

1980

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



U.S. DEPARTMENT OF COMMERCE
Maritime Administration

* 1980 *

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,^{1/} 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 1980 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.

1/Section 210

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

Section 211

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

Section 502(f)

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

The statistical data accumulated by the survey is a major input into the Shipyard Production and Mobilization Model (SPAMM), a quantitative assessment of the Nation's ship construction and ship repair capability. This capability is periodically compared with Department of Defense scenarios involving various contingency attrition rates and emergency civilian shipping requirements to 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 Commerce, the Department of Defense, and the Office of Management and Budget.

Each year in late spring, Standard Form 17, "Facilities Available for the Construction or Repair of Ships," is mailed to 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 Commerce 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 Bureau of Industrial Economics with MarAd. The Federal Emergency Management Agency (FEMA) in the General Services Administration also receives this information.

General

The annual shipyard survey of 1980 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 the annual survey. It lists the Nation's major shipbuilding, ship repair, and drydocking yards sorted on a coastal basis. Information is displayed pertaining 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 1980 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 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 and shipbuilding recession, the climate of uncertainty, and the global overcapacity in shipbuilding, the U.S. shipbuilding and ship repair industry in FY 1980 invested some \$265 million in facilities modernization and expansion, and as of July 1, 1980, planned to spend an additional \$164.4 million to improve facilities during the year ending June 30, 1981.

The Merchant Marine Act of 1970 shifted the emphasis in U.S. shipyard investments from replacement to modernization and expansion, with emphasis recently on expanded ship repair and conversion facilities. Since enactment of the Act, the shipbuilding industry has invested approximately \$2.04 billion in facilities modernization and improvements, such as new building basins and floating drydocks, cranes of unprecedented lifting capacity, plus the introduction of automated equipment and highly mechanized production systems. Emphasis has been on prefabrication of large subassemblies and preoutfitting of components using modular techniques. By these investments, the industry has increased both its capacity and its capability. 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, 1980 (see Exhibit 34), MarAd was subsidizing a construction backlog of 17 deep-draft merchant ships in seven shipyards. These were in addition to 33 nonsubsidized merchant ships under construction or on order in U.S. shipyards. MarAd was also providing Title XI financing guarantees for 268 vessels and 1,199 barges and lighters under contract in 66 shipyards throughout the country (see Exhibit 35).

Table I has been prepared to answer the frequent question as to how many building positions are available to build a specified ship.^{1/} 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 two 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 consideration that is ignored in Table I is the common shipbuilding practice of laying a keel on a building position already occupied by another ship. For example, in a 700-foot (213 m) basin, a complete 610-foot (186 m) containership and the stern section

^{1/}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.

of a second ship could be constructed simultaneously. This production procedure, analyzed periodically by SPAMM, maximizes the use of shipbuilding facilities, minimizes the construction period, and increases the number of ships that can be produced in a given period of time.

Table II is a somewhat different presentation of the data, meaningful to many requesting information from the annual survey. In lieu of actual ships, maximum ship length is used to determine the number of shipways or basins available. In this tabulation, the emphasis is on the number of individual facilities available and not on the number of ships that can be constructed. Again using Sparrows Point as an example, Table II lists the 1,200-foot by 192-foot (366 m by 59 m) basin as one facility regardless of what type of ship is constructed in it. Table I indicates that there are six building positions for a ship 475 feet (145 m) LOA at Sparrows Point, whereas Table II indicates that the yard has three individual shipways capable of constructing a ship 475 feet (145 m) in length. Exhibit 36 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 64 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 two years, the company continued its facility improvements, mainly the upgrading and modernization of existing drydocks, piers, shops and equipment.

Supplementing its booming ship repair business, ADDSCO, as of October 1, 1980, had the following new construction work under contract: one large drill barge and a \$60 million semi-submersible offshore drill rig for Diamond M Company. The yard is aggressively seeking other construction contracts, especially for offshore drill rigs. In September of this year, the Navy

awarded ADDSCO a \$17.5 million contract to overhaul 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). All of these ways are too small to construct today's mammoth ships. ADDSCO also operates three floating drydocks, the largest of which can handle 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.

ADDSCO, as of mid-1980, employed a labor force of 2,300, up from 1,500 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-unloading 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.

Currently, there is a downturn in the demand for new Great Lakes bulk carriers; and upon delivery in September 1980 of the EDGAR B. SPEER to United States Steel Corporation, Lorain had only one 1,000-foot (305 m) self-unloader under construction. This ship is scheduled for delivery to the Interlake fleet of Pickands Mather in April 1981. As of October 1 of this year, there was no other ship construction or conversion work in the yard.

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-1980, the total payroll at Lorain was approximately 930, slightly less than mid-1979; and unless new construction or conversion contracts materialize, there will be substantial layoffs in the spring of 1981.

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. Currently underway at Toledo is the conversion of the ore carrier EDWARD B. GREENE to a self-unloader.

The AMSHIP Division's Toledo yard utilizes the headquarters engineering staff located at Lorain for all work requiring a technical staff. Toledo, like the Lorain plant, has large machine shops which can accommodate almost any type of machining operation 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 operates 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-1980 was about 330, down from 450 in the summer of 1979.

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 drillships and has the distinction of being the only U.S. shipyard to have built LASH vessels. Twenty were delivered to various shipowners from 1970 to 1975. During 1977, 1978, and 1979, Avondale completed six crude oil carriers, four for SOHIO and two for EXXON (USA). In 1980, a large LASH ship was delivered to Waterman Steamship Corporation.

As of October 1, 1980, the following commercial vessels were under construction: one LASH ship (MA Design C9-S-81f) for Waterman; three large containerships (MA Design C9-M-132b) for American President Lines; two medium size Ogden Marine product tankers; three integrated tug-barge chemical/oil vessels (MA Design IB6-MT-130a) for subsidiaries of Occidental Petroleum Corporation; and three diesel-propelled hopper dredges. Also in production at Avondale were five auxiliary oilers (AO's) for the U.S. Navy.

Since 1974, three 125,000-cubic-meter liquefied natural gas (LNG) carriers, MA Design LG9-S-107a, have been under construction, with the aid of CDS, at Avondale Shipyards for subsidiaries of El Paso Company. Due to serious technical problems with the cargo insulation system, construction of these ships was terminated in accordance with a settlement agreement among the contractual parties, dated September 15, 1980.

In 1975, Avondale completed a multimillion-dollar facilities improvement program primarily to "tool-up" for the construction of large LNG ships. The shipbuilding area previously used for series production of U.S. 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. As presently configured, the new 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 the building positions used for the LNG's, 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 area.

Avondale employs a unique transfer method, whereby large sections of a ship, or entire ships, are moved 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.

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 August 1980, the total labor force was 7,507, an increase of about 500 compared to August 1979.

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 became 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 vessels, containerships, tankers, destroyers, and guided-missile frigates. Bath has built a total of 153 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 "handy-size" 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 February 1980, the second of two containerships (MA Design C5-S-73b) was delivered to Farrell Lines. Currently the only commercial ship construction in the yard is a large seagoing diesel-propelled hopper dredge for the Corps of Engineers. Sun Ship subcontracted this work to Bath in September of this year.

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 USS OLIVER HAZARD PERRY, was completed in 1977; and the Navy has awarded the company follow-on contracts for the construction of 17 additional FFG-7 Class guided-missile frigates, the last of which is scheduled for delivery in 1984. As of October 1, 1980, there were 14 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 every 3½ months. Also swelling the backlog of work were the major overhauls of three Navy ships, the guided-missile destroyer CONYNGHAM (DDG-17), the frigate TRIPPE (FF-1075), and the frigate VREELAND (FF-1068).

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, the Bath yard in 1979 began its latest expansion and facilities improvement program which will continue through 1980. Included in this program are the following: expansion of the main assembly building to double the interior work area; installation of additional computer-aided lofting and burning equipment; expanded machine shop and pipe shop capability; and replacing wood wing walls with steel wing walls on the floating drydock.

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). Besides a 9,500 ton (9652 metric ton) floating drydock that can handle ships up to 550 feet by 88 feet (168 m by 27 m), there is also a special partial drydock used exclusively for the installation and repair of sonar domes.

Two wharves and a pier provide a total of 2,900 linear feet (884 m) for outfitting and repair work. One wharf is serviced by two 25-ton (23 metric ton) rotating cranes, and the other wharf by one 25-ton (23 metric ton) rotating crane. The pier is serviced by a 94-ton (85 metric ton) rotating crane.

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.

As of mid-1980, the company's administrative and production work force totaled 6,119, its highest employment since World War II. Employment in July 1979 was 5,311.

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 1973 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 are 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 ore carriers MARINERS HARBOR and BURNS HARBOR and a large tanker barge.

As of October 1, 1980, despite the slump in Great Lakes ship construction, the yard was building two large self-unloading ore carriers and was converting a straight deck ore carrier to a self-unloader. The bad news is that by mid-1981 all this work will be completed; and unless new contracts materialize, there will be some layoffs. However, Bay does a good business in the regular maintenance and repair of Great Lakes vessels, especially during the winter months.

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. The steel erection capacity for ship construction is estimated to be 15,000 tons (13617 metric tons) per year. Also included in Bay Shipbuilding's expansion program was a \$2 million plate fabrication and burning shop, completed in 1975.

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-1980, total employment was 1,550 down from 1,825 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 1916 by Beaumont Shipbuilding and Drydock Company, which, in addition to repair and conversion work, built C1-A cargo ships and Navy minesweepers during World War II. Bethlehem acquired the yard in 1947 and has pioneered in the design and production of mobile 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.

During the first nine months of 1980, Bethlehem-Beaumont signed contracts for the construction of eight new offshore drilling rigs and completed seven new rigs. As of October 1, 1980, the yard had a record total of 14 offshore drilling units under construction or on order. All were jack-up rigs.

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 2,177 at mid-1980, up slightly from mid-1979.

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 a standpoint of continuous service. One of the largest 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. Currently in production are two large deck cargo barges for a subsidiary of Crowley.

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 mammoth 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-1980 was approximately 890, up from 800 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 seven 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 slated for completion in November 1980.

Other work under contract at Sparrows Point as of October 1, 1980, comprised the following: six oceangoing tug/barge CATUG tankers (construction of the tugs is subcontracted to Halter Marine), and three jack-up drilling rigs. These will be the first offshore drilling rigs ever built at Sparrows Point, and this is the only U.S. shipyard outside the Gulf Coast states with contracts for construction of offshore drilling rigs.

To provide the capability for construction of VLCC's 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 m²) 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, 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 2,866 at mid-1980, up from 2,450 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 Corporations' Marine and Rail Equipment Division, originally known as Gunderson Bros. Engineering Corporation, is located on the Willamette River in Portland, OR. This facility, which is 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. During

1978 and 1979, four large triple-deck RO/RO barges were delivered to Crowley Maritime Corporation. These are the world's largest RO/RO barges. In the first half of 1980, FMC completed an ocean-going covered deck barge for Puget Sound Freight Lines and a dump scow for Smith-Rice. Currently under construction are two large tank barges for Crowley Maritime Corporation.

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 acquisition of land adjacent to its existing facility, 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 side-launch shipway that can accommodate a maximum ship size of 700 feet by 105 feet (213 m by 32 m). This building position is serviced by one 200-ton (182 metric ton) whirley crane and one 50-ton (45 metric ton) gantry crane.

FMC has one 600-foot (183 m) outfitting dock but no dry-docks. Outfitting and drydocking can be done in the nearby Port of Portland facility.

At mid-1980, the labor force involved in marine work totaled 300, unchanged from mid-1979.

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 dry-dock 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 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 shipyard has specialized in vessel repair and ship modernization including lengthenings, repowering and engine room automation, and self-unloader conversions. In the past eight years, Fraser has performed most of the major ship lengthening work on the Great Lakes.

During 1980, the Fraser yard completed the following conversion jobs: converted the SPARROWS POINT, a Bethlehem Steel bulk carrier to a self-unloader; installed a bow thruster on the JOHNSTOWN, a sistership of the SPARROWS POINT; and reconstructed the cargo holds of the ARTHUR ANDERSON, a U.S. Steel bulk carrier. Currently in the yard is 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. Delivery is scheduled for April 1981. At this shipyard, general ship repair is also an important source of revenue.

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 630 feet by 62 feet (192 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 nine 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 yard's work force totaled 211 at mid-1980, down from 400 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.

In 1974, this shipyard completed construction of the SEABULK CHALLENGER, a catamaran type oceangoing integrated tug/barge (Catug) for Seabulk Tankers, Ltd. In 1977, the SEABULK MAGNACHEM, another catug, was delivered to Hvide Shipping, Inc. In 1978, construction was completed on two chemical tank barges; and during 1979, Galveston delivered two large seagoing deep-notch petroleum barges -- one for Belcher Oil Co. and one for Interstate and Ocean Transport Co. In early 1980, construction was completed on another deep-notch barge for Interstate. As of October 1, 1980, four deep-notch oceangoing oil barges were under construction for Belcher, Interstate, and Marathon Oil Co.

Galveston Shipbuilding has one building way (side-launching) on which oceangoing ships 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 an 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 installed by a subcontractor.

In addition to its large side-launch way, Galveston Shipbuilding has four smaller shipways served by a 750-ton (762 metric ton) syncrolift. In the absence of a drydock, arrangements must be made to drydock large vessels at Todd-Galveston or Livingston Shipbuilding Company. Since the former Kelso yard does not have an outfitting berth, outfitting is done at the municipal pier in Galveston.

In mid-1980, Galveston Shipbuilding Company's total work force was 375, 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 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, 1980, Quincy's backlog of work consisted of the construction of five large oil barges, plus the overhaul of a U.S. Navy cable ship, and the repair and overhaul of a large oil tanker.

In September 1980, General Dynamics Corp. signed conditional contracts with subsidiaries of Zapata Corp. and Ogden Corp. to build six 125,000-cubic-meter LNG carriers at the Quincy yard. The most controversial of several factors on which the transaction depends is the problem of approval for construction of an LNG receiving terminal in California. Environmental impact hearings are expected to defer the start of ship construction for an indefinite period.

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, a

200-ton (188 metric ton) transporter, a double-bed flat bar stripper, a web cutter with 19 torches in tandem, an angle fabricator, two web stiffener welding gantries, a T-beam fabricator, two plate stiffeners, a butt welding gantry, a panel turnover fixture, and two 40-ton (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 at Quincy.

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 1,200-ton (1089 metric ton) Goliath crane over into No. 7 where they were attached to the hull. The spheres were barges into the outboard end of No. 6 and lifted into No. 7 for installation. Basin No. 8, presently not in use, and Basin No. 6 can accommodate ships 860 feet by 123 feet (262 m by 28 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. The yard also manufactures and fabricates a large range of industrial products and non-ship components in addition to ship construction.

The Quincy shipyard was without major ship construction work when the last of its LNG's was completed in September 1980. Employment dropped from 4,850 at mid-1979 to 3,650 at mid-1980. At the General Dynamics plant near Charleston, SC, which has been manufacturing the spherical aluminum tanks for the LNG ships, the labor force fell from 340 in July 1979 to 100 at mid-1980.

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

15. Ingalls Shipbuilding Division/Litton Industries

The Ingalls Shipbuilding Division, a wholly owned subsidiary of Litton Industries 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.

In 1980, Ingalls took advantage of the boom in offshore drilling rig construction. As of October 1, 12 rigs were in production or on order. The backlog of new ship construction for the Navy consisted of the following: two Ticonderoga Class guided missile cruisers (CG) equipped with the Aegis weapons system, four guided missile destroyers (DDG), and one destroyer (DD).

The older of the two Ingalls yards is referred to as the East Bank yard. It has been in operation for 42 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 yard does not have conventional inclined shipbuilding ways. Instead, fabricated steel and minor subassemblies are brought from the fabrication, panel and shell shops to the subassembly area where they are erected into major subassemblies, which in turn move to the module assembly area. These areas are divided into five bays, each of which can produce 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-1980 employed a total labor force of 11,170, down from 16,926 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 - Orange Shipbuilding Division

Levingston, one of the leading producers of offshore drilling rigs, was founded in 1933. The plant 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. In 1975, Levingston became a wholly owned subsidiary of Ashland Oil, Inc., and a new program was instituted for the company's operations. Tug and barge construction was effectively abandoned for the building of larger vessels and offshore drilling rigs. In July 1980, Ashland Oil, Inc. sold Levingston Shipbuilding Company to Paden Corporation, but there was no change in the operations or work force.

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 nine drillships, seven semisubmersibles, nine jack-up rigs, and 139 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 372 vessels (mostly barges) as well as tankers, small roll-on/roll-off ships and ferries.

In August 1978, the company completed the second of two drillships for Glomar Marine, Inc. These vessels are the largest drillships ever built on the Gulf Coast. In 1978, the Orange

facility also delivered a small product tanker to Cleveland Tankers, Inc., and two jackup drilling rigs. Two more jackup rigs were completed in 1979.

As of October 1, 1980, Levingston had under construction three dry-bulk carriers (MA Design C5-M-129a) for Levingston Falcon I Shipping Company, with delivery of the first ship scheduled for early 1981. These 612-foot (187 m) ships are being built with the technical assistance of a U.S. subsidiary of the Japanese shipbuilder, IHI, and are the first dry-bulk carriers built in this country in 16 years. Also in production at Levingston are three jackup drilling rigs.

A long-range expansion and modernization program is underway at the Orange, TX, yard, in order to eventually 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 are a new flat panel fabrication line, numerically controlled cutting equipment, an automatic blasting and paint shop, a new subassembly construction area, and a new gantry crane.

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 1980, the total work force at the Orange plant was 1,980, up from 1,769 a year earlier.

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

17. Levingston Shipbuilding Company - Gulfport Shipbuilding Div.

Levingston's Gulfport shipyard, located in Port Arthur, TX, is primarily engaged in ship repairs and conversion, although it has the capability of building ships up to about 550 feet (168 m) long by 80 feet (24 m) in width. This shipyard is strategically located on the busy intracoastal canal with a portion of the facility 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, Gulfport Shipbuilding has constructed drilling rigs and other vessels for the oil drilling industry. Presently, in addition to repair work, it supports Levingston's Orange shipyard in the manufacture of structural and other vessel components.

An expansion and modernization program is currently underway at 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-1980 work force at Gulfport was about 400, unchanged from a year earlier.

Exhibit 18 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 Gulfport's downstream outfit and repair berths or tank-cleaning and gas-freeing facilities.

18. 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 91-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 current 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), is scheduled for completion in August 1981.

In early 1980, Lockheed was awarded a \$38.3 million contract for advanced procurement of equipment and materials for the Navy's new LSD-41 program. Also included was advanced engineering and program support activities for these amphibious dock landing ships. In early 1981, the Navy is expected to award the contract for construction of the lead ship to Lockheed.

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 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.

To improve shipbuilding technology to meet requirements for construction of the Navy submarine tenders, 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. The automated steel fabrication panel line is another new facility developed following the award of the sub tender contracts.

The yard operates three inclined shipways, two of which can accommodate ships up to 650 feet by 90 feet (198 m by 27 m), and one which can handle a ship as large as 700 feet by 100 feet (213 m by 30 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.

Lockheed's labor force, at mid-1980 totaled 1,700, down from 2,370 at mid-1979. However, due to Navy overhaul and other repair work, and with work on the LSD-41 program to begin in 1981, the work force is expected to remain stable.

Exhibits 19 and 20 are current general arrangement drawings of the Seattle yard's Plant No. 1 and Plant No. 2.

19. 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, 1980, the Gulf Marine Division was building a total of eight jackup drilling rigs. Three were delivered during the first nine months of this year, and four were completed in 1979.

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. There is one wharf, 500 feet (152 m) in length, for outfitting purposes. Estimated steel throughput at this shipyard is from 750 tons (681 metric tons) to 1,000 tons (908 metric tons) a month.

At mid-1980, the total work force at the Brownsville plant was 1,227, slightly higher than a year earlier.

Exhibit 21 is a plot plan of the yard's construction facilities.

20. 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 58 years, offers full facilities for ship construction,

conversion, overhaul, and repair. Although primarily a repair and conversion yard in recent years, Maryland built the following vessels in the 1960's: two containerships, one oceanographic research vessel, one hydrofoil, 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 Department 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.

In 1976, Maryland Dry Dock completed construction of the cargo-carrying unit of a large integrated tug/barge. In 1977, 1978, and 1979, the company's activities consisted principally of long-term Navy repair and overhaul, commercial ship repair, and the design and manufacture of industrial condensers.

Supplementing merchant ship repair contracts, Maryland currently is working on two major military ship contracts, the repair and overhaul of the RALEIGH, an amphibious transport, and the OBSERVATION ISLAND, a missile testing ship. The Industrial Products Department has a backlog of six large industrial condensers and other non-ship work. The first of four Moore-McCormack cargo ships entered the Maryland yard in October of this year for reconstruction to increase the container-carrying capacity of the ships. The vessels are being converted under MarAd's CDS program.

In 1978, Maryland completed the final phase of 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, as well as for ship repair and conversion work;
- 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);
- o Modernization of the panel fabrication system;
- o Automatic pre-blast equipment, a new building for blasting and painting, and a totally enclosed final-blast building; and

- o Computer lofting and a new tape-controlled, automatic burning machine.

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-1980 was approximately 1,800, compared to 1,100 in July 1979.

Exhibit 22 is a current plot plan of Maryland's facilities.

21. 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, minesweepers, 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 August 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, and in May 1980 the first of four Gompers class destroyer tenders (AD-41) was completed.

As of October 1, 1980, the following merchant ships were under construction or on order at National Steel: three Carlsbad class product tankers, five Ingram class product tankers, and also three La Jolla class product carriers. Under construction for the Navy were three Gompers class destroyer tenders (AD-41, AD-43, and AD-44), and a cable repair ship (T-ARC-7). This backlog of work combined with ship repair and modernization operations portends a continued high level of employment and activity through 1982.

Since San Diego 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 new 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-1980, the total labor force was 6,600, compared to 6,356 at mid-1979.

Exhibit 23 is a current NASSCO plot plan.

22. 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 world. The company, founded in 1886, is a subsidiary of Tenneco, Inc. Newport News has built 22 aircraft carriers, 29 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 23 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, 1980, was at work on nine nuclear-powered ships for the U.S. Navy - one aircraft carrier, and eight attack submarines. These ships are under construction in the South yard which also handles overhauls and repair work. Also, in September 1980, the Navy awarded Newport News a \$1.2 billion contract for construction of another Nimitz-class nuclear-powered aircraft carrier, the CVN-71.

Commercial shipbuilding is carried out in the North yard. During 1978 and 1979, the company completed three 125,000-cubic-meter LNG carriers. The U.S.T. ATLANTIC, the first of two ultra-large crude carriers (ULCC's), was delivered in March 1979; and a sistership, the U.S.T. PACIFIC, was delivered in December 1979. These ULCC's are the largest commercial ships ever built in the United States. Newport News is currently engaged in the reconstruction and jumboizing of four large oil tankers - two for affiliates of Keystone Shipping Company, one for the Berger Group, and one for an affiliate of Atlantic Richfield Company.

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 under construction and nearing completion which will further expand the multi-ship construction capability of this dock. The potential for simultaneous ship construction and repair will also be realized. The all-weather steel production plant includes automated panel lines and supporting equipment. 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.

Currently, all Navy ship construction is taking place in the South yard. 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 five graving docks. Two are serviced by a 310-ton (281 metric ton) gantry crane and can accommodate ships up to 1,100 feet by 136 feet (335 m by 42 m) and 960 feet by 124 feet (293 m by 38 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 858 feet by 114 feet (262 m by 35 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 17-½ 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 non-destructive 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 m²) automated material storage facility.

The total labor force at Newport News increased from 22,400 in mid-1979 to 22,900 in mid-1980.

Exhibits 24 and 25 are current general arrangement drawings showing major facilities in both the South yard and the North yard.

23. 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 ocean-going 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 and fabricated midbodies.

Norfolk Shipbuilding is currently building a large seagoing self-propelled hopper dredge for the U.S. Army Corps of Engineers and a large ferryboat. Also under construction at Norfolk is the barge portion of an oceangoing tug/barge unit for Coordinated Caribbean Transport, Inc. (CCT). The now defunct Seatrain Shipbuilding Corporation had left this barge unfinished. It is scheduled for delivery by Norfolk in early 1981.

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 multifaceted 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 four marine railways 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 3,360 in July 1980, an increase of 500 compared to a year earlier.

Exhibit 26 is a current plan of the Berkley Plant, the largest of the company's three plants.

24. Sun Ship, Inc.

Sun Ship, located in Chester, PA, is a complete ship-building 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. Today, Sun is a world leader in the design and construction of roll-on/roll-off ships. In recent years, the yard has specialized in these vessels and medium-sized tankers of its own design. In addition to its shipbuilding, conversion, and repair activities, the company also engages in the manufacture of a wide variety of heavy industrial equipment including welded pressure vessels, plate work, machinery, oil refinery equipment, and bridge structures.

New construction contracts underway as of October 1, 1980, at Sun Ship comprise the following: three RO/RO containerships

for Waterman Steamship Corp.; two product tankers for a subsidiary of the Sun Company; two 130,000-cubic-meter LNG carriers for Pacific Lighting Marine (conditional contract); and a 687-foot (209 m) sugar barge for C&H Sugar Company. In September of this year, the company subcontracted to Bath Iron Works the construction of a large seagoing diesel-propelled hopper dredge. In August 1980, Sun delivered a 720-foot (220 m) containership, the KAUI, to Matson Navigation Company.

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 has 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, a new plate burning shop, and other shipbuilding support facilities. The new level shipbuilding slab has two sections. It is serviced by two 250-ton (227 metric ton) gantry cranes and three 75-ton (68 metric ton) gantry cranes. Two halves of a ship as large as 1,400 feet by 195 feet (427 m by 60 m) can be constructed, or two smaller vessels 700 feet (213 m) in length or less can be built simultaneously. For launching, each half of a large ship is rolled individually to sections of the new drydock and then welded together in the river. The ship is brought to the pier for outfitting completion. Sun's new drydock, which is capable of handling vessels up to 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 is used for both construction and major repair work.

A new modernization and expansion program, recently completed, improves the yard's fabrication shop facilities, which are now capable of approximately a 60,000-ton (54468 metric ton) annual steel throughput. This program included: (1) installation of automated shape handling and preparation system; (2) automated panel line; (3) automated assembly line; (4) improving and enlarging the subassembly area; and (5) overall improvement of general working conditions in the fab shop.

In addition to the new shipbuilding platform, the company operates two active 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 3,900 feet (1189 m) of usable berthing space with modern pierside facilities.

The shipyard's total work force at mid-1980 was 4,100, a slight increase over a year earlier.

Exhibit 27 is the latest available layout of plant and facilities at Sun Ship. However, it does not show facilities improvement currently underway, such as extension of Slab A from 700 feet (213 m) to 1,000 feet (305 m).

25. 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. During the Viet Nam conflict, this shipyard renovated and reactivated several Victory ships and played a major role in the upgrading of the Military Sealift Command tanker fleet. 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 facility. Since 1975, the yard has been building barges to complement its repair business. The most recent delivery was a coal barge for Electric Fuels Corporation, completed in 1978. Currently, Tampa is actively pursuing ship construction, repair, and overhaul contracts.

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, including a 90-ton (82 metric ton) crane. 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 mid-1981. Two existing slips, each measuring 1,200 feet by 80 feet (366 m by 24 m), are being reconstructed into a combination wet berth/grading 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 new 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-1980 employment at this Florida shipyard was down to 700, compared to about 1,100 in July 1979.

Exhibit 28 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.

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 1980, Todd-Galveston delivered a large oceangoing tank barge and some smaller barges; but as of October of this year, there was no new construction work on order.

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 15,000-ton (15240 metric ton) floating drydock. The indoor fabrication plant is equipped with a 400-ton (363 metric ton) overhead crane. Manufacturing space totals 228,766 square feet (21252 m²).

Todd's Galveston Division operates a floating drydock that 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 5 tons (4.5 metric tons) to 75 tons (68 metric tons), which also service the platen areas. For use throughout the yard, three rubber-tired truck cranes with lifting capacities of up to 50 tons (45 metric tons) are also available. 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, about a mile (1.6 km) away, which provides more than 90,000 square-feet (8361 m²) of covered manufacturing space serviced by two 200-ton (182 metric ton) overhead cranes which combine to make 400-ton (363 metric ton) lifts possible. The Southwest plant is used principally for steel fabrication and hull erection and is equipped with a 212-foot by 85-foot (65 m by 26 m) covered slip.

Todd Shipyards Corporation has authorized acquisition of a new 40,000-ton (40640 metric ton) drydock at the Galveston Division. The new drydock will provide repair and maintenance services to vessels up to about 225,000 dwt. Completion is scheduled for April 1982.

In July 1980, Todd-Galveston's work force totaled 737, compared to about 900 at mid-1979.

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 1953 specialized in the design and construction of barges, towboats, dredges, crewboats, drilling structures, and other equipment for the offshore petroleum industry. During this 27-year period more than 400 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, 1980, the new construction backlog consisted of two cement barges, an oil barge, and a crane barge; and 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.

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 than 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 m²) 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 1980 was 488, compared to 436 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 re-entering the new construction and conversion field in the late 1950's, the yard has completed the following contracts: conversion of the DIAMOND MARINER to the attack transport PAUL REVERE; construction of five large cargo ships, four product tankers for charter to Military Sealift Command, and four product tankers for Zapata; construction of two guided-missile frigates and seven destroyer escorts for the U.S. Navy; construction of four forebodies and joining them to reconditioned stern sections as Sea-Land containerships; and jumboizing and upgrading the fleet oiler ASHTABULA. In 1977, the yard completed a 475-foot (145 m) forebody for an anhydrous ammonia carrier for Collier Carbon and Chemical Corporation.

In October 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 guided-missile frigate (FFG) program. As of October 1, 1980, the yard had on order or under construction a total of 11 of these sophisticated guided-missile frigates (FFG-7 class) which will provide employment to mid-1984. The first frigate, the WADSWORTH (FFG-9), was delivered to the Navy in April 1980, and a second was completed in August 1980. Todd-LA generates about 85 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, drydocks, piers and shops. Looking ahead, the parent organization is continuing to make substantial capital investments to further improve the effectiveness of its Los Angeles Division.

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 550 feet by 80 feet (168 m by 24 m).

With 4,800 feet (1463 m) of berthing space available at six wharves, and a full complement of shops and related facilities, the Todd shipyard can carry out all types of repairs and conversions, in addition to new construction.

Total employment at the yard was 4,570 at mid-1980, up from 3,124 a year earlier. The current manpower level is this shipyard's highest since 1970.

Exhibit 31 is a current 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 six-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 a series 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 looked bleak in 1976 when the Navy awarded Todd its first contracts under the guided-missile frigate (FFG) program. As of October 1, 1980, the Seattle yard had 11 of these frigates on order or in production. The DUNCAN (FFG-10) was delivered in May 1980, and the second was scheduled for completion in November of this year. Three of these ships are for the Royal Australian Navy. The last of the 11 vessels on order is slated for delivery in late 1984.

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

Overall modernization has resulted in vastly improved facilities. Recent yard additions include a numerically controlled plasma arc burning system that cuts steel plate at five times the speed of gas. A new facility for nondestructive testing was finished in 1976, completely updating the Division's NDT capability. Other capital improvements include a panel line, new steel shop, and a missile launcher erection building.

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 maintains three 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 1979 and March 1980, 104 vessels were drydocked for repairs. A large drydock in the range of 40,000 tons (40640 metric tons) lifting capacity is in the planning stage for the Seattle Division.

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.

Total employment at the Seattle plant was 4,680 in mid-1980, compared to about 3,770 in July 1979. The current work force is the yard's highest peacetime employment in its 64 years of existence.

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

30. 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 been awarded repair, conversion and overhaul contracts from commercial and Navy clients, such as repairs to the HUGHES GLOMAR EXPLORER, activation of two Malaysian LST's, and overhaul of Navy auxiliaries. In 1977, the company completed reconstruction of four American President Lines containerships (MA Design C6-S-85b).

In 1978, Triple "A" completed the major overhaul of three frigates of the KNOX (FF-1052) class, the FANNING, HEPBURN, and COOK, as well as the overhaul of the combat stores ship MARS (AFS-1).

During 1979, the yard finished the major overhaul of the Navy replenishment oiler WICHITA (AOR-1) and the conversion and overhaul of two American President Lines cargo ships, the

PRESIDENT TYLER and PRESIDENT LINCOLN. In 1980, the only major overhaul job underway was the Navy repair ship HECTOR (AR-7). This \$16.4 million contract was completed in October of this year; and only general ship repair work remained for the dwindling labor force.

In the sprawling Hunters Point yard, there is pier space totaling about 24,000 linear feet (7315 m), 21 repair berths, 19 deep-water berths, and 40 tie-up berths. The yard has six graving docks with sizes ranging from 420 feet by 60 feet (128 m by 18 m) to 1,092 feet by 140 feet (333 m by 43 m). Equipment includes 20 whirley cranes, a 300-ton (272 metric ton) gantry crane, and 19 fully-equipped shop buildings totaling 1,424,000 square feet (132290 m²).

In September 1980, employment at the yard totaled about 280, down from 1,100 a year earlier.

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

Employment

Total employment during the past four 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 January	172,100
1980 February	173,100
1980 March	172,800
1980 April	171,900
1980 May	169,400
1980 June	168,100
1980 July	169,200
1980 August	164,200
1980 September (Preliminary)	168,800

The Maritime Administration monitors employment in the 25 major U.S. privately owned shipyards in the active shipbuilding base (as identified in Exhibit 37) 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 40, the most recent industry workload projection, prepared by MarAd's Office of Ship Construction, presents a gloomy outlook for employment in the 25 major yards in the active shipbuilding base through 1981, during which it is anticipated that several thousand production workers could be laid off. However, during the 1982 - 1986 time span, shipyard employment is expected to show an overall improvement.

Material Shortages

The shipbuilding and repair industry is heavily dependent on 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 the fall of 1980, the steel industry was operating at about 80 percent of capacity. 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 1980.

Lead times for ship components, with a few exceptions, were also stable during the year; but 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 DO-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.

During 1980, some of the activities of these committees included:

- o Assisting an EPA-funded contractor in a study of hydrocarbon emissions from shipyards as a result of painting;
- o Commenting on EPA guidelines for the shipbuilding industry hazardous waste management programs;
- o Commenting on the OSHA abrasive blasting standard;
- o Commenting on an evaluation of the outercoating compounds on ships' hulls along with the associated blasting media for their potential as a hazardous waste due to toxicity;
- o Commenting on a bill to amend the Federal Water Pollution Control Act relating to civil penalties; and
- o Commenting on an EPA draft report on proposed effluent limitation guidelines and standards for the shipbuilding and ship repair industry.

Also discussed by the committees were:

- o Developments in the field of toxic substances, especially algacides and boiler compounds;

- o The U.S. Senate Endangerment Bill;
- o Solid waste disposal;
- o U.S. Coast Guard waterfront facilities regulations relating to barges and ships under repair; and
- o Proposed PCB regulations.

In July 1980, the Maritime Administration released the results of its comprehensive study of asbestos in a paper titled "Environmental Assessment for the Control of Asbestos Hazards in MarAd Programs." The purpose of this paper is to completely prevent or minimize the exposure of Agency and non-Agency personnel to airborne asbestos fibers while involved in any of MarAd's program functions.

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 61 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 76 floating drydocks, 47 graving docks, and several marine railways. However, many 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 repairs, 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. Forty-five are located on the East Coast, 18 along the Gulf Coast, 18 on the West Coast, and one on the Great Lakes.

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

o Newport News Shipbuilding

A major ongoing program to almost double the shipyard's submarine repair and overhaul capability involves constructing a new graving dock, enlarging and modernizing an existing graving dock, rebuilding piers, and installing larger capacity cranes;

o Norfolk Shipbuilding & Dry Dock Corporation

An expansion program consisting of a new 950-foot (290 m) floating drydock with a clear width of 160 feet (49 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. This expansion project was completed in 1979;

o Tampa Shipyards, Inc.

A new 900-foot by 150-foot (274 m by 46 m) graving dock. This drydock, leased from the Port of Tampa, became operational in 1978 and is the largest graving-type drydock on the Gulf Coast;

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; and

o Todd Shipyards Corporation

Either under construction or in the planning stage are new large floating drydocks for the company's shipyards in Galveston, Seattle, Los Angeles, and New Orleans.

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 will result in a workload increase through the mid-1980's 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 good and looking better than it has in some time. Many firms in the industry are readying their yards to take advantage of the prospective markets of the 1980's.

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 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 1980 on 39 of these 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 122 major topside repair facilities, 55 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 25 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 37 identifies and geographically locates these 25 yards. Exhibit 38 tabulates the number and contract value of commercial vessels and barges, large and small, under construction or on order as of September 30, 1980, in these shipyards; and Exhibit 39 indicates when each of the yards in the active shipbuilding base needed new contracts,

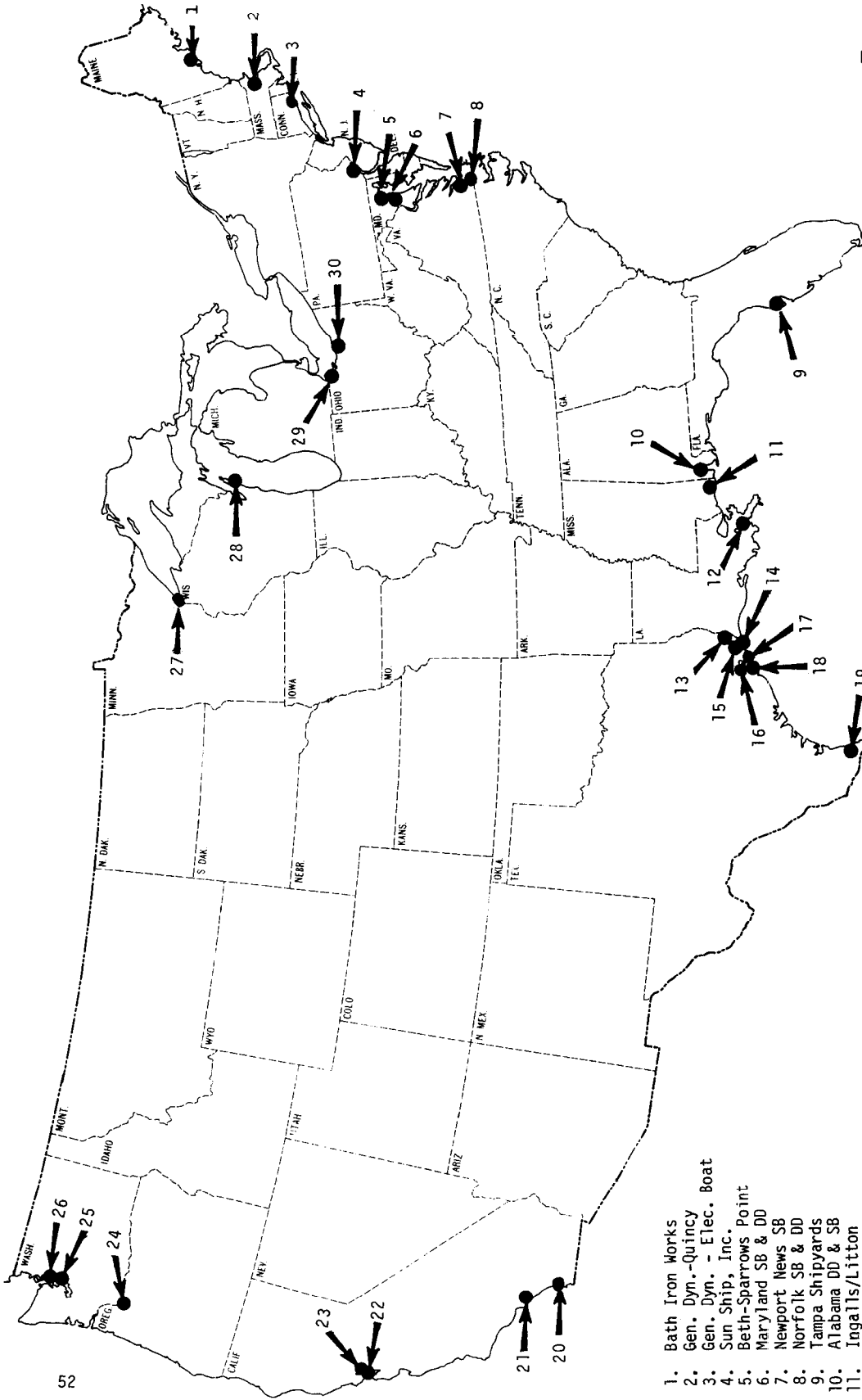
as of October 1, 1980, in order to maintain an adequate backlog for available facilities and work force. Estimates of need for new business are determined by the Maritime Administration based on methodologies developed for the Shipyard Production and Mobilization Model (SPAMM). Most of these yards presently 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 40. This data is generated by overlaying Navy, private, and CDS hypothetical 5-year shipbuilding programs onto the estimated work force required to complete the work on order. Work force levels are expected to continue to decline through 1981 with a modest upturn to begin in 1982. This upswing is attributed to an optimistic outlook for construction of small and medium size product tankers and the need to revitalize the bulk fleet. This forecast depends considerably on political stimuli, economic conditions, and other unpredictable factors.

SHIPBUILDING INDUSTRY IN THE UNITED STATES

EXHIBIT 1

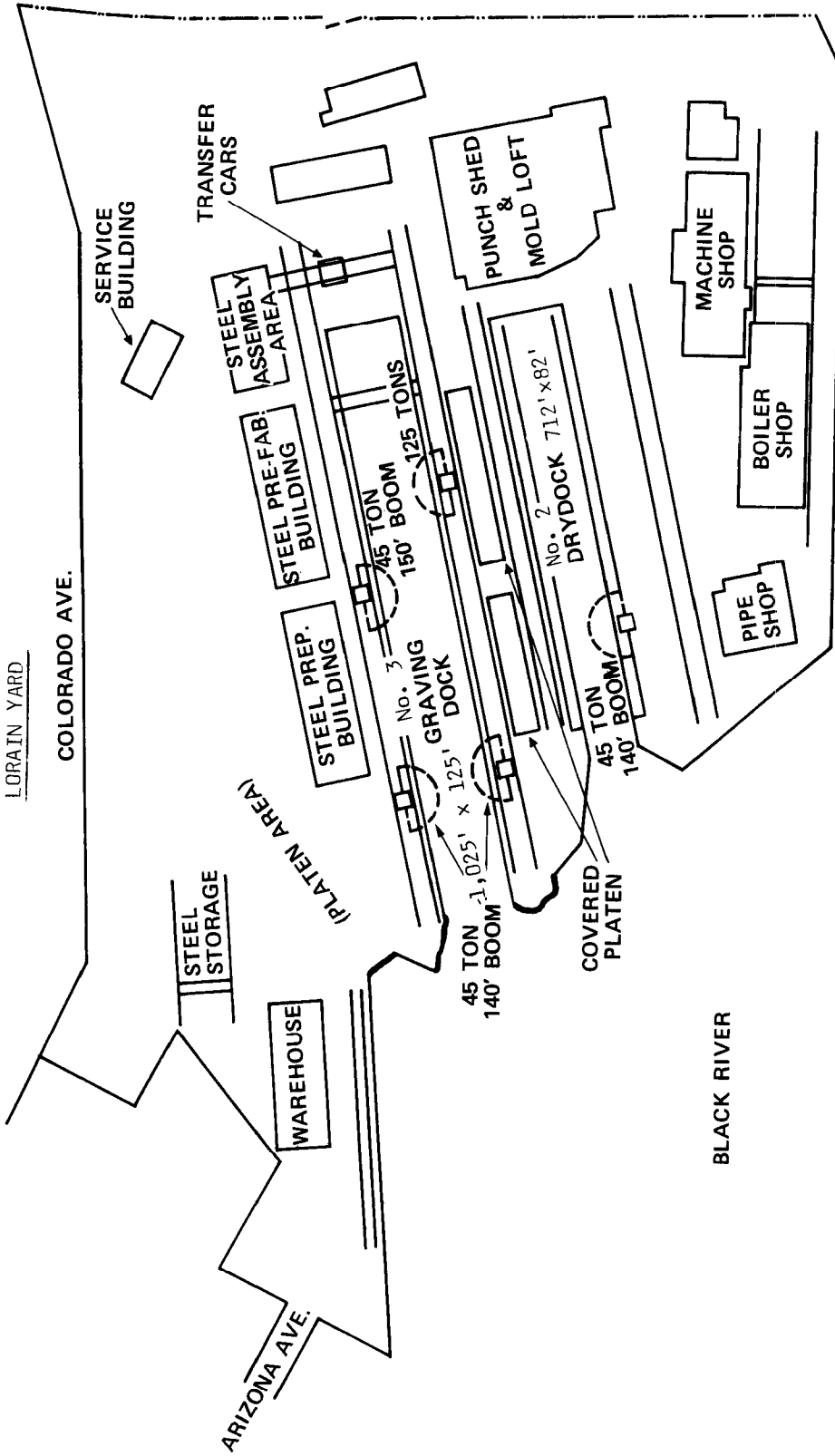


1. Bath Iron Works
2. Gen. Dyn.-Quincy
3. Gen. Dyn. - Elec. Boat
4. Sun Ship, Inc.
5. Beth-Sparrows Point
6. Maryland SB & DD
7. Newport News SB
8. Norfolk SB & DD
9. Tampa Shipyards
10. Alabama DD & SB
11. Ingalls/Litton
12. Avondale Shipyards
13. Livingston (Orange, TX)
14. Livingston (Gulfport)
15. 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

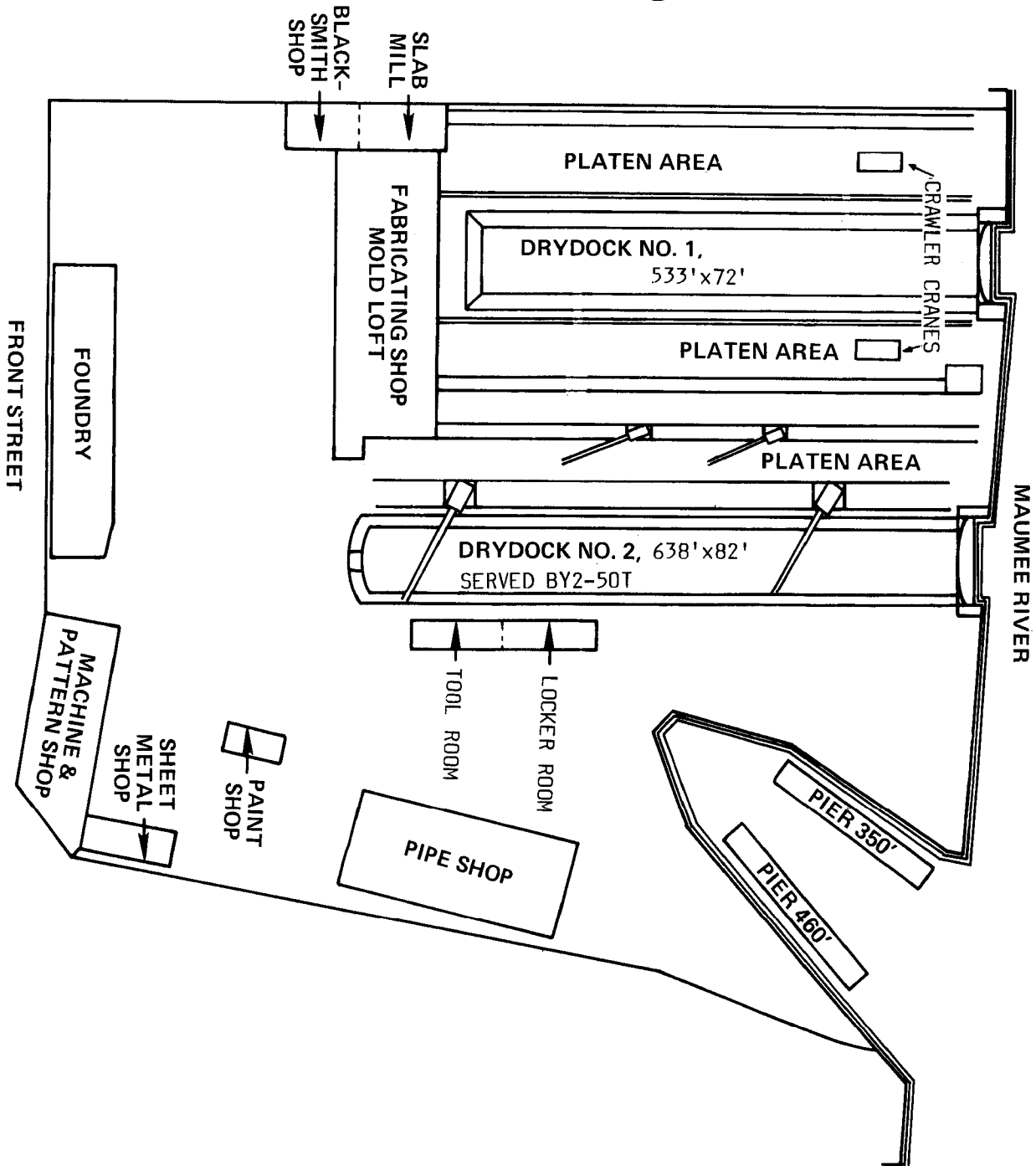
AMERICAN SHIP BUILDING CO.

LORAIN YARD



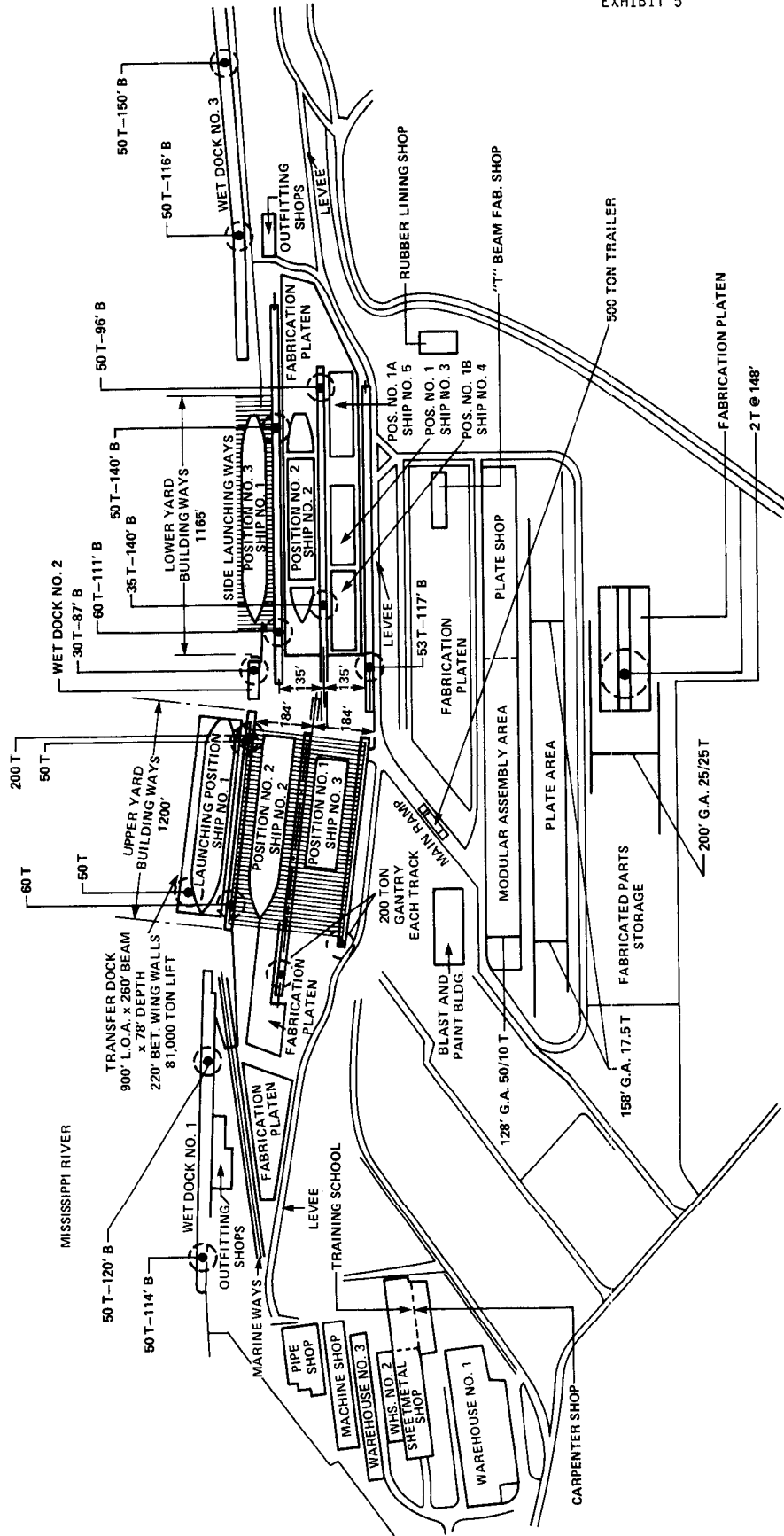
AMERICAN SHIP BUILDING CO. TOLEDO

EXHIBIT 4



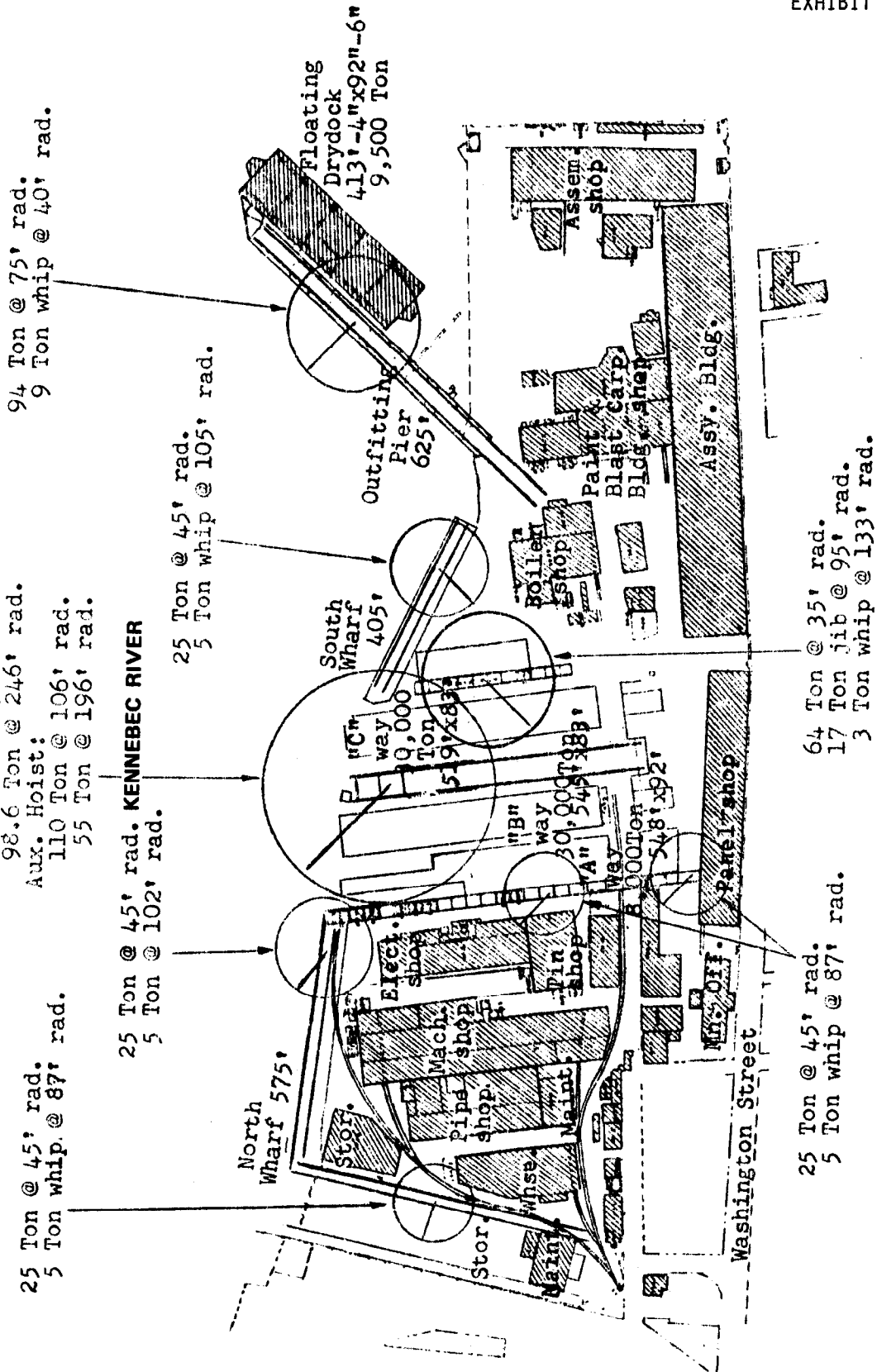
Avondale Shipyards, Inc.

EXHIBIT 5

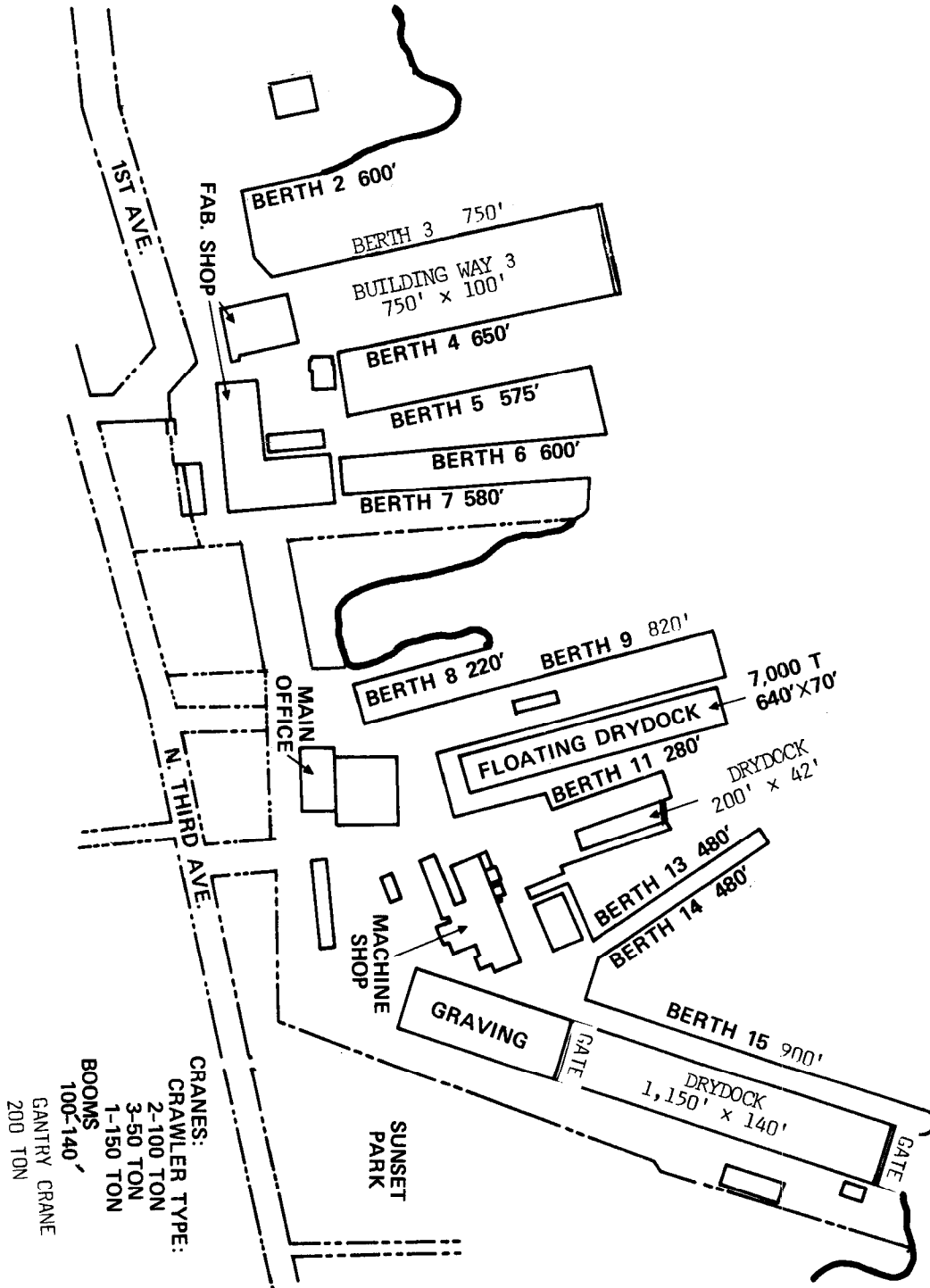


BATH IRON WORKS

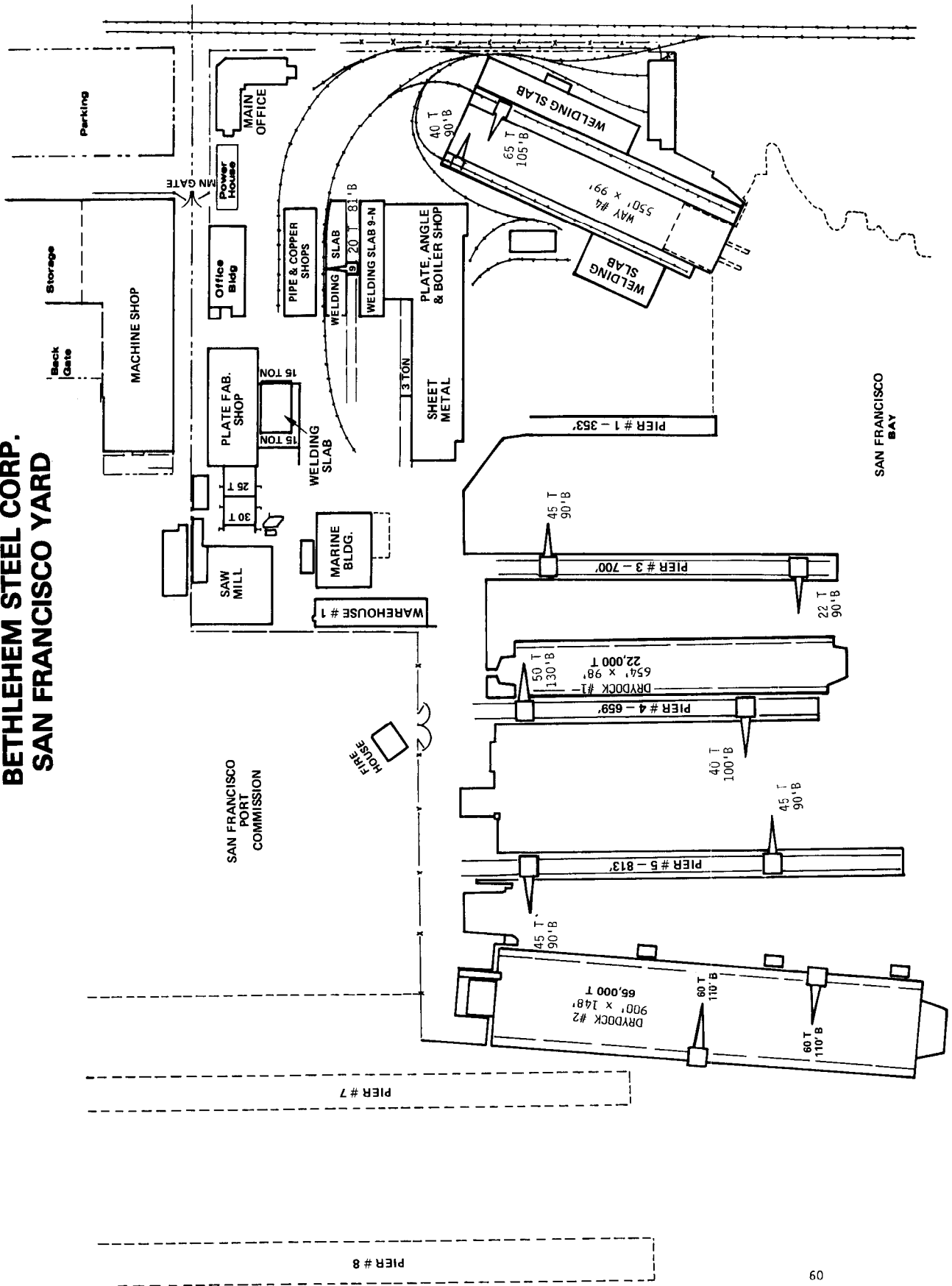
North
→



BAY SHIPBUILDING CORPORATION

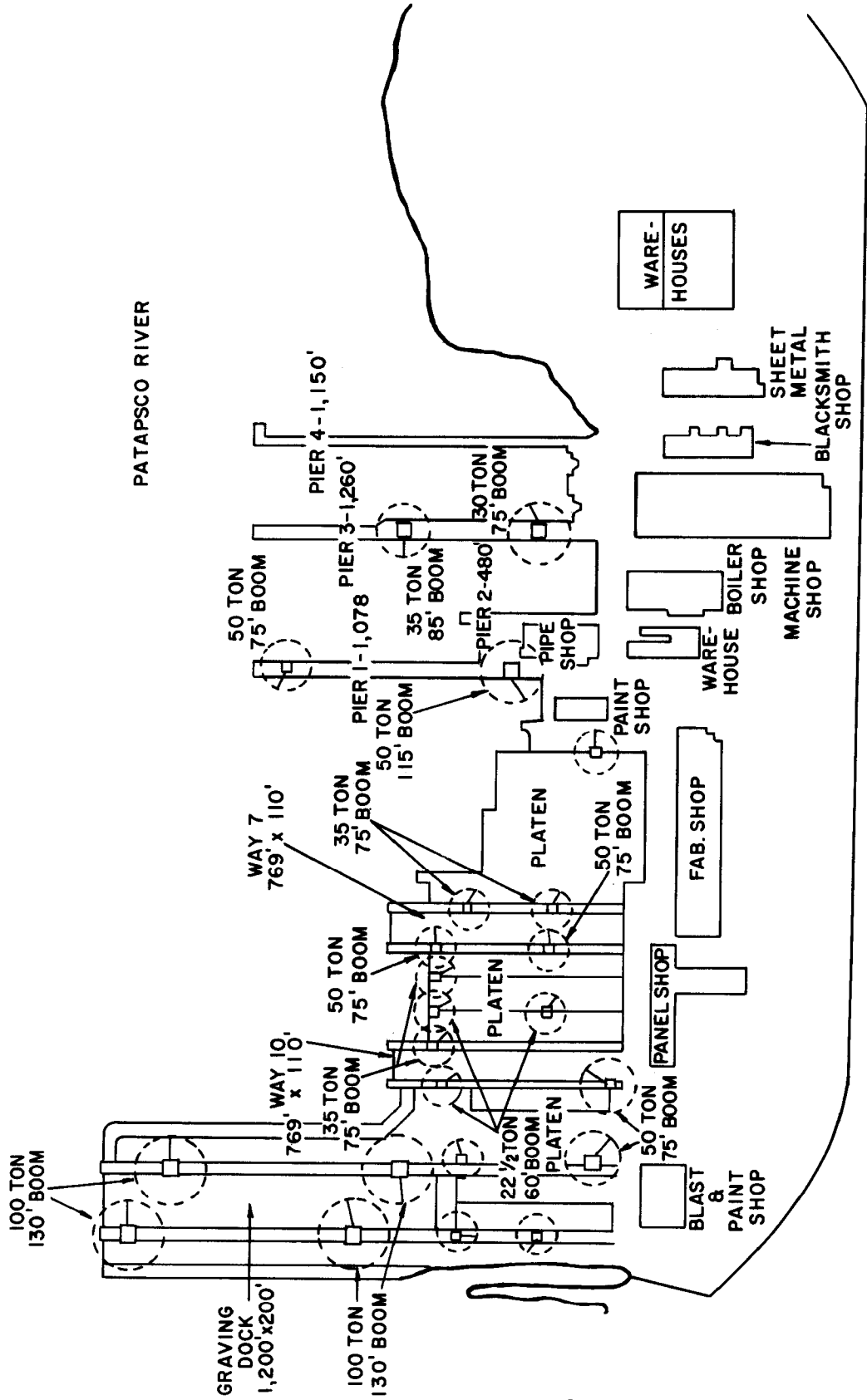


BETHLEHEM STEEL CORP. SAN FRANCISCO YARD

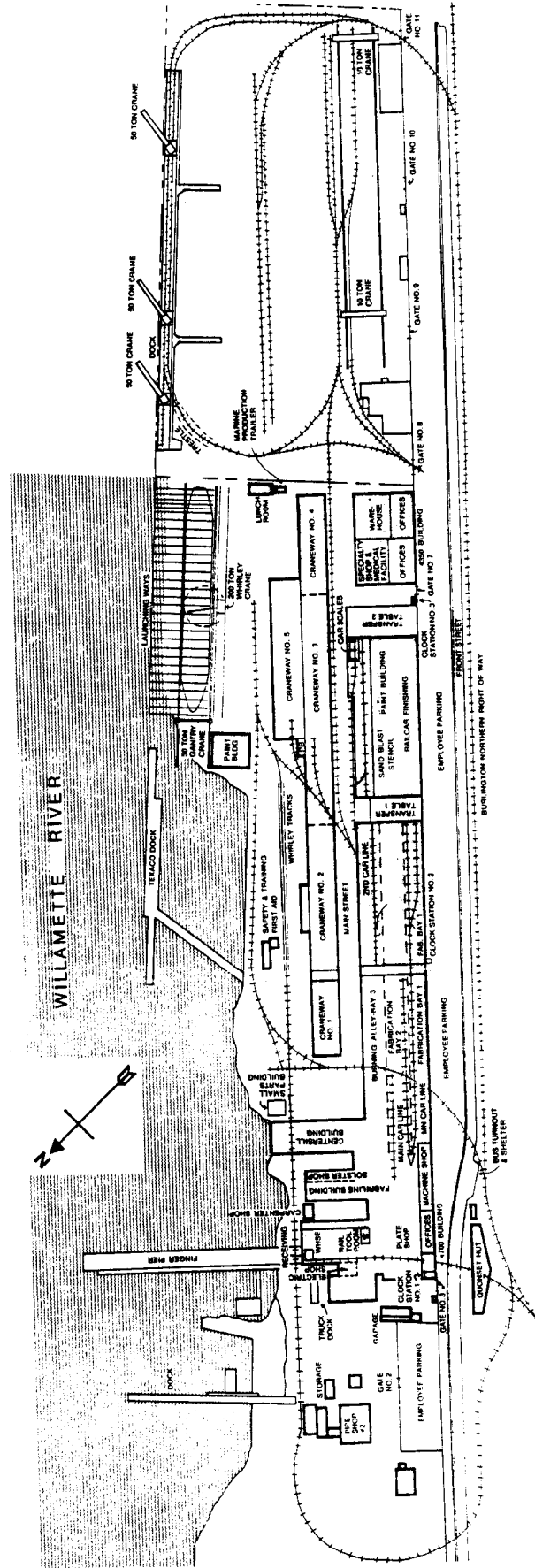


BETHLEHEM STEEL CORPORATION

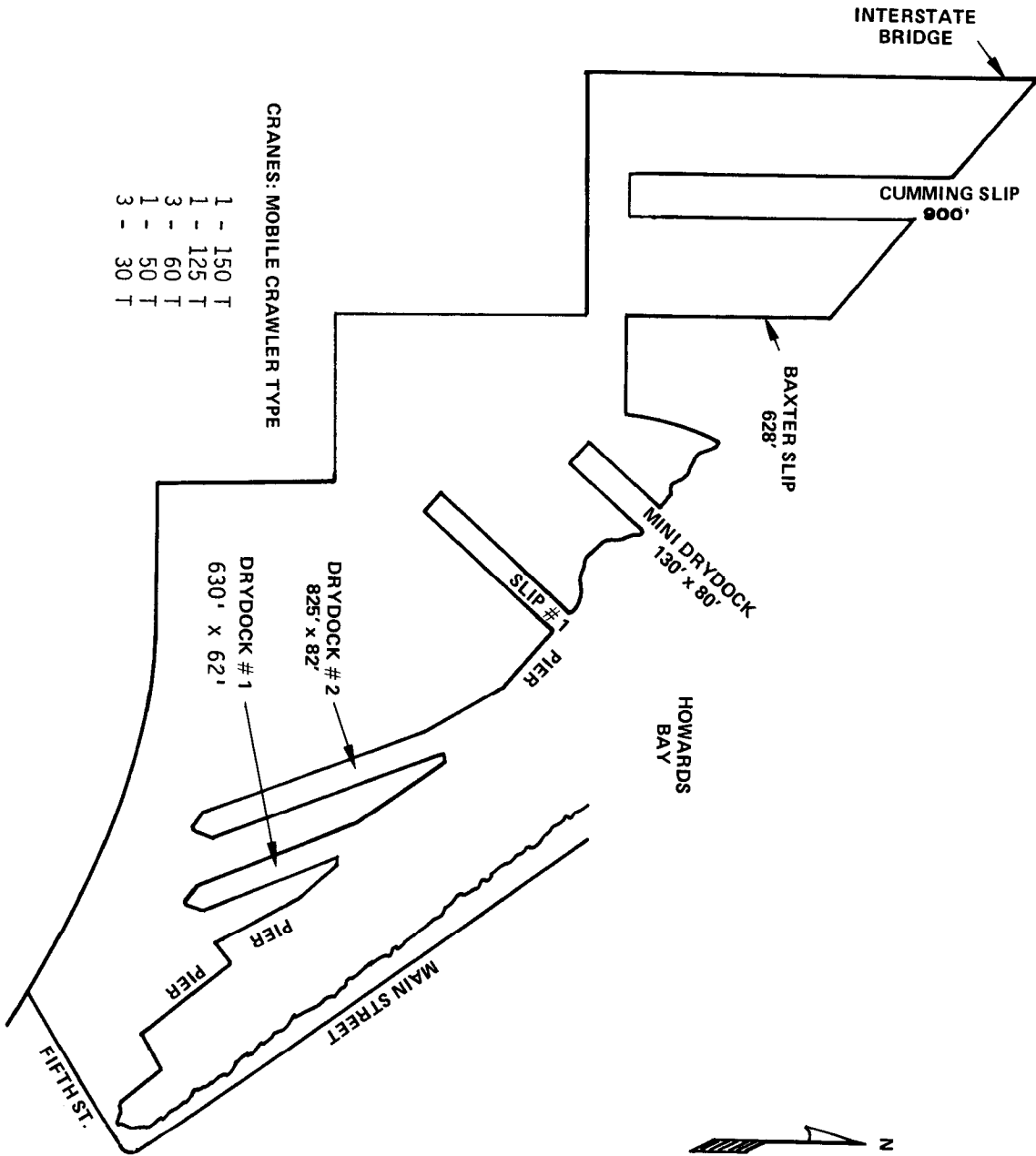
SPARROWS POINT YARD

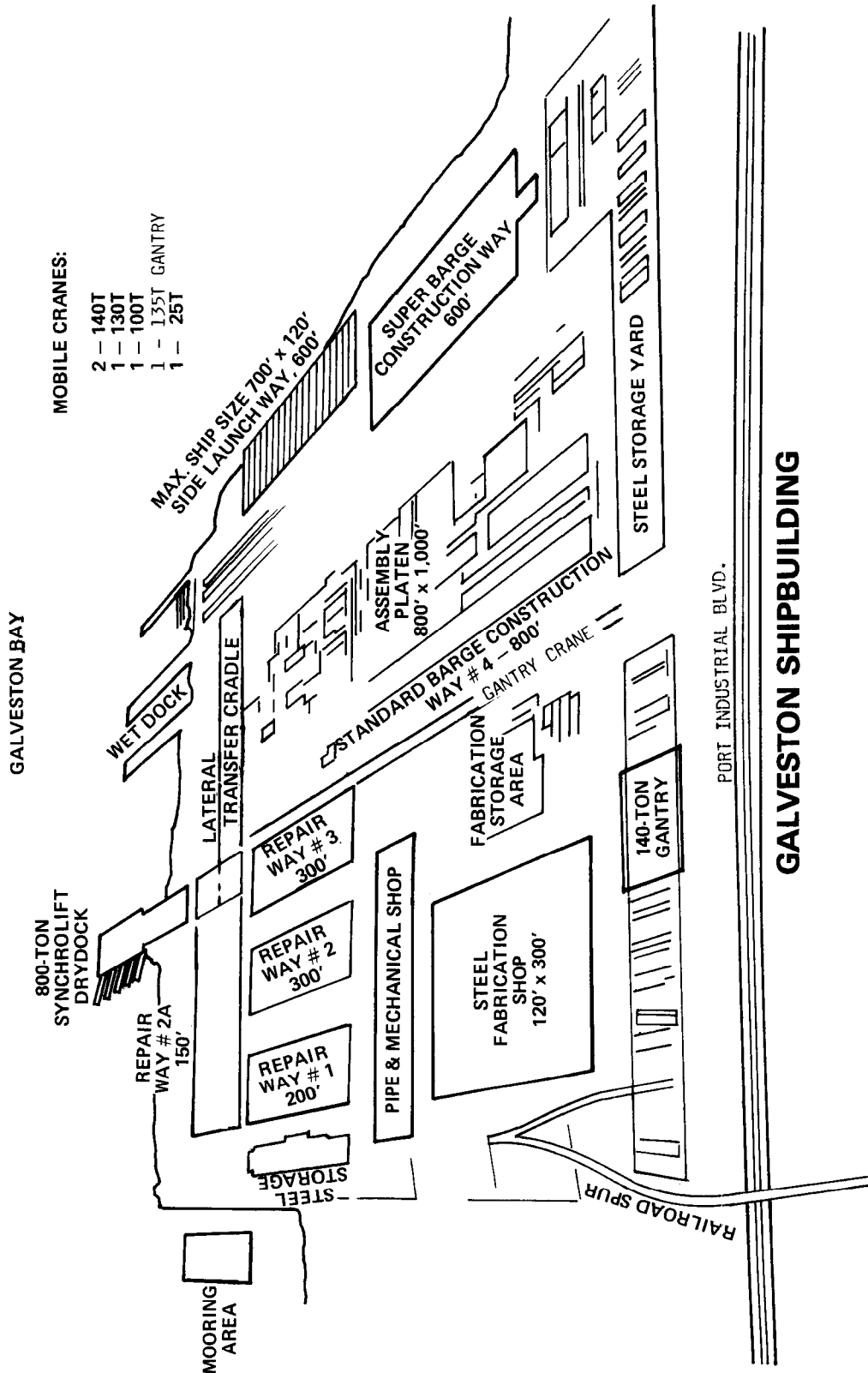


**FMC CORPORATION
Marine & Rail Equipment Division
Portland, Oregon**

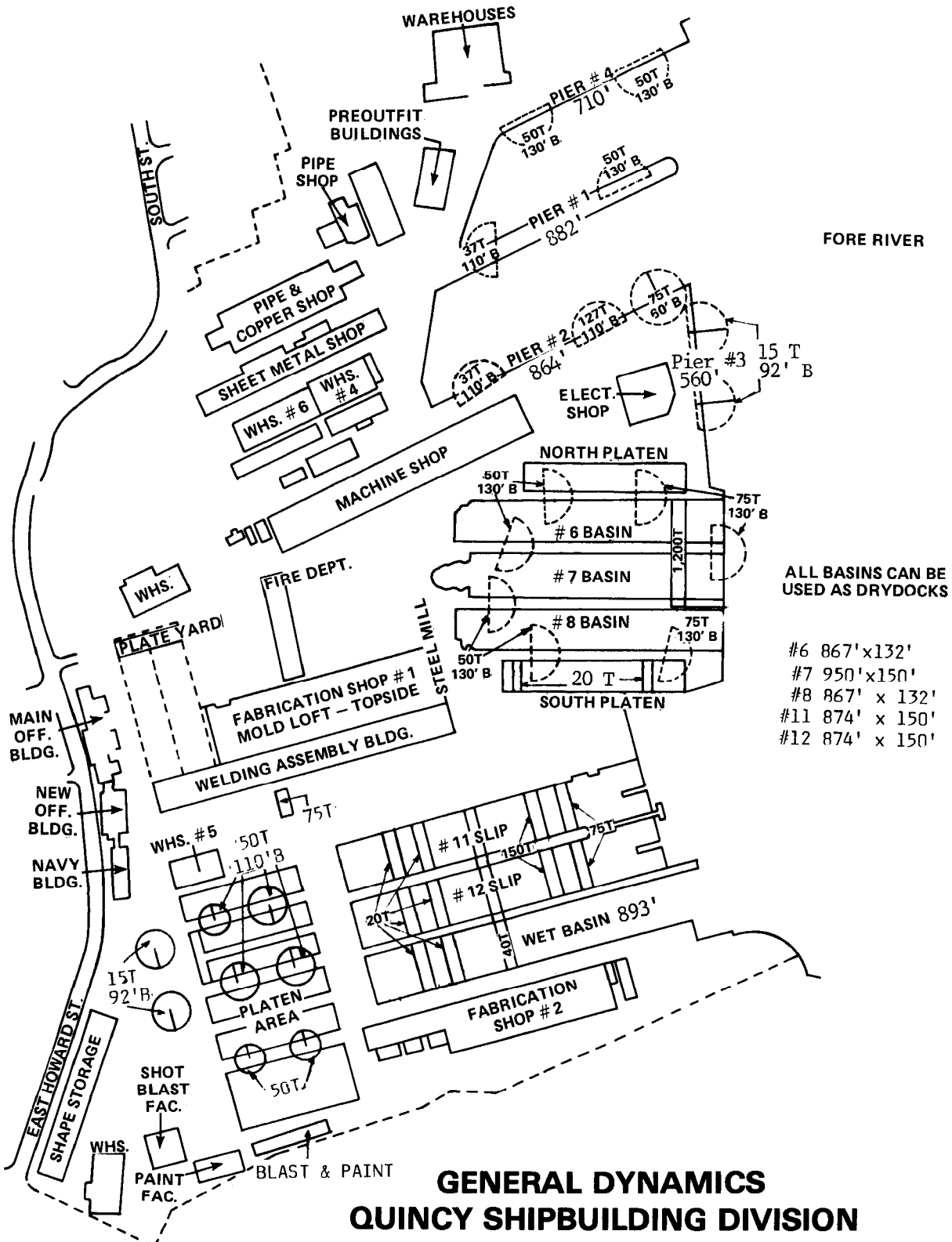


**FRASER SHIPYARDS, INC.
SUPERIOR, WISCONSIN**





GALVESTON SHIPBUILDING

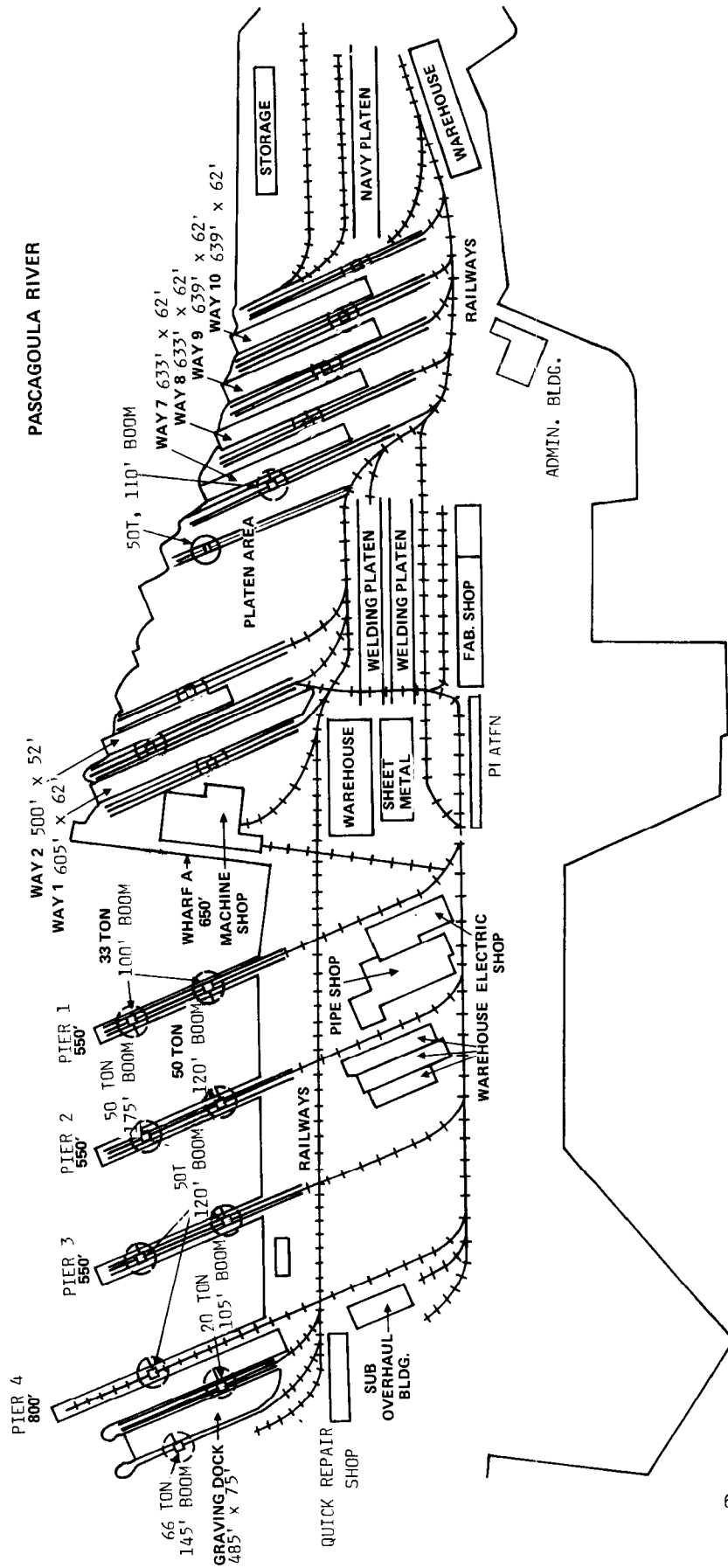


ALL BASINS CAN BE USED AS DRYDOCKS

- #6 867' x 132'
- #7 950' x 150'
- #8 867' x 132'
- #11 874' x 150'
- #12 874' x 150'

GENERAL DYNAMICS QUINCY SHIPBUILDING DIVISION

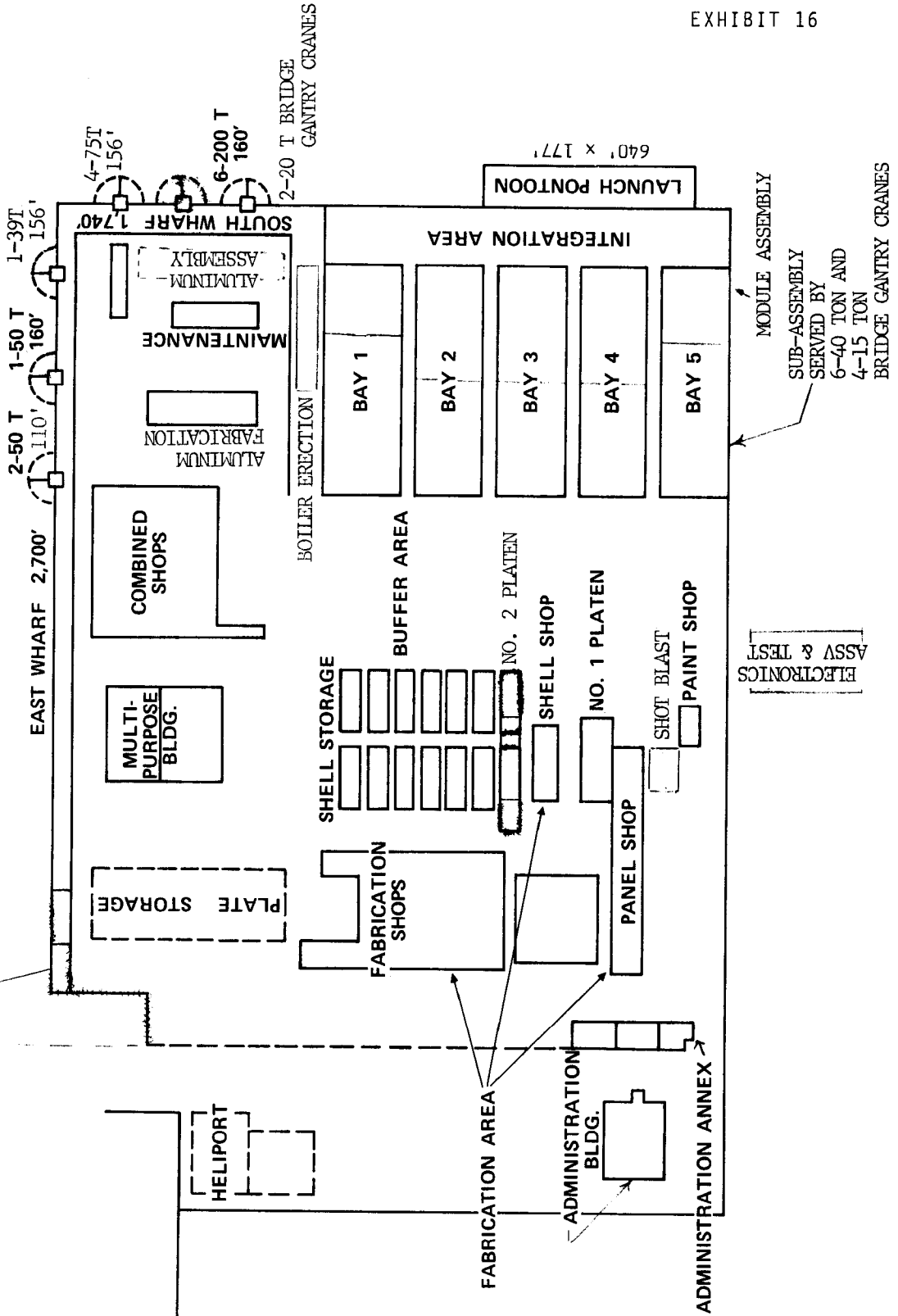
INGALLS SHIPBUILDING
DIVISION OF LITTON INDUSTRIES
EAST BANK FACILITY



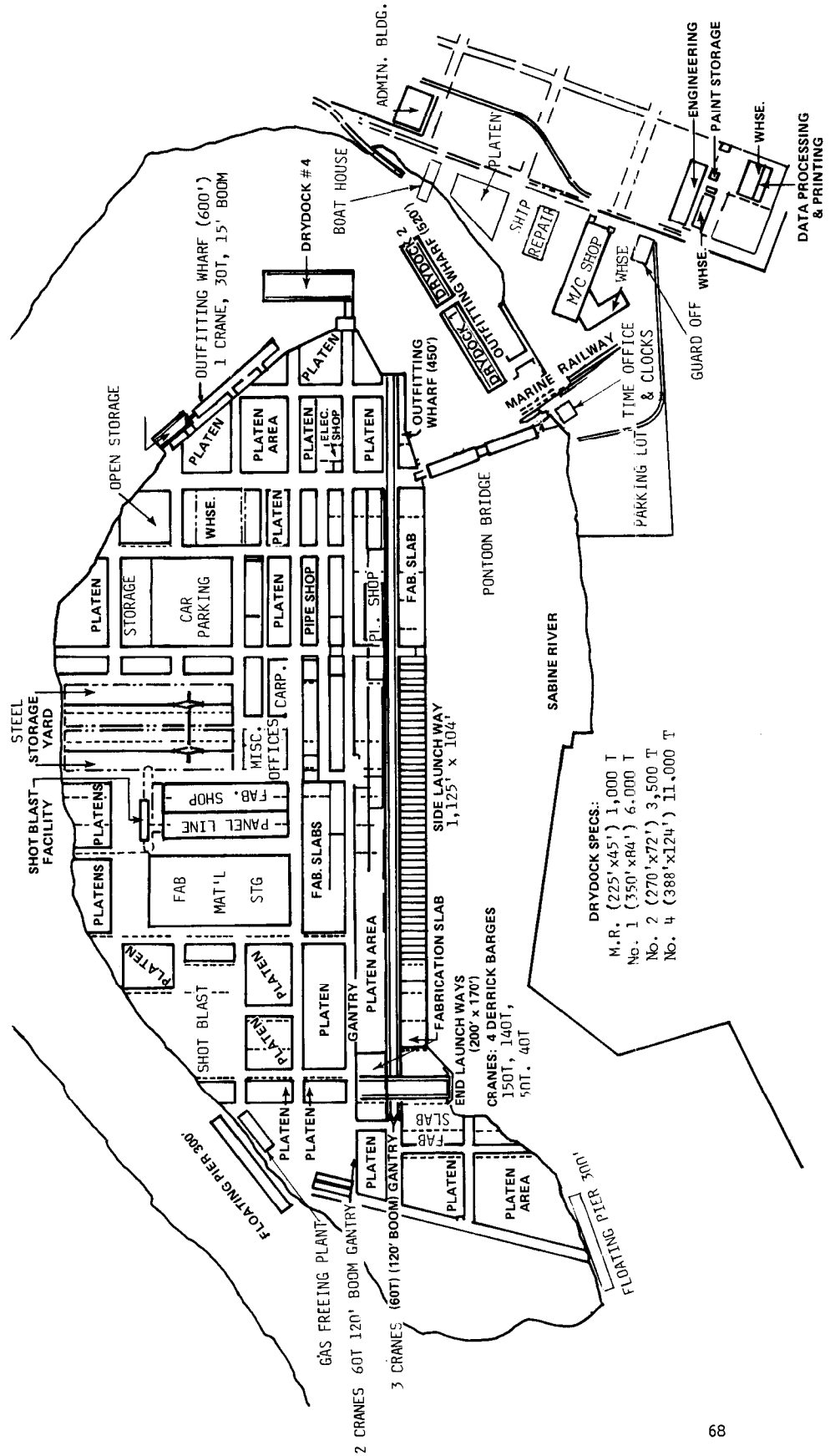
INGALLS SHIPBUILDING DIVISION OF LITTON INDUSTRIES

WEST BANK
PASCAGOULA RIVER

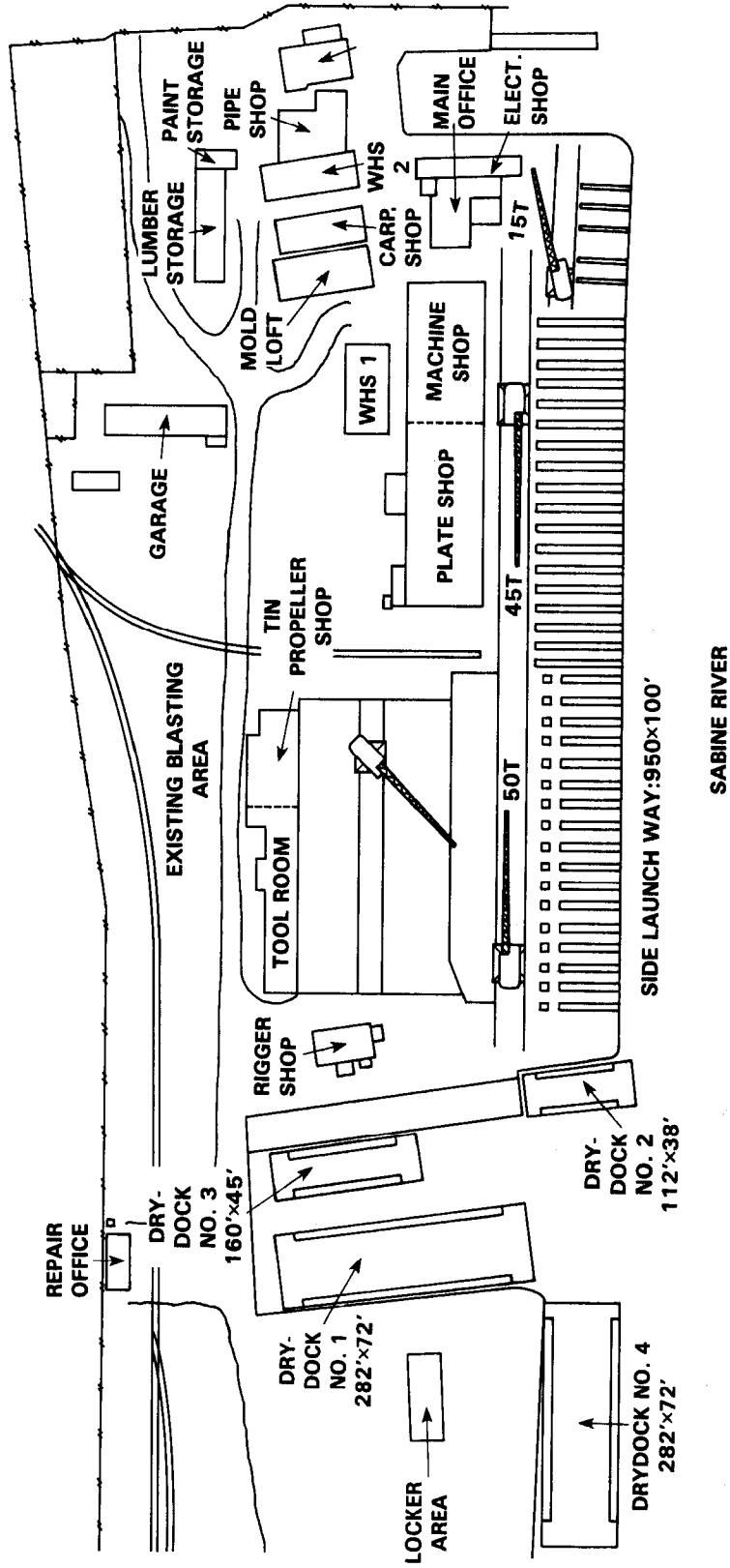
14-Whirley Cranes
Serve East & South Wharves,
Integration Area and Bays



LEVINGSTON SHIPBUILDING CO. ORANGE, TEXAS PLANT

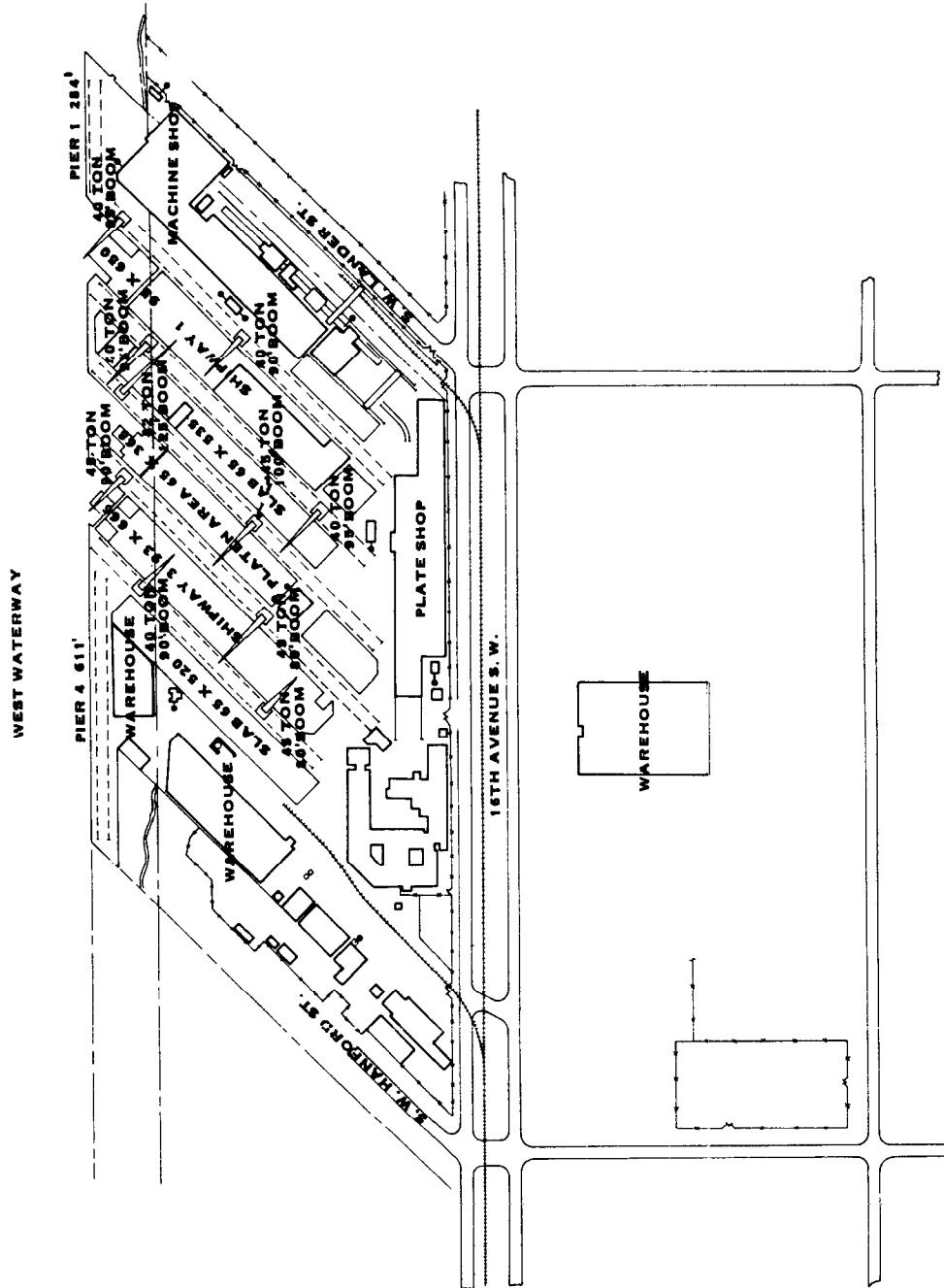


LEVINGSTON SHIPBUILDING CO.
GULFPORT SHIPBUILDING - PORT ARTHUR, TEXAS



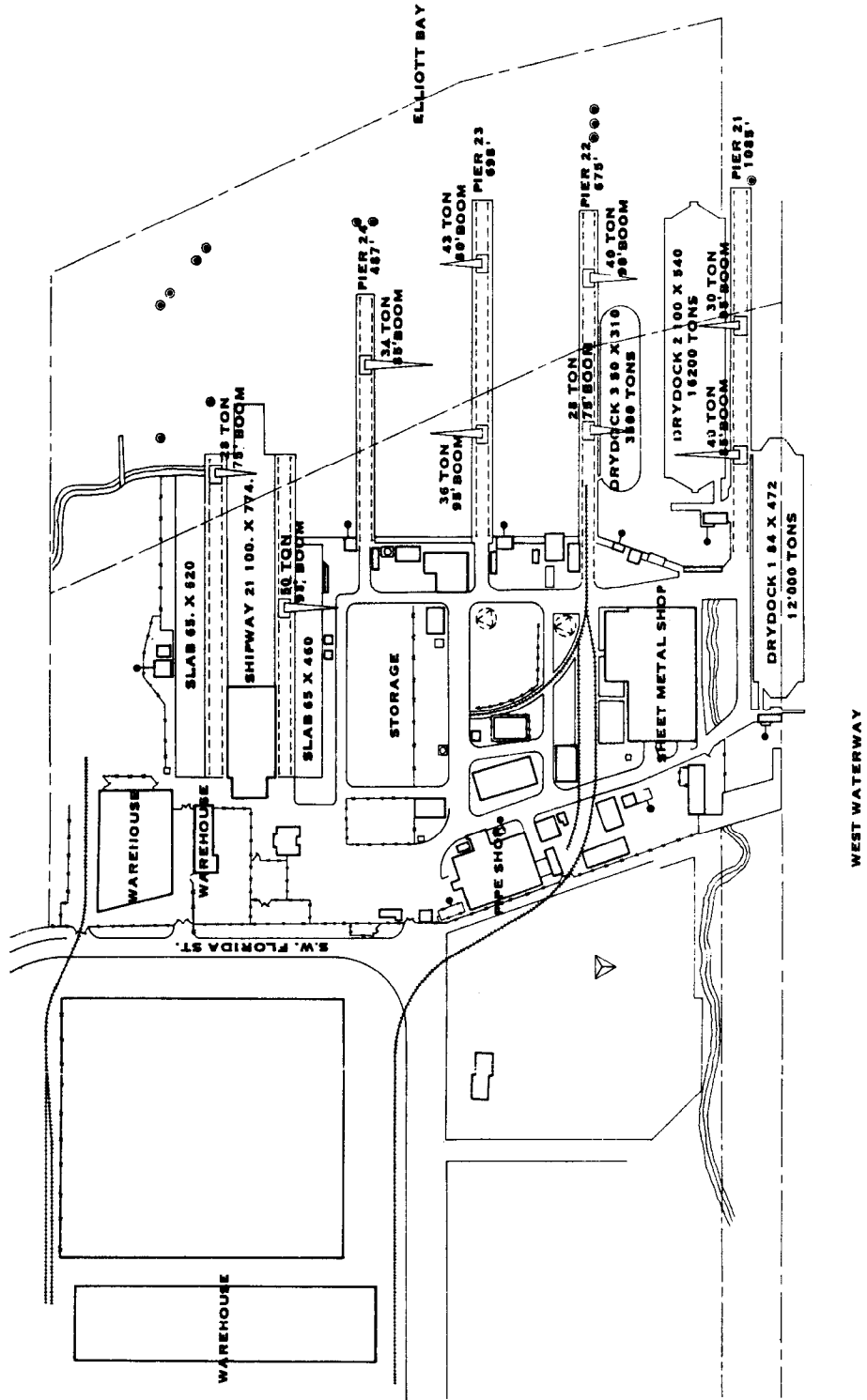
LOCKHEED SHIPBUILDING AND CONSTRUCTION COMPANY
PLANT ONE

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

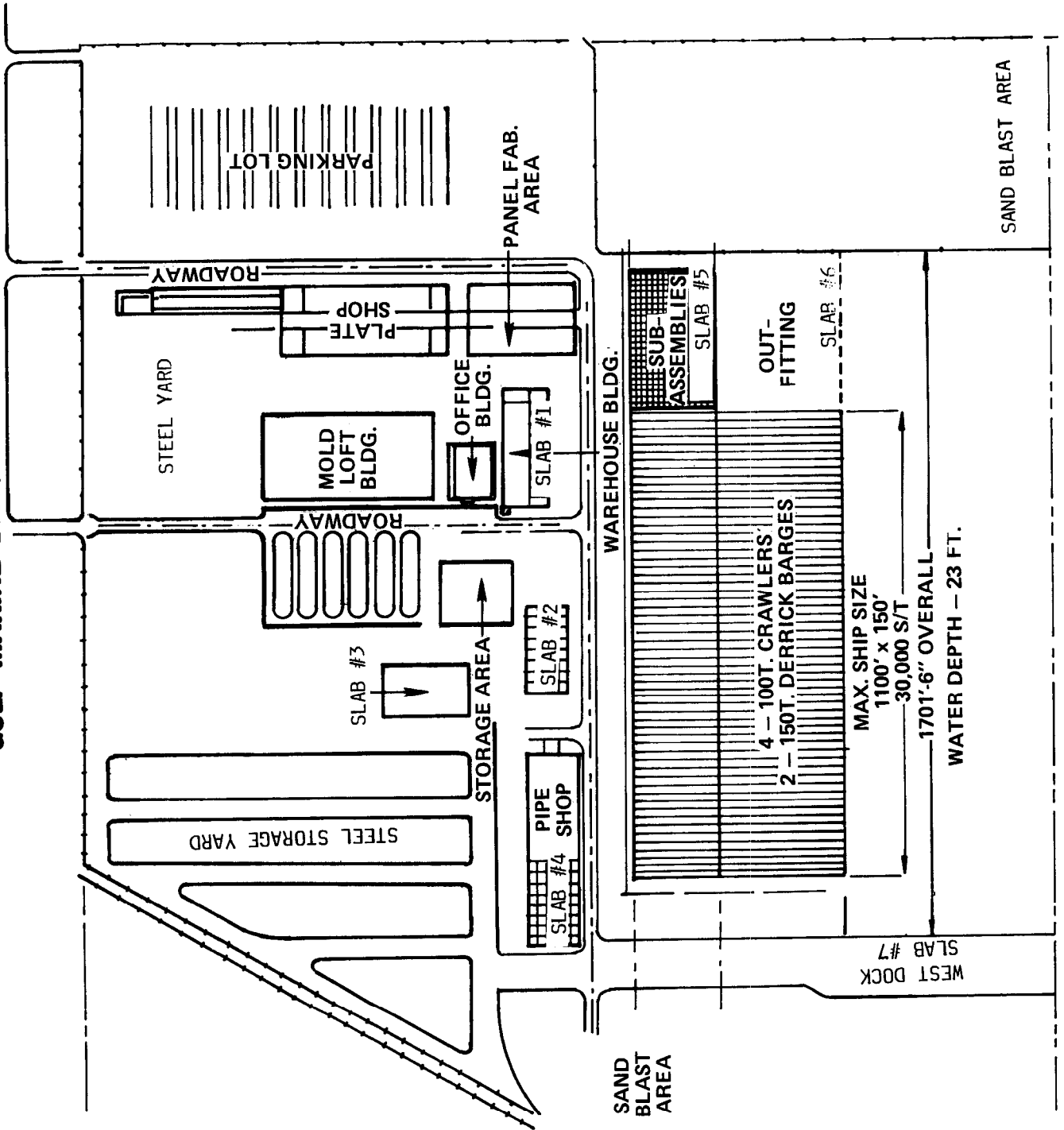


LOCKHEED SHIPBUILDING AND CONSTRUCTION COMPANY
PLANT TWO

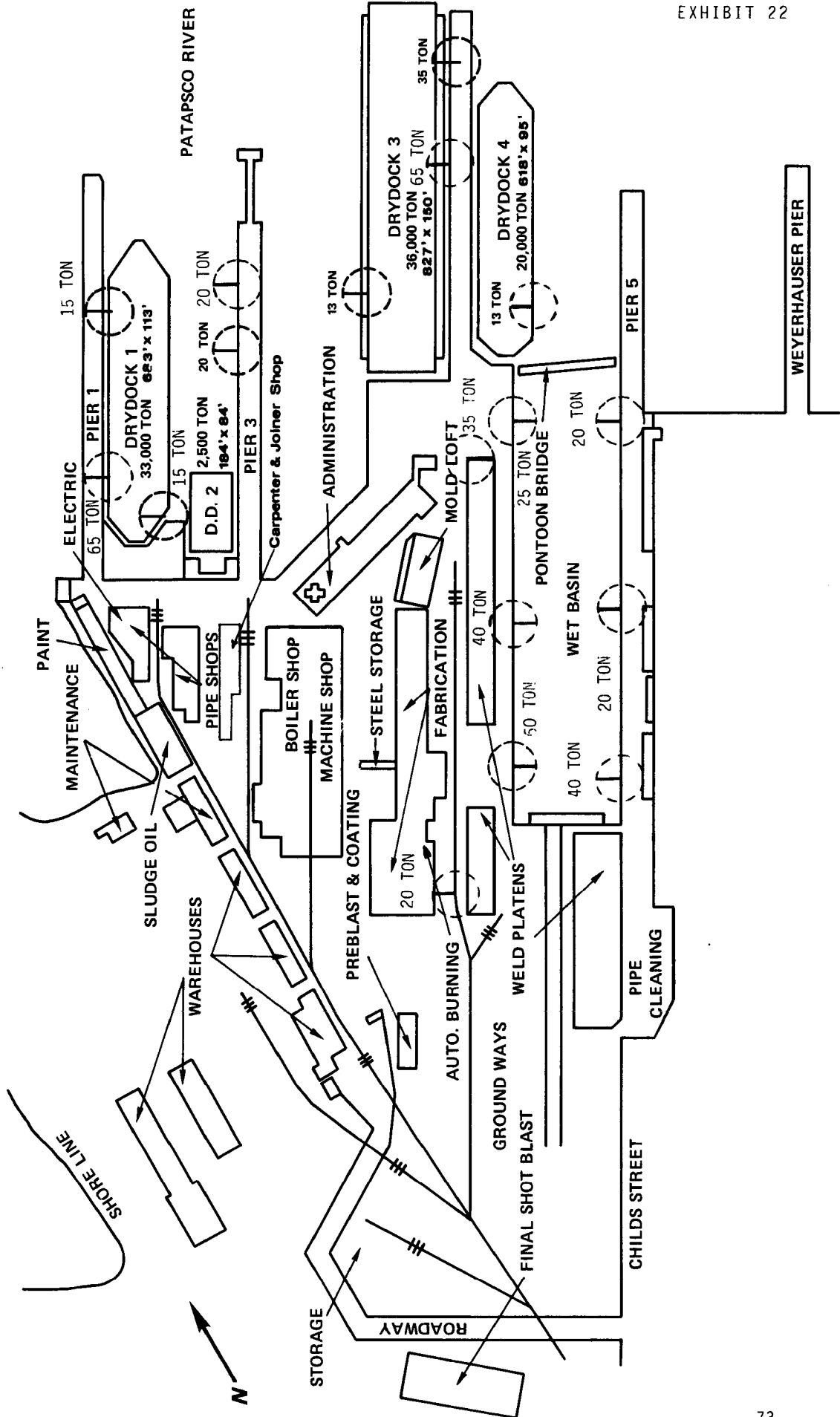
2550 S. W. FLORIDA, SEATTLE, WASHINGTON



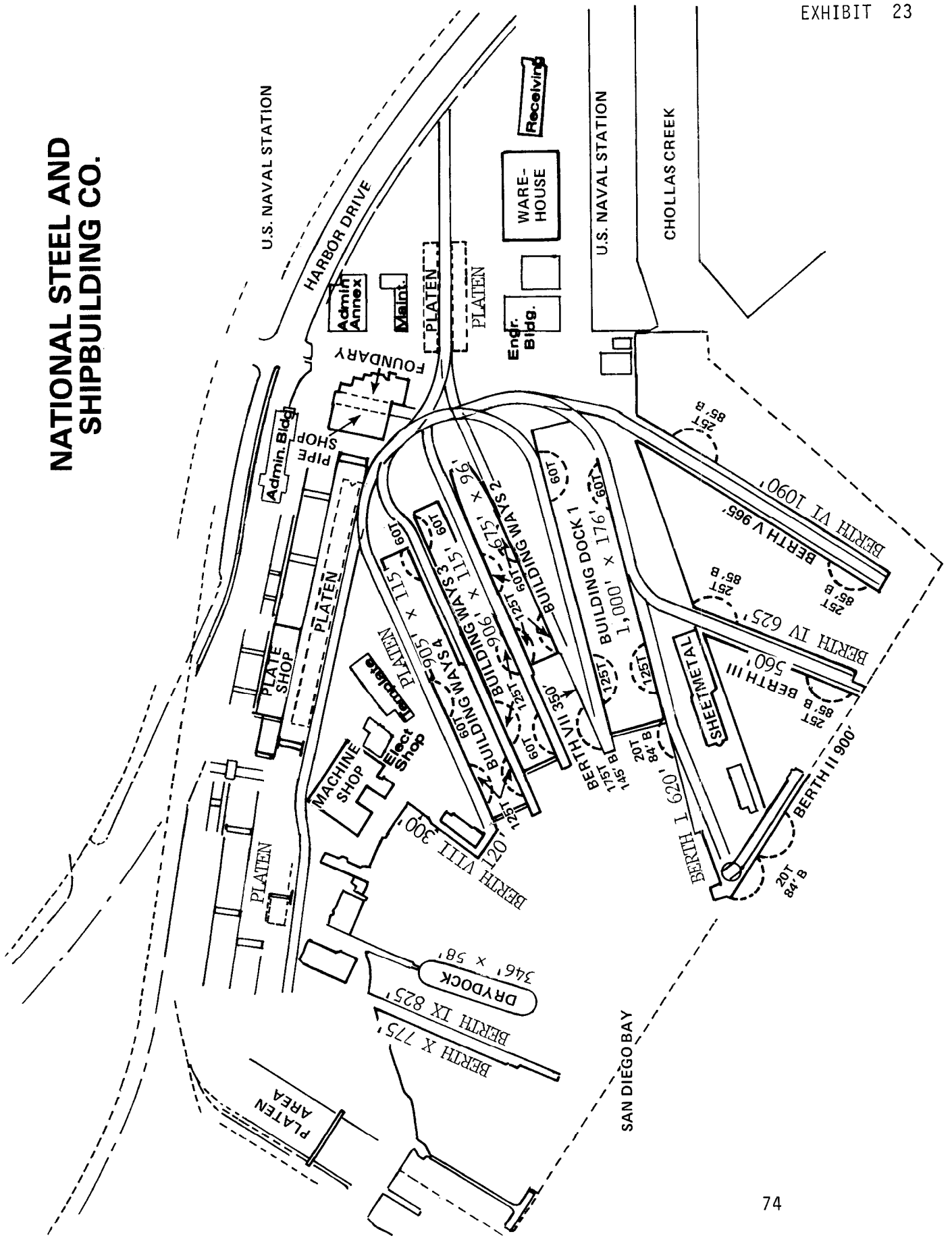
MARATHON LeTOURNEAU CO. GULF MARINE DIVISION



MARYLAND SHIPBUILDING & DRYDOCK CO.



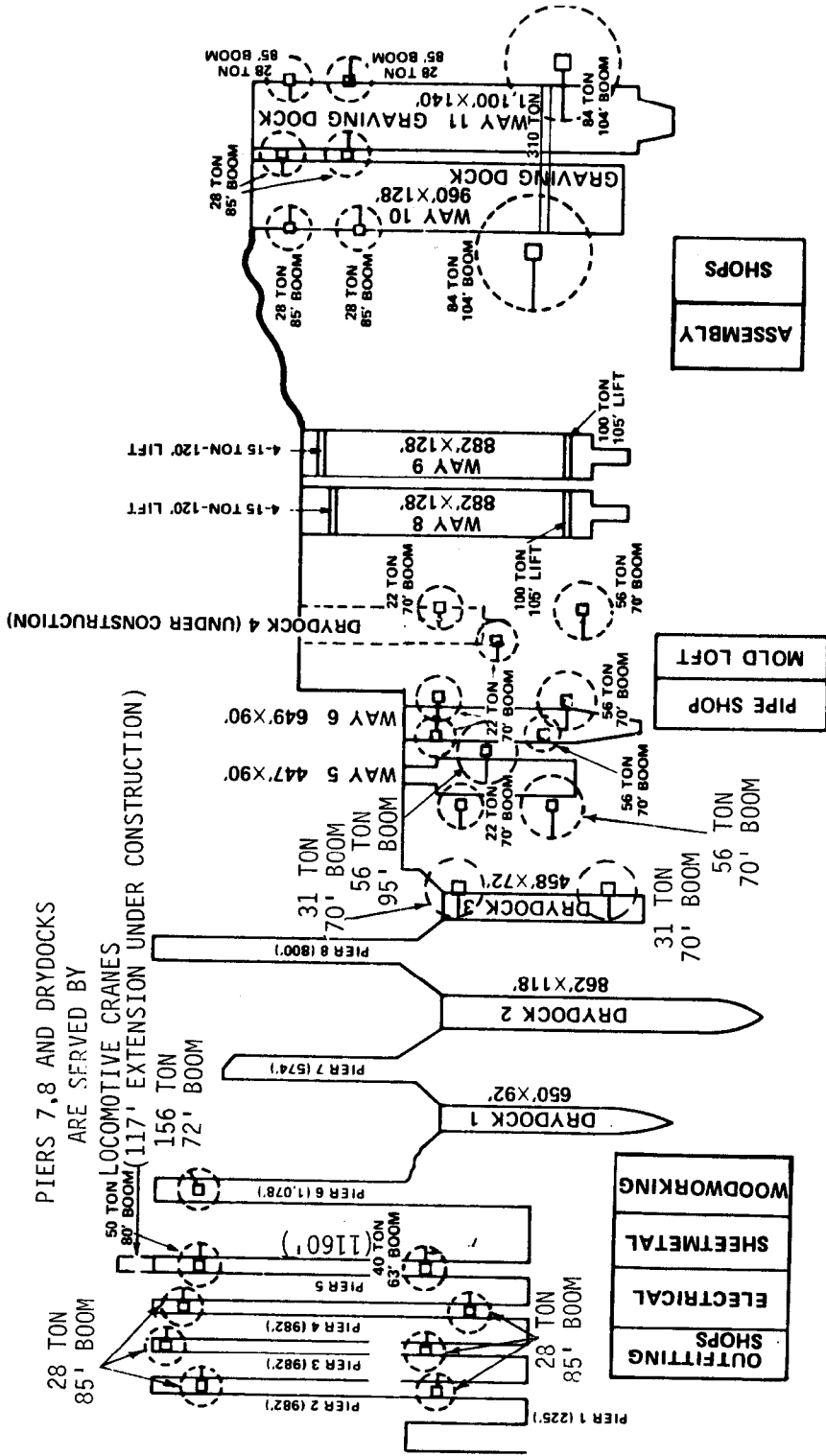
NATIONAL STEEL AND SHIPBUILDING CO.



Newport News Shipbuilding

SOUTH YARD

JAMES RIVER

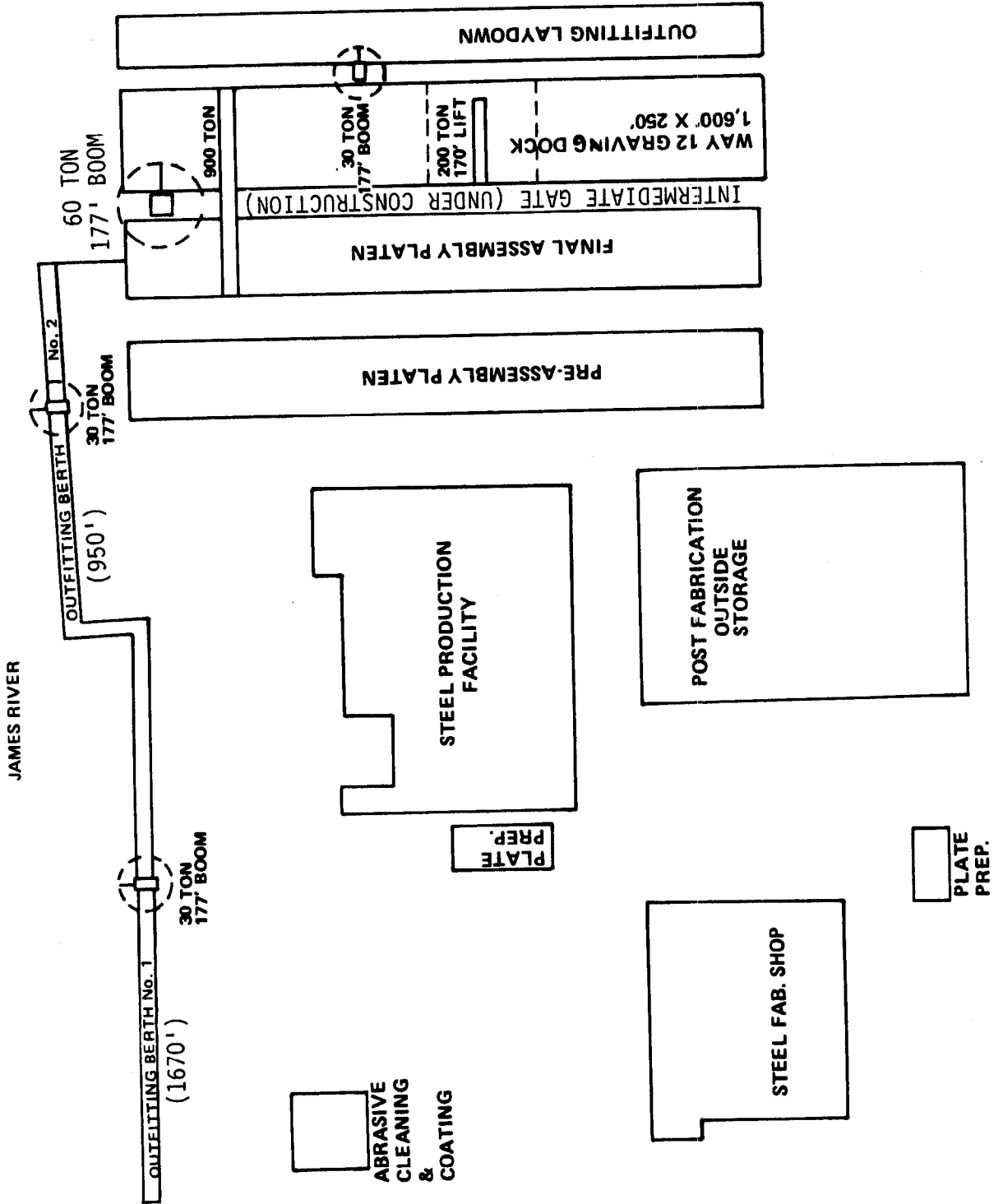


PIERS 7, 8 AND DRYDOCKS ARE SERVED BY 50 TON LOCOMOTIVE CRANES (117' EXTENSION UNDER CONSTRUCTION)

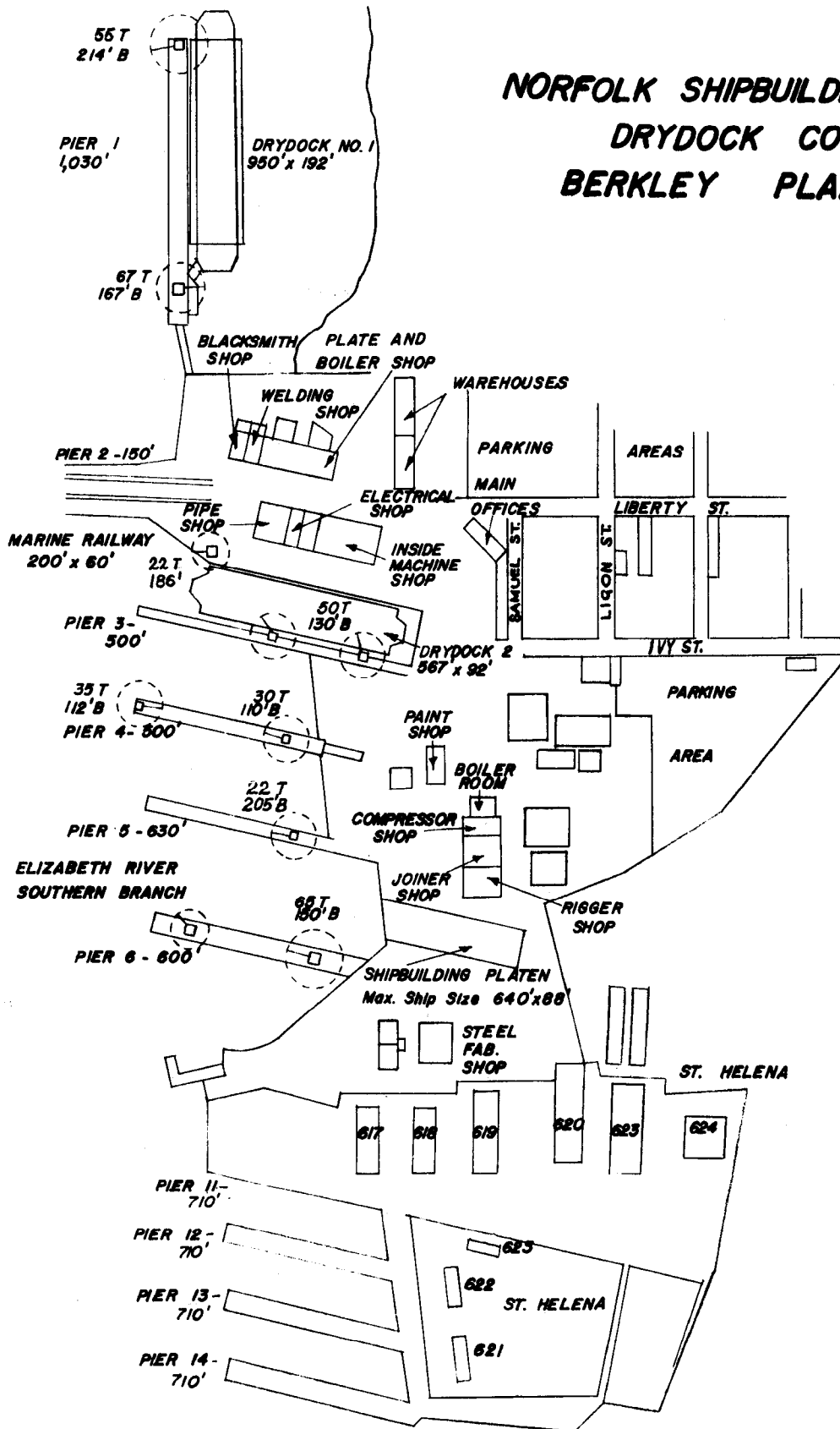
SHOPS	FOUNDRY
ASSEMBLY	PATTERN-MAKERS
PIPE SHOP	MACHINE SHOPS
MOLD LOFT	
	WOODWORKING
	SHEETMETAL
	ELECTRICAL
	OUTFITTING SHOPS
	CONSOLIDATED WAREHOUSE

Newport News Shipbuilding

NORTH YARD

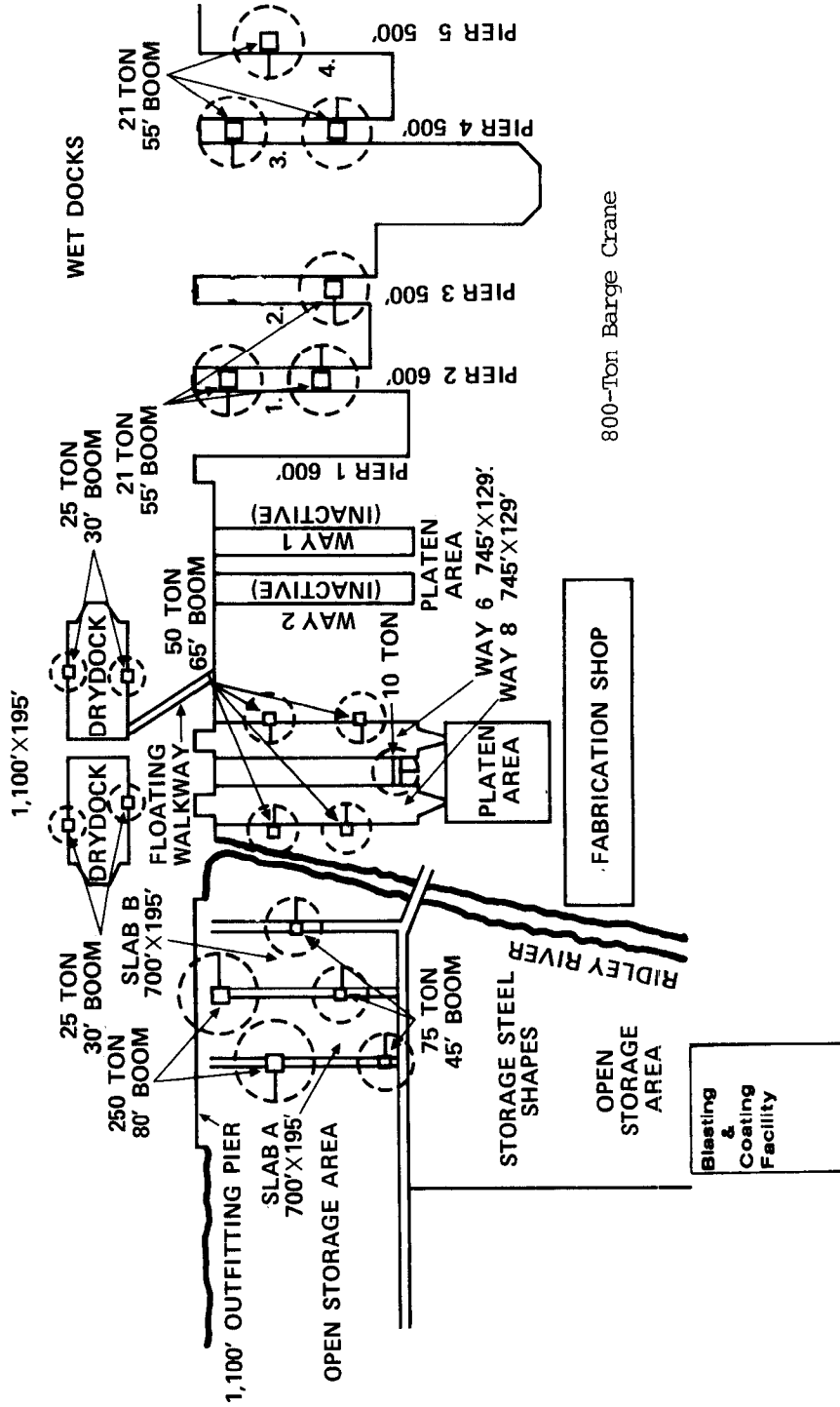


NORFOLK SHIPBUILDING AND DRYDOCK CORP. BERKLEY PLANT

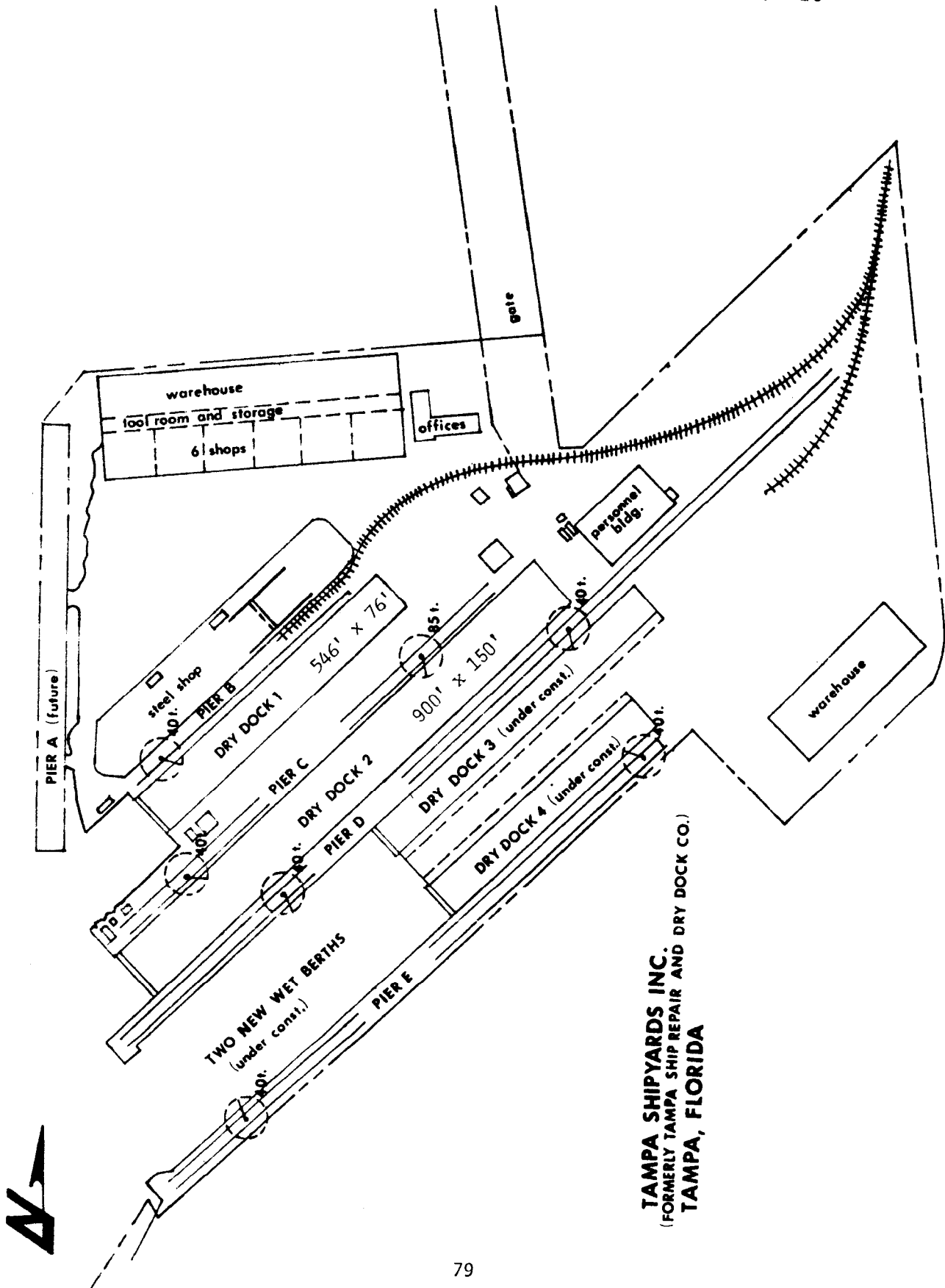


SUN SHIP, INC.

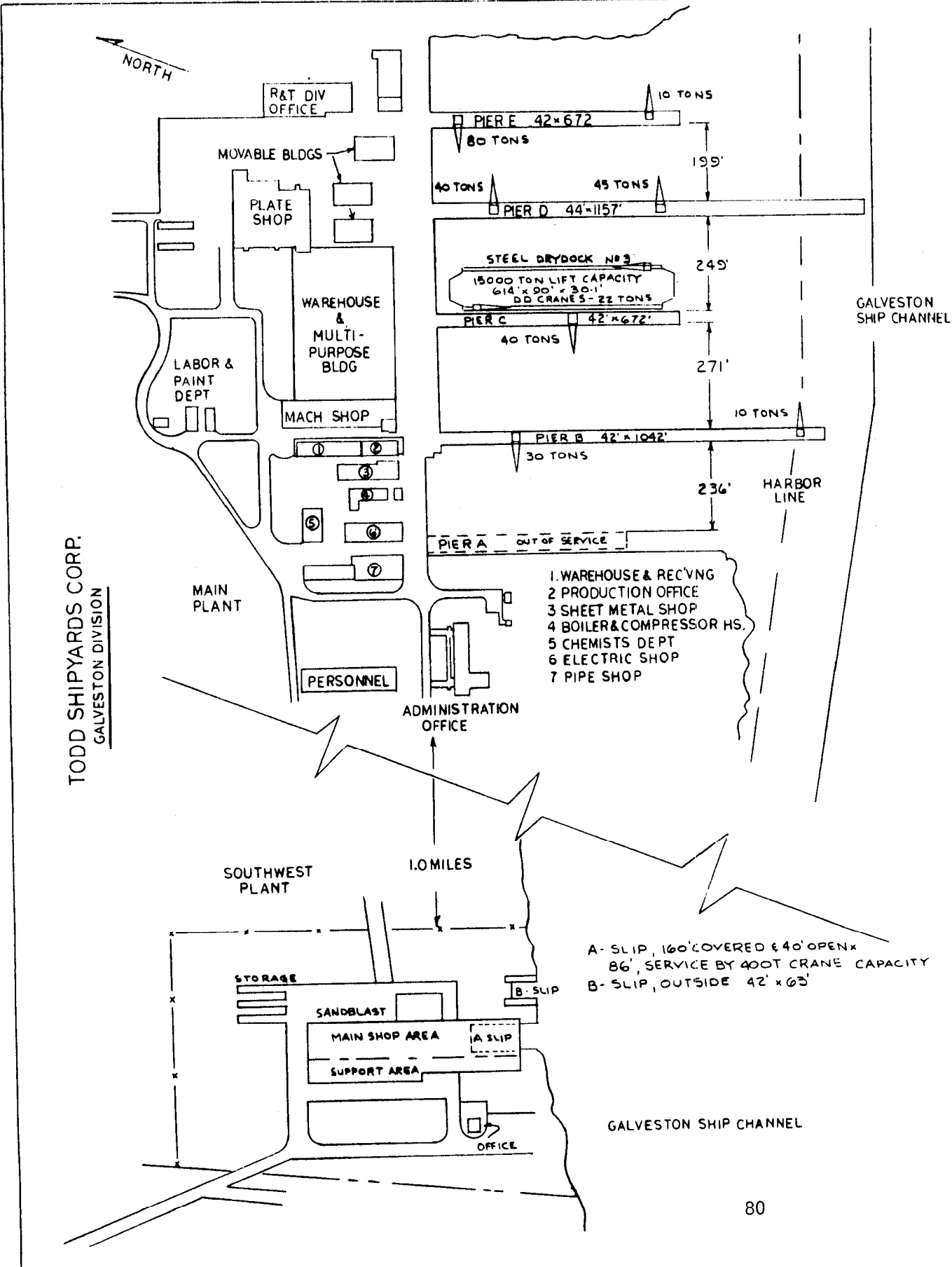
DELAWARE RIVER



NOTE: This map does not indicate extensive facilities changes currently underway, such as extension of Slab "A" from a length of 700 feet to 1,000 feet.

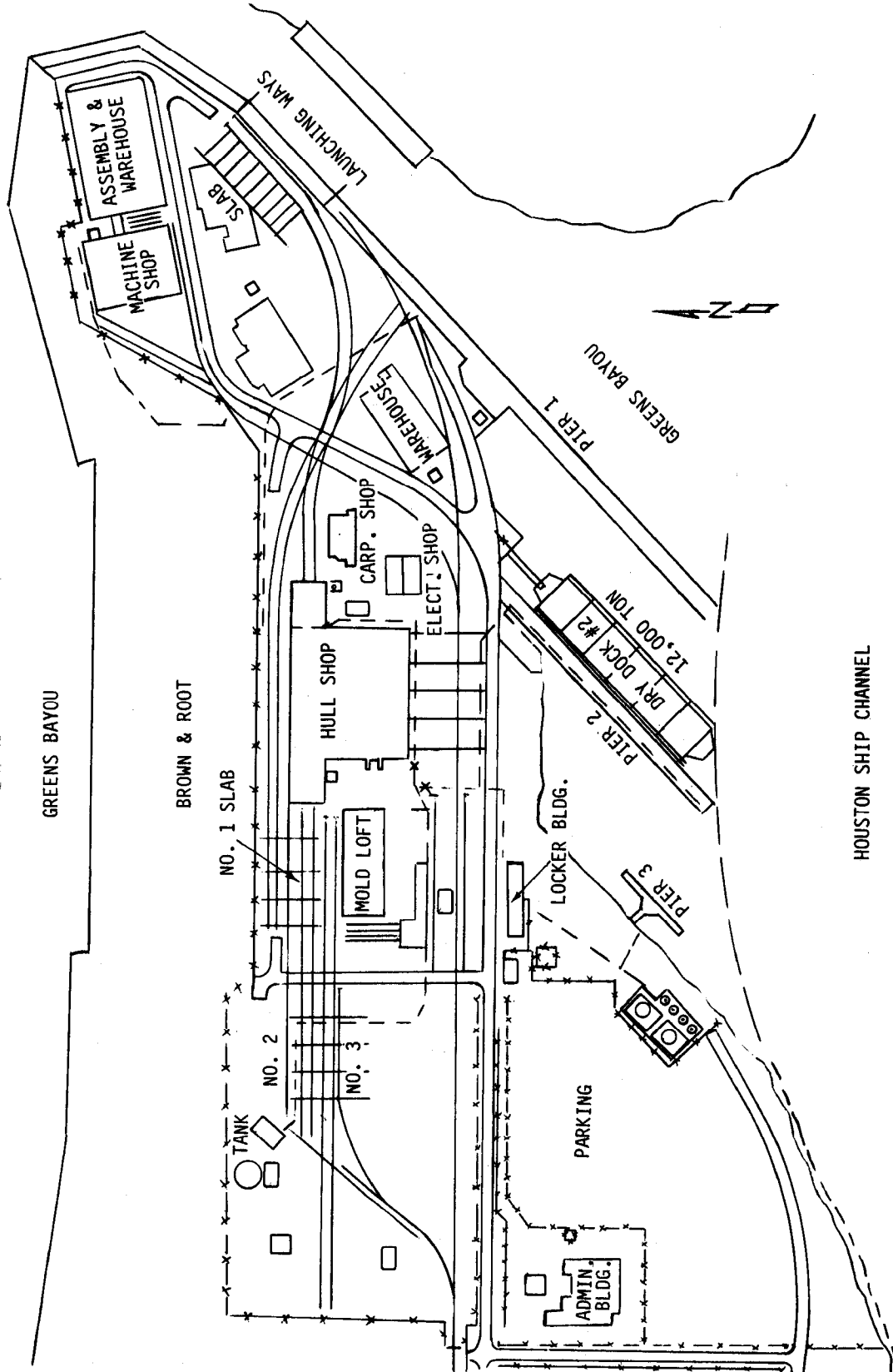


TAMPA SHIPYARDS INC.
(FORMERLY TAMPA SHIP REPAIR AND DRY DOCK CO.)
TAMPA, FLORIDA

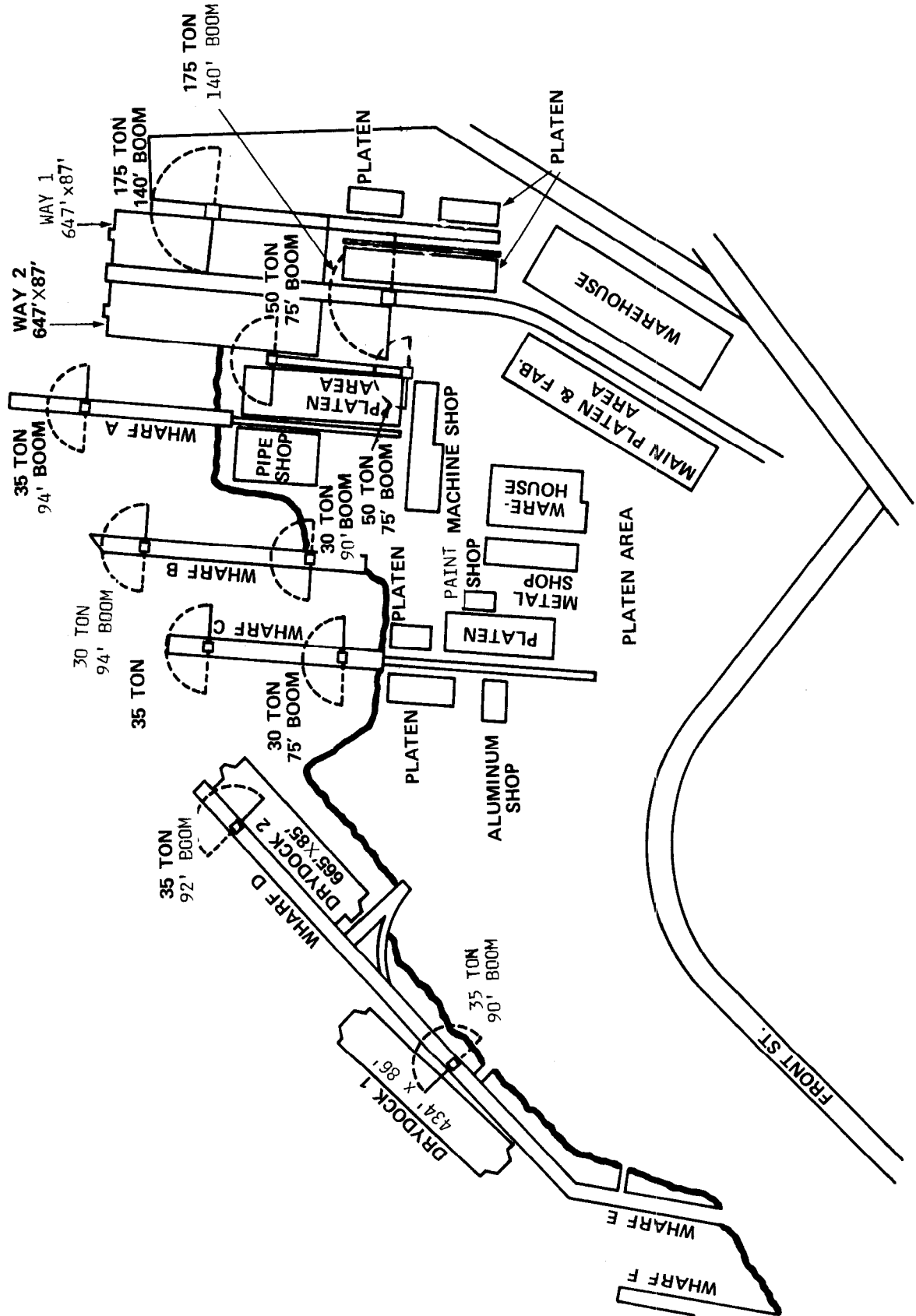


Todd Shipyards Corporation

HOUSTON DIVISION



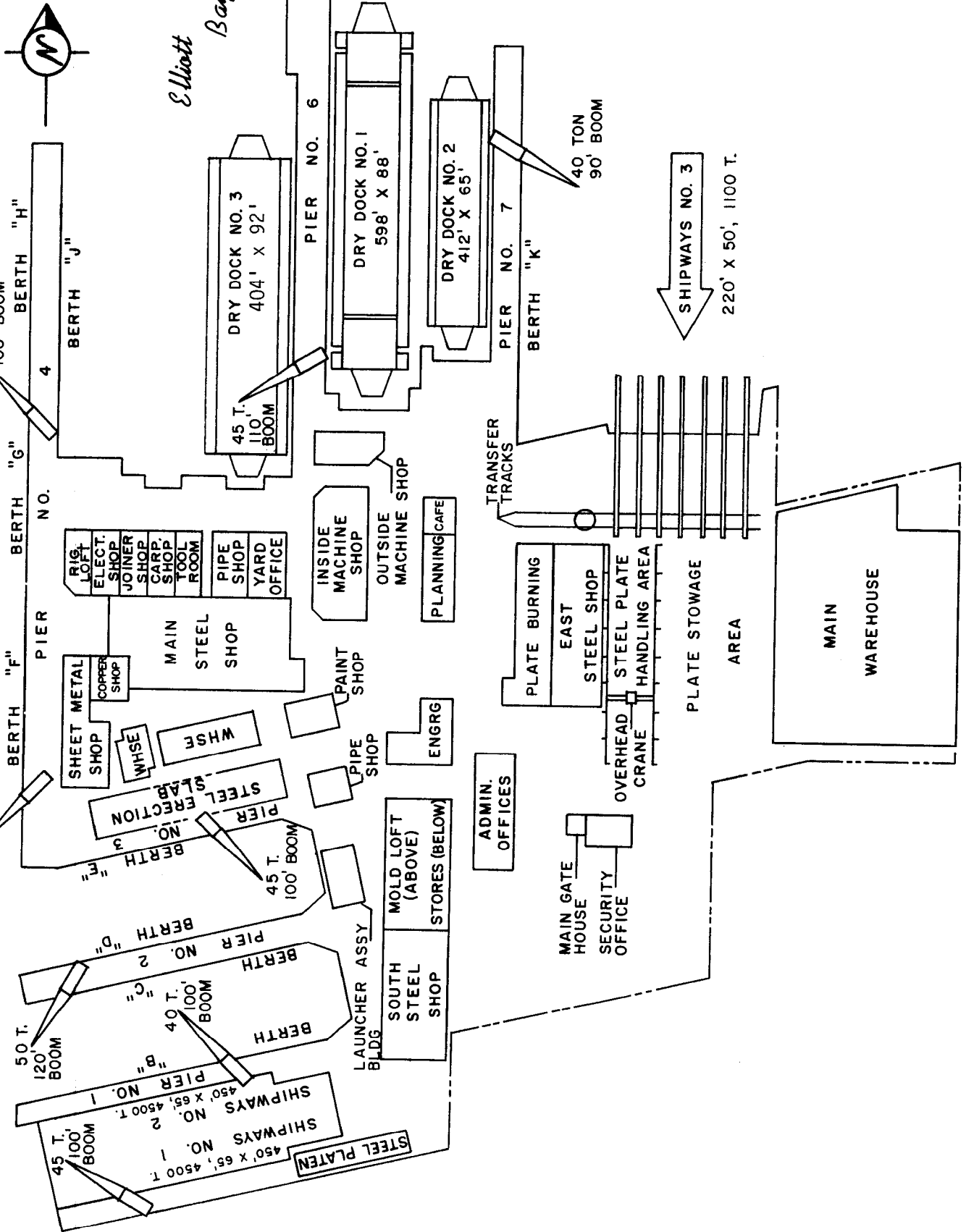
TODD PACIFIC SHIPYARDS CORP.
LOS ANGELES DIVISION



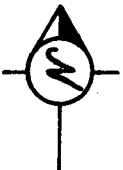
TODD PACIFIC SHIPYARDS CORPORATION

West Water Way

SEATTLE DIVISION

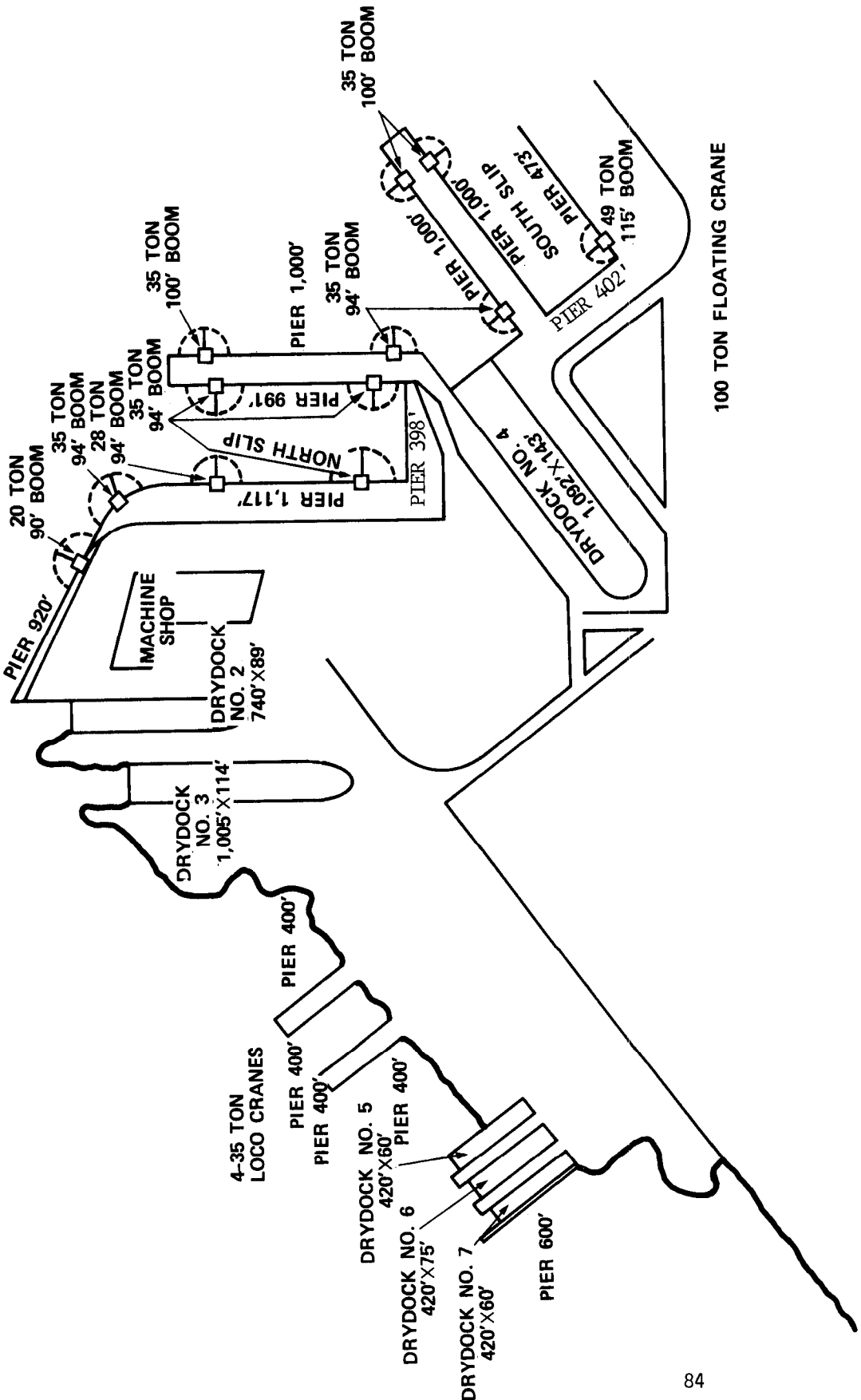


Elliott Bay



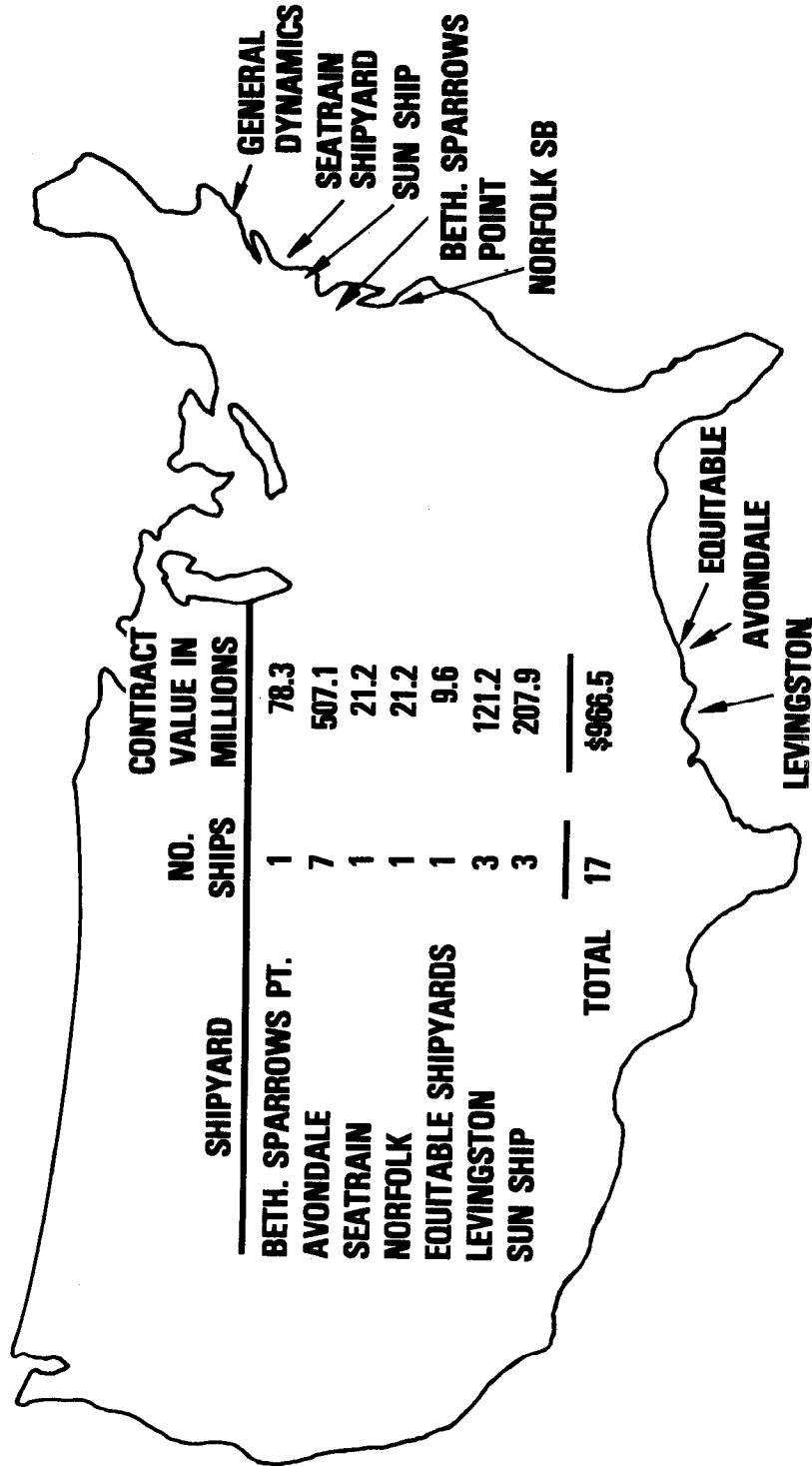
TRIPLE "A" MACHINE SHOP, INC.

HUNTERS POINT

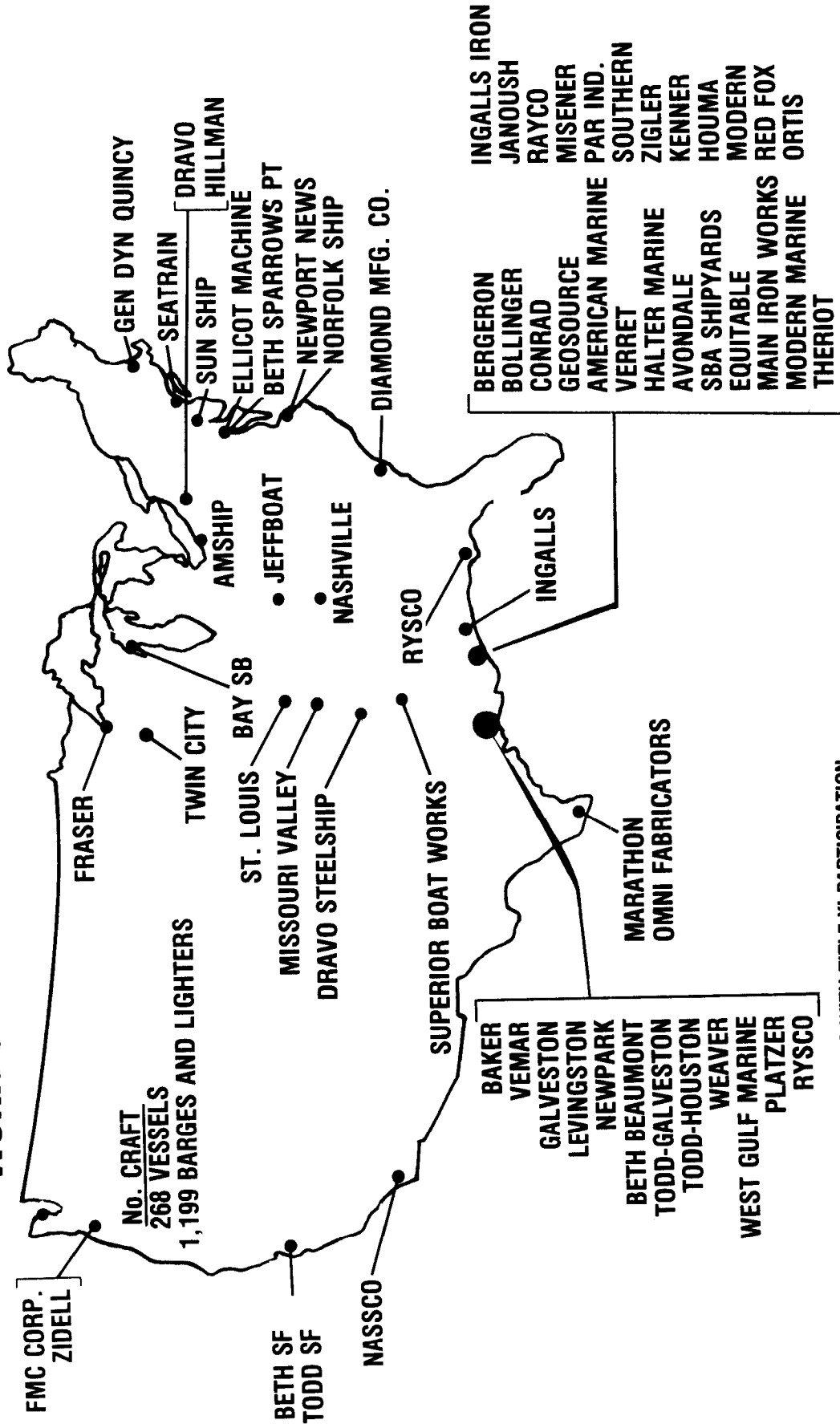


**SHIPBUILDING PROGRAM (TITLE V)
OFFICE OF SHIP CONSTRUCTION**

**SHIPS UNDER CONSTRUCTION OCTOBER 1, 1980
TOTAL CONTRACT VALUE, UNDELIVERED SHIPS**



**SHIP FINANCING GUARANTEE CONSTRUCTION PROGRAM (TITLE XI)
OFFICE OF SHIP CONSTRUCTION
WORK UNDER CONTRACT SEPTEMBER 30, 1980**

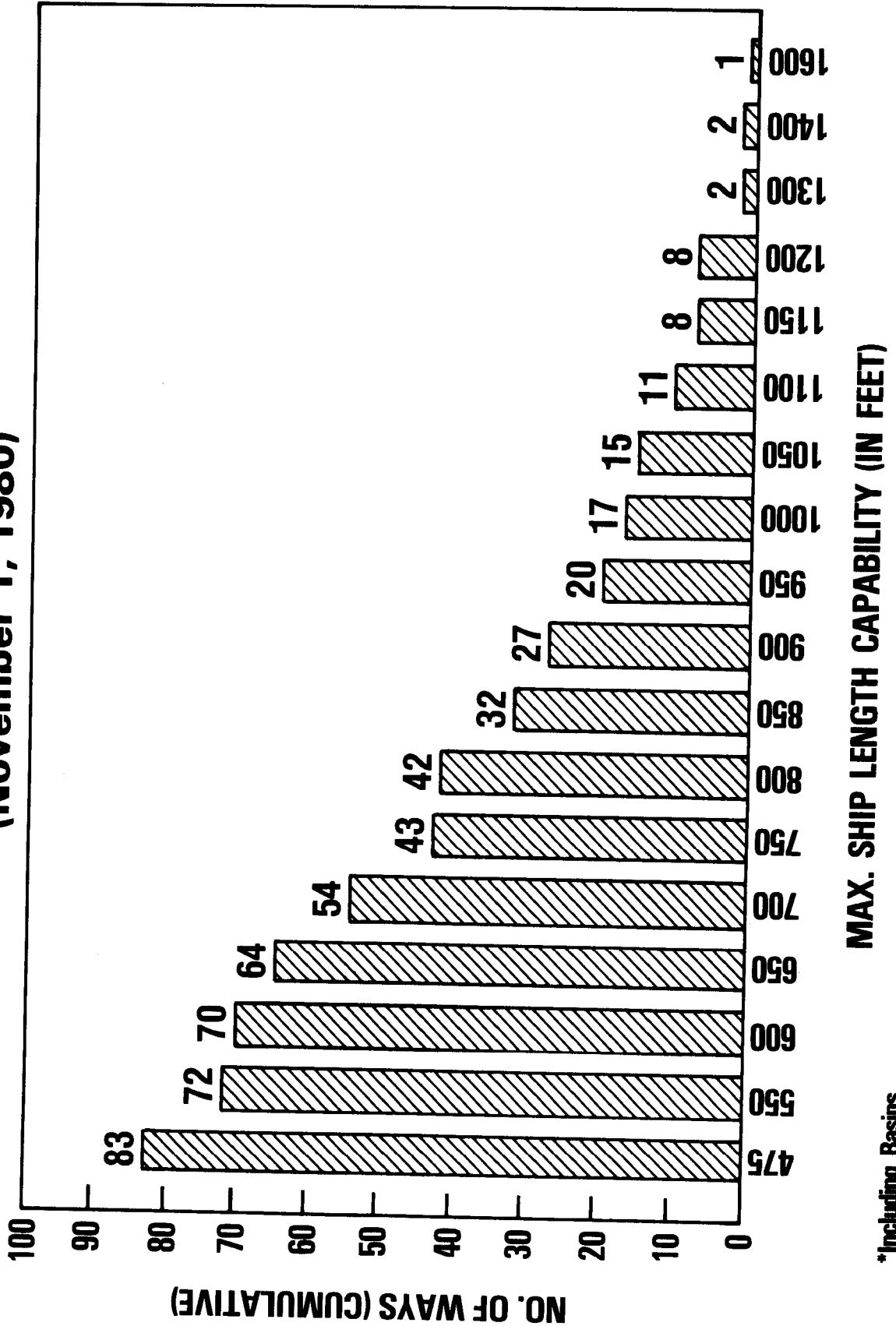


NOTE: FIGURES INCLUDE TITLE V SHIPS WITH TITLE XI PARTICIPATION.
FIGURES INCLUDE VESSELS UNDER CONSTRUCTION FOR WHICH TITLE XI APPLICATION IS PENDING.

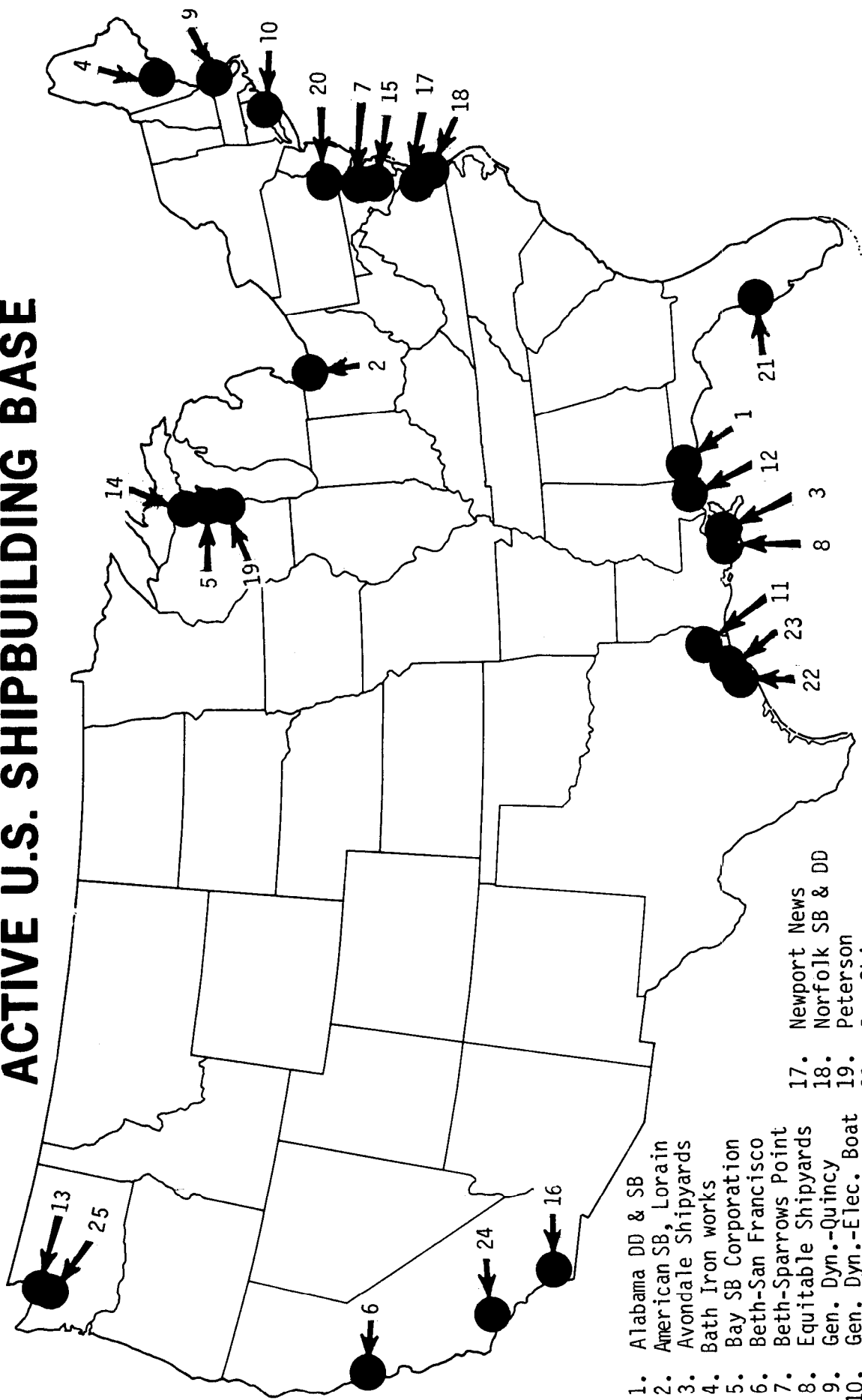
MAJOR U.S. PRIVATE SHIPYARDS

***NUMBER OF SHIPWAYS BY MAXIMUM LENGTH CAPABILITY**

(November 1, 1980)



ACTIVE U.S. SHIPBUILDING BASE



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

September 30, 1980

COMMERCIAL VESSELS UNDER CONSTRUCTION OR ON ORDER IN 25 U.S.
SHIPYARDS IN ACTIVE SHIPBUILDING BASE (SEPTEMBER 30, 1980)

SHIPYARDS	NO. CDS VESSELS	CONTRACT \$VAL. CDS VESSELS (MILLIONS)	NO. PRIVATE VESSELS	CONTRACT \$VAL. PVT. VESSELS (MILLIONS)	TOTAL ALL VESSELS	TOTAL CONTRACT \$VAL. (MILLIONS)
Alabama DD	-	-	2	61.0	2	61.0
AmShip, Lorain	-	-	1	45.0	1	45.0
Avondale	7	507.1	5	253.0	12	760.1
Bath Iron Works	-	-	1	25.0	1	25.0
Bay SB	-	-	2	87.9	2	87.9
Beth, S.F.	-	-	2	10.8	2	10.8
Beth, Sp. Pt.	1	78.3	9	397.2	10	475.5
Equitable	1	9.6	324**	113.5	325	123.1
Gen. Dyn., Quincy	-	-	5	65.0	5	65.0
Gen. Dyn., Elec. Boat						
(EXCLUSIVELY NAVY SHIP CONSTRUCTION)						
Levingston	3	121.2	3	115.0	6	236.2
Litton/Ingalls	-	-	12	220.0	12	220.0
Lockheed	-	-	-	-	-	-
Marinette	-	-	-	-	-	-
Maryland SB	-	-	-	-	-	-
National Steel	-	-	11	607.9	11	607.9
Newport News	-	-	-	-	-	-
Norfolk SB	1	11.9	2	25.0	3	36.9
Peterson	-	-	4	28.0	4	28.0
Sun Ship	3	207.9	5	391.7	8	599.6
Tampa Ship	-	-	-	-	-	-
Todd, Galveston	-	-	-	-	-	-
Todd, Houston	-	-	4	34.0	4	34.0
Todd, LA	-	-	-	-	-	-
Todd, Seattle	-	-	-	-	-	-
TOTALS	16*	\$936.0	392	\$2,480.0	408	\$3,416.0

Figures include drilling rigs, and vessels and barges of all sizes, but exclude conversions, ship repairs, and non-ship work.

*Total CDS figures do not include one unfinished CCT barge at Seatrain Shipbuilding.

**Equitable Shipyards - Figure for private vessels (324) consists of 2 ferries and 322 barges.

SHIPYARD STATUS: NEED FOR NEW BUSINESS

U.S. DEPARTMENT OF COMMERCE
MARITIME ADMINISTRATION

TIME NOW



ACTIVE SHIPBUILDING BASE	1979			1980			1981			1982		
	Jan	Feb	Mar	Jan	Feb	Mar	Jan	Feb	Mar	Jan	Feb	Mar
ALABAMA DD&SB — MOBILE, AL						*						
AMERICAN SB — LORAIN, OH												
AVONDALE SHIPYARDS — N.O., LA												
BATH IRON WORKS — BATH, ME												
BAY SHIP — STURGEON BAY, WI												
BETH. STEEL — SPARROWS PT., MD												
BETH. STEEL — SAN FRANCISCO, CA						*						
EQUITABLE SHIPYARDS — N.O., LA												
GEN. DYN.-E.B. — GROTON, CT												
GEN. DYN. — QUINCY, MA												
INGALLS/LITTON — PASCAGOULA, MS												
LEVINGSTON SHIP — ORANGE, TX												
LOCKHEED SHIP — SEATTLE, WA												
MARYLAND DD — BALTIMORE, MD						*						
MARINETTE MARINE — MARINETTE, WI												
NASSCO — SAN DIEGO, CA												
NEWPORT NEWS SB&DD — VA												
NORFOLK SB&DD — VA						*						
PETERSON BLDRS. — STURGEON BAY, WI												
SUN SHIP — CHESTER, PA												
TAMPA SHIP REPAIR — FL						*						
TODD SHIPYARDS — GALVESTON, TX						*						
TODD SHIPYARDS — HOUSTON, TX						*						
TODD SHIPYARDS — SAN PEDRO, CA												
TODD SHIPYARDS — SEATTLE, WA												

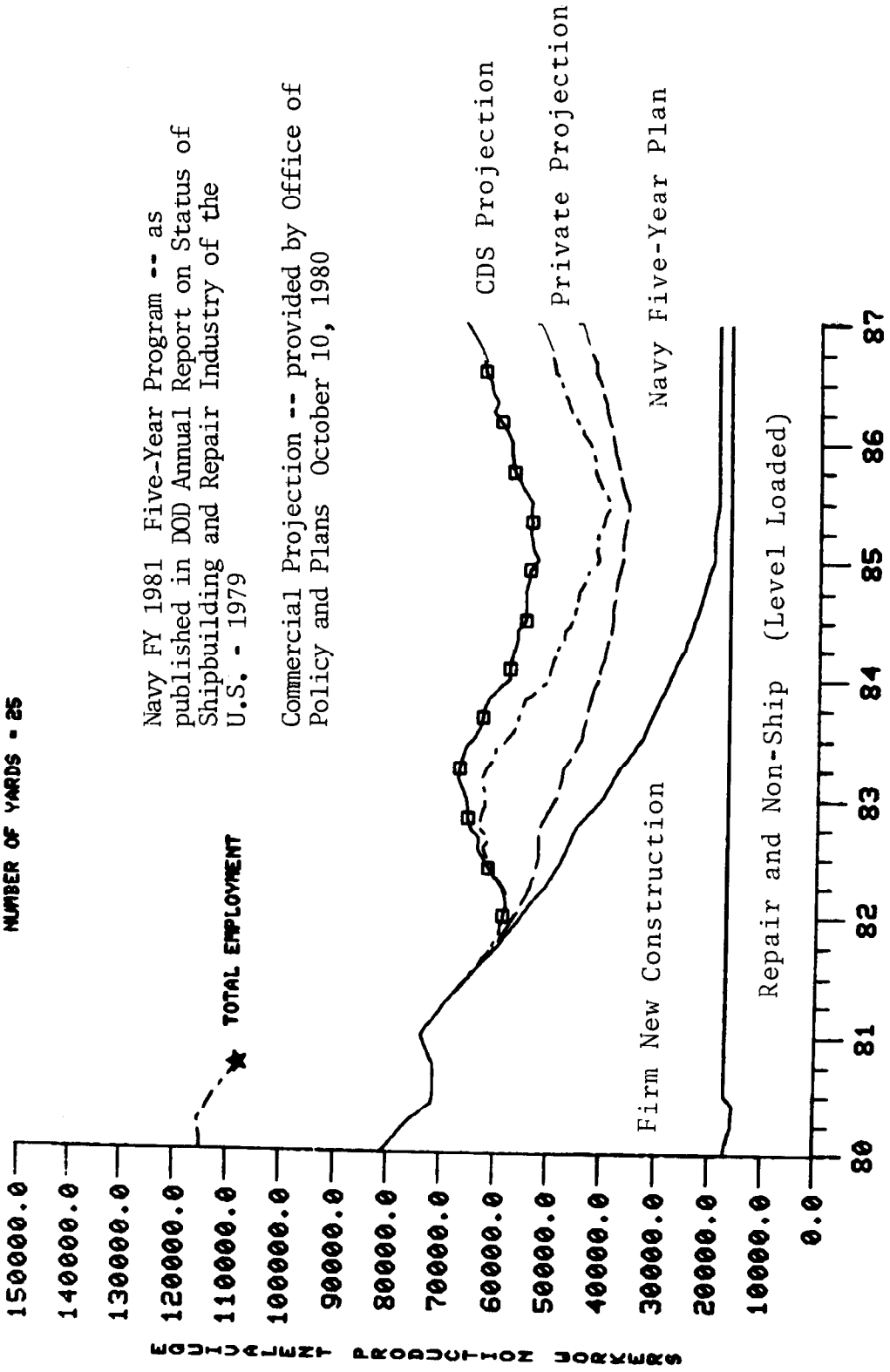
* Shipyards engaging primarily in repair work.

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 WORK FORCE ASSUME 8-MONTH ADMINISTRATIVE AND PRE FAB TIME (LEAD TIME BEFORE KEEL LAYING).

SHIPBUILDING INDUSTRY WORKLOAD PROJECTION

ACTIVE SHIPBUILDING BASE SUMMATION

NUMBER OF YARDS - 25



Navy FY 1981 Five-Year Program -- as published in DOD Annual Report on Status of Shipbuilding and Repair Industry of the U.S. - 1979

Commercial Projection -- provided by Office of Policy and Plans October 10, 1980

OCTOBER 1, 1980

SOURCE: SHIPYARD DATA FROM FORM PAS32 WHEN PROVIDED
OFFICE OF SHIP CONSTRUCTION, MARITIME ADMINISTRATION

TABLE I

SHIP CONSTRUCTION CAPABILITY
BY SHIP TYPE

TABLE I
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	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
<u>EAST</u>	Bath Iron Works	A	650 x 88	1	0	1	0	0	0	0	0	0	1	0	0
		B	700 x 130	1	0	1	1	0	0	0	0	0	1	1	0
		C	700 x 130	1	0	1	1	0	0	0	0	0	1	1	0
	Bethlehem Steel Sparrows Point	7	900 x 108	1	1	1	1	1	1	0	0	0	1	1	1
		10	900 x 108	1	1	1	1	1	1	0	0	0	1	1	1
			1200 x 192	4	1	3	2	1	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	860 x 123	2	1	1	1	0	0	0	0	1	1	0	
		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)	(1)	(0)	(5)	(5)	(5)	(1)	
			1	1	1	1	0	0	0	0	1	1	0		
Newport News S/B	5	649 x 93	(1)	(1)	(1)	(1)	(0)	(0)	(0)	(1)	(1)	(1)	(0)		
	6	715 x 93	1	0	1	0	0	0	0	0	0	0	0		
	8	940 x 125	2	1	1	1	1	1	0	0	1	1	1		
	9	940 x 125	2	1	1	1	1	1	0	0	1	1	1		
	10	960 x 124	2	1	2	1	1	1	1	1	2	2	1		
	11	1100 x 136	2	1	2	1	1	1	1	1	2	2	1		
12	1600 x 246	9	4	5	4	1	1	1	1	6	4	1			
Norfolk SB & DD	-	475 x 85	(19)	(8)	(13)	(8)	(5)	(3)	(3)	(14)	(9)	(5)			
			1	0	0	0	0	0	0	0	0	0			
			(1)	(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	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
Sun Ship, Inc.	6		745 x 129	1	1	1	1	0	0	0	1	1	0	
	8		745 x 129	1	1	1	1	0	0	0	1	1	0	
	Slab A Slab B		1000 x 195 700 x 195	4 2	1 2	2 2	1 1	1 0	1 (1)	0 (1)	2 (6)	1 (4)	1 (1)	0 (1)
TOTAL EAST COAST				48	21	33	24	10	5	35	26	10		
<u>GULF</u>	Atabama D/D & S/B	1	523 x 68	1	0	0	0	0	0	0	0	0	0	
		2	523 x 68	1	0	0	0	0	0	0	0	0	0	
		3	523 x 68	1	0	0	0	0	0	0	0	0	0	
		4	523 x 68	1	0	0	0	0	0	0	0	0	0	
		5	620 x 90	1	0	1	0	0	0	0	0	1	0	0
				(5)	(0)	(1)	(0)	(0)	(0)	(1)	(0)	(0)		
Avondale	2		1200 x 126	6	5	5	5	5	5	5	6	6	5	
	3		1020 x 174	6	3	3	3	3	3	3	3	3	3	
					(12)	(8)	(8)	(8)	(8)	(8)	(9)	(9)	(8)	
Beth. Beaumont	1		800 x 96	1	0	1	0	0	0	0	1	0	0	
				(1)	(0)	(1)	(0)	(0)	(0)	(1)	(0)	(0)	(0)	
Galveston S/B	5		700 x 120	1	0	1	1	0	0	0	1	1	0	
				(1)	(0)	(1)	(1)	(0)	(0)	(1)	(1)	(1)	(0)	
Levingston (Orange, TX)	1		700 x 100	1	0	1	0	0	0	0	1	0	0	
				(1)	(0)	(1)	(0)	(0)	(0)	(1)	(0)	(0)	(0)	
Levingston (Gulfport)	1		550 x 80	1	0	0	0	0	0	0	0	0	0	
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	

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	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	
Litton/Ingalls	1		690 x 85	1	0	0	0	0	0	1	0	0	
	2		550 x 80	1	0	0	0	0	0	0	0	0	
	7		650 x 90	1	0	1	0	0	0	1	0	0	
	8		650 x 90	1	0	1	0	0	0	1	0	0	
	9		650 x 90	1	0	1	0	0	0	1	0	0	
	10		650 x 90	1	0	1	0	0	0	1	0	0	
	WB		800 x 173	6	6	6	6	0	0	6	6	0	
				(12)	(6)	(10)	(6)	(0)	(0)	(11)	(6)	(0)	
	Marathon	1		1100 x 150	4	1	1	1	1	1	1	1	
					(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
Tampa Shipyards	3		500 x 105	1	0	0	0	0	0	0	0		
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)		
Todd-Galveston	-		475 x 85	1	0	0	0	0	0	0	0		
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)		
Todd-Houston	-		600 x 96	1	0	0	0	0	0	1	0		
				(1)	(0)	(0)	(0)	(0)	(0)	(1)	(0)		
TOTAL GULF COAST				40	15	23	16	9	9	26	17		
											9		
Beth. San Francisco	4		600 x 90	1	0	0	0	0	0	1	0		
				(1)	(0)	(0)	(0)	(0)	(0)	(1)	(0)		
FMC Corporation	4		700 x 105	1	0	1	1	0	0	1	1		
				(1)	(0)	(1)	(1)	(0)	(0)	(1)	(1)		

WEST

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	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
Lockheed S/B		1	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		3	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		21	700 x 100	1	0	1	0	0	0	0	0	1	0	0
				(3)	(0)	(3)	(0)	(0)	(0)	(0)	(0)	(3)	(0)	(0)
National Steel & S/B		1	980 x 170	4	1	1	1	1	1	1	2	1	1	1
		2	690 x 90	1	0	1	0	0	0	0	1	0	0	0
		3	900 x 106	1	1	1	1	1	0	0	1	1	1	1
		4	900 x 106	1	1	1	1	1	0	0	1	1	1	1
		(7)	(3)	(4)	(3)	(3)	(1)	(1)	(5)	(3)	(3)	(3)		
Todd, LA		1	800 x 84	1	0	0	0	0	0	0	1	0	0	
		2	800 x 84	1	0	0	0	0	0	0	1	0	0	
		(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(2)	(0)	(0)		
Todd, Seattle		1A	600 x 96	1	0	0	0	0	0	0	1	0	0	
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)	
Triple "A" Hunters Point		2	715 x 82	1	0	0	0	0	0	0	1	0	0	
		3	996 x 107	2	1	1	1	1	1	1	1	1	1	
		4	1088 x 136	4	1	1	1	1	1	1	2	1	1	
				(7)	(2)	(2)	(2)	(2)	(2)	(2)	(4)	(2)	(2)	
TOTAL WEST COAST			22	5	10	6	5	3	17	6	5			
American S/B-Lorain		GD2	708 x 78	1	0	0	0	0	0	0	1	0	0	
		GD3	1021 x 121	2	1*	1*	1*	1*	1*	1	1*	1*	1*	
		(3)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(1)	(1)			
American S/B-Toledo		GD1	540 x 68	1	0	0	0	0	0	0	0	0	0	
		GD2	680 x 78	1	0	0	0	0	0	0	1	0	0	
		(2)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)			

GREAT LAKES

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	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	
Bay S/B Corporation	GD1	3	1100 x 136	2	1*	1*	1*	1*	1*	1*	1	1*	1*
			750 x 105	1	1*	1*	1*	0	0	1	1*	1*	0
				(3)	(2)	(2)	(2)	(1)	(1)	(1)	(2)	(2)	(1)
Fraser Shipyards	GD2		825 x 82	1	0	0	0	0	0	0	1	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)
TOTAL GREAT LAKES				9	3	3	3	2	2	2	6	3	2
TOTAL POSITIONS ALL YARDS				<u>119</u>	<u>44</u>	<u>69</u>	<u>49</u>	<u>26</u>	<u>19</u>	<u>19</u>	<u>84</u>	<u>52</u>	<u>26</u>

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

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers										C&O				
				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	89,000 886 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	(3)	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
	Bethlehem Steel, Sparrows Point	7	900 x 108	1	1	1	0	0	0	0	0	0	0	0	0	0	0	
		10	900 x 108	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1
			1200 x 192	(5)	(4)	(3)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(0)	(3)	(1)	(1)	(1)
86	General Dynamics, Quincy	6	860 x 123	1	1	1	0	0	0	0	0	0	0	0	0	0	0	
		7	936 x 143	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		8	860 x 123	1	1	1	0	0	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	0	0
		12	860 x 144	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
				(5)	(5)	(5)	(1)	(1)	(1)	(1)	(0)	(0)	(0)	(0)	(1)	(1)	(0)	(0)
	Maryland S/B & D/O	1	850 x 110	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)	(0)
	Newport News S/B	5	649 x 93	1	0	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	0	
		8	940 x 125	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		9	940 x 125	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		10	960 x 124	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		11	1100 x 136	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	1600 x 246	6	4	2	2	1	1	1	1	1	1	1	1	2	1	1		
		(13)	(9)	(6)	(2)	(2)	(2)	(2)	(2)	(2)	(1)	(1)	(1)	(6)	(1)	(1)		

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			
	Norfolk SB & DD	-	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)
	Sun Ship	6	745 x 129	1	1	0	0	0	0	0	0	0	0	0	0	0
		8	745 x 129	1	1	0	0	0	0	0	0	0	0	0	0	0
		Slab A	1000 x 195	2	2	1	1	1	1	1	1	1	1	1	1	1
		Slab B	700 x 195	2	2	0	0	0	0	0	0	0	0	0	0	0
				(6)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	TOTAL EAST COAST			33	27	15	5	5	5	4	3	2	11	3	3	3
<u>GULF</u>	Alabama D/D & S/B	1	523 x 68	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
		3	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	620 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0
				(1)	(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	5	0
		3	1020 x 174	3	3	3	3	3	3	0	0	0	0	3	3	3
				(8)	(8)	(8)	(3)	(3)	(3)	(0)	(0)	(0)	(8)	(8)	(8)	(8)
	Beth. Beaumont	1	800 x 96	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)
	Galveston S/B	5	700 x 120	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)

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

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			
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)
Levingston (Gulfport)		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)
Litton/Ingalls		1	690 x 85	1	0	0	0	0	0	0	0	0	0	0	0	0
		2	550 x 80	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	650 x 90	1	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
		9	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0
		10	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0
	WB		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)
Marathon		1	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)	0 (0)
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)
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 Slip 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	150,000 998 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	9	4	0	0
<u>WEST</u>	Beth. San Francisco	4	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	700 x 105	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	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0
		3	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0
		21	700 x 100	1 (3)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	National Steel & SB	1	980 x 170	2	1	1	1	1	0	1	0	0	0	1	0	0
		2	690 x 90	1	1	0	0	0	0	0	0	0	0	0	0	0
		3	900 x 106	1	1	1	0	0	0	0	0	0	0	0	0	0
		4	900 x 106	1 (5)	1 (4)	1 (3)	0 (1)	0 (1)	0 (0)	0 (1)	0 (1)	0 (0)	0 (0)	0 (1)	0 (0)	0 (0)
	Todd, LA	1	800 x 84	1	0	0	0	0	0	0	0	0	0	0	0	0
		2	800 x 84	1 (2)	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 Seattle	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										030		
				25,000 620 x 75	38,000 688 x 90	59,000 894 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			
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	0	0	0	0
	4	1088 x 136	2	1	1	0	0	0	0	0	0	0	0	1	0	0
			(4)	(2)	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(2)	(0)	(0)
TOTAL WEST COAST				<u>15</u>	<u>8</u>	<u>5</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3</u>	<u>0</u>	<u>0</u>
GREAT LAKES																
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	0	1*	0
			(2)	(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(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)
Bay S/B Corporation	GD1	1100 x 136	1	1*	1*	0	0	0	0	0	0	0	0	0	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)	(0)	(1)	(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)
TOTAL GREAT LAKES				<u>6</u>	<u>3</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>
TOTAL POSITIONS ALL YARDS				<u>78</u>	<u>56</u>	<u>37</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>5</u>	<u>3</u>	<u>2</u>	<u>25</u>	<u>2</u>	<u>25</u>	<u>7</u>

*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	RO/RO 684 x 102	LASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 x 106	
East Coast	48	21	33	24	10	5	35	26	10	
Gulf Coast	40	15	23	16	9	9	26	17	9	
West Coast	22	5	10	6	5	3	17	6	5	
Great Lakes	9	3	3	3	2	2	6	3	2	
TOTAL POSITIONS ALL YARDS	119	44	69	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	160,000 998 x 143	
East Coast	33	27	15	5	5	4	3	2	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	2	25	7	

TABLE II

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

TABLE II

MAJOR U.S. PRIVATE SHIPYARDS

NUMBER OF SHIPBUILDING WAYS BY LENGTH (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	1				
Beth-Sparrows Point	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1				
General Dynamics, Quincy	5	5	5	5	5	5	5	5	1										
Maryland SB & DD	1	1	1	1	1	1	1	1	1										
Newport News SB & DD	6	6	6	6	6	5	5	5	5	3	2	2	2	1	1	1	1	1	
Norfolk SB & DD	1																		
Sun Ship	4	4	4	4	4	2	2	2	2	2	2	1	1	1	1	1	1	1	
TOTAL	(23)	(22)	(22)	(22)	(21)	(16)	(16)	(16)	(11)	(6)	(5)	(4)	(4)	(3)	(3)	(2)	(2)	(1)	

GULF COAST

Alabama DD & SB	5	1	1	8	8	8	8	8	8	8	8	8	5	5	5			
Avondale Shipyards	12	9	9	1	1	1	1	1	1									
Beth-Beaumont	1	1	1	1	1	1	1	1										
Ingalls-E. Bank	6	6	5	5	6	6	6	6										
Ingalls-W. Bank	6	6	6	6	6	6	6	6										
Galveston SB	1	1	1	1	1	1	1											
Galveston (Orange, TX)	1	1	1	1	1	1	1											
Levingston (Gulfport)	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Marathon LeTourneau	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Tampa Shipyards	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Todd-Galveston	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Todd-Houston	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
TOTAL	(37)	(28)	(26)	(23)	(18)	(16)	(16)	(9)	(9)	(9)	(9)	(9)	(6)	(5)	(5)			

TABLE II
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														
FMC Corporation	1	1	1	1	1														
Lockheed SB	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														
Triple "A"	3	3	3	3	3	2	2	2	2	2	1	1							
TOTAL	(15)	(15)	(15)	(13)	(10)	(7)	(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															
Bay SB Corporation	2	2	2	2	2	2	1	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	54	43	42	32	27	20	17	15	11	8	8	2	2	2	1
All Coasts and Great Lakes	83	72	70	64	54	43	42	32	27	20	17	15	11	8	8	2	2	2	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

STANDARD FORM 17

October 1965
DEPARTMENT OF THE NAVY (BUSHIPS)
& MARITIME ADMINISTRATION
Coordinator for Ship Repair
and Conversion (DD-DOC)

FACILITIES AVAILABLE FOR THE CONSTRUCTION OR REPAIR OF SHIPS

DATE

NO. OF WAY	LAUNCHING (Check one)	DIMENSIONS	MAXIMUM SHIP SIZE (Ton 2,240 lbs.)	DEPTH OF WATER		CONDITION OF WAY	CRANES SERVING WAY		INSTRUCTIONS (Forward original copy to appropriate Department of Defense Office or Maritime Administration, Washington, D.C.)		
				Over way end	At drop off		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								
	<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 FIRE PROTECTION AVAILABLE ON BUILDING WAY? YES <input type="checkbox"/> NO <input type="checkbox"/>		IS SNUBBING NECESSARY? YES <input type="checkbox"/> NO <input type="checkbox"/>	

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.		LIFTING CAPACITY (Standard tons)	
			Inboard	Outboard				No.	Type 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 OR-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	

LEGEND: (Abbreviations of Services)
 Fresh water..... F.W.—G.P.M.—P.S.I.
 Salt water..... S.W.—G.P.M.—P.S.I.
 Steam..... S—P/HR.—P.S.I.
 Air..... A—C.F.M.—P.S.I.
 Electric power..... E—V—AC—AMP
 Sanitary sewer..... S.S.—Yes or No.
 Fire protection..... F.P.—G.P.M.—P.S.I.
 Sheet 2 of 6

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

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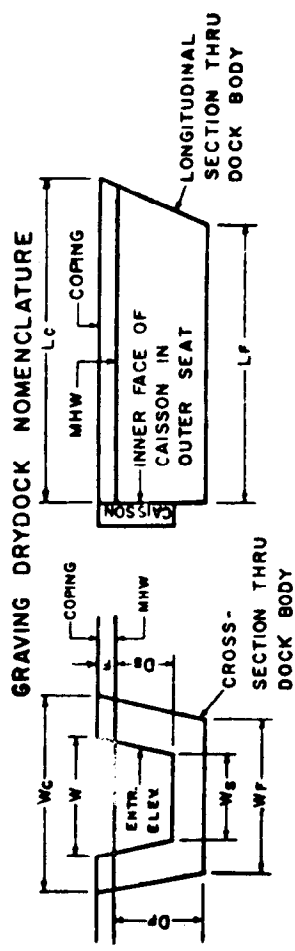
RAW STEEL STORAGE (Sq. ft.)	WELDING AND ASSEMBLY (Sq. ft.)	
ACREAGE LEGALLY CONTROLLED		
IN USE	DEVELOPED (Including in use)	TOTAL (Including undeveloped)
EXISTING LOCAL ORDINANCES LIMITING PRODUCTIVE USE		
LIMITATIONS IMPOSED BY PROPERTY ZONING CLASSIFICATION		
YARD LAYOUT—PLEASE FURNISH A PLOT PLAN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

LOCATION OF PRODUCTION FACILITIES FOR PRODUCTS LISTED IN ITEM 11, OF STD. FORM 129		ON WATERFRONT	
		<input type="checkbox"/> Yes	<input type="checkbox"/> 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 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)			
PROJECTS UNDER CONSTRUCTION WHICH WILL ALTER NAVIGATIONAL RESTRICTIONS (Specify projects and state effect and estimated completions)		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.)

GRAVING DRYDOCK CHARACTERISTICS SUMMARY

KEY
 MHW - Mean High Water
 DF - Depth of Dock from MHW to Floor
 DS - Depth of Dock from MHW to sill
 LC - Length of Dock at coping
 LF - 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	ENTRANCE DIMENSIONS		DOCK BODY DIMENSIONS		SUPERFLOODING	STANDARD DEFINITION	A. C. AMPERES (60 HZ-3Φ)			REMARKS	
	LENGTH	WIDTH	DEPTH	M.H.W.			DEPTH	WIDTH	DEPTH		TEST/CHECK
FLOOR	COPING	SILL	COPING	M.H.W.	FLOOR	COPING	M.H.W.	480V MAX HOTEL (INDUST)	2400 V ALT. HOTEL	132 KV TEST/CHECK	
LF	LC	WS	W	DS	WF	WC	DF	*	*	*	(e.g. indicate dimensions of pits in dock FLOOR)
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.

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-3Φ)			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	

APPENDIX B

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

LEGEND: Remarks Column

1/Type of work usually engaged in

2/Employment - Mid-1980

APPENDIX B

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES ^{a/}

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
<u>EAST COAST</u>				
<u>SHIPBUILDING YARDS</u>				
Bath Iron Works Corp. Bath, ME	(2) 650 (+) x 88 SW 700 x 130 SW 550 x 88 FD	850 <u>2900</u>		^{1/} Construction, conversion and repairs - all types of vessels. ^{2/} 6,119 Also has floating bow drydock for sonar domes.
Beth. Steel Corp. Sparrows Point, MD	(2) 900 x 108 SW 1200 x 192 GD	1260 <u>3970</u>		^{1/} New ship construction - to vessels 1200' in length. ^{2/} 2,866
General Dynamics Corp. Quincy SB Division Quincy, MA	(2) 860 x 123 GD 936 x 143 GD (2) 860 x 144 GD	893 <u>4600</u>		^{1/} Construction, conversion and repairs - all types of vessels. ^{2/} 3,650
Maryland SB and DD Co. Baltimore, MD	850 x 110 SW 775 x 110 FD 715 x 91 FD 900 x 146 FD	1902 <u>5650</u>		^{1/} Construction, conversion and repairs - all types of vessels. ^{2/} 1,800
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 114 GD** 461 x 68 GD** 1600 x 246 GD*	1370 <u>14620</u>		^{1/} Construction, conversion and repair - all types of vessels. ^{2/} 22,900 *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	1030 <u>12170</u>		^{1/} Ship construction, repairs, and conversion. ^{2/} 3,360
Sun Ship, Inc. Chester, PA	(2) 745 x 129 SW 700 x 195 SW 1000 x 195 SW 1100 x 195 FD	1100 <u>3900</u>		^{1/} Construction, conversion and repairs - all types of vessels. ^{2/} 4,100

^{a/} Shipbuilding: for ships 475' x 68' or above.

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

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)		Berths/Piers		Remarks
	SW--Shipway	FD--Graving Drydock	Usable length in feet	Longest Total linear feet	
EAST COAST					
REPAIR YARDS WITH DRYDOCK FACILITIES					
Beth. Steel Corp. Baltimore, MD	490 x 81 775 x 106 900 x 136 585 x 71	FD FD FD GD	964 13000		1/ Ship repairs and conversion. 2/ 750
Beth. Steel Corp. East Boston, MA	690 x 92 533 x 86	FD FD	1020 3111		1/ Ship repairs and conversion. 2/ 500
Beth. Steel Corp. Hoboken, NJ	443 x 66 685 x 106 549 x 90 640 x 96 1064 x 138	FD FD FD FD GD*	923 3000		1/ Ship repairs and conversion. 2/ 700 *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 the former Boston Naval Annex, owned by the Economic Development Industrial Corp. of Boston and leased to ship repair companies.
Ira S. Bushey & Sons Brooklyn, NY	455 x 71 300 x 66	FD FD	786 4086		1/ Ship repairs and conversion. 2/ 130
Coastal DD & Repair Corp. Brooklyn, NY	340 x 60 456 x 80 706 x 112 (2) 1094 x 143 761 x 100	GD GD GD GD GD	1400 5740		1/ Ship repairs and conversion. 2/ 950 Includes facilities formerly operated by Seatrain Shipbuilding Corp.
Colonna's Shipyard, Inc. Norfolk, VA	300 x 40 360 x 65	MR MR	900 2200		1/ General ship repairs. 2/ 153
Detyens Shipyards Mt. Pleasant, SC	560 x 82 305 x 87	FD FD	300 600		1/ General ship repairs. 2/ 425

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	
Jackson Engineering Co., Inc. Staten Island, NY	400 x 81	FD	500 x 81	FD	653 <u>2606</u>	1/ Ship repairs and conversion. 2/ 66
Jacksonville Shipyards Jacksonville, FL	(2) 660 x 90	FD*	900 x 140	FD	680 <u>4184</u>	1/ Ship repairs and conversion. Construction of small vessels. 2/ 2,000 *Leased from the Navy.
Perth Amboy DD Co. Perth Amboy, NJ	400 x 68	FD			400 <u>2130</u>	1/ Ship repairs and conversion. 2/ 156
Puerto Rico DD & Marine Terminals San Juan, PR	632 x 83	GD*			1000 <u>1000</u>	1/ Ship repairs. 2/ 110 *Leased from Navy.
Rodermond Industries Jersey City, NJ	425 x 80	FD	350 x 60	FD	842 <u>842</u>	1/ Ship repairs. 2/ 120
Savannah Shipyard Co. Savannah, GA	536 x 64	GD			382 <u>1563</u>	1/ Ship repairs and conversion. 2/ 400
Todd Shipyards Corp. Brooklyn, NY	700 x 85	GD	755 x 95	FD	1152 <u>7653</u>	1/ Ship repairs and conversion. 2/ 448
Tracor Marine, Inc. Port Everglades, FL	360 x 80 (Syncrolift)				1825 <u>1825</u>	1/ Ship repairs and conversion. 2/ 312
<u>GULF COAST SHIPBUILDING YARDS</u>						
Alabama DD & SB Co. Mobile, AL	(4) 523 x 68	SW	620 x 90	SW	1132 <u>9370</u>	1/ Ship construction, conversion, and repairs. Also drill rig construction. 2/ 2,300

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		
Avondale Shipyards, Inc.	*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	1625 3800	1/ Ship construction, conversion and repairs. Also drill rig construction. 2/ 7,507 *Three vessels up to 1020' x 174' can be constructed simultaneously. **Five large, greater than 600' LOA, vessels can be under construction simultaneously in this area. *** Westwego plant - Two plants can be constructed simultaneously.
Beth. Steel Corp. Beaumont, TX	800 x 96 SW 650 x 84 FD	1100 4050	1/ Construction of barges and drilling rigs. Also ship repairs and conversion. 2/ 2,177
Galveston SB Co. Galveston, TX	700 x 120 SW	None*	1/ Construction of barges, tugs and oceangoing integrated tug/barge units. 2/ 375 *City wharf in Galveston is available.
Ingalls SB Division Litton Industries Pascagoula, MS	(4) 690 x 85 SW 550 x 80 SW 650 x 90 SW 481 x 71 GD *800 x 173 FD	2650 8100	1/ Construction, conversion, overhaul - all types of vessels. 2/ 11,170 *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 SB Division Orange, TX	700 x 100 SW 420 x 122 FD 400 x 80 FD	600 2400	1/ Construction of offshore drilling rigs, drillships, barges and large commercial vessels. Repairs and conversion - all types of vessels. 2/ 1,980

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	
Levingston SB Co. Gulfport SB Division Port Arthur, TX	550 x 80 SW 400 x 80 SW (2) 325 x 68 FD		590 1270		¹ / Construction of offshore drilling rigs and barges. Ship repairs and conversion. ₂ /400
Marathon LeTourneau Co. Gulf Marine Division Brownsville, TX	1100 x 150 SW		1600 2100		¹ / Construction of offshore drilling rigs and drill ships. Yard has capability of building large oceangoing ships. ₂ /1227
Tampa Shipyards, Inc. Tampa, FL	500 x 105 SW 542 x 72 GD 896 x 146 GD		845 1800		¹ / Ship construction and repairs. ₂ /700
Todd Shipyards Corp. Galveston, TX	670 x 86 FD 475 x 85 SW		1160 7000		¹ / Ship construction, repairs and conversion. ₂ /737
Todd Shipyards Corp. Houston, TX	600 x 96 SW 600 x 96 FD		1844 3200		¹ / Ship construction, repairs and conversion. Construction of barges and vessels up to 600' in length. ₂ /488
<u>GULF COAST</u>					
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>					
Bender Welding & Machine Co. Mobile, AL	414 x 55 FD		617 2300		¹ / Ship repairs and construction up to 200' long. ₂ /700
Delta Shipyard Houma, LA	300 x 54 (Syncrolift)		Dolphins only		¹ / Construction and repair of small vessels up to 300' long. ₂ /200

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		
Equitable Shipyards, Inc. New Orleans, LA	325 x 90 MR	$\frac{500}{1654}$	$\frac{1}{}$ Construction and repair of small vessels and barges. $\frac{2}{980}$
Gulf-Tampa DD Co. Tampa, FL	348 x 47 FD		$\frac{1}{}$ Ship repairs. $\frac{2}{240}$
McDermott Shipyard Morgan City, LA	325 x 105 FD	$\frac{225}{225}$	$\frac{1}{}$ Ship construction, repairs and conversion. $\frac{2}{439}$
Southern SB Corp. Slideell, LA	350 x 54 GD	$\frac{200}{300}$	$\frac{1}{}$ Construction and repair of vessels up to 350' in length and not drawing over 15' of water. $\frac{2}{309}$
Todd Shipyards Corp. New Orleans, LA	696 x 86 FD 643 x 80 FD	$\frac{1725}{4956}$	$\frac{1}{}$ Ship repairs and conversion. $\frac{2}{507}$
<u>WEST COAST</u> <u>SHIPBUILDING YARDS</u>			
Beth. Steel Corp. San Francisco, CA	600 x 90 SW 700 x 94 FD 950 x 144 FD	$\frac{813}{3200}$	$\frac{1}{}$ Barge construction, ship repairs and conversion. Can build C3 and C4 type vessels. $\frac{2}{890}$
FMC Corp. Portland, OR	700 x 105 SW	$\frac{600}{1200}$	$\frac{1}{}$ Construction of vessels up to 700' in length. $\frac{2}{300}$ 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	
	MR--Marine Railway			Longest Total linear feet	
Lockheed SB & Construction Co. Seattle, WA	(2) 650 x 90 SW 700 x 100 SW 400 x 46 FD 530 x 80 FD 643 x 96 FD			800 6500	¹ / Ship construction, conversion and repairs - all types of vessels. ² / 1,700
National Steel and SB Co. San Diego, CA	980 x 170 GD 690 x 90 SW (2) 900 x 106 SW 397 x 52 FD* 687 x 90 GD*			1090 7075	¹ / Construction, conversion and repairs - all types of vessels. ² / 6,600 *Leases from Unified Port District of San Diego.
Todd Pacific Shipyards Corp. San Pedro, CA	(2) 800 x 84 SW 700 x 86 FD 550 x 80 FD			680 4800	¹ / Ship construction, repairs and conversion - all types of vessels. ² / 4,414
Todd Pacific Shipyards Corp. Seattle, WA	600 x 96 SW 650 x 83 FD 420 x 62 FD 425 x 88 FD			1137 4850	¹ / Ship construction, repairs and conversion - all types of vessels. ² / 4,680
Triple "A" Machine Shop Hunters Point San Francisco, CA	715 x 82 GD 996 x 107 GD 1088 x 136 GD (2) 416 x 56 GD 416 x 71 GD			600 24000	¹ / Ship repairs, overhaul and conversion. Has ship con- struction capability. ² / 280 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</u> <u>DRYDOCK FACILITIES</u>					
California SB & DD Co. Long Beach, CA	400 x 52 FD			600 1700	¹ / Ship repairs and conversion. ² / 107

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
Campbell Industries San Diego, CA	(2) 360 x 46 FD	575 <u>1975</u>		<u>1/</u> Construction of fishing boats. Also ship repairs. <u>2/</u> 400 Graving dock is leased from Unified Port District of San Diego. (Listed under NASSCO)
Dillingham Marine & Mfg. Co. Portland, OR				<u>1/</u> Ship repairs and conversion. <u>2/</u> 250 Leases drydocks and berths from Port of Portland as required.
Dillingham Shipyard Honolulu, HI	370 x 53 FD	600 <u>800</u>		<u>1/</u> Ship repairs and conversion. <u>2/</u> N.A.
Lake Union DD Co. Seattle, WA	340 x 56 FD	1000 <u>4235</u>		<u>1/</u> Ship repairs and conversion. <u>2/</u> 127
Marine Power & Equip. Co. Seattle, WA	400 x 57 FD 400 x 60 FD 400 x 101 (Syncrolift)	832 <u>2700</u>		<u>1/</u> Construction of small vessels and barges. Also ship repairs. <u>2/</u> 600
Merritt Ship Repair Co. Oakland, CA	320 x 52 FD	600 <u>1155</u>		<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> 1,270 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	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	6360		
	700 x 108	FD			
	1100 x 181	FD			
Richmond DD & Marine Repairs, Inc. Richmond, CA	744 x 80	GD*	1560		1/ Ship repairs and overhaul. 2/ N.A. *Leases from Port of Richmond, CA.
	583 x 80	GD*	1560		
	570 x 80	GD*			
Southwest Marine, Inc. San Diego, CA	380 x 80	FD	600		1/ Ship repairs and overhaul. Construction of vessels up to 200' in length. 2/ 700 Graving dock is leased from Unified Port District of San Diego (listed under NASSCO).
			1855		
Todd Shipyards Corp. San Francisco Division Alameda, CA	523 x 80	FD	800		1/ Ship repairs and conversion. 2/ 750
	900 x 136	FD	2485		
Triple "A" South San Diego, CA			None*		1/ Ship repairs and overhaul. 2/ 443 Graving dock is leased from Unified Port District of San Diego (listed under NASSCO). *Ships are worked at Navy piers.
Willamette Iron & Steel Co. Portland, OR			1232		1/ Ship repairs and conversion. 2/ 426 Leases drydocks and berths from Port of Portland as required.
			1232		

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)	Berths/Piers Usable length in feet	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway		
<u>GREAT LAKES</u>			
<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 1800	1/ Ship construction, repairs and conversion. 2/ 930
American SB Co. Toledo, OH	680 x 78 GD 540 x 68 GD	800 1600	1/ Ship construction, repairs and conversion. 2/ 330
Bay SB Corp. Sturgeon Bay, WI	750 x 105 SW 650 x 66 FD 1100 x 136 GD	900 7090	1/ Ship construction, repairs and conversion. 2/ 1,550
Fraser Shipyards Superior, WI	825 x 82 GD 630 x 62 GD	900 4450	1/ Ship construction, conversion and repairs. 2/ 211
<u>GREAT LAKES</u>			
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>			
American SB Co. Chicago, IL	694 x 73 GD	850 1300	1/ Ship repairs and conversion. 2/ 60
Peterson Builders Sturgeon Bay, WI	360 x 36 FD	550 2515	1/ Construction and repair of small ships and boats. 2/ 829

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

American Ship Repairs Co., Inc. Brooklyn, NY	Classon Industries Brooklyn, NY
Arnessen Electric Company, Inc. Brooklyn, NY	Diesel Injection Sales & Service Norfolk, VA
Atco Marine Corporation Brooklyn, NY	Electric Motor and Contracting Co. Norfolk, VA
Atlantic Marine, Inc. Fort George Island, FL	General Ship Corporation East Boston, MA
Atlantic Repair Co., Inc. Brooklyn, NY	General Ship Repair Corporation Baltimore, MD
Auto Marine Sales Corporation Ft. Lauderdale, FL	Golten Marine Co., Inc. Brooklyn, NY
Banks Ship Rigging Corporation Brooklyn, NY	Golten Ship Repair, Inc. Portland, ME
Berkley Shipbuilding & DD Corp. Norfolk, VA	Horne Brothers, Inc. Newport News, VA
Best Repair Company Norfolk, VA	Hudson Engineering Company Hoboken, NJ
Brady Marine Repair Co., Inc. Elizabeth, NJ	Ind-Mar Diesel Services Jacksonville, FL
Braswell Shipyards, Inc. Mt. Pleasant, SC	Industrial Welding & Machine, Inc. Portland, ME
Caddell Dry Dock & Repair Co. Staten Island, NY	J-Y Industrial Corporation Brooklyn, NY
Camden Ship Repair Co., Inc. Camden, NJ	Jackson Engineering Co., Inc. Hoboken, NJ
Charlton Marine, Inc. Jersey City, NJ	Jonathan Corporation Norfolk, VA

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

Marine Contractors Co., Inc.
East Boston, MA

Marine Electric Corporation
Brooklyn, NY

Meier & Oelhaf Company, Inc.
New York, NY

Merrill-Stevens DD Company
Miami, FL

Metro Machine Corporation
Norfolk, VA

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

Moon Engineering Co., Inc.
Norfolk, VA

Munro Drydock, Inc.
Chelsea, MA

Neptune Machine Works, Inc.
Brooklyn, NY

Newport Ship Yard, Inc.
Newport, RI

Nordic Diesel & Machine Co.
Brooklyn, NY

Norlantic Diesel, Inc.
Fairhaven, MA

North Florida Shipyards
Jacksonville, FL

Promet Marine Services Corp.
East Providence, RI

Reynolds Shipyard Corporation
Staten Island, NY

Rollinson Electric Contractors
Savannah, GA

Sandblasters, Inc.
John's Island, SC

Seahol Contracting Co.
Charleston, SC

South Portland Shipyard & Marine
Railway Corporation
South Portland, ME

Stephen Ransom, Inc.
Port Newark, NJ

Surless Ship Repair Corporation
Brooklyn, NY

Thames Shipyard & Repair Co.
New London, CT

Tickle Engineering Works, Inc.
Brooklyn, NY

Todd Electric Company
Norfolk, VA

Williams Brothers
Division of Gowen, Inc.
Portland, ME

Williams & Manchester Shipyard
Newport, RI

Wilmington Iron Works, Inc.
Wilmington, NC

GULF COAST

American Marine Corporation
New Orleans, LA

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

General Engineering Co.
New Orleans, LA

Hahn & Clay
Houston, TX

Harrisburg Machine Co., Inc.
Houston, TX

Hendry Corporation
Tampa, FL

Marine Repairs, Inc.
Houston, TX

McDonough Iron Works
Galveston, TX

Misener Industries, Inc.
Tampa, FL

National Marine Service
Harvey, LA

Newpark SB & Repair, Inc.
Houston, TX

Port Houston Marine, Inc.
Houston, TX

Runyan Machine & Boiler Works
Pensacola, FL

Saucer Marine Service, Inc.
New Orleans, LA

Sherman Shipyard
Panama City, FL

Slocum Iron Works, Inc.
Mobile, AL

Texas Shipbuilding Co.
Houston, TX

WEST COAST

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

Pacific Dry Dock & Repair Co.
Oakland, CA

Pacific Marine & Supply Co.
Honolulu, Hawaii

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

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

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

Pittsburgh & Conneaut Dock Co.
Conneaut, OH

Purvis & Foster
Detroit, MI

Soo Drydock Company
Sault Ste. Marie, MI

William Farrel, Inc.
Toledo, OH

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

Sen-Wel Industries, Inc.
Buffalo, NY

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

