

1979

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



U.S. DEPARTMENT OF COMMERCE
Maritime Administration

* 1979 *

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

* 1979 *

Prepared by:

Office of Ship Construction
Division of Production

Issued December 1979

CONTENTS

	<u>Page</u>
Introduction	1
General	2
Major Shipbuilding Facilities	3
Bath Iron Works Corporation	5
Bethlehem Steel Corporation - Sparrows Point Yard	7
General Dynamics Corporation - Quincy Shipbuilding Division.	9
Maryland Shipbuilding & Drydock Company	10
Newport News Shipbuilding & Dry Dock Company	12
Norfolk Shipbuilding & Drydock Corporation	15
Sun Shipbuilding & Dry Dock Company	16
Alabama Dry Dock and Shipbuilding Company	18
Avondale Shipyards, Inc.	18
Bethlehem Steel Corporation - Beaumont Yard.	20
Galveston Shipbuilding Company	21
Ingalls Shipbuilding Division/Litton Industries.	22
Levingston Shipbuilding Co. - Orange Shipbuilding Division	24
Levingston Shipbuilding Co. - Gulfport Shipbuilding Division	25
Marathon LeTourneau Company - Gulf Marine Division	26
Tampa Ship Repair & Dry Dock Co., Inc.	27
Bethlehem Steel Corporation - San Francisco Yard	28
FMC Corporation - Marine and Rail Equipment Division	29
Lockheed Shipbuilding and Construction Company	31
National Steel and Shipbuilding Company.	32

	Page
Todd Pacific Shipyards Corporation - Los Angeles Division	33
Todd Pacific Shipyards Corporation - Seattle Division.	35
Triple "A" Machine Shop, Hunters Point	36
American Ship Building Company - Lorain Ohio	37
American Ship Building Company - Toledo, Ohio	38
Bay Shipbuilding Corporation	39
Fraser Shipyards, Inc.	40
Employment	41
Material Shortages	42
Shipyards Pollution Abatement	43
Ship Repair Facilities	44
Major Drydocking Facilities	46
Major Topside Repair Facilities	47
Exhibit 1 Shipbuilding Industry in United States	48
Exhibit 2 Bath Iron Works - Yard Plan	49
Exhibit 3 Bethlehem, Sparrows Point - Yard Plan	50
Exhibit 4 General Dynamics, Quincy - Yard Plan	51
Exhibit 5 Maryland Shipbuilding - Yard Plan	52
Exhibit 6 Newport News Shipbuilding - Yard Plan	53
Exhibit 7 Norfolk Shipbuilding (Berkley Plant) Yard Plan	54
Exhibit 8 Sun Shipbuilding - Yard Plan	55
Exhibit 9 Alabama Dry Dock - Yard Plan	56
Exhibit 10 Avondale Shipyards - Yard Plan	57

	<u>Page</u>
Exhibit 11 Bethlehem, Beaumont - Yard Plan	58
Exhibit 12 Galveston Shipbuilding - Yard Plan	59
Exhibit 13 Ingalls/Litton (East Bank) - Yard Plan	60
Exhibit 14 Ingalls/Litton (West Bank) - Yard Plan	61
Exhibit 15 Levingston Shipbuilding (Orange, TX) - Yard Plan.	62
Exhibit 16 Levingston Shipbuilding (Gulfport Division) - Yard Plan .	63
Exhibit 17 Marathon, Gulf Marine Division - Yard Plan	64
Exhibit 18 Tampa Ship Repair - Yard Plan	65
Exhibit 19 Bethlehem, San Francisco - Yard Plan	66
Exhibit 20 FMC Corporation - Yard Plan	67
Exhibit 21 Lockheed (Plant 1) - Yard Plan	68
Exhibit 22 Lockheed (Plant 2) - Yard Plan	69
Exhibit 23 National Steel - Yard Plan	70
Exhibit 24 Todd, Los Angeles - Yard Plan	71
Exhibit 25 Todd, Seattle - Yard Plan	72
Exhibit 26 Triple "A", Hunters Point - Yard Plan	73
Exhibit 27 American Ship, Lorain - Yard Plan	74
Exhibit 28 American Ship, Toledo - Yard Plan	75
Exhibit 29 Bay Shipbuilding - Yard Plan	76
Exhibit 30 Fraser Shipyards - Yard Plan	77
Exhibit 31 Shipbuilding Program (Title V)	78
Exhibit 32 Ship Financing Guarantee Construction Program (Title XI)	79

	<u>Page</u>
Exhibit 33 Major U.S. Private Shipyards - Number of Shipways by Maximum Length Capability	80
Exhibit 34 Shipyard Status - Need for New Business	81
Exhibit 35 U.S. Shipyard Employment	82
Table I Ship Construction Capability by Ship Type	83
Table II Major U.S. Private Shipyards - Number of Shipbuilding . . . Ways by Length	95
Appendix A Standard Form 17 - Facilities Available for the Construction or Repair of Ships	98
Appendix B Major U.S. Shipbuilding and Repair Facilities	107
Appendix C Major Topside Repair Facilities	119

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 1979 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.

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

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."

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 Domestic Business Development with MarAd. The Federal Preparedness Agency in the General Services Administration also receives this information.

General

The annual shipyard survey of 1979 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 1979 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 clearance at each side between the ship and the wing wall.

For graving docks, the maximum ship length was determined by allowing a 2-foot 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 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 length overall (LOA) and a beam of 68 feet. These dimensions represent the smallest ship size that has previously been considered for mass production during a mobilization period. There are presently 27 shipyards in this category, which are identified and geographically located in Exhibit 1.

Despite the continuing worldwide shipping depression, the climate of uncertainty, and the global overcapacity in shipbuilding, the U.S. shipbuilding and ship repair industry in FY 1979 invested some \$208 million in facilities modernization and expansion, and as of July 1, 1979, planned to spend an additional \$221 million to improve facilities during the year ending June 30, 1980.

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 \$1.7 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 30 are general arrangement plans outlining shipbuilding and repair facilities in 27 of the major yards. Detailed descriptions of these exhibits are included in this report.

As of October 1, 1979 (see Exhibit 31), MarAd was subsidizing a construction backlog of 30 large oceangoing ships in nine shipyards, with a total contract value of \$2 billion. These were in addition to 26 nonsubsidized ships under construction or on order in U.S. shipyards. MarAd was also providing financing guarantees for 253 vessels and 150 lighters under contract in 28 shipyards throughout the country (see Exhibit 32). The total Title XI guarantee value of these vessels and lighters was approximately \$1.6 billion.

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 basin at Bethlehem's Sparrows Point shipyard can accommodate one 265,000-dwt. tanker or four of the smaller 475-foot by 68-foot 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 114 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 basin a complete 610-foot containership and the stern section of a second ship could be constructed simultaneously. This production procedure, analyzed periodically by SPAMM, maximizes the use of shipbuilding facilities, minimizes the construction period, and increases the number of ships that can be produced in a given period of time.

^{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.

Table II is a somewhat different presentation of the data, meaningful to many requesting information from the annual survey. In lieu of actual ships, maximum ship length is used to determine the number of shipways or basins available. In this tabulation, the emphasis is on the number of individual facilities available and not on the number of ships that can be constructed. Again using Sparrows Point as an example, Table II lists the 1,200-foot by 192-foot basin as one facility regardless of what type of ship is constructed in it. Table I indicates that there are six building positions for a ship 475 feet LOA at Sparrows Point, whereas Table II indicates that the yard has three individual shipways capable of constructing a ship 475 feet in length. Exhibit 33 is a histogram displaying the reduction in the number of available shipways as the maximum ship length increases.

There is sufficient U.S. shipyard capacity to handle merchant shipbuilding requirements in the near future. Exhibit 34 indicates when each of the major commercial yards needed new contracts as of October 1, 1979 in order to maintain an adequate backlog for available facilities and manpower. Estimates on 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.

Following is a brief description of 27 major U.S. commercial shipyards capable of constructing oceangoing or Great Lakes merchant ships, with a minimum size of 475 feet by 68 feet.

1. Bath Iron Works Corporation

Bath Iron Works Corporation, a subsidiary of Congoleum 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 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 25,000-dwt. "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 May 1978, a 26,600-dwt. containership was delivered to Matson Navigation Company; and in June 1979, the first of two 14,600-dwt. containerships (MA Design

C5-S-73b) was delivered to Farrell Lines. The only commercial vessel currently on the ways is the second Farrell containership.

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 November 1977; and the Navy has awarded the company follow-on contracts for the construction of fourteen additional FFG-7 Class guided-missile frigates, the last of which is scheduled for delivery in late 1983. Now at peak production on the FFG program, the Bath shipyard is launching an FFG every 3½ months. Also swelling the backlog of work are the major overhauls of two Navy ships, the frigate W.S. SIMS (FF-1059) and the guided-missile destroyer CONYNGHAM (DDG-17).

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 in length between perpendiculars (LBP) with a maximum beam of 130 feet, or two ships per way with a beam of 54 feet each; the installation of a 220-ton level luffing crane with sufficient outreach to erect units on all shipways; and new steel fabrication shops and equipment that have increased steel throughput capacity by 50 percent. To accommodate its accelerated shipbuilding program, the Bath yard in 1979 completed a \$3.2 million expansion of its main assembly building which doubled the interior work area.

With the purchase of a 5-unit, 9,500-ton floating drydock from General Dynamics in 1976, BIW's management decided that overhaul and repair work would no longer be just a stop-gap alternative to fill the production lulls in new ship construction. A fully staffed Overhaul Division has been established to manage the yard's expansion into this field.

In addition to the two upgraded building positions, Bath operates one other shipway that can accommodate a ship 650 feet in length with a beam of 88 feet. Besides the new floating drydock that can handle ships up to 550 feet by 88 feet, 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 for outfitting and repair work. One wharf is serviced by two 25-ton rotating cranes, and the other wharf by one 25-ton rotating crane. The pier is serviced by a 94-ton rotating crane.

BIW operates a supporting facility, the Hardings plant, located three miles 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 yard is not considered to be automated although numerically controlled plasma burning is employed.

As of July 1979, the administrative and production work force totaled 5,311 compared with 4,460 a year earlier.

Exhibit 2 is a current plot plan of the Bath Iron Works Facilities.

2. 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 containerships. 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 265,000-dwt. crude carriers (MA Design T10-S-101b), among the largest ever built in the United States. The first of these 1,100-foot VLCC's, the MASSACHUSETTS, was delivered in 1975. The NEW YORK and MARYLAND were completed in 1976, and the AMERICAN SPIRIT and AMERICAN INDEPENDENCE were delivered in 1977. During 1978, an auxiliary repair drydock was built for the U.S. Navy, and the bow sections were completed for two 390,770-dwt. tankers under construction at Newport News Shipbuilding.

As of November 1, 1979, the following comprised the new construction backlog at Sparrows Point: two 27,340-dwt. container/unitized cargo ships (MA Design C8-S-85d) for Farrell Lines, one oceangoing 47,000-dwt. tug/barge (CATUG) tanker for Artemis Marine Co. (Berger Group), and a total of seven of these tug/barge vessels for subsidiaries of Amerada Hess Corporation. However, Hess had until November 16 to exercise an option to cancel three of the vessels. Bethlehem is subcontracting construction of all of the tugs to Halter Marine, Inc.

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, are the building basin for construction of ships as large as 1,200 feet by 192 feet and a 68,000-square-foot panel shop for fabrication of steel. This fabrication shop is capable of constructing panels up to 60 feet square, four feet in depth, and weighing up to 200 tons. Other improvements include the structural strengthening of pier No. 1 to accommodate VLCC's, a numerically controlled gas plate-cutting machine and automated plate and shape blasting-painting equipment.

Complementing the large construction basin, Sparrows Point has two active building ways, each of which can accommodate a maximum ship size of 900 feet by 108 feet. One of these ways is being used temporarily as a storage area. Two smaller sliding ways are presently 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 of space serviced by four tower cranes ranging in capacity from 30 to 50 tons. Several locomotive cranes of various capacities are also available.

The total labor force at the Sparrows Point yard was 2,450 at mid-1979, down about 900 from a year earlier.

Exhibit 3 is a current plot plan showing the company's construction facilities.

3. General Dynamics Corporation - Quincy Shipbuilding Division

The Quincy Shipbuilding Division of General Dynamics Corporation is located on the Fore River in Quincy, Mass. This 180-acre 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. In August 1980, Quincy is scheduled to deliver the last in a series of ten high technology, 125,000-cubic-meter LNG carriers. The first of these 935-foot sisterships, the LNG AQUARIUS (MA Design LG8-S-102a), was completed in 1977 and was the first LNG ship built in the United States. The company is aggressively pursuing shipbuilding and repair work in order to keep its labor force intact until additional contracts for LNG carriers or other major ship construction materializes.

To provide the tools and facilities to efficiently build the LNG tankers in series production, General Dynamics in 1975 completed a major improvement 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 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 turn-over fixture, and two 40-ton cranes. In addition, a 1,200-ton Goliath crane, the largest gantry in the Western Hemisphere, was installed for transferring the 120-foot-diameter 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, S.C. facility for fabrication of the 800-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 in length and 144 feet in beam, and since the LNG vessels are 935 feet LOA, hull erection in Basins No. 11 and 12 excludes the bow section.

Following float-out from No. 11 or No. 12, the ships are 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. The 900-ton bow units of the LNG's are constructed at the inboard end of Basin No. 6 and are lifted by the 1,200-ton Goliath crane over into No. 7 where they are attached to the hull. The spheres are barged 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 LOA and 123 feet in beam.

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. Each pier and the wet basin is serviced by adequate crane capacity for outfitting and general repair work. The building basins can also be used as drydocks for repair work when not in use for new construction or conversion.

The Quincy shipyard will be without major construction work when the last of its current workload of LNG's is completed in August 1980. Layoffs could possibly reach 1,500 by the end of 1979. Employment dropped from 6,050 at mid-1978 to 4,856 at mid-1979. At the General Dynamics plant near Charleston, S.C., which is manufacturing the spherical aluminum tanks for the LNG ships, the labor force fell from 560 in July 1978 to 340 in July 1979.

4. Maryland Shipbuilding & Drydock Company

Maryland Shipbuilding & Drydock Company, a subsidiary of Fruehauf Corporation, is located on the south bank of the Patapsco River in Baltimore, Md. This yard 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 195-foot trawler/factory ships, which are 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.

An unusual new building job, completed in 1976 for Bulk Food Carriers, was the 626-foot-long VALERIE F, the cargo-carrying unit of an integrated tug/barge. The tug was built by Southern Shipbuilding Corporation. In 1977 and 1978, the company's activities consisted principally of long-term Navy repair and overhaul, commercial ship repair, and the design and manufacture of industrial condensers.

In addition to 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.

Recently, Maryland completed the final phase of a major modernization and expansion program, the main features of which are:

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

In addition to the new floating drydock, Maryland operates three other floating drydocks, primarily for repair and conversion work. The maximum ship sizes that the older drydocks can accommodate are 775 feet by 110 feet, 715 feet by 91 feet, and 210 feet by 76 feet. There are 5,650 feet of pierside berthing available for topside and inboard repair. Each pier and drydock is served by adequate crane capacity.

The total administrative and production work force at mid-1979 was approximately 1,100 and is expected to increase to 1,600 by year's end.

Exhibit 5 is a current plot plan of Maryland's facilities.

5. 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 was founded in 1886 and is a subsidiary of Tenneco, Inc. Orders for naval vessels have been traditionally a mainstay for Newport News, which has built 22 aircraft carriers, 29 nuclear-powered submarines, and 120 other surface ships for the U.S. Navy. Commercial vessels delivered by the yard include 71 cargo ships, 82 tankers, 63 passenger ships (most notably the famed superliner UNITED STATES), and more than 50 other vessels. Newport News 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 July 1, 1979, was at work on 10 nuclear-powered ships for the U.S. Navy - one aircraft carrier, one guided missile cruiser, and eight attack submarines. These ships are under construction in the 260-acre South yard which also handles overhauls and repair work.

Commercial shipbuilding is carried out in the North Yard. In 1978, the company completed two 125,000-cubic-meter LNG carriers, the EL PASO SOUTHERN and the EL PASO ARZEW. A third LNG, the EL PASO HOWARD BOYD, was delivered in June 1979. The U.S.T. ATLANTIC, the first of two 390,770-dwt. ultra-large crude carriers (ULCC's) was delivered in March 1979. A sistership, the U.S.T. PACIFIC, is to be delivered later this year. These ULCC's are the largest commercial ships ever built in the United States. After completion of the U.S.T. PACIFIC, no other commercial ship construction remains in the yard. However, in June 1979 conversion contracts were signed to jumboize three tankers - two for affiliates of Keystone Shipping Company and one for the Berger Group.

The North yard, completed in 1977, is adjacent to the South yard on 150 acres of land reclaimed from the James River. This facility was designed for high production and efficiency and 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 long, 250 feet wide and 44 feet deep. In this graving dock, one ULCC or large LNG and part of a second can be built simultaneously. The all-weather steel production plant includes automated panel lines and supporting equipment. A 900-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 8-acre final assembly platen and has a height of 234 feet overall, a girder clearance of 200 feet and a span between rail centers of 540 feet. The North yard has one 1,670-foot outfitting berth and one 1,000-foot mooring berth.

Newport News is well into a major expansion and upgrading of its South yard facilities, to almost double the yard's capacity for ship repair and overhaul. A new graving dock (#4) is under construction, to replace shipway #7 which is being demolished. Existing graving dock #3 will be upgraded and modernized. These two drydocks will be used for repair and overhaul of nuclear-powered submarines. Also part of this continuing facilities improvement program is the rebuilding of several piers and the installation of larger capacity cranes at drydocks and piers.

Currently, all Navy ship construction is taking place in the South yard. The South yard has four inclined shipways, two of which can accommodate a maximum ship size of 940 feet by 125 feet, one a ship size of 715 feet by 93 feet, and one a ship size of 447 feet by 93 feet. This last building way can be extended to handle ships with a length of about 649 feet. There are also two building basins serviced by a 310-ton gantry crane that can accommodate ships up to 1,100 feet by 136 feet and 960 feet by 124 feet. In addition, the South yard has three graving docks that are used for repair, conversion and overhaul of naval and commercial vessels. The largest of these can accommodate a maximum ship size of 858 feet by 102 feet. Nine piers for outfitting and topside repair are available with a combined berthing space of approximately 7,166 linear feet. These piers are serviced by cranes with capacities of up to 140 tons and are supplemented by locomotive cranes and floating derricks with capacity to 65 tons.

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

- o A 6-1/2 acre steel fabrication shop where various types of steel and other metals ranging in thickness from 1/8 inch to 6 inches, up to 45 ft. long and weighing as much as 17-1/2 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 U.S. where steel castings weighing as much as 128,000 lbs. and alloy steels, copper, nickel, aluminum, brass and other nonferrous alloys are poured;
- o A 300,000 sq. ft. machining complex with over 250 machines including a 42 ft. boring mill, and lathes with maximum swing of 124 in. diameter and lengths up to 68 ft. between centers;

- o A large pipe fabrication facility with machines capable of bending pipe up to 12 in. 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. automated material storage facility.

The total labor force at Newport News dropped from 25,000 in mid-1978 to 22,400 in mid-1979.

Exhibit 6 is a current general arrangement drawing showing major facilities in both the South yard and the North yard.

6. Norfolk Shipbuilding & Drydock Corporation

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

This company has sophisticated new construction experience, as demonstrated in the construction of two U.S. Coast and Geodetic Survey vessels in the late 1960's and a Navy patrol frigate, PF-108, 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 320-foot ferryboat. The yard's principal activity, however, is ship repairs and overhaul.

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, non-destructive 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 a day.

A multifaceted expansion program emphasizing repair operations was completed in February 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 long, 192 feet wide and 160 feet between the wingwalls. The drydock has a lifting capacity of 54,250 long tons with 4,000 tons of residual water and one foot of freeboard.

A new 1,030-foot-long concrete pier, to be used for repair and servicing of ships as long as 1,200 feet, 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.

In 1977, Norshipco announced a 6-year contract with El Paso Marine Company, a subsidiary of the El Paso Company, for annual dry-docking and repairs to its fleet of nine liquefied natural gas (LNG) carriers.

For major ship construction, the company's Berkley Plant operates a building way which can accommodate ships as large as 475 feet in length by 85 feet 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 640 feet by 88 feet. The largest of the company's four marine railways can accommodate a vessel 441 feet by 64 feet and has a lifting capacity of 5,500 tons.

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

Norshipco's payroll totaled 3,500 at mid-1979, an increase of about 1,000 since mid-1978. The work force is expected to reach 4,000 by early 1980.

Exhibit 7 is a current plan of the Berkley Plant, the largest of the company's three plants.

7. Sun Shipbuilding & Dry Dock Company

Sun Ship, located in Chester, Pa., is a complete shipbuilding and manufacturing complex encompassing nearly 200 acres 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.

In January 1979, Sun completed construction of the KENAI, the second of its 118,300-dwt. double-hull Ecology Class crude carriers, for a subsidiary of SOHIO. This is a sistership of the TONSINA, delivered in 1978.

New construction contracts currently underway at Sun Ship comprise the following: three 692-foot RO/RO containerships for Waterman Steamship Corp.; two 31,000-dwt. product tankers for a subsidiary of the Sun Company; a 720-foot containership for Matson Navigation Company; two 130,000-cubic-meter LNG carriers for Pacific Lighting Marine; and an oceangoing self-propelled hopper dredge for the U.S. Army Corps of Engineers.

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, a 1,100-foot 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 gantry cranes and three 75-ton gantry cranes. Two halves of a ship as large as 1,400 feet by 195 feet can be constructed, or two smaller vessels 700 feet in length or less can be built simultaneously. For launching, each half of a large ship 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 gantry cranes, two 10-ton gantry cranes, a 25-ton truck crane, and an 800-ton barge crane, which is used for both construction and major repair work.

Underway at Sun Ship is a new modernization and expansion program to improve the yard's fabrication shop facilities, which will result in approximately a 60,000-ton annual steel throughput capacity. This program includes: (1) installation of 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. The yard has a total of 3,900 feet of usable berthing space with modern pierside facilities.

The shipyard's total work force at mid-1979 was 4,000, a slight increase over a year earlier.

Exhibit 8 is a current layout of plant and facilities at Sun Ship.

8. Alabama Dry Dock and Shipbuilding Company

Alabama Dry Dock and Shipbuilding Company (ADDSCO) has been in operation for 63 years. It is located on Pinto Island across the river from Mobile, Ala., 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 year, the company continued its facility improvements, mainly the upgrading and modernization of existing drydocks, piers, shops and equipment.

Currently, ADDSCO's principal activity is repair, overhaul, and conversion work. The company is aggressively seeking ship construction and repair contracts.

Alabama Dry Dock operates four side-launching shipways, each of which can accommodate a maximum ship size of 523 feet by 68 feet, and one sliding way which can handle vessels as large as 620 feet by 90 feet. All of these ways are too small to construct today's mammoth ships. ADDSCO also operates three floating drydocks that can handle ship sizes of 750 feet by 100 feet, 620 feet by 83 feet, and 380 feet by 70 feet. There is also 9,370 feet by berthing space available at seven finger piers for topside and inboard repairs. There are 19 revolving gantry cranes with capacities varying from 12 tons to 65 tons available to service the shipways and berthing areas. A 275-ton Goliath bridge crane, which straddles the slip between piers K and L, is used for repair work and outfitting.

ADDSCO, as of mid-1979, employed a labor force of 1,500, approximately the same as a year earlier.

Exhibit 9 is a current general arrangement of the yard's facilities.

9. 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 164,000-dwt. crude oil carriers, four for SOHIO and two for EXXON (USA).

As of September 1, 1979, the following commercial vessels were under construction or on order: three 125,000-cubic-meter LNG carriers (MA Design LG9-S-107a) for El Paso; two LASH ships (MA Design C9-S-81f) for Waterman; three large containerships (MA Design C9-M-132b) for American President Lines; two 42,000-dwt. Ogden Marine product tankers; three 39,500-dwt. integrated tug-barge chemical/oil vessels (MA Design IB6-MT-130a) for subsidiaries of Occidental Petroleum Corporation; and two self-propelled hopper dredges, one for Eagle Dredging Corporation and one for the U.S. Army Corps of Engineers. Also in production at Avondale were five auxiliary oilers (AO's) for the U.S. Navy.

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 in length by 174 feet 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 long, 260 feet wide and 78 feet high, with 220 feet clear width inside the wing walls. It can accommodate ships as large as 1,000 feet in length by 216 feet wide, and the lifting capacity is 81,000 long tons. The dock is serviced by gantry cranes of 60 and 200 tons capacity which are mounted on the supporting wharf, two 50-ton gantry cranes on the drydock floor, and a 600-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 with a light weight of approximately 16,000 long tons. Up to five large vessels, greater than 600 feet 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 down-hand 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. ship-builder has had more success with series production of commercial ships. The yard offers approximately 3,800 feet of berthing space, serviced by 30-ton to 50-ton gantry cranes. Use of the 600-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 long by 90 feet in beam. A floating drydock, 380 feet by 76 feet, with a lifting capacity of 3,800 long tons, is available at Westwego for repair of small ships, river boats and barges.

As a result of the company's record backlog of orders, employment at mid-1979 was 7,494, up from 6,180 a year earlier.

Exhibit 10 is a current arrangement plan of Avondale's main plant.

10. Bethlehem Steel Corporation - Beaumont Yard

This shipyard, located on the Neches River in Beaumont, Tex., was established in 1916 by Beaumont Shipbuilding and Drydock Company, which, in addition to repair and conversion work, built C1-A cargo ships and Navy minesweepers during World War II. Bethlehem acquired the yard in 1947 and has pioneered in the design and production of mobile 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 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 1978, the Beaumont yard delivered five offshore drilling or storage-production vessels and signed eight contracts for construction of drilling rigs. The latter is a record for any year in the yard's history. Several large ship repair-conversion projects were also completed during the year.

Bethlehem-Beaumont is currently engaged mainly in work for the petrochemical industry. As of October 1, the yard's large backlog of new construction consisted of nine jack-up drilling 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 and also operates a smaller side-launching way which is available for barge construction or repair. One floating drydock is available which can handle vessels as large as 650 feet by 86 feet. The Beaumont plant has 4,050 feet of berthing space serviced by adequate crane capacity for outfitting and general repair work.

Employment at Bethlehem-Beaumont was 1,937 as of mid-1979, up from 1,241 in mid-1978.

Exhibit 11 is a current layout of the plant and facilities.

11. 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, Tex. This medium-sized yard began operations in 1966 and has been primarily a builder of barges and tugs, although it has the capability of building tankers up to about 35,000 dwt. 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 35,000-dwt. catamaran type oceangoing integrated tug/barge (Catug) for Seabulk Tankers, Ltd. In 1977, the SEABULK MAGNACHEM, a 40,000-dwt. Catug was delivered to Hvide Shipping, Inc. In 1978, construction was completed on two 469-foot-long chemical tank barges; and in mid-1979, a 37,700-dwt. oceangoing petroleum barge unit was delivered to Belcher Towing Co.

Currently in production at Galveston are a 55,000-dwt. ocean-going petroleum barge unit for Belcher and two 20,000-dwt oceangoing barges for Interstate and Ocean Transport 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. A present limitation is that, except at the launch site where the water is approximately 20 feet deep, the water depth on the way to the channel is only about 12 feet. However, by means of pontoons (sectional barges fitted together), a vessel with up to an 18-foot 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 syncrolift. In the absence of a drydock, arrangements must be made to drydock large vessels at Todd-Galveston or Levingston Shipbuilding Company. Since the former Kelso yard does not have an outfitting berth, outfitting is done at the municipal pier in Galveston.

In mid-1979, Galveston Shipbuilding Company's total work force was 341, up from 260 a year earlier.

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

12. Ingalls Shipbuilding Division/Litton Industries

The Ingalls Shipbuilding Division, a wholly owned subsidiary of Litton Industries, Inc., is actually two separate shipyards. Located on the Gulf of Mexico at Pascagoula, Miss., Ingalls is a diversified shipbuilding complex 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 September 1978, the Navy awarded Litton Industries a \$287.8 million contract for design and construction of the prototype ship of a new class of guided-missile destroyers, the DDG-47, equipped with the Aegis air defense system. Delivery of this lead ship is scheduled for early 1983. In addition to this contract, as of October 1, 1979, the backlog of Navy work at the Pascagoula shipyard consisted of the following: one LHA amphibious assault ship, eight Spruance class (DD-963) destroyers, and four DDG-993 class destroyers. These four destroyers were originally ordered for the Iranian Navy. Currently, Ingalls has no contracts for new commercial ships.

The older of the two Ingalls yards is referred to as the East Bank yard. It has been in operation for 41 years, engaging primarily in new construction of commercial cargo ships and tankers, and in 1974 completed a series of highly productive containerships. These were the last commercial vessels built at Ingalls. The yard has six inclined shipways. Maximum ship sizes which can be accommodated are: four ways 650 feet by 90 feet, one way 690 feet by 85 feet, and one way 550 feet by 80 feet. The East Bank plant has one small graving dock which has been used for construction of nuclear-powered submarines but is currently being used mainly for repair work. A wharf and four piers serviced by cranes with a 50-ton maximum capacity provide a total of 3,700 feet of berthing space for outfitting and topside repair.

The ultramodern West Bank yard, completed in 1970, 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 225-foot-long, 6,000-ton modules. After modules are completed in the module assembly area, they are moved to the integration area where they are erected into a complete ship. The completed ship is then moved onto a launch pontoon which is subsequently floated and moved to a deep water area where it is sunk and the ship launched. The West Bank yard at the present time can launch a maximum ship size of 800 feet by 173 feet. It is estimated that the various assembly and subassembly areas are the equivalent of six conventional inclined ways in terms of the number of ships that could be delivered annually. Approximately 4,400 feet of berthing space, serviced by cranes varying from 25 tons to 200 tons, are available for outfitting.

Ingalls Shipbuilding Division at mid-1979 employed a total labor force of 16,926, down from 20,750 a year earlier.

Exhibits 13 and 14 are current general arrangement plans of facilities in the Ingalls East Bank and West Bank yards.

13. Levingston Shipbuilding Company - Orange Shipbuilding Division

Levingston, one of the leading producers of offshore drilling rigs, was founded in 1933. The 100-acre plant is strategically located on the Sabine River at Orange, Tex., approximately 30 miles inland from the Gulf of Mexico. Gulfport Shipbuilding, in Port Arthur, Tex., was purchased in 1970 by Levingston to supplement Levingston's construction and repair facilities at Orange, Tex. In 1975, Levingston became a wholly owned subsidiary of Ashland Oil, Inc.

Levingston combines commercial ship construction with its traditional offshore industry work, and with a solid base of ship repair and some industrial fabrication. To date, the yard has built 65 drill barges, 25 tenders, ten drillships, 12 jack-ups, and six semi-submersibles. Levingston has designed a sizeable portion of the rigs constructed in its shipyard. However, Levingston is not limited to serving the petrochemical industry. It has built several patrol frigates for the Navy, as well as tugs, barges, ferries, and small cargo vessels.

In August 1978, the company completed the second of two 450-foot-long 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 10,000-dwt. product tanker to Cleveland Tankers, Inc., and two jack-up drilling rigs. Two more jack-up rigs were completed in 1979.

As of October 1, 1979, Levingston had under construction or on order five 32,000-dwt. dry-bulk carriers (MA Design C5-M-129a) for Levingston Falcon I Shipping Company, with delivery of the first ship scheduled for late 1980. These 612-foot-long 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 15 years. Also in production at Levingston is a \$22 million drilling rig for an Argentine company.

A long-range expansion and modernization program is underway at the Orange, Tex. yard, in order to eventually increase steel throughput from about 25,000 tons/year to 50,000 tons/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 can be constructed on Levingston's 1,100-foot-long side-launch building way. A 200-foot 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. Total usable berthing space is about 2,400 feet.

In September 1979, the total work force at the Orange plant was 1,769. It is expected to peak at about 2,100 during construction of the Falcon cargo ships.

Exhibit 15 is a current general arrangement drawing showing construction facilities at Levingston's Orange, Tex. yard.

14. Levingston Shipbuilding Company - Gulfport Shipbuilding Division

Levingston's Gulfport shipyard, located in Port Arthur, Tex., is primarily engaged in ship repairs and conversion, although it has the capability of building ships up to about 550 feet long by 80 feet 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 can be constructed, the yard has a smaller, side-launching way. Of the three floating drydocks, two can handle vessels as large as 325 feet by 68 feet. There is a total of 1,270 feet of alongside berthing.

The mid-1979 work force at Gulfport was about 300, unchanged from a year earlier.

Exhibit 16 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.

15. 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 on a 133-acre tract with a 2,500-foot frontage on the ship channel at the Port of Brownsville, Tex. In addition to the construction of offshore drilling rigs, the yard has the capability of fabricating and launching drillships, barges, work boats, tugs, supply vessels, and large merchant ships. Marathon's Vicksburg, Miss. plant and another in Longview, Tex. serve as support facilities for the Brownsville yard.

As of October 1, 1979, the Gulf Marine Division was building a total of ten jack-up drilling rigs.

The Brownsville yard operates one shipbuilding way with a maximum ship size of 1,100 feet by 150 feet on which oceangoing ships could be constructed in the event of national emergency. Modular construction techniques are combined with conventional shipbuilding methods. Large module sections are fabricated on a forming and subassembly slab about 400 feet by 200 feet, which is actually an extension of the yard's building way. A 250-ton gantry crane travels on rails which run the full length of the slab and building way. The crane lifts the subassembly sections from the slab to the launchway, and the sections are joined to form the completed vessel which is then side-launched. For outfitting purposes, there is one 500-foot-long wharf. Estimated steel throughput in this shipyard is from 750 to 1,000 tons a month.

At mid-1979, the total work force at the Brownsville plant was 1,200, slightly higher than a year earlier.

Exhibit 17 is a plot plan of the yard's construction facilities.

16. Tampa Ship Repair & Dry Dock Co., Inc.

Founded in 1948, Tampa Ship Repair & Dry Dock Co. is the largest ship repair facility on the West Coast of Florida. It is located at Hooker's Point on Tampa Bay in Tampa, Fla. 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 year the facility was purchased by The American Ship Building Company, Tampa Ship completed the conversion of a C1-M-AV1 cargo ship to a deep sea drillship; and a year later, it built two hulls for a large semisubmersible drilling rig under construction at Bethlehem-Beaumont.

Although Tampa Ship has the capability to construct large ocean-going ships, it 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 13,500-dwt. coal barge for Electric Fuels Corporation, completed in November 1978. Currently, Tampa is actively pursuing ship 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 graving dock with all necessary ancillary equipment and services, including a 90-ton crane. This drydock, leased from the Tampa Port Authority, is designed to accommodate vessels up to 125,000 dwt. and 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.

The company recently announced plans for Phase II of its overall expansion program. Plans are to reconstruct two existing slips, each measuring 1,200 feet by 80 feet, into a combination wet berth/drydock facility. A finger of land will be removed to create two large wet berths. Two gates will then be placed on each side of the remaining portions, thereby creating two additional drydocks for the construction or repair of small ships and large barges.

Tampa Ship currently operates one sliding way which can accommodate a maximum ship size of about 500 feet by 105 feet. This building way is serviced by three 40-ton gantry cranes. In addition to the new graving dock, the company operates a graving dock that can handle vessels up to 542 feet by 72 feet. Usable berthing space in the yard totals about 1,800 feet.

Mid-1979 employment at this Florida yard was 1,193, up from about 640 a year earlier.

Exhibit 18 is a current general plan of Tampa Ship's main plant. Since the large building way is located approximately one-half mile 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.

17. Bethlehem Steel Corporation - San Francisco Yard

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

During World War I, as a subsidiary of Bethlehem Steel, the yard delivered destroyers at the rate of three a month. In the huge ship-building, 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 33,000-dwt oil tankers.

Bethlehem-San Francisco demonstrated its flexibility in the 1960's. Shipbuilding continued with the construction of four C4 cargo ships, two 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 3-year program to build 22 large 400-foot by 100-foot barges. During 1977 and 1978, in addition to repair work, the company converted four LASH vessels to full containerships for Pacific Far East Line. The yard is currently building six combination grain/petroleum products barges for Crowley Maritime Corporation, with an option to build six additional barges.

Bethlehem-San Francisco operates one building way. It is a conventional end-launch type and can accommodate ships up to 550 feet by 90 feet. The yard's mammoth floating drydock (maximum vessel size 950 feet by 144 feet) has a lifting capacity of 65,000 long tons and can handle ships up to about 230,000 dwt. 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. This Bay Area facility also has a second floating drydock (maximum vessel size 700 feet by 94 feet) and about 3,680 linear feet of usable berthing space.

The total work force in July 1979 remained at approximately 800, the same as a year earlier.

Exhibit 19 is a current plot plan of the Bethlehem-San Francisco plant and facilities.

18. FMC Corporation - Marine and Rail Equipment Division

FMC Corporation's Marine and Rail Equipment Division, originally known as Gunderson Bros. Engineering Corporation, is located on the Willamette River in Portland, Ore. This 75-acre 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 1972 and 1973, the company contracted to build six 35,000-dwt. gas turbine-powered electric-drive tankers. The first was delivered in 1975, the next two in 1976 and the fourth in July 1977. The contract for one of the six ships was cancelled, and the final ship, the CHEVRON ARIZONA, was completed in December 1977. These "handy size" tankers are under charter, for use in the domestic trade, to Chevron Shipping Company, a wholly owned subsidiary of Standard Oil Company of California.

Having been out of the tanker market for the past two years, FMC has been building barges. In December 1979, the last of a series of four large triple-deck RO/RO barges, each 580 feet by 105 feet by 57 feet, will be delivered to Crowley Maritime Corporation. These are the world's largest RO/RO barges and are designed to carry 374 truck trailers. The yard also has on order a 3,000-cubic-yard dump scow to be built for Smith-Rice and is actively seeking additional barge construction contracts.

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 23 acres of land adjacent to its existing facility, the purchase of a 200-ton whirley crane, new types of welding equipment, a 1,000-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. FMC can fabricate steel modules weighing up to the 200-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. This building position is serviced by one 200-ton whirley crane and one 50-ton gantry crane.

FMC has one 600-foot outfitting dock but no drydocks. Outfitting and drydocking can be done in the nearby Port of Portland facility.

At mid-1979, the labor force involved in marine work totaled 300, down from about 400 at mid-1978.

Exhibit 20 is a current general arrangement drawing of FMC's ship construction facilities.

19. Lockheed Shipbuilding and Construction Company

Lockheed Shipbuilding and Construction Company, a wholly owned subsidiary of Lockheed Corporation, is located in Seattle, Wash. on the southern perimeter of Puget Sound's Elliott Bay. This 90-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. Early this year, the yard delivered its first naval vessel in six years. This ship, the 643-foot submarine tender EMORY S. LAND (AS-39), was commissioned in March. A second tender, the FRANK CABLE (AS-40) was delivered in September of this year; and a third, the MCKEE (AS-41), is scheduled for completion in August 1981.

Lockheed recently completed a \$3 million LSD-41 design support contract, the first phase of the new LSD-41 program. The company has also been awarded the land-based test site contract and will make a strong bid to construct the lead ship of this new Navy amphibious transport class.

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 panel line is another new facility developed following the award of the sub tender contract.

The yard operates three inclined shipways, two of which can accommodate ships up to 650 feet by 90 feet, and one which can handle a ship as large as 700 feet by 100 feet. These building ways are serviced by 10 whirley cranes varying in capacity from 28 tons to 50 tons. Lockheed operates three floating drydocks that can accommodate maximum ship sizes of 643 feet by 96 feet, 530 feet by 80 feet, and 400 feet by 46 feet. Also available is 6,500 feet of wharf and pier space that is used for both repair and outfitting. Whirley cranes ranging in capacity from 17 tons to 50 tons service the wharf and pier areas.

Lockheed's labor force, at mid-1979, totaled 2,370, down from 2,990 at mid-1978, and is expected to drop below 2,000 by early 1980.

Exhibits 21 and 22 are current general arrangement drawings of the Seattle yard's Plant No. 1 and Plant No. 2.

20. National Steel and Shipbuilding Company

National Steel and Shipbuilding Company (NASSCO), jointly owned by Morrison-Knudsen Company, Inc. and Kaiser Industries Corporation, is located on a 145-acre site in San Diego, Calif. NASSCO, the largest shipbuilding complex on the West Coast, has had experience in both commercial and Navy construction.

The Company 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 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 stores ships (AFS's).

From 1973 through mid-1979, the yard completed two San Clemente class oil/bulk/ore carriers (OBO's), six Coronado class (38,300-dwt.) tankers, 13 San Clemente class (89,000-dwt.) tankers, and two San Diego class (188,500-dwt.) tankers. In 1976, NASSCO delivered a large fleet replenishment oiler, the ROANOKE (AOR-7), to the Navy.

As of October 1, 1979, the following ships were under construction or on order at National Steel: two San Diego class (188,500-dwt.) crude oil carriers for ARCO, three NASSCO-designed Charlesbad class (37,500-dwt.) product tankers for Union Oil Company, four Gompers class destroyer tenders (AD-41, AD-42, AD-43, and AD-44) for the Navy, and one cable repair ship (T-ARC-7) for the Navy.

Since San Diego is the headquarters of the Eleventh Naval District and home port for the major portion of the Pacific Fleet, NASSCO obtains a significant amount of Navy repair and overhaul work.

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, compared to a previous maximum of 900 feet by 106 feet. Also included in the program was a new modern digital-controlled mold loft, a new 1,090-foot finger pier, and a new semi-automatic panel line that welds steel plate into 40-foot by 65-foot panel sections, additional heavy-duty whirley cranes, land development, and one of the most advanced production control systems in the United States.

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, and one a ship size of 690 feet by 90 feet. These ways and the new building dock are serviced by 11 gantry cranes ranging in capacity from 45 tons to 175 tons. A small 2,800-ton floating drydock and a large graving dock that can accommodate a maximum ship size of 687 feet LOA by 90 feet 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 for outfitting and repair. These berths are serviced by mobile and gantry cranes varying in capacity from five tons to 175 tons.

At mid-1979, the total labor force was 6,356, compared to 5,453 at mid-1978.

Exhibit 23 is a current NASSCO plot plan.

21. Todd Pacific Shipyards Corporation - Los Angeles Division

Todd's Los Angeles Division is a 90-acre complex 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 after World War II, 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 25,000-dwt. product tankers for charter to Military Sealift Command, and four 35,000-dwt. 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 USS ASHTABULA. In 1977, the yard completed a 475-foot forebody for a 23,000-dwt. anhydrous ammonia carrier for Collier Carbon and Chemical Corporation.

Todd-San Pedro currently has on order or under construction a total of twelve sophisticated guided-missile frigates (FFG-7 class) which will provide employment through 1983. Major repair work in the yard during the last half of 1979 consisted of an \$8.9 million Navy contract for overhaul of the USS CAYUGA (LST-1186).

The yard has undergone a major upgrading and expansion of its facilities in recent years. New equipment includes two 175-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.

The Los Angeles Division presently has two conventional inclined shipways, each capable of launching a ship as large as 800 feet by 84 feet. The panel line, platens and shipways are serviced by two 175-ton, two 50-ton, and four smaller whirley cranes. There are two floating drydocks, one of which can accommodate a vessel 700 feet by 86 feet, and the other a vessel 550 feet by 80 feet.

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

Total employment at the yard was 3,124 at mid-1979, up from 2,622 a year earlier.

Exhibit 24 is a current plant map of the Los Angeles Division's facilities.

22. 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, Washington. 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 enjoys an outstanding reputation for building vessels for the U.S. Navy. It also does extensive barge building and ship repair work and industrial work for the aircraft, aerospace, and hydroelectric industries. During World War II, the Seattle plant built 46 Navy destroyers and three tenders, in addition to ship repair and conversion work. In 1952, the yard embarked on new vessel construction and industrial production, completing a formidable array of tugs, barges, ferries, dredges, pile drivers, floating cranes, etc. In 1964, the 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.

Currently, the yard has under contract 10 sophisticated guided-missile frigates (FFG-7 class), three of which are for the Royal Australian Navy. These Navy construction contracts will be completed in late-1983.

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 550 feet by 96 feet. It can also be used as a dual launchway for construction of two ships with beams of 50 feet or less simultaneously. A small side-launch building way, maximum vessel size 220 feet by 50 feet, was added in 1974. The shipyard has three floating drydocks capable of accommodating vessels 650 feet by 83 feet, 550 feet by 88 feet, and 420 feet by 62 feet.

Two wharves and four piers provide a total of about 4,850 feet of berthing space for outfitting and repair. The yard is serviced by nine 45-ton whirley traveling cranes, two 35-ton mobile rigs, and a number of smaller portable units.

Total employment at the Seattle plant was 3,770 in mid-1979, compared to about 2,200 in July 1978. The labor force is expected to remain relatively stable throughout 1980.

Exhibit 25 is a current plot plan of Todd-Seattle's facilities.

23. Triple "A" Machine Shop, Inc.

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

In July 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. Current contracts at Triple "A" include the major overhaul of the Navy repair ship HECTOR (AR-7), as well as commercial ship repair work.

The Hunters Point yard sprawls over 860 acres, with pier space totaling about 24,000 linear feet. There are 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 to 1,092 feet by 140 feet. Equipment includes 20 whirley cranes, a 300-ton gantry crane, 19 fully equipped shop buildings totaling 1,424,000 square feet, and 350,000 square feet of warehouse space.

At mid-1979, employment at the yard totaled about 1,100, down from 1,250 a year earlier.

Exhibit 26 is a current yard plan showing the Triple "A" facilities at Hunters Point.

24. 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, Ill. The TAMPA Division consists of only Tampa Ship Repair & Dry Dock Co., 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 has 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.

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, which covers 48 acres, is one of two shipyards on the Great Lakes capable of building ships up to 1,000 feet 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 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. Currently in production are two more of these super bulk carriers, one for U.S. Steel and one for Pickands Mather. These 1,000-footers, designed by AMSHIP, can carry 59,000 tons of iron ore pellets or 52,000 tons of coal, more than twice the capacity of bulk freighters built on the Lakes in the late 1950's. Due to a crippling 320-day strike of production workers from August 1978 to July 1979, delivery of these two ships will not be completed until June 1980 and April 1981. 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.

Repair and conversion work is also 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 (maximum ship size 1,021 feet by 121 feet) is used for new construction. The yard's other graving dock, which can handle ships up to 708 feet by 78 feet, is being used for repair and overhaul work. A total of about 1,800 feet of berthing space is available for repair and outfitting.

On September 1, 1979, the total payroll at Lorain was down to approximately 500, since only about half of the strikers had returned to their jobs. However, the work force was expected to build up to 1,000 by the end of 1979.

Exhibit 27 is a current plot plan of facilities at the Lorain plant.

25. 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 26,000-dwt. 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 is currently fabricating a 560-foot by 77-foot midbody section and a bow unit for a 1,000-foot bulk carrier under construction at Lorain. The 698-foot conventional bulk carrier, ELTON HOYT II, is being converted to a self-unloader for Interlake Steamship Company at Toledo. Completion of the job is scheduled for the spring of 1980.

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.

There are two graving docks. One can accommodate vessels up to 680 feet by 78 feet, the other vessels as large as 540 feet by 68 feet. Usable berthing space totals about 1,600 feet.

Total employment at mid-1979 was about 450, unchanged from the summer of 1978.

Exhibit 28 is a current layout of AMSHIP's Toledo yard.

26. Bay Shipbuilding Corporation

Bay Shipbuilding Corporation, located in Sturgeon Bay, Wis., is the largest shipbuilder on the Great Lakes. Its parent company, The Manitowoc Company, Inc., purchased Sturgeon Bay Shipbuilding and Dry Dock Co. in 1968 and the adjoining Christy Corporation property in 1970. These two facilities were combined to form the Bay Shipbuilding Corporation. This 50-acre 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.

From 1973 through September 1979, this Sturgeon Bay shipyard completed the following large Great Lakes ore carriers: 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 self-unloading vessels. These are constructed in two sections. The 660-foot 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.

As of October 1 of this year, there were four more self-unloading bulk carriers under construction at Bay Shipbuilding, all designed for carrying ore pellets and coal. Two of these bulkers are 1,000-footers. These contracts are expected to provide employment into 1981.

Bay Shipbuilding in 1977 completed a major facilities expansion program that has enabled the company to build 1,000-foot Great Lakes bulk carriers. The new graving dock can accommodate a vessel as large as 1,100 feet by 136 feet and is the largest such dock on the Lakes. It is serviced by a 200-ton traveling gantry crane and several crawler cranes of about 100-ton capacity. The steel erection capacity for ship construction is estimated to be 15,000 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, and one floating drydock is available which can handle ships up to 650 feet by 66 feet. There is 7,090 feet of berthing space for repair and outfitting. The 14 available piers are serviced by crawler cranes of 40- to 100-ton capacity each.

At mid-1979, total employment was 2,000, up from 1,900 a year earlier.

Exhibit 29 is a current general arrangement plan showing Bay Shipbuilding's facilities.

27. Fraser Shipyards, Inc.

The Fraser yard, the only major American shipyard and drydock operation on the Western end of the Great Lakes, is located on Howards Bay in Superior, Wis. Since it was founded in the 1890's by Capt. Alexander McDougall, who built 42 of his famous "whaleback" steamers and barges there, this 63-acre 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, Wis. contracting and construction firm, but business continues under the Fraser name.

Since World War II, the yard has specialized in vessel repair and ship modernization including lengthenings, repowering and engine room automation, and self-unloader conversions. In the past seven years, Fraser has performed most of the major ship lengthening work on the Great Lakes.

The WILLIAM CLAY FORD, a Ford Motor Company bulk carrier, was the most recent jumboizing job. The vessel was completed in June of this year. Currently underway at the Fraser plant is the conversion of the SPARROWS POINT, a Bethlehem Steel Corporation bulk carrier, to a self-unloader. Delivery is scheduled for April 1980. The company is aggressively bidding on conversion, repair, and overhaul work.

Fraser has two graving docks suitable for ship construction, repair and conversion work. One basin can accommodate a vessel 825 feet by 80 feet, and the other a vessel 621 feet by 60 feet. A small graving-type drydock, 130 feet by 80 feet, was added in 1973 to build new midbody sections for the bulk ore freighters under contract for lengthening. There is 4,450 feet of berthing space. Fraser's nine mobile cranes, ranging from 15 tons to 150 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 was around 400 at mid-1979, up from 300 a year earlier.

Exhibit 30 is a current plot plan of Fraser's shipbuilding and ship repair facilities.

Employment

Exhibit 35 depicts the drastic decline in employment in recent months in the U.S. shipbuilding and repair industry. As of April 1979, there was a total of 224,600 employees, including workers in the eight

naval shipyards, compared to a total of 246,400 employees a year earlier. As of April 1979, employees in the 27^{1/} major commercial yards totaled 115,000, a decline of about 8,000 since April 1978. The only shipyard employment not showing a decline during the past year was that of the naval shipyards. In April 1979, the total labor force in these yards was 68,700, about the same as a year earlier.

It is anticipated that some 16,000 production workers will be laid off during the two-year period, from mid-1979 to mid-1981; and employment in the industry is expected to remain low during the next five years. With the expected decline in orders for commercial ships, several major yards face possible mass layoffs.

Material Shortages

In the fall of 1979, the steel industry was operating at between 85 percent and 90 percent of capacity. Supplies were adequate and are expected to continue to be plentiful in the foreseeable future. There were no known shortages of any materials required for ship construction.

According to the Navy Shipbuilding Scheduling Office, manufacturing lead times for ship components continue to remain generally stable while the producers of most of the basic materials are reporting a continuing increase in lead times. The most significant trends are lead times for aluminum and forgings due to increased consumer demand. The timely ordering of these materials and components is necessary to ensure required deliveries to meet scheduling needs.

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.

1/ Includes General Dynamics, Electric Boat Division, which is engaged solely in ship construction for the Navy.

Shipyard Pollution Abatement

The shipbuilding and repair industry continues to make great strides toward meeting its obligation of controlling shipyard-related pollution. Through the efforts of the Society of Naval Architects and Marine Engineers (SNAME) and the Shipbuilders Council of America, the shipbuilding and ship repair industry has directed its energies toward the control of pollutants such as oil, sewage, solid waste, toxic and hazardous materials, noise, and hydrocarbon air emissions.

To better coordinate and consolidate the industry's pollution control effort, which generally falls under the functional responsibility of a shipyard's Facilities Department, SNAME recently combined the former SP-1 Panel, Facilities, and SP-3 Panel, Shipyard Environmental Effects, into one panel, SP-1, titled Shipyard Facilities and Environmental Effects.

The SNAME technical panel, SP-1, Shipyard Facilities and Environmental Effects, and the Shipbuilders Council of America's Environmental Control Committee, have worked closely with the Environmental Protection Agency, the Department of Labor (OSHA), the U.S. Coast Guard, and the Department of the Navy to comply with the intent of the environmental requirements established by these agencies. The shipyards, on an individual basis, have also worked with their respective state and local governments to meet the objectives of their environmental regulations.

As part of its commitment to ensure that the regulations established are meaningful as well as cost effective, these committees have submitted comments to the regulatory bodies as well as conducted independent studies to establish guidelines for use in the development of cost effective pollution prevention regulations.

During the past year, these two industry groups have focused on such issues as: (1) Draft Development Document for the Shipbuilding and Repair Industry - Drydocks Point Source Category, (2) methods of receiving sewage from vessels using drydock facilities, (3) programs for complying with National Pollutant Discharge Elimination Standard Permit requirements, (4) methods for hazardous waste material disposal, (5) PCB spill and prevention plans, (6) civil penalties for violation of the Federal Water Pollution Control Act (FWPCA), and (7) certificates for financial responsibility.

Typical equipment installed by the shipyards to control the various forms of pollution includes oil containment booms, oily waste collection equipment, closed-cycle blasting equipment, air filters, and more efficient combustion control equipment.

The shipbuilding and ship repair industry recognizes the need for protection of the marine environment and is continuing to devote its resources to the development of cost effective pollution controls.

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 more. For ships this size, the U.S. shipbuilding and repair industry has a total of 76 floating drydocks, 45 graving docks, and five marine railways. However, several of these graving docks are currently 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.

There has been an increase in new drydocks acquired by the privately owned ship repair yards over the past several years, geared to the larger types of ships now in operation. Such drydocks include those at Sun Shipbuilding & Dry Dock Company, Jacksonville Shipyards, Ingalls Shipbuilding Division/Litton Industries, Bethlehem Steel Corporation (San Francisco, Baltimore and Hoboken Yards), Todd Shipyards Corporation (San Francisco Division), Maryland Shipbuilding & Drydock Company, and Triple "A" Machine Shop's Hunters Point yard.

Because of the scarcity of merchant ship new construction contracts, a number of large yards are seeking to increase their ship repair business. Substantial amounts of money are being invested in new drydocks and related facilities. The following are examples of current and recent expansion and modernization programs:

- o Newport News Shipbuilding & Dry Dock Co.

A major program to almost double the shipyard's repair and conversion capacity involves enlarging and modernizing one of the existing graving docks, rebuilding piers, and installing larger capacity cranes. Completion is scheduled for 1985.

- o Norfolk Shipbuilding & Dry Dock Corp.

An expansion program consisting of a new 950-foot floating drydock with a clear width of 160 feet and a lifting capacity of 54,250 tons, a new 1,030-foot-long concrete pier to be used for repair and servicing of ships as long as 1,200 feet, and other facilities to increase the company's repair and conversion capability. This expansion project was completed in February 1979.

- o Tampa Ship Repair & Dry Dock Co.

A new 900 foot by 150 foot graving dock that can accommodate tankers up to 125,000-dwt. This drydock, which is leased from the Port of Tampa, became operational in July 1978 and is the largest graving-type drydock on the Gulf Coast.

o Port of Portland (Oregon)

A floating drydock, 982 feet in length overall and 192 feet between wing walls. Lifting capacity is approximately 81,000 tons. This drydock, which became operational in March 1979, is the largest floating drydock on the U.S. West Coast.

Expansion is a necessity if a repair yard is to keep pace with the present trend toward larger ships and barges.

In some instances, profits on repair work offset ship construction losses. Ship repair yards over the last few years have been actively soliciting non-ship industrial work requiring skills such as steel fabrication, welding, boiler repairs, and motor overhauls, typical in ship repair. The advent of larger ships has affected the ability of some yards with smaller drydocks to maintain their old clients. In general, the ship repair yard often commands excellent prices for urgently needed repairs and can control its overhead more closely. Ship repairing is considered within the industry as generally more profitable than ship construction.

Private U.S. shipyards continue to receive at least 30 percent of the funds available for repairs, alterations, and conversion of naval vessels. More emphasis is now being placed on preparing the private sector for the more complex combatant ship overhauls. Projected ship alteration and repair programs essential to maintain naval 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 Navy workload will be restricted to a limited number of privately owned yards.

The ship repair industry - unlike the ship construction business - faces a stable future. There is a general feeling of cautious optimism that ship repair activities will increase during the coming year and well into the 1980's.

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 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 demands it.

Appendix B tabulates information updated through 1979 on 40 of these yards on a coastal basis. Additional data is available in the Office of Ship Construction.

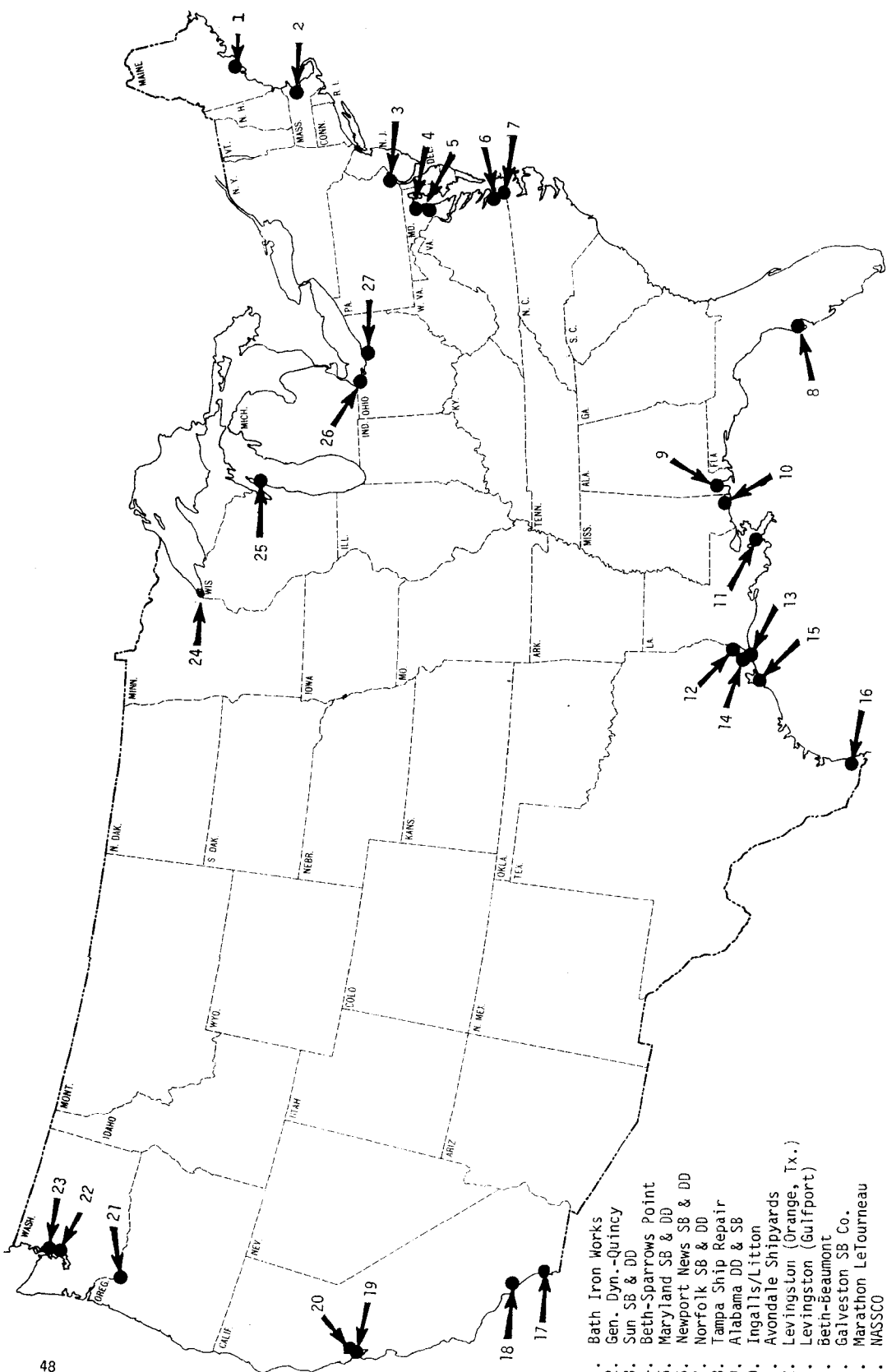
Major Topside Repair Facilities

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 115 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 survey and is available in the Office of Ship Construction

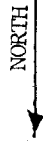
SHIPBUILDING INDUSTRY IN THE UNITED STATES

EXHIBIT 1



1. Bath Iron Works
2. Gen. Dyn.-Quincy
3. Sun SB & DD
4. Beth-Sparrows Point
5. Maryland SB & DD
6. Newport News SB & DD
7. Norfolk SB & DD
8. Tampa Ship Repair
9. Alabama DD & SB
10. Ingalls/Litton
11. Avondale Shipyards
12. Livingston (Orange, Tx.)
13. Levinston (Guilford)
14. Beth-Beaumont
15. Galveston SB Co.
16. Marathon LeTourneau
17. MASSCO
18. Todd-Los Angeles
19. Beth-San Francisco
20. Triple "A"
21. FMC Corporation
22. Lockheed SB
23. Todd-Seattle
24. Fraser Shipyards
25. Bay SB Corporation
26. American SB Co., Lorain
27. American SB Co., Toledo

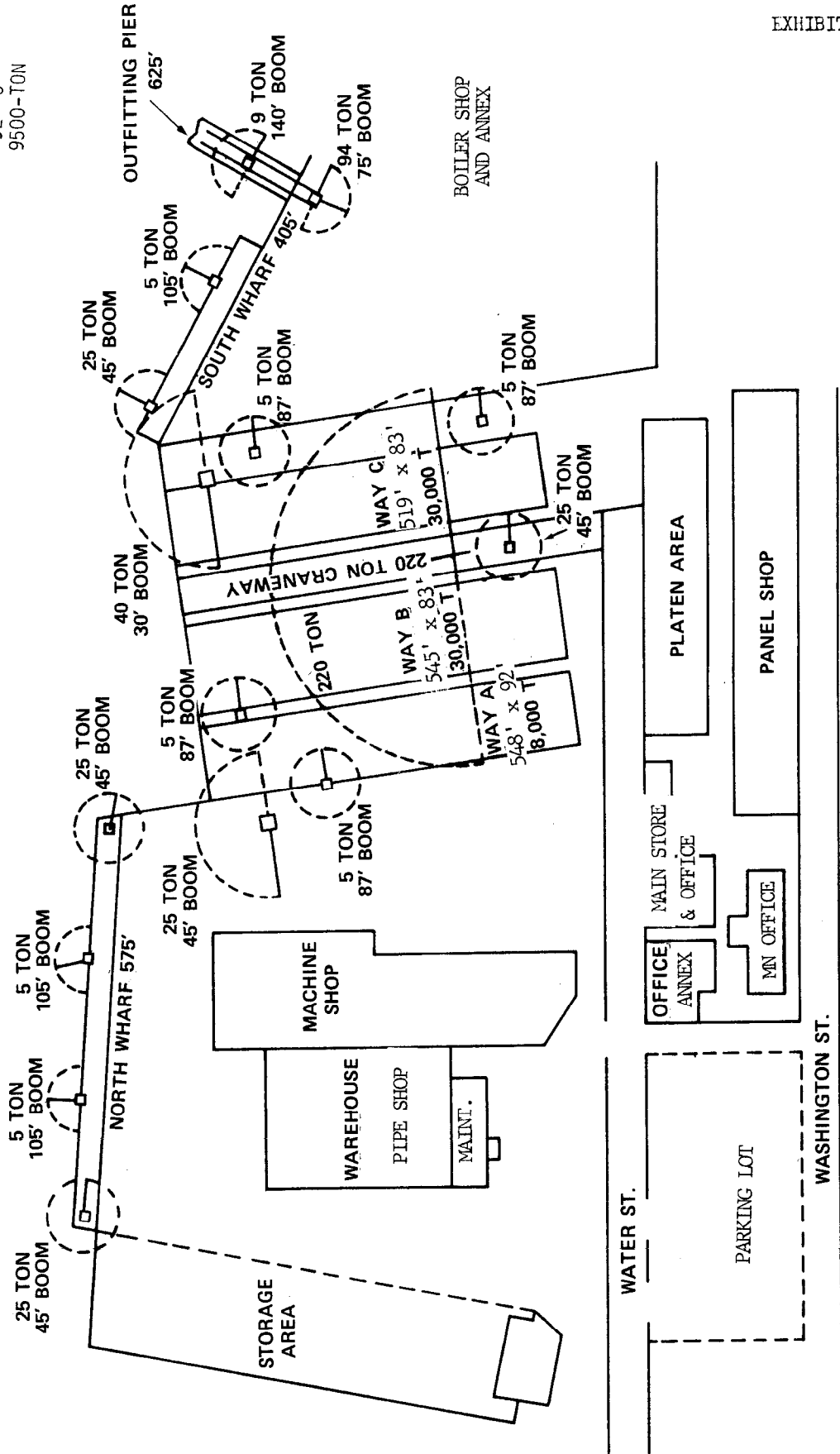
MAJOR AMERICAN SHIPYARDS
BUILDING CAPACITY - SHIPS 475 FEET IN LENGTH OR OVER



BATH IRON WORKS

FLOATING
DRYDOCK
413'-4"
X
92'-6"
9500-TON

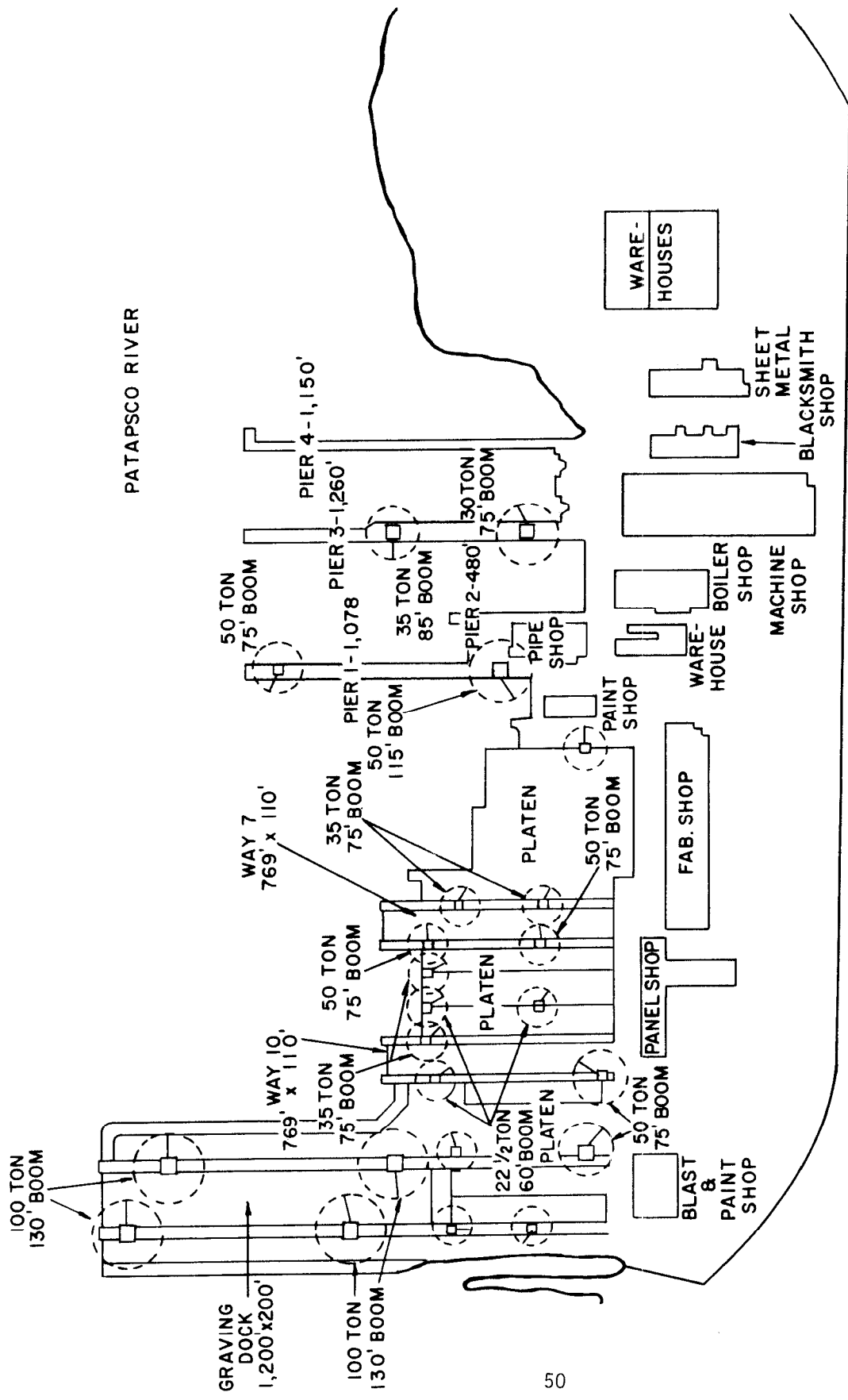
KENNEBEC RIVER

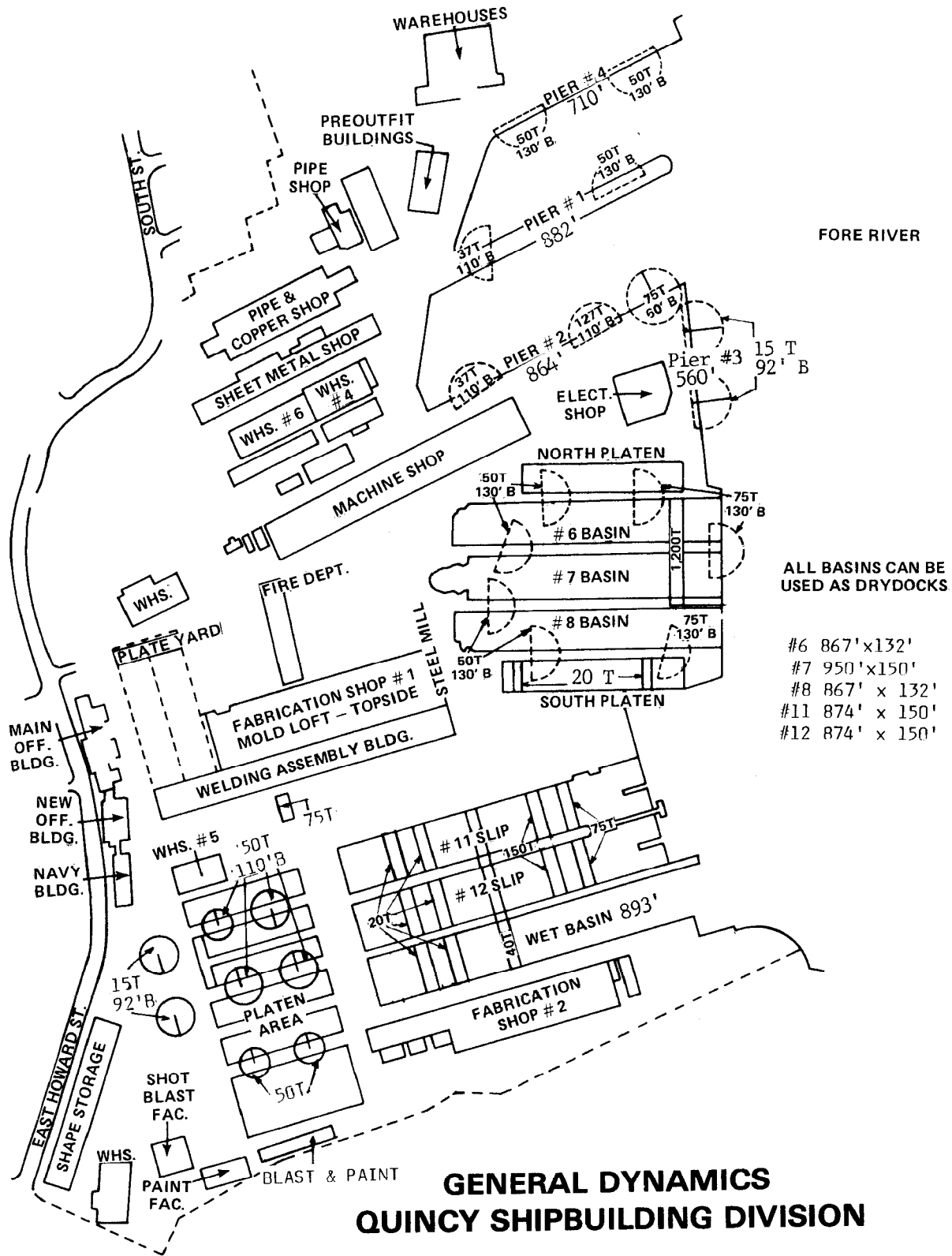


BETHLEHEM STEEL CORPORATION

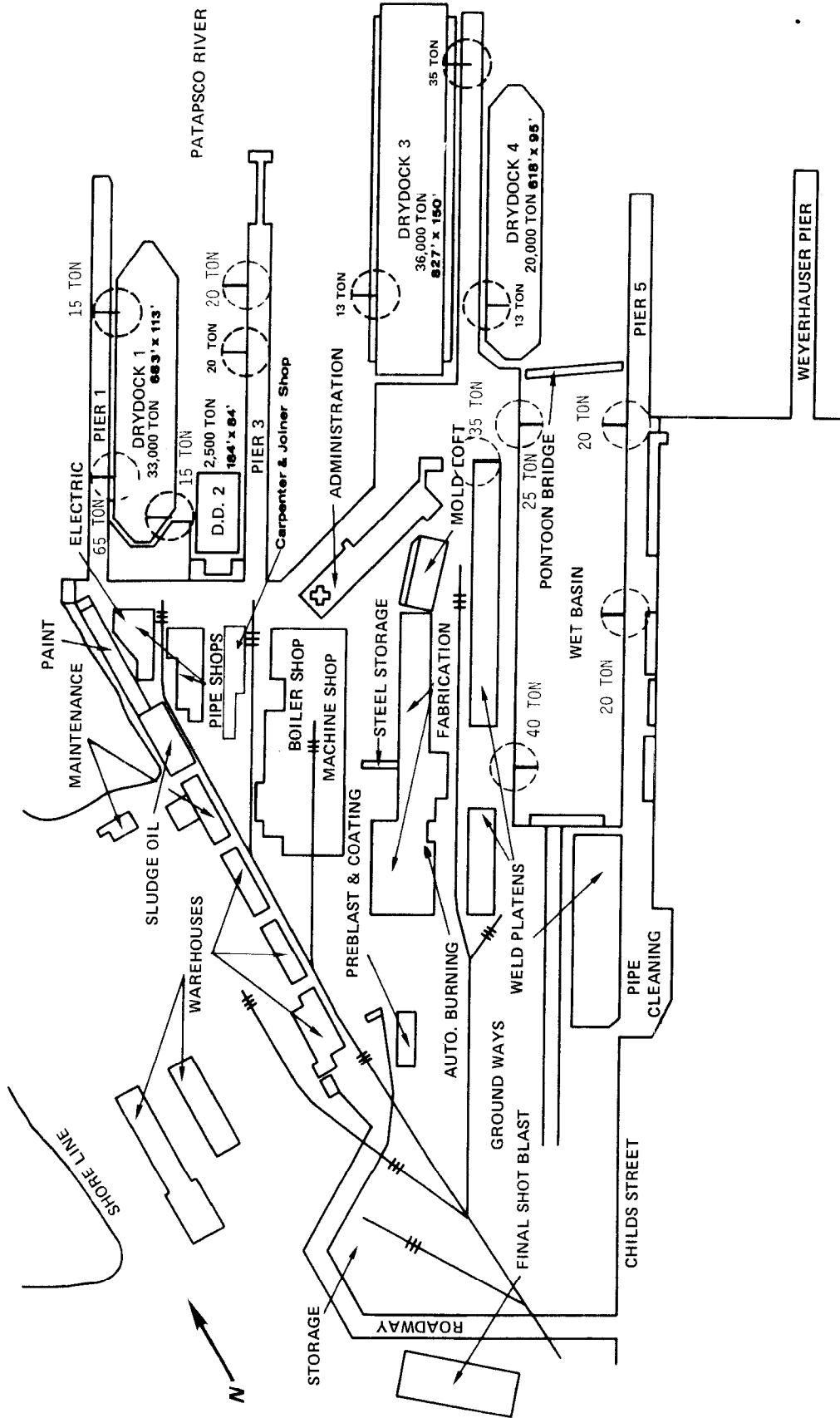
SPARROWS POINT YARD

EXHIBIT 3



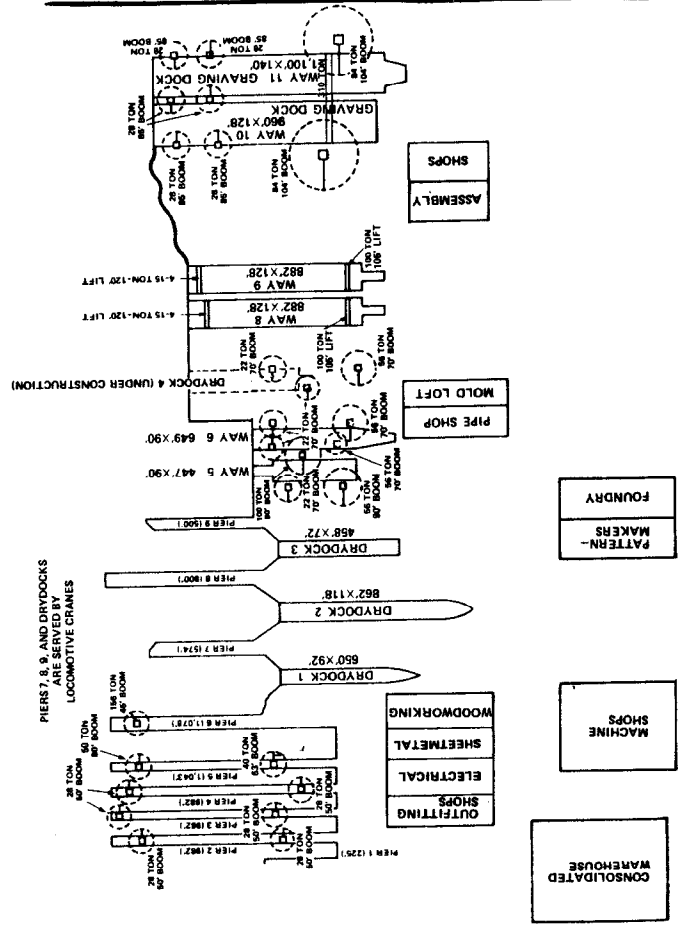


MARYLAND SHIPBUILDING & DRYDOCK CO.

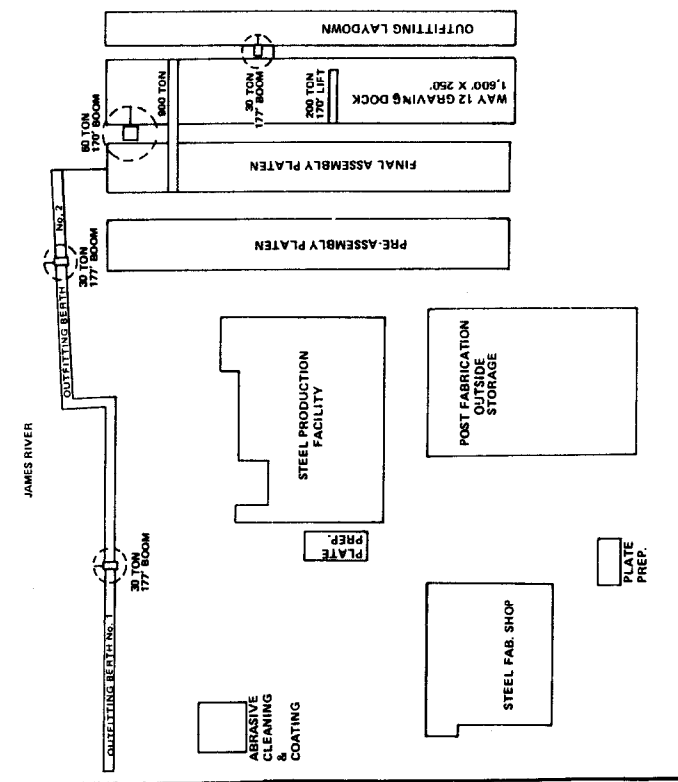


Newport News Shipbuilding

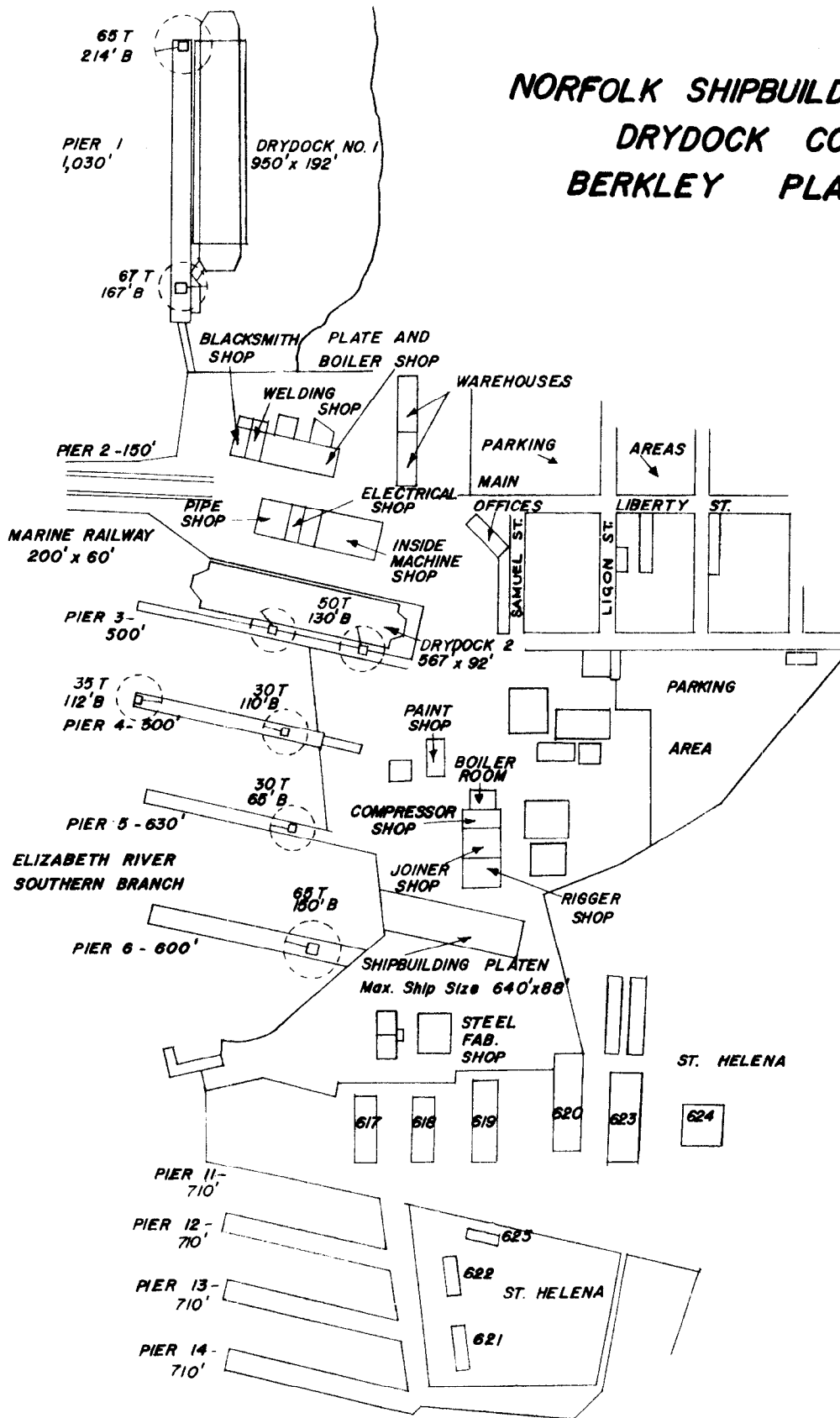
SOUTH YARD
JAMES RIVER



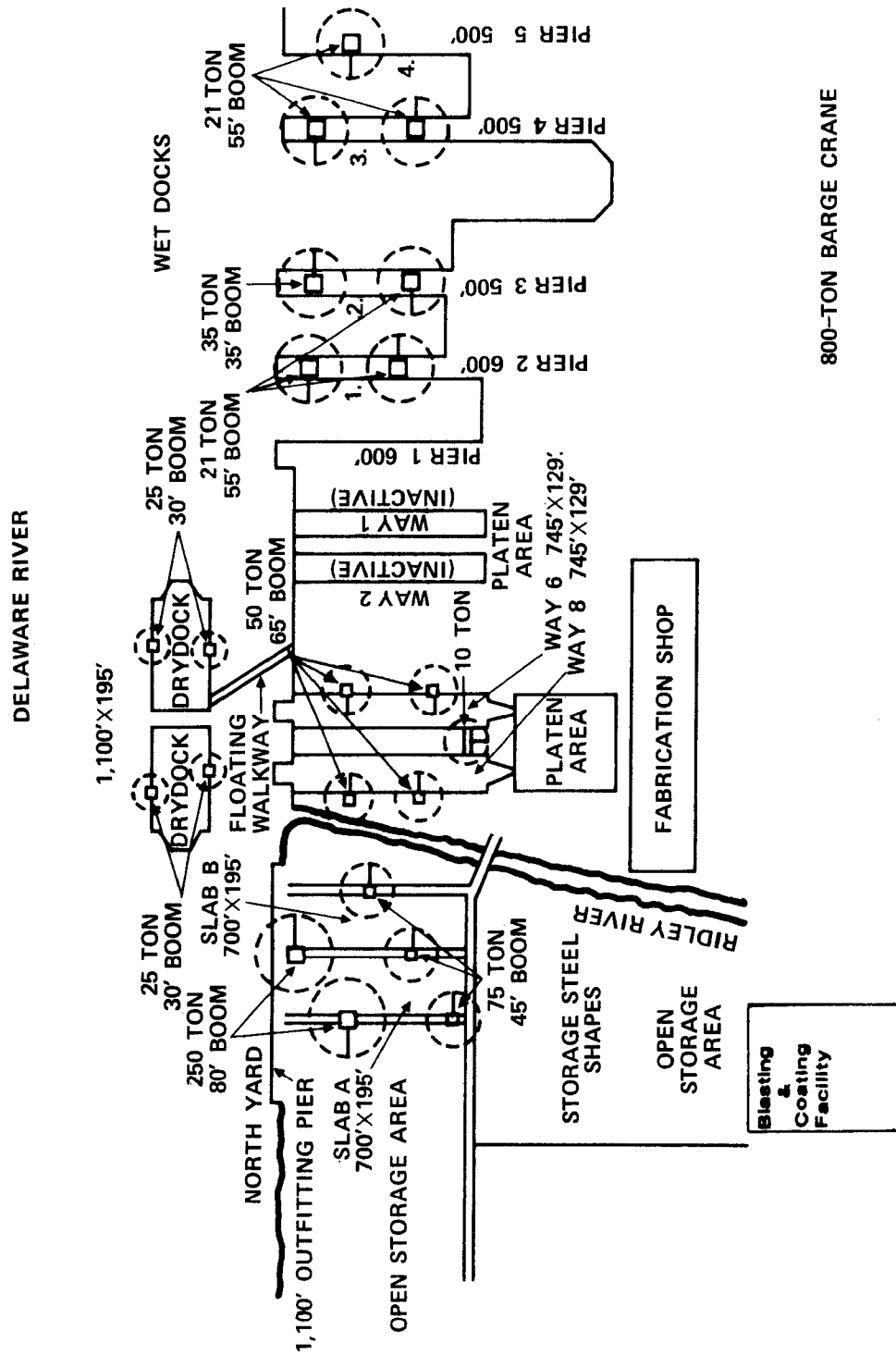
NORTH YARD
JAMES RIVER



NORFOLK SHIPBUILDING AND DRYDOCK CORP. BERKLEY PLANT

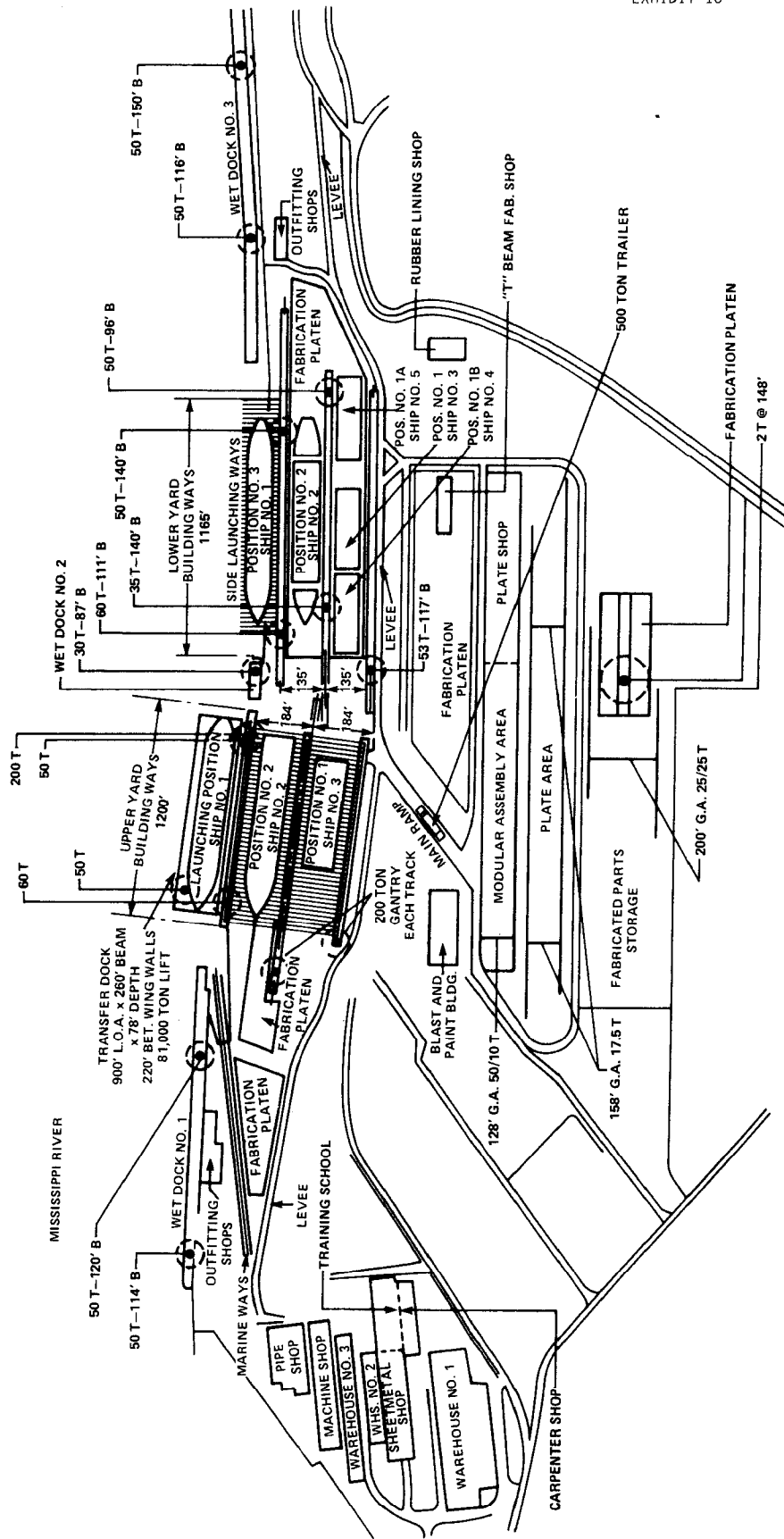


SUN SHIPBUILDING & DRYDOCK CO.

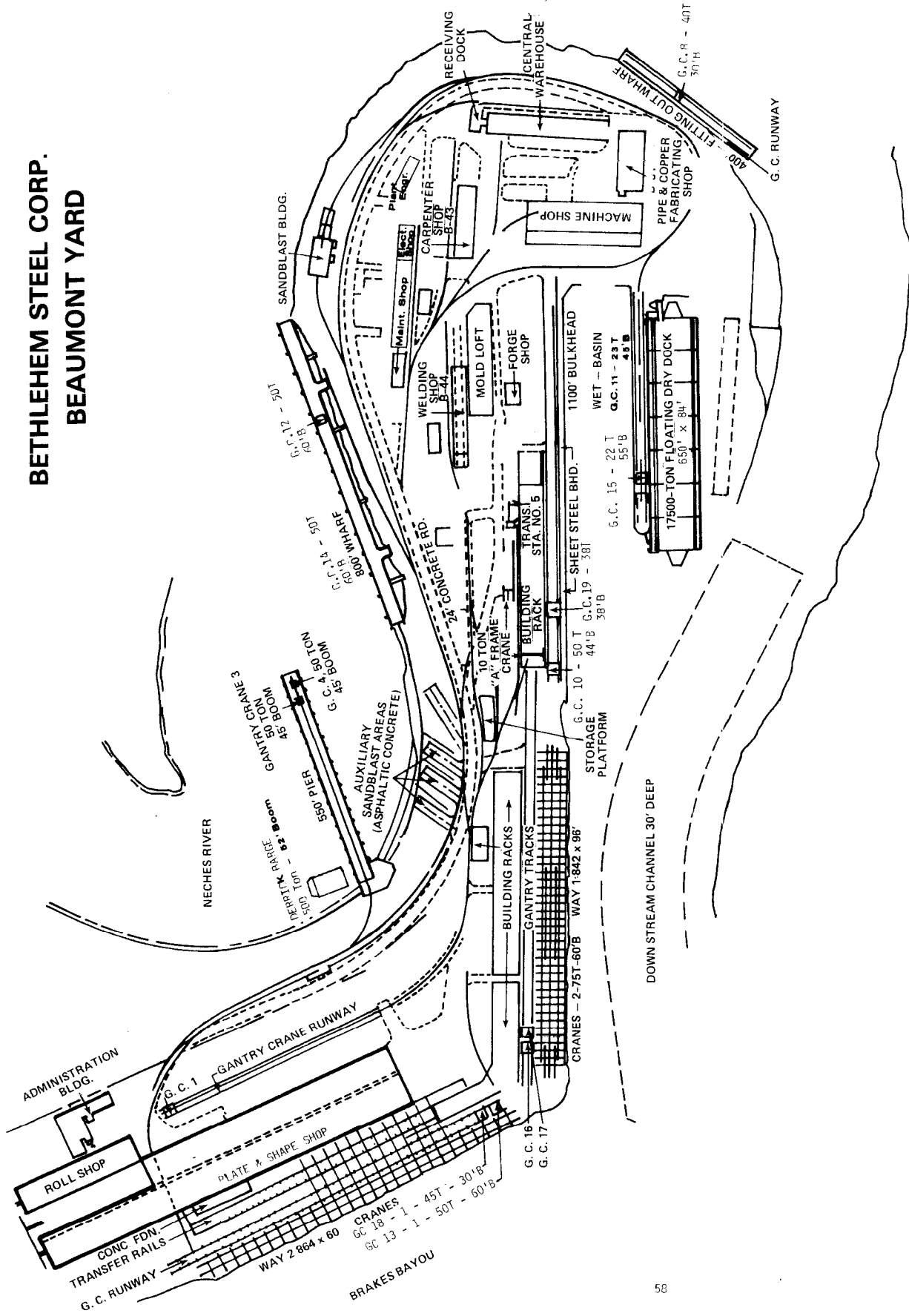


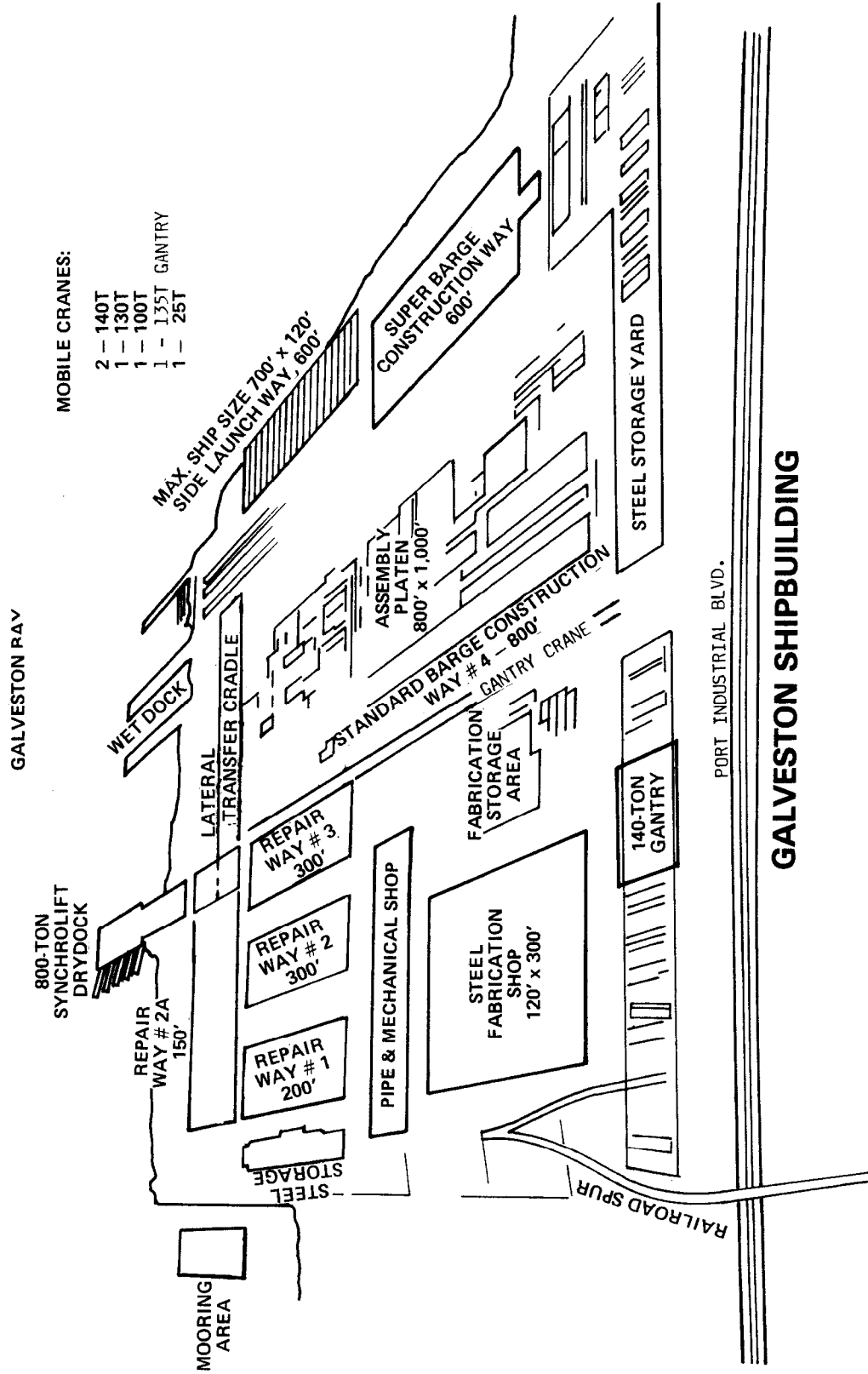
800-TON BARGE CRANE

AVONDALE SHIPYARD



BETHLEHEM STEEL CORP. BEAUMONT YARD



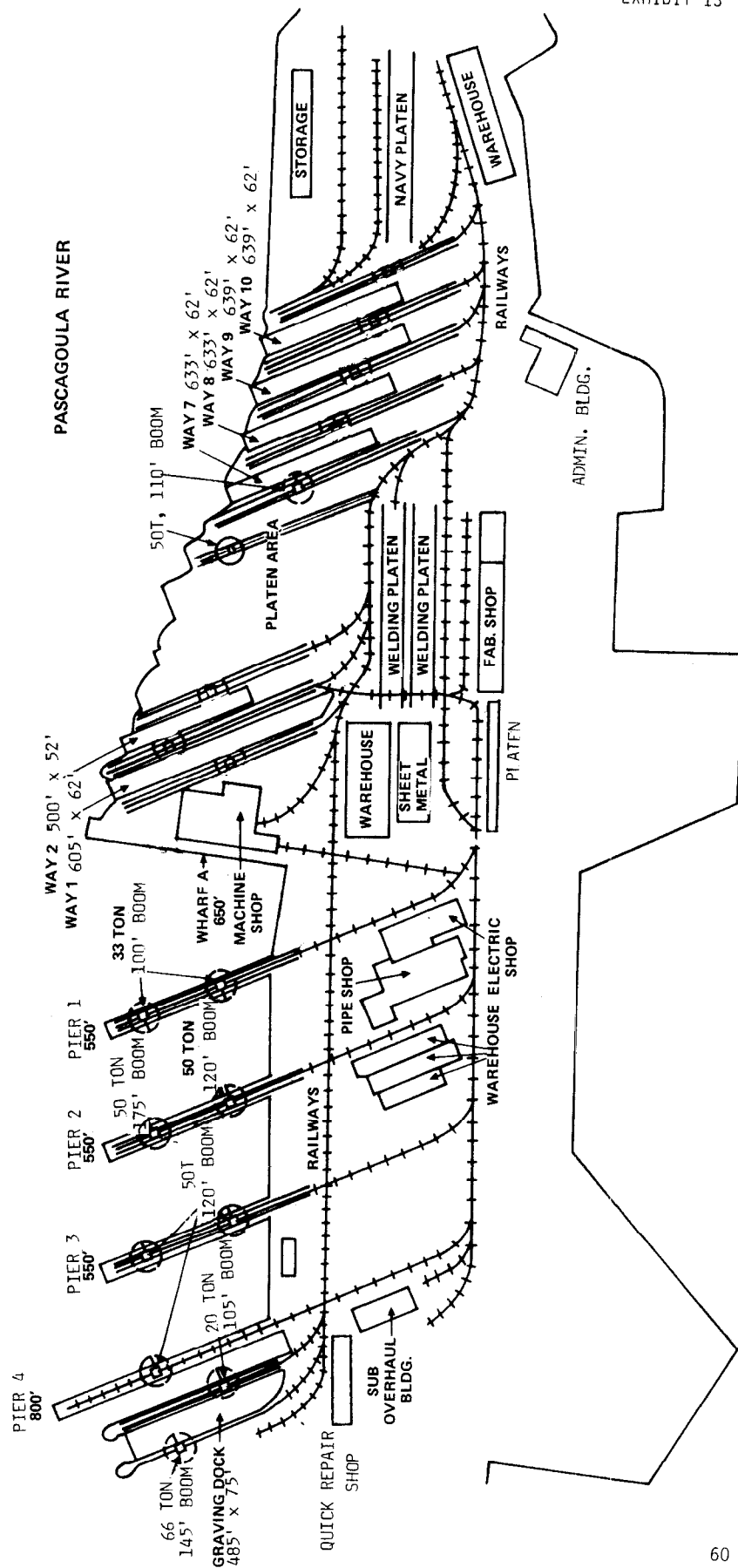


GALVESTON SHIPBUILDING

INGALLS SHIPBUILDING

DIVISION OF LITTON SYSTEMS, INC.

EAST BANK FACILITY



INGALLS SHIPBUILDING
 DIVISION OF LITTON SYSTEMS, INC.

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

WEST BANK
 PASCAGOULA RIVER

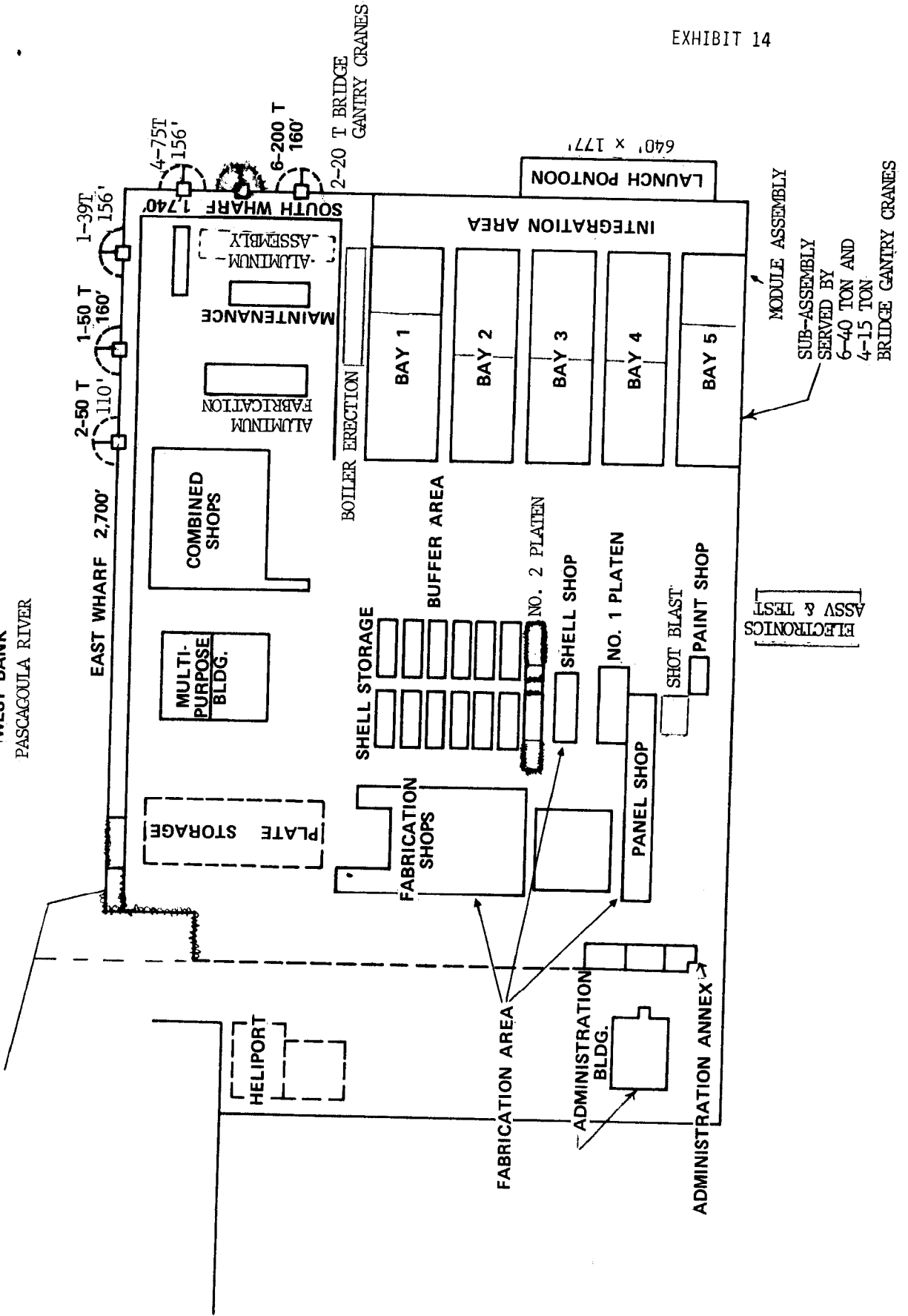
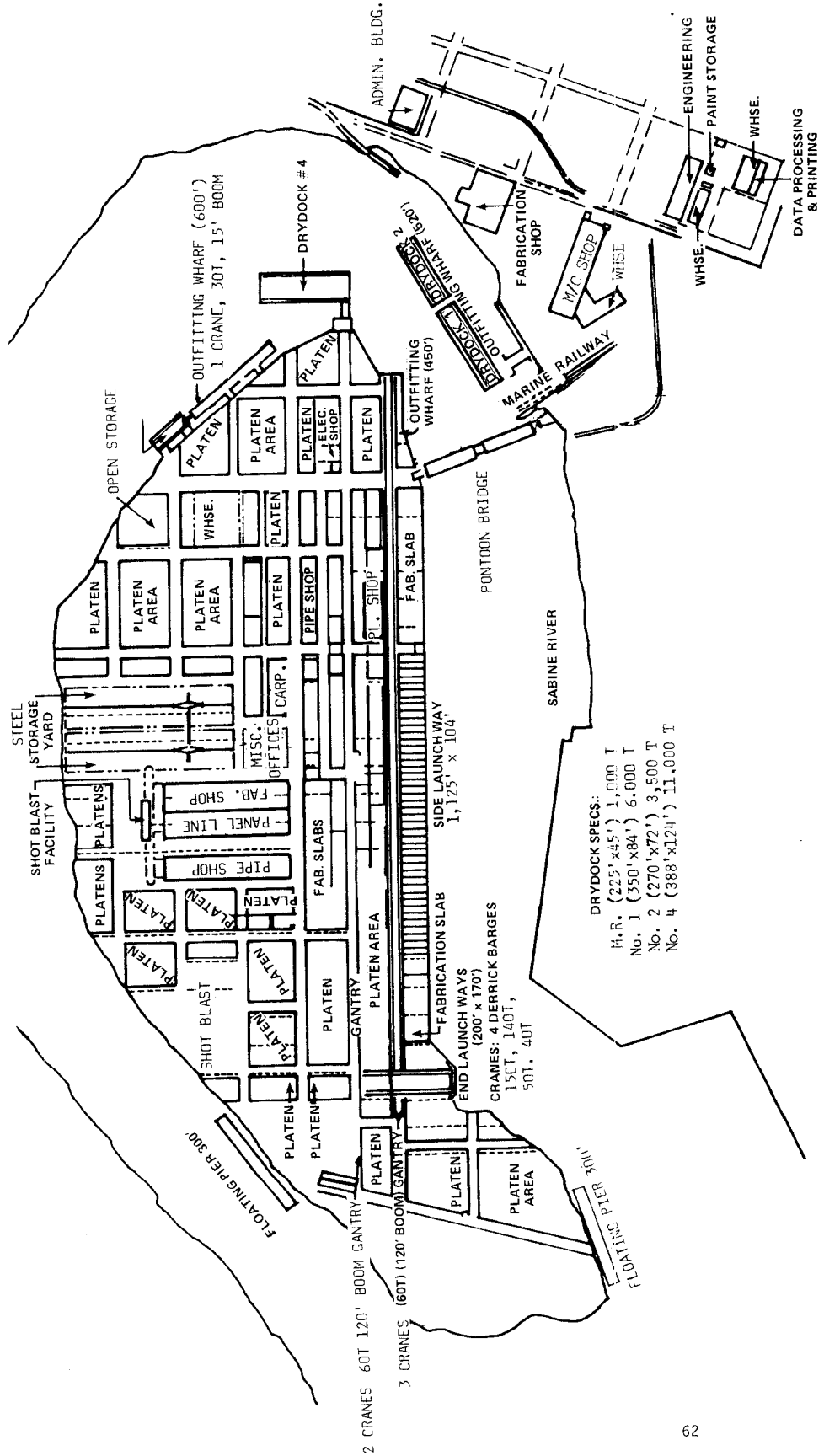


EXHIBIT 14

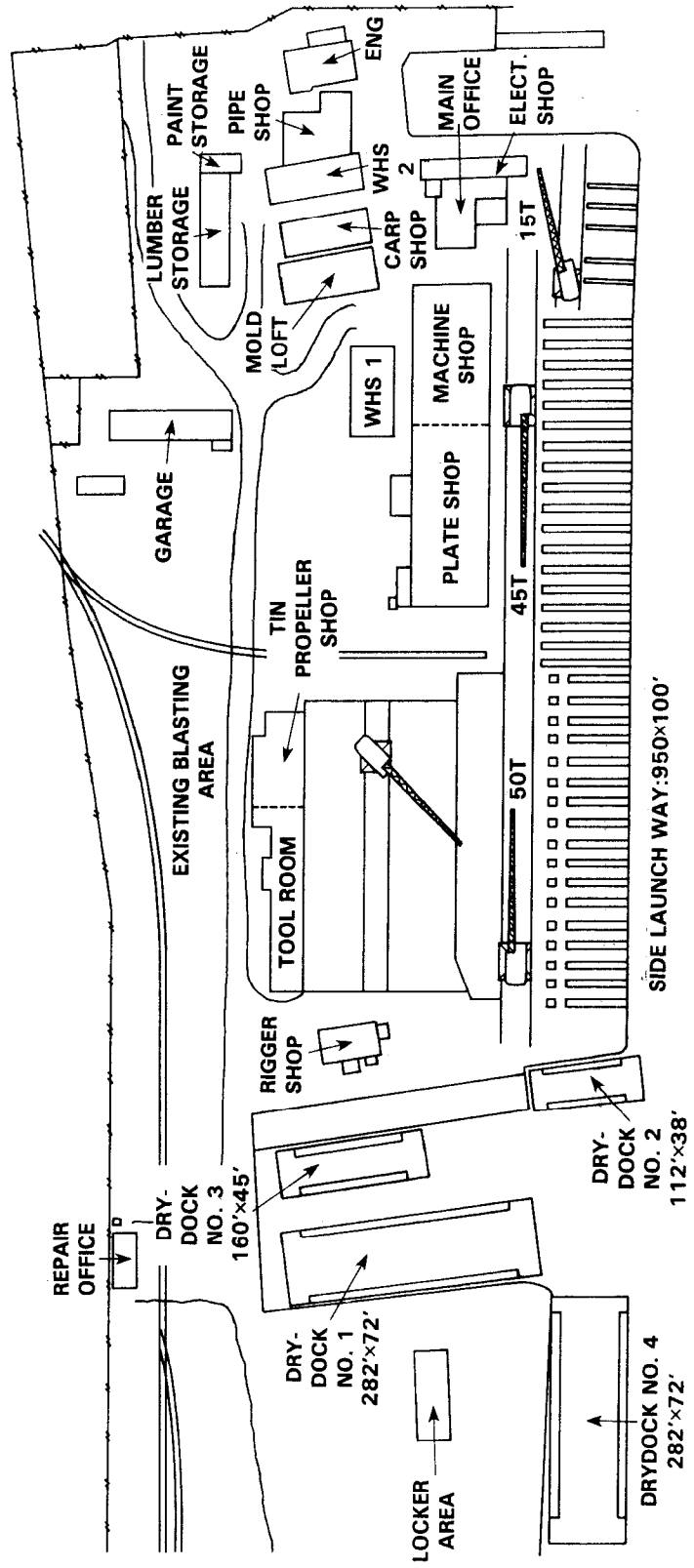
ELECTRONICS
 ASSY & TEST

MODULE ASSEMBLY
 SUB-ASSEMBLY
 SERVED BY
 6-40 TON AND
 4-15 TON
 BRIDGE GANTRY CRANES

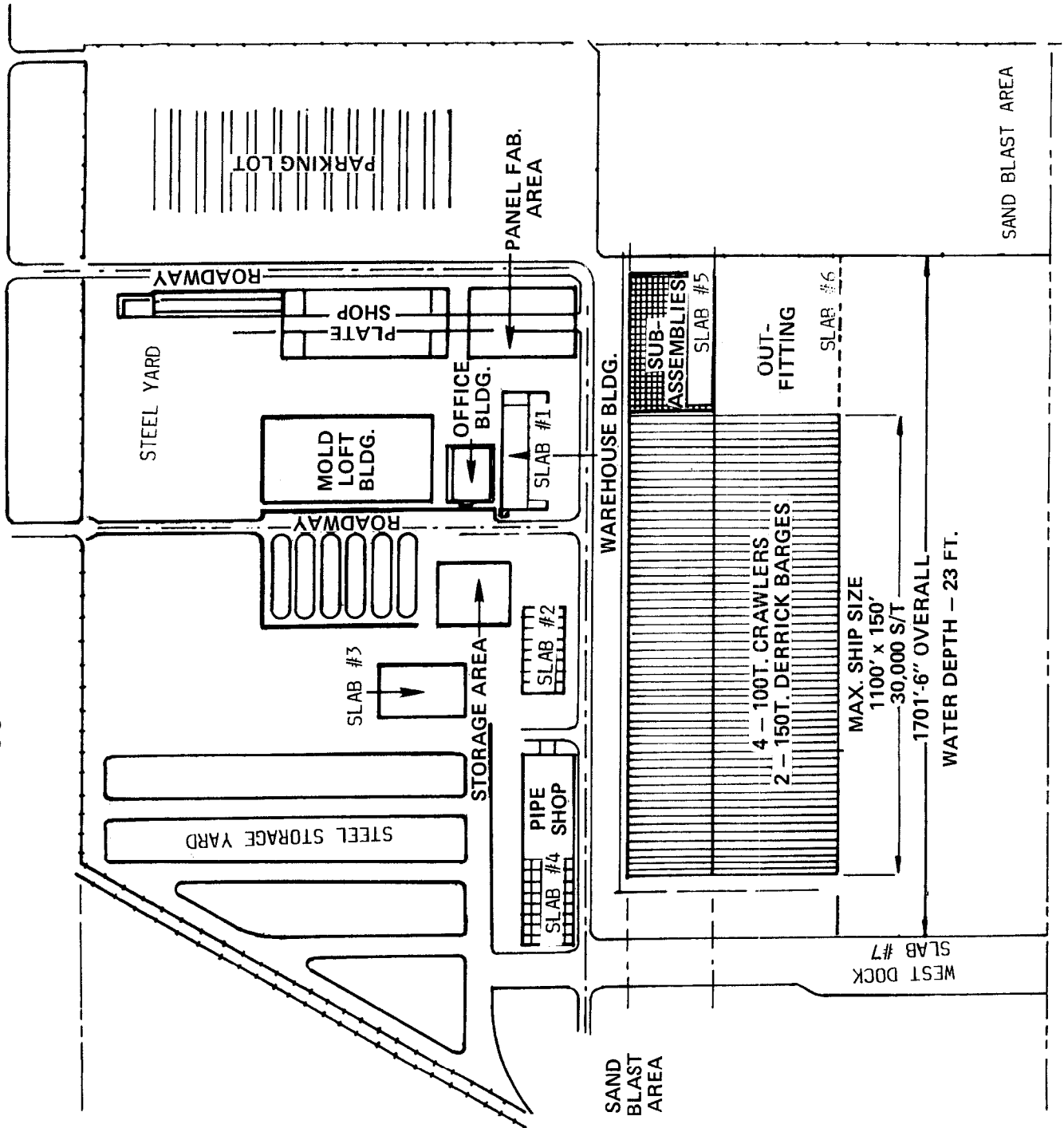
LEVINGSTON SHIPBUILDING CO. ORANGE, TEXAS PLANT



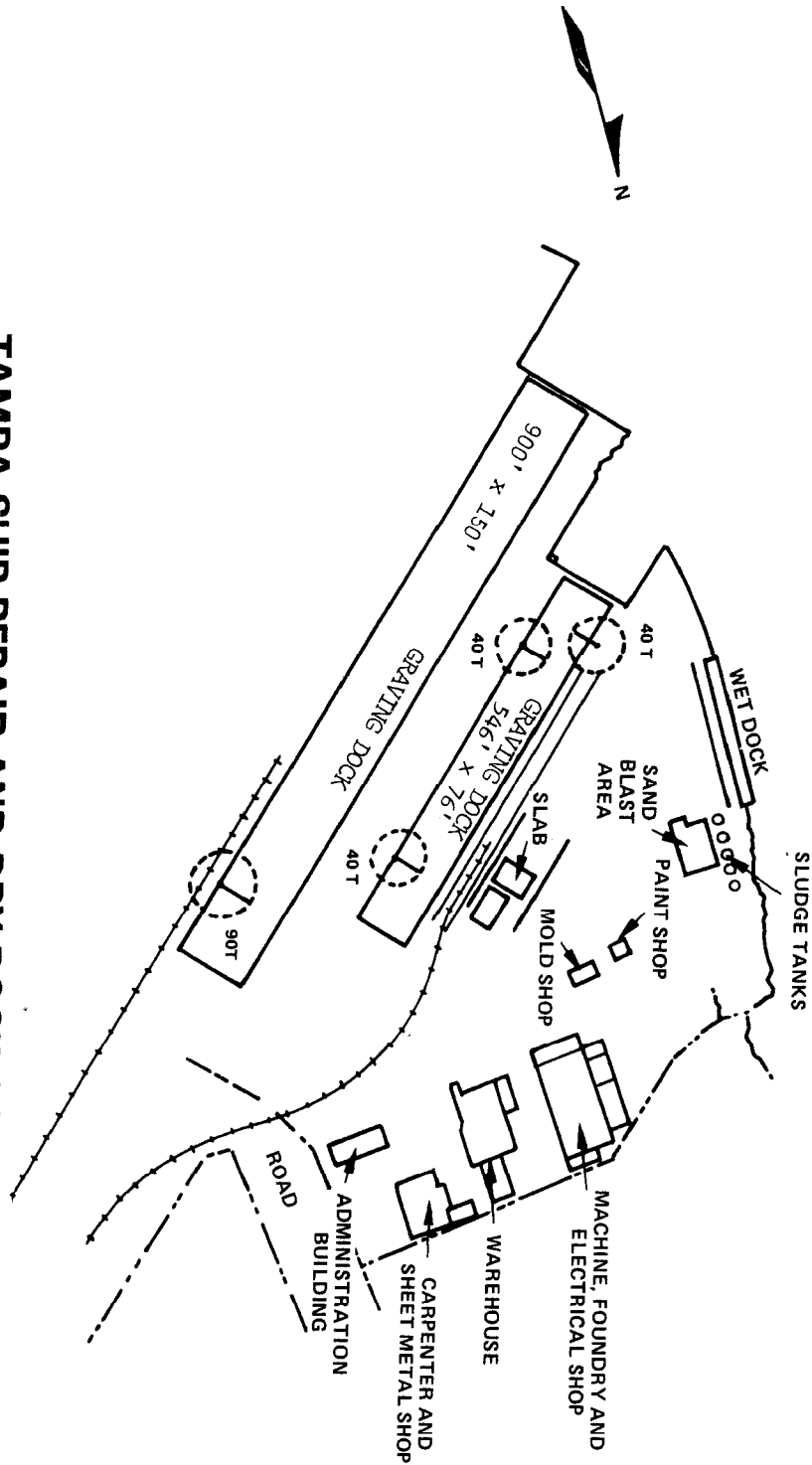
LEVINGSTON SHIPBUILDING CO.
GULFPORT SHIPBUILDING — PORT ARTHUR, TEXAS



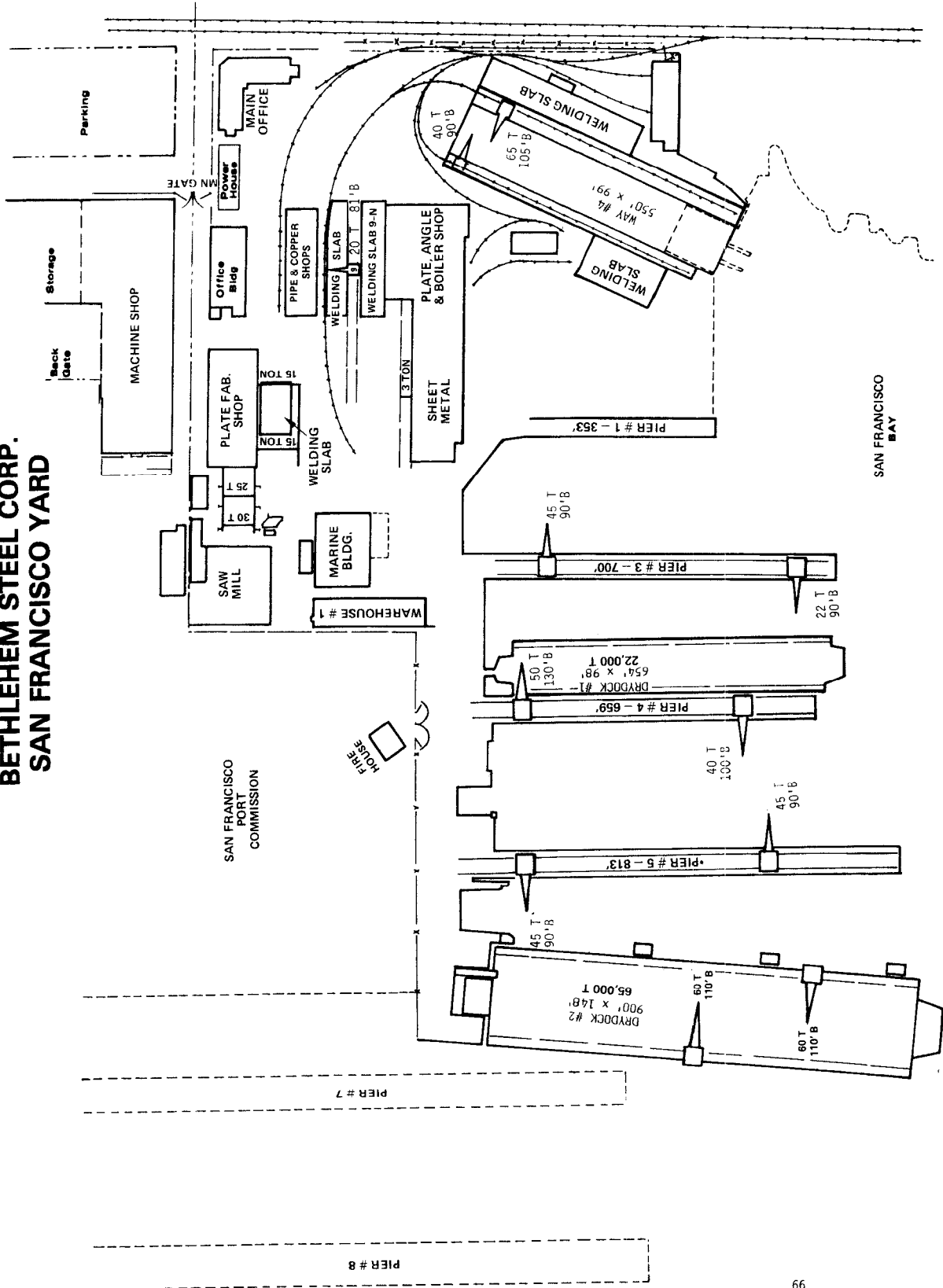
**MARATHON LeTOURNEAU CO.
GULF MARINE DIVISION**



**TAMPA SHIP REPAIR AND DRY DOCK CO.
TAMPA, FLORIDA**



BETHLEHEM STEEL CORP. SAN FRANCISCO YARD



FMC CORPORATION
Marine & Rail Equipment Division
Portland, Oregon

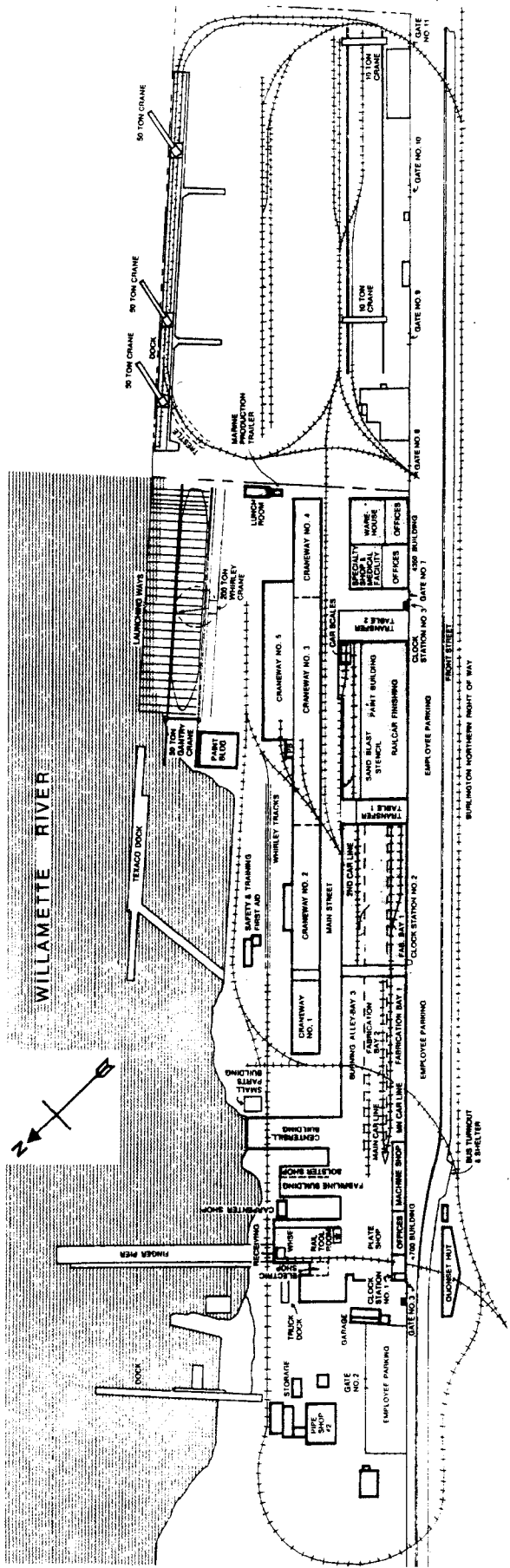
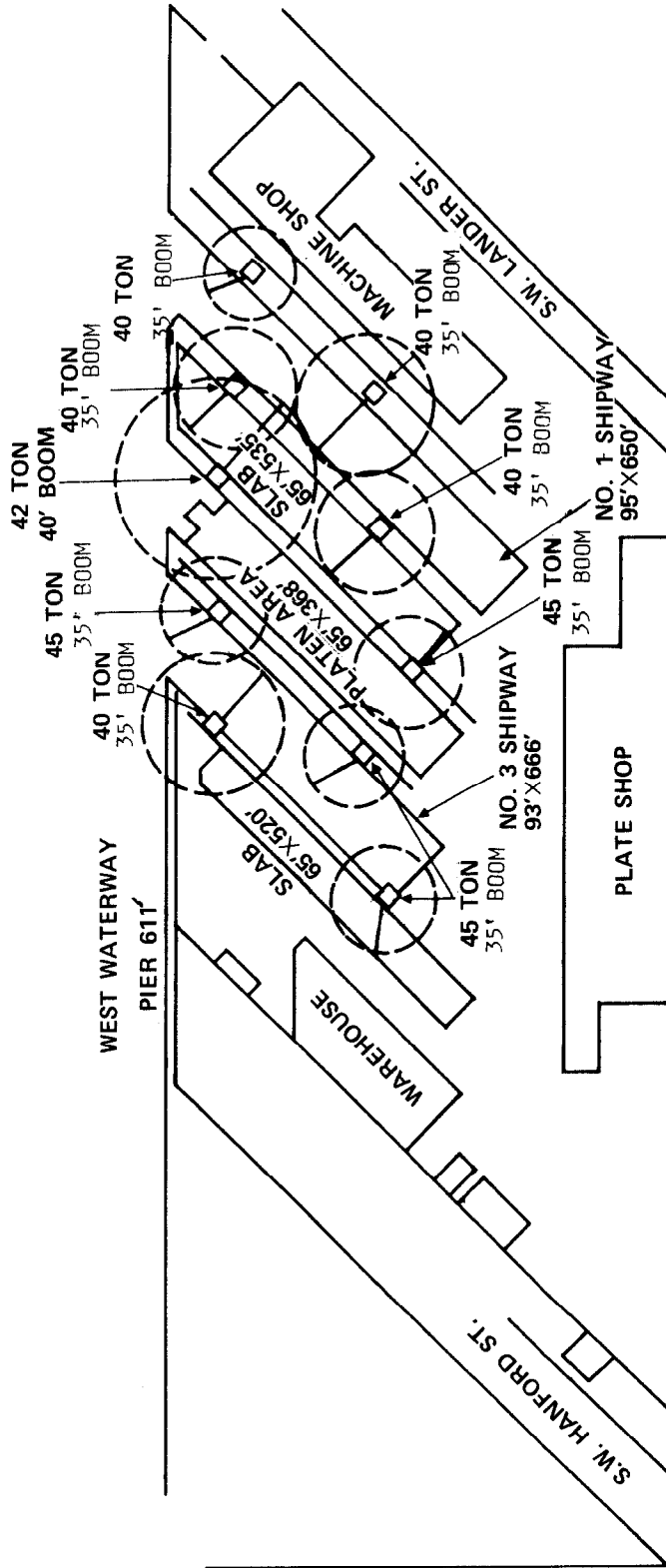
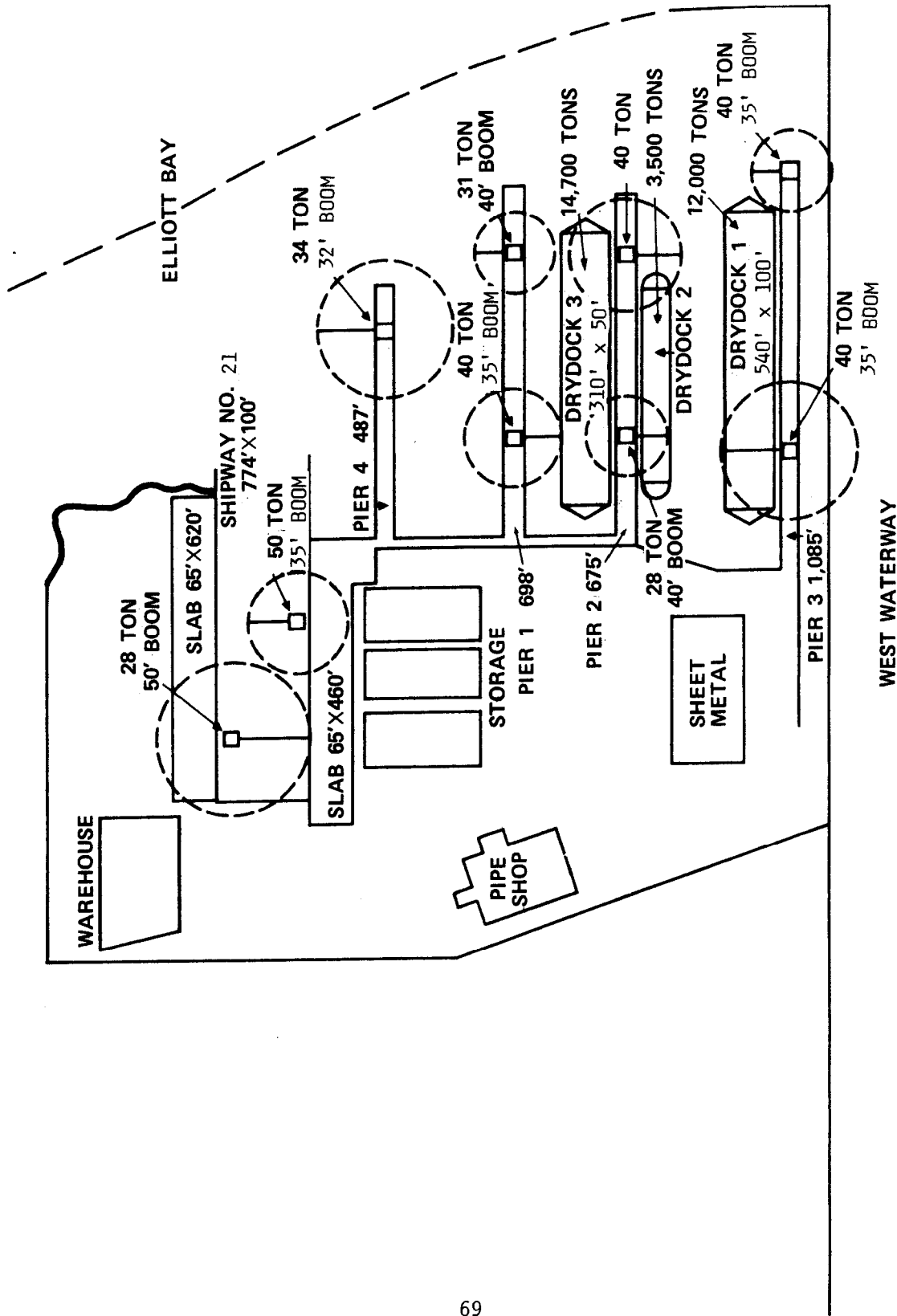


EXHIBIT 20

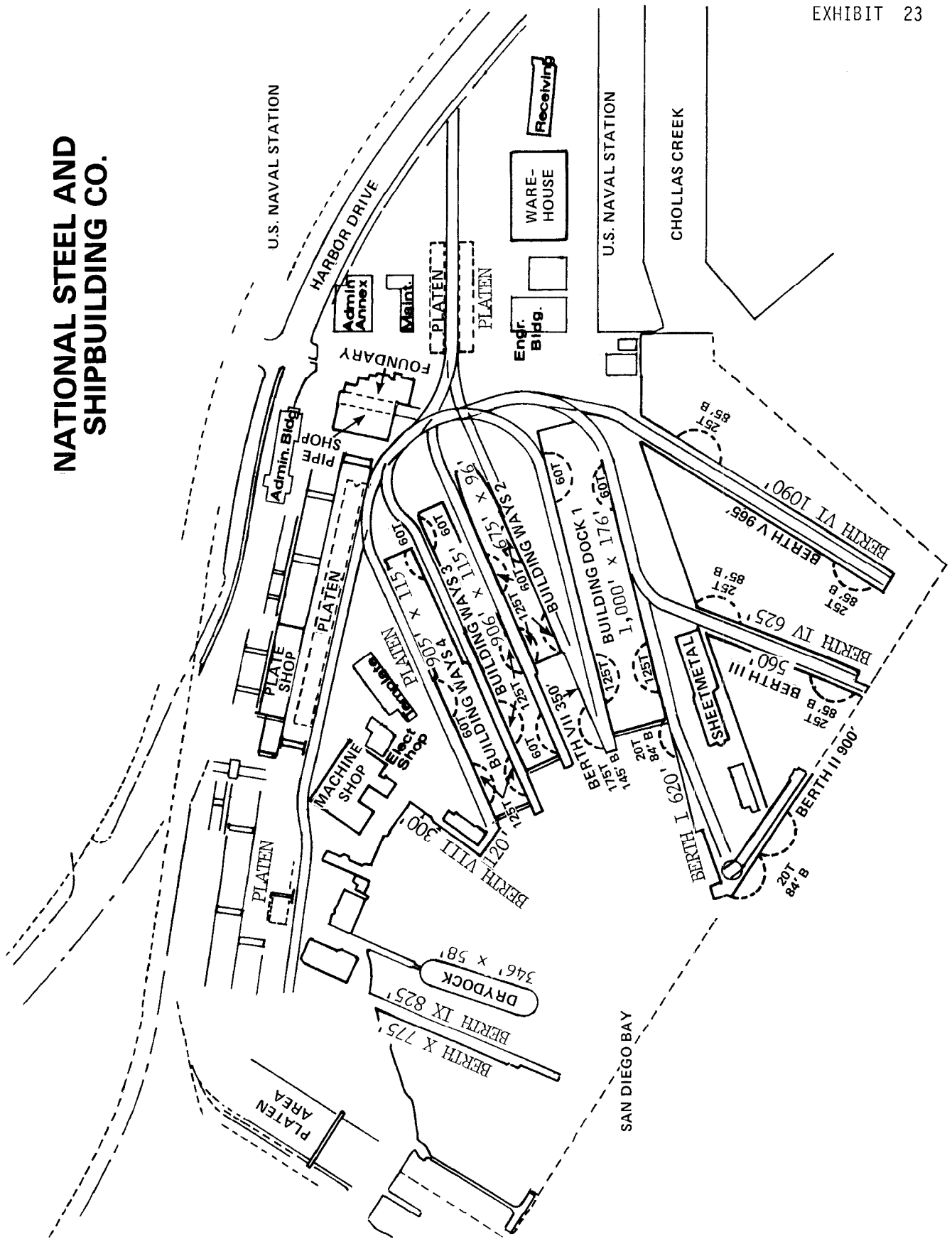
LOCKHEED
2929 16TH AVENUE, S.W.
PLANT 1

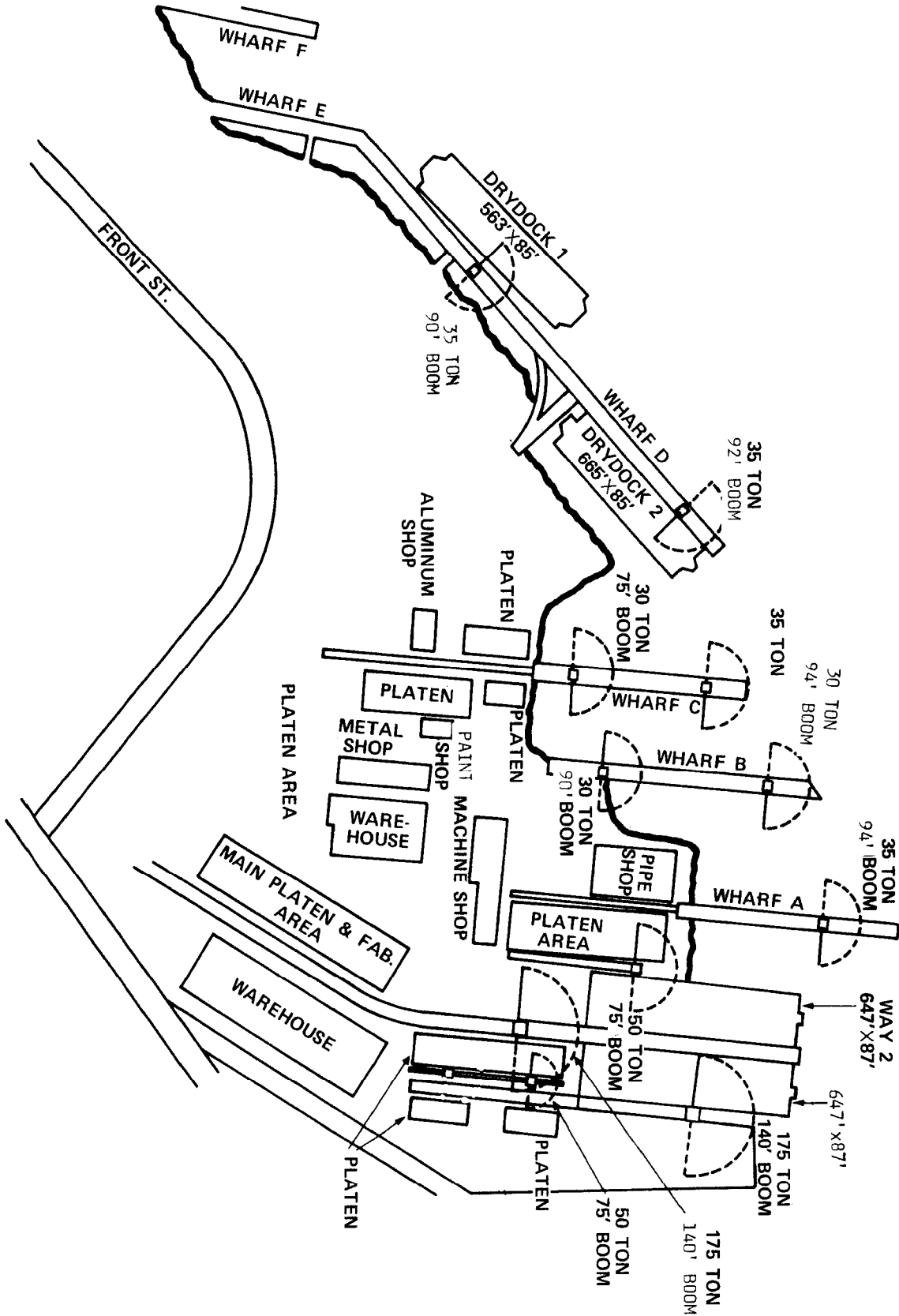


LOCKHEED
2330 S.W. FLORIDA ST.
PLANT 2



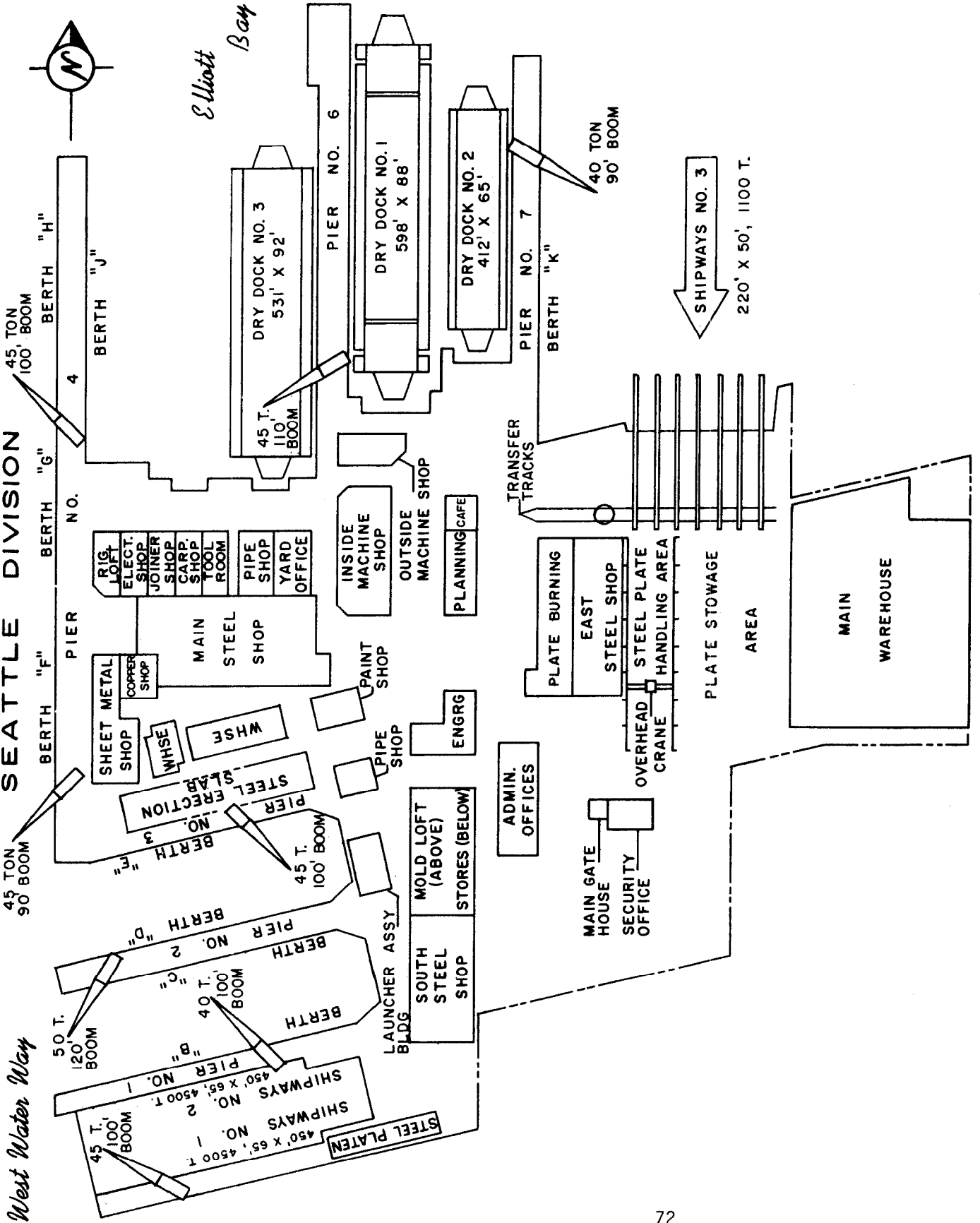
NATIONAL STEEL AND SHIPBUILDING CO.





TODD PACIFIC SHIPYARDS CORP.
LOS ANGELES DIVISION

TODD PACIFIC SHIPYARDS CORPORATION SEATTLE DIVISION



West Water Way

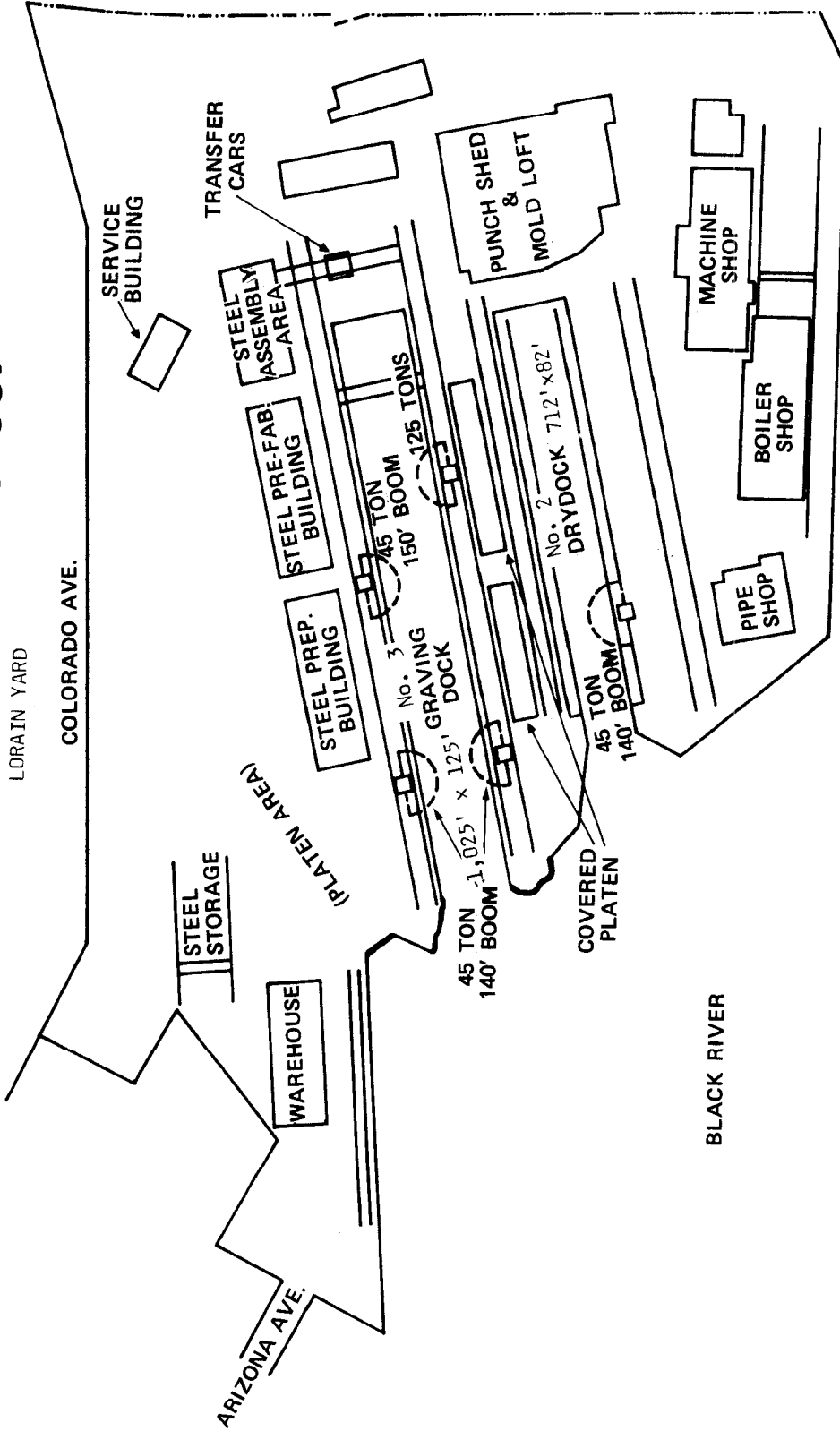
Elliott Bay



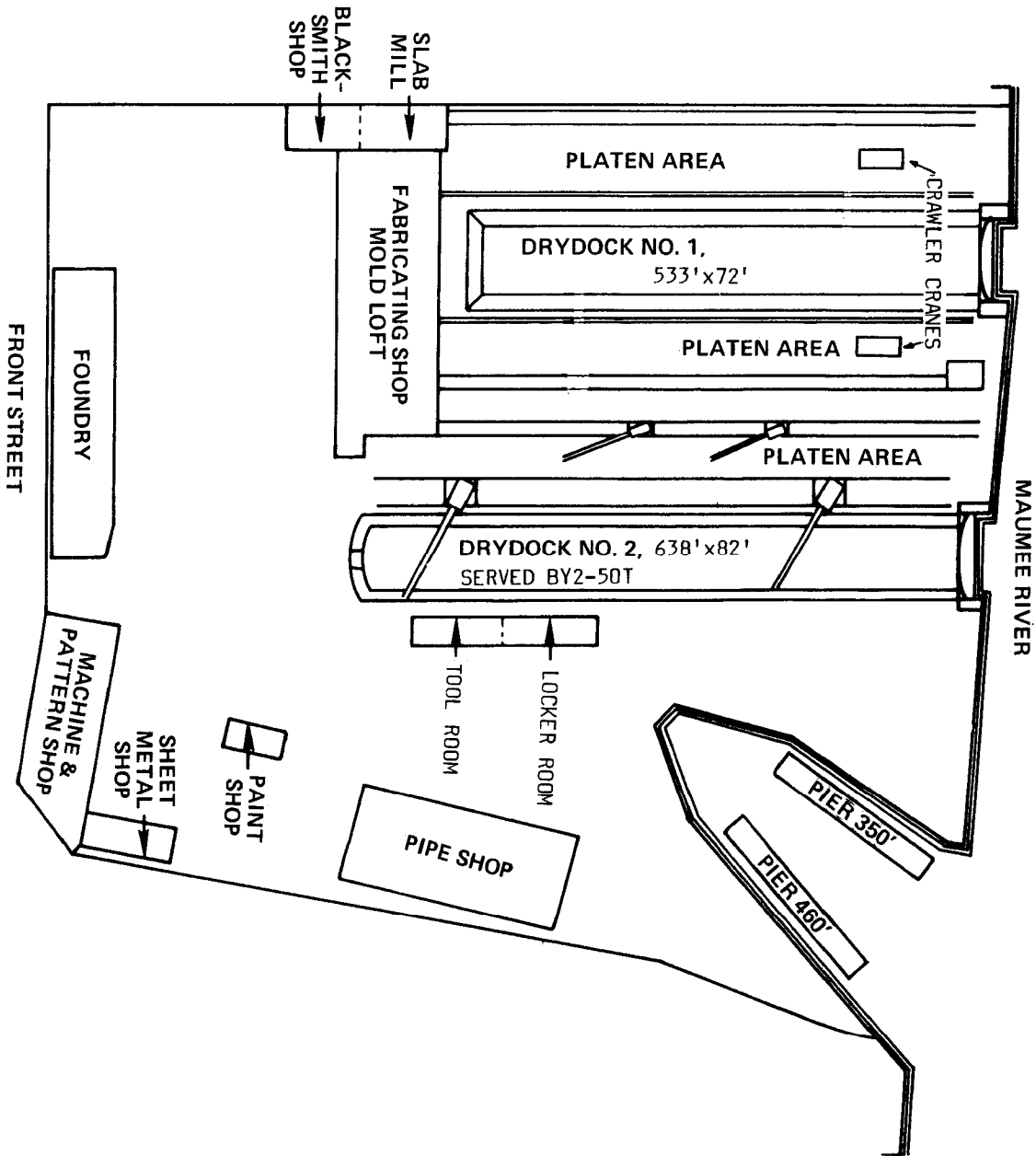
AMERICAN SHIP BUILDING CO.

LORAIN YARD

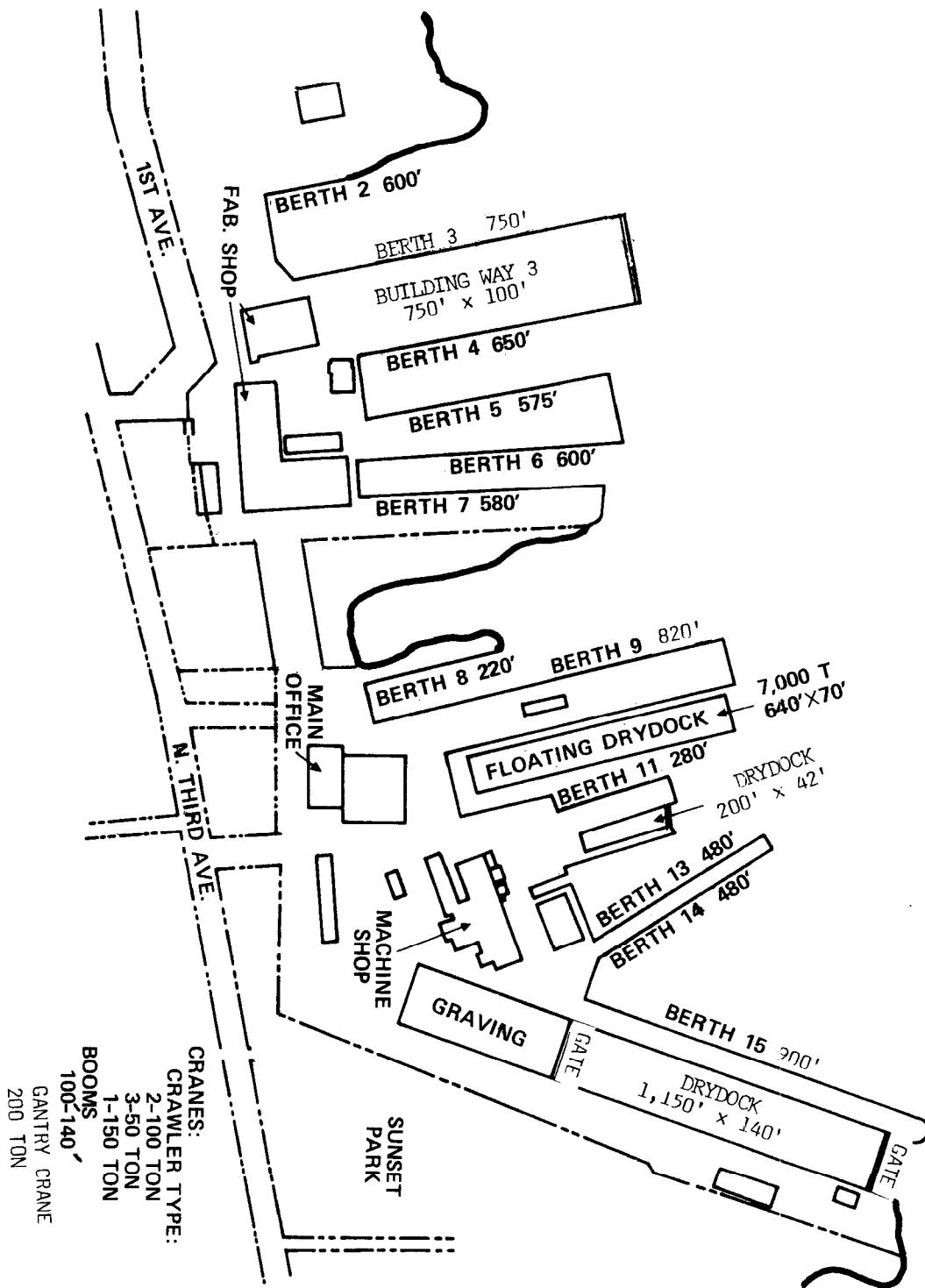
COLORADO AVE.



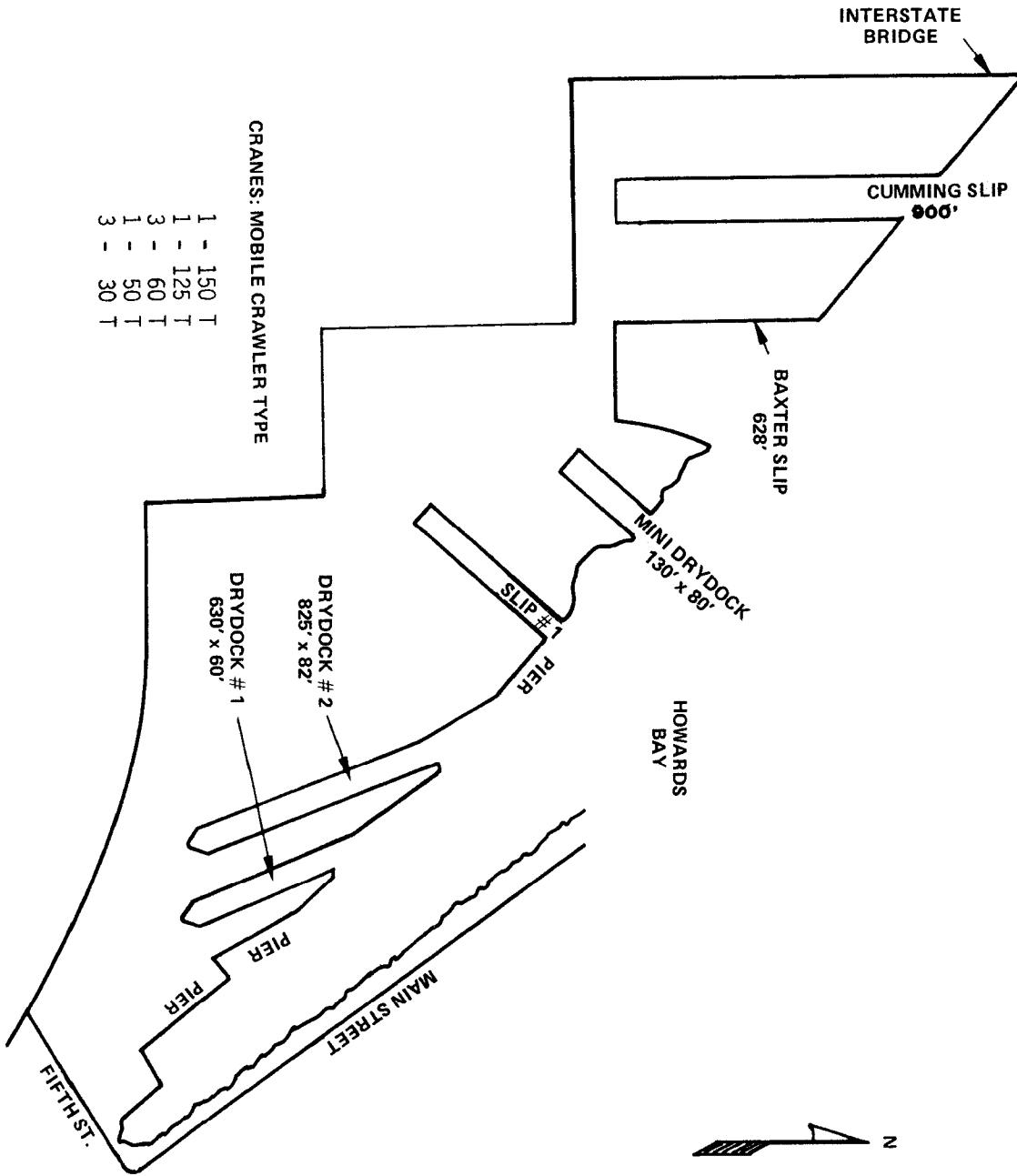
AMERICAN SHIP BUILDING CO. TOLEDO



BAY SHIPBUILDING CORPORATION

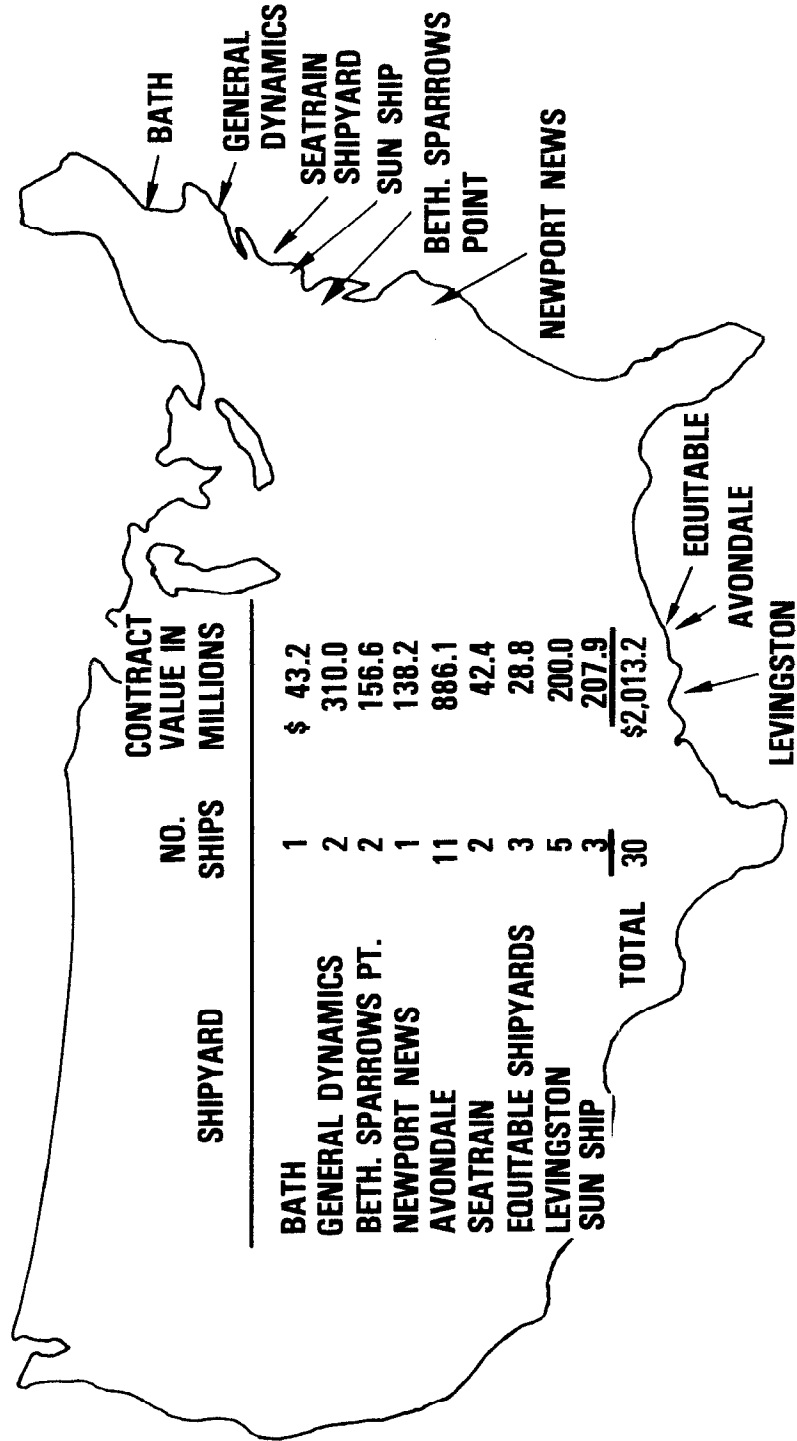


FRASER SHIPYARDS, INC. SUPERIOR, WISCONSIN

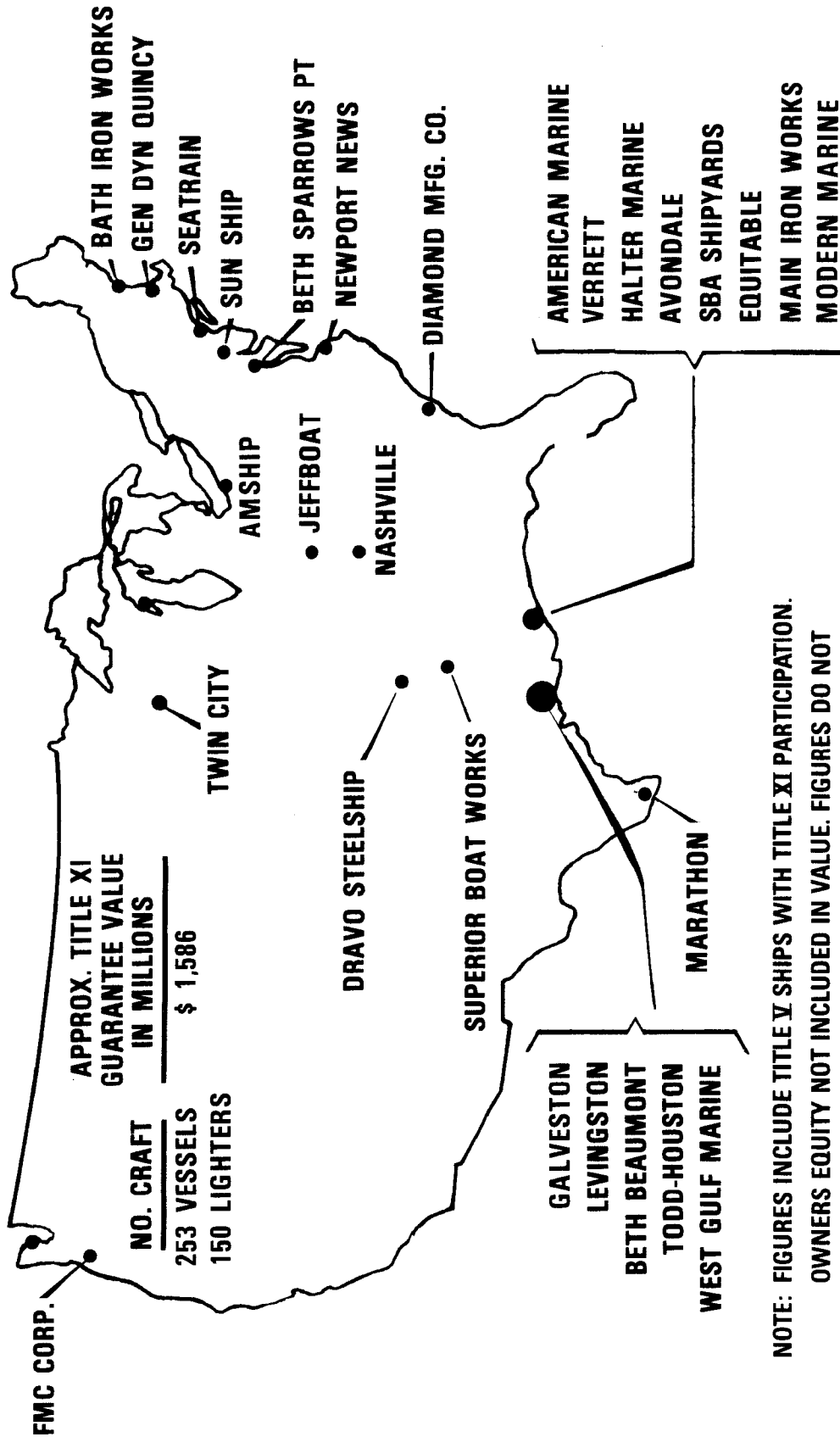


SHIPBUILDING PROGRAM (TITLE V) OFFICE OF SHIP CONSTRUCTION

SHIPS UNDER CONSTRUCTION OCTOBER 1, 1979
TOTAL CONTRACT VALUE, UNDELIVERED SHIPS



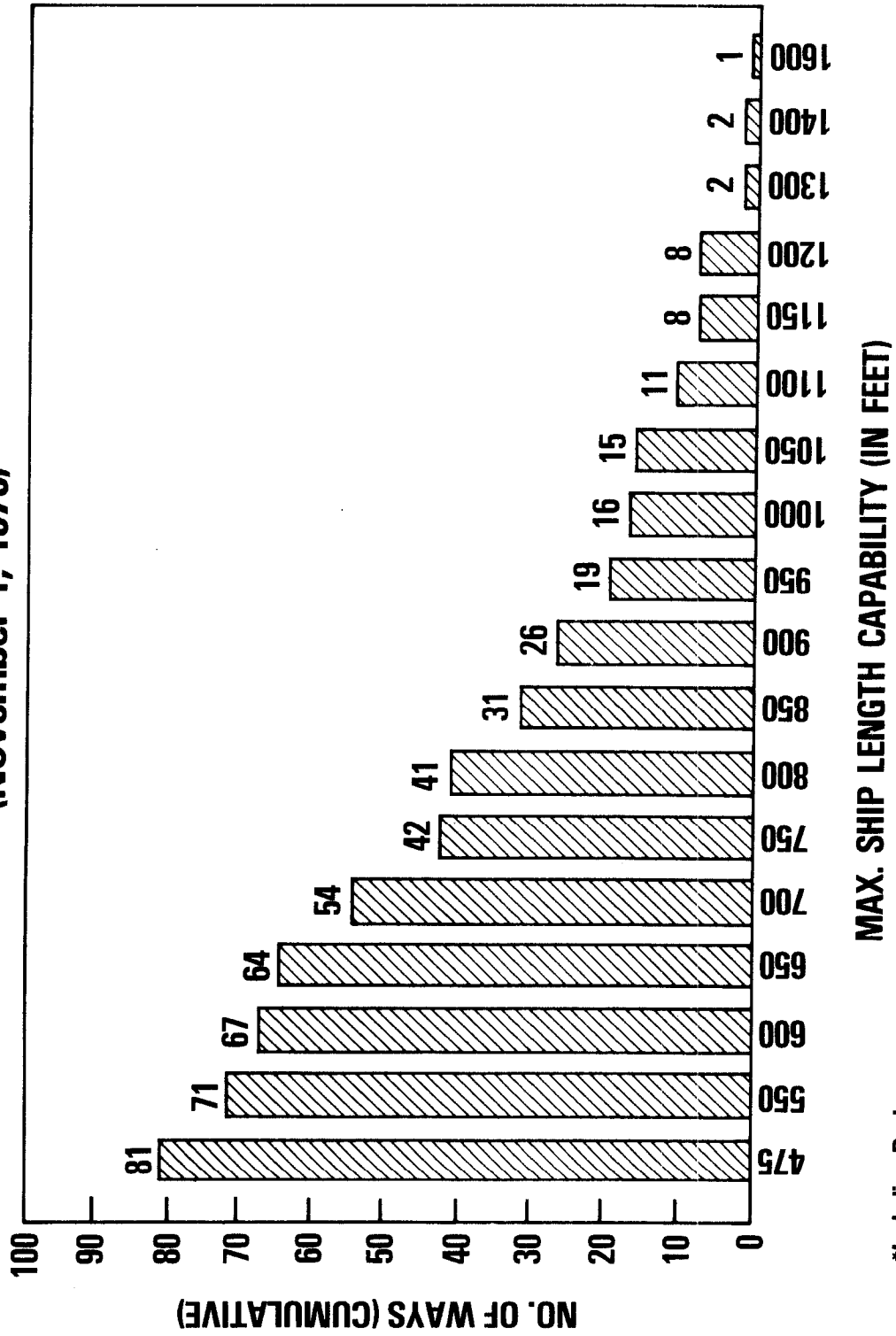
**SHIP FINANCING GUARANTEE CONSTRUCTION PROGRAM (TITLE XI)
OFFICE OF SHIP CONSTRUCTION
WORK UNDER CONTRACT SEPTEMBER 30, 1979**



**NOTE: FIGURES INCLUDE TITLE V SHIPS WITH TITLE XI PARTICIPATION.
OWNERS EQUITY NOT INCLUDED IN VALUE. FIGURES DO NOT
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, 1979)**

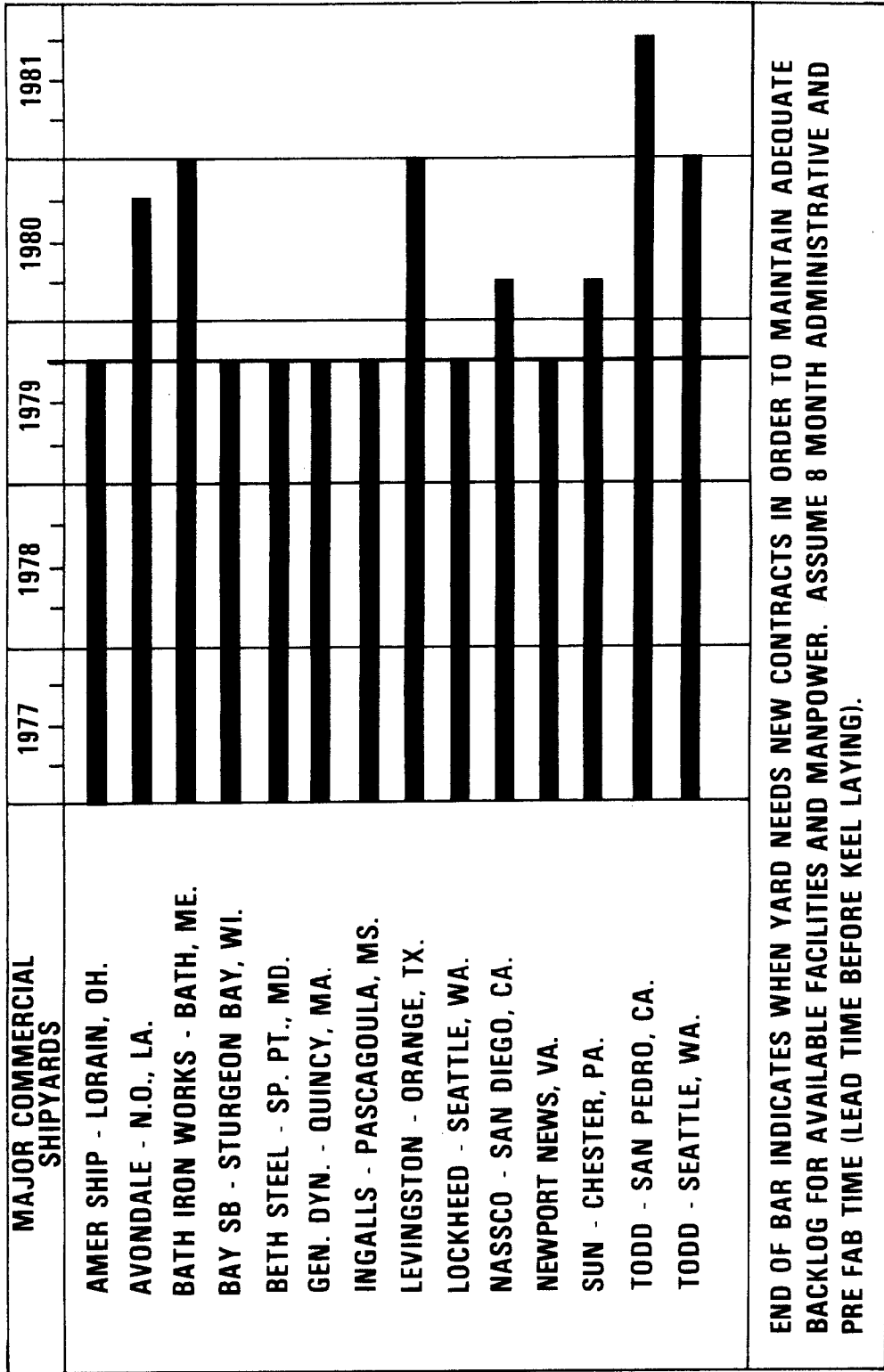


*Including Basins

SHIPYARD STATUS: NEED FOR NEW BUSINESS

U.S. DEPARTMENT OF COMMERCE MARITIME ADMINISTRATION

TIME NOW
➔



U.S. SHIPYARD EMPLOYMENT

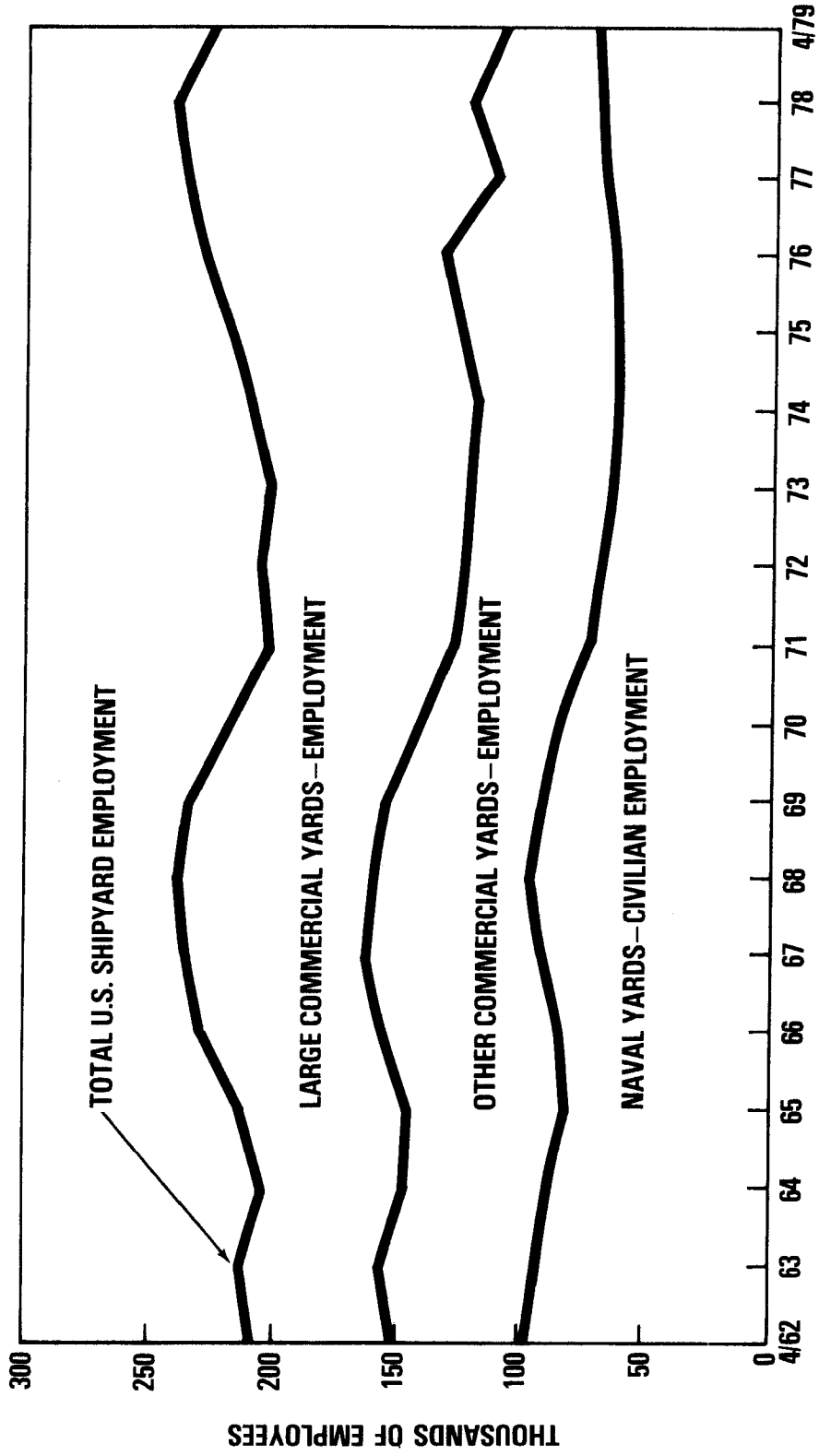


TABLE I

SHIP CONSTRUCTION CAPABILITY
BY SHIP TYPE

TABLE I
SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 720 x 105	Container 610 x 90	R/O/R/O 684 x 102	LASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 x 106		
<u>EAST</u>	Bath Iron Works	A	650 x 88	1	0	1	0	0	0	0	0	1	0	0
		B	700 x 130	1	0	1	1	0	0	0	0	1	1	0
		C	700 x 130	1	0	1	1	0	0	0	0	1	1	0
	Bethlehem Steel Sparrows Point	7	900 x 108	1	1	1	1	1	1	0	0	1	1	1
		10	900 x 108	1	1	1	1	1	0	0	1	1	1	1
			1200 x 192	4	1	3	2	1	1	1	1	4	3	1
	General Dynamics Quincy	6	860 x 123	(6)	(3)	(5)	(4)	(3)	(1)	(1)	(6)	(5)	(3)	
		7	936 x 143	2	1	1	1	0	0	0	1	1	0	
		8	860 x 123	2	1	1	1	0	0	0	1	1	0	
		11	860 x 144	2	1	1	1	0	0	0	1	1	0	
		12	860 x 144	2	1	1	1	0	0	0	1	1	0	
	Maryland S/B & D/D	1	850 x 110	(10)	(5)	(5)	(5)	(1)	(0)	(0)	(5)	(5)	(1)	
			1	1	1	1	0	0	0	1	1	0		
Newport News S/B	6	715 x 93	(1)	(1)	(1)	(1)	(0)	(0)	(0)	(1)	(1)	(0)		
	8	940 x 125	1	0	1	0	0	0	0	1	0	0		
	9	940 x 125	2	1	1	1	1	0	0	1	1	1		
	10	960 x 124	2	1	2	1	1	1	1	2	1	1		
	11	1100 x 136	2	1	2	1	1	1	1	2	2	1		
	12	1600 x 246	9	4	5	4	1	1	6	4	1	1		
		(18)	(8)	(12)	(8)	(5)	(3)	(13)	(9)	(5)				

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 720 x 105	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
	Norfolk SB & DD	-	475 x 85	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Sun S/B & D/D	6	745 x 129	1	1	1	1	1	1	1	1	1	1	1
		8	745 x 129	1	1	1	1	1	1	1	1	1	1	1
		Slab A	700 x 195	2	1	2	1	1	1	1	2	1	1	1
		Slab B	700 x 195	2	1	2	1	1	1	1	2	1	1	1
				(6)	(4)	(6)	(4)	(1)	(1)	(1)	(6)	(4)	(4)	(1)
				<u>45</u>	<u>21</u>	<u>32</u>	<u>24</u>	<u>10</u>	<u>5</u>	<u>34</u>	<u>26</u>	<u>10</u>		
	TOTAL EAST COAST													
	Alabama D/D & S/B	1	523 x 68	1	0	0	0	0	0	0	0	0	0	0
		2	523 x 68	1	0	0	0	0	0	0	0	0	0	0
		3	523 x 68	1	0	0	0	0	0	0	0	0	0	0
		4	523 x 68	1	0	0	0	0	0	0	0	0	0	0
		5	620 x 90	1	0	1	0	0	0	0	1	0	0	0
				(5)	(0)	(1)	(0)	(0)	(0)	(1)	(1)	(0)	(0)	(0)
	Avondale	2	1200 x 126	6	5	5	5	5	5	6	6	5	5	5
		3	1020 x 174	6	3	3	3	3	3	3	3	3	3	3
				(12)	(8)	(8)	(8)	(8)	(8)	(9)	(9)	(9)	(8)	(8)
	Beth. Beaumont	1	800 x 96	1	0	1	0	0	0	1	0	0	0	0
				(1)	(0)	(1)	(0)	(0)	(0)	(1)	(1)	(0)	(0)	(0)

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 720 x 105	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		
	Galveston S/B	5	700 x 120	1 (1)	0 (0)	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	1 (1)	1 (1)	0 (0)	0 (0)
	Levingston (Orange, Tx.)	1	700 x 100	1 (1)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)
	Levingston (Gulfport)	1	550 x 80	1 (1)	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	1	0	0	0
		2	550 x 80	1	0	0	0	0	0	0	0	0	0	0
		7	650 x 90	1	0	1	0	0	0	0	1	0	0	0
		8	650 x 90	1	0	1	0	0	0	0	1	0	0	0
		9	650 x 90	1	0	1	0	0	0	0	1	0	0	0
		10	650 x 90	1	0	1	0	0	0	0	1	0	0	0
	WB		800 x 173	6 (12)	6 (6)	6 (10)	6 (6)	0 (0)	0 (0)	0 (0)	6 (11)	6 (6)	0 (0)	0 (0)
	Marathon	1	1100 x 150	4 (4)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
	Tampa Ship Repair	3	500 x 105	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	TOTAL GULF COAST			38	15	23	16	9	9	25	17	9	9	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo										Dry Bulk				
				Gen. Cargo 475 x 68	Mob. Cargo 720 x 105	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						
<u>WEST</u>	Beth. San Francisco	4	550 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)	(0)	
	FMC Corporation	4	700 x 105	1	0	1	1	0	0	0	0	0	1	1	0	0		
				(1)	(0)	(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(1)	(0)	(0)	
	Lockheed S/B	1 3 21	650 x 90 650 x 90 700 x 100	1	0	1	0	0	0	0	0	0	0	0	0	0	0	
				1	0	1	0	0	0	0	0	0	0	0	0	0	0	
				1	0	1	0	0	0	0	0	0	0	0	0	0	0	
	National Steel & S/B	1 2 3 4	980 x 170 690 x 90 900 x 106 900 x 106	(3)	(0)	(3)	(0)	(0)	(0)	(0)	(0)	(0)	(3)	(0)	(0)	(0)	(0)	
				4	1	1	1	1	1	1	1	1	1	1	1	1	1	
				1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Todd, LA	1 2	800 x 84 800 x 84	(7)	(3)	(4)	(3)	(3)	(3)	(1)	(1)	(5)	(3)	(3)	(3)	(3)		
1				0	0	0	0	0	0	0	0	0	0	0	0	0		
Todd, Seattle	1A	550 x 96	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(2)	(0)	(0)	(0)			
			1	0	0	0	0	0	0	0	0	0	0	0	0	0		
Triple "A" Hunters Point	2 3 4	715 x 82 996 x 107 1088 x 136	(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		
			2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
			4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
<u>TOTAL WEST COAST</u>				<u>22</u>	<u>5</u>	<u>10</u>	<u>6</u>	<u>5</u>	<u>3</u>	<u>15</u>	<u>6</u>	<u>5</u>	<u>6</u>	<u>5</u>				

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk		
				Gen. Cargo 475 x 68	Mob. Cargo 720 x 105	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	
GREAT LAKES	American S/B-Lorain	GD2	708 x 78	1	0	0	0	0	0	0	1	0	0
		GD3	1021 x 121	2 (3)	1* (1)	1* (1)	1* (1)	1* (1)	1* (1)	1* (1)	1 (2)	1* (1)	1* (1)
	American S/B-Toledo	GD1	540 x 68	1	0	0	0	0	0	0	0	0	0
		GD2	680 x 78	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)
	Bay S/B Corporation	GD1	1100 x 136	2	1*	1*	1*	1*	1*	1*	1	1*	1*
		3	750 x 105	1 (3)	1* (2)	1* (2)	1* (2)	1* (2)	0 (1)	0 (1)	1 (2)	1* (2)	0 (1)
Fraser Shipyards	GD2	825 x 80**	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	
TOTAL GREAT LAKES			9	3	3	3	3	2	2	6	3	2	
TOTAL POSITIONS ALL YARDS			114	44	68	49	26	19	80	52	26		

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

** Per advice received from Fraser Shipyards by letter dated 6-29-79.

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						
EAST	Bath Iron Works	A	650 x 88	1	0	0	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	0	0
		C	700 x 130	1	1	0	0	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	0	0
		10	900 x 108	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
			1200 x 192	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	General Dynamics, Quincy			(5)	(4)	(3)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		6	860 x 123	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	936 x 143	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		8	860 x 123	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	860 x 144	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		12	860 x 144	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maryland S/B & D/D			(5)	(5)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
	1	850 x 110	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Newport News S/B			(1)	(1)	(0)	(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	0	0	
	8	940 x 125	1	1	1	0	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	0	
	10	960 x 124	1	1	1	0	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	1	1
12	1600 x 246	6	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
		(12)	(9)	(6)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Piers	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	125,000Cu. 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		
	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 S/B & D/D	6 8 Slab A Slab B	745 x 129 745 x 129 700 x 195 700 x 195	1 1 2 2 (6)	1 1 2 2 (6)	0 0 1/2 1/2 (1)	0 0 1/2 1/2 (1)	0 0 1/2 1/2 (1)	0 0 1/2 1/2 (1)	0 0 1/2 1/2 (1)	0 0 1/2 1/2 (1)	0 0 1/2 1/2 (1)	0 0 1/2 1/2 (1)	0 0 1/2 1/2 (1)	0 0 1/2 1/2 (1)	0 0 1/2 1/2 (1)
	TOTAL EAST COAST			32	27	12	5	5	4	1	3	2	11	3	0	0
	GULF															
	Alabama D/D & S/B	1 2 3 4 5	523 x 68 523 x 68 523 x 68 523 x 68 620 x 90	0 0 0 0 1 (1)	0 0 0 0 0 (0)	0 0 0 0 0 (0)	0 0 0 0 0 (0)	0 0 0 0 0 (0)	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 0 0 0 (0)	0 0 0 0 0 (0)	0 0 0 0 0 (0)	0 0 0 0 0 (0)
	Avondale	2 3	1200 x 126 1020 x 174	5 3 (8)	5 3 (8)	5 3 (8)	0 3 (3)	0 3 (3)	0 0 (0)	0 0 (0)	0 0 (0)	0 0 (0)	5 3 (8)	5 3 (8)	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	125,000cu. 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				
	Beth. Beaumont	1	800 x 96	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Galveston S/B	5	700 x 120	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	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)	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)	0 (0)
	Litton/Ingalls	1	690 x 85	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	550 x 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		9	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	650 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		WB	800 x 173	6 (11)	6 (6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Marathon	1	1100 x 150	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	1 (1)	1 (1)	1 (1)	1 (1)
	Tampa Ship Repair	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)	0 (0)
	TOTAL GULF COAST			24	18	9	4	4	4	1	1	0	0	0	9	1	4

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				
WEST	Beth, San Francisco	4	550 x 90	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	FMC Corporation	4	700 x 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	0
		3	650 x 90	1	0	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)	0 (0)
	National Steel & SB	1	980 x 170	2	1	1	1	1	1	1	1	1	1	1	1	1	1
		2	690 x 90	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		3	900 x 106	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		4	900 x 106	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Todd, LA	1	800 x 84	(5)	(4)	(3)	(1)	(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
		2	800 x 84	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Todd, Seattle	1A	550 x 96	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	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	1	1	1	1	1	1	1	1	1	1	1
		4	1088 x 136	2 (4)	1 (2)	1 (2)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)	1 (0)
TOTAL WEST COAST			15	8	5	1	1	1	1	1	1	1	1	1	3	0	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers												
				25,000 620 x 75	36,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000Cu. M. 952 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			
GREAT LAKES	American S/B-Lorain	GD2	708 x 78	1	0	0	0	0	0	0	0	0	0	0	0	0
		GD3	1021 x 121	1 (2)	1* (1)	1* (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1* (1)	0 (0)	0 (0)
	American S/B-Toledo	GD1	540 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0
		GD2	680 x 78	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Bay S/B Corporation	GD1	1100 x 136	1	1*	1*	0	0	0	0	0	0	0	1*	0	0
		3	750 x 105	1 (2)	1* (2)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (0)
	Fraser Shipyards	GD2	825 x 80**	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL GREAT LAKES				6	3	2	10	10	5	10	3	2	2	0	0	0
TOTAL POSITIONS ALL YARDS				77	56	28	10	10	5	10	3	2	2	25	7	7

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

**Per advice received from Fraser Shipyards by letter dated 6-29-79.

TABLE 1
SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE
SUMMARY

REGION	GENERAL CARGO							DRY BULK			
	Gen. Cargo 475 x 68	Mob. Cargo 720 x 105	Container 610 x 90	R0/R0 684 x 102	LASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 x 106		
East Coast	45	21	32	24	10	5	34	26	10		
Gulf Coast	38	15	23	16	9	9	25	17	9		
West Coast	22	5	10	6	5	3	15	6	5		
Great Lakes	9	3	3	3	2	2	6	3	2		
TOTAL POSITIONS ALL YARDS	114	44	68	49	26	19	80	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	32	27	12	5	5	4	2	11	3			
Gulf Coast	24	18	9	4	4	1	0	9	4			
West Coast	15	8	5	1	1	0	0	3	0			
Great Lakes	6	3	2	0	0	0	0	2	0			
TOTAL POSITIONS ALL YARDS	77	56	28	10	10	5	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 0A (In Feet):	475	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1300	1400	1600
<u>ATLANTIC COAST</u>																		
Bath Iron Works	3	3	3	3	2	3	3	3	3	1	1	1	1	1				
Beth-Sparrows Point	3	3	3	3	3	3	3	3	3	1	1	1	1	1				
General Dynamics, Quincy	5	5	5	5	5	5	5	5	1									
Maryland SB & DD	1	1	1	1	1	1	1	1										
Newport News SB & DD	6	6	6	6	6	5	5	5	5	3	2	2	2	1	1	1	1	1
Norfolk SB & DD	1																	
Sun SB & DD	4	4	4	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1
TOTAL	(23)	(22)	(22)	(22)	(21)	(15)	(15)	(15)	(10)	(5)	(4)	(4)	(4)	(3)	(3)	(2)	(2)	(1)

GULF COAST

Alabama DD & SB	5	1	1															
Avondale Shipyards	12	9	9	8	8	8	8	8	8	8	8	8	5	5	5			
Beth-Beaumont	1	1	1	1	1	1	1											
Ingalls-E. Bank	6	6	5	5	6	6	6											
Ingalls-W. Bank	6	6	6	6	6	6	6											
Galveston SB	1	1	1	1	1	1	1											
Levingston (Orange TX)	1	1	1	1	1	1												
Levingston (Gulfport)	1	1	1	1	1	1												
Marathon LeTourneau	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Tampa Ship Repair	1																	
TOTAL	(35)	(27)	(25)	(23)	(18)	(16)	(16)	(9)	(9)	(9)	(9)	(9)	(6)	(5)	(5)			(5)

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																
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																
Triple "A"	3	3	3	3	3	2	2	2	2	2	1	1						
TOTAL	(15)	(15)	(13)	(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	81	71	67	64	54	42	41	31	26	19	16	15	11	8	8	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

SHIPS' BERTHS (PIERS, WHARVES, BULKHEADS, MOORING DOLPHINS (M.L.W.))

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

DRYDOCKS (mean HIGH water) (List building docks under building ways)

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

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
Electric power..... E.-V.-DC-AMP

Fire protection.....
Sanitary sewer.....

FP-G.P.M.-P.S.I.
SS-Yes or No.
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 loft, if any)
NAME OF SHOP OR BUILDING	DIMENSIONS OF SHOP OR BUILDING	MATERIALS PROCESSED (See note)	LARGEST EXIT		Height			
			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				

SHOP OR YARD CRANES (5 tons or over)										
BRIDGE TYPE					STATIONARY, RAIL OR MOBILE					
Cap. (Std. tons)	Max. span	Height of hook	Area/shop serviced	Type	Cap. (Std. tons)	Max. reach	Capacity at reach	Boom length	Height hinge	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 size, e.g., 30' plate bending rolls, 10' plate shears, 400 ton Hyd. press, 30' plate furnace, engine (size 36" X 20" b.c., etc.)

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

	RAW STEEL STORAGE (Sq. ft.)	WELDING AND ASSEMBLY (Sq. ft.)
--	-----------------------------	--------------------------------

ACREAGE LEGALLY CONTROLLED

IN USE	DEVELOPED (including in use)	TOTAL (including undeveloped)
--------	------------------------------	-------------------------------

EXISTING LOCAL ORDINANCES LIMITING PRODUCTIVE USE

LIMITATIONS IMPOSED BY PROPERTY ZONING CLASSIFICATION

YARD LAYOUT—PLEASE FURNISH A PLOT PLAN OF YARD OR PLANT, IF AVAILABLE

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

LOCATION OF PRODUCTION FACILITIES FOR PRODUCTS LISTED IN ITEM 11, OF STD. FORM 129		ON WATERFRONT	
		<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 is under common control with, the reporting firm. Common ownership of stock by individuals does not in itself, constitute affiliation.)

DESCRIPTION OF TYPES OF WORK NORMALLY SUBCONTRACTED

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

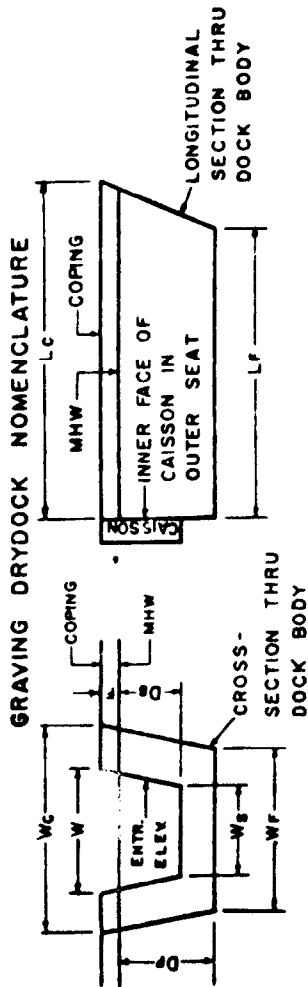
MINIMUM HORIZONTAL AND VERTICAL BRIDGE CLEARANCES TO TIDEWATER (Identify structures)

LIMITING LOCK DIMENSIONS TO TIDEWATER (Identify locks)

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	LENGTH		ENTRANCE DIMENSIONS		DOCK BODY DIMENSIONS			SUPERFLOODING	STANDARD DEFINITION	A. C. AMPERES (60 HZ-3Ø)			REMARKS
	FLOOR	COPING	SILL	WIDTH	DEPTH	WIDTH	DEPTH			DEPTH	FREEBOARD	480V MAX HOTEL (INDUST)	
	Lf	Lc	Ws	W	M.H.W. Ds	FLOOR Wf	COPING Wc	M.H.W. Df	F		*	* * *	(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-3 φ)			REMARKS (Indicate existence of hauling blocks, if end section can be lowered, and max. length of ship DD can accommodate.)
						480V MAX. HOTEL (INDUS)	2400V ALT. HOTEL	13.2KV TEST/ CHECK	

APPENDIX B

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

LEGEND: Remarks Column

- 1/ Type of work usually engaged in
- 2/ Employment - Mid-1979

APPENDIX B

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
<u>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 2900		1/ Construction, conversion and repairs - all types of vessels. 2/ 5,311 Also has floating bow drydock for sonar domes.
Beth. Steel Corp. Sparrows Point, Md.	(2) 900 x 108 SW 1200 x 192 GD	1260 3970		1/ New ship construction - to vessels 1200' in length. 2/ 2,450
General Dynamics Corp. Quincy SB Division Quincy, Mass.	(2) 860 x 123 GD 936 x 143 GD (2) 860 x 144 GD	893 4600		1/ Construction, conversion and repairs - all types of vessels. 2/ 4,856
Maryland SB and DD Co. Baltimore, Md.	850 x 110 SW 775 x 110 FD 715 x 91 FD 900 x 146 FD	1902 5650		1/ Construction, conversion and repairs - all types of vessels. 2/ 1,100
Newport News SB & DD Co. Newport News, Va.	(2) 715 x 93 SW 940 x 125 SW 960 x 124 GD* 1100 x 136 GD* 646 x 88 GD** 858 x 102 GD** 461 x 68 GD** 1600 x 246 GD*	1370 8986		1/ Construction, conversion and repair - all types of vessels. 2/ 22,400 * Used for construction ** Used for repairs and overhaul.
Norfolk SB & DD Co. Norfolk, Va.	475 x 85 SW 640 x 88 FD 1000 x 156 FD 441 x 60 MR	1030 12170		1/ Ship construction, repairs, and conversion. 2/ 3,500

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) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
Sun SB and DD Co. Chester, Pa.	(2) 745 x 129 SW (2) 700 x 195 SW* 1100 x 195 FD	1100 3900		1/ Construction, conversion and repairs - all types of vessels. 2/ 4,000 * Shipbuilding platform, Maximum ship 1400' x 195' or two ships 700' x 195' simultaneously.
<u>EAST COAST</u> <u>REPAIR YARDS WITH</u> <u>DRYDOCK FACILITIES</u>				
Beth. Steel Corp. Baltimore, Md.	530 x 81 FD 775 x 106 FD 830 x 136 FD 585 x 71 GD 456 x 44 GD	964 13404		1/ Ship repairs and conversion. 2/ 1,629
Beth. Steel Corp. East Boston, Mass.	690 x 92 FD 533 x 86 FD	1020 3111		1/ Ship repairs and conversion. 2/ 525
Beth. Steel Corp. Hoboken, N.J.	443 x 66 FD 685 x 106 FD 549 x 90 FD 640 x 96 FD 1064 x 138 GD*	923 3000		1/ Ship repairs and conversion. 2/ 675 * Military Ocean Terminal, Bayonne N.J. - leased by Bethlehem.
Boston Marine Industrial Park Boston, Mass.	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.
Braswell Shipyards, Inc. Boston, Mass.	650 x 92 GD*	N.A.		1/ Ship repairs and overhaul. 2/ 359 * GD #4 is located in the Boston Marine Industrial Park in the former Boston Naval Annex and is leased by Braswell.

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	
Ira S. Bushey & Sons Brooklyn, N.Y.	455 x 71 300 x 66	FD FD	<u>786</u> 4086		1/ Ship repairs and conversion. 2/ 130
Coastal DD & Repair Corp. Brooklyn, N.Y.	340 x 60 456 x 80 706 x 112	GD GD GD	<u>575</u> 1150		1/ Ship repairs and conversion. 2/ 600
Colonna's Shipyard Inc. Norfolk, Va.	300 x 40 360 x 65	MR MR	<u>900</u> 2200		1/ General ship repairs. 2/ 182
Detyens Shipyards Mt. Pleasant, S.C.	560 x 82 305 x 87	FD FD	<u>300</u> 600		1/ General ship repairs. 2/ 400
Jackson Engineering Co., Inc. Staten Island, N.Y.	400 x 81 500 x 81	FD FD	<u>653</u> 2606		1/ Ship repairs and conversion. 2/ N.A.
Jacksonville Shipyards Jacksonville, Fla.	(2) 660 x 90 900 x 140 400 x 53	FD* FD FD*	<u>680</u> 4184		1/ Ship repairs and conversion. Construction of small vessels. 2/ 2,690 * Leased from the Navy.
Perth Amboy DD Co. Perth Amboy, N.J.	400 x 68	FD	<u>400</u> 2130		1/ Ship repairs and conversion. 2/ 139
Puerto Rico DD & Marine Terminals San Juan, P.R.	632 x 83	GD*	<u>1000</u> 1000		1/ Ship repairs. 2/ 125 * Leased from Navy

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
Rodermond Industries Jersey City, N.J.	425 x 80 FD 350 x 60 FD 300 x 57 FD	842 842		1/ Ship repairs. 2/ 104
Savannah Machine and Shipyard Co. Savannah, Ga.	532 x 64 GD	382 1563		1/ Ship repairs and conversion. 2/ 400
Todd Shipyards Corp. Brooklyn, N.Y.	716 x 85 GD 755 x 95 FD	1152 7653		1/ Ship repairs and conversion. 2/ 383
Tracor Marine, Inc. Port Everglades, Fla.	360 x 80 (Syncrolift)	1825 1825		1/ Ship repairs and conversion. 2/ 266
<u>GULF COAST</u> <u>SHIPBUILDING YARDS</u>				
Alabama DD & SB Co. Mobile, Ala.	(4) 523 x 68 SW 620 x 90 SW 620 x 83 FD 750 x 100 FD 380 x 70 FD	1132 9370		1/ Ship construction, conversion, and repairs. Also drill rig construction. 2/ 1,500
Avondale Shipyards, Inc. New Orleans, La.	*(2) 1020 x 174 SW **1200 x 126 SW ***450 x 90 SW 300 x 50 MR 1000 x 216 FD 380 x 76 FD	1625 3800		1/ Ship construction, conversion and repairs. Also drill rig construction. 2/ 7,494 * Three vessels up to 1020' x 174' can be constructed simultaneously. ** Five large, greater than 600' LOA, vessels can be under con- struction simultaneously in this area. *** Westwego plant - Two vessels can be constructed simultaneously.

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	
Beth. Steel Corp. Beaumont, Tex.	800 x 96	SW	1100		1/ Construction of barges and drilling rigs. Also ship repairs and conversion. 2/ 1,937
	650 x 86	FD	4050		
Galveston SB Co. Galveston, Tex.	700 x 120	SW	None*		1/ Construction of barges, tugs and oceangoing integrated tug/barge units. 2/ 341 * City wharf in Galveston is available.
Ingalls SB Division Litton Industries Pascagoula, Miss.	690 x 85	SW	2650		1/ Construction, conversion, overhaul - all types of vessels. 2/ 16,926 * West Bank can launch ship up to 800' x 173'. Equivalent of six conventional inclined ways in terms of ships delivered annually.
	550 x 80	SW	8100		
	(4) 650 x 90	SW			
	481 x 71	GD			
	*800 x 173	FD			
Levingston SB Co. Orange SB Division Orange, Tex.	700 x 100	SW	600		1/ Construction of offshore drilling rigs, drillships, barges and commercial vessels. Repairs and conversion - all types of vessels. 2/ 1,769
	420 x 122	FD	2400		
	400 x 80	FD			
Levingston SB Co. Gulfport SB Division Port Arthur, Tex.	550 x 80	SW	590		1/ Construction of offshore drilling rigs and barges. Ship repairs and conversion. 2/ 300
	400 x 80	SW	1270		
	(2) 325 x 68	FD			
Marathon LeTourneau Co. Gulf Marine Division Brownsville, Tex.	1100 x 150	SW	500		1/ Construction of offshore drilling rigs and drill ships. Yard has capability of building large oceangoing ships. 2/ 1,200
			500		

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	
Tampa Ship Repair & DD Co. Tampa, Fla.	500 x 105 SW 542 x 72 GD 896 x 146 GD	845	1800	1/ Ship construction and repairs. 2/ 1,193
<u>GULF COAST</u> REPAIR YARDS WITH DRYDOCK FACILITIES Bender Welding & Machine Co. Mobile, Ala.	414 x 55 FD	617	2300	1/ Ship repairs and construction up to 200' long. 2/ 650
Delta Shipyard Houma, La.	300 x 54 (Syncrolift)	Dolphins only		1/ Construction and repair of small vessels up to 300' long. 2/ 215
Equitable Shipyards, Inc. New Orleans, La.	325 x 90 MR	500	1654	1/ Construction and repair of small vessels and barges. 2/ 1,003
Southern SB Corp. Slidell, La.	350 x 54 GD	200	300	1/ Construction and repair of vessels up to 350' in length and not drawing over 15' of water. 2/ 300
Todd Shipyards Corp. Galveston, Tex.	670 x 86 FD	1086	5035	1/ Ship repairs and conversion. Also nuclear-related work. 2/ 908
Todd Shipyards Corp. Houston, Tex.	600 x 95 SW 600 x 96 FD	1844	3271	1/ Ship repairs and conversion. Construction of barges and vessels up to 600' in length. 2/ 436

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	
Todd Shipyards Corp. New Orleans, La.	696 x 86	FD		1725		1/ Ship repairs and conversion. 2/ 416
	643 x 80	FD		4956		
<u>WEST COAST</u>						
<u>SHIPBUILDING YARDS</u>						
Beth. Steel Corp. San Francisco, Calif.	550 x 90	SW		813		1/ Ship repairs and conversion. Can build C3 and C4 type vessels. 2/ 800
	700 x 94	FD		3680		
	950 x 144	FD				
FMC Corp. Portland, Ore.	700 x 105	SW		600		1/ Construction of vessels up to 700' in Length. 2/ 300 Leases drydocks and berths from Port of Portland as required.
				1200		
Lockheed SB & Construction Co. Seattle, Wash.	(2) 650 x 90	SW		800		1/ Ship construction, conversion and repairs - all types of vessels. 2/ 2,370
	700 x 100	SW		6500		
	400 x 46	FD				
	530 x 80	FD				
	643 x 96	FD				
National Steel and SB Co. San Diego, Calif.	980 x 170	GD		1090		1/ Construction, conversion and repairs - all types of vessels. 2/ 6,356 * Leases from Unified Port District of San Diego.
	690 x 90	SW		7075		
	(2) 900 x 106	SW				
	397 x 52	FD*				
	687 x 90	GD*				
Todd Pacific Shipyards Corp. San Pedro, Calif.	(2) 800 x 84	SW		680		1/ Construction, repairs and conversion - all types of vessels. 2/ 3,124
	700 x 86	FD		4800		
	550 x 80	FD				

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	
Todd Pacific Shipyards Corp. Seattle, Wash.	550 x 96 650 x 83 420 x 62 550 x 88	SW FD FD FD	1137 4850		1/ Ship Construction, repairs and conversion - all types of vessels. 2/ 3,770
Triple "A" Machine Shop Hunters Point San Francisco, Calif.	715 x 82 996 x 107 1088 x 136 (2) 416 x 56 416 x 71	GD GD GD GD GD	600 24000		1/ Ship repairs, overhaul and conversion. Has ship construction capability. 2/ 1,100 All graving docks are part of the inactive Hunters Point Naval Shipyard and are leased from the U.S. Navy.
<u>WEST COAST</u>					
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>					
Beth. Steel Corp. San Pedro Yard Terminal Island, Calif.	600 x 86 720 x 93	FD FD	1800 4175		1/ Ship repairs and conversion. 2/ 555
Calif. SB & DD Co. Long Beach, Calif.	391 x 54	FD	600 1700		1/ Ship repairs and conversion. 2/ 115
Campbell Industries San Diego, Calif.	(2) 360 x 46	FD	575 1975		1/ Construction of fishing boats. Also ship repairs. 2/ 400 Graving dock is leased from Unified Port District of San Diego, (Listed under NASSCO)
Dillingham Marine & Mfg. Co. Portland, Ore.					1/ Ship repairs and conversion. 2/ 320 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) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
Dillingham Shipyard Honolulu, Hawaii	370 x 53 FD	600 800		1/ Ship repairs and conversion. 2/ N.A.
Lake Union DD Co. Seattle, Wash.	340 x 56 FD	1000 4235		1/ Ship repairs and conversion. 2/ 120
Marine Power & Equip. Co. Seattle, Wash.	400 x 57 FD	832 2700		1/ Construction of small vessels and barges. Also ship repairs. 2/ 500
Merritt Ship Repair Co. Oakland, Calif.	320 x 52 FD	600 1155		1/ Ship and barge repairs. 2/ 95
Northwest Marine Iron Works Portland, Ore.	500 x 100 SW (Barge construction only)			1/ Ship repairs, conversion and barge construction. 2/ 1,000 Leases drydocks and berths from Port of Portland as required.
Port of Portland Swan Island Ship Repair Yard Portland, Ore.	633 x 84 FD 525 x 88 FD 810 x 110 FD 1100 x 181 FD	750 6360		Port of Portland owns these drydocks which are leased to ship repair companies on an as-required basis.
Southwest Marine, Inc. San Diego, Calif.	380 x 80 FD	600 1855		1/ Ship repairs and overhaul. Construction of vessels up to 200 feet in length. 2/ 650 Graving dock is leased from Unified Port District of San Diego (listed under NASSCO).
Southwest Marine of San Francisco San Francisco, Calif.	744 x 80 GD*	N.A.		1/ Ship repairs and overhaul. 2/ 170 Leases from Port of Richmond, Calif.

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	
Todd Shipyards Corp. San Francisco Division Alameda, Calif.	523 x 80	FD	800	2485	1/ Ship repairs and conversion. 2/ 750
Triple "A" South San Diego, Calif.			None*		1/ Ship repairs and overhaul. 2/ 300 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, Ore.			1232	1232	1/ Ship repairs and conversion. 2/ 430 Leases drydocks and berths from Port of Portland as required.
<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, Ohio	708 x 78	GD	900	1800	1/ Ship construction, repairs and conversion. 2/ 1,000
American SB Co. Toledo, Ohio	680 x 78	GD	800	1600	1/ Ship construction, repairs and conversion. 2/ 450
Bay SB Corp. Sturgeon Bay, Wis.	750 x 105	SW	900	7090	1/ Ship construction, repairs and conversion. 2/ 2,000

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (L.O.A.--Beam)	Berths/Piers		Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Usable length in feet	Longest Total linear feet	
Fraser Shipyards Superior, Wis.	825 x 80 GD 621 x 60 GD	900 4450		1/ Ship construction, conversion and repairs. 2/ 400
<u>GREAT LAKES</u>				
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>				
American SB Co. Chicago, Ill.	694 x 73 GD	850 1300		1/ Ship repairs and conversion. 2/ 150
Peterson Builders Sturgeon Bay, Wis.	342 x 30 FD	550 2515		1/ Construction and repair of ships and boats. 2/ 886

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

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

Newpark SB & Repair, 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 Iron Works, Shipyard
Division
Tacoma, WA

Marine Ways Corporation
Portland, OR

Pacific Dry Dock & Repair Co.
Oakland, CA

Pacific Marine & Supply Co.
Honolulu, Hawaii

Rowe Machine Works, Inc.
Seattle, WA

Service Engineering Co.
San Francisco, CA

Southwest Marine, Inc.
San Diego, CA

Tacoma Boatbuilding Co., Inc.
Tacoma, WA

Triple "A" South
San Diego, CA

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

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

