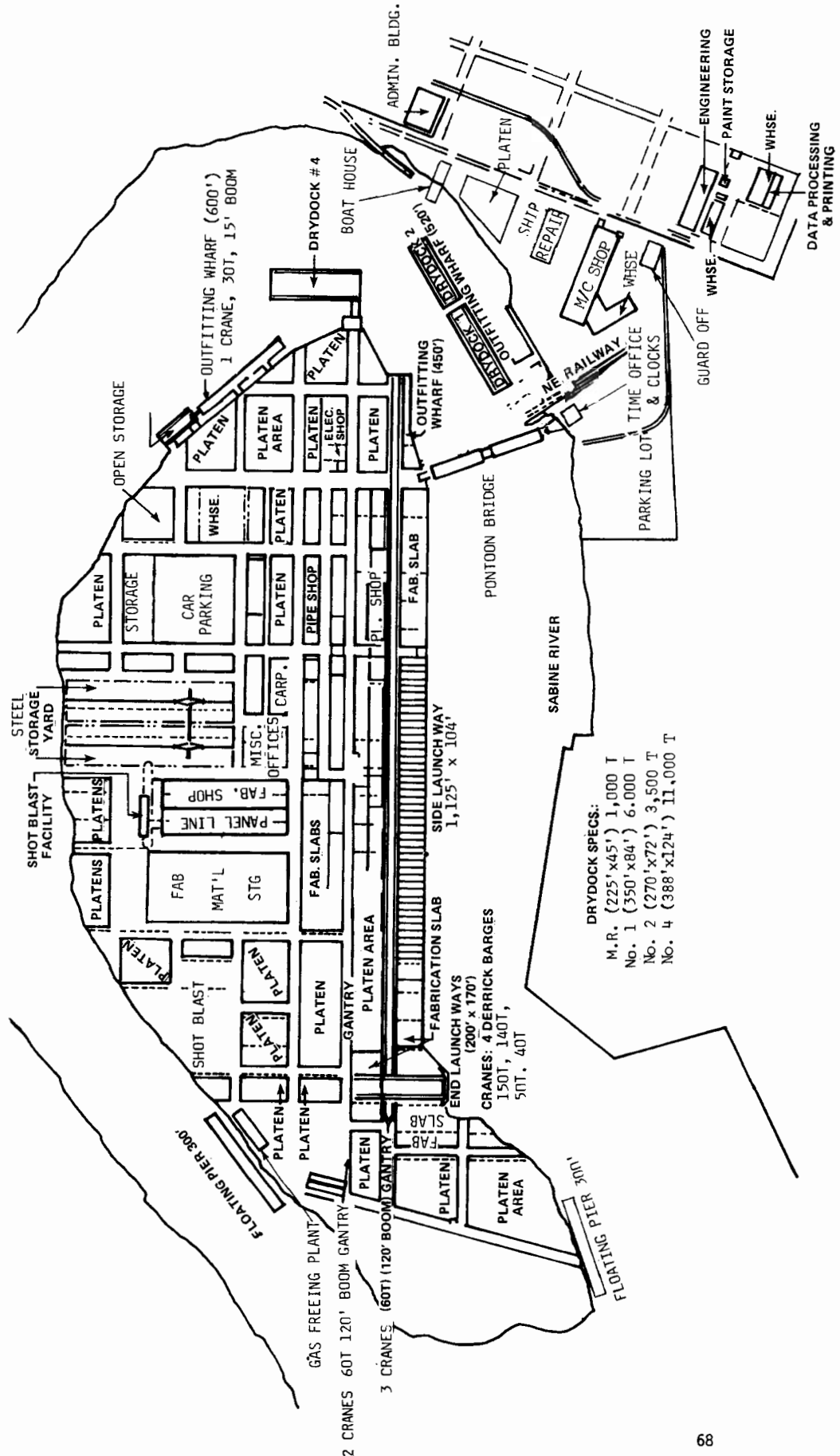
## DIVISION OF LITTON INDUSTRIES

WEST BANK  
PASCAGOULA RIVER

14-Whirley Cranes  
Serve East & South Wharves,  
Integration Area and Bays



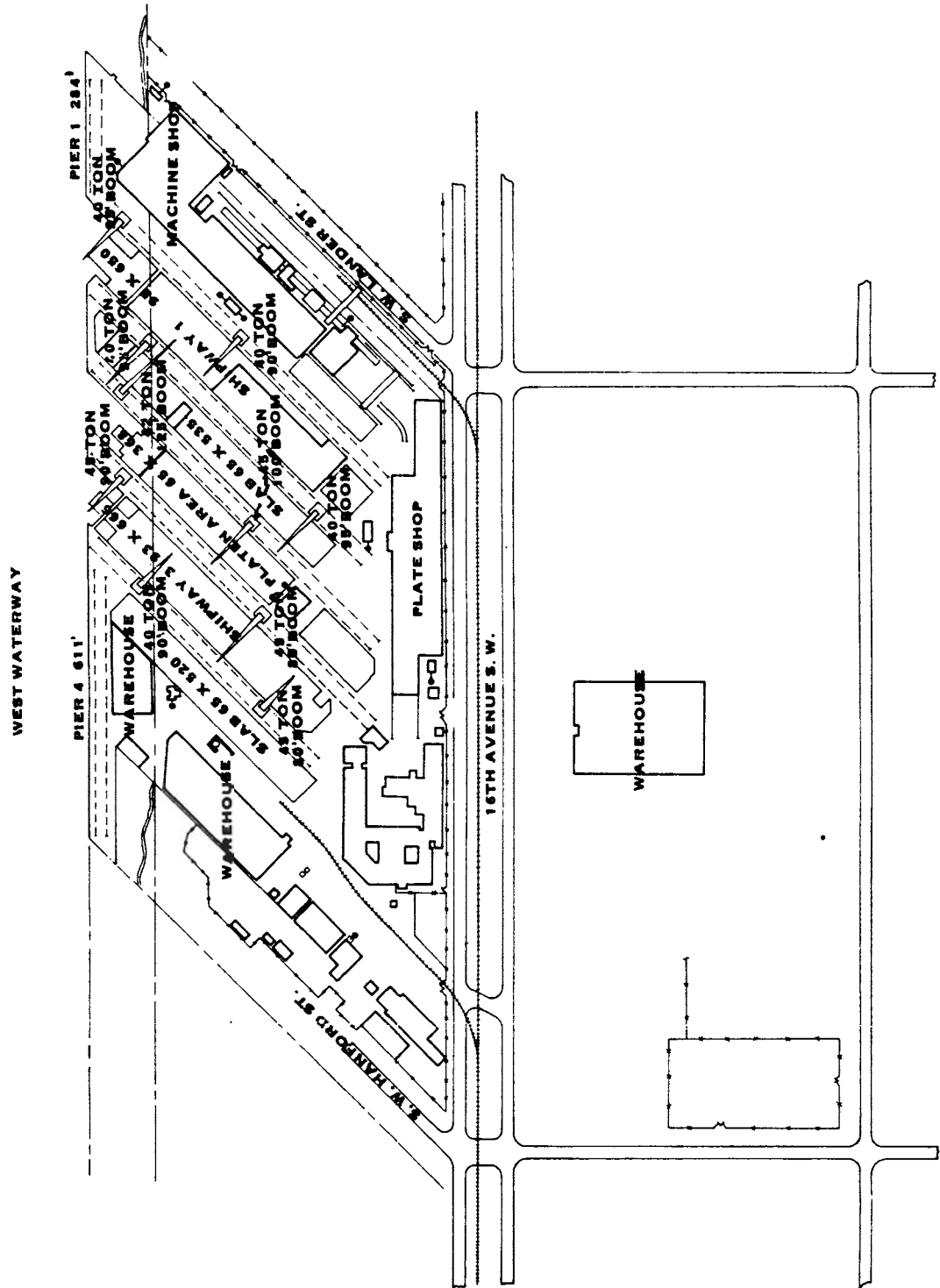
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LOCKHEED SHIPBUILDING AND CONSTRUCTION COMPANY

PLANT ONE

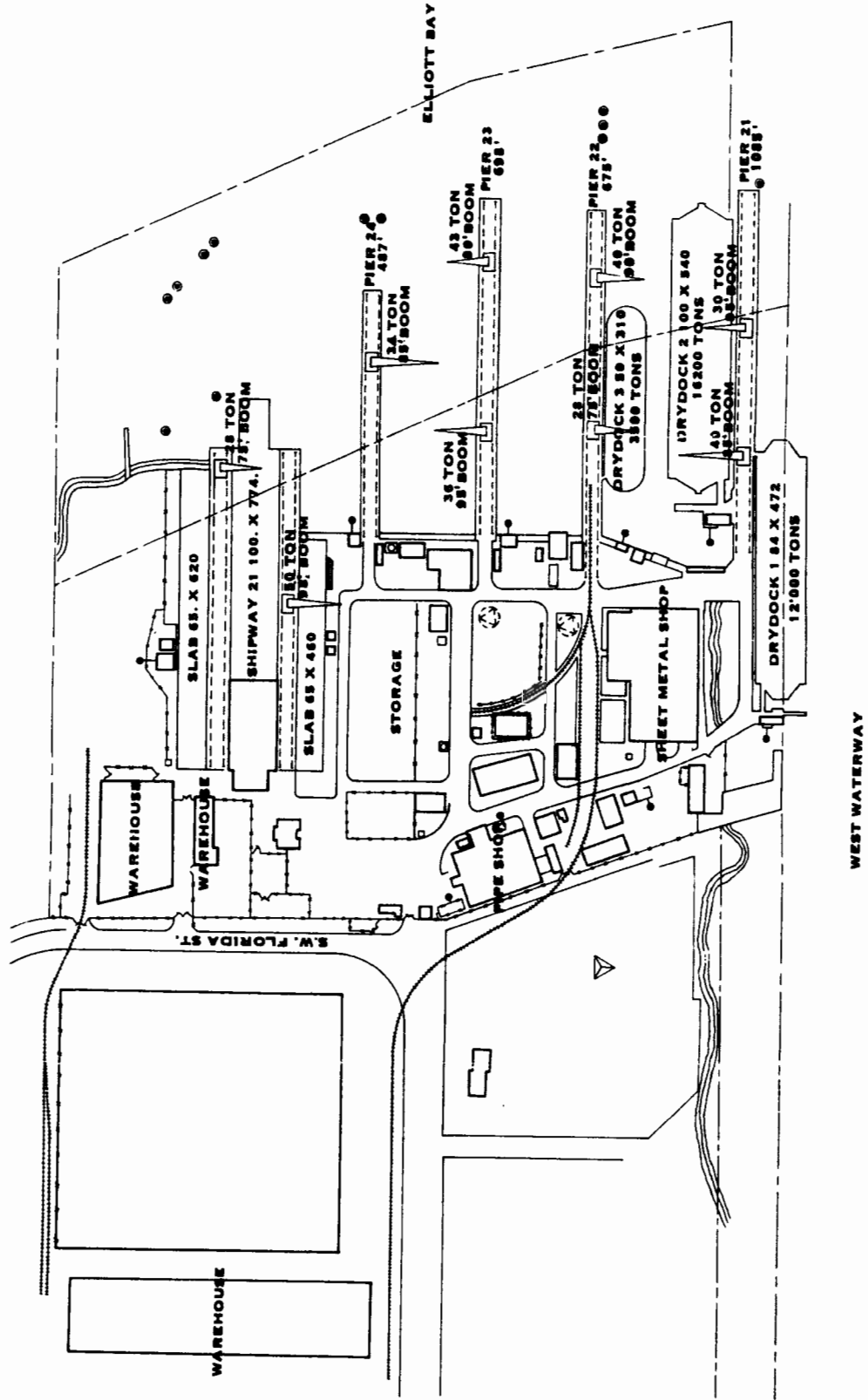
2929 16th AVE S.W., SEATTLE, WASHINGTON



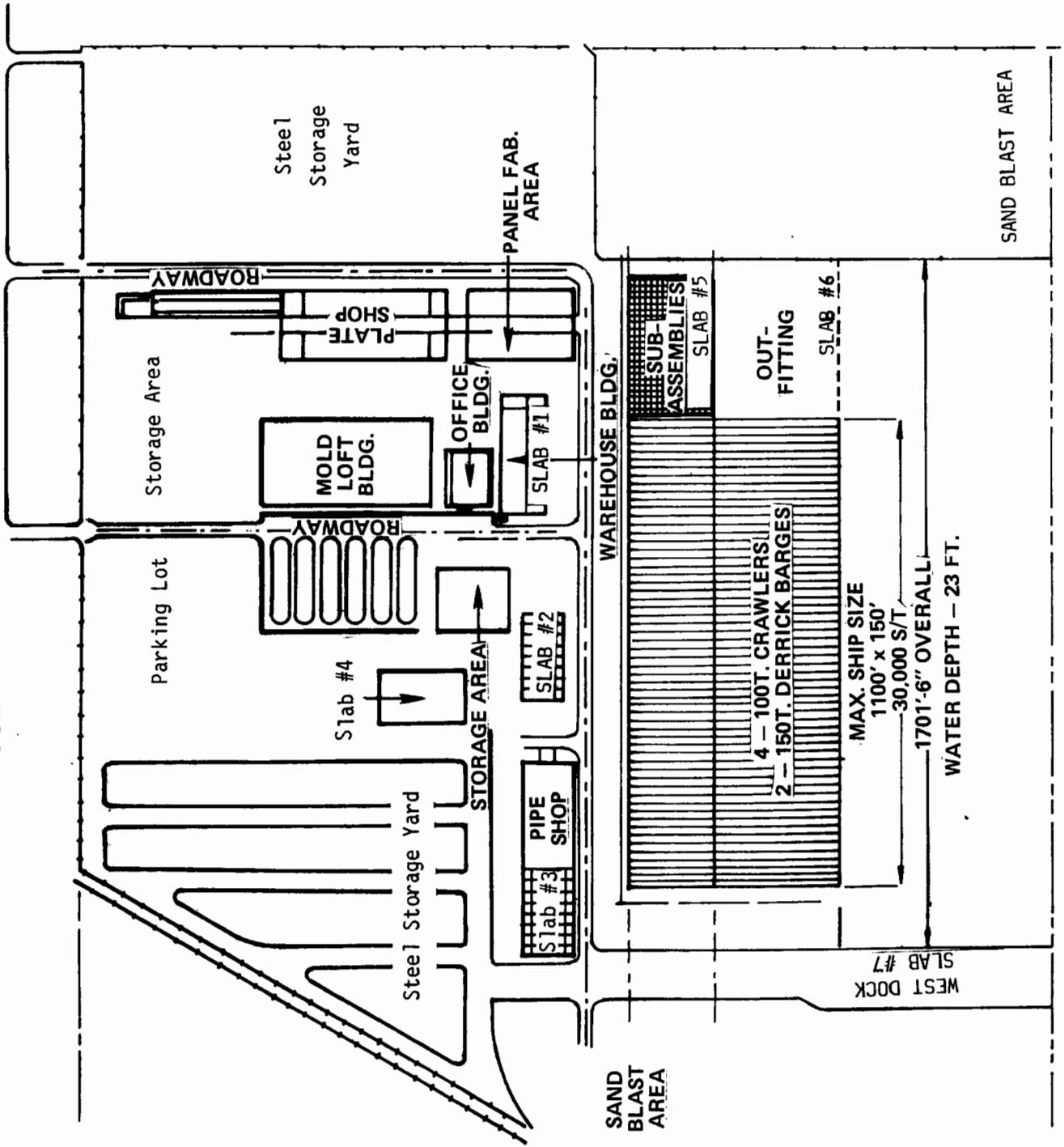
LOCKHEED SHIPBUILDING AND CONSTRUCTION COMPANY

PLANT TWO

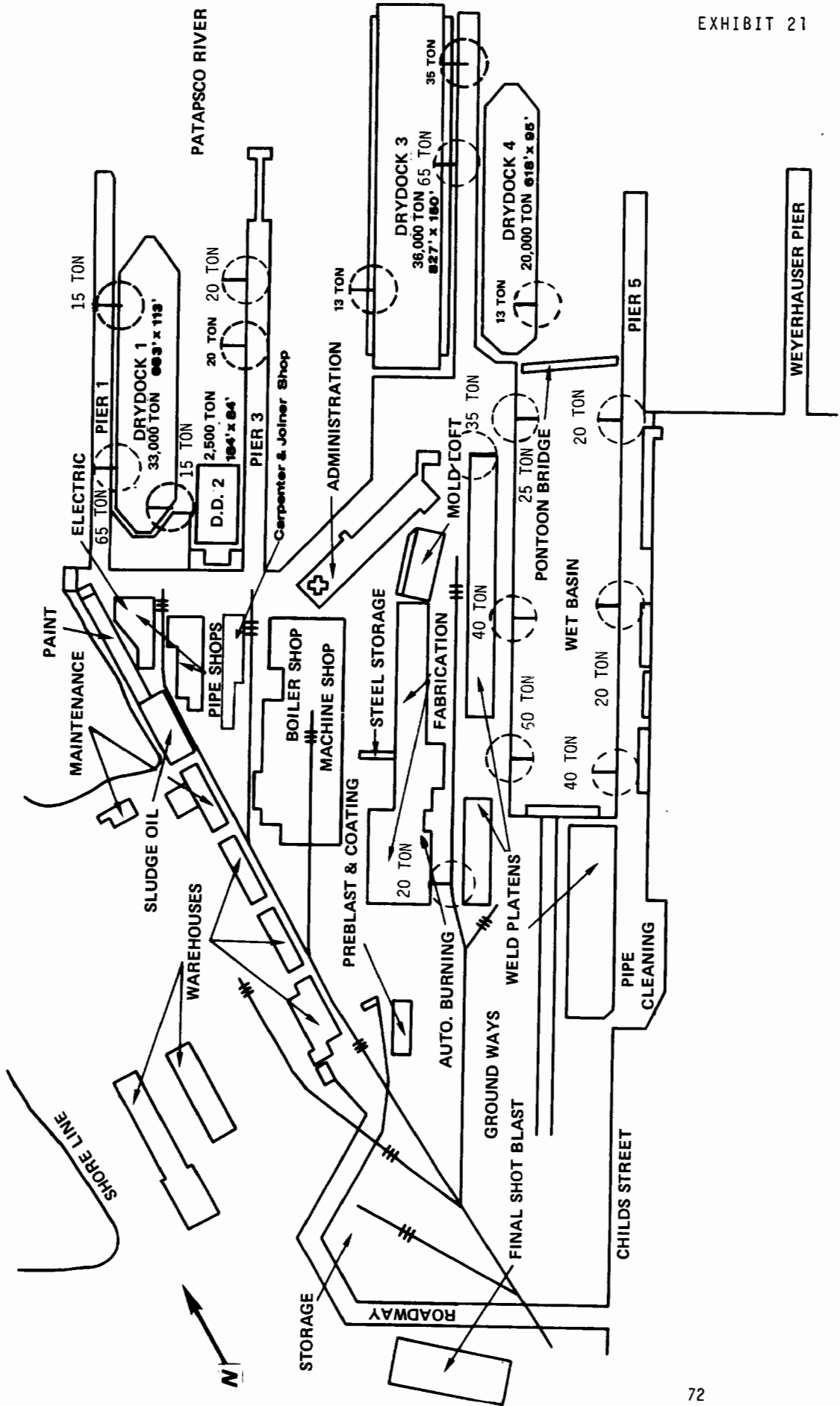
2550 S. W. FLORIDA, SEATTLE, WASHINGTON



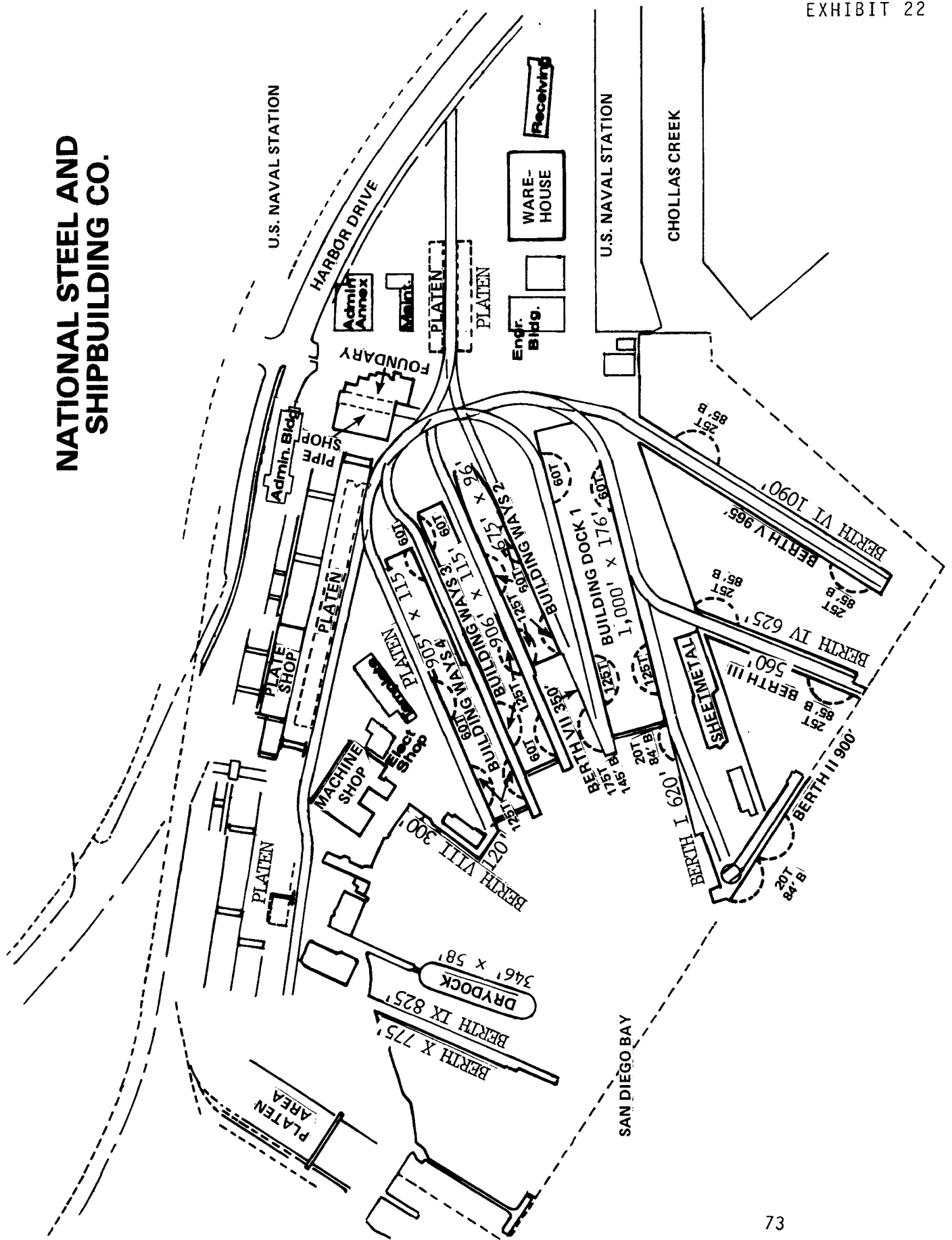
# MARATHON LeTOURNEAU CO. GULF MARINE DIVISION



# MARYLAND SHIPBUILDING & DRYDOCK CO.



# NATIONAL STEEL AND SHIPBUILDING CO.





# Newport News Shipbuilding

EXHIBIT 23

## SOUTH YARD

CONSOLIDATED WAREHOUSE

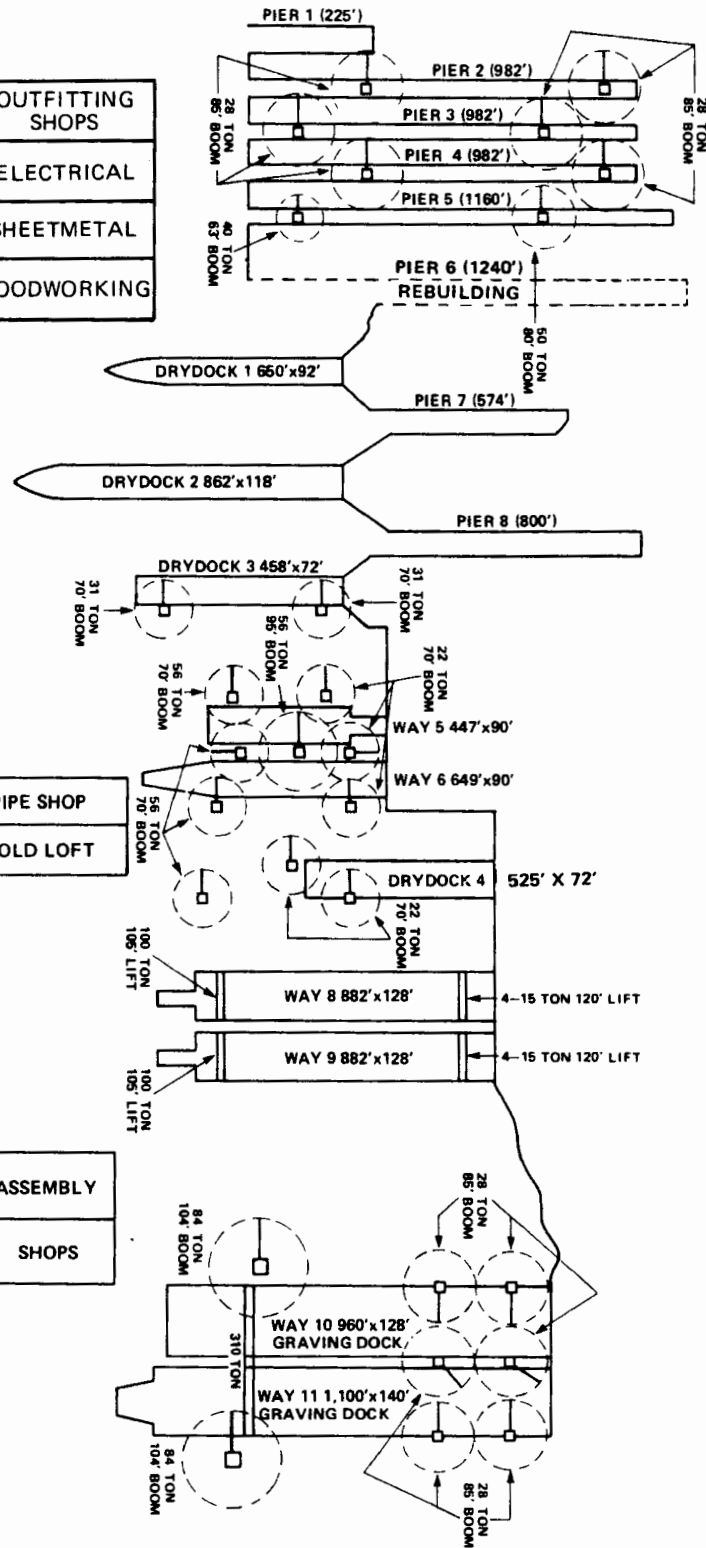
MACHINE SHOPS

PATTERN-MAKERS  
FOUNDRY

OUTFITTING SHOPS  
ELECTRICAL  
SHEETMETAL  
WOODWORKING

PIPE SHOP  
MOLD LOFT

ASSEMBLY SHOPS



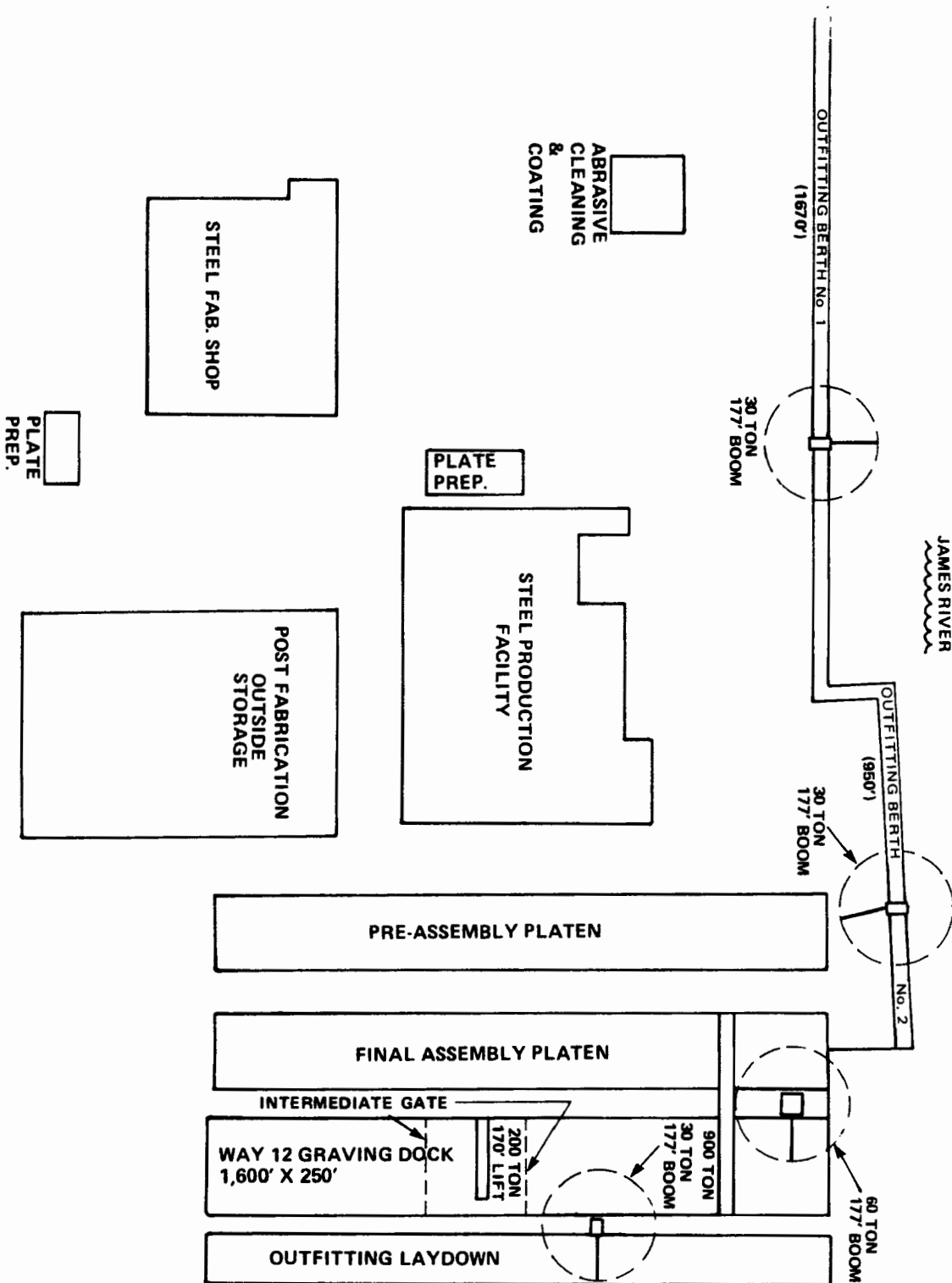
PIERS 7, 8 AND DRYDOCKS ARE SERVED BY LOCOMOTIVE CRANES

JAMES RIVER

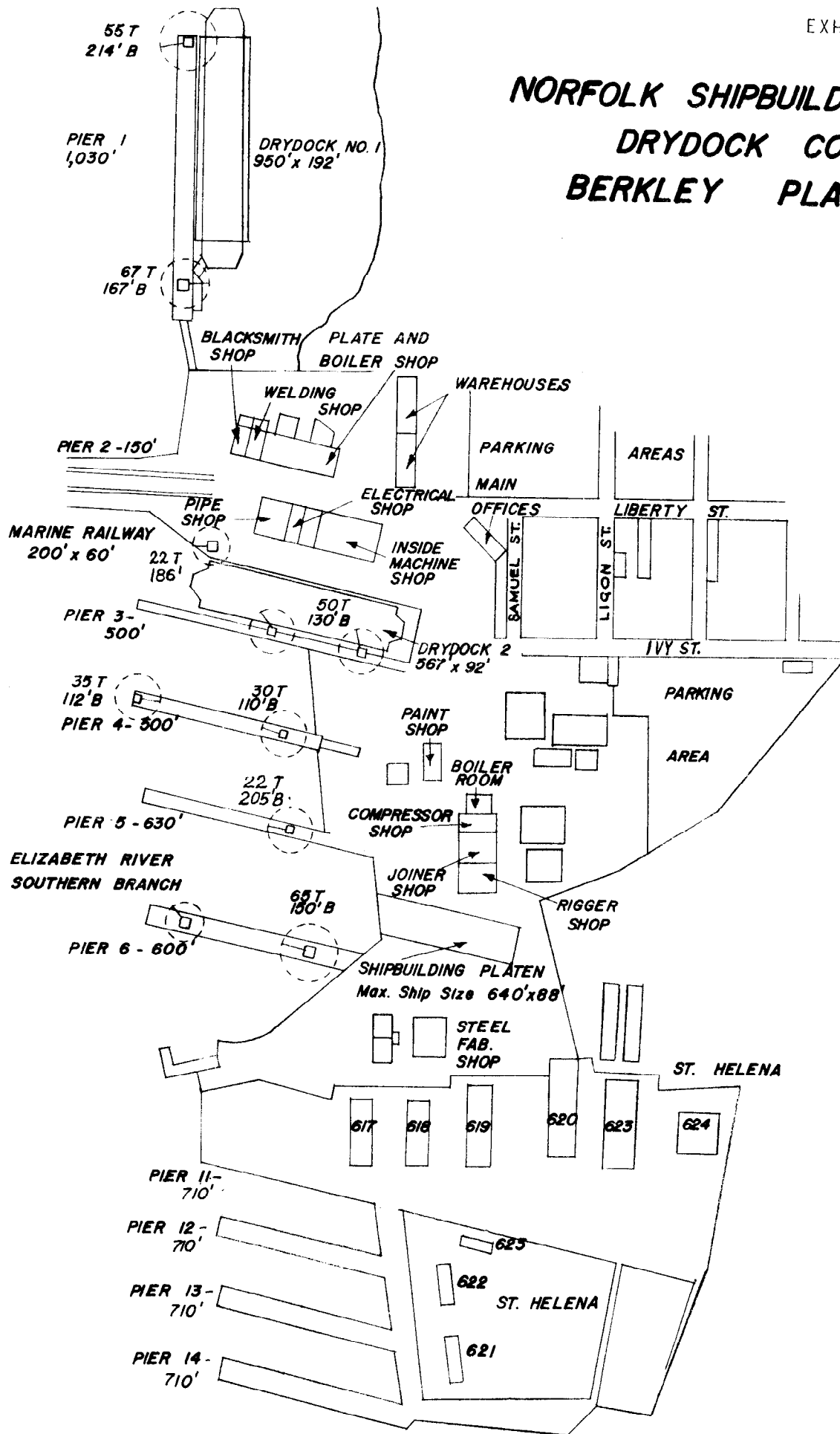
# Newport News Shipbuilding

EXHIBIT 24

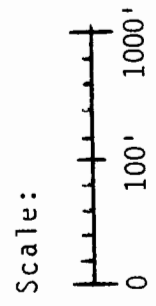
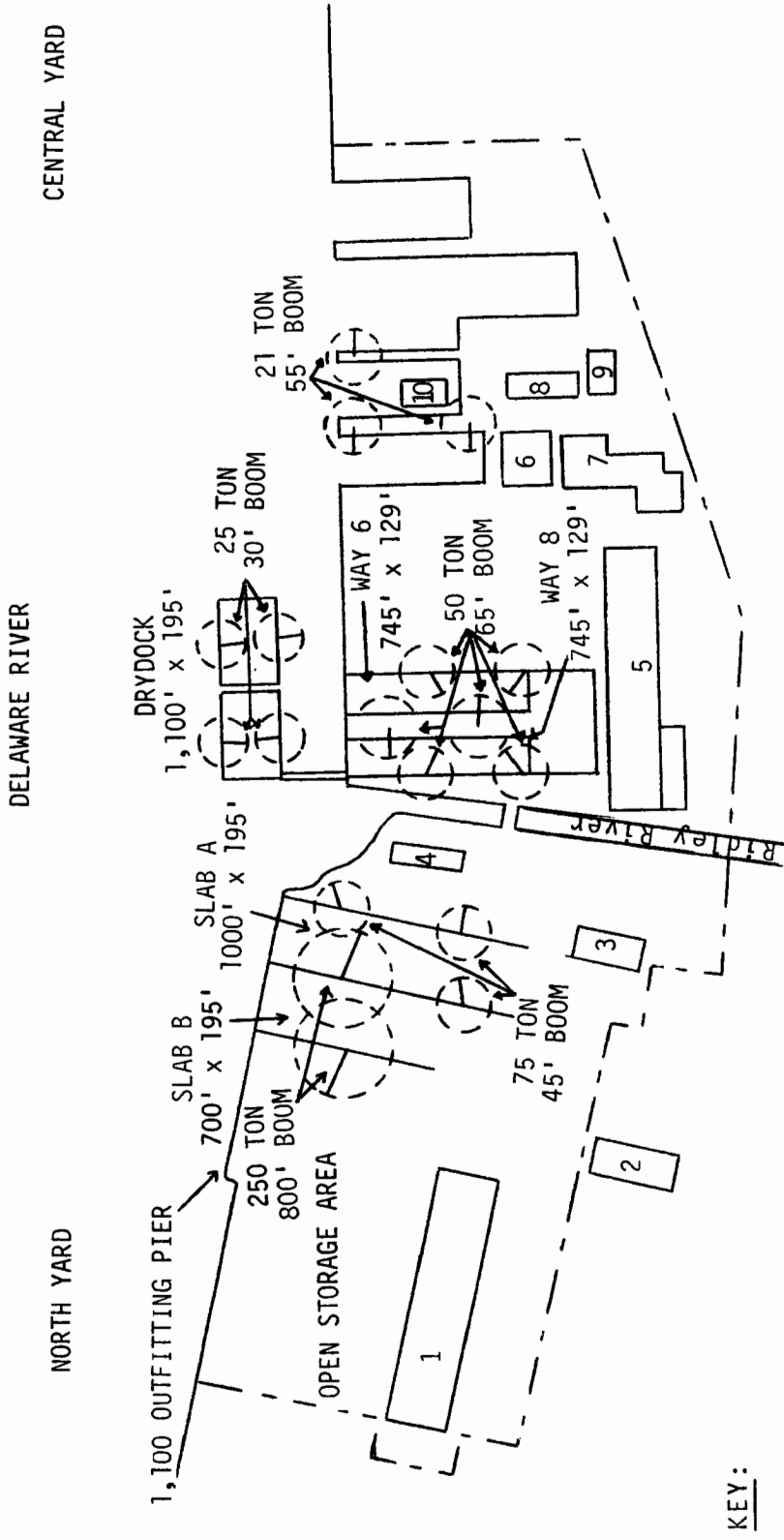
NORTH YARD



# NORFOLK SHIPBUILDING AND DRYDOCK CORP. BERKLEY PLANT

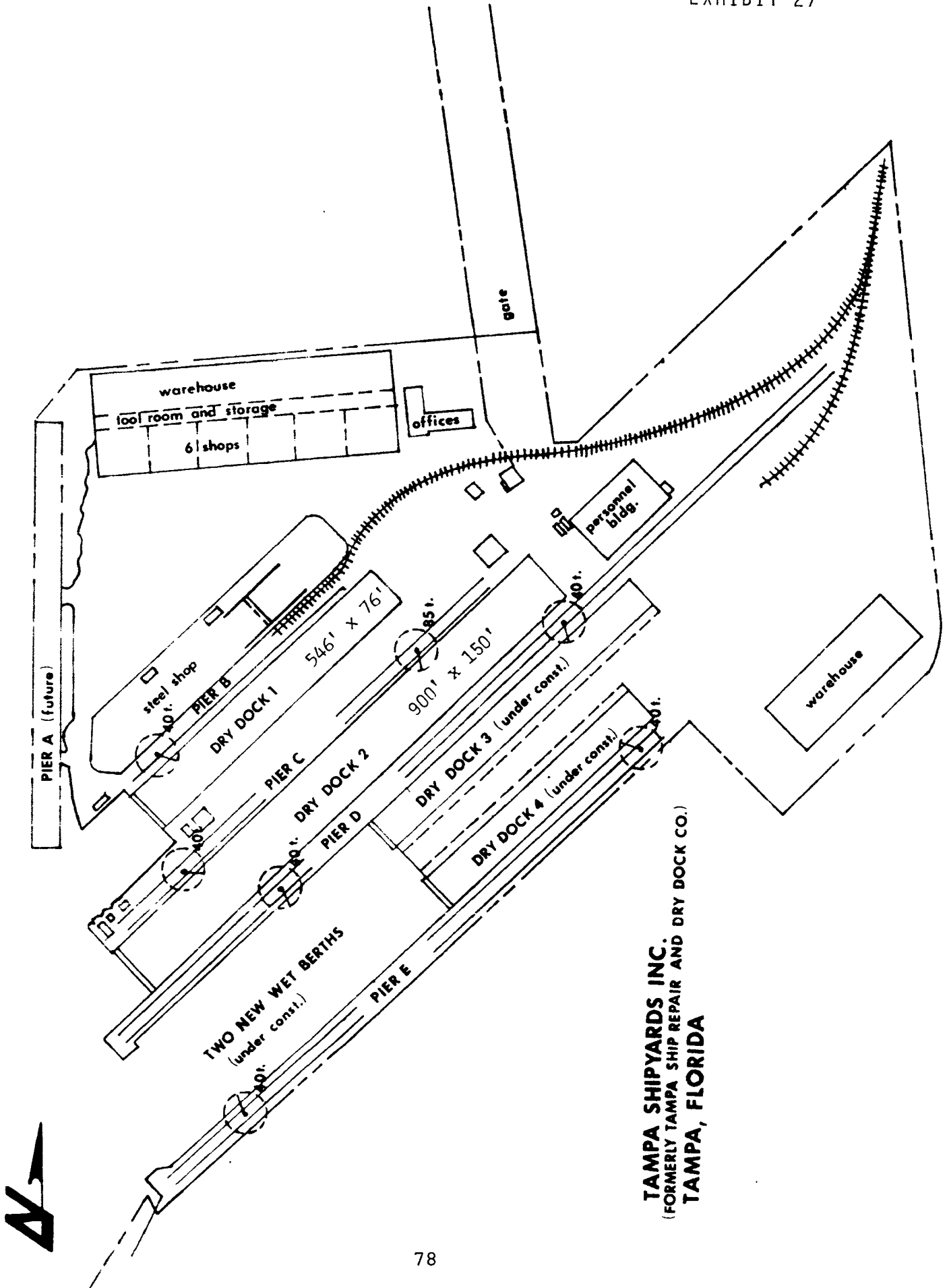


# SUN SHIP INC.



KEY:

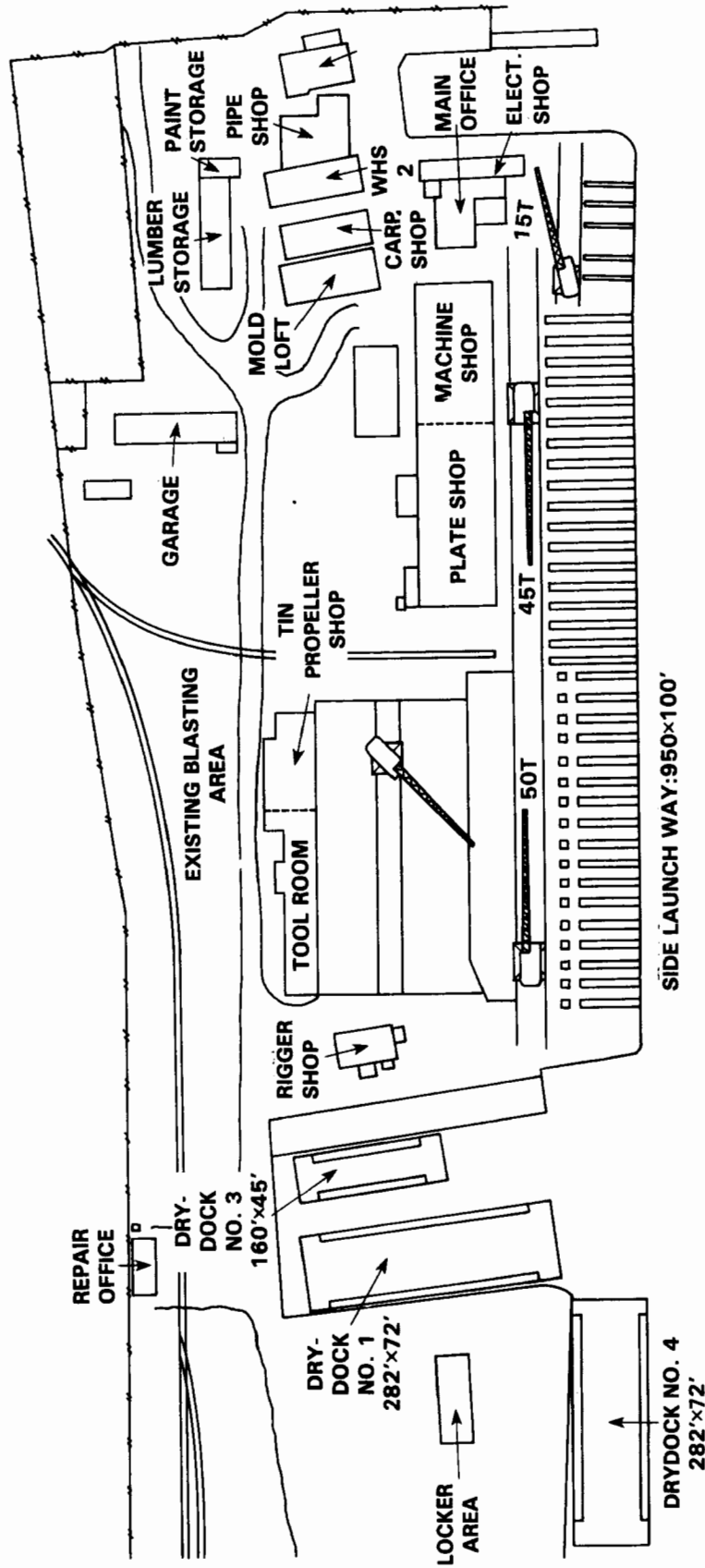
1. Storage and Receiving
2. Engineering Management Building
3. Blast and Paint Facility
4. Multipurpose Building
5. Fabrication Shop
6. Store House
7. Boiler and Misc. Shops
8. Pipe Shop
9. Main Office
10. 800-Ton Barge Crane

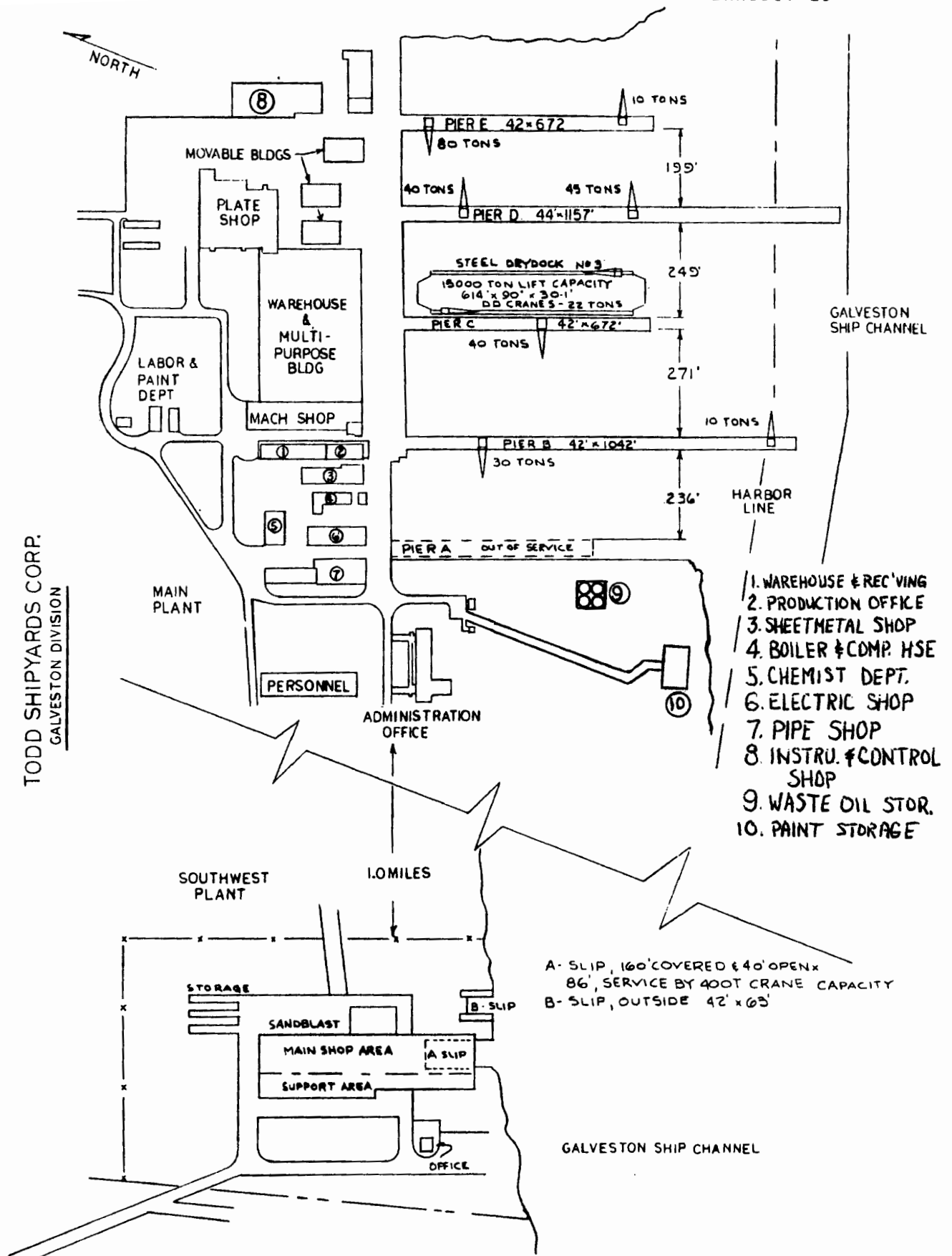


**TAMPA SHIPYARDS INC.**  
(FORMERLY TAMPA SHIP REPAIR AND DRY DOCK CO.)  
**TAMPA, FLORIDA**

# TEXAS GULFPORT SHIPBUILDING CO.

(FORMERLY GULFPORT SHIPBUILDING)





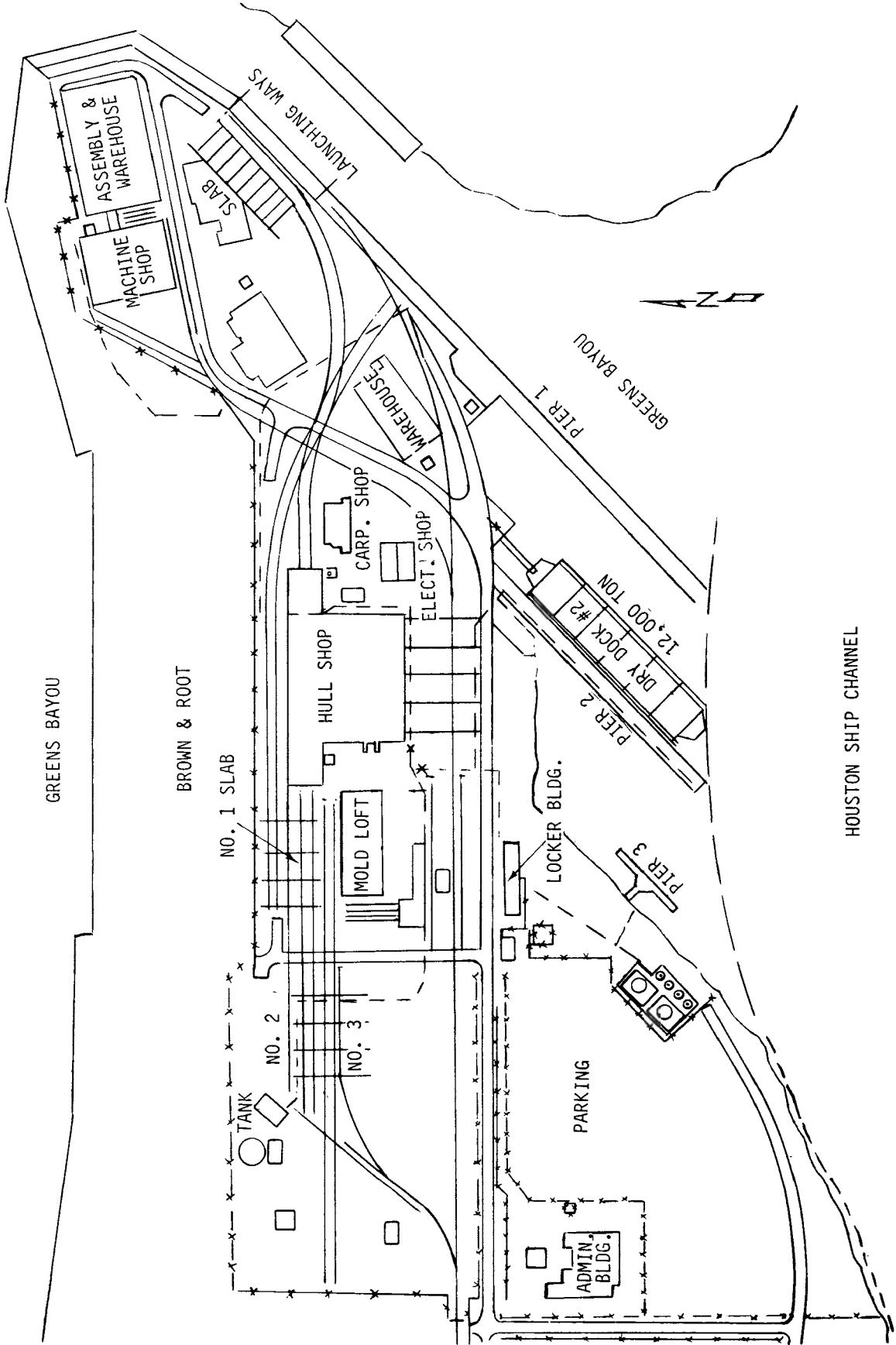
TODD SHIPYARDS CORP.  
GALVESTON DIVISION

- 1. WAREHOUSE & REC'ING
- 2. PRODUCTION OFFICE
- 3. SHEETMETAL SHOP
- 4. BOILER & COMP. HSE
- 5. CHEMIST DEPT.
- 6. ELECTRIC SHOP
- 7. PIPE SHOP
- 8. INSTRU. & CONTROL SHOP
- 9. WASTE OIL STOR.
- 10. PAINT STORAGE

A - SLIP, 160' COVERED & 40' OPEN x 86', SERVICE BY 400 TON CRANE CAPACITY  
 B - SLIP, OUTSIDE 42' x 63'

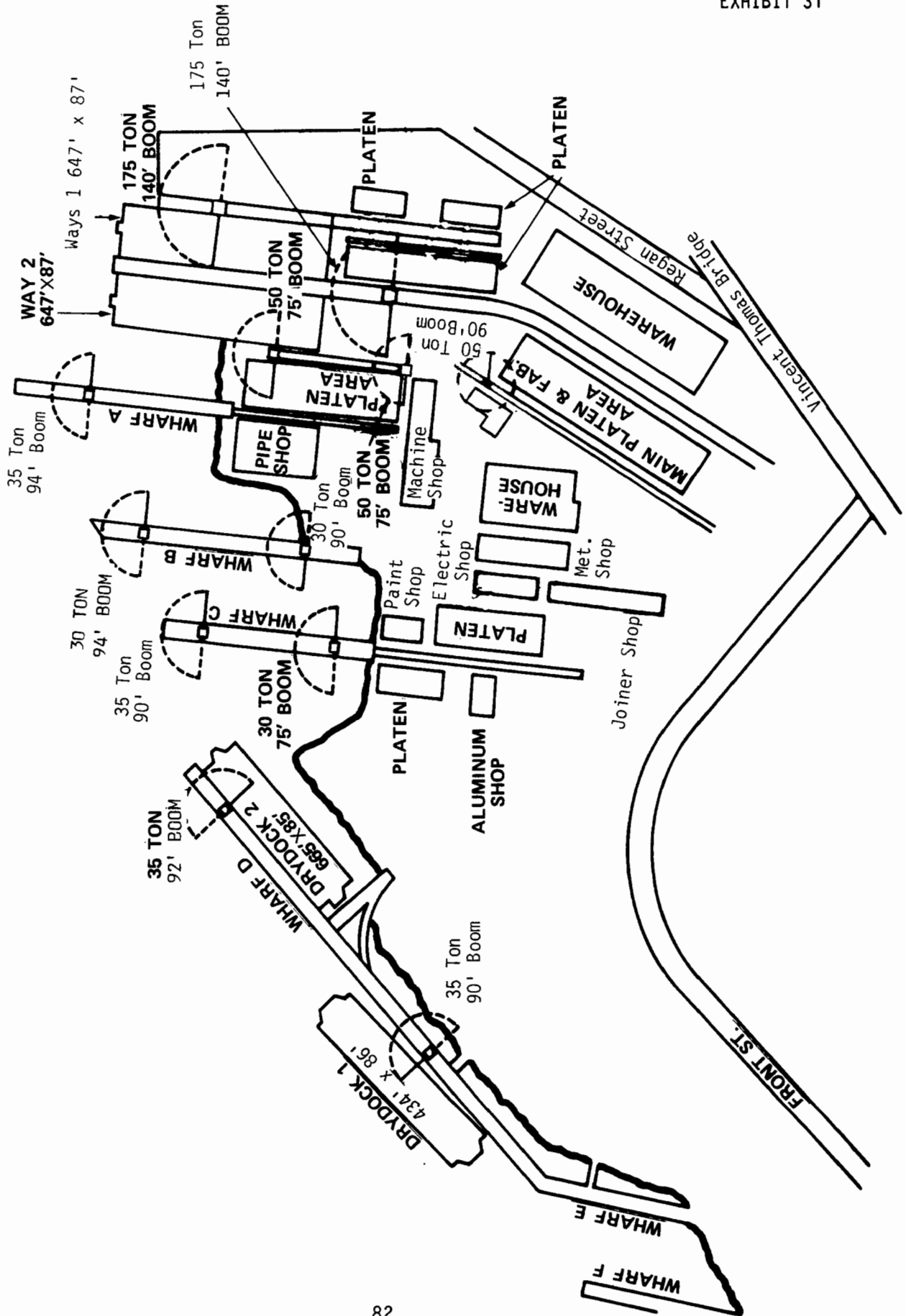
# Todd Shipyards Corporation

HOUSTON DIVISION

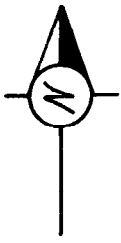




**TODD PACIFIC SHIPYARDS CORP.**  
LOS ANGELES DIVISION

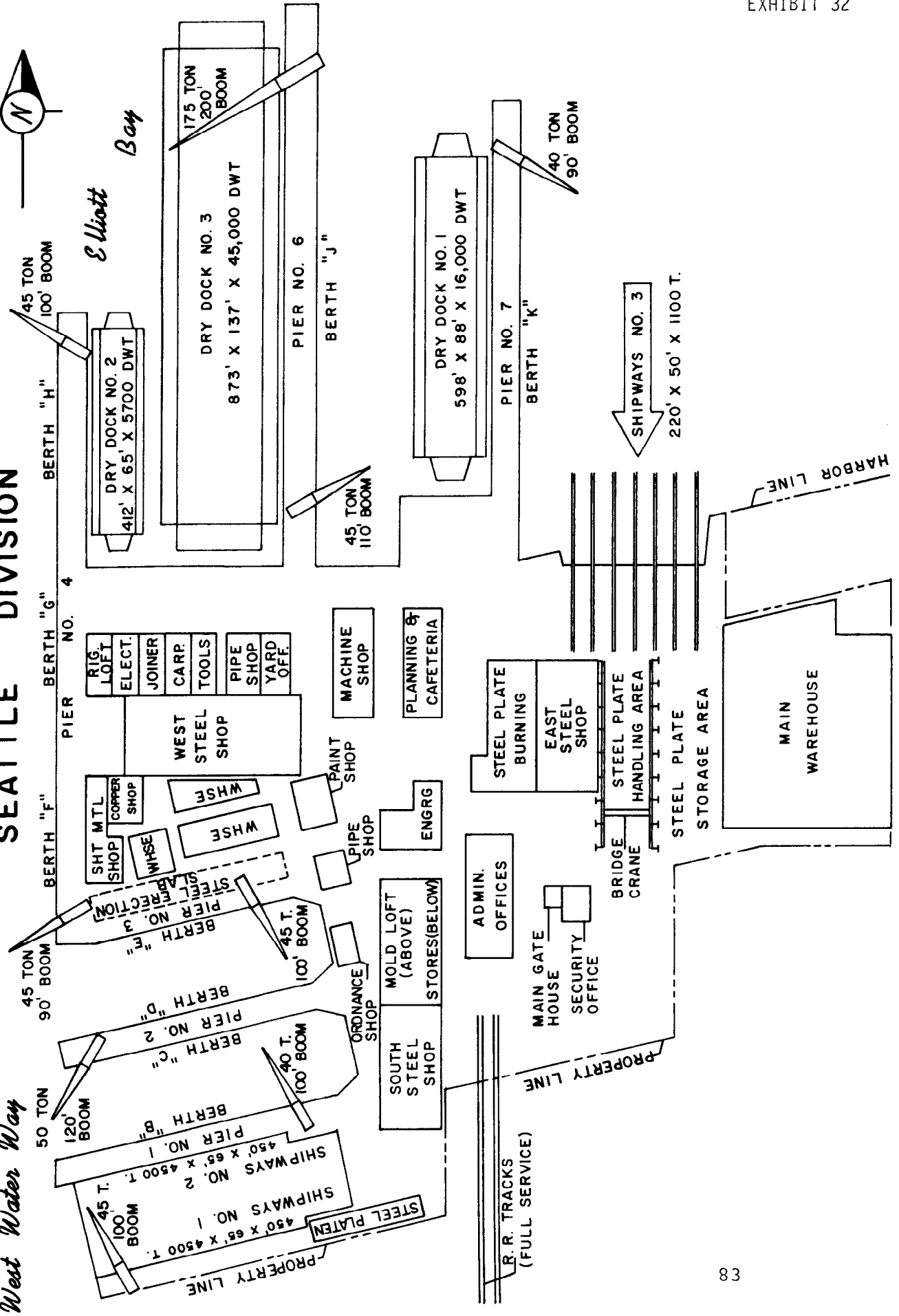


# TODD PACIFIC SHIPYARDS CORPORATION SEATTLE DIVISION



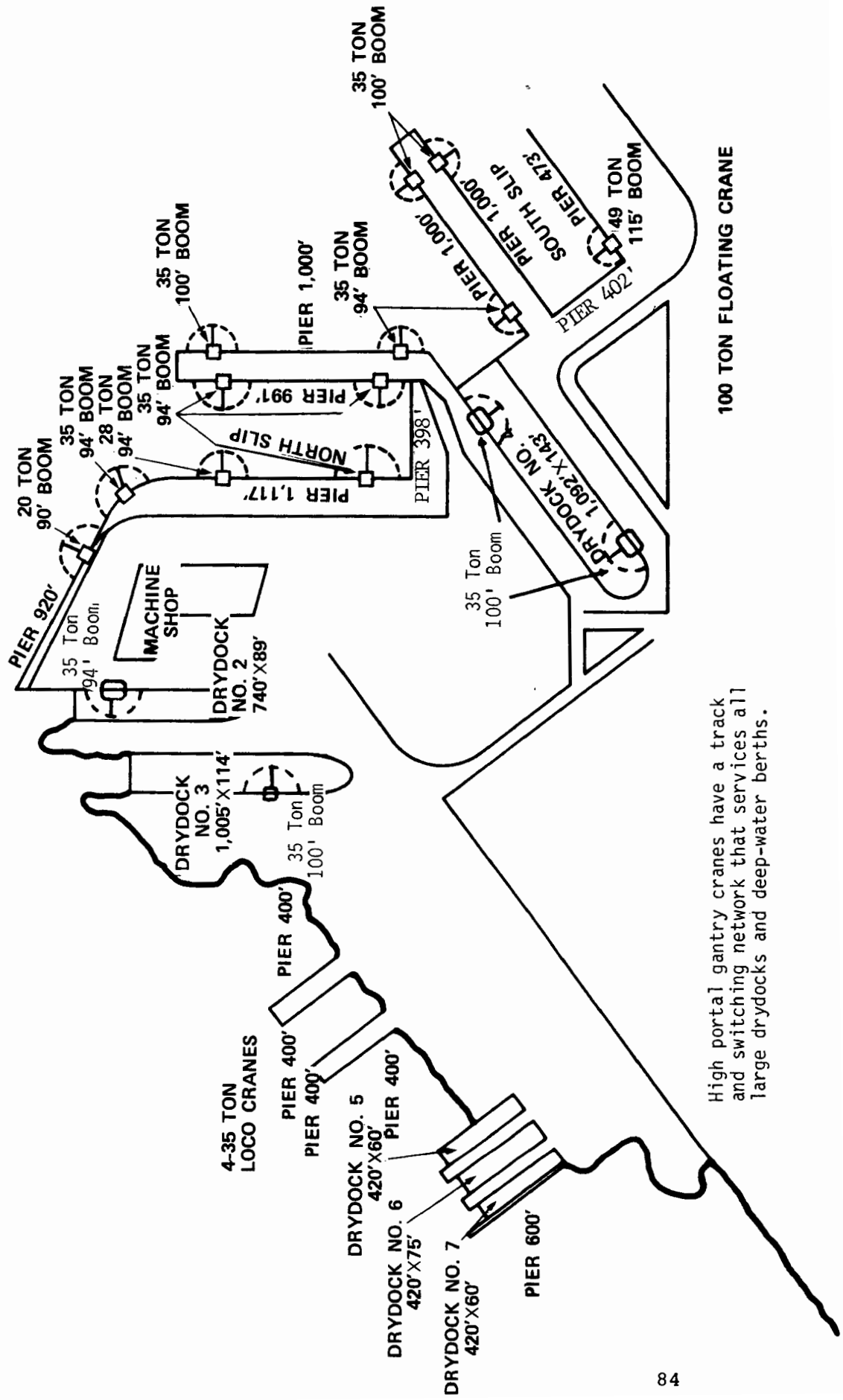
*West Water Way*

*Elliott Bay*



# TRIPLE A MACHINE SHOP, INC.

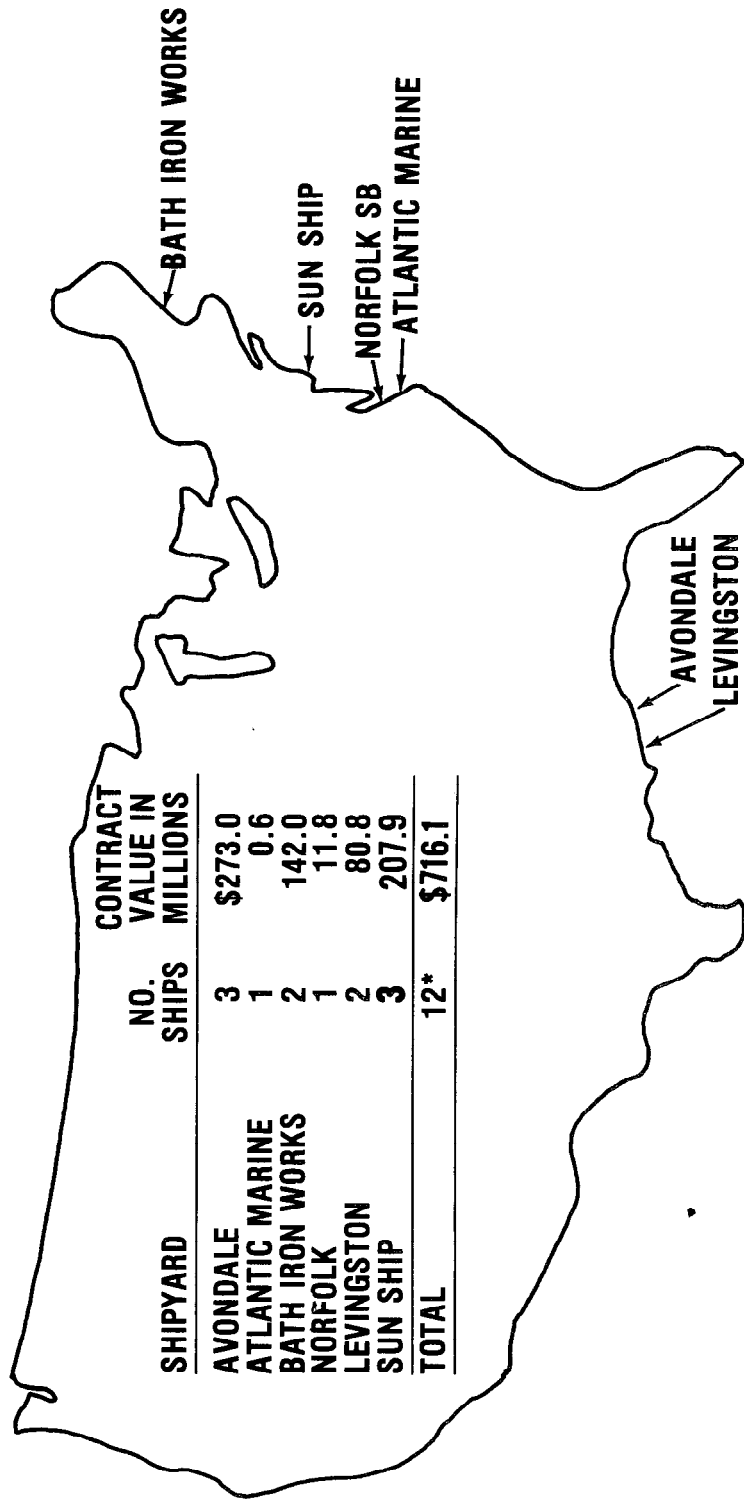
## HUNTERS POINT



High portal gantry cranes have a track and switching network that services all large drydocks and deep-water berths.

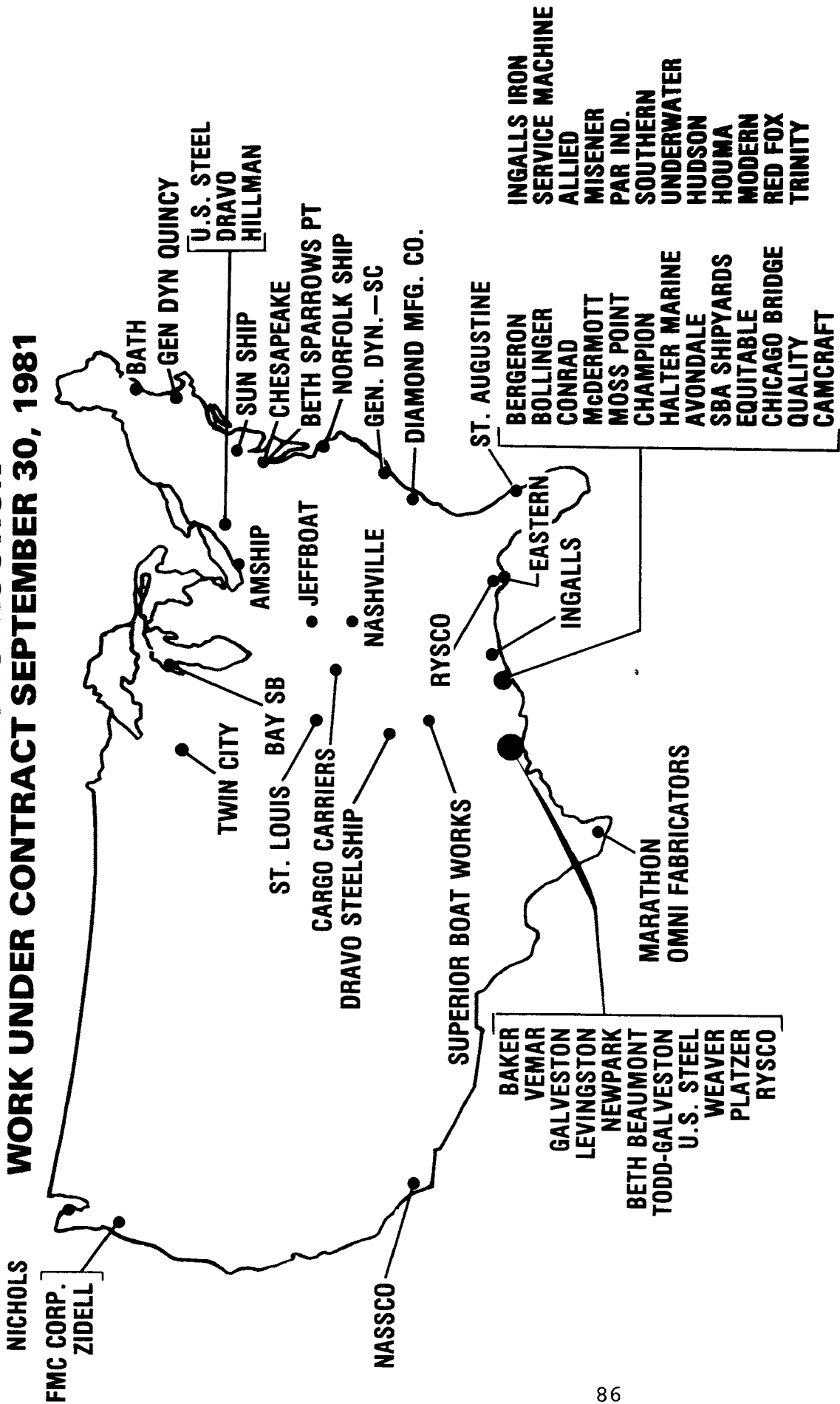
**SHIPBUILDING PROGRAM (TITLE V)  
OFFICE OF SHIP CONSTRUCTION**

**SHIPS UNDER CONSTRUCTION OCTOBER 1, 1981  
TOTAL CONTRACT VALUE, UNDELIVERED SHIPS**



\*IN ADDITION TO 12 NEW SHIPS, 15 MAJOR TITLE V CONVERSIONS, WITH A CONTRACT VALUE OF \$130.5 MILLION, ARE ALSO ON ORDER.

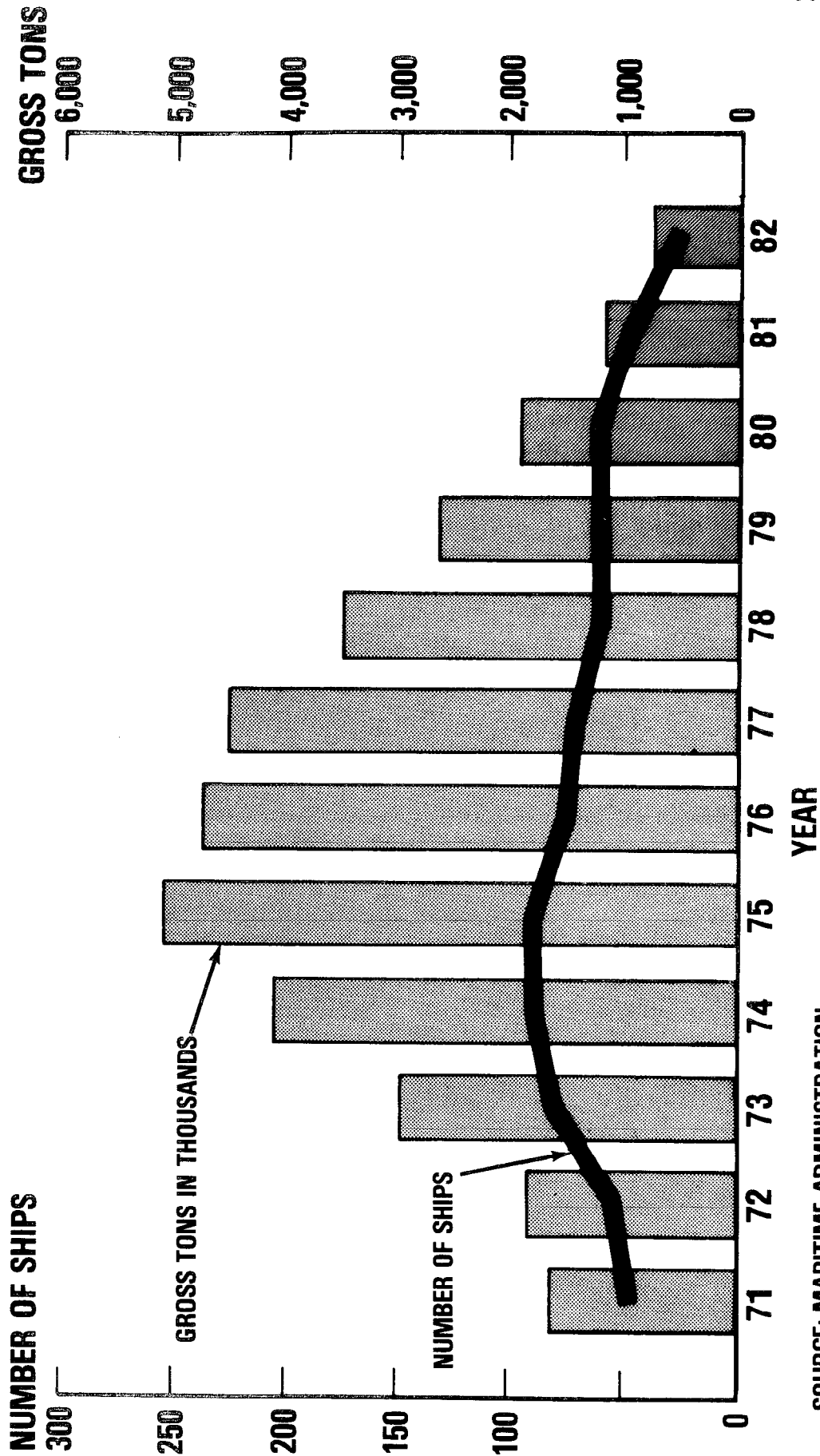
**SHIP FINANCING GUARANTEE CONSTRUCTION  
PROGRAM (TITLE XI)  
OFFICE OF SHIP CONSTRUCTION  
WORK UNDER CONTRACT SEPTEMBER 30, 1981**



NOTE: FIGURES INCLUDE TITLE V SHIPS WITH TITLE XI PARTICIPATION.  
FIGURES INCLUDE VESSELS UNDER CONSTRUCTION FOR WHICH TITLE XI APPLICATION IS PENDING.

# MERCHANT VESSELS BUILDING OR ON ORDER (AS OF JANUARY 1)

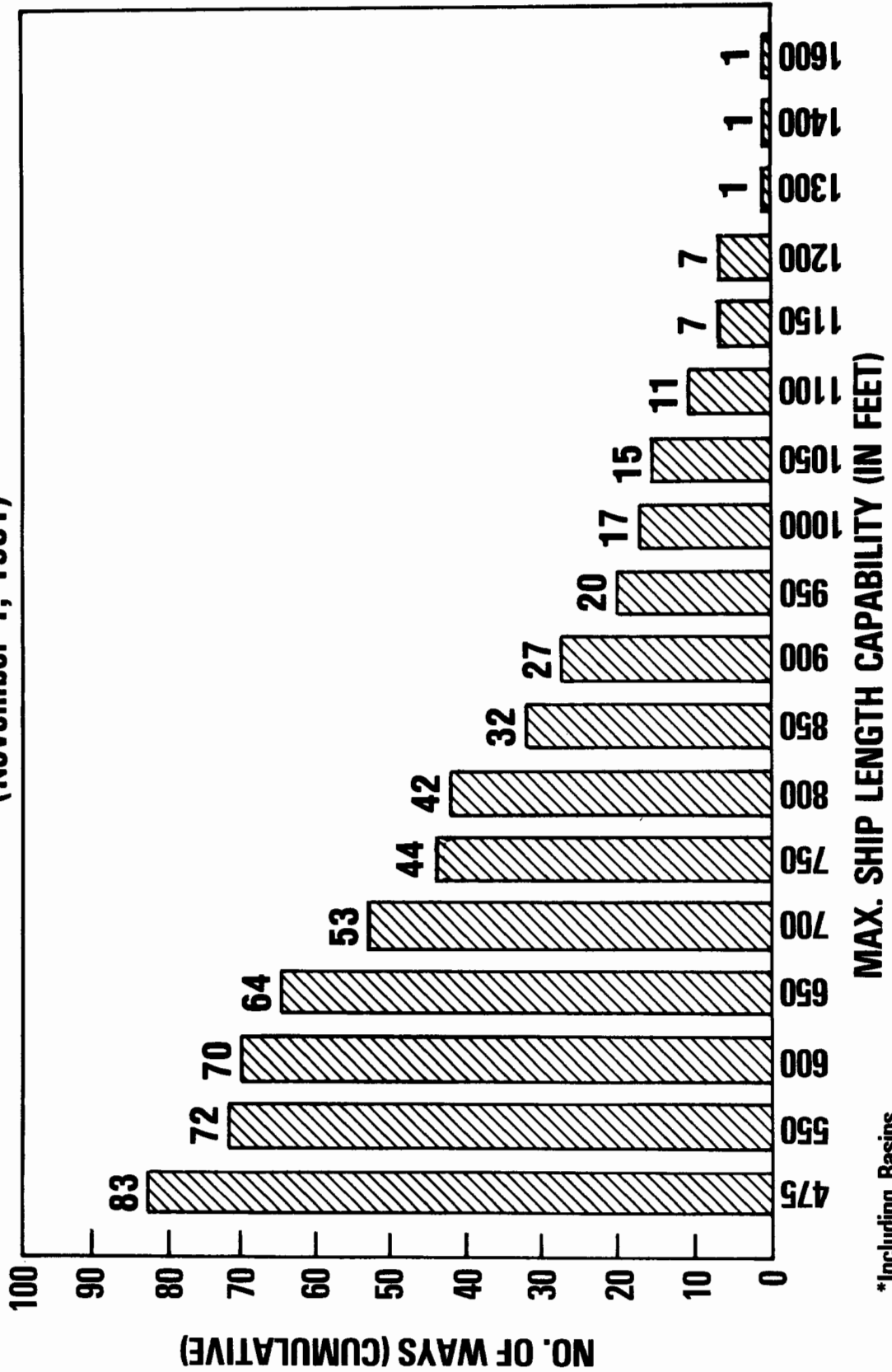
SHIPS OF 1,000 GROSS TONS AND LARGER



SOURCE: MARITIME ADMINISTRATION

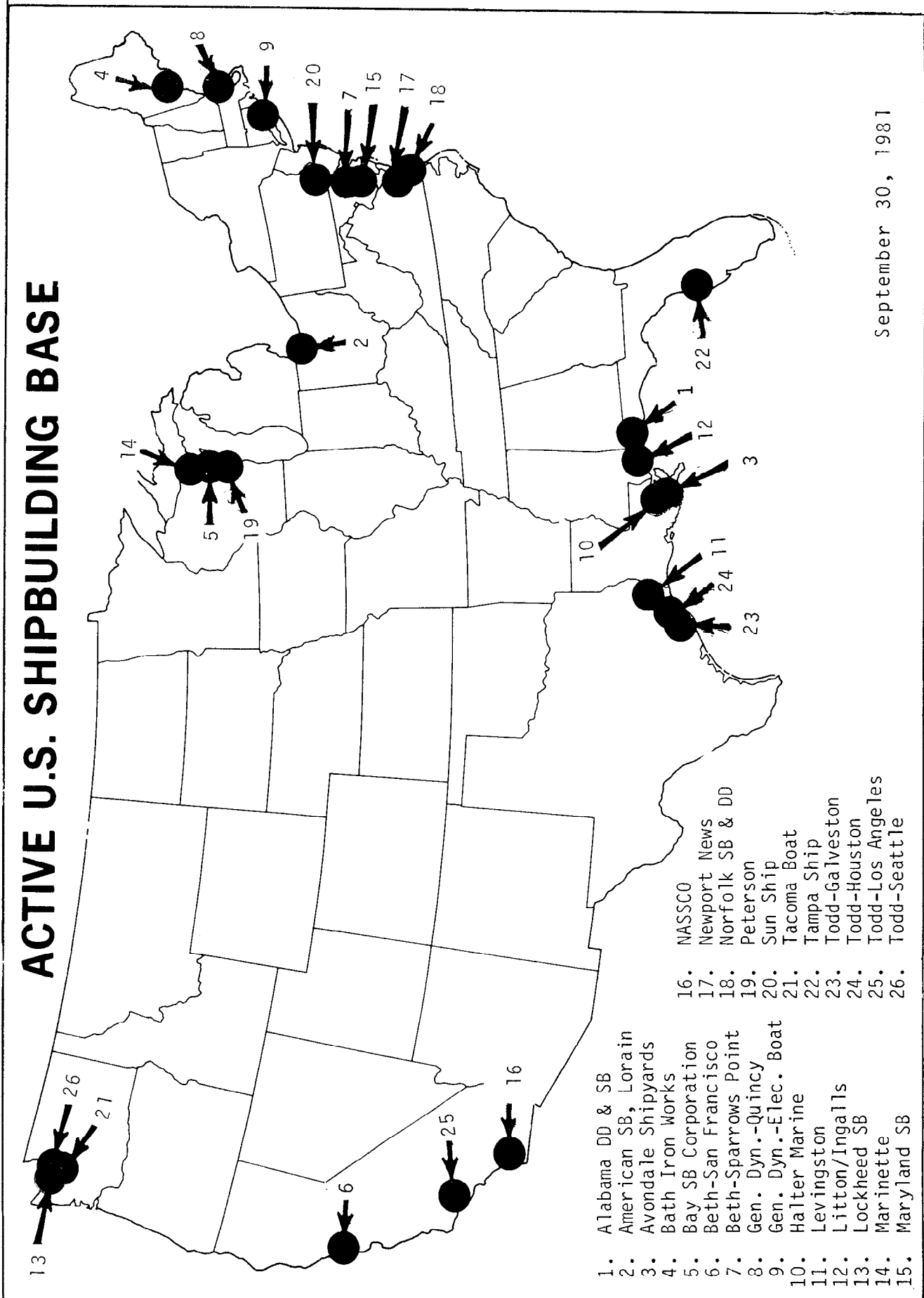
# MAJOR U.S. PRIVATE SHIPYARDS

## \*NUMBER OF SHIPWAYS BY MAXIMUM LENGTH CAPABILITY (November 1, 1981)



\*Including Basins

# ACTIVE U.S. SHIPBUILDING BASE



- |                         |                      |
|-------------------------|----------------------|
| 1. Alabama DD & SB      | 16. NASSCO           |
| 2. American SB, Lorain  | 17. Newport News     |
| 3. Avondale Shipyards   | 18. Norfolk SB & DD  |
| 4. Bath Iron Works      | 19. Peterson         |
| 5. Bay SB Corporation   | 20. Sun Ship         |
| 6. Beth-San Francisco   | 21. Tacoma Boat      |
| 7. Beth-Sparrows Point  | 22. Tampa Ship       |
| 8. Gen. Dyn.-Quincy     | 23. Todd-Galveston   |
| 9. Gen. Dyn.-Elec. Boat | 24. Todd-Houston     |
| 10. Halter Marine       | 25. Todd-Los Angeles |
| 11. Levinston           | 26. Todd-Seattle     |
| 12. Litton/Ingalls      |                      |
| 13. Lockheed SB         |                      |
| 14. Marinette           |                      |
| 15. Maryland SB         |                      |

September 30, 1981



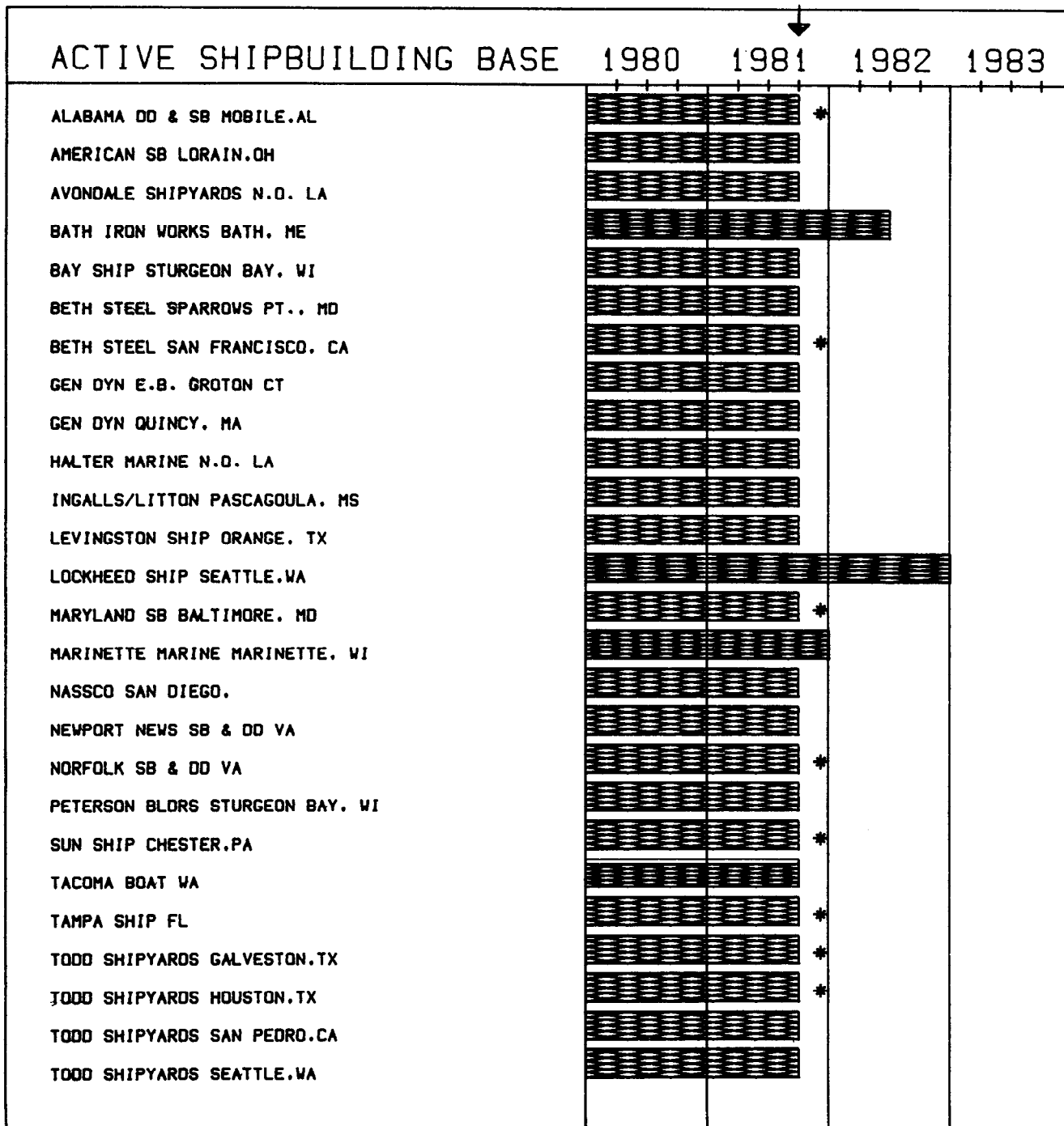
COMMERCIAL VESSELS UNDER CONSTRUCTION OR ON ORDER IN U.S.  
SHIPYARDS IN ACTIVE SHIPBUILDING BASE (September 30, 1981)

<u>SHIPYARDS</u>	<u>NO. CDS VESSELS</u>	<u>CONTRACT \$ VAL. CDS VESSELS (MILLIONS)</u>	<u>PRIVATE VESSELS</u>	<u>CONTRACT \$ VAL. PVT. VESSELS (MILLIONS)</u>	<u>TOTAL ALL VESSELS</u>	<u>TOTAL CONTRACT \$ VAL. (MILLIONS)</u>
Alabama DD	-	-	3	180.0	3	180.0
AmShip-Lorain	-	-	-	-	-	-
Avondale	3	273.0	7	443.1	10	716.1
Bath Iron Works	2	142.0	2	51.0	4	193.0
Bay SB	-	-	3	62.0	3	62.0
Beth., SF	-	-	-	-	-	-
Beth, Sp. Pt.	-	-	10	528.2	10	528.2
Gen. Dyn., Quincy	1	61.0	5	117.0	6	178.0
Gen. Dyn., E. Boat	(Exclusively Navy Ship Construction)					
Halter Marine	-	-	41	195.0	41	195.0
Levingston	2	80.8	2	80.0	4	160.8
Litton/Ingalls	-	-	13	425.0	13	425.0
Lockheed	-	-	-	-	-	-
Marinette	-	-	1	10.4	1	10.4
Maryland SB	-	-	-	-	-	-
National Steel	-	-	9	507.9	9	507.9
Newport News	-	-	-	-	-	-
Norfolk SB	1	11.8	-	-	1	11.8
Peterson	-	-	3	21.0	3	21.0
Sun Ship	2	137.4	1	38.0	3	175.4
Tacoma Boat	-	-	6	26.0	6	26.0
Tampa Ship	-	-	-	-	-	-
Todd, Galveston	-	-	2	22.0	2	22.0
Todd, Houston	-	-	1	9.0	1	9.0
Todd, LA	-	-	-	-	-	-
Todd, Seattle	-	-	-	-	-	-
<hr/>						
TOTALS	11	\$706.0	109	\$2,715.6	120	\$3,421.6

All figures exclude conversions, ship repairs, and non-ship work.

# SHIPYARD STATUS: NEED FOR NEW BUSINESS

MARITIME ADMINISTRATION  
DEPARTMENT OF TRANSPORTATION  
TIME NOW



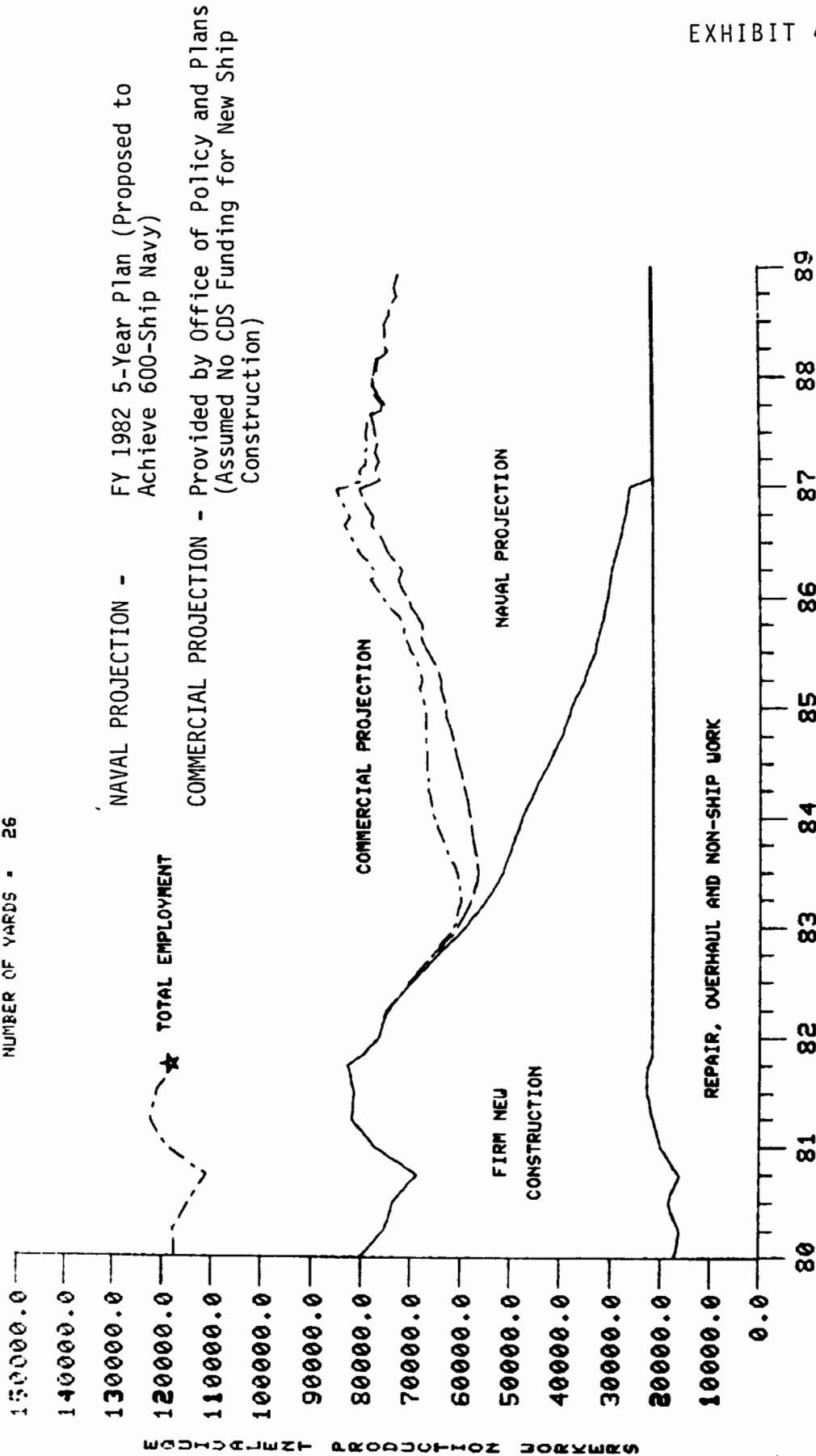
\*SHIPYARDS ENGAGING PRIMARILY IN REPAIR WORK  
NOTE END OF BAR EXCEPT FOR YARDS MARKED WITH AN ASTERISK INDICATES WHEN YARD NEEDS NEW CONTRACTS IN ORDER TO MAINTAIN ADEQUATE BACKLOG FOR AVAILABLE FACILITIES AND WORKFORCE. ASSUME 8-MONTH ADMINISTRATIVE AND PRE-FAB TIME (LEAD TIME BEFORE KEEL LAYING).

09/30/81

# SHIPBUILDING INDUSTRY WORKLOAD PROJECTION

## ACTIVE SHIPBUILDING BASE SUMMATION

NUMBER OF YARDS - 26



OCTOBER 1, 1981

SOURCE: SHIPYARD DATA FROM FORM MAB32 WHEN PROVIDED  
OFFICE OF SHIP CONSTRUCTION, MARITIME ADMINISTRATION

TABLE 1

SHIP CONSTRUCTION CAPABILITY  
BY SHIP TYPE

TABLE 1

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipway	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	RO/RO 684 x 102	LASH 893 x 100	Container 947 x 106		21,300 570 x 75	51,000 600 x 105	100,000 900 x 106	
<u>EAST</u>	Bath Iron Works	A	650 x 88	1	0	1	0	0	0	0	0	1	0	0
		B	700 x 130	1	0	1	1	0	0	0	0	1	1	0
		C	700 x 130	1	0	1	1	0	0	0	0	1	1	0
	Bethlehem Steel Sparrows Point	7	900 x 108	1	1	1	1	1	1	0	0	1	1	1
		10	900 x 108	1	1	1	1	1	1	0	0	1	1	1
		GD	1200 x 192	4	1	3	2	1	1	1	1	4	3	1
	General Dynamics Quincy	6	860 x 123	(6)	(3)	(5)	(4)	(3)	(1)	(1)	(1)	(6)	(5)	(3)
		7	860 x 123	2	1	1	1	0	0	0	0	1	1	0
		8	936 x 143	2	1	1	1	1	0	0	0	1	1	1
		11	860 x 144	2	1	1	1	0	0	0	0	1	1	0
		12	860 x 144	2	1	1	1	0	0	0	0	1	1	0
	Maryland S/B & D/D	1	850 x 110	(10)	(5)	(5)	(5)	(1)	(0)	(0)	(5)	(5)	(5)	(1)
1		850 x 110	(1)	(1)	(1)	(1)	(0)	(0)	(0)	(1)	(1)	(1)	(0)	
Newport News S/B	5	649 x 93	1	0	1	0	0	0	0	0	1	0	0	
	6	715 x 93	1	0	1	0	0	0	0	0	1	0	0	
	8	940 x 125	2	1	1	1	1	0	0	0	1	1	1	
	9	940 x 125	2	1	1	1	1	0	0	0	1	1	1	
	10	960 x 124	2	1	2	1	1	1	1	1	2	1	1	
	11	1100 x 136	2	1	2	1	1	1	1	1	2	2	1	
Norfolk SB & DD	12	1600 x 246	9	4	5	4	1	1	1	1	6	4	1	
	-	475 x 85	(19)	(8)	(13)	(8)	(5)	(3)	(3)	(14)	(9)	(5)	(5)	
			1	0	0	0	0	0	0	0	0	0	0	
			(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipway	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	RO/RO 684 x 102	LASH 893 x 100	Container 947 x 106	21,300	570 x 75	51,000	600 x 105	100,000
Sun Ship, Inc.	6		745 x 129	1	1	1	1	0	0	0	1	1	1	0
	8		745 x 129	1	1	1	1	0	0	0	1	1	1	0
	Slab A		1000 x 195	4	1	2	1	1	1	1	1	2	1	1
	Slab B		700 x 195	2	1	2	1	0	0	0	2	1	1	0
				(8)	(4)	(6)	(4)	(1)	(1)	(1)	(6)	(4)	(1)	(1)
				<u>48</u>	<u>21</u>	<u>33</u>	<u>24</u>	<u>10</u>	<u>5</u>	<u>35</u>	<u>26</u>	<u>10</u>		
TOTAL EAST COAST														
<u>GULF</u>	1	Alabama D/D & S/B	523 x 68	1	0	0	0	0	0	0	0	0	0	0
	2		523 x 68	1	0	0	0	0	0	0	0	0	0	0
	3		523 x 68	1	0	0	0	0	0	0	0	0	0	0
	4		523 x 68	1	0	0	0	0	0	0	0	0	0	0
	5		620 x 90	1	0	1	0	0	0	0	1	0	0	0
				(5)	(0)	(1)	(0)	(0)	(0)	(1)	(0)	(0)	(0)	(0)
				<u>6</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>6</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>
Avondale	2		1200 x 126	6	3	3	3	3	3	3	3	3	3	3
	3		1020 x 174	(12)	(8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)	(8)
Beth. Beaumont	-		800 x 96	1	0	1	0	0	0	0	1	0	0	0
				(1)	(0)	(1)	(0)	(0)	(0)	(0)	(1)	(0)	(0)	(0)
Galveston S/B	5		700 x 120	1	0	1	1	0	0	0	1	1	1	0
				(1)	(0)	(1)	(1)	(0)	(0)	(0)	(1)	(1)	(1)	(0)
Levingston (Orange, TX)	1		700 x 100	1	0	1	0	0	0	0	1	0	0	0
				(1)	(0)	(1)	(0)	(0)	(0)	(0)	(1)	(0)	(0)	(0)

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	R0/R0 684 x 102	LASH 893 x 100	Container 947 x 106	21,300	570 x 75	51,000	600 x 105	100,000
Litton/Ingalls		1	690 x 85	1	0	0	0	0	0	0	0	1	0	0
		2	550 x 80	1	0	0	0	0	0	0	0	0	0	0
		7	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		8	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		9	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		10	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		WB	800 x 173	6	6	6	6	6	0	0	0	6	6	0
				(12)	(6)	(10)	(6)	(6)	(0)	(0)	(0)	(11)	(6)	(0)
				4	1	1	1	1	1	1	1	1	1	1
				(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Marathon		-	1100 x 150											
		3	500 x 105	1	0	0	0	0	0	0	0	0	0	0
Tampa Shipyards				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Texas Gulfport SB		1	550 x 80	1	0	0	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Todd-Galveston		-	475 x 85	1	0	0	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Todd-Houston		-	600 x 96	1	0	0	0	0	0	0	1	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)	(0)
TOTAL GULF COAST				40	15	23	16	9	9	9	26	17	9	9
WEST				1	0	0	0	0	0	0	1	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)	(0)
FMC Corporation		4	750 x 130	1	1	1	1	1	0	0	1	1	0	0
				(1)	(1)	(1)	(1)	(1)	(0)	(0)	(1)	(1)	(1)	(0)

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipway	Shipway or Basin	Maximum Ship Size	General Cargo						Dry Bulk					
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	RO/RO 684 x 102	LASH 893 x 100	Container 947 x 106	21,300	570 x 75	51,000	600 x 105	100,000	900 x 106
Lockheed S/B	1		650 x 88	1	0	0	0	0	0	0	0	1	0	0	0
	3		650 x 88	1	0	0	0	0	0	0	0	1	0	0	0
	21		690 x 90	1	0	1	0	0	0	0	0	1	0	0	0
				(3)	(0)	(1)	(0)	(0)	(0)	(0)	(0)	(3)	(0)	(0)	(0)
National Steel & S/B	1		980 x 170	4	1	1	1	1	1	1	1	2	1	1	1
	2		690 x 90	1	0	1	0	0	0	0	1	1	0	0	0
	3		900 x 106	1	1	1	1	1	1	0	1	1	1	1	1
	4		900 x 106	1	1	1	1	1	1	0	1	1	1	1	1
			(7)	(3)	(4)	(3)	(3)	(3)	(1)	(1)	(5)	(3)	(3)	(3)	(3)
Todd, LA	1		800 x 84	1	0	0	0	0	0	0	0	1	0	0	0
	2		800 x 84	1	0	0	0	0	0	0	0	1	0	0	0
			(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(2)	(0)	(0)	(0)	(0)
Todd, Seattle	1A		600 x 96	1	0	0	0	0	0	0	0	1	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)	(0)	(0)
Triple A Hunters Point	2		715 x 82	1	0	0	0	0	0	0	0	1	0	0	0
	3		996 x 107	2	1	1	1	1	1	1	1	1	1	1	1
	4		1088 x 136	4	1	1	1	1	1	1	2	1	1	1	1
				(7)	(2)	(2)	(2)	(2)	(2)	(2)	(4)	(2)	(2)	(2)	(2)
TOTAL WEST COAST			22	6	8	6	5	3	3	17	6	5	5	5	
American S/B-Lorain	GD2		708 x 78	1	0	0	0	0	0	0	0	1	0	0	0
	GD3		1021 x 121	2	1*	1*	1*	1*	1*	1*	1	1*	1*	1*	1*
				(3)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(1)	(1)	(1)	(1)
American S/B-Toledo	GD1		540 x 68	1	0	0	0	0	0	0	0	0	0	0	0
	GD2		680 x 78	1	0	0	0	0	0	0	1	0	0	0	0
			(2)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)	(0)	(0)	

GREAT LAKES



SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipyard Or Basin	Maximum Ship Size	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	RO/RO 684 x 102	LASH 893 x 100	Container 947 x 106	21,300	570 x 75	51,000	600 x 105	100,000
Bay S/B Corporation	G01	3	1100 x 136 750 x 105	2	1*	1*	1*	1*	1*	1	1*	1*	1*	
				1	1*	1*	1*	0	0	1	1*	0		
				(3)	(2)	(2)	(2)	(1)	(1)	(2)	(2)	(1)		
Fraser Shipyards	G02		825 x 82	1	0	0	0	0	0	1	0	0		
				(1)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)		
TOTAL GREAT LAKES				9	3	3	3	2	2	6	3	2		
TOTAL POSITIONS ALL YARDS				119	45	67	49	26	19	84	52	26		

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

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway Of Basin	Maximum Ship Size	Tankers										OBO			
				25,000 620 x 75	38,000 688 x 90	89,000 824 x 105	120,000 920 x 138	125,000 Gt.m. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143				
EAST	Bath Iron Works	A	650 x 88	1	0	0	0	0	0	0	0	0	0	0	0	0	
		B	700 x 130	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		C	700 x 130	1	1	0	0	0	0	0	0	0	0	0	0	0	0
				(3)	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
66	Bethlehem Steel, Sparrows Point	7	900 x 108	1	1	1	0	0	0	0	0	0	0	1	0	0	
		10	900 x 108	1	1	1	0	0	0	0	0	0	0	1	0	0	
		6D	1200 x 192	3	2	1	1	1	1	1	1	1	1	0	1	1	1
				(5)	(4)	(3)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(0)	(3)	(1)	(1)
				1	1	1	0	0	0	0	0	0	0	0	1	0	0
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
66	General Dynamics, Quincy	6	860 x 123	1	1	1	0	0	0	0	0	0	0	0	0	0	
		7	936 x 143	1	1	1	1	1	1	1	1	1	1	1	1	1	
		8	860 x 123	1	1	1	0	0	0	0	0	0	0	0	0	0	
		11	860 x 144	1	1	1	0	0	0	0	0	0	0	0	0	0	
		12	860 x 144	1	1	1	0	0	0	0	0	0	0	0	0	0	
				(5)	(5)	(5)	(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)
66	Maryland S/B & D/D	1	850 x 110	1	1	0	0	0	0	0	0	0	0	0	0	0	
				(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
66	Newport News S/B	5	649 x 93	1	0	0	0	0	0	0	0	0	0	0	0	0	
		6	715 x 93	1	1	0	0	0	0	0	0	0	0	0	0	0	
		8	940 x 125	1	1	1	0	0	0	0	0	0	0	0	1	0	
		9	940 x 125	1	1	1	0	0	0	0	0	0	0	0	1	0	
		10	960 x 124	1	1	1	0	0	0	0	0	0	0	0	1	0	
		11	1100 x 136	2	1	1	1	1	1	1	1	1	1	1	1	1	1
		12	1600 x 246	6	4	2	1	1	1	1	1	1	1	1	2	1	1
		(13)	(9)	(6)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(6)	(1)	(1)		

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers										ORO			
				25,000 620 x 75	38,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000 Cu.m. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143				
	Norfolk SB & DD	-	475 x 85	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sun Ship	6	745 x 129	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		8	745 x 129	2	2	1	1	1	1	1	1	1	1	1	1	1	1
		Slab A	1000 x 195	2	2	0	0	0	0	0	0	0	0	0	0	0	0
		Slab B	700 x 195	(6)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	TOTAL EAST COAST			33	27	15	5	5	4	3	1	11	3	0	0	0	0
	Alabama D/D & S/B	1	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	620 x 90	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)
	Avondale	2	1200 x 126	5	5	5	0	0	0	0	0	0	0	0	0	0	0
		3	1020 x 174	3	3	3	3	3	0	0	0	0	0	0	0	0	0
				(8)	(8)	(8)	(3)	(3)	(0)	(0)	(0)	(8)	(3)	(8)	(3)	(3)	(3)
	Beth. Beaumont	-	800 x 96	1	1	0	0	0	0	0	0	0	0	0	0	0	0
				(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Galveston S/B	5	700 x 120	1	1	0	0	0	0	0	0	0	0	0	0	0	0
				(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway Or Basin	Maximum Ship Size	Tankers										OSO			
				25,000 620 x 75	38,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000 Cu.m. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 105	169,000 998 x 143				
Levingston (Orange, TX)		1	700 x 100	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	1	0	0	0	0	0	0	0	0	0	0	0	0	
		2	550 x 80	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		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 WB	650 x 90 800 x 173	6 (11)	6 (6)	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		-	1100 x 150	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	1 (1)	1 (1)	1 (1)	
Tampa Shipyards		3	500 x 105	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)	
Texas Gulfport S/B		1	550 x 80	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)	
Todd-Galveston		-	475 x 85	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)	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

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 Cu. m. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143			
Todd-Houston	-	-	600 x 96	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)
TOTAL GULF COAST				24	18	15	4	4	1	0	0	0	0	9	4	0
Beth. San Francisco	-	-	600 x 90	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
FMC Corporation	4	4	750 x 130	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)
Lockheed S/B	1	1	650 x 88	1	0	0	0	0	0	0	0	0	0	0	0	0
	3	3	650 x 88	1	0	0	0	0	0	0	0	0	0	0	0	0
	21	21	690 x 90	1	1	0	0	0	0	0	0	0	0	0	0	0
				(3)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
National Steel & SB	1	1	980 x 170	2	1	1	1	1	0	0	0	0	0	1	0	0
	2	2	690 x 90	1	1	0	0	0	0	0	0	0	0	0	0	0
	3	3	900 x 106	1	1	1	0	0	0	0	0	0	0	0	0	0
	4	4	900 x 106	1	1	1	1	1	0	0	0	0	0	0	0	0
				(5)	(4)	(3)	(1)	(1)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)
Todd, LA	1	1	800 x 84	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	2	800 x 84	1	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)
Todd Seattle	1A	1A	600 x 96	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)

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

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 Ca. m. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143					
Triple A Hunters Point		2	715 x 82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		3	996 x 107	1	1	1	0	0	0	0	0	0	0	1	1	0	0	
		4	1088 x 136	2	1	1	0	0	0	0	0	0	0	0	1	0	0	0
				(4)	(2)	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(2)	(2)	(0)	(0)
TOTAL WEST COAST				15	8	5	1	1	0	0	0	0	0	3	3	0	0	
<u>GREAT LAKES</u>																		
American S/B-Lorain		GD2	708 x 78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		GD3	1021 x 121	1	1*	1*	0	0	0	0	0	0	0	0	1*	1*	0	0
		(2)	(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(1)	(0)	(0)	
American S/B-Toledo		GD1	540 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		GD2	680 x 78	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)	(0)	(0)	
Bay S/B Corporation		GD1	1100 x 136	1	1*	1*	0	0	0	0	0	0	0	0	1*	1*	0	
		3	750 x 105	1	1*	0	0	0	0	0	0	0	0	0	0	0	0	
				(2)	(2)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(1)	(0)	(0)
Fraser Shipyards		GD2	825 x 82	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)	(0)
TOTAL GREAT LAKES				6	3	2	0	0	0	0	0	0	0	2	2	0	0	
TOTAL POSITIONS ALL YARDS				78	56	37	10	10	5	3	1	25	7					

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

TABLE 1  
SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE  
SUMMARY

REGION	GENERAL CARGO						DRY BULK		
	Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	R0/R0 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	48	21	33	24	10	5	35	26	10
Gulf Coast	40	15	23	16	9	9	26	17	9
West Coast	22	6	8	6	5	3	17	6	5
Great Lakes	9	3	3	3	2	2	6	3	2
TOTAL POSITIONS ALL YARDS	119	45	67	49	26	19	84	52	26

REGION	TANKERS							OBO		
	25,000 620 x 75	38,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000Cu.M 932 x 140	225,000 1100 x 140	265,000 1100 x 178		390,770 1204 x 228	80,000 886 x 106
East Coast	33	27	15	5	5	4	3	1	11	3
Gulf Coast	24	18	15	4	4	1	0	0	9	4
West Coast	15	8	5	1	1	0	0	0	3	0
Great Lakes	6	3	2	0	0	0	0	0	2	0
TOTAL POSITIONS ALL YARDS	78	56	37	10	10	5	3	1	25	7

TABLE 2

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



TABLE 2  
MAJOR U.S. PRIVATE SHIPYARDS  
NUMBER OF SHIPBUILDING WAYS BY LENGTH (MAXIMUM 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	3	3	3	3	1	1	1	1	1					
Beth-Sparrows Point	3	3	3	3	3	5	5	5	1										
General Dynamics, Quincy	5	5	5	5	5	1	1	1											
Maryland SB & DD	1	1	1	1	1	5	5	5	5	3	2	2	2	1	1	1	1	1	1
Newport News SB & DD	6	6	6	6	6	5	5	5	5										
Norfolk SB & DD	1																		
Sun Ship	4	4	4	4	4	2	2	2	2	2	2	1	1						
TOTAL	(23)	(22)	(22)	(22)	(21)	(16)	(16)	(16)	(11)	(6)	(5)	(4)	(4)	(2)	(2)	(1)	(1)	(1)	(1)
<u>GULF COAST</u>																			
Alabama DD & SB	5	1	1																
Avondale Shipyards	12	9	9	8	8	8	8	8	8	8	8	8	5	5	5				
Beth-Beaumont	1	1	1	1	1	1	1												
Ingalls-E. Bank	6	6	5	5															
Ingalls-W. Bank	6	6	6	6	6	6	6												
Galveston SB	1	1	1	1	1														
Levingston (Orange, TX)	1	1	1	1	1														
Marathon LeTourneau	1	1	1	1	1	1	1	1	1	1	1	1	1						
Tampa Shipyards	1																		
Texas Gulfport SB	1	1																	
Todd-Galveston	1																		
Todd-Houston	1	1	1																
TOTAL	(37)	(28)	(26)	(23)	(18)	(16)	(16)	(9)	(9)	(9)	(9)	(9)	(6)	(5)	(5)				(5)

TABLE 2

MAJOR U.S. PRIVATE SHIPYARDS

NUMBER OF SHIPBUILDING WAYS BY LENGTH (MAXIMUM 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>WEST COAST</u>																			
Beth-San Francisco	1	1	1	1	1	1													
FMC Corporation	1	1	1	1	1	1													
Lockheed SB	3	3	3	3	3	3													
National Steel & SB	4	4	4	4	3	3	3	3	3	1									
Todd-Los Angeles	2	2	2	2	2	2	2												
Todd-Seattle	1	1	1	1	1	1													
Triple A	3	3	3	3	3	2	2	2	2	2	1	1							
TOTAL	(15)	(15)	(15)	(13)	(9)	(8)	(7)	(5)	(5)	(3)	(1)	(1)							
<u>GREAT LAKES*</u>																			
American SB-Lorain	2	2	2	2	2	1	1	1	1	1	1								
American SB-Toledo	2	1	1	1	2	2	1	1	1	1	1	1							
Bay SB Corporation	2	2	2	2	2	2	1	1	1	1	1	1							
Fraser Shipyards	2	2	2	1	1	1	1												
TOTAL	(8)	(7)	(7)	(6)	(5)	(4)	(3)	(2)	(2)	(2)	(2)	(1)	(1)						
Grand Total	83	72	70	64	53	44	42	32	27	20	17	15	11	7	7	1	1	1	1
All Coasts and Great Lakes	83	72	70	64	53	44	42	32	27	20	17	15	11	7	7	1	1	1	1

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

APPENDIX A

STANDARD FORM 17  
FACILITIES AVAILABLE FOR THE CONSTRUCTION  
OR REPAIR OF SHIPS

**FACILITIES AVAILABLE FOR THE CONSTRUCTION OR REPAIR OF SHIPS**

DATE

TO: (Complete departmental address)		SHIPYARD AND ADDRESS		INSTRUCTIONS (Forward original copy to appropriate Department of Defense Office or Maritime Administration, Washington, D.C.)					
NO. OF WAY	LAUNCHING (Check one)	DIMENSIONS	BUILDING WAYS (M.L.W.)		CONDITION OF WAY	CRANES SERVING WAY			
			MAXIMUM SHIP SIZE (Ton 2,240 lbs.)	DEPTH OF WATER		No.	Type (Plus hook height for bridge cranes)	Lift Capacity (Std. tons)	
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight	Over way end At drop off					
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
LENGTH OF LAUNCHING RUN		DEPTH OF RUN AT M.L.W.		TIDAL RANGE (Difference M.L.-M.H.)		IS SNUBBING NECESSARY?		IS FIRE PROTECTION AVAILABLE ON BUILDING WAY? <input type="checkbox"/> YES <input type="checkbox"/> NO	

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.	
			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

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

LEGEND: (Abbreviations of Services)

Fresh water..... F.W.-G.P.M.-P.S.I.      Steam..... S-P/HR-P.S.I.      Electric power..... E-V-AC-AMP      Fire protection..... FP-G.P.M.-P.S.I.

Salt water..... S.W.-G.P.M.-P.S.I.      Air..... A-C.F.M.-P.S.I.      Electric power..... E-V-DC-AMP      Sanitary sewer..... SS-Yes or No

Sheet 2 of 6

PRINCIPAL SHOPS AND BUILDINGS										ALL OTHER SHOPS (List names and dimensions, include mold loft, if any)											
NAME OF SHOP OR BUILDING	DIMENSIONS OF SHOP OR BUILDING	MATERIALS PROCESSED (See note)	LARGEST EXIT		WEIGHT OF MATERIAL OR NUMBER AND SIZE OF UNITS PRODUCED PER 8 HOURS (See note)	Area/shop serviced	Type	SHOP OR YARD CRANES (5 tons or over)													
			Width	Height				Capacity (Std. tons)	Max. reach	Boom length	Height hinge	Area serviced	Hgt. of hook above base at out reach								
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																
Woodworking			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																
Electrical		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																
Pipe																					
Galvanizing																					
Foundry																					
Rigger		X X X X X X	X X X X	X X X X																	
										NOTE.—Indicate materials as steel, alumi- num, reinforced plastic, wood, plywood, sheet metal, etc.											
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	Hgt. 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.)
<b>ACREAGE LEGALLY CONTROLLED</b>		
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		

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

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

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

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

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

DISTANCE TO NEAREST RAILROAD CONNECTION DISTANCE TO NEAREST AIRPORT—IDENTIFY

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

NAVIGATIONAL RESTRICTIONS (INDICATE ALL AT M.L.W.)  
 MINIMUM CHANNEL TO TIDEWATER MINIMUM HORIZONTAL AND VERTICAL BRIDGE CLEARANCES TO TIDEWATER (Identify structures)

LIMITING LOCK DIMENSIONS TO TIDEWATER (Identify locks)

DESCRIPTION OF TYPES OF WORK NORMALLY SUBCONTRACTED



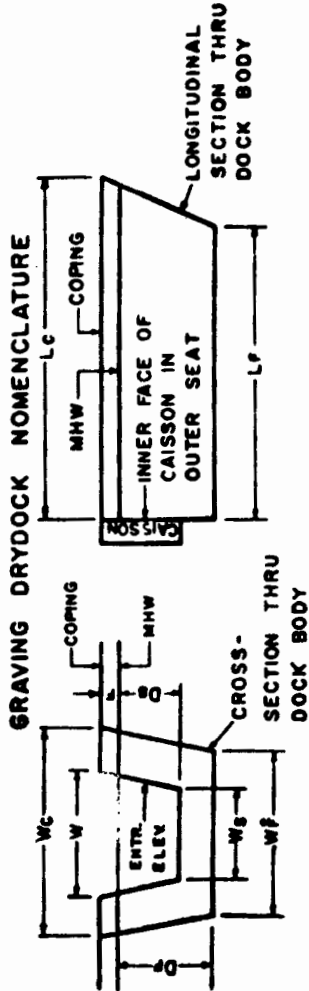
PRODUCTION EXPERIENCE (List at least three of the largest and the most complex ships or boats constructed, indicating (1) date completed, (2) hull length, beam, and molded depth, (3) type propulsion unit (fully described), (4) horsepower, (5) electrical and/or electronic installation, (6) special piping features, (7) size and tensile strength of plates, if steel, or type hull material, if other than steel, (8) special annealing, heat treating, or stress relieving problems encountered, 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.)

FLOATING DRYDOCK CHARACTERISTICS SUMMARY

FLOATING DRYDOCK	MAXIMUM LENGTH OF PONTOON	MAXIMUM DEPTH OVER BLOCKS	CLEAR WIDTH BETWEEN WINGWALLS	LIFT CAPACITY (TONS)	NORMAL KEEL BLOCK HEIGHT	A.C. AMPERES (60 HZ-3 φ)			REMARKS (Indicate existence of hauling blocks, if end section can be lowered, and max. length of ship DD can accommodate.)
						480V MAX. HOTEL (INDUS.)	2400V ALT. HOTEL	13.2KV TEST/ CHECK	

GRAVING DRYDOCK CHARACTERISTICS SUMMARY

**KEY**  
 MHW - Mean High Water  
 DP - Depth of Dock from MHW to Floor  
 DS - Depth of Dock from MHW to sill  
 LC - Length of Dock at coping  
 LP - Length of Dock at Floor  
 W - Width of Dock at top of entrance.  
 WC - Width of Dock at coping or maximum clear width above Dock Floor.  
 WF - Width at Dock Floor  
 WS - Width of Dock at entrance (sill)  
 F - Freeboard. Distance from MHW to top of coping. Indicate if part of F may be superflooded.



DRYDOCK NUMBER	LENGTH		ENTRANCE DIMENSIONS		DOCK BODY DIMENSIONS		STANDARD DEFINITION	A. C. AMPERES (60 HZ-3Ø)			REMARKS (e.g. indicate dimensions of pits in dock FLOOR)	
	FLOOR	COPING	WIDTH	DEPTH	WIDTH	DEPTH		LC	WC	DP		480V MAX HOTEL (INDUST)
1												
2												
3												
4												
5												

\* Alternate Hotel Service Consists of 2400 V Supply and 1000 KVA (480V SEC.) Portable Transformer.  
 \*\* Test and Check-out Power Consists of 13,200 V Supply and 3,750 KVA (480V SEC.) Portable Transformer.

APPENDIX B

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

LEGEND: Remarks Column

1/Type of work usually engaged in

2/Employment - Mid-1981

APPENDIX B

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

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers Usable length in feet  Longest Total linear feet	Remarks
<u>EAST COAST SHIPBUILDING YARDS</u>			
Bath Iron Works Corp. Bath, ME	(2) 650 (+) x 88 SW 700 x 130 SW 550 x 88 FD	840 2900	<sup>1/</sup> Construction, conversion and repairs - all types of vessels.  <sup>2/</sup> 6,565  Also has floating bow drydock for sonar domes.
Beth. Steel Corp. Sparrows Point, MD	(2) 900 x 108 SW 1200 x 192 GD	1260 3970	<sup>1/</sup> New ship construction - to vessels 1200' in length.  <sup>2/</sup> 2,964
General Dynamics Corp. Quincy SB Division Quincy, MA	(2) 860 x 123 GD 936 x 143 GD (2) 860 x 144 GD	893 4600	<sup>1/</sup> Construction, conversion and repairs - all types of vessels.  <sup>2/</sup> 2,700
Maryland SB and DD Co. Baltimore, MD	850 x 110 SW 775 x 110 FD 715 x 91 FD 900 x 146 FD	1902 5620	<sup>1/</sup> Construction, conversion and repair - all types of vessels.  <sup>2/</sup> 1,720
Newport News SB & DD Co. Newport News, VA	(2) 649 x 93 SW 715 x 93 SW 940 x 125 SW 960 x 124 GD* 1100 x 136 GD* 646 x 88 GD** 858 x 102 GD** 455 x 68 GD** 521 x 68 GD** 1600 x 246 GD*	1670 14220	<sup>1/</sup> Construction, conversion and repair - all types of vessels.  <sup>2/</sup> 24,000  *Used for construction  **Used for repairs and overhaul.
Norfolk SB & DD Corp. Norfolk, VA	475 x 85 SW 650 x 83 FD 1100 x 156 FD 441 x 60 MR* 325 x 60 FD*	1030 12170	<sup>1/</sup> Ship construction, repairs, and conversion - all types of vessels.  <sup>2/</sup> 3,381  *Located at Brambleton plant.
Sun Ship, Inc. Chester, PA	(2) 745 x 129 SW 700 x 195 SW 1000 x 195 SW 1100 x 195 FD	1100 3900	<sup>1/</sup> Conversion, overhaul, and repairs - all types of vessels.  <sup>2/</sup> 2,158

<sup>a/</sup> Shipbuilding: for ships 475' x 68' or above.

Repair: drydocking facilities for ships 300' in length or above.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers Usable length in feet  Longest Total linear feet	Remarks
<u>EAST COAST</u> <u>REPAIR YARDS WITH</u> <u>DRYDOCK FACILITIES</u>  Beth. Steel Corp. Baltimore, MD	490 x 81 FD 775 x 106 FD 900 x 136 FD 585 x 71 GD	$\frac{964}{13000}$	$\frac{1}{300}$ Ship repairs and conversion. $\frac{2}{300}$
Beth. Steel Corp. East Boston, MA	690 x 92 FD 533 x 86 FD	$\frac{1020}{3111}$	$\frac{1}{500}$ Ship repairs and conversion. $\frac{2}{500}$
Beth. Steel Corp. Hoboken, NJ	433 x 69 FD 685 x 106 FD 549 x 90 FD 640 x 96 FD 1064 x 138 GD*	$\frac{923}{3000}$	$\frac{1}{540}$ Ship repairs and conversion. $\frac{2}{540}$ *Military Ocean Terminal, Bayonne, NJ - leased by Beth.
Boston Marine Industrial Park Boston, MA	1145 x 119 GD*	N.A.	*GD #3 is a public drydock in former Boston Naval Annex, owned by Economic Development Industrial Corp. of Boston and leased to ship repair companies.
Caddell DD & Repair Co. Staten Island, NY	400 x 63 FD	$\frac{550}{1400}$	$\frac{1}{180}$ Ship repairs and conversion. $\frac{2}{180}$
Coastal DD & Repair Corp. Brooklyn, NY	340 x 60 GD 456 x 80 GD 706 x 112 GD (2) 1094 x 143 GD 761 x 100 GD	$\frac{1200}{7700}$	$\frac{1}{1,070}$ Ship repairs, overhaul, and conversion. $\frac{2}{1,070}$ All facilities are part of the former Brooklyn Naval Shipyard and are leased from the City of New York.
Colonna's Shipyard, Inc. Norfolk, VA	300 x 40 MR 360 x 65 MR	$\frac{950}{2200}$	$\frac{1}{151}$ General ship repairs. $\frac{2}{151}$
Detyens Shipyards Mt. Pleasant, SC	560 x 82 FD 300 x 82 FD	$\frac{300}{600}$	$\frac{1}{400}$ General ship repairs. $\frac{2}{400}$

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)		Berths/Piers		Remarks
	SW--Shipway	GD--Graving Drydock	Usable length in feet	Longest Total linear feet	
General Ship Corp. East Boston, MA	680 x 90	GD*	N.A.		1/ Ship repairs and overhaul. Construction up to 200' in length.  2/ 270  *GD is located in the Boston Marine Industrial Park in the former Boston Naval Annex and is leased by General Ship Corp.
Jackson Engineering Co., Inc. Staten Island, NY	425 x 82 550 x 82	FD FD	<u>653</u> 2600		1/ Ship repairs and conversion.  2/ 192
Jacksonville Shipyards Jacksonville, FL	(2) 660 x 90 900 x 140 400 x 53	FD* FD FD*	<u>680</u> 4184		1/ Ship repairs and conversion. Construction of small vessels.  2/ 2,690  *Leased from the Navy.
Newport Ship Yard, Inc. Newport, RI	320 x 60	MR	<u>500</u> 2515		1/ Small vessel construction, conversion, and repairs.  2/ 180
Perth Amboy DD Co. Perth Amboy, NJ	400 x 68	FD	<u>400</u> 2130		1/ Ship repairs and conversion.  2/ 140
Puerto Rico DD & Marine Terminals San Juan, PR	632 x 83	GD*	<u>1000</u> 1632		1/ Ship repairs.  2/ 90  *Leased from Navy.
Rodermond Industries Jersey City, NJ	425 x 80 350 x 60 300 x 57	FD FD FD	<u>842</u> 842		1/ Ship repairs.  2/ 130
Savannah Shipyard Co. Savannah, GA	536 x 64	GD	<u>382</u> 1563		1/ Ship repairs and conversion.  2/ 400
Todd Shipyards Corp. Brooklyn, NY	700 x 85 755 x 95	GD FD	<u>1152</u> 7653		1/ Ship repairs and conversion.  2/ 388

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		
Tracor Marine, Inc. Port Everglades, FL	800 x 80 FD 360 x 80 (Syncrolift)	<u>1825</u> 1825	<u>1/</u> Ship repairs and conversion. <u>2/</u> 334
<u>GULF COAST</u> <u>SHIPBUILDING YARDS</u>			
Alabama DD & SB Co. Mobile, AL	(4) 523 x 68 SW 620 x 90 SW 665 x 87 FD 750 x 100 FD	<u>1132</u> 9370	<u>1/</u> Ship construction, conversion and repairs. Also drill rig construction. <u>2/</u> 2,019
Avondale Shipyards, Inc. New Orleans, LA	*2) 1020 x 174 SW **1200 x 126 SW ***450 x 90 SW 300 x 50 MR 1000 x 216 FD 380 x 76 FD	<u>1625</u> 3800	<u>1/</u> Ship construction, conver- sion and repairs - all types of vessels. <u>2/</u> 7,300  *Three vessels up to 1020' x 174' can be constructed simultaneously.  **Five large, greater than 600' LOA, vessels can be under construction simul- taneously in this area.  *** Westwego plant - Two vessels can be constructed simul- taneously.
Beth. Steel Corp. Beaumont, TX	800 x 96 SW 650 x 84 FD	<u>1100</u> 4050	<u>1/</u> Construction of barges and drilling rigs. Also ship repairs and conversion. <u>2/</u> 2,300
Galveston SB Co. Galveston, TX	700 x 120 SW	None*	<u>1/</u> Construction of barges, tugs and oceangoing integrated tug/barge units. <u>2/</u> 400  *City wharf in Galveston is available.



MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)		Berths/Piers	Remarks
	SW--Shipway	GD--Graving Drydock	Usable length in feet	
	FD--Floating Drydock	MR--Marine Railway	Longest Total linear feet	
Ingalls SB Division Litton Systems, Inc. Pascagoula, MS	690 x 85 SW 550 x 80 SW (4) 650 x 90 SW 481 x 71 GD *800 x 173 FD		2650 <u>8100</u>	1/ Construction, conversion, and repairs - all types of vessels. 2/ 12,700  *West Bank can launch ships up to 800' x 173'. Equivalent of six conventional inclined ways in terms of ships delivered annually.
Levingston SB Co. Orange, TX	700 x 100 SW 420 x 122 FD 400 x 80 FD		600 <u>2400</u>	1/ Construction of offshore drilling rigs, drill ships, barges and large commercial vessels. Repairs and conversion - all types of vessels. 2/ 2,014
Marathon LeTourneau Co. Gulf Marine Division Brownsville, TX	1100 x 150 SW		600 <u>1100</u>	1/ Construction of drilling rigs. Yard has capability of building large oceangoing ships. 2/ 1,300
Tampa Shipyards, Inc. Tampa, FL	500 x 105 SW 542 x 72 GD 896 x 146 GD		845 <u>1800</u>	1/ Ship construction, conversion, and repairs. 2/ 600
Texas Gulfport SB Co. Port Arthur, TX	550 x 80 SW 400 x 80 SW (2) 325 x 68 FD		590 <u>1270</u>	1/ Construction of drilling rigs and barges. Ship repairs and conversion. 2/ 464
Todd Shipyards Corp. Galveston, TX	670 x 86 FD 475 x 85 SW		1160 <u>7000</u>	1/ Ship construction, repairs and conversion. 2/ 773
Todd Shipyards Corp. Houston, TX	600 x 96 SW 600 x 96 FD		1844 <u>3200</u>	1/ Ship construction, repairs and conversion. 2/ 492

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)		Berths/Piers		Remarks
	SW--Shipway	GD--Graving Drydock	Usable length in feet	Longest Total linear feet	
<u>GULF COAST</u> REPAIR YARDS WITH DRYDOCK FACILITIES					
Bender Shipbuilding & Repair Company Mobile, AL	420 x 45	FD	617	2300	1/ Construction of vessels up to 260' in length. Also ship repairs. 2/ 740
Delta Shipyard Houma, LA	300 x 56 (Syncrolift)	FD	700	700	1/ Construction and repair of vessels up to 300' in length. 2/ 240
Bergeron Industries, Inc. St. Bernard, LA	300 x 72	MR	100	600	1/ Construction and repair of barges, dredges, and floating drydocks. 2/ 700
Equitable Shipyards, Inc. New Orleans, LA	325 x 90	MR	500	1654	1/ Construction and repair of small vessels and barges. 2/ 1,200
Gretna Machine & Iron Works, Inc. Harvey, LA	(2) 300 x 100 465 x 75	GD GD	340	340	1/ Construction and repair of barges. 2/ 60
Gulf-Tampa DD Co. Tampa, FL	348 x 47	FD			1/ Ship repairs and overhaul. 2/ 285
Ingalls Iron Works Co. Decatur, AL	590 x 85	GD	500	500	1/ Construction and repair of barges. 2/ 350
McDermott Shipyard Morgan City, LA	325 x 106	FD	225	225	1/ Ship construction, repairs and conversion. 2/ 520

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	Usable length in feet	
	MR--Marine Railway			Longest Total linear feet	
Platzer Shipyard, Inc. Houston, TX	300 x 70	MR		300 1000	1/ Construction and repair of barges. 2/ 240
Port Allen Marine Service, Inc. Port Allen, LA	300 x 54	MR		390 390	1/ Construction and repair of boats and barges. 2/ 75
Saucer Marine Service, Inc. New Orleans, LA	(2) 300 x 56	FD		200 600	1/ Repair of barges, dredges, and drill rigs. 2/ 70
SBA Shipyards, Inc. Jennings, LA	480 x 74	GD		1000 2000	1/ Construction, conversion, and repair of boats and barges. 2/ 200
Southern SB Corp. Slide11, LA	350 x 54	GD		200 300	1/ Construction and repair of vessels up to 350' in length and not drawing over 15' of water. 2/ 250
Todd Shipyards Corp. New Orleans, LA	696 x 86 643 x 80 350 x 60	FD FD FD		1725 4956	1/ Ship repairs and conversion. 2/ 455
<u>WEST COAST</u> <u>SHIPBUILDING YARDS</u>					
Beth. Steel Corp. San Francisco, CA	600 x 90 700 x 94 950 x 144	SW FD FD		813 3200	1/ Barge construction, ship repairs and conversion. Can build C3 and C4 type vessels. 2/ 500
FMC Corp. Portland, OR	750 x 130	SW		1100 1100	1/ Construction of barges and vessels up to 750' in length. 2/ 300  Leases drydocks and berths from Port of Portland as required.

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	Usable length in feet	Longest Total linear feet	
Lockheed SB & Construction Co. Seattle, WA	(2) 650 x 88 690 x 90 400 x 46 530 x 80 643 x 96	SW SW FD FD FD		800 <u>6500</u>		<sup>1/</sup> Ship construction, conversion and repairs - all types of vessels.  <sup>2/</sup> 2,230
National Steel and SB Co. San Diego, CA	(2) 980 x 170 690 x 90 900 x 106 397 x 52 687 x 90	GD SW SW FD* GD*		1090 <u>7075</u>		<sup>1/</sup> Construction, conversion and repairs - all types of vessels.  <sup>2/</sup> 6,775  *Leased from Unified Port District of San Diego as needed.
Todd Pacific Shipyards Corp. San Pedro, CA	(2) 800 x 84 700 x 86 470 x 82	SW FD FD		680 <u>4255</u>		<sup>1/</sup> Ship construction, repairs and conversion - all types of vessels.  <sup>2/</sup> 5,241
Todd Pacific Shipyards Corp. Seattle, WA	600 x 96 650 x 83 420 x 62	SW FD FD		1137 <u>4850</u>		<sup>1/</sup> Ship construction, repairs and conversion - all types of vessels.  <sup>2/</sup> 4,780
Triple A Shipyards Hunters Point San Francisco, CA	(2) 715 x 82 996 x 107 1088 x 136 416 x 56 416 x 71	GD GD GD GD GD		600 <u>24000</u>		<sup>1/</sup> Ship repairs, overhaul and conversion. Has ship construction capability.  <sup>2/</sup> 450  All graving docks are part of the inactive Hunters Point Naval Shipyard and are leased from the U.S. Navy.
<u>WEST COAST</u>						
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>						
California SB & DD Co. Long Beach, CA	400 x 52	FD		600 <u>1700</u>		<sup>1/</sup> Ship repairs and conversion.  <sup>2/</sup> 180

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	
Campbell Industries San Diego, CA	(2) 360 x 46 FD	<u>640</u> 2280	<u>1/</u> Construction of fishing boats. Also ship repairs.  <u>2/</u> 750  Graving dock is leased from Unified Port District of San Diego as required.
Dillingham Marine & Mfg. Co. Portland, OR		<u>260</u> 260	<u>1/</u> Ship repairs and conversion.  <u>2/</u> 320  Leases drydocks and berths from Port of Portland as required.
Dillingham Shipyard Honolulu, HI	385 x 52 FD	<u>650</u> 850	<u>1/</u> Ship repairs and overhaul.  <u>2/</u> 283
Kaiser Steel Corp. Napa, CA	304 x 51 FD 364 x 51 FD	<u>500</u> 500	<u>1/</u> Heavy steel fabrication and erection. Construction and repair of small ships and barges.  <u>2/</u> 1,400
Lake Union DD Co. Seattle, WA	340 x 56 FD	<u>1000</u> 4235	<u>1/</u> Ship repairs and conversion.  <u>2/</u> 115
Marine Power & Equip. Co. Seattle, WA	400 x 57 FD 400 x 60 FD 400 x 101 (Synocrolift)	<u>832</u> 2700	<u>1/</u> Construction of small vessels and barges, Also ship repairs.  <u>2/</u> 600
Pacific DD & Repair Co. Oakland, CA	320 x 52 FD	<u>600</u> 1155	<u>1/</u> Ship and barge repairs.  <u>2/</u> 80
Northwest Marine Iron Works Portland, OR	500 x 100 SW (Barge construc- tion only)		<u>1/</u> Ship repairs, conversion and barge construction.  <u>2/</u> 1,275  Leases drydocks and berths from Port of Portland as required.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)		Berths/Piers	Remarks
	SW--Shipway	GD--Graving Drydock	Usable length in feet	
	FD--Floating Drydock	MR--Marine Railway	Longest Total linear feet	
Port of Portland Swan Island Ship Repair Yard Portland, OR	600 x 83	FD	1000	Port of Portland owns these drydocks which are leased to ship repair companies on an as-required basis.
	500 x 88	FD	<del>6360</del>	
	700 x 108	FD		
	1100 x 181	FD		
Port of San Diego Unified Port District San Diego, CA	687 x 90	GD	N.A.	Drydocks available for lease to ship repair companies.
	397 x 52	FD	13000	
Richmond DD & Marine Repair Richmond, CA	(4) 600 x 84	GD*	1560	1/ Ship repairs, conversion, and overhaul. 2/ 309 *Leased from Port of Richmond, CA.
	750 x 84	GD*	1560	
Southwest Marine, Inc. San Diego, CA	400 x 82	FD	600	1/ Ship repairs and overhaul. Construction of vessels up to 250' in length. 2/ 600 Graving dock is leased from Unified Port District of San Diego as required.
			<del>1855</del>	
Todd Shipyards Corp. San Francisco Division Alameda, CA	523 x 80	FD	800	1/ Ship repairs, overhaul, and conversion. 2/ 550
	900 x 136	FD	<del>2485</del>	
Triple A South San Diego, CA			None*	1/ Ship repairs and overhaul. 2/ 450 Graving dock is leased from Unified Port District of San Diego as required. *Ships are worked at Navy piers.
Southwest Marine, Inc. Terminal Island San Pedro, CA	720 x 93	FD	1800	1/ Ship repairs, overhaul, and conversion. 2/ 850 (October 1, 1981) In August 1981, Southwest Marine began operations in this former Bethlehem-San Pedro Yard.
			<del>4175</del>	

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 Usable length in feet  Longest Total linear feet	Remarks
GREAT LAKES <u>SHIPBUILDING YARDS</u>			
(Maximum size ship that can exist St. Lawrence Seaway Locks is 730' x 78')			
American SB Co. Lorain, OH	708 x 78 GD 1021 x 121 GD	900 <del>1800</del>	<sup>1/</sup> Ship construction, repairs and conversion.  <sup>2/</sup> 100
American SB Co. Toledo, OH	680 x 78 GD 540 x 68 GD	800 <del>1600</del>	<sup>1/</sup> Ship construction, repairs and conversion.  <sup>2/</sup> 90
Bay SB Corp. Sturgeon Bay, WI	750 x 105 SW 650 x 66 FD 1100 x 136 GD	900 <del>7090</del>	<sup>1/</sup> Ship construction, repairs and conversion.  <sup>2/</sup> 1,500
Fraser Shipyards Superior, WI	825 x 82 GD 620 x 61 GD	900 <del>4450</del>	<sup>1/</sup> Ship construction, conversion and repairs.  <sup>2/</sup> 390
GREAT LAKES <u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>			
American SB Co. Chicago, IL	694 x 73 GD	850 <del>1300</del>	<sup>1/</sup> Ship repairs and conversion.  <sup>2/</sup> 30
Peterson Builders Sturgeon Bay, WI	360 x 36 FD	550 <del>2515</del>	<sup>1/</sup> Construction and repair of small ships and boats.  <sup>2/</sup> 995

APPENDIX C

MAJOR TOPSIDE REPAIR FACILITIES  
SHIPS 300 FEET IN LENGTH AND OVER



APPENDIX C

MAJOR TOPSIDE REPAIR FACILITIES, SHIPS 300 FEET  
IN LENGTH AND OVER

EAST COAST

Allied Repair Service, Inc.  
Norfolk, VA

AMT, Inc.  
Miami, FL

American Ship Repairs Co., Inc.  
Brooklyn, NY

Arnessen Electric Company, Inc.  
Brooklyn, NY

Atco Marine Corporation  
Brooklyn, NY

Atlantic Marine, Inc.  
Fort George Island, FL

Atlantic Repair Co., Inc.  
Brooklyn, NY

Auto Marine Sales Corporation  
Ft. Lauderdale, FL

Banks Ship Rigging Corporation  
Brooklyn, NY

Berkley Shipbuilding & DD Corp.  
Norfolk, VA

Best Repair Company  
Norfolk, VA

Brady Marine Repair Co., Inc.  
Elizabeth, NJ

Braswell Shipyards, Inc.  
Mt. Pleasant, SC

Camden Ship Repair Co., Inc.  
Camden, NJ

Charlton Marine, Inc.  
Jersey City, NJ

Classon Industries  
Brooklyn, NY

Diesel Injection Sales & Service  
Norfolk, VA

Electric Motor and Contracting Co.  
Norfolk, VA

Fisher Marine Repair Corporation  
Brooklyn, NY

General Ship Repair Corporation  
Baltimore, MD

Golten Marine Co., Inc.  
Brooklyn, NY

Golten Ship Repair, Inc.  
Portland, ME

Golten Service Co., Inc.  
Miami, FL

Hoffert Marine, Inc.  
- Jacksonville, FL  
- Norfolk, VA

Holmes Bros., Inc.  
Portsmouth, VA

Horne Brothers, Inc.  
Newport News, VA

Hudson Engineering Company  
Hoboken, NJ

Ind-Mar Diesel Services  
Jacksonville, FL

Industrial Welding & Machine, Inc. Portland, ME	North Florida Shipyards Jacksonville, FL
J-Y Industrial Corporation Brooklyn, NY	Phillyship Philadelphia, PA
Jackson Engineering Co., Inc. Hoboken, NJ	Promet Marine Services Corp. East Providence, RI
Jonathan Corporation Norfolk, VA	Reynolds Shipyard Corporation Staten Island, NY
Kurt's Marine Diesel, Inc. Ft. Lauderdale, FL	Rollinson Electric Contractors Savannah, GA
Marine Contractors Co., Inc. East Boston, MA	Sandblasters, Inc. John's Island, SC
Marine Electric Corporation Brooklyn, NY	South Portland Shipyard & Marine Railway Corporation South Portland, ME
Meier & Oelhaf Company, Inc. New York, NY	Stephen Ransom, Inc. Port Newark, NJ
Merrill-Stevens DD Company Miami, FL	Surless Ship Repair Corporation Brooklyn, NY
Metro Machine Corporation Norfolk, VA	Thames Shipyard & Repair Co. New London, CT
A. Moe & Co., Inc. Philadelphia, PA	Tickle Engineering Works, Inc. Brooklyn, NY
Moon Engineering Co., Inc. Norfolk, VA	Todd Electric Company Norfolk, VA
Munro Drydock, Inc. Chelsea, MA	Tony Stamis Engineering Co. Ridgefield, NJ
Neptune Machine Works, Inc. Brooklyn, NY	Williams Brothers Division of Gowen, Inc. Portland, ME
Newport Ship Yard, Inc. Newport, RI	Williams & Manchester Shipyard Newport, RI
Nordic Diesel & Machine Co. Brooklyn, NY	Wilmington Iron Works, Inc. Wilmington, NC
Norlantic Diesel, Inc. Fairhaven, MA	

## GULF COAST

American Marine Corporation  
New Orleans, LA

Atlantic Sandlasting & Coatings, Inc.  
Tampa, FL

Boland Marine & Manufacturing Co.  
New Orleans, LA

Buck Kreihs Co., Inc.  
New Orleans, LA

Coastal Iron Works, Inc.  
Corpus Christi, TX

Coastal Marine Service of Texas  
Port Arthur, TX

Dixie Machine Welding & Metal Works  
New Orleans, LA

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

Florida Ship Repair  
Tampa, FL

General Engineering Co.  
New Orleans, LA

Hahn & Clay  
Houston, TX

Harrisburg Machine Co., Inc.  
Houston, TX

Hendry Corporation  
Tampa, FL

International Ship Repair & Marine  
Services, Inc.  
Tampa, FL

Marine Repairs, Inc.  
Houston, TX

Marine Maintenance Industries  
Houston, TX

McDonough Iron Works  
Galveston, TX

Misener Industries, Inc.  
Tampa, FL

Modern Diesel Power, Inc.  
New Orleans, LA

National Marine Service  
Harvey, LA

Newpark SB & Repair, Inc.  
Houston, TX

Port Houston Marine, Inc.  
Houston, TX

Runyan Machine & Boiler Works  
Pensacola, FL

Sherman Shipyard  
Panama City, FL

## WEST COAST

Atkinson Marine Corporation  
National City, CA

Cavanaugh Machine Works  
Wilmington, CA

Coastal Marine Engineering Co.  
San Francisco, CA

Colberg, Inc.  
Stockton, CA

Dockside Machine & Ship Repair  
Wilmington, CA

Duwamish Shipyard, Inc.  
Seattle, WA

Electro-Mechanical Co.  
Portland, OR

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

Franklin Machine Works, Inc.  
San Francisco, CA

Fulton Shipyard  
Antioch, CA

General Engineering & Machine Works  
San Francisco, CA

Golten Marine Co., Inc.  
Wilmington, CA

Kettenburg Marine  
San Diego, CA

Marine Ways Corporation  
Portland, OR

Marisco, Ltd.  
Honolulu, HI

Pacific Dry Dock & Repair Co.  
Oakland, CA

Pacific Marine & Supply Co.  
Honolulu, HI

Palau Corporation  
San Francisco, CA

Rowe Machine Works, Inc.  
Seattle, WA

San Francisco Welding &  
Fabricating, Inc.  
San Francisco, CA

Service Engineering Co.  
San Francisco, CA

Southwest Marine of SF  
San Francisco, CA

Tacoma Boatbuilding Co., Inc.  
Tacoma, WA

Triple A South  
San Diego, CA

Western Maritime, Inc.  
Tacoma, WA

Westinghouse Marine Repair  
- Seattle, WA  
- Portland, OR  
- Emeryville, CA  
- Anchorage, AK

West Winds, Inc.  
San Francisco, CA

Wilmington Iron Works  
Wilmington, CA

Wilmington Welding & Boiler Works  
Wilmington, CA

#### GREAT LAKES

Advance Boiler & Tank Co.  
Milwaukee, WI

American Propeller Company  
Toledo, OH

Diversified Piping Company  
Avon Lake, OH

Erie Machine & Iron Works  
Toledo, OH

G&W Industries, Inc.  
Cleveland, OH

Edward E. Gillen Co.  
Milwaukee, WI

Hans Hansen Welding Co., Inc.  
Toledo, OH

Lower Lake Dock Company  
Sandusky, OH

Merce Boiler & Welding Co., Inc.  
Toledo, OH

Niagara Industries, Inc.  
Erie, PA

Nicholson & Hall Corporation  
Buffalo, NY

Nicholson Terminal & Dock Co.  
River Rouge, MI

Oldman Boiler Works, Inc.  
Buffalo, NY

Perry Shipbuilding Corp.  
Erie, PA

Purvis & Foster  
Detroit, MI

Soo Drydock Company  
Sault Ste. Marie, MI

Ste. Marie Yard & Marine, Inc.  
Sault Ste. Marie, MI

Sen-Wel Industries, Inc.  
Buffalo, NY

Twin City Drydock & Marine, Inc.  
Sault Ste. Marie, MI

William Farrel, Inc.  
Toledo, OH

