

* 1982 *

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

* 1982 *

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Introduction

In compliance with the Merchant Marine Act of 1936, as amended, 1/ the Office of Ship Construction conducts an annual survey to obtain information from the shipbuilding and ship repair industry to be used primarily to determine if an adequate mobilization base exists for national defense and for use in a national emergency. This report on the 1982 survey of U.S. shipyard facilities was prepared by the Division of Production, Office of Ship Construction, and is for general use within the Maritime Administration (MARAD) and other Government agencies.

1/ Section 210

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

Section 211

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

Section 502(f)

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

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

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

Each year in late spring, Standard Form 17, "Facilities Available for the Construction or Repair of Ships," is mailed to some 220 U.S. shipyards and ship repair facilities. The survey form was developed jointly by MARAD and the Navy. A completed Form 17 represents a detailed description of a shipbuilding or ship repair facility, which is not available from any other source on a continuing and structured basis. The information requested, and available for official use, can be reviewed on a blank Form 17 shown herein as Appendix A. A graving drydock characteristics summary and a floating drydock characteristics summary are appended to Standard Form 17 to better identify the characteristics of the facilities.

Upon receipt of a completed Form 17 from a shipyard, MARAD forwards a copy to the Office of the Coordinator for Ship Repair and Conversion which maintains records of available facilities and capacities of various shipyards and repair plants so that the Department of Transportation and the Department of Defense can use such facilities to the best advantage. SF 17 also serves as a primary data input to the Office of Industrial Resource Administration (Department of Commerce). The Federal Emergency Management Agency (FEMA) in the General Services Administration also uses this information, as does the U.S. Coast Guard and U.S. Army Corps of Engineers.

General

The annual shipyard survey of 1982 has been completed; and the information collected has been organized and condensed in the following narrative, exhibits, and tabulations to focus attention on those elements that are most often requested from

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

MARAD has examined drydock data submitted by shipyards in the 1982 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 beam was determined by allowing a two-foot (.6 m) clearance at each side between the ship and wing wall.

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

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

Major Shipbuilding Facilities

A major shipyard is defined in this report as one having at least one shipbuilding position, either an inclined way, a side-launching platform or a building basin, with the capability to accommodate a minimum ship size of 475 feet (145 m) length overall and a beam of 68 feet (21 m). There are presently 32 shipyards in this category, which are identified and geographically located in Exhibit 1.

Despite the continuing worldwide shipping recession, uncertain near-term future prospects, and declining commercial orderbooks, the U.S. shipbuilding and ship repair industry in FY 1982 invested some \$329 million in facilities modernization and expansion and as of July 1, 1982, planned to spend an additional \$240 million during the year ending June 30, 1983, mainly for larger drydocks and support facilities to increase vessel conversion, overhaul, and repair capabilities. Several yards have plans for gearing up for the anticipated increase in naval ship construction.

Since enactment of the Merchant Marine Act of 1970, the U.S. shipbuilding and ship repair industry has invested approximately \$2.6 billion in plant modernization and improvements. These investments have significantly increased the capacity, capability, and productivity of the industry. With the slump in ship construction, the emphasis in recent years has been on expansion of ship repair and conversion facilities. Exhibits 2 through 36 are general arrangement plans outlining shipbuilding and repair facilities in 31 of the major yards. Detailed descriptions of these exhibits are included in this report.

As of October 1, 1982, (see Exhibit 37), MARAD was subsidizing a construction backlog of nine merchant ships and the major reconstruction of three large commercial vessels. These were in addition to 17 nonsubsidized deep-draft merchant ships under construction in U.S. shipyards. There were 31 offshore drilling rigs on order with an estimated contract value of \$1.3 billion. MARAD was providing Title XI financing guarantees for a wide variety of commercial vessels, barges, and offshore drilling rigs under construction in 46 American shipyards (see Exhibit 38). Exhibit 39 illustrates the continuing overall decline since the mid-1970's in both the numbers and gross tonnage of merchant ships being built in U.S. shipyards.

Table 1 has been prepared to answer the frequent question as to how many shipbuilding positions are available to build a specified ship. ^{1/} A single shipway or basin may have several building positions depending on the size of the ships being constructed. For example, the 1,200-foot by 192-foot (366 m by 59 m) basin at Bethlehem's Sparrows Point shipyard can accommodate one 265,000-dwt. tanker or four of the smaller 475-foot by 68-foot (145 m by 21 m) cargo ships. With the exception of the mobilization ship, the ship types listed are mainly those presently under construction or recently delivered to commercial service. The total number of building positions varies from 128 for the small cargo ship to one for a 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 1 is the common shipbuilding practice of laying a keel on a building position already occupied by another ship. For example, in a 700-foot (213 m) basin, a complete 610-foot

^{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.

m(186 m) containership and the stern section of a second ship could be constructed simultaneously. This production procedure, analyzed periodically by SPAMM, maximizes the use of shipbuilding facilities, minimizes the construction period, and increases the number of ships that can be produced in a given period of time.

Table 2 is a somewhat different presentation of the data, meaningful to many requesting information from the annual survey. In lieu of actual ships, maximum ship length is used to determine the number of shipways or basins available. In this tabulation, the emphasis is on the number of individual facilities available and not on the number of ships that can be constructed. Again using Sparrows Point as an example, Table 2 lists the 1,200-foot by 192-foot (366 m by 59 m) basin as one facility regardless of what type of ship is constructed in it. Table 1 indicated that there are six building positions for a ship 475 feet (145 m) LOA at Sparrows Point, whereas Table 2 indicates that the yard has three individual shipways capable of constructing a ship 475 feet (145 m) in length. Exhibit 40 is a histogram displaying the reduction in the number of available shipways as the maximum ship length increases.

Following is a brief description of 32 major U.S. commercial shipyards capable of constructing oceangoing or Great Lakes merchant ships, with a minimum size of 475 feet (145 m by 21 m).

1. Alabama Dry Dock and Shipbuilding Company

Alabama Dry Dock and Shipbuilding Company (ADDSCO) has been in operation for 66 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 four years, the company has continued its facility improvements, mainly the upgrading and modernization of existing drydocks, piers, shops and equipment.

Supplementing its booming ship repair and overhaul business, ADDSCO, as of October 1, 1982, was building one semi-submersible offshore drilling rig for Diamond M Company, the last of a series of three semi-submersibles constructed for Diamond M Company in recent months.

Alabama Dry Dock operates four side-launching shipways, each of which can accommodate a maximum ship size of 523 feet by 68 feet (160 m by 21 m) and one sliding way which can handle vessels as large as 620 feet by 90 feet (189 m by 27 m). ADDSCO also operates two floating drydocks; the larger of the two can accommodate a ship size of 750 feet by 98 feet (229 m

by 30 m). There are also 9,370 feet (2856 m) of berthing space available at seven finger piers for topside and inboard repairs. There are 19 revolving gantry cranes with capacities up to 65 tons (59 metric tons) available to service the shipways and berthing areas. A 275-ton (250 metric ton) Goliath bridge crane which straddles the slip between piers K and L, is used for construction, repair work, and outfitting.

ADDSCO's wholly owned subsidiary, Mobile Giant Erectors, Inc., operates the largest capacity lifting facility on the Gulf Coast on property adjacent to ADDSCO's main plant. This twin-boom luffing derrick with 300-foot (91 m) high booms and the capability of handling 1400 metric tons at a radius of 175 feet (53 m) gives ADDSCO the ability to serve the heavy construction industry and to construct the heavy offshore structures required in today's market.

ADDSCO, as of July 1982, employed a labor force of 2,900, up from 2,000 a year earlier.

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

2. The American Ship Building Company - Lorain, Ohio

Since it was founded in 1899 in Lorain, Ohio, The American Ship Building Company has been a leader in the design and construction of ships for the Great Lakes. Under its present organization, the company's AMSHIP Division consists of two yards, in Lorain and Toledo, Ohio. The Tampa Division consists of only Tampa Shipyards, Inc., and the NABRICO Division consists of only Nashville Bridge Company. These are the divisions involved in shipbuilding.

During the World War II period, the company built an impressive variety of vessels for the Navy, Army, Maritime Commission, and private interests. Since World War II, American Ship specialized in the construction of ore carriers, besides building seven Coast Guard cutters, two naval auxiliaries, and a fisheries research vessel.

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

The Lorain plant is one of two shipyards on the Great Lakes capable of building ships up to 1,000 feet (305 m) in length. The JAMES R. BARKER, the first of two 1,000-foot

(305 m) self-unloading Great Lakes ore carriers for Pickands Mather and Co., was completed at Lorain in 1976. The MESABI MINER, a sistership of the BARKER, was delivered to Pickands Mather in 1977; and a third 1,000-footer, the GEORGE A. STINSON, was delivered in 1978.

In 1980, the 1,000-foot (305 m) self-unloader, EDGAR B. SPEER, was delivered to the United States Steel Corporation; and in 1981, a similar vessel, the WILLIAM J. DeLANCEY, was delivered to the Interlake fleet of Pickands Mather. In July 1981, The American Ship Building Company was awarded a \$73 million contract to convert four Moore McCormack general cargo ships to larger self-sustaining breakbulk/container vessels. Tampa Ship performed the first and third of these reconstruction jobs, the Lorain yard converted the second ship, and as of November 1, it had not been decided which of the company's yards would convert the fourth Moore McCormack vessel.

The Military Sealift Command in September 1982, announced the award to Ocean Carriers, Inc. of a "build and charter" contract for two new T-5 handy-size product tankers, with an option for three more. The American Ship Building Company will build these ships. However, as of November 1, 1982, the company had not determined how the work will be allocated among its shipyards.

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

In the Lorain facility, graving dock No. 3, with a maximum ship size of about 1,021 feet by 121 feet (311 m by 37 m), is used for new construction. The yard's other graving dock is presently inactive but can be readily reactivated. In the past, it was used primarily for repair and overhaul work and can handle ships up to 708 feet by 78 feet (216 m by 24 m). The yard also has an inactive side-launch way which is currently being used as a platen area. For repair and outfitting, Lorain has available a total of about 1,800 feet (549 m) of berthing space.

At mid-1982, the total payroll at Lorain was approximately 400 compared to 100 at mid-1981.

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

3. The American Ship Building Company - Toledo, Ohio

In 1947, The American Ship Building Company purchased this shipyard from the Toledo Shipbuilding Company. Like the Lorain yard, the Toledo plant is a complete, modern, full-service shipyard, equipped for new construction, modern, conversion, repairs, and general heavy fabrication and machine work.

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

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

The Toledo yard was closed in April 1982 on a temporary indefinite basis due to a lack of work.

Some of the work on the T-5 tankers to be constructed by The American Ship Building Company may be allocated to the Toledo shipyard.

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

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

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

4. Avondale Shipyards, Inc.

Avondale Shipyards, a wholly owned subsidiary of Ogden Corporation, is located on the west bank of the Mississippi River approximately nine miles upriver from New Orleans, La. Since it began operations in 1938, Avondale has developed into one of the largest and most diversified shipyards in the country. The yard has constructed dry cargo ships, tankers, Navy ships, Coast Guard cutters, offshore drilling rigs and drill ships and has the distinction of being the only American shipyard to have constructed LASH vessels. A total of 22 were built with the aid of construction-differential subsidy. Ships completed during the first nine months of 1982 were: one replenishment oiler (AO) for the Navy, two diesel-propelled hopper dredges, and a large cement barge.

As of October 1, 1982, commercial ships in production at Avondale were: three containerships for American President Lines, and three 42,500-dwt. product tankers for Exxon. Also under construction was a fleet oiler (AO) for the Navy.

In July 1982, NAVSEA selected the team of Ingalls/Litton and Avondale Shipyards to activate and modernize the World War II battleship USS IOWA. When FY 1983 funds are available, Ingalls will perform upgrading of shipboard systems, weapons modernization, addition of new weapons systems, and electronic modifications. Drydocking will be accomplished at Avondale where work will be completed on outer hull work, interior rip-out work, propulsion shafting, and other aspects of the IOWA refurbishing program.

In September 1982, the Navy awarded the company a contract for conversion of an SL-7 commercial containership to a fast logistic ship (T-AKRX) with an option for two additional ships.

Avondale is building the three Exxon tankers using a technology transfer arrangement from the Japanese shipbuilder, IHI. These systems, known as zone-by-zone construction, is being used to an extent of about 90 percent. The IHI method applies the modular construction of ship hulls, already used by Avondale and most large U.S. yards, to the outfitting and painting areas. Outfitting and hull construction can then be accomplished simultaneously. These Exxon tankers are being built by erecting from 100 to 200 individual modules.

In 1975, Avondale completed a multimillion-dollar facilities improvement program primarily for the construction of large LNG ships. The shipbuilding area previously used for series production of Navy destroyer escorts was restructured and expanded into two large positions to accommodate vessels of up to 1,020 feet (311 m) in length by 174 feet (53 m) in beam. The major part of one ship can be erected along with the stern section of a second ship on position No. 1 while a third hull

is being finalized on position No. 2. Avondale's large floating drydock is 900 feet (274 m) long, 260 feet (79 m) wide and 78 feet (24 m) high, with 220 feet (67 m) clear width inside the wing walls. It can accommodate ships as large as 1,000 feet (305 m) in length by 216 feet (66 m) wide, and the lifting capacity is 81,000 long tons (82296 metric tons). The dock is serviced by gantry cranes of up to 200 tons (182 metric tons) capacity mounted on the supporting wharf, two 50-ton (45 metric ton) gantry cranes on the drydock floor, and a 600-ton (610 metric ton) floating lifting device. In addition to its use as a launching platform for new construction, this drydock has given the company the capability of performing a variety of conversion and major repair work.

The outstanding feature of the company's recently completed modernization and expansion program is a new largely automated pipe fabrication plant, the most advanced of its kind in the world.

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

Avondale employs a unique transfer method, whereby large sections of a ship, or entire ships, are moved horizontally to different building positions. A ship might be situated and worked on in four different building positions between keel laying and launching. For relatively small vessels, e.g., destroyer escorts, the yard perfected a rotating jig to allow for the maximum use of downhand welding of the hull. Modern construction methods and steel processing facilities have made Avondale one of this country's most productive shipyards. No U.S. shipbuilder has had more success with series production of commercial ships. The yard offers approximately 6,100 feet (1859 m) of berthing space, serviced by gantry cranes. Use of the 600-ton (610 metric ton) floating lifting barge is available along the entire length of the berths.

In July 1982, Avondale's new "Panamax" floating drydock entered service in the main plant. This drydock, which will complement the company's existing drydock and double the main yard's ship repair capacity can accommodate ships up to 750 feet (228 m) long by 115 feet (34 m) wide. Lifting capacity is 19,688 long tons (20000 metric tons).

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

In July 1982, the total labor force was 5,360, down from about 7,300 a year earlier.

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

5. Bath Iron Works Corporation

Bath Iron Works Corporation, a subsidiary of Fibac Corporation, is located on the Kennebec River in Bath, Me. The small iron foundry which was established on this site in 1826 became Bath Iron Works, Ltd. in 1884, and the first shipbuilding began in 1889. This yard has a history of proven diversity, having constructed various types of ships including roll-on/roll-off cargo vessels, containerships, tankers, barges, fishing vessels, destroyers, and guided missile frigates. Bath has built a total of 168 destroyers for the Navy.

During 1982, in the commercial ship construction field, BIW completed a 37,000-dwt. oceangoing barge for C & H Sugar Company and delivered a large diesel-propelled hopper dredge for the Corps of Engineers. Under construction, for delivery in 1983, are two 34,000-dwt. product tankers (MA Design T6-M-136a) being built with the aid of CDS for Falcon I Sea Transport Company.

Bath Iron Works is one of the industry leaders in design, construction, and modernization of destroyer-type vessels for the U.S. Navy. BIW is the lead shipbuilder for the Navy's guided missile frigate (FFG-7 class) program. The lead ship, the OLIVER HAZARD PERRY, was completed in 1977; and the Navy has awarded the company follow-on contracts for the construction of 22 additional FFG-7 class guided missile frigates, the last of which is scheduled for delivery in 1986. As of October 1, 1982, there were 12 of these ships on order or in various stages of construction.

The Navy in May 1982 selected Bath Iron Works as its second source for the high-technology CG-47 class Aegis Cruiser program, awarding the company a contract to build one of these Ticonderoga class cruisers. BIW estimates it may construct seven or eight of these cruisers. The lead shipyard in the program is the Ingalls Shipbuilding Division of Litton Industries which currently has contracts to build six of these ships.

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

More recent improvements were an additional blast and paint facility and two 300-foot by 60 foot (91 m by 18 m) platens with movable covers.

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

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

BIW operates a supporting facility, the Hardings plant, located three miles (4.8 km) from the shipyard at East Brunswick, where the initial steel fabrication takes place. At this plant, steel is blasted and sprayed, cut, straightened or shaped. The steel is then transported to Bath by truck or rail where it is joined together into subassemblies for final erection at the shipway. The plant has been highly mechanized and computerized, and much of the work is automated.

Bath Iron Works is making a major move into the overhaul and repair market with the construction of a second shipyard in Portland, Me. The new facility, scheduled for completion in the fall of 1983, will allow BIW to expand its repair and overhaul capabilities to include most surface combatant Navy ships and commercial vessels up to the supertanker class. A major component of the new shipyard will be an 80,000-ton (81280 metric ton) capacity drydock.

As of mid-1982, the company's administrative and production work force totaled 7,300 its highest employment since World War II. Employment in June 1981 was 6,565.

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

6. Bay Shipbuilding Corporation

Bay Shipbuilding Corporation, 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 Company in 1968 and the adjoining Christy Corporation property in 1970. These two facilities were combined to form the Bay Shipbuilding Corporation. The present 80-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.

Bay Shipbuilding, a full-service shipyard, has built more modern self-unloading ships than any yard in the United States. From 1973 through 1981, 15 self-unloading Great Lakes ore carriers were completed, including six 1,000-foot-long (305 m) vessels. The 1,000-footers were constructed in two sections. The bow portion of the ship was built from prefabricated sections and side launched, and the stern section was built in the graving dock and later joined to the bow portion.

With declining orders for construction of Great Lakes ore carriers, Bay Ship in 1980 entered salt water shipbuilding competition. In 1981, two 550-foot-long (168 m) oceangoing deep-notch barges were completed; and in August 1982, a 610-foot-long (186 m) oceangoing deep-notch barge was delivered. With the delivery in September 1982 of an integrated tug/barge to Amoco Oil Company for service on the Lakes, no ship construction work remained in the yard. Overhaul of the Coast Guard cutter MACKINAW and the ore carrier WILLIAM CLAY FORD was expected to provide work until April 1983. Eight winter drydockings were also scheduled.

Production methods at Bay Shipbuilding are highly sophisticated. The company in 1977 completed a major facilities expansion program that has enabled the shipyard to build 1,000-foot (305 m) Great Lakes bulk carriers. The new graving dock can accommodate a vessel as large as 1,100 feet by 136 feet (335 m by 41 m) and is the largest such dock on the Lakes. It is serviced by a 200-ton (182 metric ton) travelling gantry crane and several crawler cranes. Recently completed capital expenditures were spent on the following facilities and equipment: additional 2,400 linear feet (732 m) of new dock wall; a 30,000 square-foot (2787 m) expansion to the fabrication shop with 100-ton (91 metric ton) bridge crane capacity; new pipe shop, carpenter shop, and stores

distribution center; shot blast and prime surface treatment line; one-side panel welder; computer lofting and in-house design capabilities. Steel fabrication capacity for ship construction is estimated to be 36,000 tons (32681 metric tons) per year.

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

At mid-1982, total employment was 1,100, down from approximately 1,800 a year earlier. By November 1, 1982, the number of production workers had dropped to about 400.

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

7. Bethlehem Steel Corporation - Beaumont Yard

This shipyard, located on the Neches River in Beaumont, Texas, was established in 1917 by Beaumont Shipbuilding and Drydock Company, which built Cl-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 has been one of the world leaders in production of offshore drilling rigs and drillships. It is also an experienced builder of barges, primarily of the sophisticated tank type required by Gulf Coast industries for the transportation of liquid and bulk chemicals.

Bethlehem-Beaumont has delivered more than 50 jackup drilling units since it built its first jackup rig in 1954. As of October 1, 1982, the yard had one offshore rig under construction, compared to 12 a year earlier.

In November 1982, the Navy awarded Bethlehem Steel firm contracts to reconstruct three Maersk Line cargo ships, as part of the Navy's T-AKX program, for the U.S. maritime prepositioning force. One of these three ships will be converted at the Beaumont Yard.

The Beaumont Yard is highly mechanized. In the early 1970's the company installed a multimillion-dollar panel line and materials handling facilities. During the past five years,

other capital improvements included: installation of a CNC plasma burning machine, larger plate bending rolls, larger overhead bridge cranes, pipe burning and bending equipment, an additional pipe fabricating shop, better and more automatic welding equipment, an updated electrical distribution system, mobile cranes, better building platens, automated air compressors, and a computer graphics design terminal. The program of facility improvement is continuing with the installation of CNC machine tools, automated panel line operations, and CAD/CAM systems among those projects anticipated.

Bethlehem-Beaumont has one side-launching way that can accommodate ships up to approximately 800 feet by 96 feet (224 m by 29 m) and also operates a smaller side-launching way which is available for barge or module construction and repair work.

This shipyard maintains a complete repair service with the capability to perform virtually every phase of ship repair and reconditioning work. Major facilities include a 15,000-ton (15,240 metric ton) capacity floating drydock which can handle vessels as large as 650 feet by 84 feet (198 m by 26 m). There are 4,000 feet (1219 m) of fully-serviced piers and wharves and mobile equipment for servicing ships or other vessels at pier side or anchorage. With a 500-ton (508 metric ton) lift capacity, the company's barge-mounted "Big Bessie" is the largest floating derrick in the Port of Beaumont.

Employment at Bethlehem-Beaumont totaled 1,500 at mid-1982, down from about 2,000 a year earlier.

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

8. Bethlehem Steel Corporation - Sparrows Point Yard

Sparrows Point, the largest of Bethlehem Steel's five 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 1,100-foot (335 m) crude carriers (MA Design T10-S-101b), among the largest tankers ever built in the United States.

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

Since 1979 Sparrows Point has built five Bethlehem-design offshore drilling rigs and three 47,000-dwt. oceangoing tug/barge tankers. (Construction of the tug portion was subcontracted to Halter Marine). As of October 1, 1982, one drilling rig and three of these integrated tug/barges were nearing completion.

In November 1982, the Navy awarded Bethlehem Steel firm contracts to reconstruct three Maersk Line cargo ships, as part of the Navy's T-AKX program, for the U.S. maritime prepositioning force. Two of these three ships will be converted at the Sparrows Point Yard.

With its range of skills, tools, and facilities, this yard has been called upon regularly by various industries to produce large-scale fabricated steelwork, weldments, and a variety of specialized assemblies.

To provide the capability for construction of supertankers at Sparrows Point, millions of dollars were invested in facilities improvements: establishing new production and materials-handling methods, installing new and sophisticated systems and equipment, and developing new design concepts and engineering techniques. The major components of this program, completed in 1974, were the building basin for construction of ships as large as 1,200 feet by 192 feet (366 m by 59 m) and a 68,000-square-foot (6317 m²) panel shop for fabrication of steel. This fabrication shop is capable of constructing panels weighing up to 200 tons (182 metric tons). Other improvements included the structural strengthening of pier No. 1, a numerically controlled gas plate cutting machine, automated plate and shape blasting-painting equipment, and expanded machine shop and pipe shop capability.

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

cranes with lifting capacities up to 50 tons (45 metric tons). Several locomotive cranes of various capacities are also available.

The total labor force at the Sparrows Point yard dipped to a low of 500 in August 1982. It is expected to rise to a level of about 2,000 by the summer of 1983.

Exhibit 9 is a current plot plan outlining the company's construction facilities.

9. Coastal Dry Dock and Repair Corporation

Coastal Dry Dock was incorporated in New York in 1950, and for a number of years maintained ship repair facilities on Staten Island. In 1971, it disposed of its Staten Island plant, taking over two drydocks along with ancillary facilities in the former Brooklyn Navy Yard (later the New York Naval Shipyard). In 1980, under an agreement with Seatrain Lines, Inc., the company also took over drydocks, shops, and other adjacent facilities previously operated by Seatrain Shipbuilding Corporation, which ceased operations in 1979. Coastal Dry dock is presently leasing from the city of New York the entire former Brooklyn Navy Yard waterfront, shipbuilding and repair facilities, and shoreside housing quarters for 2,400 naval personnel.

Although Coastal's current activities mainly involve the repair, overhaul, and conversion of U.S. Navy vessels, the yard has the capacity for major shipbuilding in the event of national emergency. When this shipyard was the Brooklyn Navy Yard, several battleships, aircraft carriers, and other naval combatants were among the large number of vessels built.

As of October 1, 1982, the company's backlog of work consisted of two major Navy overhaul jobs; and two frigates were due in the yard for major overhaul later in the year. Coastal is actively seeking Navy repair, overhaul, and conversion contracts.

Among the facilities Coastal Dry Dock now has at its disposal are six graving docks ranging from 343 feet (105 m) to 1,093 feet (333 m) in length, and 12 deep-water berths up to 1,200 feet (366 m) in length.

The two largest graving docks are serviced by two 200-ton (182 metric ton) gantry cranes and two 85-ton (77 metric ton) gantries. Cranes servicing the other four drydocks range from 35 to 50 tons (32 to 45 metric tons). Several other cranes are available throughout the yard, including a 150-ton (136 metric ton) rubber-tired mobile crane. By operating the two 200-ton gantries in tandem, Coastal has the capability of lifting a maximum weight of about 400 tons (364 metric tons).

The company's multimillion-dollar facilities improvement and upgrading program, which will be completed by the end of 1982, includes reactivation and modernization of the yard's six graving docks. Each of these drydocks has been certified by the Navy.

Coastal's total work force in July 1982 was between 800 and 900, approximately the same level as a year earlier.

Exhibit 10 is a current general arrangement plan of the company's drydocks, piers, and shops.

10. FMC Corporation - Marine and Rail Equipment Division

FMC Corporation's Marine and Rail Equipment Division, originally known as Gunderson Bros. Engineering Corporation, is located on 95 acres of Willamette River waterfront property in Portland, Ore. This facility, also a major manufacturer of railroad freight cars, is an experienced builder of tankers, tugs, barges, ferry boats, small military craft, and wide range of marine structures.

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

Since 1977, the Division has concentrated its marine construction capabilities on barge building, primarily ABS classed vessels. Some of the significant barges built in recent years include the four largest RO/RO barges in the world, each 580 feet by 105 (177 m by 32 m); several 400 feet (122 m) combination deck cargo/tank barges; and specialized 250-foot (76 m) self-dumping hopper barges--all certified for ocean service.

As of October 1, 1982, FMC had under construction or on order four large barges for Crowley Maritime Corporation's Alaskan service and one barge for Morrison-Knudsen Company. However, according to the yard's management, near-term prospects for barge construction were not encouraging.

To expand its shipbuilding capability to include construction of oceangoing ships, FMC in 1970 undertook a major improvement program. Included in this expansion program was the purchase of a 200-ton (182 metric ton) whirley crane, new types of welding equipment, a 1,000-ton (908 metric ton) press, and numerically controlled burning equipment which is fed by tapes generated by computerized lofting. The panel line and subassembly buildings are amply serviced by several overhead cranes with capacities up to 40 tons (36 metric tons). FMC can fabricate steel modules weighing up to the 200-ton (182 metric

ton) limit of the crane and transport them to the ship for erection. Modular living quarters complete with interior decor, carpeting, and drapes, can be erected to reduce outfitting time and cost.

Recent strength in FMC's barge business necessitated a second major yard expansion, completed in early 1982. The side-launch ways capacity has been increased to accommodate a maximum vessel size of 750 feet by 130 feet (229 m by 40 m). Crane tracks were lengthened accordingly, and a 1,100-foot (335 m) outfitting dock serviced by whirley cranes and railroad tracks was also acquired. Drydocking is done in the nearby Port of Portland facility.

At mid-1982, the labor force involved in marine work totaled 300, unchanged from mid-1981.

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

11. Fraser Shipyards, Inc.

The Fraser yard, the only major American shipyard and drydock operation on the Western end of the Great Lakes, is located on Howards Bay in Superior, 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 plant has had a succession of owners. From 1900 to 1926, Superior Shipbuilding Co. operated the yard and built more than 50 large Great Lakes ore carriers and oceangoing ships. The yard became a repair facility of The American Ship Building Co. from 1926 to 1945 and then became known as Knudsen Bros. Shipbuilding and Dry Dock Co.

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

Since World War II, this complete shipbuilding and ship repair facility has specialized in vessel repair and ship modernization including lengthenings, repowering and engine room automation, and self-unloader conversions. In the past 10 years, Fraser has performed most of the major ship lengthening work on the Great Lakes. At this shipyard, general ship repair is also an important source of revenue.

In 1981, Fraser completed the \$14.2 million conversion of the CHARLES M. BEEGHLY from a straight-deck bulk carrier to a self-unloading bulker for Interlake Steamship Company. In April 1982, Fraser Shipyards completed conversion of three ships of U.S. Steel Corporation's Great Lakes fleet -- the ARTHUR M. ANDERSON, CASON J. CALLAWAY, and PHILIP R. CLARKE -- to conveyor-type self-unloaders. Following completion of these vessels, the only activity in the yard has been minor repair work. As of September 1, 1982, with no work in the yard, total employment consisted of some 35 salaried personnel. According to management, the near-term outlook for shipbuilding conversion, and repair work appeared bleak.

In 1981, Fraser instituted a major renovation of its fabrication capabilities including a 40 percent increase in its platen table capacity and extension of its railroad trackage to increase steel unloading capabilities by 300 percent. An all new steel cutting process with hydraulic loading and unloading tables was installed, as well as a major repowering of the shipyard to support the expanded facilities and improve existing capacity. New automated welding equipment and related modern techniques were also instituted to increase productivity.

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

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

12. Galveston Shipbuilding Company

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

This Gulf Coast yard began operations in 1966 and has been primarily a builder of barges and tugs, although it has the capability of building medium size tankers. Galveston

Shipbuilding has probably built more oceangoing deep-notch barge units than any other yard in the country, including some of the most sophisticated vessels serving the petroleum and chemical industries.

During 1981 and the first half of 1982, this shipyard delivered several oceangoing barges including a 55,000-dwt. deep-notch petroleum barge for Belcher Oil Co. The last construction job in the yard, a 22,000-dwt. coal barge, was completed in October 1982.

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

In addition to its large side-launch way, Galveston Shipbuilding has four smaller shipways served by an 800-ton (813 metric ton) syncrolift. In the absence of a drydock, arrangements must be made to drydock large vessels at Todd-Galveston or Levingston Shipbuilding Company.

By mid-1982, Galveston Shipbuilding's labor force had dropped to 150; and by October 1 with no work remaining in the yard, all production workers had been laid off except for some 50 production workers who were transferred to West Gulf Marine Works, an affiliate company also located in Galveston, Texas.

Exhibit 13 is a current general arrangement drawing of Galveston Shipbuilding's ship construction facilities.

13. General Dynamics Corporation - Electric Boat Division

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

14. General Dynamics Corporation - Quincy Shipbuilding Division

The Quincy Shipbuilding Division of General Dynamics Corporation is located on the Fore River in Quincy, Mass. This shipyard, 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, the world's principal builder of liquefied natural gas (LNG) carriers, delivered the last in a series of 10 high-technology, 125,000-cubic-meter LNG carriers in 1980. The first of these 935-foot (285 m) sisterships, the LNG AQUARIUS (MA Design LG8-S-102a), was completed in 1977 and was the first LNG ship built in the United States.

During 1980, 1981, and 1982, Quincy built several large oceangoing deep-notch tank barges, in addition to Navy and commercial ship repair and overhaul work.

In September 1982, the Navy awarded General Dynamics-Quincy a contract for time charter for two firm and three option T-AKX maritime prepositioning ships. These vessels will be constructed at the Quincy yard.

Under construction at the Quincy yard as of October 1, 1982 were: a 36,000-dwt. coal-fired collier, a large deep-notch tank barge, and a Waterman Steamship Corp. RO/RO containership being built for Sun Ship.

To provide the tools and facilities to efficiently build LNG tankers in series production, General Dynamics in 1975 completed a major expansion and modernization program. In addition to the conversion of two conventional sliding ways to large construction basins, other improvements at Quincy included: a steel fabrication facility, materials-handling equipment, two 200-ton (188 metric ton) transporters, a double-bed flat bar stripper, a web cutter with 19 torches in tandem, an angle fabricator, two web stiffener welding gantries, a T-beam fabricator, two plate stiffeners, a one-sided butt welding gantry, and two 40-ton (36 metric ton) cranes. In addition, a 1,200-ton (1089 metric ton) Goliath crane, the largest gantry in the Western Hemisphere, was installed for transferring the spherical LNG tanks from the barge, on which they were delivered one at a time, to the LNG ships under construction. The company in 1975 also expended several millions of dollars for tools, machinery and buildings at its newly acquired Charleston, SC, facility for fabrication of the 800-ton (726 metric ton) spherical aluminum tanks for the LNG ships constructed at Quincy. General Dynamics in 1980 and 1981 built drilling rigs at this Charleston plant.

The five building positions at Quincy include three assembly basins and two new construction basins. Especially noteworthy is the ingenious construction schedule for the LNG carriers. Since Basins No. 11 and 12 can only accommodate ships up to 860 feet (262 m) in length and 144 feet (44 m) in beam, and since the LNG vessels were 935 feet (285 m) LOA, hull erection in Basins No. 11 and 12 excluded the bow section. Following float-out from No. 11 or No. 12, the ships were floated into Basin No. 7 for bow erection and sphere installation. Basin No. 7 can accommodate a maximum ship size of 936 feet by 143 feet (285 m by 44 m). The 900-ton (817 metric ton) bow units of the LNG's were constructed at the inboard end of Basin No. 6 and were lifted by the 1,200-ton (1089 metric ton) Goliath crane over into No. 7 where they were attached to the hull. The spheres were barged into the outboard end of No. 6 and lifted into No. 7 for installation. Basins No. 6 and 8 can each accommodate ships 870 feet by 123 feet (262 m by 37 m).

The yard also has extensive capability to do topside and inboard repair work. Four piers and a wet basin are available with a total dockside accessibility of 4,600 linear feet (1402 m). Each pier and the wet basin is serviced by adequate crane capacity for outfitting and general repair work. The building basins can be used as drydocks for repair work when not in use for new construction or conversion. In addition to ship construction, the yard also manufactures and fabricates industrial products and non-ship components.

The total workforce at Quincy at mid-1982 was 2,800, approximately the same as a year earlier.

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

15. Ingalls Shipbuilding Division/Litton Systems, Inc.

The Ingalls Shipbuilding Division comprises 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. Ingalls was a pioneer in the application of modular construction in the U.S. shipbuilding industry.

During 1981 and the first nine months of 1982, Ingalls delivered four guided missile destroyers (DDG's) to the Navy. As of October 1, 1982, the construction backlog consisted of six Aegis guided missile cruisers (CG's), one destroyer (DD), and four jackup drilling rigs. The destroyer, slated for delivery in 1983, is the 31st Spruance class destroyer built at Ingalls. In addition to being the lead shipbuilder for four new classes of Navy ships during the past decade, the company has been active in repair and overhaul of naval vessels, construction of mobile offshore drilling rigs, and fabrication and assembly of approximately 3,000 railroad cars.

In July 1982, NAVSEA selected the team of Ingalls and Avondale to reactivate and modernize the World War II battleship IOWA with a \$4.5 million planning award to Ingalls. When FY 1983 funds are available, the contract will be converted to cover actual reactivation work. Ingalls will perform upgrading of shipboard systems, weapons modernization, addition of new weapons systems, and electronic modifications. Avondale, as subcontractor, will complete work on outer hull, propulsion shafting, and other aspects of the IOWA refurbishing program during the initial three-month drydocking. The IOWA is scheduled for redelivery to the Navy in December 1984.

The older of the two Ingalls yards is referred to as the East Bank yard. It has been in operation for 44 years, engaging primarily in new construction of commercial cargo ships and tankers, and in 1974 completed a series of highly productive containerships, the last commercial ships built at Ingalls. The yard maintains six inclined shipways. Maximum ship sizes which can be accommodated are: four ways 650 by 90 feet (198 m by 27 m), one way 690 feet by 85 feet (210 m by 26 m), and one way 550 by 80 feet (168 m by 24 m). The East Bank plant has one small graving dock which has been used for construction of nuclear-powered submarines but is currently being used mainly for repair work. A wharf and four piers serviced by cranes with a 50-ton (45 metric ton) maximum capacity provide a total of 3,700 feet (1128 m) of berthing space for outfitting and topside repair.

The newer West Bank yard, completed in 1970, was designed and equipped for series production using modular construction methods. The yard is geared to assembly-line construction of large Navy and merchant ships. The West Bank plant does not have conventional inclined shipbuilding ways. Instead, fabricated steel and minor subassemblies are brought from the fabrication, panel and shell shops to the subassembly area where they are erected into major subassemblies, which in turn move to the module assembly area. These areas are divided into five bays, each of which can produce 6,000-ton (5447 metric ton) modules. After modules are completed in the module assembly area, they are moved to the integration area where they are erected into a complete ship. The completed ship is

then moved onto a launch pontoon (floating drydock) which is subsequently floated and moved to a deep water area where it is sunk and the ship launched. The West Bank yard can launch a maximum ship size of 800 feet by 173 feet (244 m by 53 m). It is estimated that the various assembly and subassembly areas are the equivalent of six conventional inclined ways in terms of the number of ships that could be delivered annually. Approximately 4,400 feet (1341 m) of berthing space, serviced by cranes up to 200 tons (182 metric tons) are available for outfitting.

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

Ingalls Shipbuilding Division at mid-1982 employed a total labor force of 12,350, approximately the same level as a year earlier.

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

16. Levingston Shipbuilding Company

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

In May 1981, Levingston officials announced the formation of a new corporate organization, Levingston Industries, Inc., headquartered in Orange, Texas. Wholly owned subsidiaries were Levingston Shipbuilding Company, Orange, Texas; Texas Gulfport Shipbuilding Company (formerly Gulfport Shipbuilding), Port Arthur, Texas; and Levingston Marine Corporation. In early 1982, Levingston Industries took over the ailing Sun Ship, Inc. of Chester, Pa. Sun Ship's new corporate name is Pennsylvania Shipbuilding Company.

Levingston's Orange plant combines commercial ship construction with its traditional offshore industry work, with a solid base of ship repair and some industrial fabrication. Levingston has built more than 700 vessels of all types since it started steel ship construction in 1933. Of this total, 164 were for the offshore industry -- including drillships, semi-submersibles, jackup rigs, and barges and tenders of various types. The company has also built 167 vessels for the U.S. Government, including frigates, a surface-effect ship, and more than 160 tugs and coastal vessels. For the commercial marine industry, Levingston has built more than 370 vessels (mostly barges) as well as tankers, small roll-on/roll-off ships and ferries.

Levingston, Orange, completed the PRIDE OF TEXAS in May 1981, and the STAR OF TEXAS in January 1982. These 36,000 dwt. dry-bulk carriers are 612 feet (187 m) in length and the largest ships ever built in the yard. As of November 1, 1982, the only construction work remaining was a sistership, the SPIRIT OF TEXAS, and one offshore jackup rig, both of which were scheduled for delivery in December 1982. These three dry-bulk ships were built with the aid of CDS.

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

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

In July 1982, the total workforce at the Orange plant totaled 1,000. By November 1, 1982, the labor force had dropped to about 400.

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

17. 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 93-year-old company was known as Puget Sound Bridge and Drydock Company when acquired in 1959 by Lockheed. In 1965, the yard's name was changed to Lockheed Shipbuilding and Construction Company. It is now the largest privately owned shipyard in the Pacific Northwest.

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

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

Currently under construction at Lockheed for the Navy are two Whidbey Island-class amphibious dock landing ships, the LSD-41 and the LSD-42. The company is optimistic with regard to winning future construction contracts for additional LSD's. On the repair side, Lockheed is currently overhauling three Spruance-class destroyers.

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

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

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

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

Lockheed's labor force at mid-1982 totaled 2,000, approximately the same as a year earlier.

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

18. Marathon LeTourneau Company - Gulf Marine Division

Marathon Manufacturing Company, the world leader in production of offshore drilling rigs, launched its new Gulf Coast shipyard, the Gulf Marine Division, in 1972 with a commitment of several millions of dollars. This 133-acre shipyard is located in Brownsville, Texas, and has a 2,500-foot (762 m) frontage on the Brownsville ship channel. In addition to the construction of offshore drilling rigs, the yard has the capability of fabricating and launching drillships, barges, work boats, tugs, supply vessels, and large merchant ships. The Gulf Marine Division's total marine construction and repair capabilities are supported by Marathon's Engineering Group in Houston and by Marathon's manufacturing facilities in Longview, Texas, and Vicksburg, Miss.

As of October 1, 1982, the Gulf Marine Division was building a total of seven jackup drilling rigs. Four cantilever jackups were delivered in 1981, two were completed during the first nine months of 1982, and two more were slated for delivery in the fourth quarter of 1982. Repair work has also been a significant source of revenue for this Marathon shipyard.

The Brownsville yard operates one launchway with a maximum vessel size of 1,100 feet by 150 feet (335 m by 46 m) on which oceangoing ships could be constructed in the event of national emergency. Steel plate and other materials move from a 400,000 square-foot (37160 m²) in-yard storage area and from four warehouses through a 450-foot by 240-foot (137 m by 73 m) plate shop equipped with a 55-foot (17 m) wide automated panel line. Modular construction techniques are combined with conventional shipbuilding methods. Large module sections are fabricated on

a forming and subassembly slab about 400 feet by 200 feet (122 m by 61 m), which is actually an extension of the yard's building way. A 250-ton (227 metric ton) gantry crane travels on rails which run the full length of the slab and building way. The crane lifts the subassembly sections from the slab to the launchway, and the sections are joined to form the completed vessel which is then side-launched. The 250-foot by 120-foot (76 m by 37 m) covered pipe shop has a complete range of positioning, welding, and cutting equipment. Usable berthing space for outfitting and repair totals 1,100 feet (335 m). Estimated steel throughput at this shipyard is from 750 tons (681 metric tons) to 1,000 tons (908 metric tons) a month.

At mid-1982, the total work force at the Brownsville plant was 1,300, about the same as a year earlier.

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

19. Maryland Shipbuilding & Drydock Company

Maryland Shipbuilding & Drydock Company, a subsidiary of Fruehauf Corporation, is located on the south bank of the Patapsco River in Baltimore, Md. This yard, which has been in business for 60 years, offers full facilities for ship construction, conversion, overhaul, and repair. Although primarily a repair and conversion yard, Maryland built the following vessels during the 1960's and 1970's: two containerships, one oceanographic research vessel, one hydrofoil, one tug/barge, and two trawler/factory ships, which were the first stern ramp fish-processing trawlers to be built in the United States. The company's industrial products Division engages in nonmarine work such as: 1) the design, manufacture and installation of large steam surface condensers for the utility industry; 2) general machine repairs to pumps, turbines, and other industrial machinery; and 3) heavy structural steel fabrications.

From 1968 to the present time, Maryland has completed repair or overhaul work on 35 naval vessels of many different types. This was in addition to the yard's workload of commercial ship repair.

Maryland Shipbuilding's repair business has fallen off considerably compared with 1980 and 1981, and the company's Industrial Products Division was expected to run out of work in October 1982.

During FY 1983, Maryland hopes to be the winner of a lucrative Navy contract for a hospital ship conversion (T-AH), part of the Navy's hospital ship acquisition program. This contract could create at least 800 jobs, and more if two hospital ships are involved.

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

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

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

The total administrative and production work force at mid-1982 was approximately 1,200, compared to about 1,800 at mid-1981.

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

20. National Steel and Shipbuilding Company

National Steel and Shipbuilding Company is the largest shipbuilder on the West Coast. In the marine business since 1945, the company has expanded several times to occupy 145 acres on the harbor in San Diego, California. NASSCO is wholly owned by Morrison-Knudsen Company, Inc., Boise, Idaho.

In the past, NASSCO has constructed special purpose ships such as ferries, an oceanographic research ship, special purpose barges, passenger ships, tugs, minesweepers, dry-cargo ships, and a variety of Navy vessels, including one fleet replenishment oiler (AOR), 17 landing ship tanks (LST), and seven combat supply ships (AFS).

From 1973 to October 1982, NASSCO completed two San Clemente class (80,500 dwt.) oil/bulk/ore carriers, six Coronado class (38,300 dwt.) tankers, 13 San Clemente class (90,000 dwt.) tankers, four San Diego class (188,500 dwt.) tankers, three Carlsbad class (37,500 dwt.) tankers, and one Ingram class (37,500 dwt.) tanker. The San Diego class tankers are the largest vessels ever built on the West Coast. The company delivered the third of four Gompers class destroyer tenders (AD-43) to the Navy in February 1982.

Vessels under construction as of October 1, 1982 included one Gompers class destroyer tender (AD-44), one Ingram class (37,500 dwt.) product carrier, three La Jolla class (44,000 dwt.) product carriers, and a cable repair ship (T-ARC 7) for the Navy. NASSCO also performs a significant amount of Navy repair and overhaul work for the Pacific Fleet, which makes its home port in San Diego.

In August 1982, the Navy announced a provisional charter hire award to Waterman Steamship Corporation for conversion of one RO/RO containership with an option for two additional ships of the same type. As part of the Navy's T-AKX program, these vessels will be converted at NASSCO and serve in the U.S. maritime prepositioning force.

In September 1982, the Navy also awarded the company a contract for conversion of two SL-7 commercial containerships to fast logistic ships (T-AKRX) with an option for one additional ship.

In 1976, NASSCO began a major facilities expansion and modernization program. In the new building dock, the shipyard can now produce ships up to 980 feet by 170 feet (299 m by 52 m), compared to a previous maximum of 900 feet by 106 feet (274 m by 32 m). Also included in the program was a new modern digital controlled mold loft, a new 1,090-foot (332 m) outfitting pier, a new semi-automatic panel line that welds steel plate into 40-foot by 40-foot (12 m by 12 m) panel sections, additional heavy-duty whirley cranes, an advanced production control system, and a CNC punching and burning machine.

In addition to the new building dock, the yard operates three conventional inclined shipways, two of which can accommodate a maximum size ship of 900 feet by 106 feet (274 m by 32 m), and one a ship size of 690 feet by 90 feet (210 m by 27 m). These ways and the large building dock are serviced by 11 gantry cranes ranging in capacity from 45 tons (41 metric tons) to 175 tons (159 metric tons). A large graving dock that can handle a maximum ship size of 687 feet by 90 feet (209 m by 27 m) is 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 (2,156 m) for outfitting and repair. These berths are serviced by mobile and gantry cranes varying in capacity from five tons (4.5 metric tons) to 175 tons (159 metric tons).

At mid-1982, the total labor force was 6,180, down from 6,770 at mid-1981.

Exhibit 22 is a current NASSCO plot plan.

21. Newport News Shipbuilding and Dry Dock Company

Newport News Shipbuilding and Dry Dock Company, located at the Port of Hampton Roads in Newport News, Va., is the largest shipbuilding complex in the Free World. The company, founded in 1886, is a subsidiary of Tenneco, Inc. Newport News has built 23 aircraft carriers, 31 nuclear-powered submarines, and 121 other surface ships for the U.S. Navy. Commercial vessels delivered by the yard include 71 cargo ships, 83 tankers, 62 passenger ships (most notably the famed superliner UNITED STATES), and more than 60 other vessels. Newport News was a pioneer in the field of jumboizing ships, and since 1957 has completed 33 such operations. The company is also engaged in various industrial and marine product lines.

Newport News is the Nation's foremost builder of Navy nuclear warships. The yard, as of October 1, 1982, was at work on a Nimitz-class aircraft carrier and nine attack submarines. Newport News is also building a 35,000-dwt. chemical tanker for Union Carbide. Overhaul and repair of nuclear-powered submarines and surface ships for the Navy is also a principal activity at Newport News.

The company's continuing multimillion-dollar capital investment program was highlighted by the opening in 1982 of a new drydock complex to double the yard's submarine overhaul capacity. Other major improvements include upgrading and renovation of an older drydock, outfitting piers, and other facilities.

The 150-acre North yard has been converted from the construction of merchant vessels to the building of Navy ships. This facility, designed for high production and efficiency, has the capability to handle large components from fabricating areas to final erection. Data storage and retrieval systems control material storage and work flow. The building basin, the largest in the Nation, is 1,600 feet (488 m) long, 250 feet (76 m) wide, and 44 feet (13 m) deep. A two-position intermediate gate is being utilized to further expand the multi-ship construction capability of this dock, permitting simultaneous ship construction and repair. A 900-ton (817 metric ton) 23-story Goliath gantry crane, one of the largest in the world, can handle completely outfitted assemblies. This crane services the graving dock and the final assembly platen and has a height of 234 feet (71 m) overall, a girder clearance of 200 feet (61 m) and a span between rail centers of 540 feet (165 m). The North yard has one 1,670-foot (509 m) outfitting berth and one 950-foot (290 m) outfitting berth.

The South yard has four inclined shipways, the two largest of which can accommodate a maximum ship size of 940 feet by 125 feet (287 m by 38 m). The South yard has six graving docks. Two are serviced by a 310-ton (281 metric ton) gantry crane and

can accommodate ships up to 1,100 feet by 130 feet (335 m by 40 m) and 960 feet by 118 feet (293 m 36 m). The remaining three docks can be used for new construction, repair, or conversion. The largest of these can accommodate a maximum ship size of 862 feet by 108 feet (263 m by 33 m). Eight piers for outfitting and topside repair are available with a combined berthing space of approximately 12,000 linear feet (3658 m). These piers are serviced by cranes with capacities of up to 50 tons (45 metric tons) and are supplemented by locomotive cranes and floating derricks with capacities to 67 tons (61 metric tons).

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

- o A steel fabrication shop where various types of steel and other metals ranging in thickness from 1/8 inch (3 mm) to six inches (152 mm) up to 45 feet (14 m) long and weighing as much as 17 1/2 tons (16 metric tons) are cut and shaped to design specifications employing automated processes;
- o A fully-equipped wood pattern shop facility;
- o One of the largest foundries in the Nation where steel castings weighing as much as 145,000 lbs. (65772 kg) and alloy steels, copper, nickel, aluminum, brass, and other nonferrous alloys are poured;
- o A machining complex with over 250 machines including a 42-foot (13 m) boring mill, and lathes with maximum swing of 124 inches (3150 mm) diameter and lengths up to 68 feet (21 m) between centers;
- o A large pipe fabrication facility with machines capable of bending pipe up to 12 inches (305 mm) in diameter, horizontal boring mills, automatic welding machines, cleaning equipment and nondestructive and hydrostatic testing capabilities;
- o A large sheet metal facility capable of manufacturing sheet metal components required for outfitting ships and other similar applications;
- o Electrical switchboard and panel shops capable of manufacturing large, as well as small, electrical switchboards and panels; and
- o A computer center, testing laboratories, and a 106,000 sq. ft. (9847 m²) automated material storage facility.

The total labor force at Newport News increased from 24,000 in mid-1981 to 25,000 in mid-1982.

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

22. Norfolk Shipbuilding & Drydock Corporation

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

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

In 1981, Norshipco completed the diesel-powered oceangoing hopper dredge YAQUINA for the Corps of Engineers. During 1982, three major construction projects were completed: (1) a large passenger ferry; (2) a new steel floating drydock for use in the company's Brambleton yard; and (3) delivery of the RO/RO ATLANTIC to the Maritime Administration. This vessel is the 6,500-dwt. barge portion of an integrated tug/barge. The unfinished barge had been removed from the defunct Seatrain yard in Brooklyn, N.Y. and towed to Norshipco for completion and joining to the completed tug.

With no ship construction work available and with a declining market for commercial ship repair, Norshipco is currently engaged mainly in the repair and overhaul of vessels for the Navy. As of October 1, 1982, three naval vessels were in the yard for major overhaul work.

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

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

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

For major ship construction, the company's Berkley Plant operates a building way which can accommodate ships as large as 475 feet (145 m) in length by 85 feet (26 m) wide. The vessels are constructed on the flat building position and end-launched in one piece hydraulically into a floating drydock. In addition to the new floating drydock, there are two older floating drydocks, the largest of which can handle vessels up to 650 feet by 83 feet (198 m by 56 m). The largest of the company's marine railways, located in the smaller Brambleton Plant can accommodate a vessel 441 feet by 60 feet (134 m by 18 m) with a lifting capacity of 5,500 long tons (5580 metric tons). During 1982, the company installed a new 2,800-ton (2842 metric ton) floating drydock at its Brambleton yard.

At the company's yards, a total of 12,170 feet (3709 m) of berthing space is available at several piers for outfitting and repair.

Norshipco's payroll totaled 2,540 in July 1982, down from 3,380 a year earlier.

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

23. Pennsylvania Shipbuilding Company (Formerly Sun Ship, Inc.)

Levingston Industries of Orange, Texas, in February 1982, acquired the assets of the ailing Sun Ship yard from Sun Company. The new corporate name of this Chester, Pa. shipyard is Pennsylvania Shipbuilding Company. This 200-acre shipbuilding and manufacturing complex borders on the Delaware River. In its 63 years of operation, the Sun yard designed and constructed more than 650 vessels, mainly commercial ships. In recent years, the yard had specialized in the design and

construction of RO/RO ships and medium-size tankers. In addition to its shipbuilding, conversion, and repair capabilities, the company also manufactured heavy industrial equipment.

Although Penn Ship's repair and overhaul business has flourished during most of this year, the only major construction work underway as of October 1, 1982 was the RO/RO containership THOMAS HEYWARD, scheduled for delivery to Waterman Steamship in December 1982.

In September 1982, the Navy awarded Penn Ship a contract for conversion of one SL-7 commercial containership to a fast logistic ship (T-AKRX) with an option to convert a second SL-7. The company is also seeking contracts for construction of fleet oilers for the Navy.

In 1976, completion of a major capital improvement program enhanced the shipyard's ability to fabricate larger, more sophisticated ships. This expansion and modernization program provided a new level shipbuilding platform, a two-section floating drydock capable of lifting 75,000 long tons (76200 metric tons), a 1,100-foot (335 m) outfitting pier, and other shipbuilding support facilities. The new level shipbuilding slab has two sections. On Slab "A", a ship 1,000 feet by 195 feet (305 m by 59 m) can be built. In this shipyard, a ship as large as 1,100 feet (335 m) in length and 195 feet (59 m) wide can be constructed. This is the maximum limit of the large floating drydock into which vessels built on the two-section shipbuilding platform are launched. Two halves of a large ship can be built on this platform and each half can be rolled individually to the drydock and then welded together. The ship is brought to the pier for outfitting completion. The large drydock, which is capable of handling vessels up to about 400,000-dwt. , is one of the world's largest floating drydocks. It is serviced by two 25-ton (23 metric ton) gantry cranes, two 10-ton (9 metric ton) gantry cranes, two 25-ton (23 metric ton) truck cranes, and an 800-ton (813 metric ton) barge crane.

In September 1982, in order to handle an increasing volume of repair and overhaul work, Penn Ship transferred a medium-size floating drydock from Levingston Shipbuilding Company, its affiliate in Orange, Texas, to the Chester, Pa., plant.

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

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

Employment at Penn Ship totaled 1,400 in August 1982, down from about 1,850 in February 1982 when the yard was acquired from Sun Ship.

Exhibit 26 is the latest available layout of the plant and facilities at Pennsylvania Shipbuilding Company.

24. Tacoma Boatbuilding Co.

In operation for over a half century in Tacoma, Washington, this shipyard designs, constructs, and repairs vessels for commercial customers, for the Navy and Coast Guard, and for foreign governments. Tacoma Boat's overall facilities consist of four yards covering over 45 acres of leased or company-owned land located in the Commencement Bay area.

World War II transformed Tacoma Boat from a builder of fishing vessels into one of many Government shipbuilders on the West Coast. In addition to the conversion of military vessels during this period, the company constructed 23 small naval vessels and support craft.

Tacoma Boat has grown continuously through the years, producing a diversified construction pattern including a variety of standard-class tuna purseiners, a semisubmersible oil-drilling rig, barges and tug/supply vessels for the offshore oil industry, WYTM icebreaking tugs for the Coast Guard, and high-speed patrol ships, gunboats, and minesweepers for the Navy. The company also helped design and build an 80-knot surface effect ship (SES).

Tacoma Boat's backlog of ship construction as of October 1, 1982 included the following U.S. Government contracts: four medium-endurance cutters (WMEC's) for the Coast Guard, two PCG patrol chasers for the Navy, and 12 T-AGOS ocean surveillance ships for the Navy. Commercial vessels under construction were: two tuna purseiners, four revolutionary design "tractor" tugs, and two U.S.-flag incinerator ships the first ships, of this type ever constructed in the United States.

Ship repair is an important source of revenue for this shipyard. The company also designs and manufactures deck machinery and fabricates controllable-pitch propeller systems under license from Escher Wyss, a West German firm.

To broaden the company's shipbuilding base, Tacoma Boat expanded its operations in 1980 to include a third yard near its two plants on Commencement Bay. In addition to the acquisition of an 8,000-ton (8128 metric ton) floating drydock and installation of a large side-launch building way which will permit construction of drill rigs and ships up to 650 feet (198 m) in length, the company's ongoing expansion and modernization program includes a new approach to shipbuilding. CAD/CAM (Computer-Aided Design and Computer-Aided Manufacturing), introduced in 1981, will be used in conjunction with zone outfitting techniques. The Navy T-AGOS program is the first Tacoma Boat contract to exclusively use zone outfitting.

Tacoma Boat's facilities include five end-launch construction ways and a new side-launch way fitted with a marine railway and serviced by a 200-ton whirley crane. This new building way, which became operational in 1982, permits launching of ships, barges or drill rigs up to 650 feet (198 m) in length. It's width is about 400 feet (122 m). This facility launches into water 260 feet (79 m) deep.

The company operates two floating drydocks. The larger of the two can handle vessels up to 539 feet by 98 feet (164 m by 30 m) and has a lifting capacity of 8,000 tons (8128 metric tons). Available for outfitting and repair work is 1,780 feet (543 m) of usable berthing space.

Total work force at Tacoma Boat in July 1982 was 2,630, compared to 1,940 a year earlier.

Exhibits 27 and 28 are current general arrangement drawings of the company's four yards.

25. Tampa Shipyards, Inc.

Founded in 1948, Tampa Shipyards, Inc. (formerly Tampa Ship Repair and Drydock Co.), is a full-service yard and is the largest ship repair facility on the West Coast of Florida. It is located at Hooker's Point on Tampa Bay in Tampa, 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 and repairing cargo ships, barges, and a wide range of oceangoing vessels. In 1972, the facility was purchased by The American Ship Building Company.

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

In July 1981, Tampa's parent company, The American Ship Building Company, was awarded a \$73 million contract to convert four Moore McCormack C-4 cargo ships (with the aid of CDS) to larger self-sustaining breakbulk/container vessels. The first ship was redelivered by Tampa Ship in August 1982, and second was completed at the Lorain yard in October 1982. Work on the third vessel was to be done at Tampa. As of November 1, it had not been determined which of the company's yards would convert the fourth Moore McCormack ship.

The Military Sealift Command in September 1982, announced the award to Ocean Carriers, Inc. of a "build and charter" contract for two new T-5 handy-size product tankers, with an option for three additional ships. The American Ship Building Company will build these tankers. However, as of November 1, 1982, the company had not determined how the work will be allocated among its shipyards.

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

Major progress has been made on the second phase of the overall expansion program, which will add two graving docks as well as piers and two wet berths. The two new drydocks will be 450 feet by 82 feet (137 m by 25 m) and 600 feet by 82 feet (183 m by 25 m), and the wet berths will be able to accommodate vessels up to 900 feet (274 m) in length. New shops are also being constructed. These new facilities are within the company's main complex.

The yard currently operates one sliding way which can accommodate a maximum ship size of about 500 feet by 105 feet (152 m by 32 m). This building way is serviced by three 40-ton (36 metric ton) gantry cranes. In addition to the large graving dock, the company maintains a graving dock that can handle vessels up to 542 feet by 72 feet (165 m by 22 m). Usable berthing space in the yard totals about 2,240 feet (683 m).

Mid-1982 employment at this Florida shipyard totaled 820, compared to about 600 in July 1981.

Exhibit 29 is a general plan of Tampa Ship's main plant showing drydocks, piers, and wet berths under construction, as well as existing facilities. Since the large building way is located approximately one-half mile (800 m) north of the main plant, it is not shown on this plan. This building way, like the graving docks, is leased from the Tampa Port Authority.

26. Texas Gulfport Shipbuilding Company (formerly Gulfport Shipbuilding)

This Port Arthur, Texas, shipyard, formerly the Gulfport Division of Levingston Shipbuilding Company, became a wholly owned subsidiary of the newly formed corporation, Levingston Industries, Inc., in May 1981 and has been renamed Texas Gulfport Shipbuilding Company. The yard has the capability of building ships up to about 550 feet (168 m) long by 80 feet (24 m) in beam. This facility is strategically located on the busy intracoastal canal with a portion of the plant extending south of the Gulfgate bridge, allowing unlimited vertical clearance to the Gulf of Mexico.

Since the yard was founded in 1932, it has built a variety of small vessels, such as tugs, dredges, and ice-breakers. Beginning in 1970, when it was purchased by Levingston, this shipyard has mainly constructed drilling rigs and other vessels for the oil drilling industry. Since the last drilling rig was completed in early 1982, the only remaining work was repair of offshore rigs, small vessels, and barges. With the current slump in drilling rig activity, business has been in a serious decline during the first three quarters of 1982.

An expansion and modernization program was completed in 1981 at Texas Gulfport, including a general upgrading of facilities, enlargement of drydocks, and development of new outfitting facilities downstream from the main portion of the yard.

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

With repair work about 40 percent below the 1981 level, the labor force at Texas Gulfport was down to 200 at mid-1982, compared to 450 a year earlier.

Exhibit 30 is a plot plan of the main portion of the yard. Because of the attenuated shape of the yard as a whole, this plan does not show downstream outfit and repair berths or tank-cleaning and gas-freeing facilities.

27. Todd Shipyards Corporation - Galveston Division

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

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

Hundreds of ships, mainly foreign-flag, normally enter this yard every year for repair, overhaul, and drydocking; but conversion work has also been a mainstay of the company. From 1967 to 1973, 23 major conversions were completed. During 1981 and the first half of 1982, Todd-Galveston delivered three large oceangoing barges. One large bulk coal barge, under construction for Dixie Carriers, was slated for completion in November 1982. The company is bidding on construction, conversion, and overhaul work.

With regard to ship and barge construction, vessels up to 475 feet by 85 feet (145 m by 26 m) can be built under roof on a launching pontoon and then launched into the yard's floating drydock. Manufacturing space for Todd's Galveston Division totals 228,766 square feet (21252 m²).

In its continuing effort to increase its repair business, Todd in April 1982 put into operation at its Galveston plant the largest floating drydock on the Gulf Coast. The new 40,000 metric ton drydock, built by Kawasaki Heavy Industries, Ltd. in Japan, is capable of lifting ships as large as 225,000 dwt.

The Galveston Division also operates a floating drydock with 15,000 tons (15240 metric tons) lifting capacity. This drydock can handle ships or barges as large as 670 feet by 86 feet (204 m by 26 m). There are four piers in the main yard, serviced by seven rail-mounted revolving gantry cranes, ranging from five tons (4.5 metric tons) to 75 tons (68 metric tons), which also service the platen areas. For use throughout the

yard, two rubber-tired truck cranes with lifting capacities of up to 50 tons (45 metric tons) are available. Also available, are two rubber-tired straddle carriers, each with a lifting capacity of up to 50 tons (45 metric tons). In the main yard, usable berthing for outfitting and repair work totals about 6,400 linear feet (1950 m).

Supplementing the main yard is Galveston's Southwest Plant, located about a mile (1.6 km) away, which provides more than 90,000 square feet (8361 m²) of covered manufacturing space. This facility is serviced by two 200-ton (182 metric ton) overhead cranes which combine to make 400-ton (362 metric ton) lifts possible. The Southwest Plant is used principally for steel fabrication and hull erection and has a 200-foot by 86-foot (61 m by 26 m) slip of which 160 feet (49 m) is covered.

In July 1982, Todd-Galveston's work force totaled 1,000, up from about 770 a year earlier.

Exhibit 31 is a current plan of the main yard and Southwest Plant.

28. Todd Shipyards Corporation - Houston Division

This shipyard, located on approximately 72 acres of land on the Houston (Texas) ship channel, has since 1949 specialized in the design and construction of barges, towboats, dredges, crewboats, drilling structures, and other equipment for the offshore petroleum industry. During this 33-year period, more than 600 barges and vessels of diversified types have been built at Todd-Houston. Although ship and barge construction has been the principal business of this shipyard, it has also been active in conversion and repair work.

During 1981 and the first half of 1982, Todd's Houston yard built two cement barges, two heavy-lift crane barges, and an oil barge. Also three sets of caissons were fabricated for submersible drilling rigs under construction at Vemar, Inc. As of October 1, 1982, there was no major construction work in the yard.

In July 1982, Todd-Houston's old 8,000-ton (8128 metric ton) floating drydock was sold. In October 1982, as part of a major yard upgrading and modernization program, the company replaced this facility with a new larger 17,500-ton (17780 metric ton) floating drydock. The new drydock, built by Bender Shipbuilding, can accommodate vessels up to 600 feet by 118 feet (183 m by 36 m). A 35-ton (32 metric ton) gantry crane has been purchased to service this facility, and two 100-ton (91 metric ton) crawler cranes have been acquired for general yard use.

Todd-Houston has automatic and semi-automatic fabrication equipment, together with facilities which permit production work to be accomplished under cover. Work areas are equipped with heavy-duty lifting gear and advanced power tooling. The entire plant is served by railroad trackage.

The Houston Division is capable of constructing ships or barges up to 600 feet by 118 feet (183 m by 36 m). There is one side-launch building way on which ships or barges up to 475 feet by 125 feet (145 m by 38 m) can be launched. However, for construction of longer vessels, the hull can be launched in two pieces and joined in the yard's floating drydock. Servicing the launchway are two 100-ton (91 metric ton) crawler cranes and a smaller crawler crane.

In addition to warehouses, there are 212,800 square feet (19769 m²) of covered shops and manufacturing space. The three piers in this Todd facility are serviced by three rail-mounted revolving gantry cranes with lifting capacities of up to 60 tons (54 metric tons). Usable pier space totals approximately 3,200 linear feet (975 m).

Todd Houston's total work force in July 1982 was 250, down from 450 a year earlier. Current employment is at the lowest level in many years.

Exhibit 32 is a general arrangement plan of the yard.

29. Todd Shipyards Corporation - San Francisco Division

Under the terms of a three-party agreement consummated on October 14, 1982, Bethlehem Steel Corporation sold this 40-acre San Francisco shipyard to the city and sold the yard's equipment, including drydocks, to Todd Shipyards Corporation. The San Francisco Port Commission took title to the land, piers and buildings; and Todd acquired a 30-year lease on this property.

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

During World War I, as a subsidiary of Bethlehem Steel, this shipyard delivered destroyers at the rate of three a month. In the huge shipbuilding, repair, and conversion programs of World War II, the yard, with the help of facilities

leased from the Navy, built 72 ships including 52 Navy combat vessels. In addition, about 2,500 Navy and commercial vessels were repaired or converted at the yard during the World War II period.

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

This San Francisco yard demonstrated its flexibility in the 1960's. Shipbuilding continued with the construction of four C4 cargo ships, two Navy destroyer escorts, and a number of oil and rail barges. An outstanding 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 recent years, this shipyard's specialty has been barge design and construction. Other activities included ship conversion and general ship repair work. Business declined in 1982; and at the time of the sale to Todd Shipyards Corporation, no major ship construction or repair work remained in the yard.

Todd's San Francisco shipyard operates one building way, a conventional end-launch type that can accommodate ships up to 550 feet by 96 feet (168 m by 29 m). The yard's larger floating drydock with a maximum vessel size of 950 feet by 144 feet (290 m by 44 m) has a lifting capacity of 65,000 long tons (66040 metric tons). This drydock, designed by Bethlehem and built at the San Francisco yard, is capable of serving the largest tankers that transport crude oil from Alaska to West Coast ports. Also available is a second floating drydock, with a maximum vessel size of 700 feet by 94 feet (213 m by 29 m), and about 3,200 linear feet (975 m) of usable berthing space along four piers, all fully serviced with utilities and by cranes of up to 50 tons (45 metric tons) capacity.

At the time of sale, October 14, 1982, the total work force was approximately 100, down from 600 a year earlier.

Exhibit 34 is a current plot plan of Todd's newly-acquired San Francisco plant and facilities.

30. Todd Pacific Shipyards Corporation - Los Angeles Division

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

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

In 1977, the Los Angeles and Seattle Divisions were combined to form Todd Pacific Shipyards Corp. Rebounding from several disastrous tanker cancellations in the mid-1970's, Todd-LA in 1976 won its first contracts under the Navy's current guided missile frigate (FFG) program. On October 1, 1982, the yard had on order or under construction a total of 10 of these sophisticated frigates (FFG-7 class). Six frigates have been delivered to the Navy with the remaining 10 to follow at about four-month intervals. During 1981 and 1982, the yard performed shakedown availability work on several FFG's, with the prospect of more such overhauls in the future. The company is vigorously pursuing follow-on FFG construction contracts and other Navy work for its Los Angeles Division.

Todd-LA, along with three other shipyards, has been awarded producibility and design standard studies on the DDG-51 destroyer, equipped with the advanced AEGIS weapons system, which is scheduled for production in 1985.

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

At the Los Angeles Division, ground was broken in 1982 for a land-level ship repair facility which will use a syncrolift platform 655 feet (200 m) long by 106 feet (32 m) wide having a lifting capacity of 21,942 long tons (22293 metric tons) to raise ships as large as 48,000 dwt. to land level where they will be transferred to a work bay via a rail system. The completed facility will accommodate a minimum of five vessels simultaneously. It is scheduled to go into operation by the end of 1983 and will be the largest land-level shiplift system in the world.

To be completed at Todd-LA in 1982 is a new shoreside Navy crew complex consisting of four single-story modular housing units designed for exclusive use of naval officers and crew members while their ships are undergoing post shakedown availability (PSA), overhaul, or repair work in the shipyard.

The yard presently has two conventional inclined shipways, each capable of launching a ship as large as 800 feet by 84 feet (244 m by 25 m). The panel line, platens, and shipways are serviced by two 175-ton (159 metric ton), and six smaller whirley cranes. There are two floating drydocks, one of which can accommodate a vessel 700 feet by 86 feet (213 m by 26 m), and the other a vessel 470 feet by 82 feet (143 m by 25 m).

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

Total employment at the yard was 5,760 at mid-1982, up from 5,240 a year earlier. The current manpower level is this shipyard's highest since World War II.

Exhibit 33 is a plant map of the Los Angeles Division's facilities.

31. 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, Wash. 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 finest 6-masted barkentine and (at that time) the world's fastest single-screw steamer.

This 45-acre yard has an unrivaled heritage on the West Coast as a prime supplier of fighting ships for the U.S. Navy. During World War II, Todd operated three shipyards in the Seattle-Tacoma area, mainly turning out destroyers and aircraft carriers. More than 57,000 persons worked three shifts during the war years.

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

Prospects for the Seattle Division were bleak during the mid-1970's until the Navy awarded Todd its first contracts under the guided missile frigate (FFG) program in early 1976. As of October 1, 1982, the Seattle yard had delivered six of these frigates and had six more in production or on order. Two of the six ships on order are for the Royal Australian Navy.

In October 1982, the U.S. Navy awarded Todd-Seattle a lucrative contract to construct a floating drydock to service nuclear attack submarines in San Diego. Delivery of the drydock is scheduled for mid-1985.

This yard has a thriving ship repair and overhaul operation that annually works on from 400 to 500 commercial and naval vessels.

The FFG program provided the impetus for a multimillion-dollar capital investment program directed to improving productivity of the Seattle yard in ship repair, overhaul, and conversion. In July 1982, the company transferred a 39,375-ton (40000 metric ton) floating drydock from its San Francisco Division to Seattle. This drydock is the centerpiece of the yard's most recent upgrading of facilities and capabilities. A newly-installed 150-ton (137 metric ton) traveling whirley crane on the adjacent 1,000-foot (305 m) concrete pier serves the floating drydock and the new pier.

The Seattle Division has been appointed authorized repair and service representative for B&W Diesel of Denmark and Sulzer Marine Diesels of Switzerland.

The largest building way at Todd-Seattle can handle a ship up to 600 feet by 96 feet (183 m by 29 m). It can also be used as a dual launchway for construction of two ships with beams of 50 feet (15 m) or less, simultaneously. A small side-launch building way was added in 1974. In addition to the large floating drydock transferred from San Francisco this year, there are two other floating drydocks, the largest of which can accommodate ships up to 650 feet by 84 feet (198 m by 26 m).

Three wharves and five piers provide a total of about 5,000 feet (1524 m) of berthing space for outfitting and repair. The yard is serviced by several whirley traveling cranes and a number of smaller portable units.

In July 1982, total employment at the Seattle plant was about 4,500 slightly lower than a year earlier.

Exhibit 35 is a current plot plan of Todd-Seattle's facilities.

32. Triple A Shipyards, Division of 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 1976, the company leased the shipbuilding and ship repair facilities at the Hunters Point Naval Shipyard which had been closed and idle for almost two years. Triple A, since leasing the Hunters Point facility, has become a full-service repair yard and the predominant ship repair organization in the San Francisco Bay Area, engaging in Navy and commercial ship repair, overhaul, and conversion work. An average of about 30 ships a year have been drydocked.

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

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

As of September 1, 1982, employment at the yard totaled about 900; but the labor force fluctuates depending upon available repair work.

Exhibit 36 is a current yard plan outlining the Triple A facilities at Hunters Point.

Employment

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

1978 Average	172,000
1979 Average	171,600
1980 Average	170,400
1981 Average	177,800
1982 January	170,500
1982 February	169,000
1982 March	173,800
1982 April	172,900
1982 May	170,600
1982 June	169,900
1982 July	167,000
1982 August	165,600
1982 September (Prelim.)	168,200

The Maritime Administration monitors employment in the 27 major U.S. privately owned shipyards in the Active Shipbuilding Base (as identified in Exhibit 41 of this report) on a monthly basis. As of August 1982, employment in these 27 yards totaled 113,168, or approximately 68 percent of the overall shipbuilding and repair industry employment published by the Bureau of Labor Statistics. See Exhibit 44 of this MARAD report for employment projections for equivalent production workers in the Active Shipbuilding Base. These industry workload projections were prepared by the Office of Ship Construction.

Material Shortages

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

The NAVSEA Shipbuilding Support Office (NAVSHIPSO) July 1982 issue of Publication of Manufacturing Lead Times reported a substantial decrease in lead times during the first half of 1982 for finished ship components, compared with 1981. The greatest percent of change occurred in the diesel engine category, especially for engines 7,000 BHP and lower. Decreases were also noted for electric motors, shafting, and switchboards. Producers of basic materials for Navy ship construction and conversion programs also continued to report decreases in lead times, the most notable being forgings of all alloys and shapes.

During October 1982, the U.S. steel industry was operating at from 37 to 40 percent of capacity. According to the American Iron and Steel Institute, this was the lowest production level since the Great Depression.

A continuation of the recession in shipbuilding would inevitably result in a diminishing of the industry's component supply base. As shipbuilding contracts continue to decline, some manufacturing industries allied with shipbuilding and ship repair will shift emphasis to non-marine work in order to maintain a stable workload. There are already some signs of a gradual erosion of the existing supporting industrial base.

Shipyard Pollution Abatement

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

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

Fiscal Year 1982 saw within the committees a continuation of 1981 activities.

Ship Repair Facilities

While over 200 privately owned firms of varying capabilities are involved in repairing ships in the United States, only 73 yards are capable of drydocking vessels 300 feet in length and over. For ships this size, the U.S. shipbuilding and repair industry is currently operating a total of 84 floating drydocks, 51 graving docks, and several marine railways. However, some of these graving docks are committed to new construction. The large organizations which have drydocks generally use extensive waterfront acreage and are capable of all types of ship repair and maintenance. Major shipyards usually combine repair, overhaul, and conversion with shipbuilding capabilities, and employment usually numbers in the thousands. It is difficult to draw a sharp line between shipbuilding yards and ship repair yards, as many of the two engage in both types of work.

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

As of October 1982, the Maritime Administration held lump-sum master repair contracts with 81 ship repair facilities. Forty-seven of these firms were located in the Eastern Region, 19 were in the Central Region, and 15 were in the Western Region.

Since the downtrend in orders for new merchant vessels, several shipyards have in recent years expanded or upgraded ship repair, overhaul, and conversion facilities to improve their efficiency and competitive posture. Examples of recent, current, and planned plant expansion and modernization programs are:

o Newport News Shipbuilding:

A continuing multimillion-dollar capital investment program was highlighted by the opening in 1982 of a new drydock complex to double the yard's submarine overhaul capacity. Other major improvements include upgrading and renovation of older drydocks, outfitting piers, and other facilities.

o Norfolk Shipbuilding & Dry Dock Corporation:

An expansion program, completed in 1979, consisting of a new 950-foot (290 m) floating drydock with a clear width of 160 feet (29 m) and a lifting capacity of 54,250 long tons (55118 metric tons), a new 1,030-foot (314 m) concrete pier to be used for repair and servicing of ships as long as 1,200 feet (366 m), and other facilities to increase the company's repair and conversion capability.

o Port of Portland (Oregon):

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

o Avondale Shipyards:

An outstanding feature of the company's recently completed modernization and expansion program was a new, largely automated pipe fabrication shop, the most advanced of its kind in the world. In July 1982, Avondale's new "Panamax" floating drydock entered service. This drydock, in conjunction with the company's existing drydock, is expected to double the main yard's ship repair capacity.

o Bath Iron Works:

BIW began construction in early 1982 on a new \$46.7 million ship repair and overhaul facility in Portland, Me. The new shipyard, including an 80,000-ton (81280 metric ton) floating drydock, will be used initially for repair and outfitting of Navy and commercial ships and is expected to employ 1,000 people by 1986.

o Todd Shipyards Corporation:

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

Todd's Galveston Division, in April 1982, put into operation a new floating drydock capable of accommodating ships up to 225,000 dwt. This drydock, built in Japan, is 853 feet (260 m) long with an inside width of 160 feet (49 m) and a lifting capacity of 40000 metric tons, the largest unit of its kind in the Western Gulf area.

Todd's Houston Division, in October 1982, replaced its old 8,000-ton (8128 metric ton) floating drydock with a new, larger 17,500-ton (17780 metric ton) floating drydock. This new drydock, built by Bender Shipbuilding, can accommodate vessels up to 600 feet by 118 feet (183 m by 36 m). This is part of a major facilities improvement program scheduled for the Houston yard.

At Todd's Los Angeles Division, ground was broken in 1982 for a land-level ship repair facility which will use a syncrolift platform 655 feet (200 m) long by 106 feet (32 m) wide having a lifting capacity of 21,942 long tons (22293 metric tons) to raise ships as large as 48,000 dwt. to land level where they will be transferred

to a work bay via a rail system. The completed system will accommodate a minimum of five vessels simultaneously. It is scheduled to go into operation by the end of 1983, and will be the largest land-level shiplift system in the world.

Todd's facility upgrading program also includes the transfer in 1982 of a 40,000 displacement ton (40640 metric ton) floating drydock from its San Francisco Division to its Seattle Division where it is being modified to accommodate naval combatants and auxiliaries, as well as commercial ships.

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

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

The commercial ship repair market was weaker in 1982 than during 1981, and future prospects are uncertain. During the current year, Navy repair and overhaul work continued to be a consistent and stable element in our repair industry's endeavors. Several yards were competing for interim repair and conversion contracts awarded by the military sector -- contracts that will keep some shipyards above water until the Navy's new building program gets underway.

Although several firms in the industry are readying their yards for greater future participation in both naval and commercial repair markets, private ship repair capacity in some areas of the Nation continues to be underutilized.

Major Drydocking Facilities

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

Appendix B tabulates information updated through 1982 on 48 of these repair yards on a coastal basis. Additional data is available in the Office of Ship Construction.

Major Topside Repair Facilities

Major topside repair facilities are those that have the capability to provide repair service to oceangoing ships when the work can be accomplished without taking the ships out of the water. The topside yards continue to get a substantial share of large ship business. These facilities usually lease pier space on a job basis and do not have any type of drydocking installation. 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 136 major topside repair facilities, 61 of which are located on the East Coast. No attempt has been made to tabulate their machinery and equipment due to the variance of the type of work an individual firm will engage in. Detailed data for most of the facilities has been obtained during the MARAD annual shipyard survey and is available in the Office of Ship Construction.

Active Shipbuilding Base

The Active Shipbuilding Base comprises the 27 privately owned U.S. shipyards currently engaged in or seeking contracts for the construction of naval ships and/or major oceangoing or Great Lakes merchant ships. Exhibit 41 of this report identifies and geographically locates these 27 yards. Exhibit 42 tabulates the number and contract value of commercial vessels and barges, large and small, under construction or on order as of September 30, 1982, in these shipyards; and Exhibit 43 indicates when each of the yards in the Active Shipbuilding Base needed new contracts as of September 30, 1982, in order to maintain an adequate backlog for available facilities and work force. Estimates of need for new business are determined by the Maritime Administration based on methodologies developed for the Shipyard Production and Mobilization Model (SPAMM). Most of these yards presently have building facilities available to expand employment levels if new contracts could be secured.

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

As of September 30, 1982, nine of the 27 yards were engaged primarily in major naval ship construction. Four of the yards were mainly engaged in construction of commercial ships 1,000 gross tons and over, three yards were building offshore drilling rigs, and the rest of the yards were engaged in repair and conversion work or construction of small vessels.

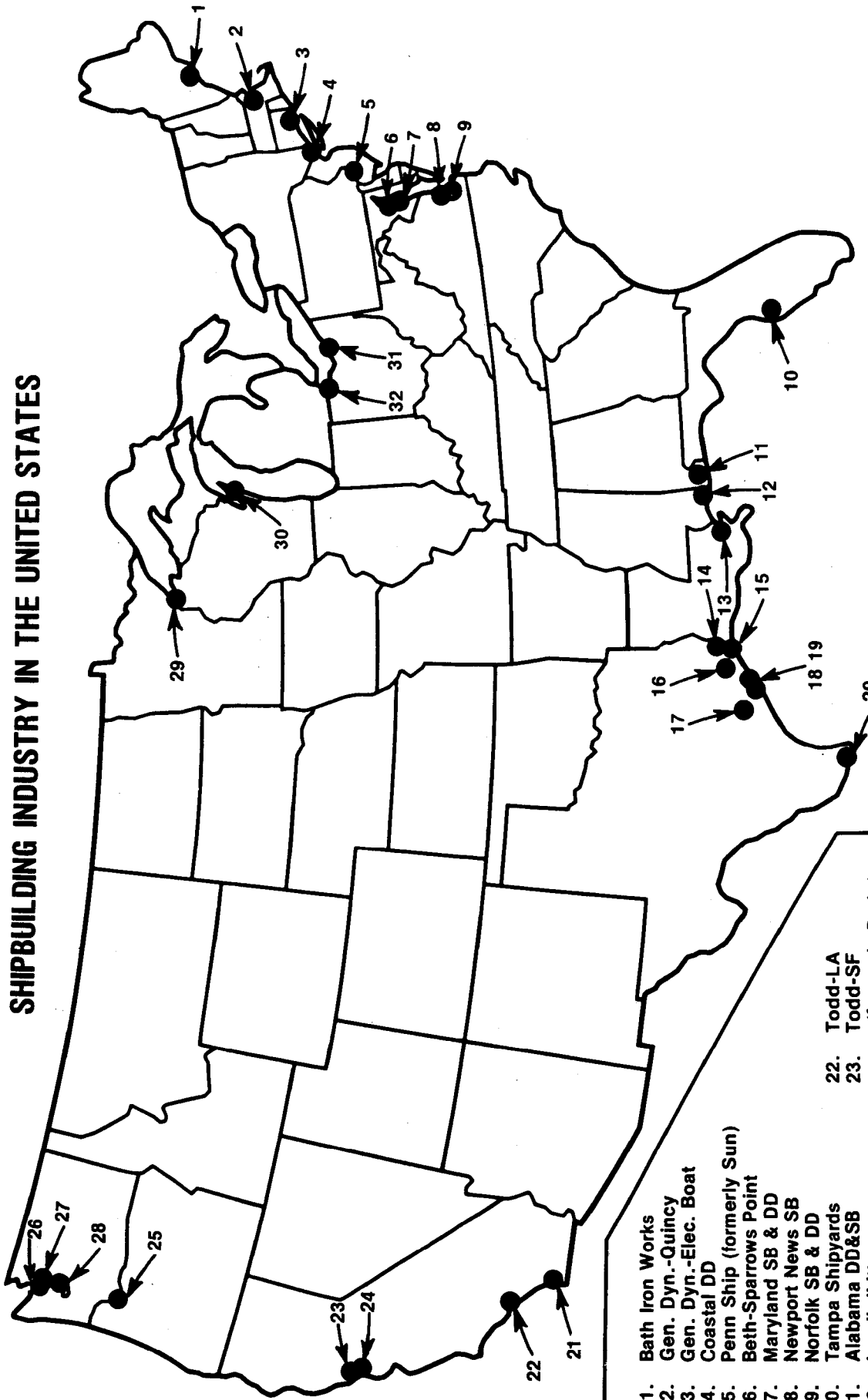
As of September 30, 1982, 76 percent of the production workers in these 27 shipyards were engaged in Navy or Coast Guard ship construction and repair work.

Employment projections for equivalent production workers is shown by Exhibit 44. This data is generated by overlaying Navy and private projected five-year shipbuilding and conversion programs onto the estimated work force required to complete the current firm orderbook.

Exhibit 44 indicates that work force levels are expected to drop from mid-1982 to mid-1983, followed by a leveling out continuing into 1987. During the last half of 1987, it is anticipated that an upturn in shipyard employment will begin.

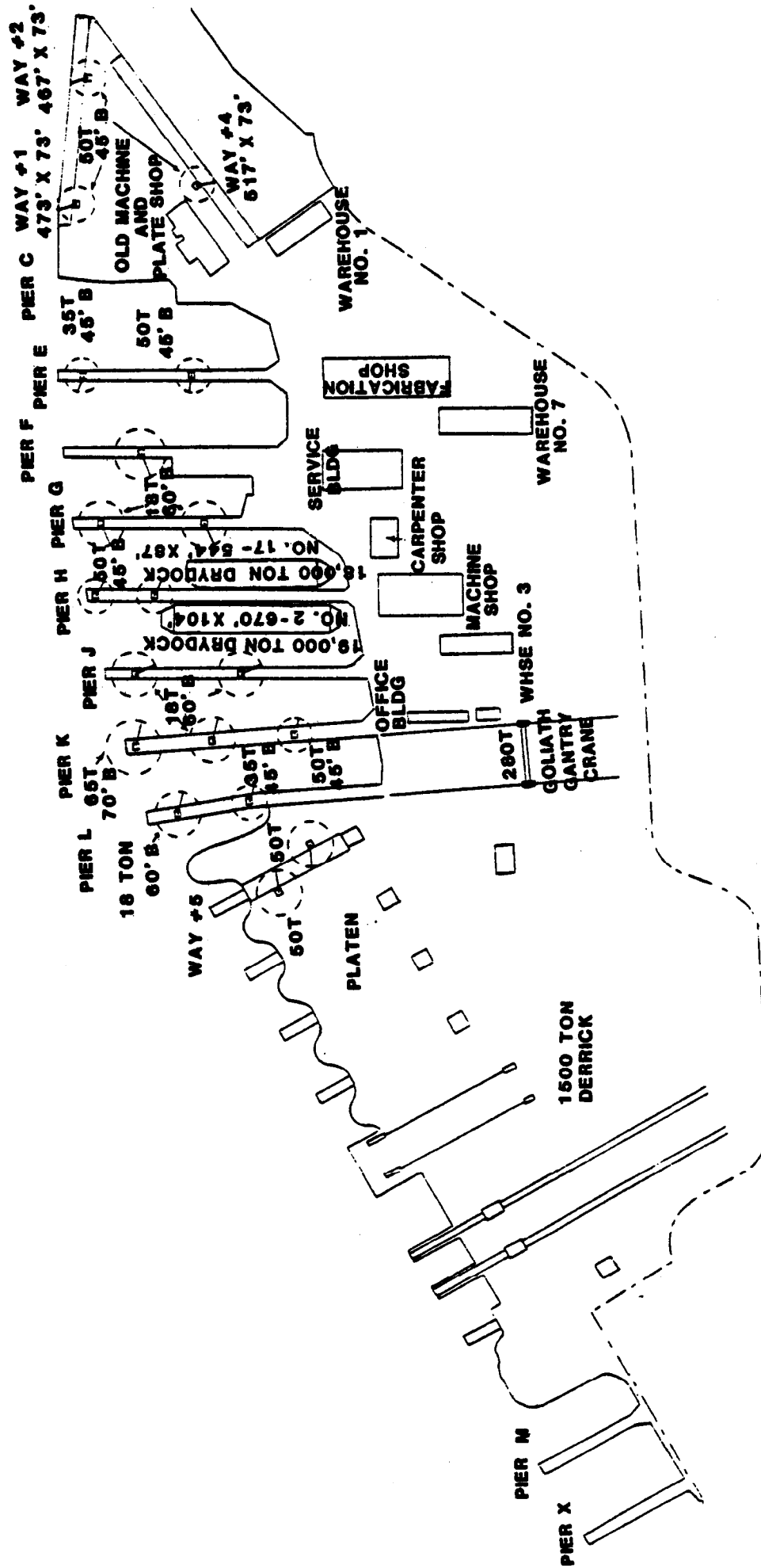
These projections are contingent upon near-term economic conditions, the demand for commercial vessels, and upon future Administration and Congressional action with regard to the proposed increase in the Navy workload.

SHIPBUILDING INDUSTRY IN THE UNITED STATES

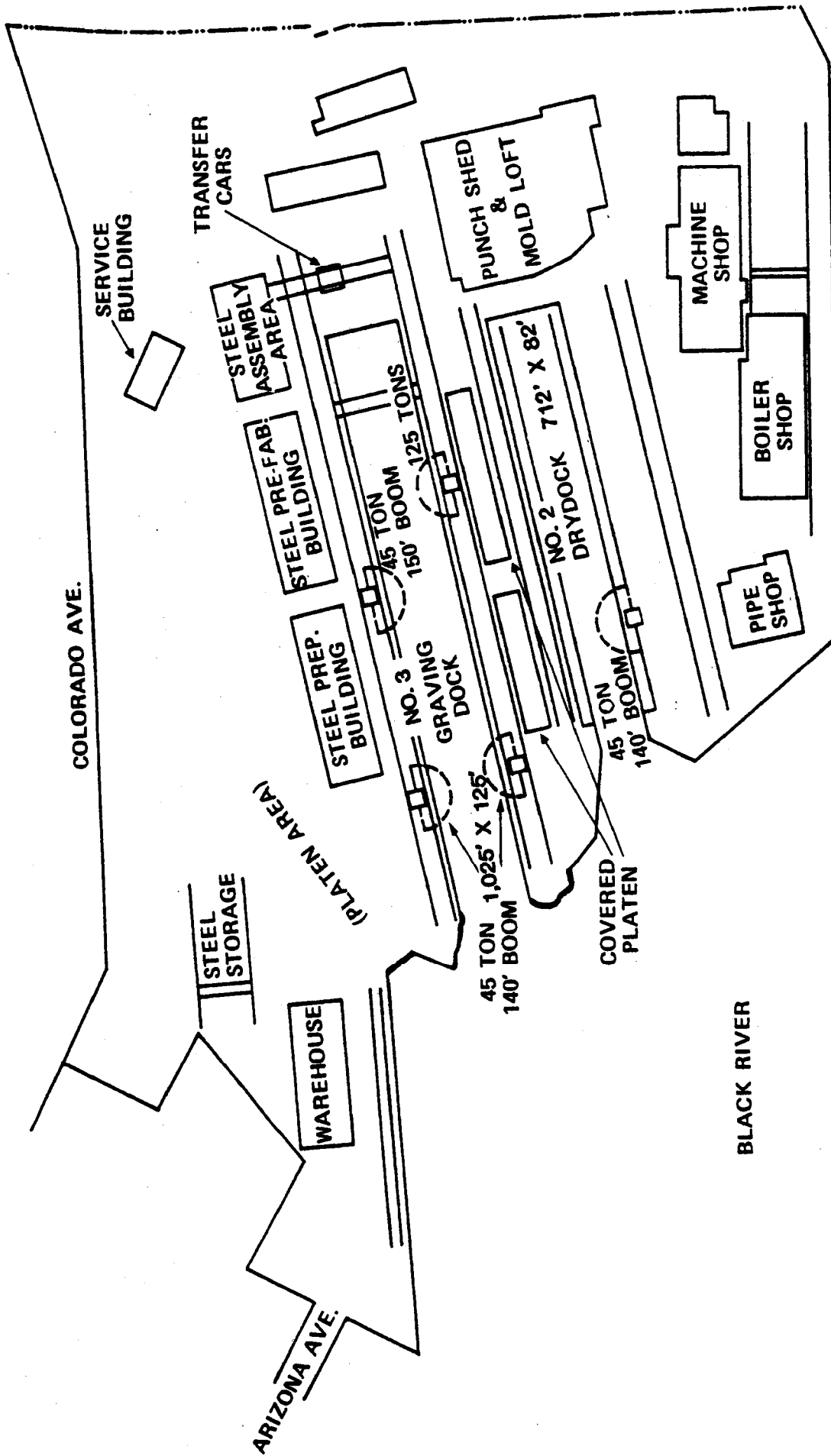


- | | |
|-----------------------------|------------------------------|
| 1. Bath Iron Works | 22. Todd-LA |
| 2. Gen. Dyn.-Quincy | 23. Todd-SF (formerly Beth.) |
| 3. Gen. Dyn.-Elec. Boat | 24. Triple A |
| 4. Coastal DD | 25. FMC Corporation |
| 5. Penn Ship (formerly Sun) | 26. Lockheed SB |
| 6. Beth-Sparrows Point | 27. Tacoma Boat |
| 7. Maryland SB & DD | 28. Todd-Seattle |
| 8. Newport News SB | 29. Fraser Shipyards |
| 9. Norfolk SB & DD | 30. Bay Shipbuilding |
| 10. Tampa Shipyards | 31. American SB-Lorain |
| 11. Alabama DD&SB | 32. American SB-Toledo |
| 12. Ingalls/Litton | |
| 13. Avondale Shipyards | |
| 14. Levinston (Orange, TX) | |
| 15. Texas (Gulfport SB) | |
| 16. Beth-Beaumont | |
| 17. Todd-Houston | |
| 18. Todd-Galveston | |
| 19. Galveston SB Co. | |
| 20. Marathon LeTourneau | |
| 21. NASSCO | |

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

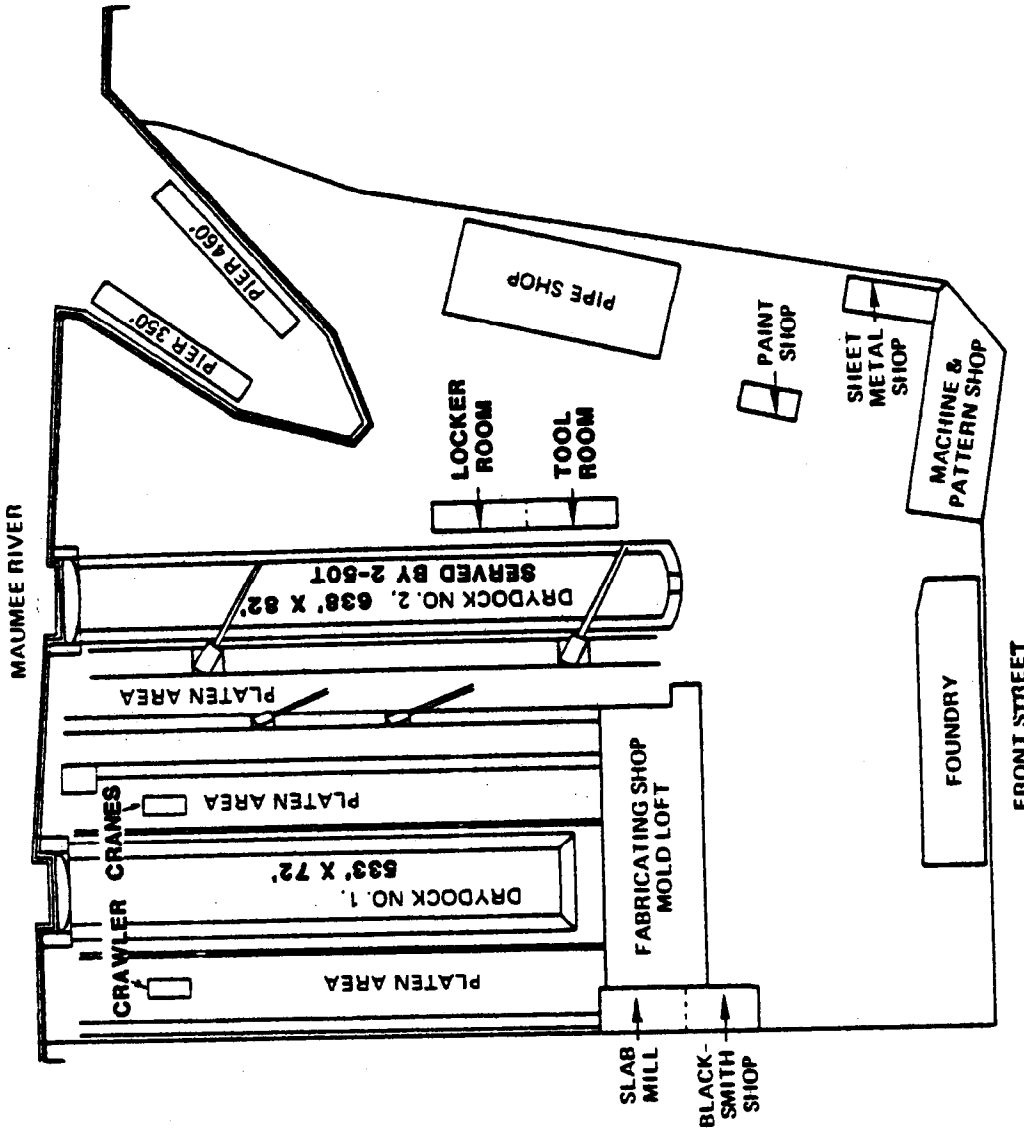


ALABAMA DRYDOCK & SHIPBUILDING CO.



AMERICAN SHIP BUILDING CO.

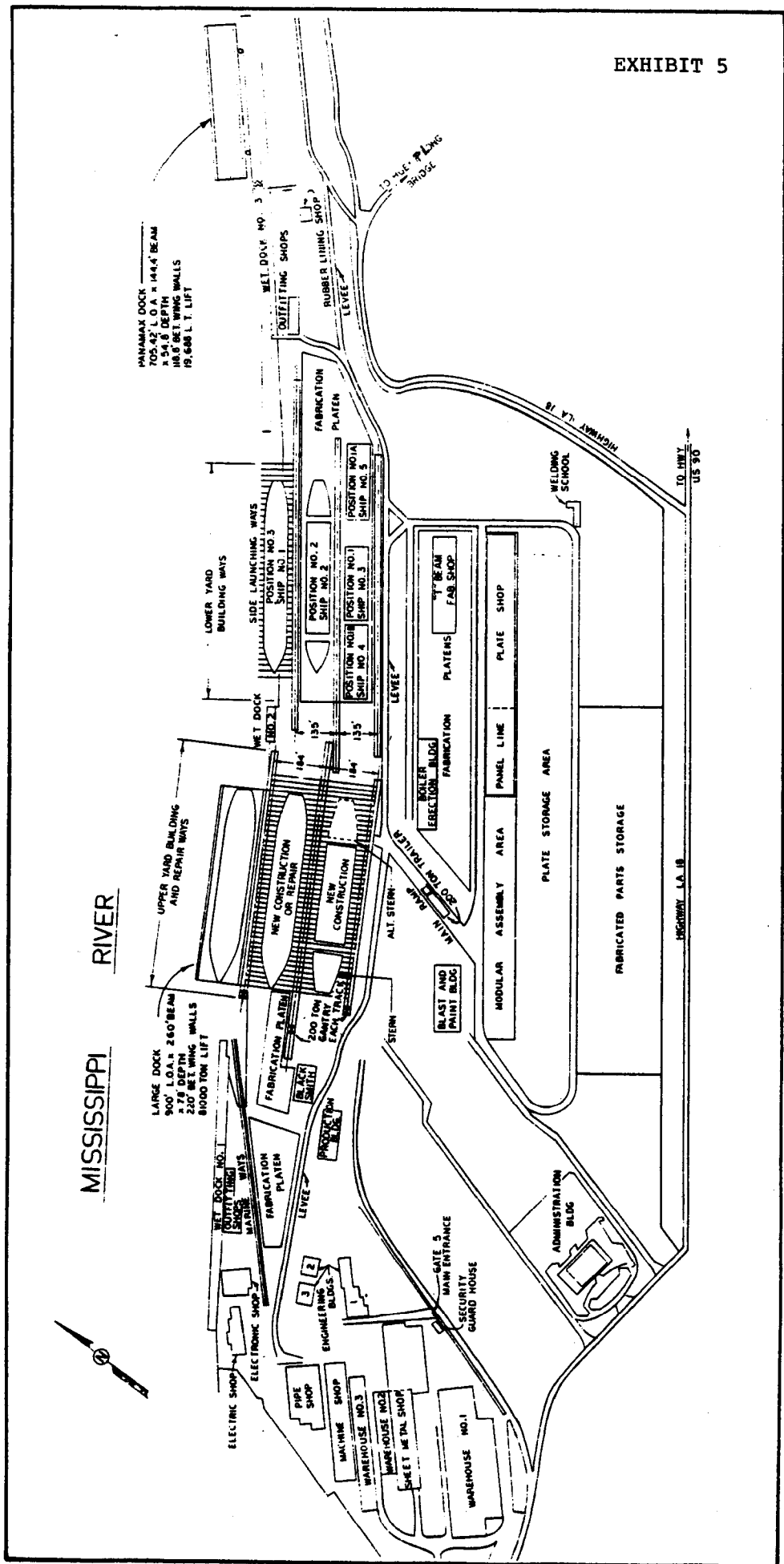
LORAIN YARD

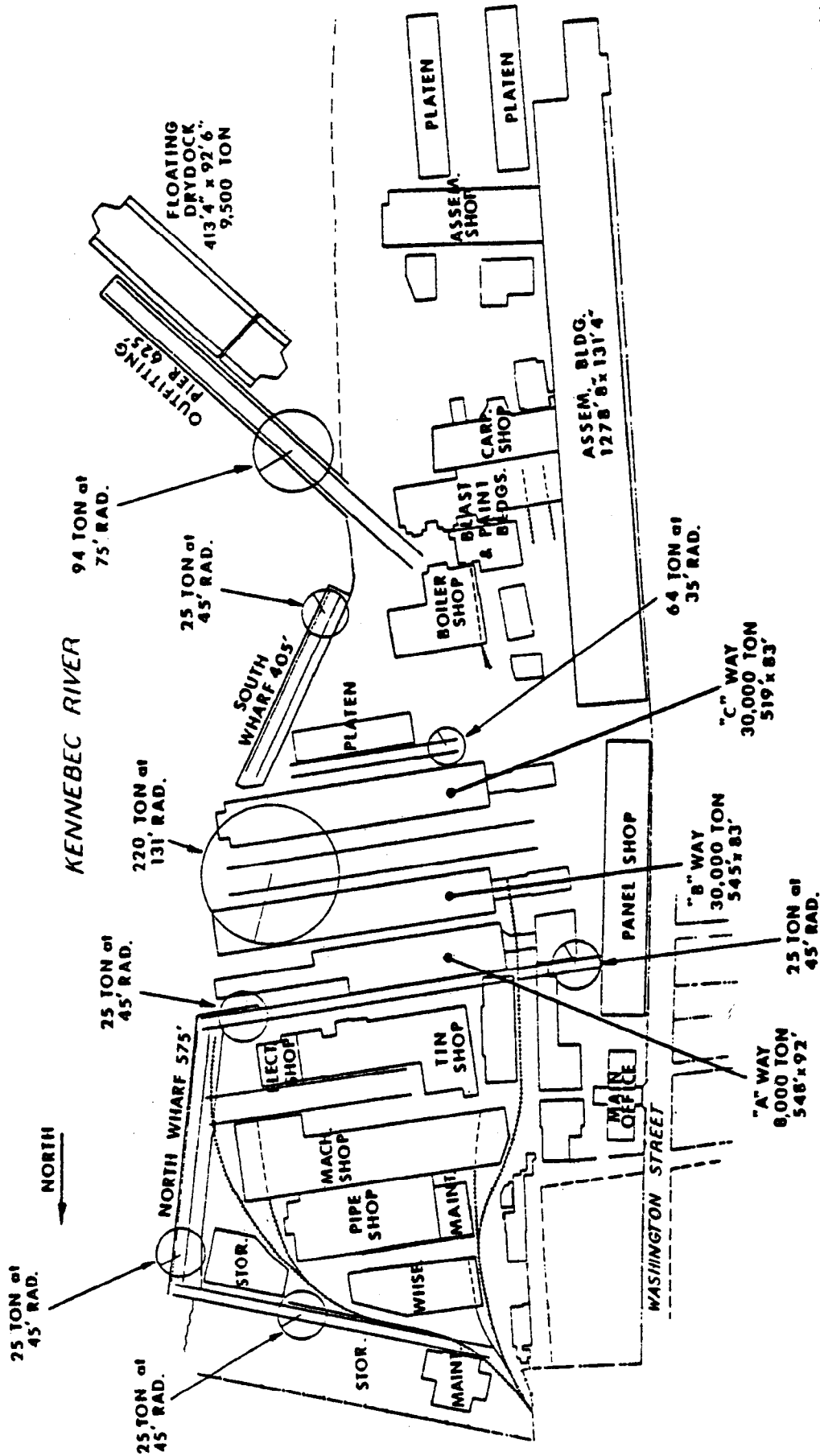


AMERICAN SHIP BUILDING CO. TOLEDO

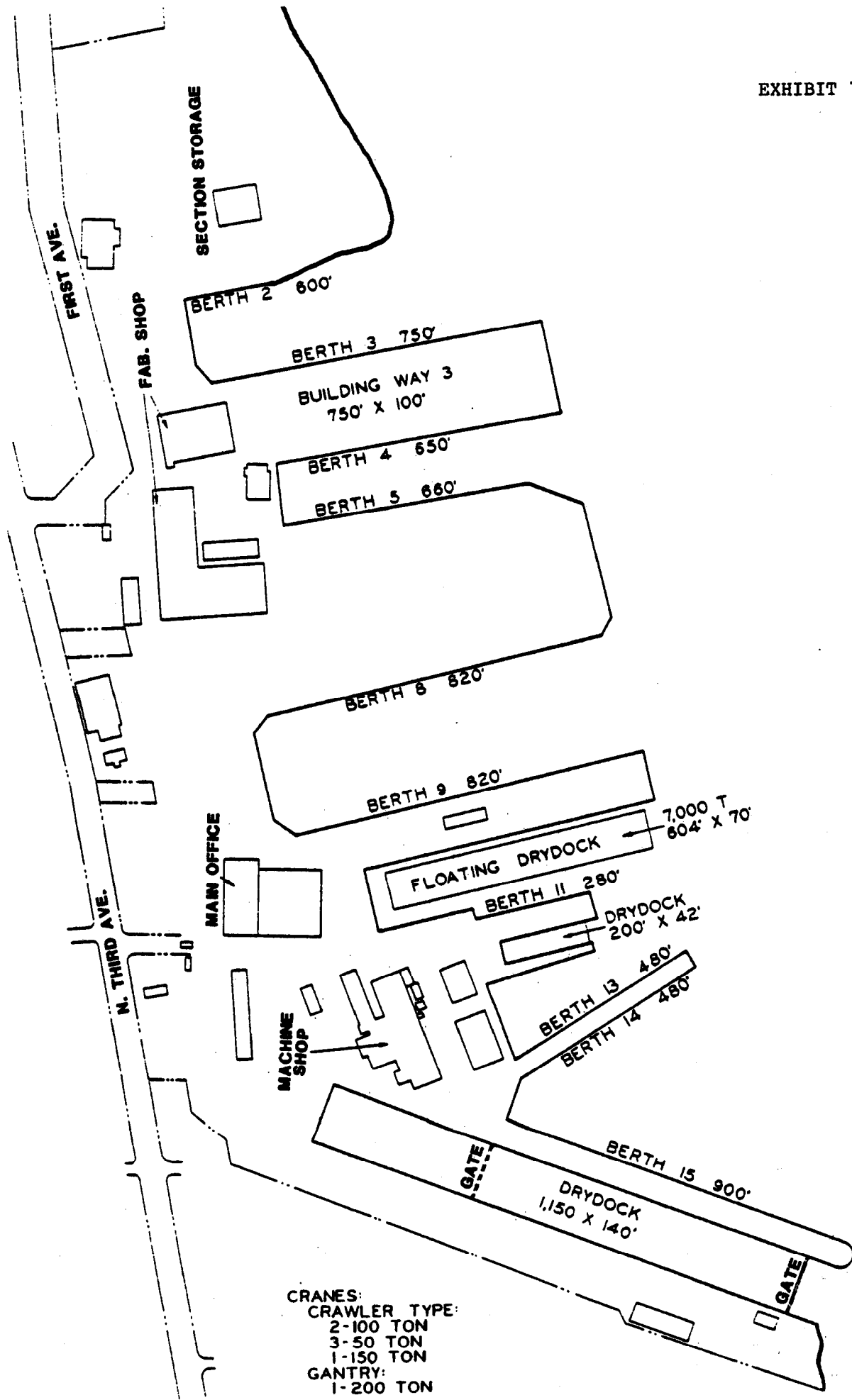
AVONDALE SHIPYARDS, INC. MAIN PLANT

EXHIBIT 5

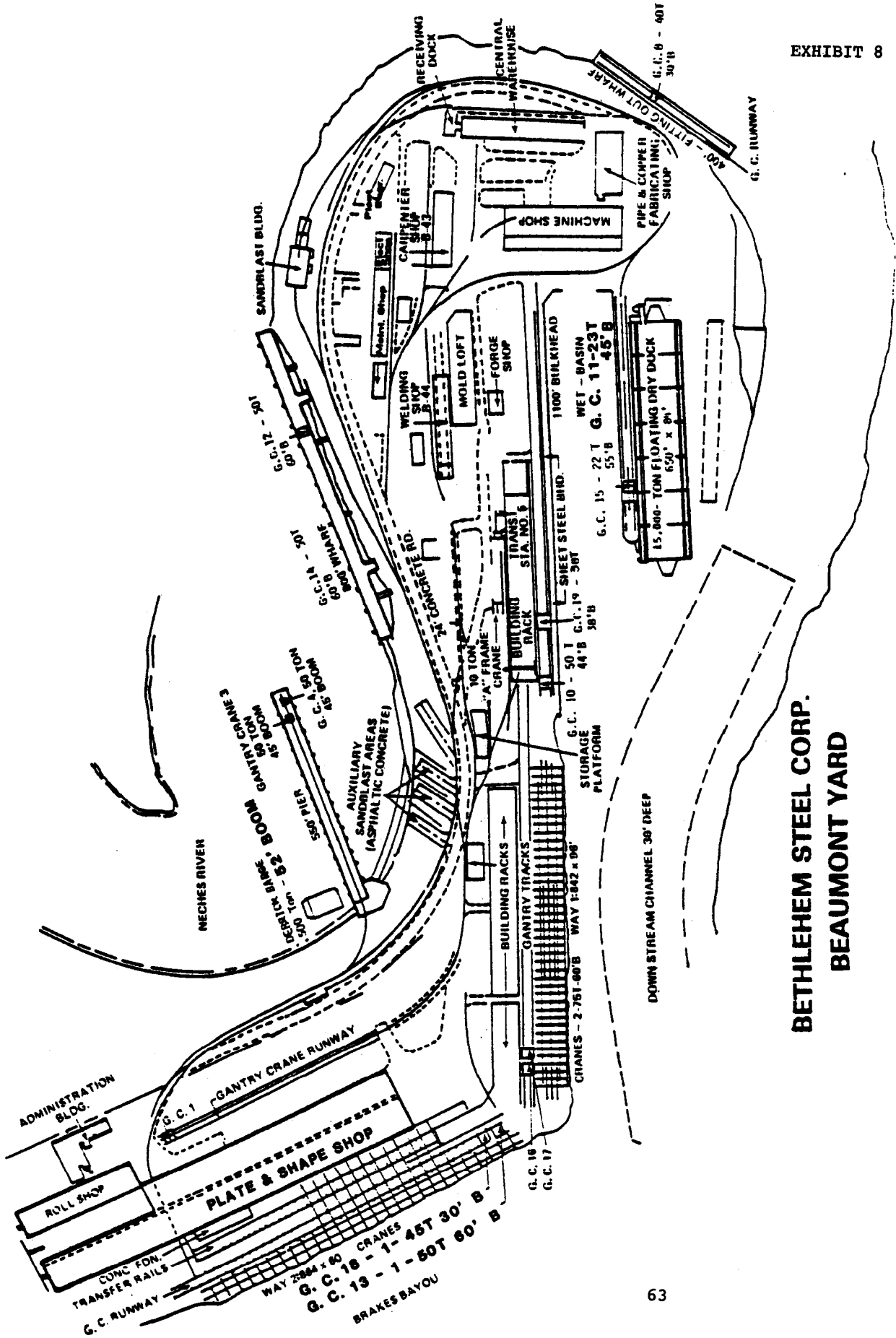




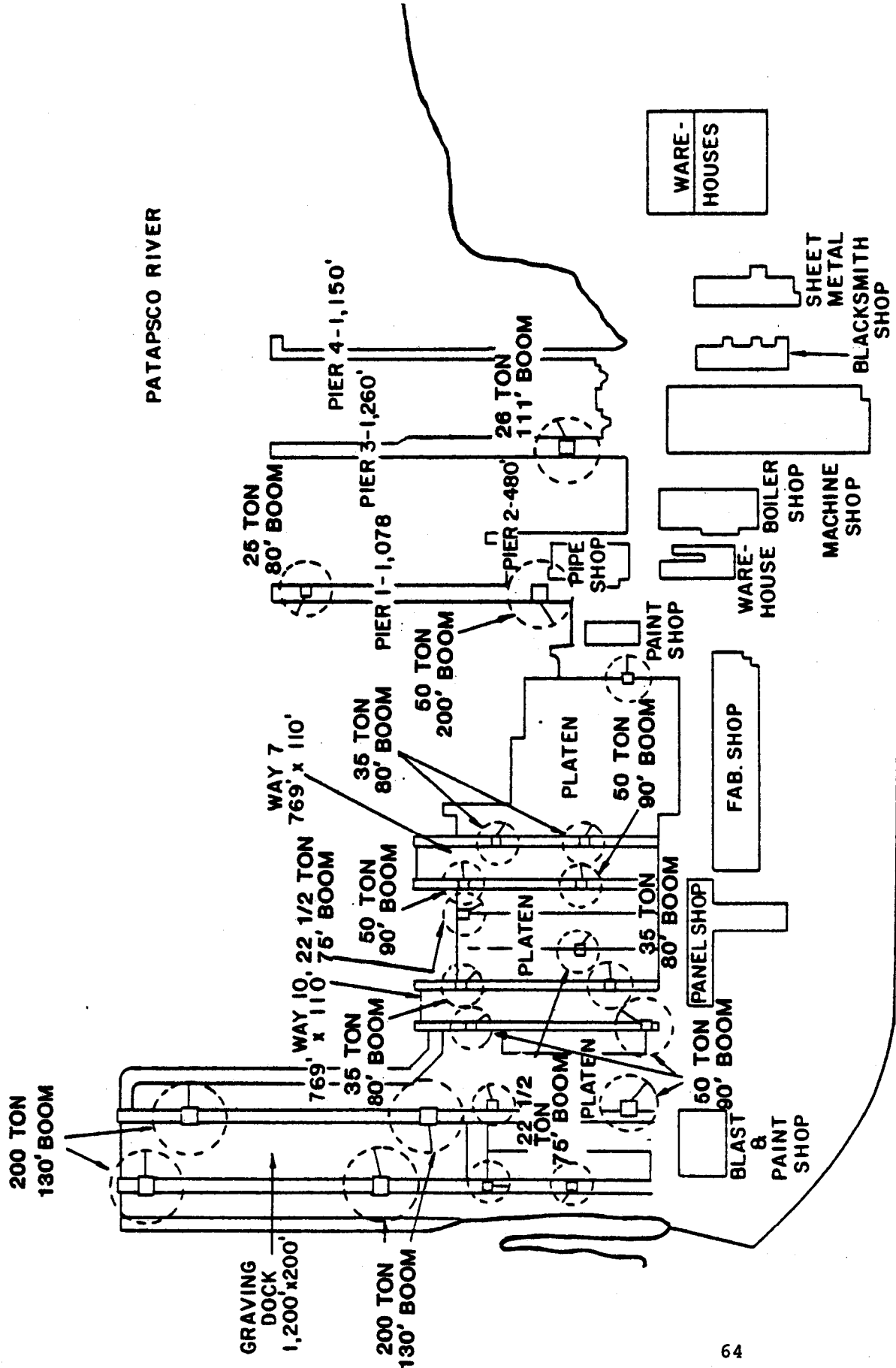
BATH IRON WORKS CORP.



BAY SHIPBUILDING CORPORATION



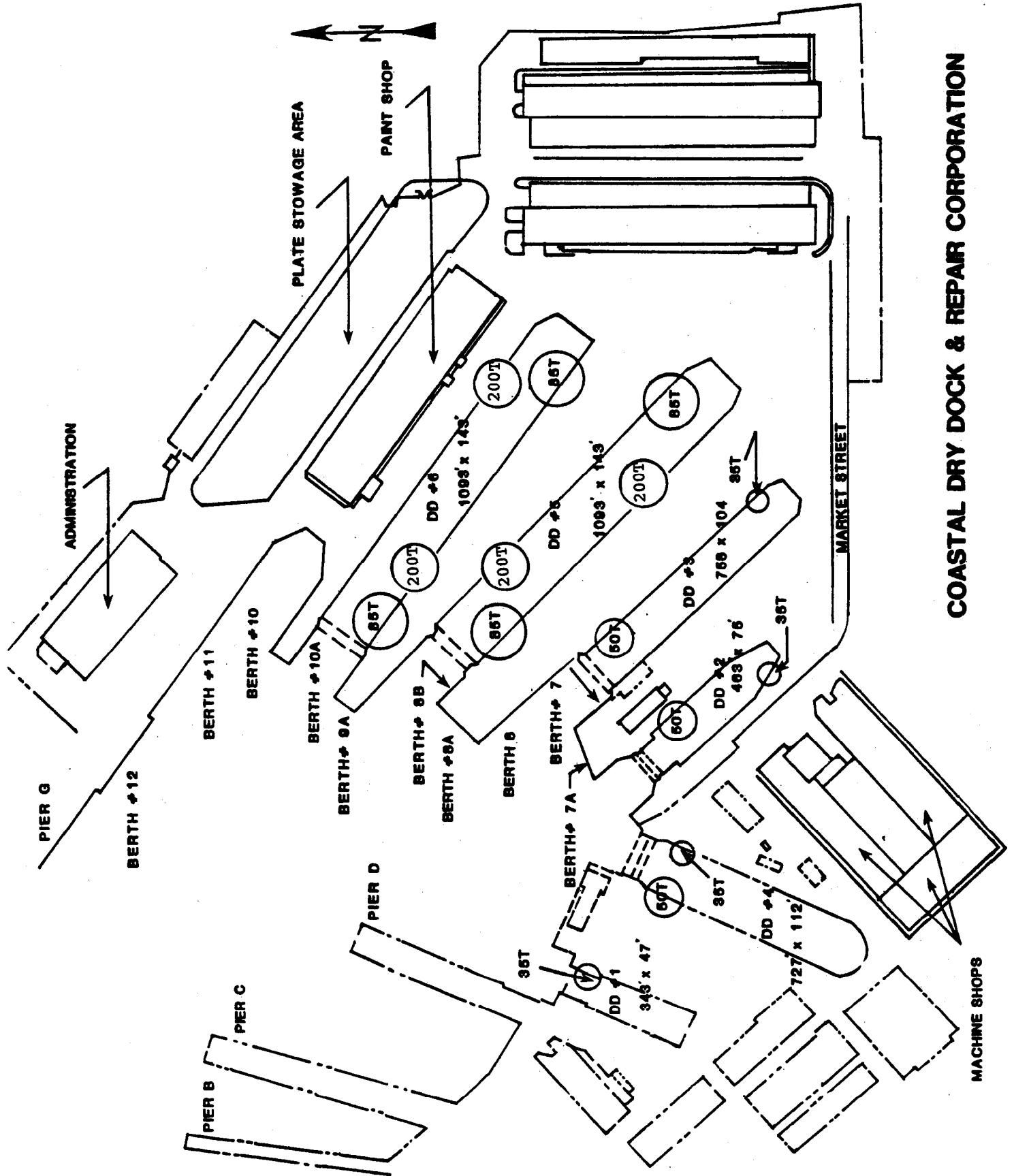
**BETHLEHEM STEEL CORP.
BEAUMONT YARD**



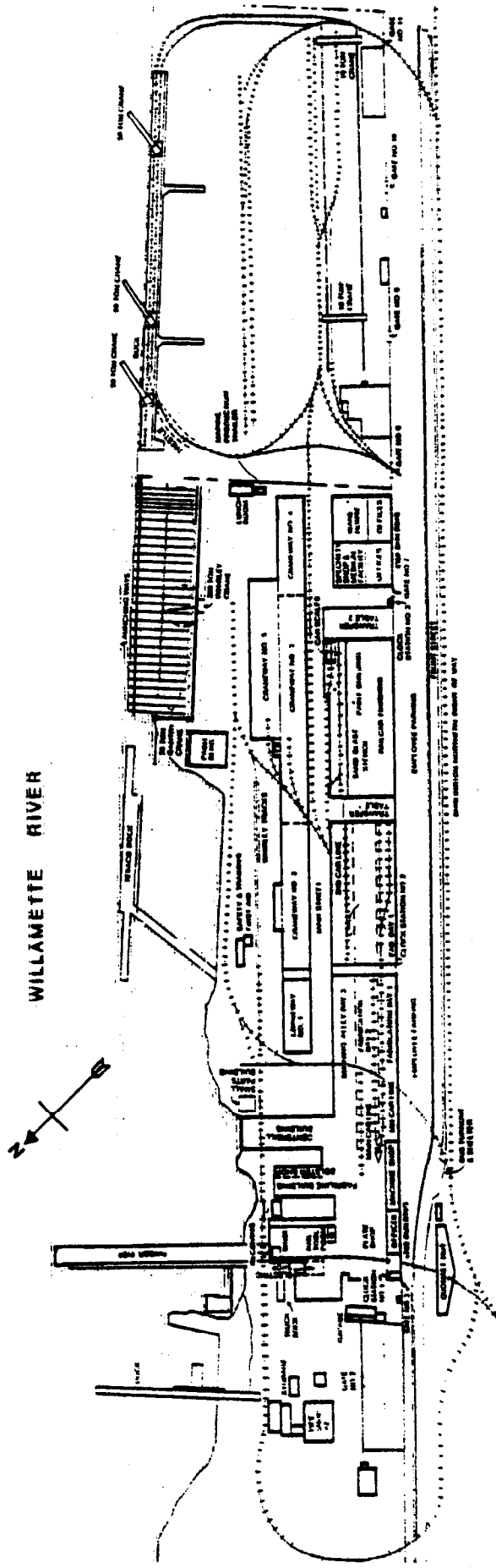
PATAPSCO RIVER

BETHLEHEM STEEL CORPORATION

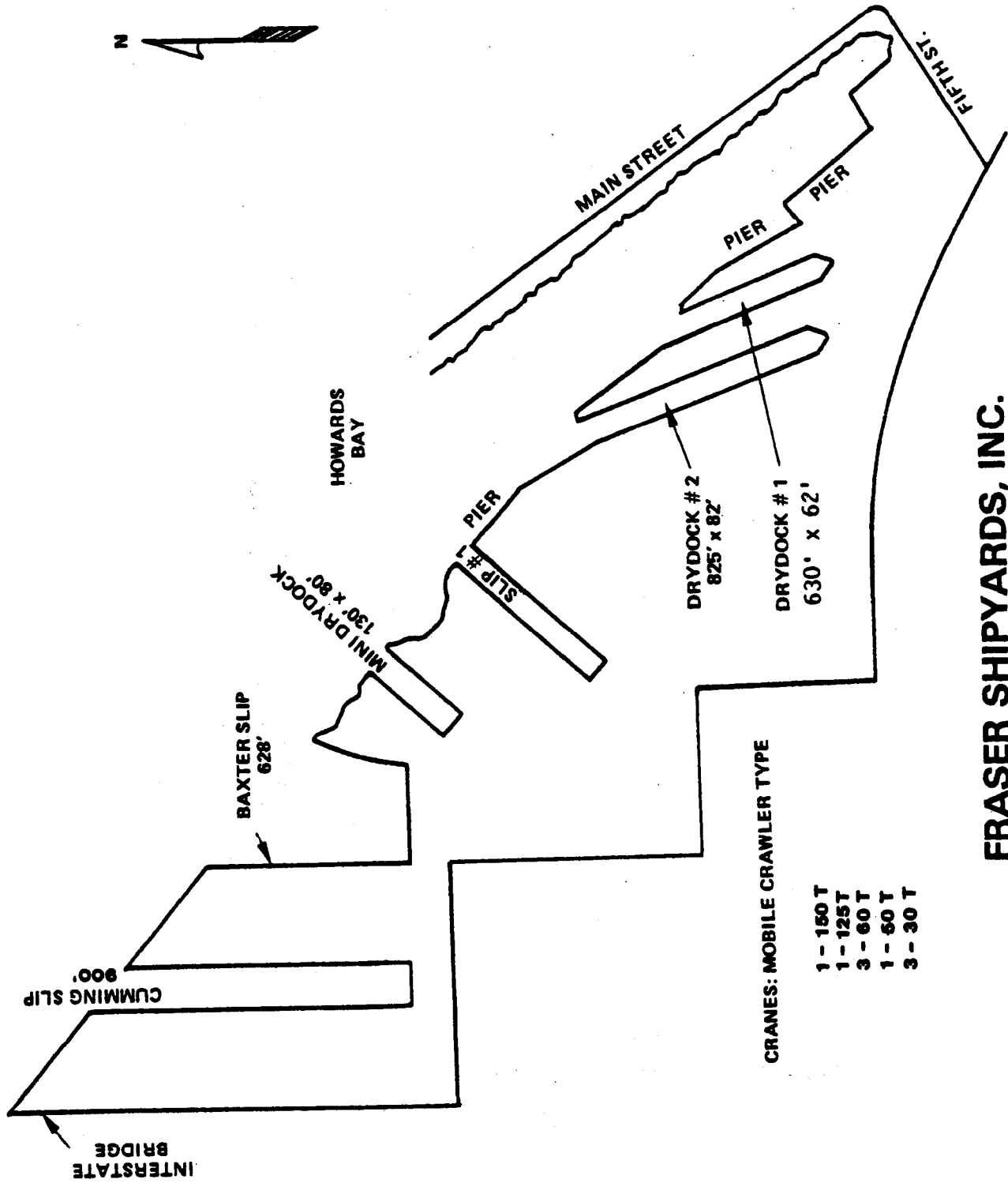
SPARROWS POINT YARD



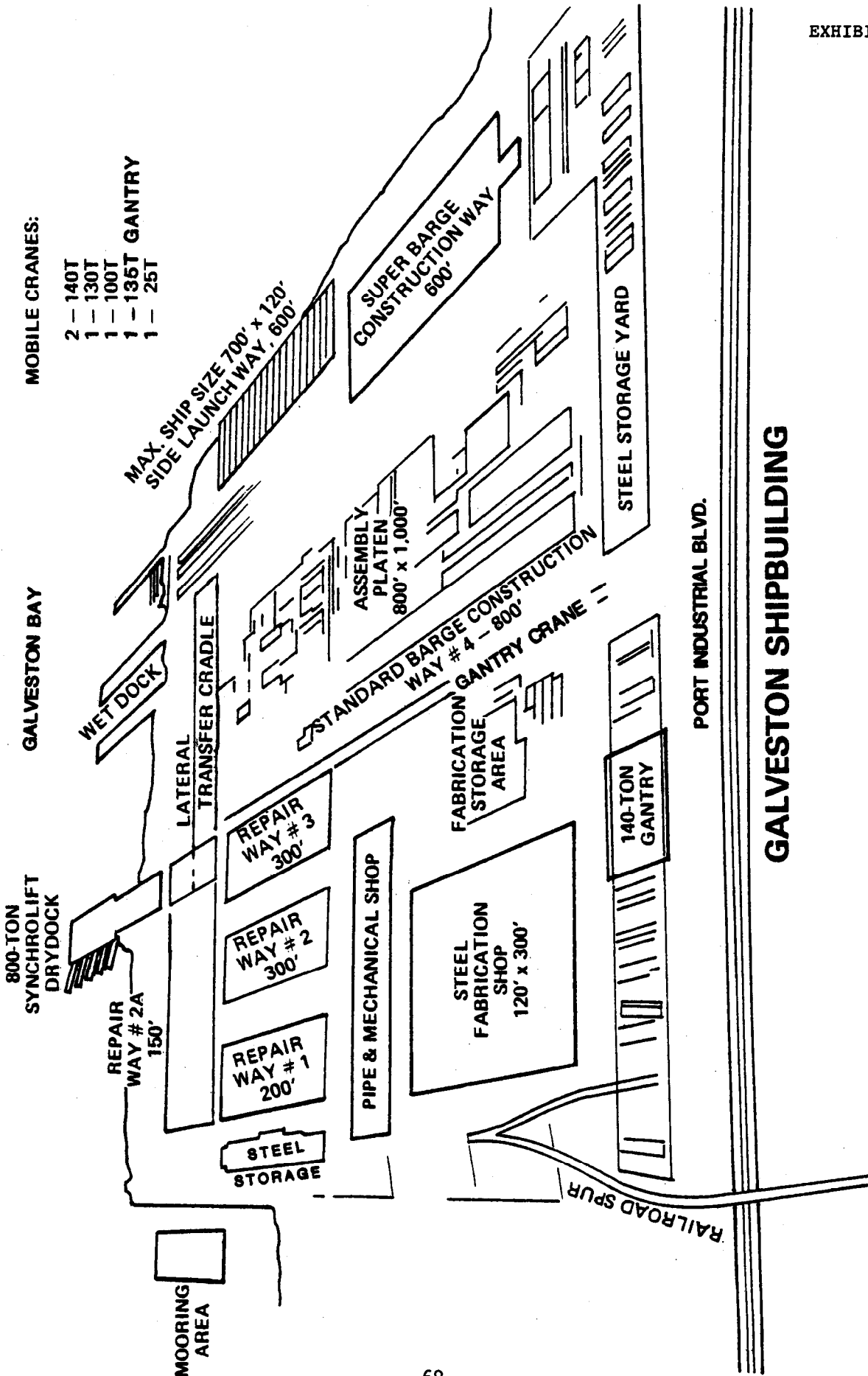
COASTAL DRY DOCK & REPAIR CORPORATION



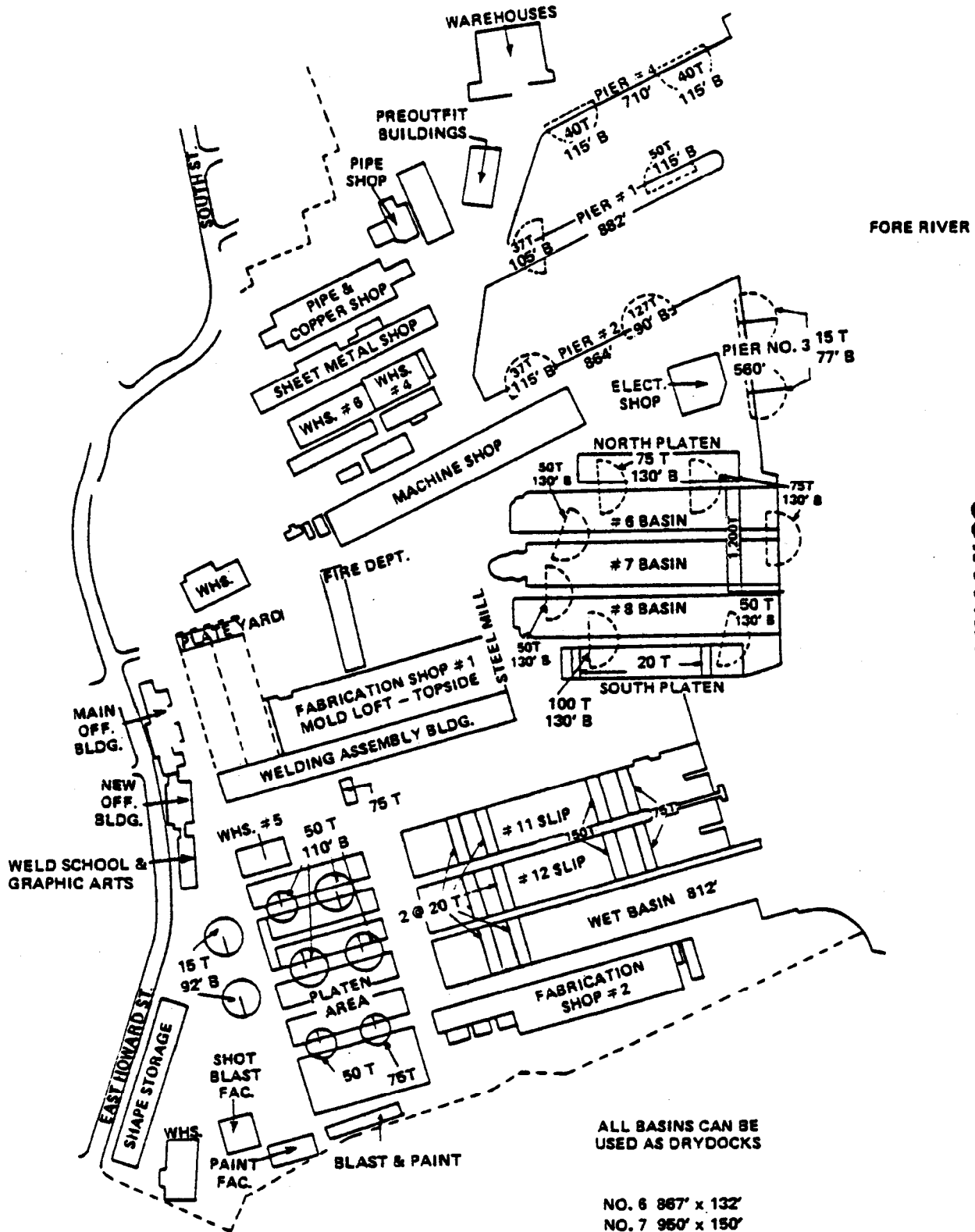
FMC CORPORATION
Marine & Rail Equipment Division
Portland, Oregon



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



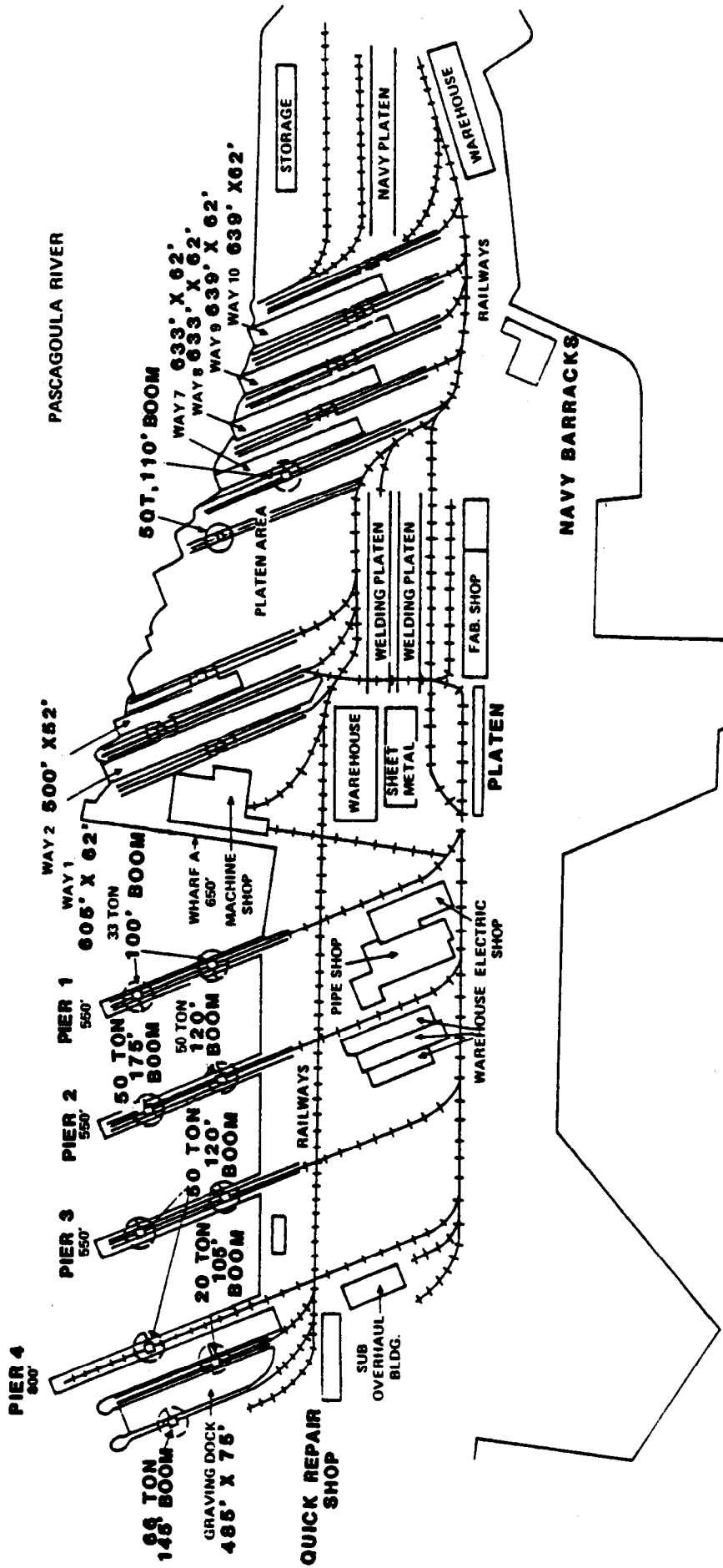
GALVESTON SHIPBUILDING



GENERAL DYNAMICS
QUINCY SHIPBUILDING DIVISION

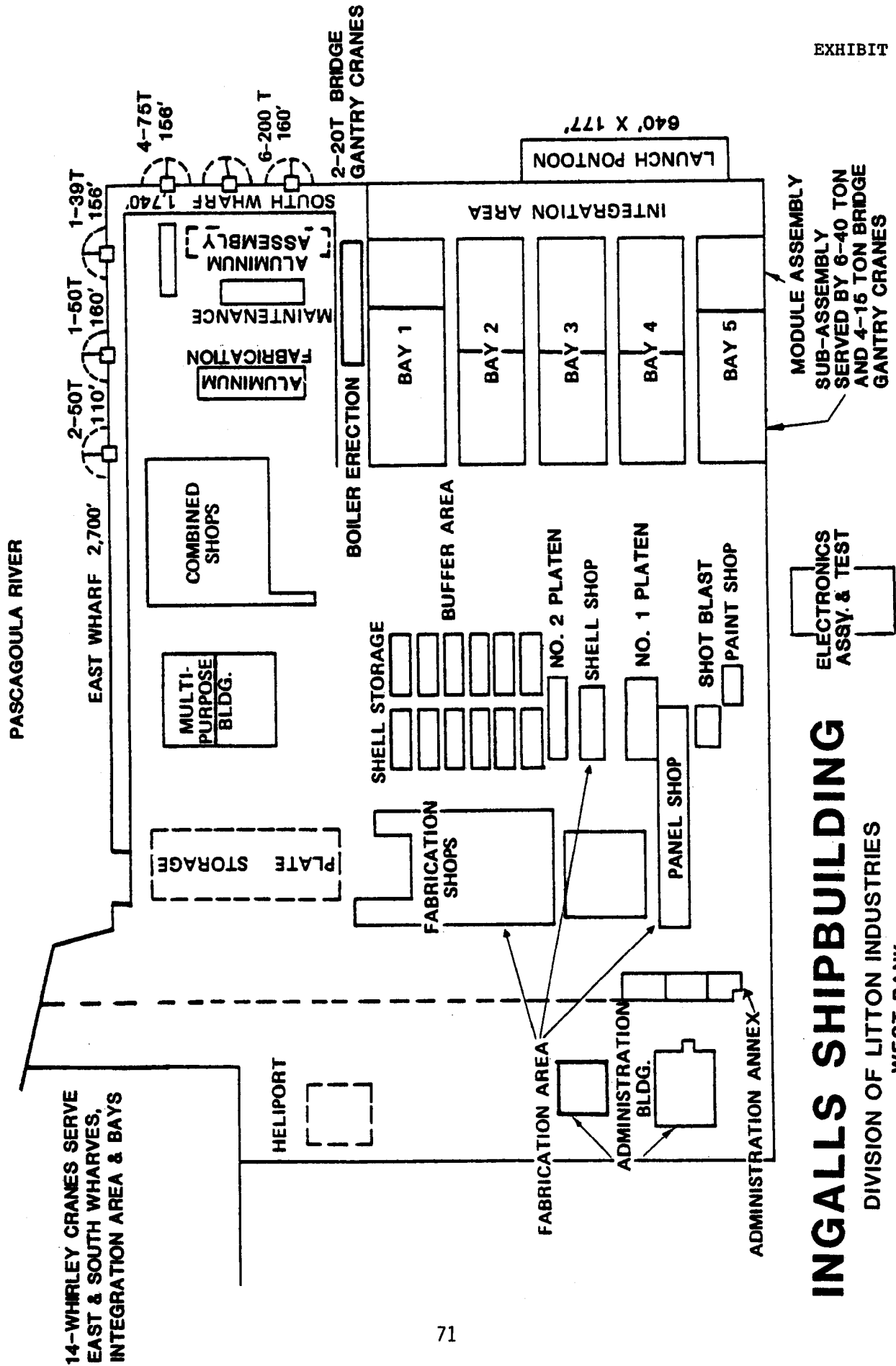
ALL BASINS CAN BE USED AS DRYDOCKS

- NO. 6 867' x 132'
- NO. 7 950' x 150'
- NO. 8 867' x 132'
- NO. 11 874' x 150'
- NO. 12 874' x 150'



**INGALLS SHIPBUILDING
DIVISION OF LITTON INDUSTRIES**

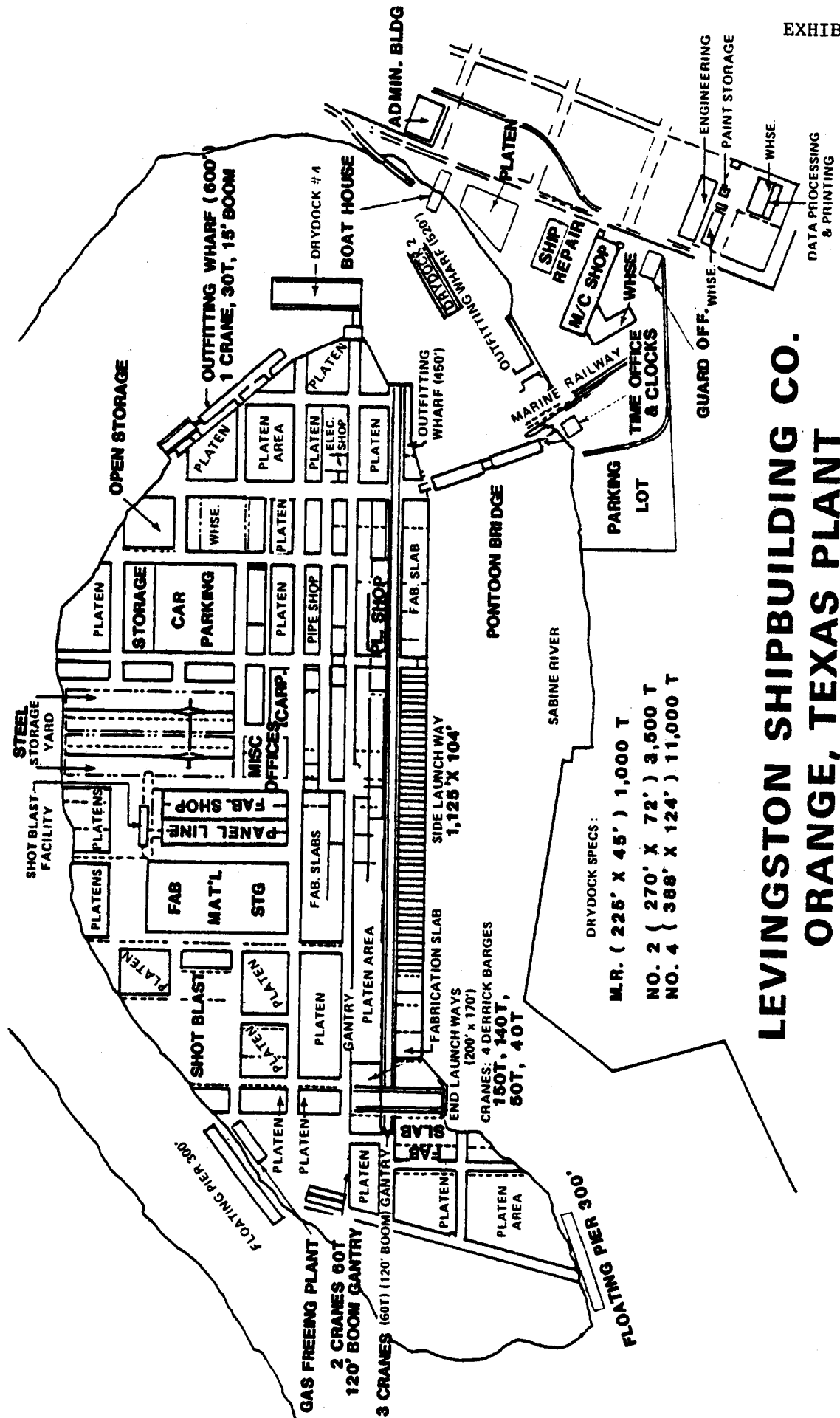
EAST BANK FACILITY



ELECTRONICS ASSY. & TEST

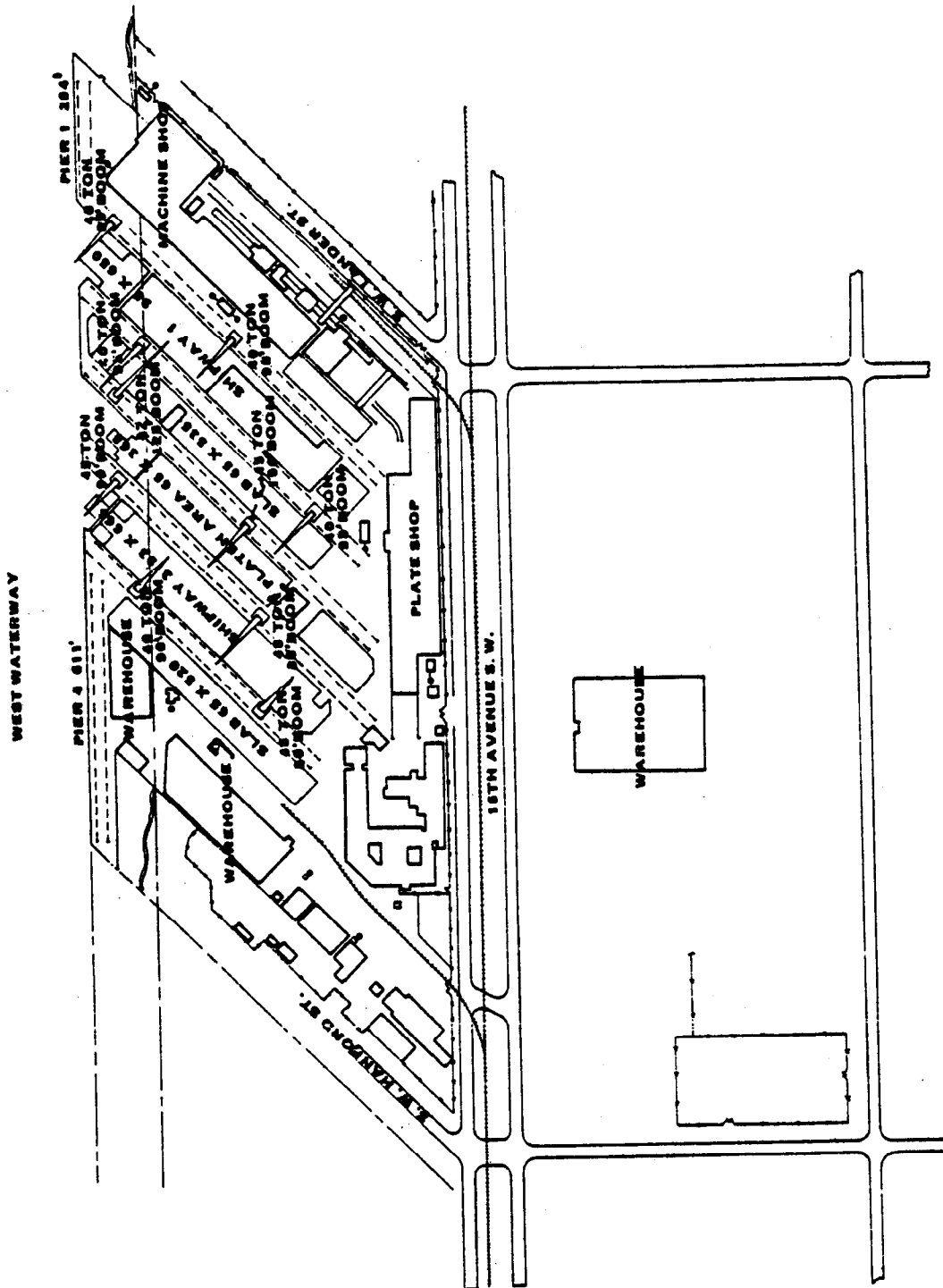
INGALLS SHIPBUILDING

DIVISION OF LITTON INDUSTRIES
WEST BANK

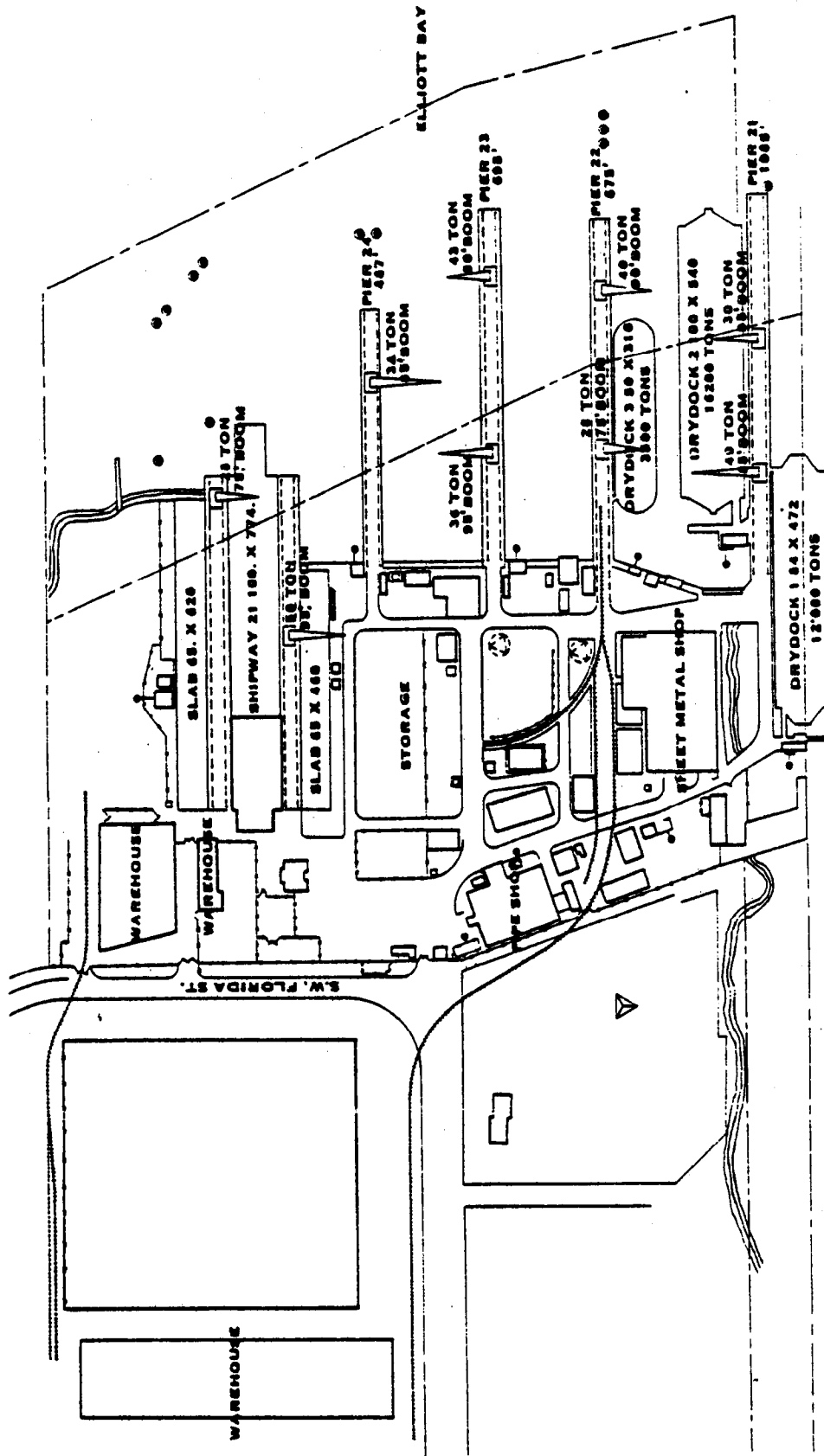


LEVINGSTON SHIPBUILDING CO. ORANGE, TEXAS PLANT

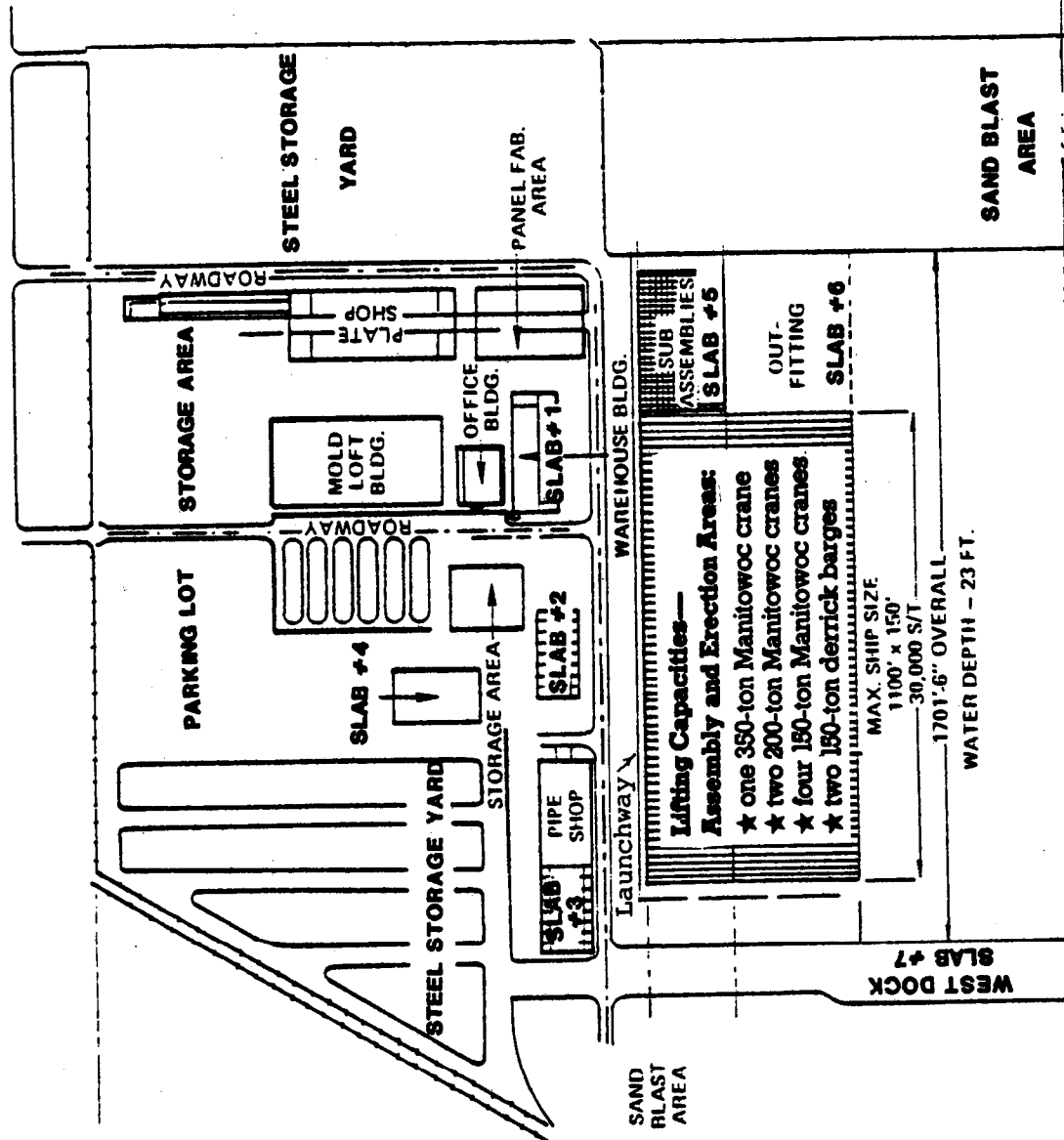
DRYDOCK SPECS:
 M.R. (225' X 45') 1,000 T
 NO. 2 (270' X 72') 3,500 T
 NO. 4 (366' X 124') 11,000 T



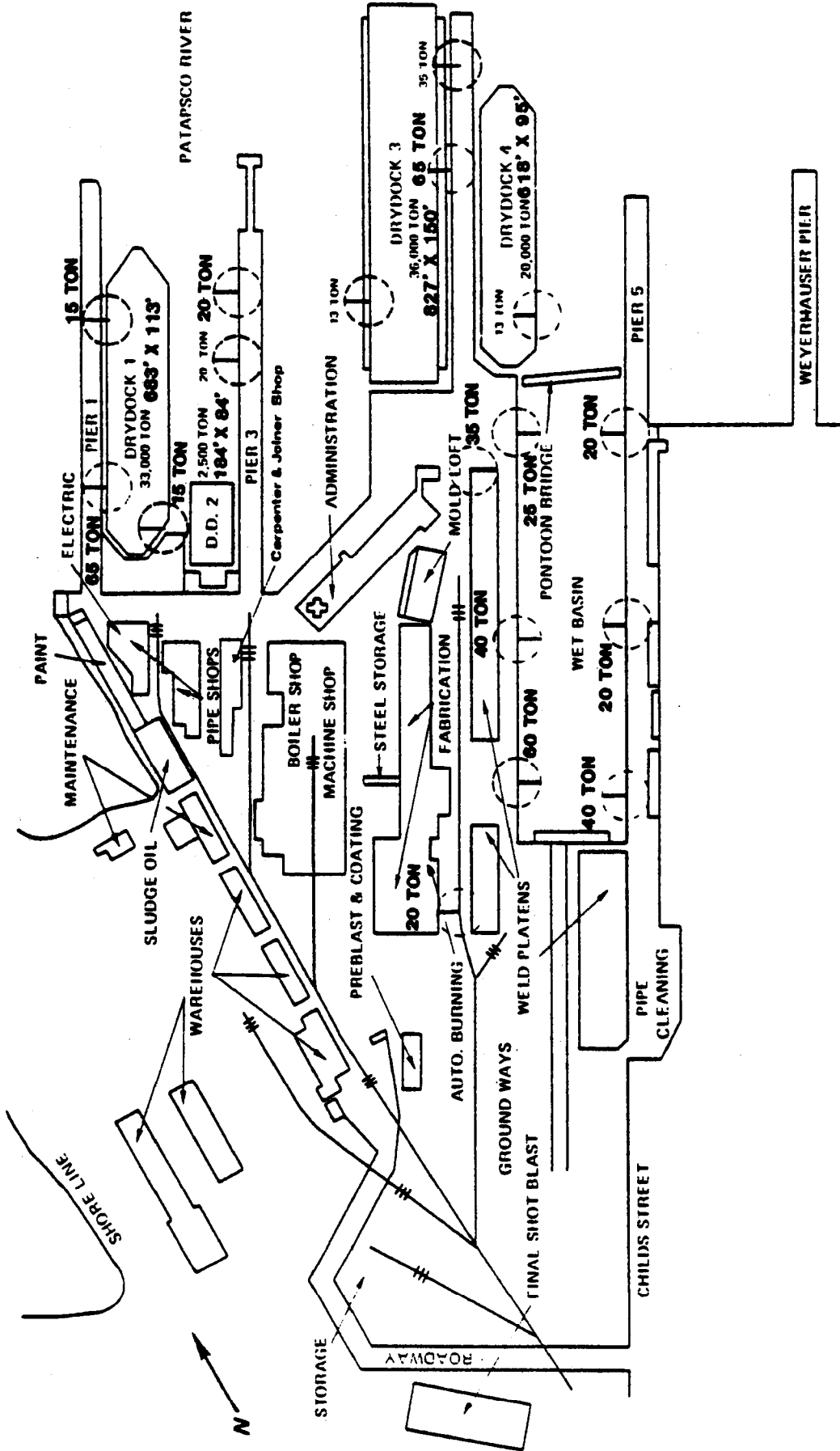
LOCKHEED SHIPBUILDING AND CONSTRUCTION COMPANY
PLANT ONE
2029 16th AVE S.W., SEATTLE, WASHINGTON



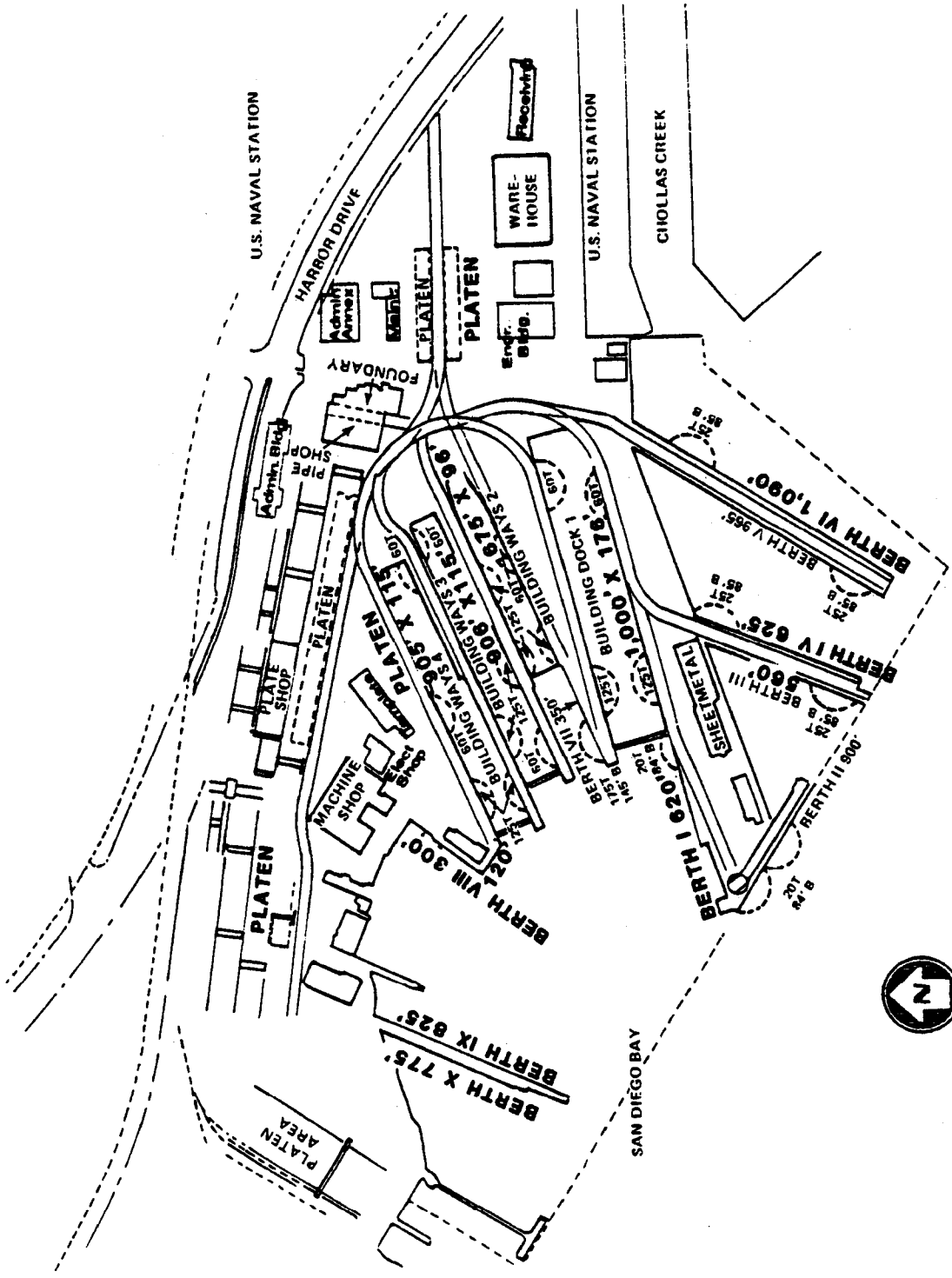
LOCKHEED SHIPBUILDING AND CONSTRUCTION COMPANY
PLANT TWO
2650 S. W. FLORIDA, SEATTLE, WASHINGTON



MARATHON LeTOURNEAU CO.
GULF MARINE DIVISION



MARYLAND SHIPBUILDING & DRYDOCK CO.



NATIONAL STEEL AND SHIPBUILDING CO.

CONSOLIDATED WAREHOUSE

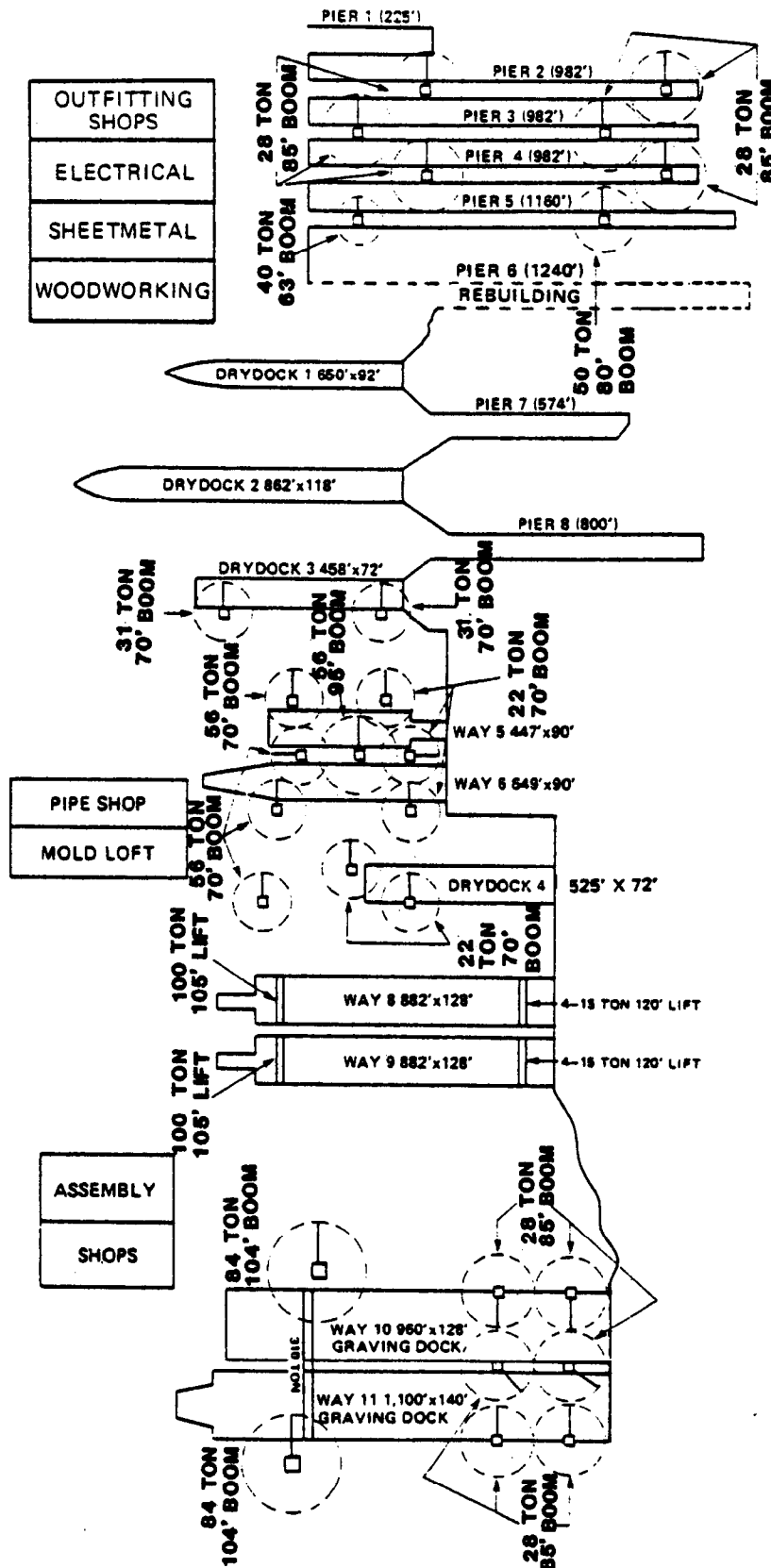
MACHINE SHOPS

PATTERN-MAKERS
FOUNDRY

OUTFITTING SHOPS
ELECTRICAL
SHEETMETAL
WOODWORKING

PIPE SHOP
MOLD LOFT

ASSEMBLY SHOPS

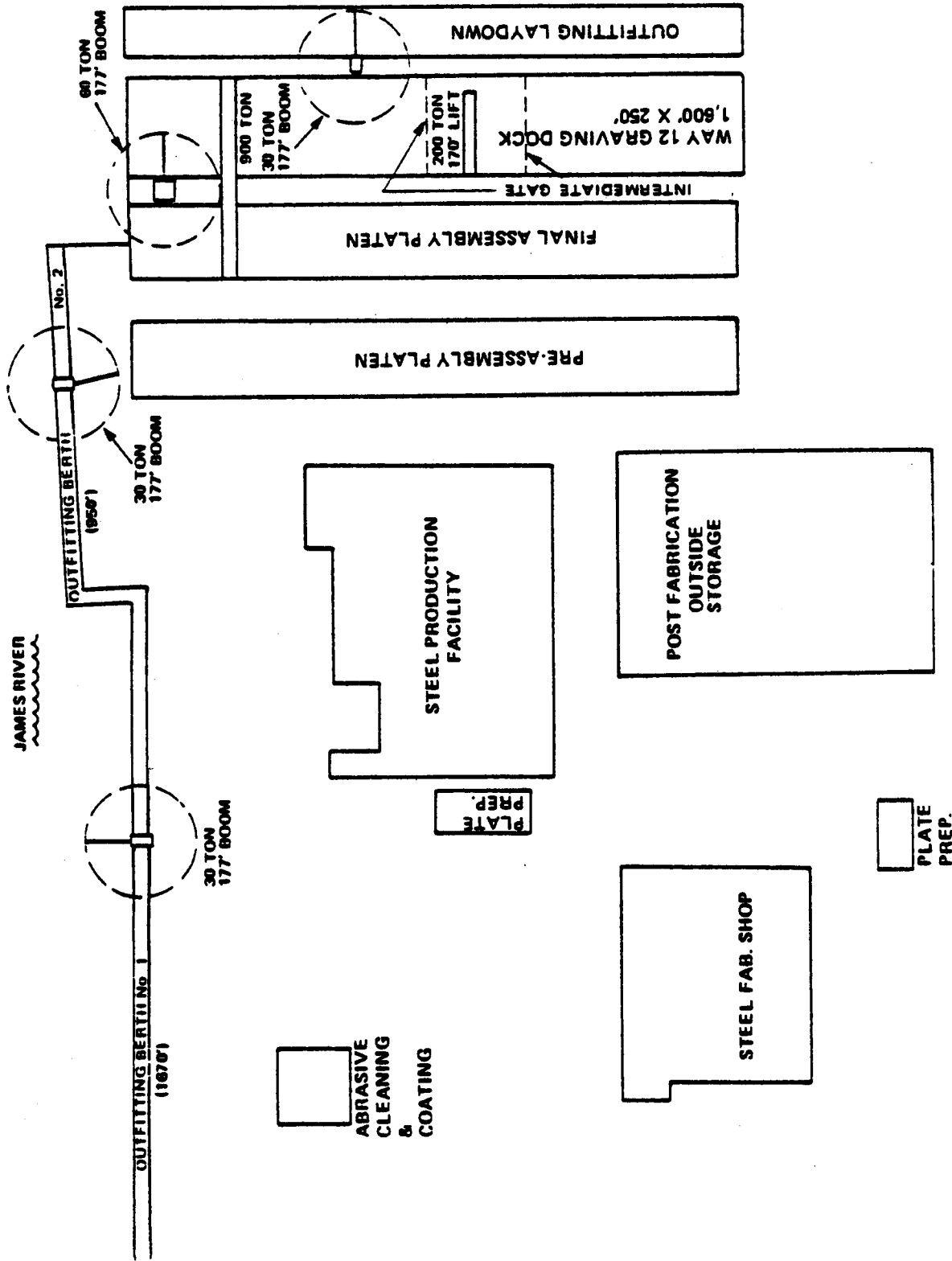


PIERS 7, 8 AND DRYDOCKS ARE SERVED BY LOCOMOTIVE CRANES

JAMES RIVER

Newport News Shipbuilding

SOUTH YARD



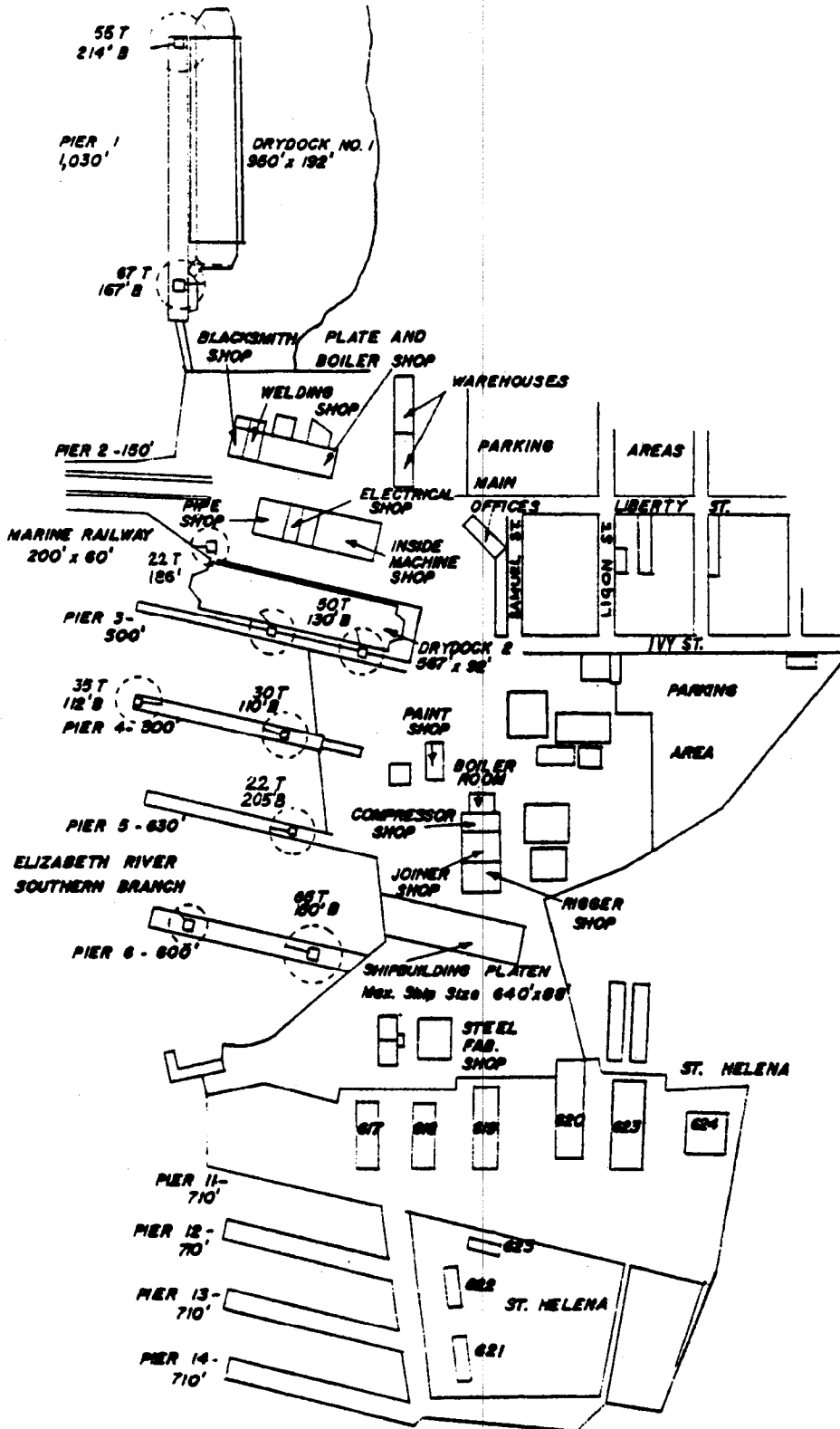
Newport News Shipbuilding

NORTH YARD

ABRASIVE
 CLEANING
 &
 COATING

PLATE
 PREP.

PLATE
 PREP.

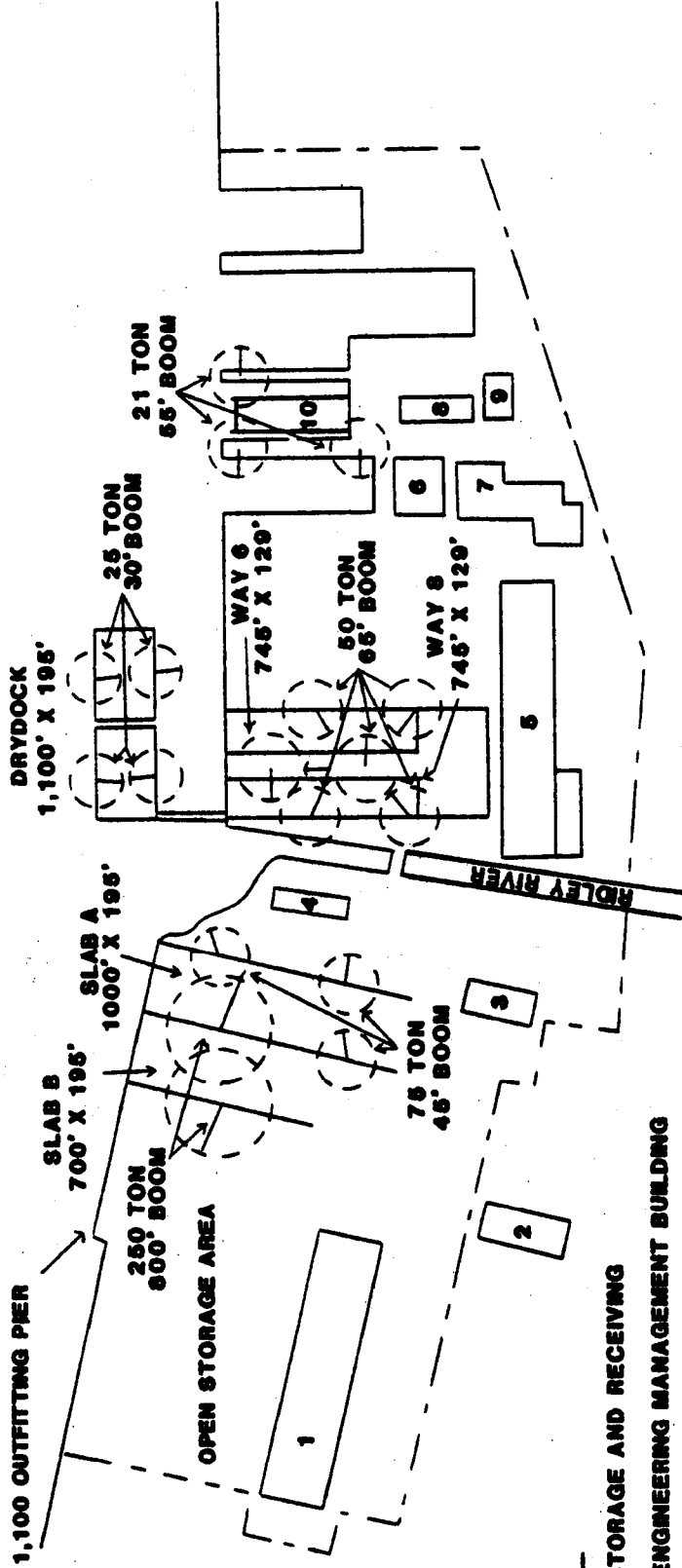


**NORFOLK SHIPBUILDING AND
DRYDOCK CORP.
BERKLEY PLANT**

CENTRAL YARD

DELAWARE RIVER

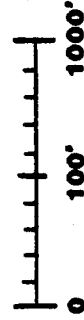
NORTH YARD



KEY:

- 1. STORAGE AND RECEIVING
- 2. ENGINEERING MANAGEMENT BUILDING
- 3. BLAST AND PAINT FACILITY
- 4. MULTIPURPOSE BUILDING
- 5. FABRICATION SHOP
- 6. STORE HOUSE
- 7. BOILER AND MISC. SHOPS
- 8. PIPE SHOP
- 9. MAIN OFFICE
- 10. DRYDOCK FROM LEVINGSTON, ORANGE, TEXAS

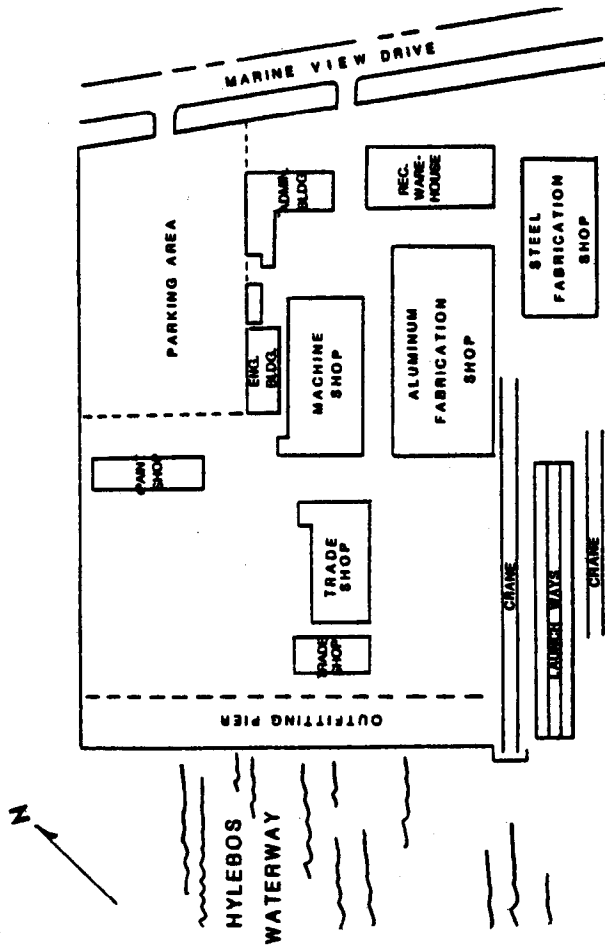
SCALE:



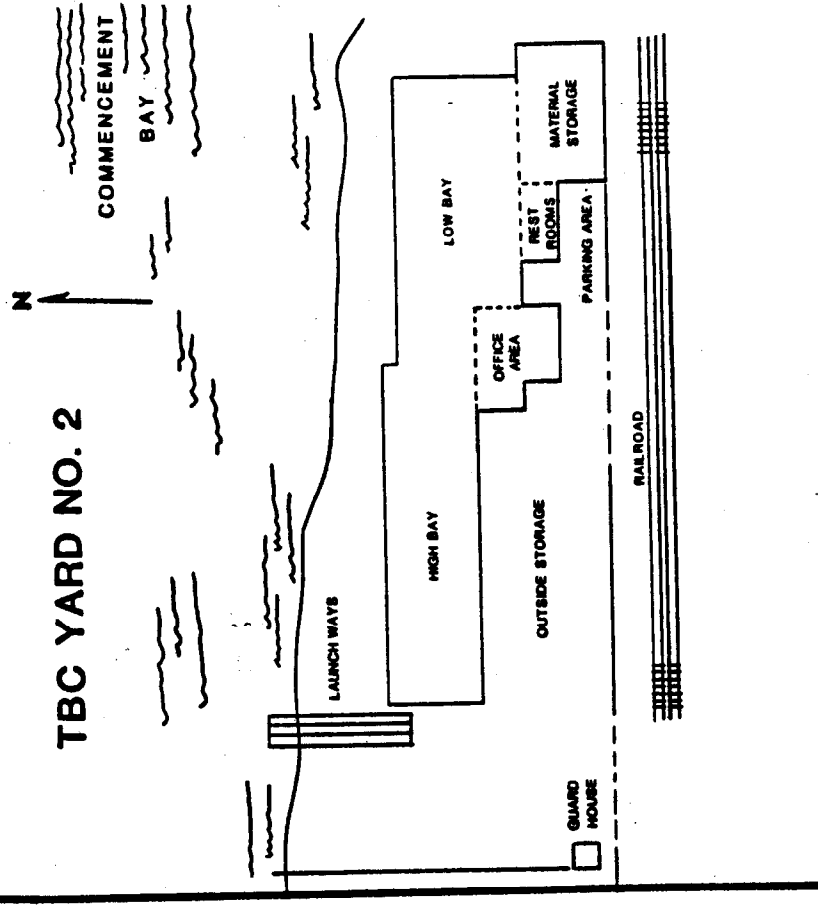
PENNSYLVANIA SHIPBUILDING CO.
 (FORMERLY SUN SHIP INC.)

TACOMA BOATBUILDING COMPANY

TBC YARD NO. 1



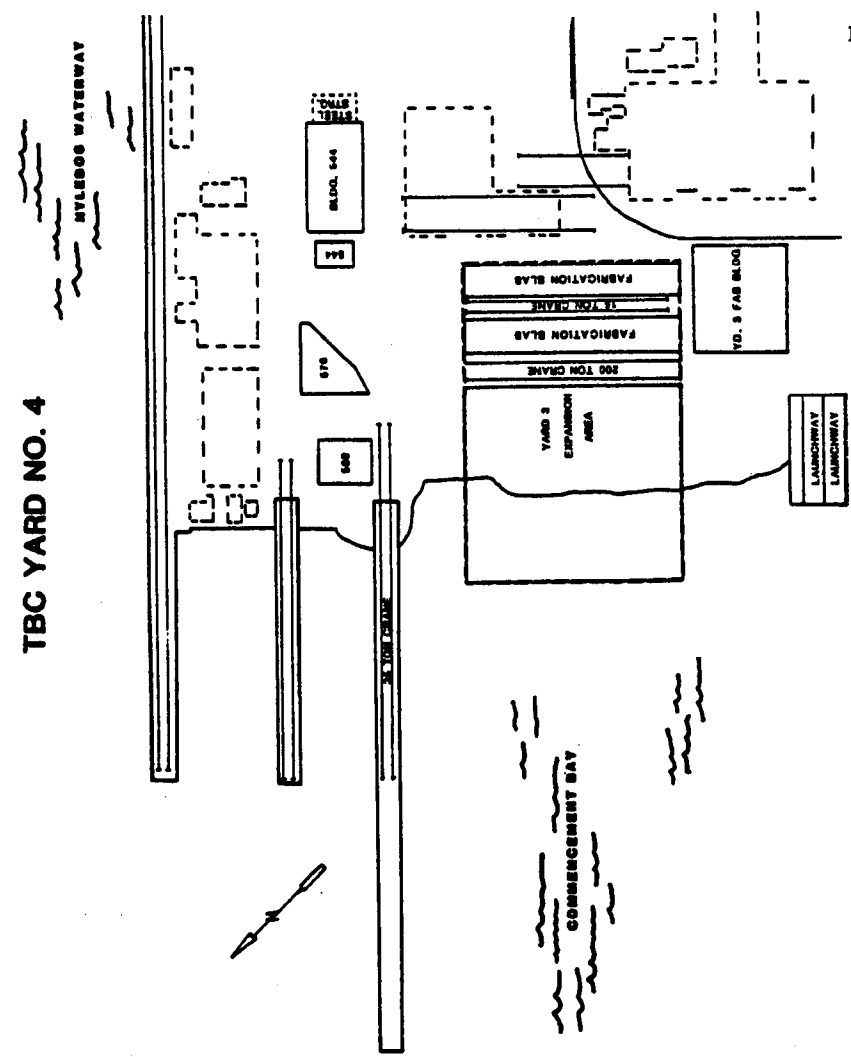
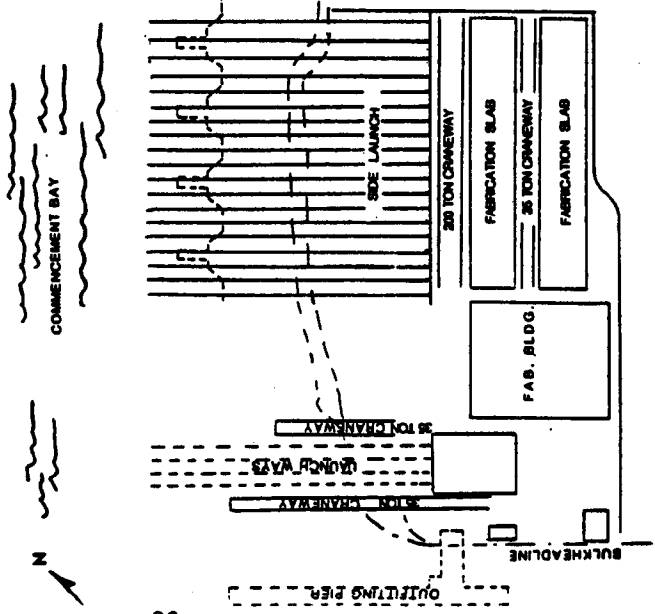
TBC YARD NO. 2

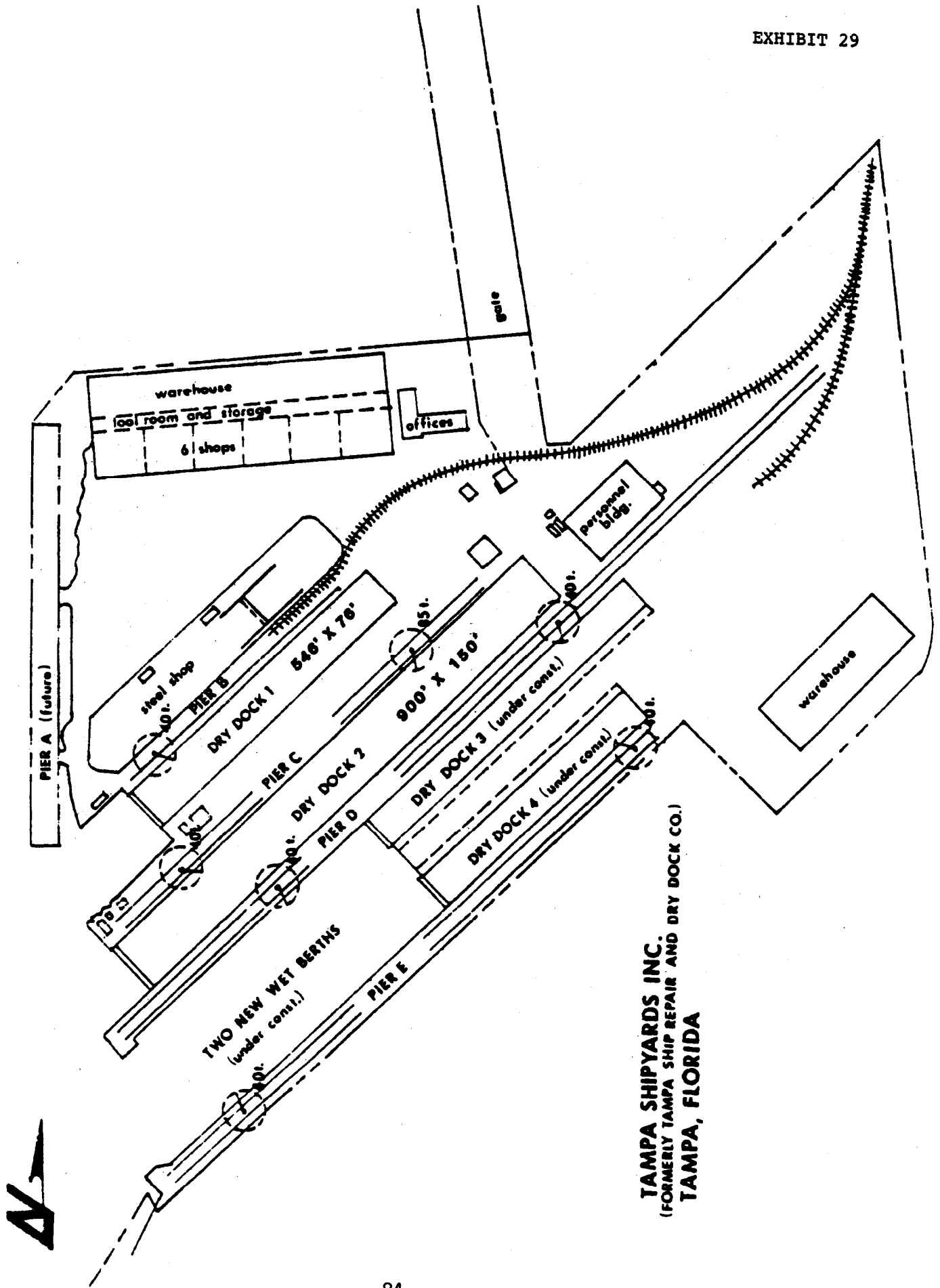


TACOMA BOATBUILDING COMPANY

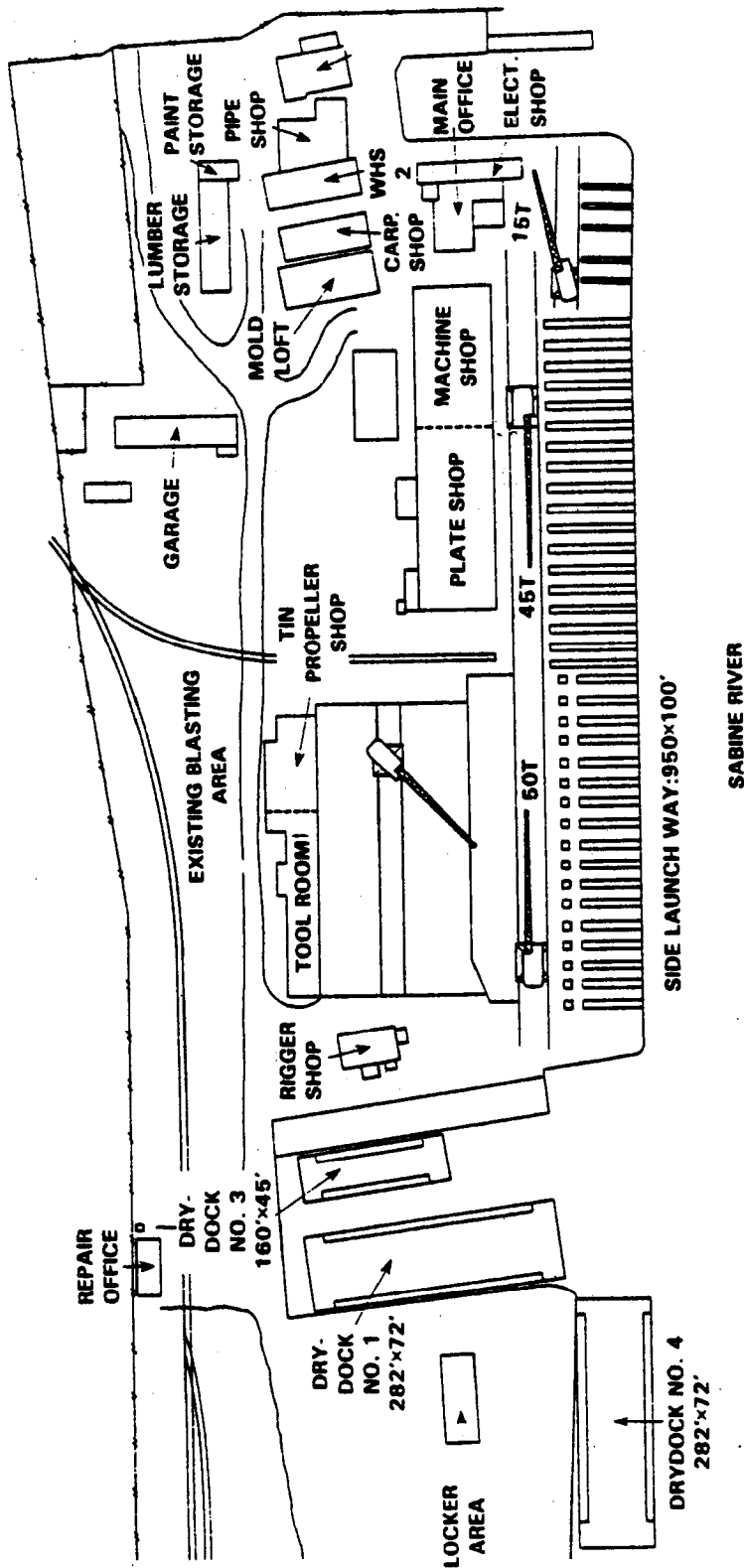
TBC YARD NO. 3

TBC YARD NO. 4



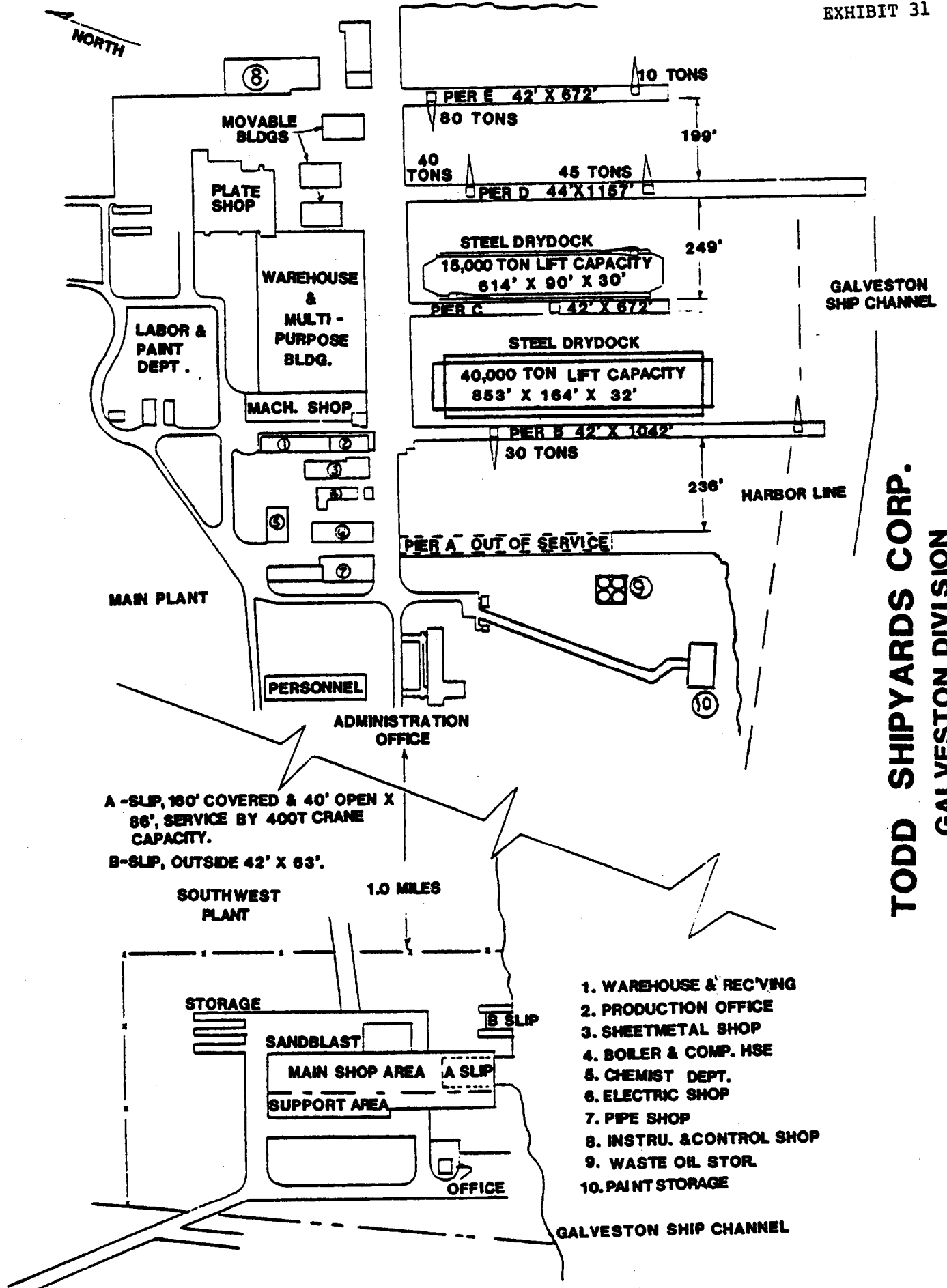


TAMPA SHIPYARDS INC.
(FORMERLY TAMPA SHIP REPAIR AND DRY DOCK CO.)
TAMPA, FLORIDA



TEXAS GULFPORT SHIPBUILDING CO.

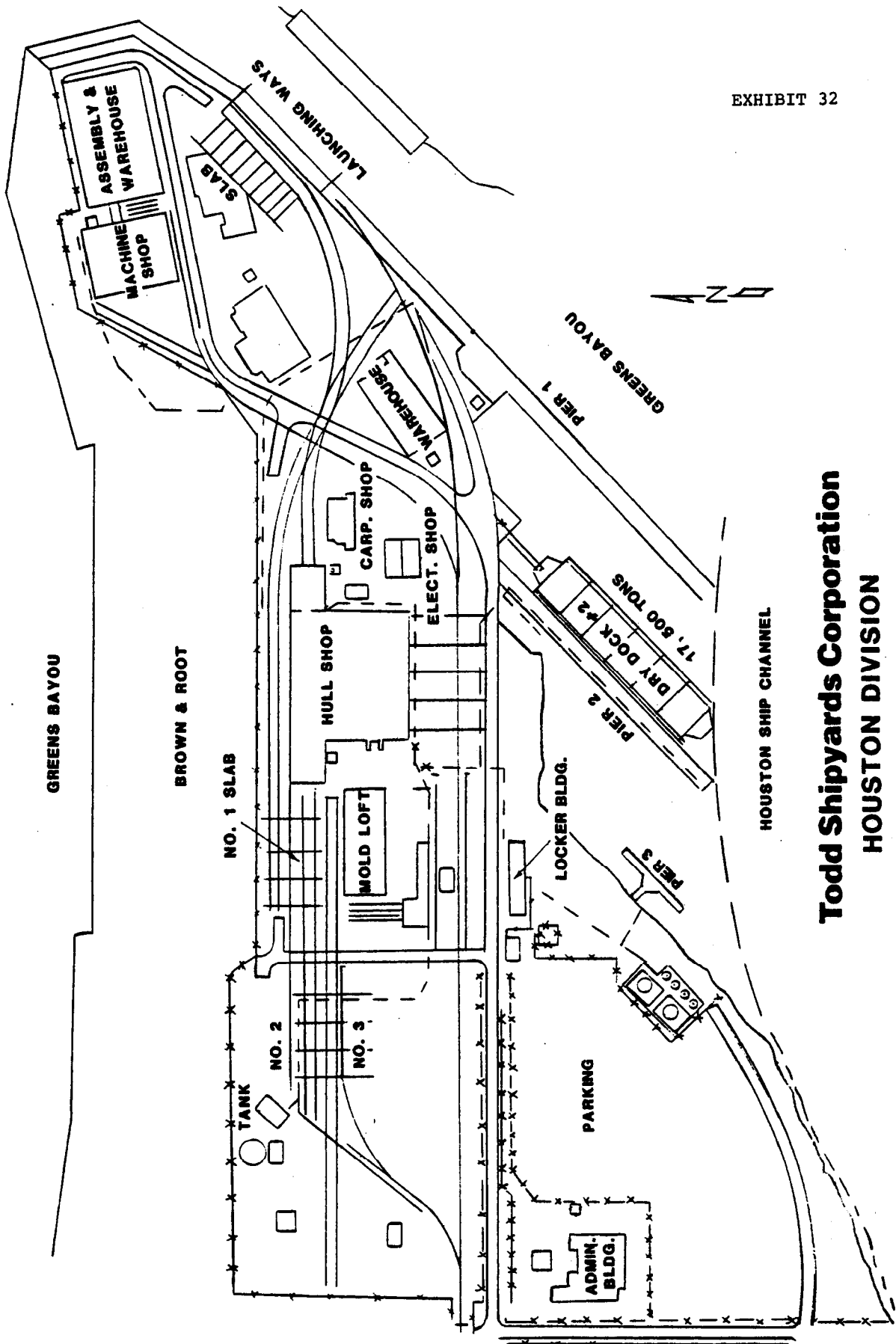
(FORMERLY GULFPORT SHIPBUILDING)



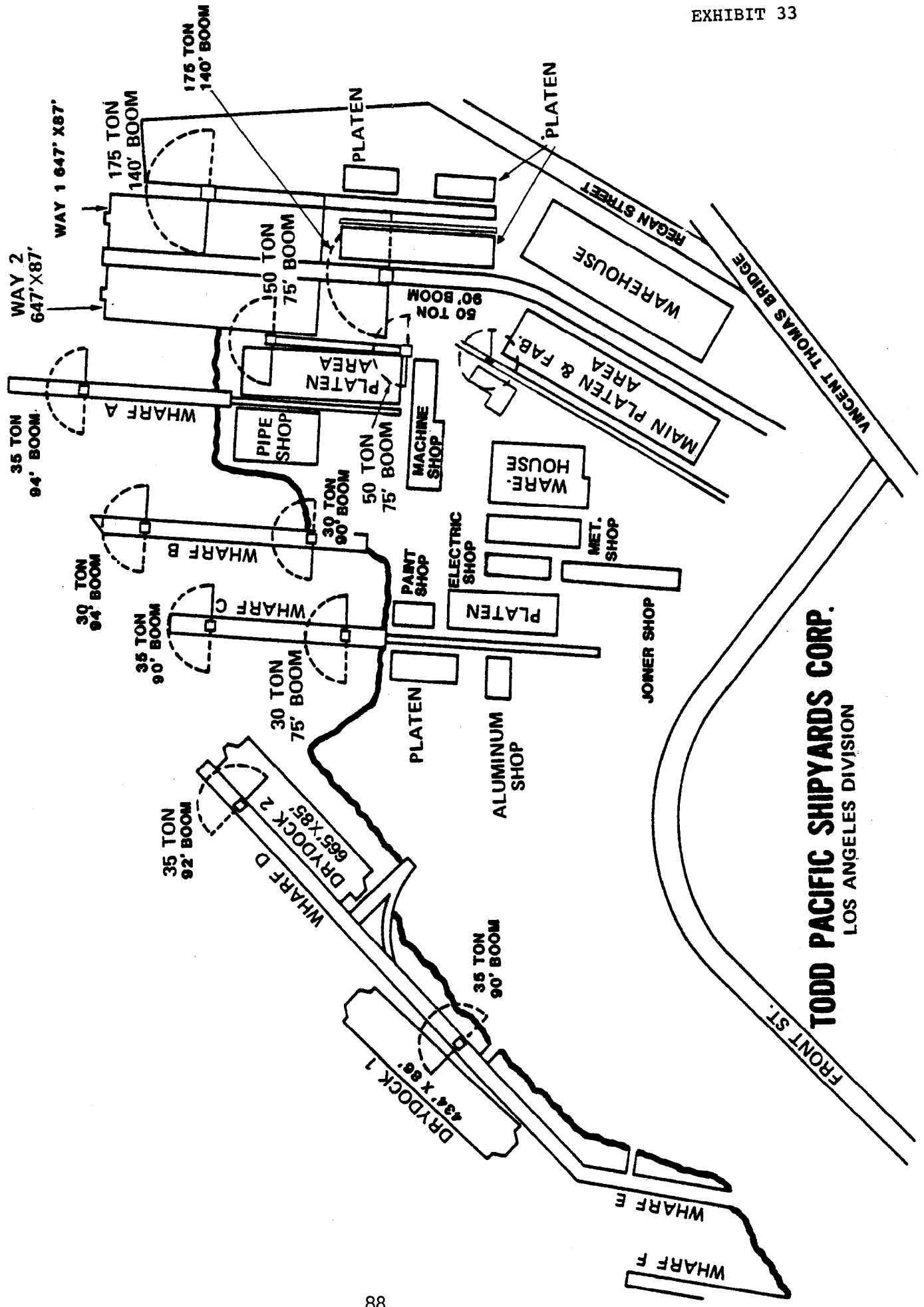
**TODD SHIPYARDS CORP.
GALVESTON DIVISION**

A -SLIP, 160' COVERED & 40' OPEN X 86', SERVICE BY 400T CRANE CAPACITY.
B-SLIP, OUTSIDE 42' X 63'.

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

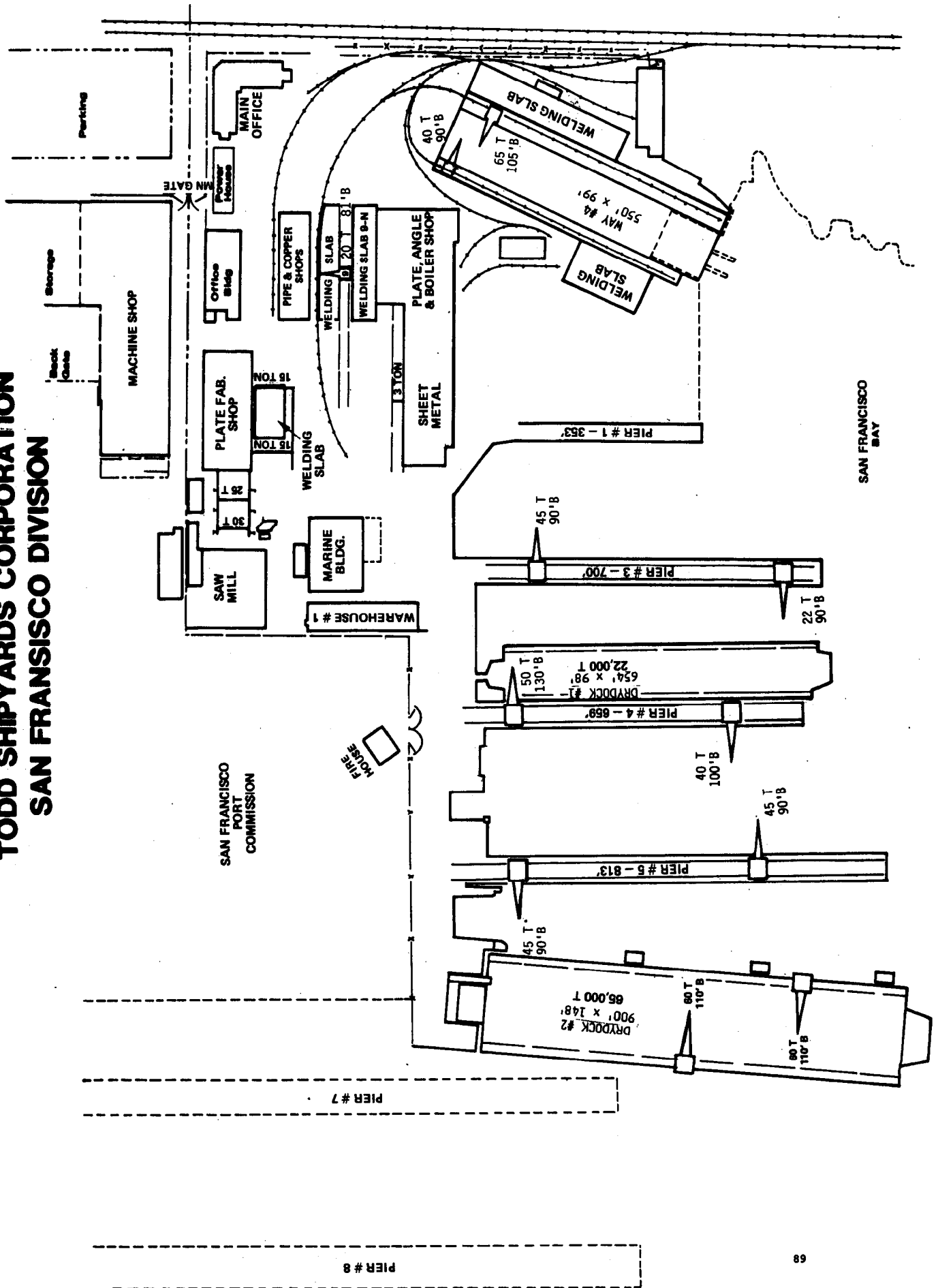


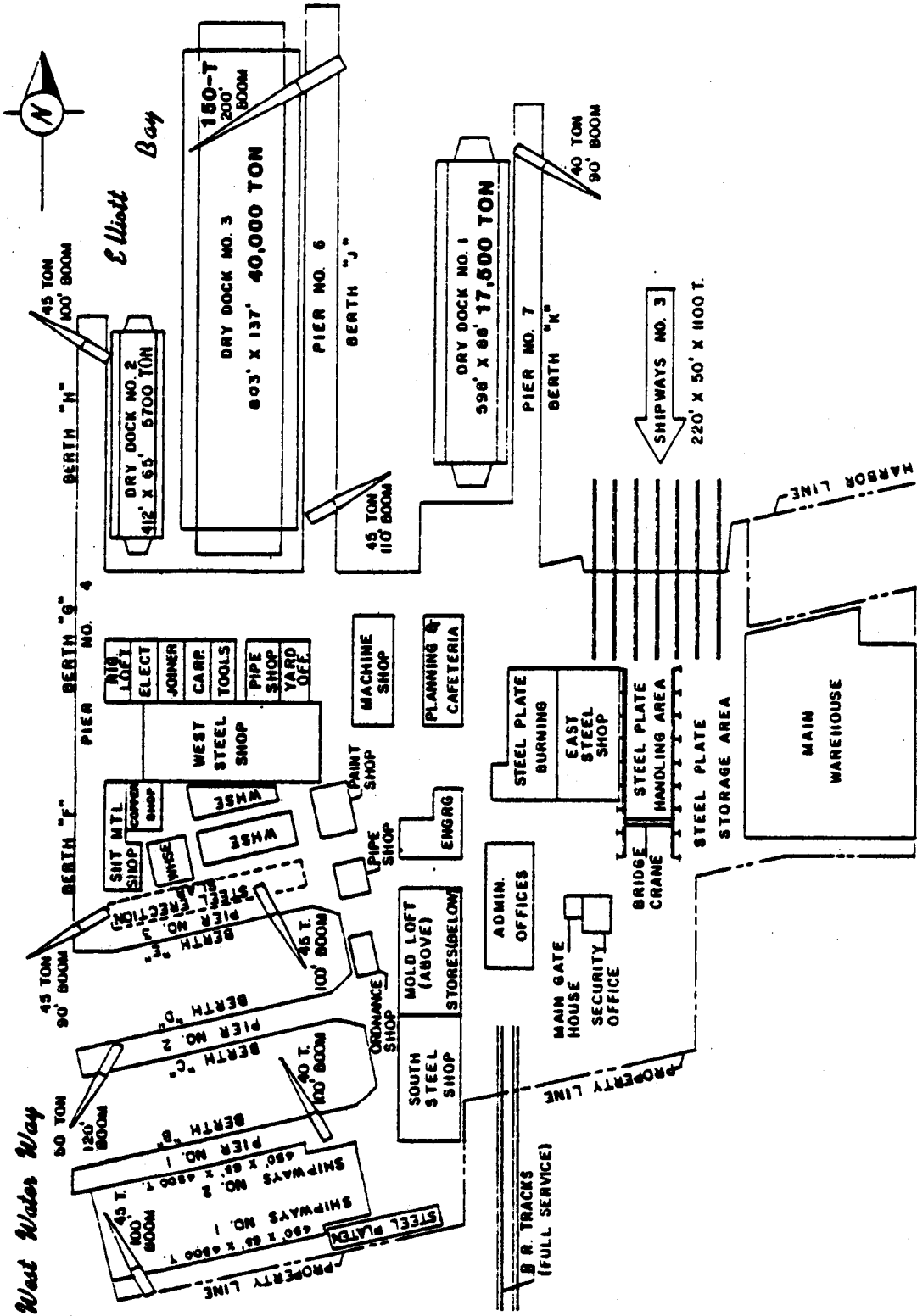
Todd Shipyards Corporation
HOUSTON DIVISION



TODD PACIFIC SHIPYARDS CORP.
 LOS ANGELES DIVISION

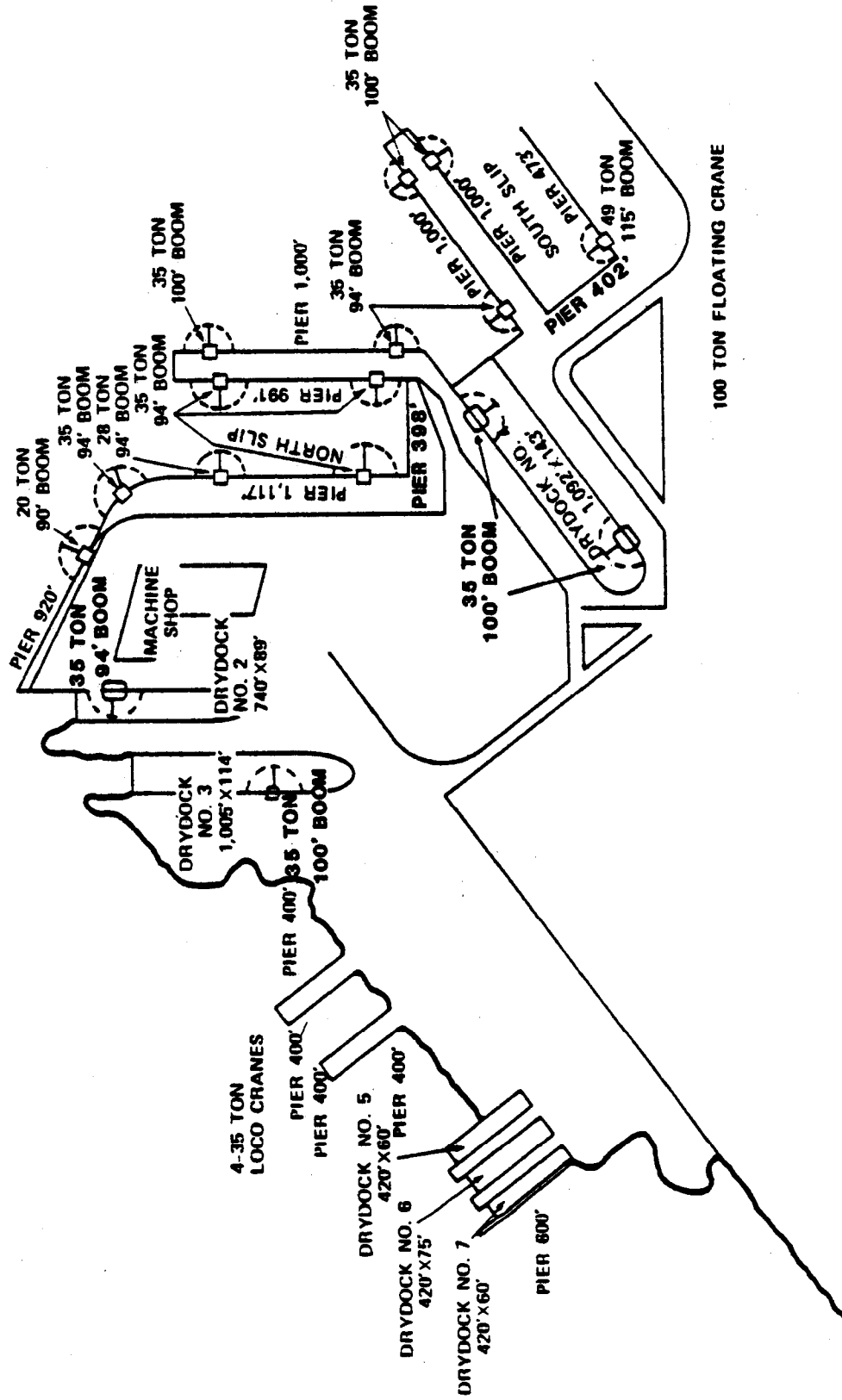
TODD SHIPYARDS CORPORATION SAN FRANCISCO DIVISION





TODD PACIFIC SHIPYARDS CORPORATION
SEATTLE DIVISION

HIGH PORTAL GANTRY CRANES HAVE A TRACK AND SWITCHING NETWORK THAT SERVICES ALL LARGE DRYDOCKS AND DEEP - WATER BERTHS.

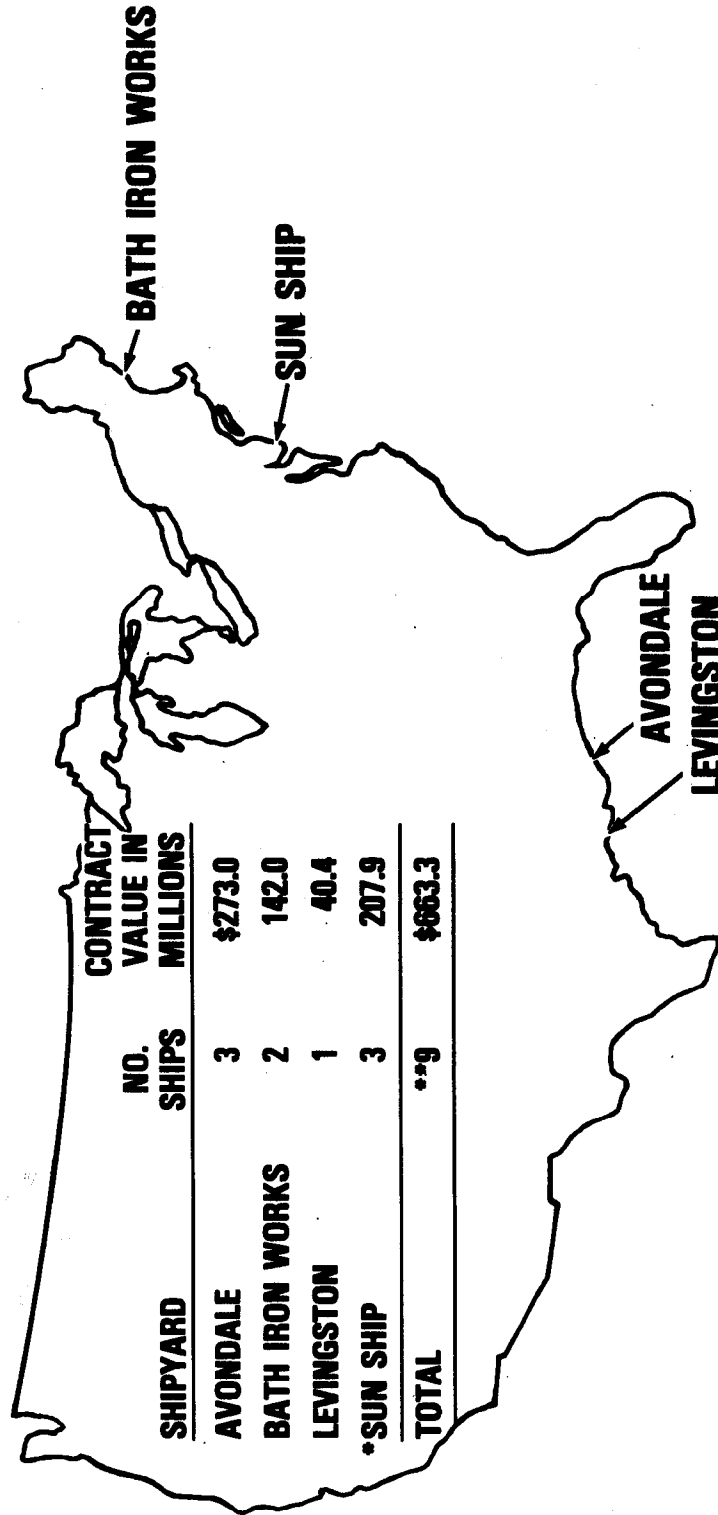


TRIPLE A MACHINE SHOP, INC.

HUNTERS POINT

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

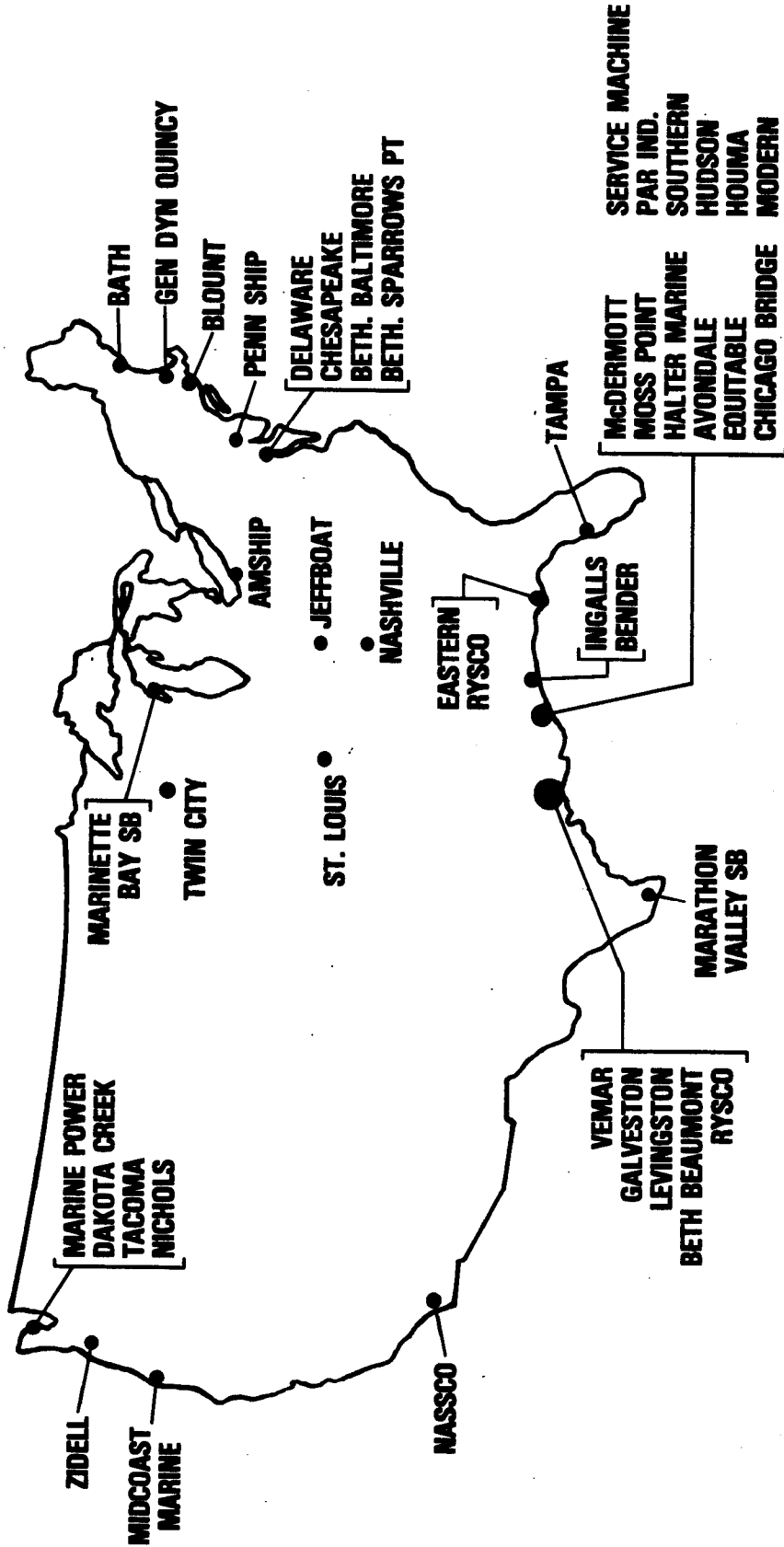
**SHIPS UNDER CONSTRUCTION OCTOBER 1, 1982
TOTAL CONTRACT VALUE, UNDELIVERED SHIPS**



* SECOND SHIP IS BEING COMPLETED FOR SUN SHIP BY PENNSYLVANIA SHIPBUILDING COMPANY. THIRD SHIP IS BEING CONSTRUCTED FOR SUN SHIP BY GENERAL DYNAMICS, GURNEY SHIPBUILDING DIVISION.

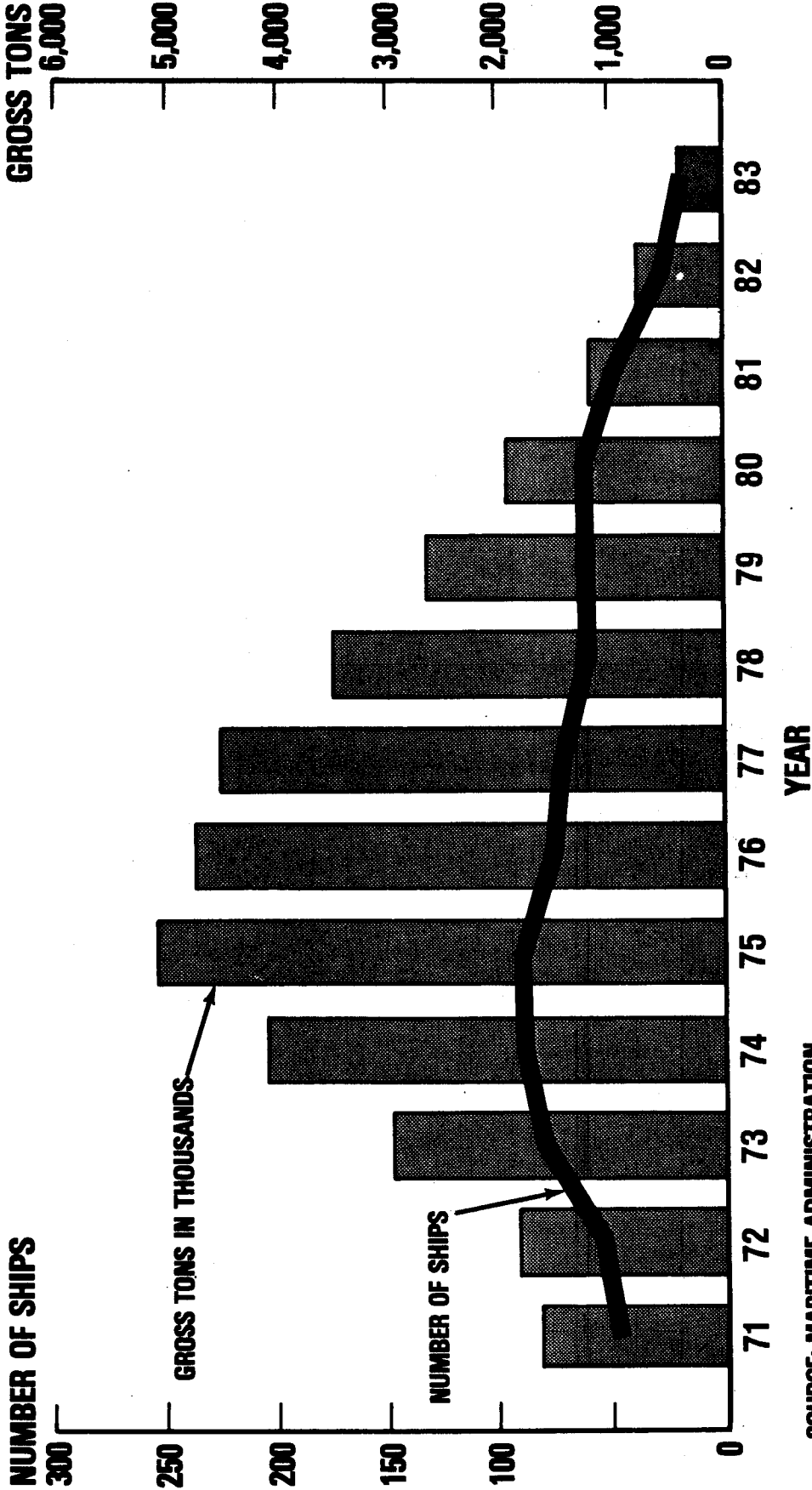
** IN ADDITION TO NINE NEW SHIPS, THREE MAJOR TITLE V CONVERSIONS WITH A TOTAL CONTRACT VALUE OF \$54.6 MILLION WERE ALSO UNDERWAY AT THE TAMPA AND LORAIN YARDS OF THE AMERICAN SHIP BUILDING COMPANY

SHIP FINANCING GUARANTEE CONSTRUCTION PROGRAM
(TITLE XI)
OFFICE OF SHIP CONSTRUCTION
WORK UNDER CONTRACT SEPTEMBER 30, 1982



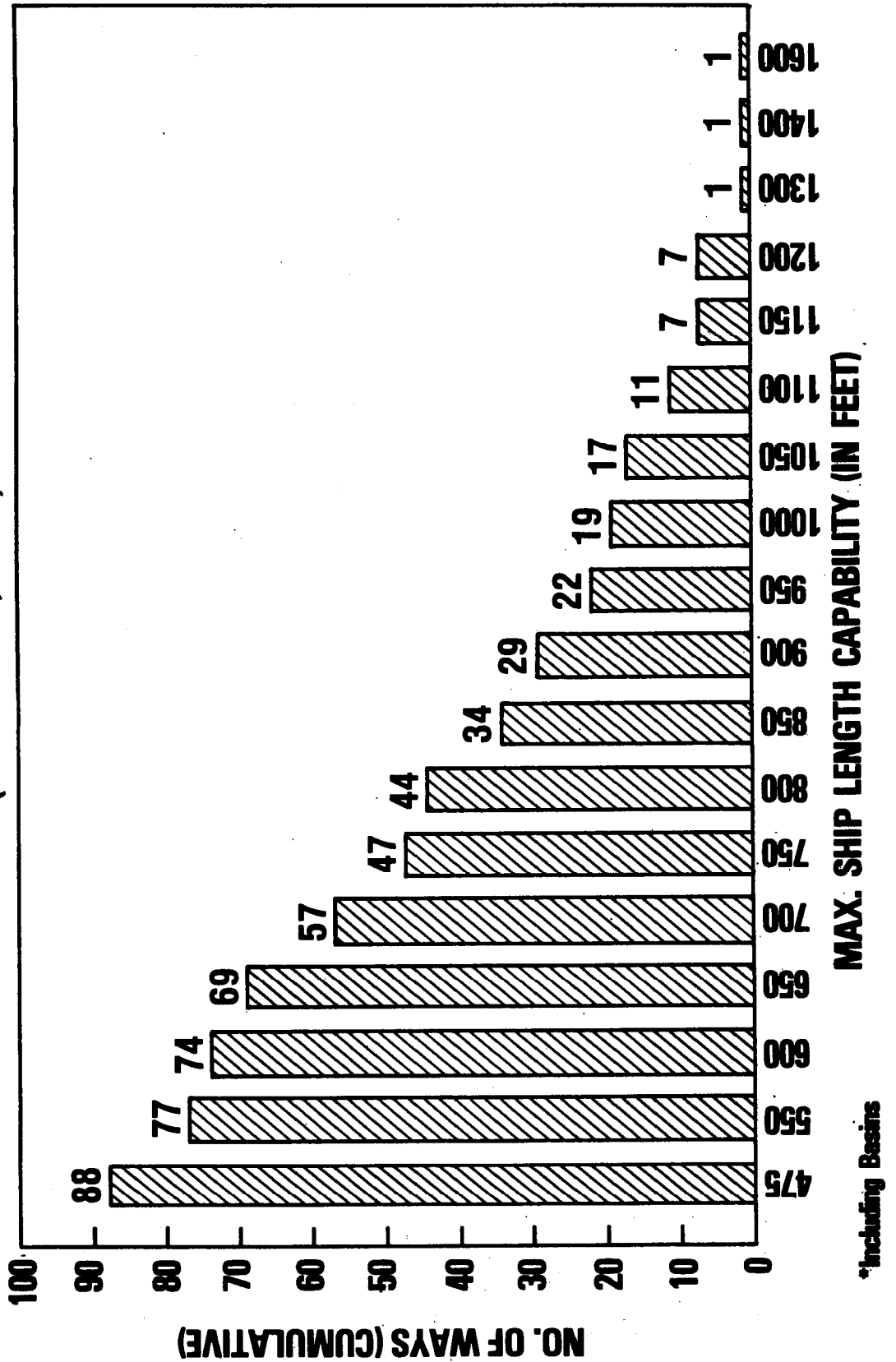
MERCHANT VESSELS BUILDING OR ON ORDER (AS OF JANUARY 1)

SHIPS OF 1,000 GROSS TONS AND LARGER

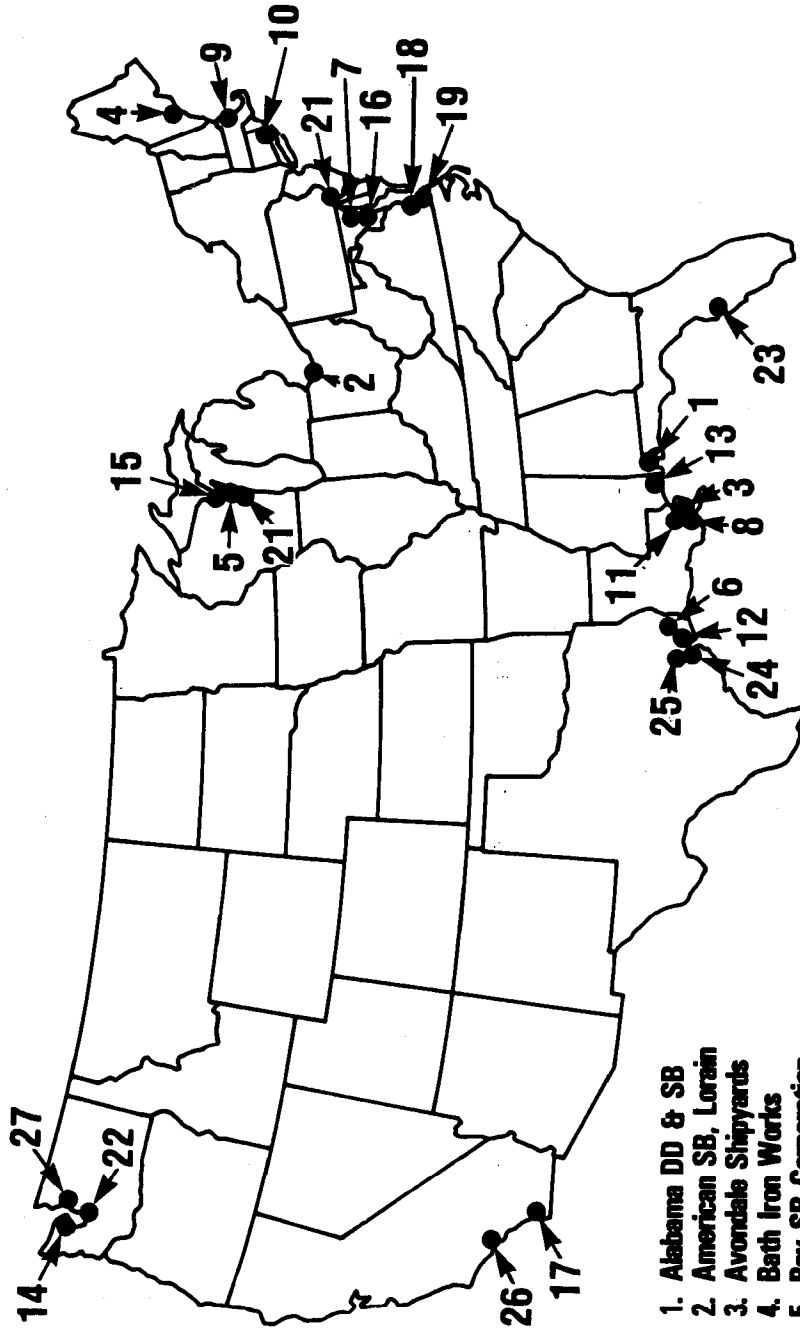


SOURCE: MARITIME ADMINISTRATION

MAJOR U.S. PRIVATE SHIPYARDS
***NUMBER OF SHIPWAYS BY MAXIMUM LENGTH**
CAPABILITY
(November 1, 1982)



ACTIVE U.S. SHIPBUILDING BASE



- 1. Alabama DD & SB
- 2. American SB, Lorain
- 3. Avondale Shipyards
- 4. Bath Iron Works
- 5. Bay SB Corporation
- 6. Berth-Beaumont
- 7. Berth-Sparrow Point
- 8. Equitable Shipyards
- 9. Gen. Dyn.-Quincy
- 10. Gen. Dyn.-Elec. Boat
- 11. Halper Marine
- 12. Levingson
- 13. Litton/Ingalls

- 14. Lockheed SB
- 15. Marinette
- 16. Maryland SB
- 17. NAASCO
- 18. Newport News
- 19. Norfolk SB & DD
- 20. Peterson

- 21. Penn Ship
- 22. Tacoma Boat
- 23. Tampa Ship
- 24. Todd-Galveston
- 25. Todd-Houston
- 26. Todd-Los Angeles
- 27. Todd-Seattle

October 1, 1962

COMMERCIAL VESSELS UNDER CONSTRUCTION OR ON ORDER IN U.S.
SHIPYARDS IN ACTIVE SHIPBUILDING BASE (September 30, 1982)

EXHIBIT 42

<u>SHIPYARDS</u>	<u>NO. CDS VESSELS</u>	<u>CONTRACT \$ VALUE CDS VESSELS (MILLIONS)</u>	<u>PRIVATE VESSELS</u>	<u>CONTRACT \$ VALUE PVT. VESSELS (MILLIONS)</u>	<u>TOTAL ALL VESSELS</u>	<u>TOTAL CONTRACT \$ VALUE (MILLIONS)</u>
Alabama DD	-	-	1	60.0	1	60.0
AmShip-Lorain	-	-	-	-	-	-
Avondale	3	273.0	3	255.0	6	528.0
Bath Iron Works	2	142.0	1	65.0	3	207.0
Bay SB	-	-	-	-	-	-
Beth., Beaumont	-	-	1	35.0	1	35.0
Beth., Sp.Pt.	-	-	4	287.2	4	287.2
Equitable	-	-	1	2.5	1	2.5
Gen. Dyn., Quincy	1*	70.5	3	90.0	4	160.5
Gen. Dyn., E.Boat	(Exclusively Navy Ship Construction)					
Halter Marine	-	-	43	200.0	43	200.0
Levingston	1	40.4	1	40.0	2	80.4
Litton/Ingalls	-	-	4	140.0	4	140.0
Lockheed	-	-	-	-	-	-
Marinette	-	-	1	30.0	1	30.0
Maryland SB	-	-	-	-	-	-
National Steel	-	-	4	200.9	4	200.9
Newport News	-	-	1	80.0	1	80.0
Norfolk SB	-	-	-	-	-	-
Peterson	-	-	-	-	-	-
Penn Ship (ex-Sun)	2*	137.4	-	-	2	137.4
Tacoma Boat	-	-	8	111.4	8	111.4
Tampa Ship	-	-	-	-	-	-
Todd, Galveston	-	-	1	11.0	1	11.0
Todd, Houston	-	-	-	-	-	-
Todd, LA	-	-	-	-	-	-
Todd, Seattle	-	-	-	-	-	-
TOTALS	9	\$663.3	77	\$1,608.0	86	\$2,271.3

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

* Under construction for Sun Ship.

SHIPYARD STATUS: NEED FOR NEW BUSINESS

MARITIME ADMINISTRATION DEPARTMENT OF TRANSPORTATION

EXHIBIT 43

TIME NOW
↓

ACTIVE SHIPBUILDING BASE	1981	1982	1983	1984
	█	█	█	█
ALABAMA DD & SB – MOBILE, AL	█	█*		
AMERICAN SB – LORAIN, OH	█	█		
AVONDALE SHIPYARDS – N.O., LA	█	█		
BATH IRON WORKS – BATH, ME	█	█		
BAY SHIP – STURGEON BAY, WI	█	█		
BETH. STEEL – BEAUMONT, TX	█	█	█	
BETH. STEEL – SPARROWS PT., MD	█	█	█	
EQUITABLE SHIPYARDS, INC.	█	█*		
GEN. DYN. E.B. – GROTON, CT	█	█		
GEN. DYN. – QUINCY, MA	█	█		
HALTER MARINE – CHICKASAW, AL	█	█		
INGALLS/LITTON – PASCAGOULA, MS	█	█		
LEIVINGSTON SHIP – ORANGE, TX	█	█		
LOCKHEED SHIP – SEATTLE, WA	█	█	█	
MARINETTE MARINE – MARINETTE, WI	█	█		
MARYLAND SB – BALTIMORE, MD	█	█*		
NASSCO – SAN DIEGO, CA	█	█		
NEWPORT NEWS SB & DD – VA	█	█	█	
NORFOLK SB & DD – VA	█	█*		
PETERSON BLDRS. – STURGEON BAY, WI	█	█		
PENN SHIP – CHESTER, PA (EX-SUN)	█	█*		
TACOMA BOAT – WA	█	█	█	
TAMPA SHIP – FL	█	█*		
TODD SHIPYARDS – GALVESTON, TX	█	█*		
TODD SHIPYARDS – HOUSTON, TX	█	█*		
TODD SHIPYARDS – SAN PEDRO, CA	█	█		
TODD SHIPYARDS – SEATTLE, WA	█	█		

* Shipyards engaging primarily in repair work.

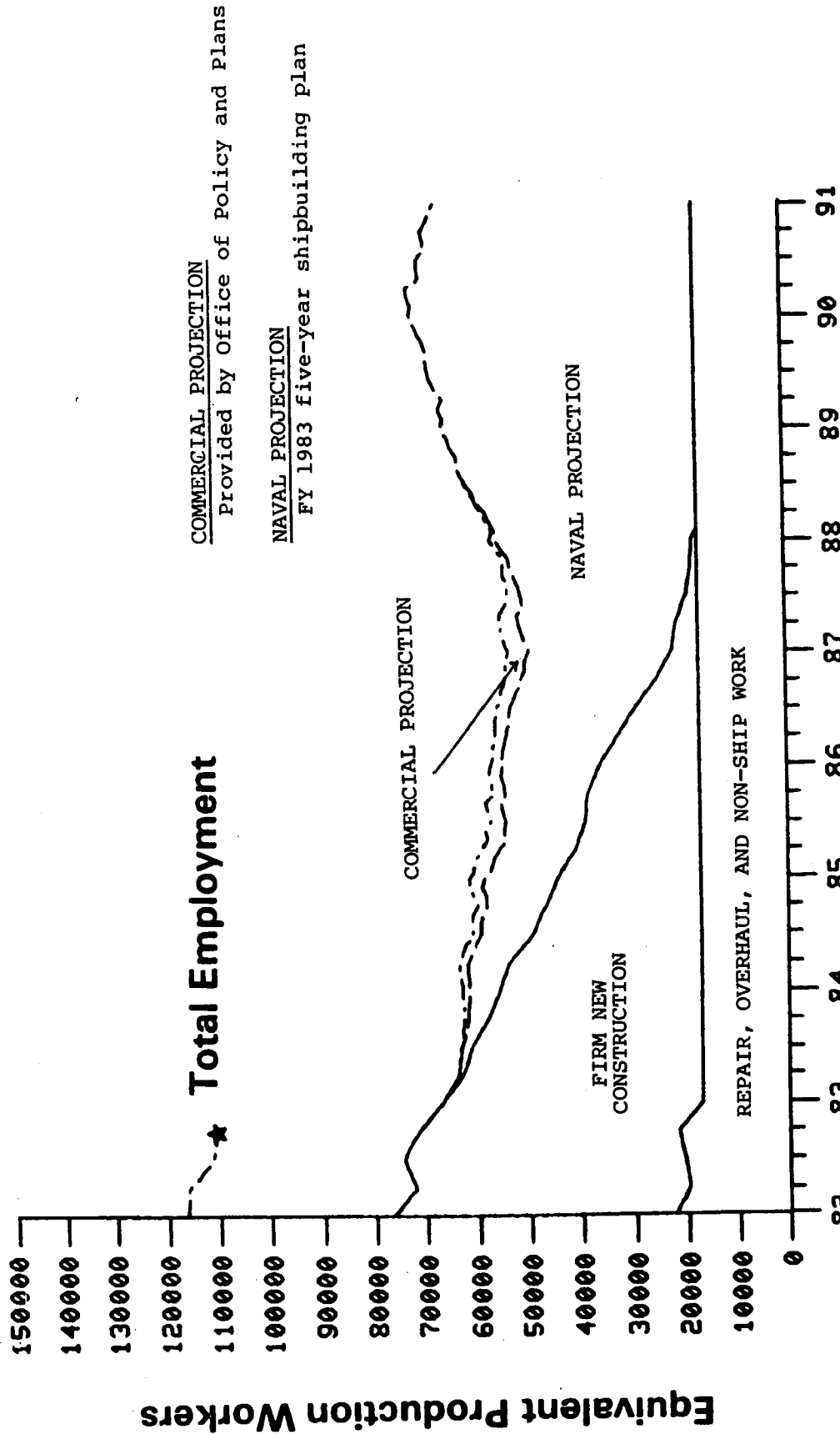
NOTE: END OF BAR EXCEPT FOR YARDS MARKED WITH AN ASTERISK INDICATES WHEN YARD NEEDS NEW CONTRACTS IN ORDER TO MAINTAIN ADEQUATE BACKLOG FOR AVAILABLE FACILITIES AND WORKFORCE. ASSUME 8-MONTH ADMINISTRATIVE AND PRE-FAB TIME (LEAD TIME BEFORE KEEL LAYING)

09/30/82

Shipbuilding Industry Workload Projection

Active Shipbuilding Base Summation

Number of Yards = 27



OCTOBER 1, 1982

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

TABLE I

SHIP CONSTRUCTION CAPABILITY
BY SHIP TYPE

TABLE I
SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipyard or Basin	Maximum Ship Size	General Cargo					Dry Bulk					
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	RO/RO 684 x 102	LASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 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	(3)	(0)	(3)	(2)	(0)	(0)	(0)	(3)	(2)	(0)	(0)
		10	900 x 108	1	1	1	1	1	0	0	1	1	1	1
		GD	1200 x 192	4	1	3	2	1	1	1	1	4	3	1
	Coastal Dry Dock	3	758 x 104	(6)	(3)	(5)	(4)	(3)	(1)	(3)	(1)	(6)	(5)	(3)
		4	727 x 112	1	0	1	1	0	0	0	0	1	0	0
		5	1093 x 143	3	1	2	1	1	1	1	1	3	2	1
		6	1093 x 143	3	1	2	1	1	1	1	1	3	2	1
				(8)	(2)	(6)	(4)	(2)	(2)	(2)	(8)	(5)	(2)	(2)
				2	1	1	1	0	0	0	0	1	1	1
	General Dynamics, Quincy	6	860 x 123	2	1	1	1	1	0	0	1	1	1	0
		7	936 x 143	2	1	1	1	1	0	0	1	1	1	0
		8	860 x 123	2	1	1	1	0	0	0	1	1	1	0
		11	860 x 144	2	1	1	1	1	0	0	1	1	1	0
		12	860 x 144	2	1	1	1	1	0	0	1	1	1	0
	Maryland SB & DD	1	850 x 110	(10)	(5)	(5)	(5)	(1)	(0)	(1)	(0)	(5)	(5)	(1)
				1	1	1	1	0	0	0	1	1	1	0
				(1)	(1)	(1)	(1)	(0)	(0)	(0)	(1)	(1)	(1)	(0)
		5	649 x 93	1	0	1	0	0	0	0	0	1	0	0
		6	715 x 93	1	0	1	0	0	0	0	0	1	0	0
		8	940 x 125	2	1	1	1	1	0	0	1	1	1	1
		9	940 x 125	2	1	1	1	1	0	0	1	1	1	1
		10	960 x 124	2	1	2	1	1	1	1	2	2	2	1
		11	1100 x 136	2	1	2	1	1	1	1	1	2	2	1
		12	1600 x 246	9	4	5	4	4	1	1	1	6	4	1
				(19)	(8)	(13)	(8)	(5)	(3)	(5)	(14)	(9)	(5)	(5)
			Norfolk SB & DD	-	475 x 85	1	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	

TABLE I
SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipway	Shipway or Basin	Maximum Ship Size	General Cargo						Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	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	
Penn Ship	6		745 x 129	1	1	1	1	0	0	0	1	1	0
	8		745 x 129	1	1	1	1	0	0	0	1	1	0
	Slab A		1000 x 195	4	1	2	1	1	1	1	2	1	1
	Slab B		700 x 195	2	1	2	1	0	0	0	2	1	0
				(8)	(4)	(6)	(4)	(1)	(1)	(6)	(4)	(1)	
				<u>56</u>	<u>23</u>	<u>39</u>	<u>28</u>	<u>12</u>	<u>7</u>	<u>43</u>	<u>31</u>	<u>12</u>	
<u>TOTAL EAST COAST</u>													
<u>GULF</u>	Alabama DD & SB	1	523 x 68	1	0	0	0	0	0	0	0	0	0
		2	523 x 68	1	0	0	0	0	0	0	0	0	0
		3	523 x 68	1	0	0	0	0	0	0	0	0	0
		4	523 x 68	1	0	0	0	0	0	0	0	0	0
		5	620 x 90	1	0	1	0	0	0	0	0	1	0
				(5)	(0)	(1)	(0)	(0)	(0)	(1)	(0)	(0)	
Avondale	2		1200 x 126	6	5	5	5	5	5	5	6	6	5
	3		1020 x 174	6	3	3	3	3	3	3	3	3	3
				(12)	(8)	(8)	(8)	(8)	(8)	(8)	(9)	(9)	(8)
Beth. Beaumont	-		800 x 96	1	0	1	0	0	0	0	1	0	0
				(1)	(0)	(1)	(0)	(0)	(0)	(0)	(1)	(0)	(0)
Galveston SB	5		700 x 120	1	0	1	1	0	0	0	1	1	0
				(1)	(0)	(1)	(1)	(0)	(0)	(0)	(1)	(1)	(0)
Levingston (Orange, TX)	1		700 x 100	1	0	1	0	0	0	0	1	0	0
				(1)	(0)	(1)	(0)	(0)	(0)	(0)	(1)	(0)	(0)

TABLE I
SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipyard or Basin	Maximum Ship Size	General Cargo						Dry Bulk				
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	R0/R0 684 x 102	LASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 x 106		
Litton/Ingalls		1	690 x 85	1	0	0	0	0	0	0	0	1	0	0
		2	550 x 80	1	0	0	0	0	0	0	0	0	0	0
		7	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		8	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		9	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		10	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		WB	800 x 173	6	6	6	6	6	0	0	0	6	6	0
				(12)	(6)	(10)	(6)	(6)	(0)	(0)	(0)	(11)	(6)	(0)
				4	1	1	1	1	1	1	1	1	1	1
				(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Marathon		-	1100 x 150											
		3	500 x 105	1	0	0	0	0	0	0	0	0	0	0
Tampa Shipyards		3	500 x 105	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Texas Gulfport SB		1	550 x 80	1	0	0	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Todd-Galveston		-	475 x 85	1	0	0	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Todd-Houston		-	600 x 118	1	0	0	0	0	0	0	1	1	1	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(1)	(1)	(0)
<u>TOTAL GULF COAST</u>				<u>40</u>	<u>15</u>	<u>23</u>	<u>16</u>	<u>9</u>	<u>9</u>	<u>26</u>	<u>18</u>	<u>9</u>	<u>9</u>	
WEST COAST	FMC Corporation	4	750 x 130	1	1	1	1	1	0	0	1	1	0	
				(1)	(1)	(1)	(1)	(1)	(0)	(1)	(1)	(1)	(0)	

TABLE I

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipway	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	R0/R0 684 x 102	LASH 893 x 100	Container 947 x 106	21,300	570 x 75	51,000	600 x 105	100,000
Lockheed SB	1	1	650 x 88	1	0	0	0	0	0	0	0	1	0	0
	3	3	650 x 88	1	0	0	0	0	0	0	0	1	0	0
	21	21	690 x 90	1	0	1	0	0	0	0	0	1	0	0
National Steel & SB	1	1	980 x 170	(3)	(0)	(1)	(0)	(0)	(0)	(0)	(0)	(3)	(0)	(0)
	2	2	990 x 90	4	1	1	1	1	1	1	2	1	1	1
	3	3	900 x 106	1	0	1	0	0	0	0	1	0	0	0
	4	4	900 x 106	1	1	1	1	1	1	0	1	1	1	1
Tacoma Boat	1	1	650 x 400	(7)	(3)	(4)	(3)	(3)	(3)	(1)	(5)	(3)	(3)	(3)
	1	1	650 x 400	1	0	1	0	0	0	0	1	1	1	0
Todd-LA	1	1	800 x 84	(1)	(0)	(1)	(0)	(0)	(0)	(0)	(1)	(1)	(1)	(0)
	2	2	800 x 84	1	0	0	0	0	0	0	1	0	0	0
Todd-SF	1	1	550 x 96	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(2)	(0)	(0)	(0)
	1	1	550 x 96	1	0	0	0	0	0	0	0	0	0	0
Todd-Seattle	1A	1A	600 x 96	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	1A	1A	600 x 96	1	0	0	0	0	0	0	1	0	0	0
Triple A Hunters Point	2	2	715 x 82	1	0	0	0	0	0	0	1	0	0	0
	3	3	996 x 107	2	1	1	1	1	1	1	1	1	1	1
	4	4	1088 x 136	4	1	1	1	1	1	1	2	1	1	1
	4	4	1088 x 136	(7)	(2)	(2)	(2)	(2)	(2)	(2)	(4)	(2)	(2)	(2)
TOTAL WEST COAST				23	6	9	6	5	3	18	7	5	5	5
American SB-Lorain	GD2	GD2	708 x 78	1	0	0	0	0	0	0	1	0	0	0
	GD3	GD3	1021 x 121	2	1*	1*	1*	1*	1*	1*	1	1*	1*	1*
American SB-Toledo	GD1	GD1	540 x 68	(3)	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(1)	(1)	(1)
	GD2	GD2	680 x 78	1	0	0	0	0	0	0	0	0	0	0
TOTAL				(2)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)	(0)	(0)

GREAT LAKES

TABLE I
SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipway	Shipway or Basin	Maximum Ship Size	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	R0/R0 684 x 102	LASH 893 x 100	Container 947 x 106		21,300 570 x 75	51,000 600 x 105	100,000 900 x 106	
Bay SB Corporation	GD1	3	1100 x 136	2	1*	1*	1*	1*	1*	1*	1	1*	1*	1*
			750 x 105	1	1*	1*	1*	0	0	0	1	1*	1*	0
Fraser Shipyards	GD2		825 x 82	(3)	(2)	(2)	(2)	(1)	(1)	(1)	(2)	(2)	(2)	(1)
				1	0	0	0	0	0	0	1	0	0	0
<u>TOTAL GREAT LAKES</u>				9	3	3	3	2	2	2	6	3	3	2
<u>TOTAL POSITIONS ALL YARDS</u>				128	47	74	53	28	21	21	93	59	59	28

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

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers								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					
EASI	Bath Iron Works	A	650 x 88	1	0	0	0	0	0	0	0	0	0	0	0	0		
		B	700 x 130	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
		C	700 x 130	(3)	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Bethlehem Steel, Sparrows Point	7	900 x 108	1	1	1	0	0	0	0	0	0	0	0	1	1	0	
		10	900 x 108	1	1	1	0	0	0	0	0	0	0	0	1	1	0	
		GD	1200 x 192	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1
				(5)	(4)	(3)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(3)	(1)	(1)
	Coastal Dry Dock	3	758 x 104	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
		4	727 x 112	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
		5	1093 x 143	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		6	1093 x 143	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				(6)	(4)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
	General Dynamics, Quincy	6	860 x 123	1	1	1	0	0	0	0	0	0	0	0	0	0	0	
		7	936 x 143	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
		8	860 x 123	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		11	860 x 144	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		12	860 x 144	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
				(5)	(5)	(5)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	Maryland S/B & D/D	1	850 x 110	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
				(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Newport News S/B	5	649 x 93	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		6	715 x 93	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
		8	940 x 125	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		9	940 x 125	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		10	960 x 124	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		11	1100 x 136	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		12	1600 x 246	6	4	2	1	1	1	1	1	1	1	1	1	2	1	1
		(13)	(9)	(6)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(6)	(1)	(1)		

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway Or Basin	Maximum Ship Size	Tankers										OBO			
				25,000 620 x 75	38,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000 Cu.m. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143				
	Norfolk SB & DD	-	475 x 85	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Penn Ship	6	745 x 129	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		8	745 x 129	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		Slab A	1000 x 195	2	2	1	1	1	0	0	0	0	0	0	0	0	0
		Slab B	700 x 195	2	2	0	0	0	0	0	0	0	0	0	0	0	0
				(9)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
	<u>TOTAL EAST COAST</u>			39	31	17	7	7	7	6	3	1	13	5			
<u>Gulf</u>	Alabama D/D & S/B	1	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	523 x 68	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	620 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Avondale	2	1200 x 126	5	5	5	0	0	0	0	0	0	5	0	0	0	0
		3	1020 x 174	3	3	3	3	3	3	3	3	3	3	3	3	3	3
				(8)	(8)	(8)	(3)	(3)	(3)	(0)	(0)	(0)	(8)	(3)	(3)	(3)	(3)
	Beth. Beaumont	-	800 x 96	1	1	0	0	0	0	0	0	0	0	0	0	0	0
				(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Galveston S/B	5	700 x 120	1	1	0	0	0	0	0	0	0	0	0	0	0	0
				(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers										OBO			
				25,000 620 x 75	38,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000 Cu.m. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143				
	Levingston (Orange, TX)	1	700 x 100	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	Litton/Ingalls	1	690 x 85	1	0	0	0	0	0	0	0	0	0	0	0	0	
		2	550 x 80	0	0	0	0	0	0	0	0	0	0	0	0	0	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)	6 (6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	Marathon	-	1100 x 150	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	1 (1)	1 (1)	0 (0)	
	Tampa Shipyards	3	500 x 105	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	Texas Gulfport S/B	1	550 x 80	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
	Todd-Galveston	1	475 x 85	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers										OBO			
				25,000	38,000	89,000	120,000	125,000 Cu. m.	225,000	265,000	390,770	1204 x 228	80,000	160,000			
	Todd-Houston	-	600 x 118	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	<u>TOTAL GULF COAST</u>			24	18	15	4	4	4	1	1	0	0	0	9	4	0
<u>West</u>	FMC Corporation	4	750 x 130	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Lockheed S/B	1	650 x 88	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	650 x 88	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		21	690 x 90	(3)	(1)	(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	0	0	0	0	0	1	0	0
		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	0	0	0	0	0	0	0	0	0	0	0
		4	900 x 106	1	1	1	0	0	0	0	0	0	0	0	0	0	0
				(5)	(4)	(3)	(1)	(1)	(1)	(0)	(0)	(0)	(0)	(0)	(1)	(0)	(0)
	Todd-LA	1	800 x 84	1	0	0	0	0	0	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
				(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Todd-San Francisco	-	550 x 96	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Todd-Seattle	1A	600 x 96	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Tacoma Boat	1	650 x 400	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)

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		
	Triple A	2	715 x 82	1	0	0	0	0	0	0	0	0	0	0	0
	Hunters Point	3	996 x 107	1	1	1	0	0	0	0	0	0	0	1	0
		4	1088 x 136	2	1	1	0	0	0	0	0	0	0	1	0
				(4)	(2)	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(2)	(0)
	<u>TOTAL WEST COAST</u>			<u>16</u>	<u>8</u>	<u>5</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3</u>	<u>0</u>
<u>GREAT LAKES</u>															
	American S/B-Lorain	GD2	708 x 78	1	0	0	0	0	0	0	0	0	0	0	0
		GD3	1021 x 121	1	1*	1*	0	0	0	0	0	0	0	1*	0
				(2)	(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)
	American S/B-Toledo	GD1	540 x 68	0	0	0	0	0	0	0	0	0	0	0	0
		GD2	680 x 78	1	0	0	0	0	0	0	0	0	0	0	0
				(1)	(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
		3	750 x 105	1	1*	0	0	0	0	0	0	0	0	0	0
				(2)	(2)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(0)
	Fraser Shipyards	GD2	825 x 82	1	0	0	0	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	<u>TOTAL GREAT LAKES</u>			<u>6</u>	<u>3</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>
	<u>TOTAL POSITIONS ALL YARDS</u>			<u>85</u>	<u>60</u>	<u>39</u>	<u>12</u>	<u>12</u>	<u>12</u>	<u>7</u>	<u>3</u>	<u>1</u>	<u>1</u>	<u>27</u>	<u>9</u>

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

TABLE 1
SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

SUMMARY

REGION	GENERAL CARGO						DRY BULK			
	GEN. CARGO 475 x 68	MOB. CARGO 724 x 106	CONTAINER 610 x 90	RO/RO 684 x 102	LASH 893 x 100	CONTAINER 947 x 106		21,300 570 x 75	51,000 600 x 105	100,000 900 x 106
EAST COAST	56	23	39	28	12	7	43	31	12	
GULF COAST	40	15	23	16	9	9	26	18	9	
WEST COAST	23	6	9	6	5	3	18	7	5	
GREAT LAKES	9	3	3	3	2	2	6	3	2	
TOTAL POSITIONS ALL YARDS	128	47	74	53	28	21	93	59	28	

REGION	TANKERS									
	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	39	31	17	7	7	6	3	1	13	5
GULF COAST	24	18	15	4	4	1	0	0	9	4
WEST COAST	16	8	5	1	1	0	0	0	3	0
GREAT LAKES	6	3	2	0	0	0	0	0	2	0
TOTAL POSITIONS ALL YARDS	85	60	39	12	12	7	3	1	27	9

TABLE 2

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

TABLE 2

MAJOR U.S. PRIVATE SHIPYARDS

NUMBER OF BUILDING WAYS BY LENGTH (MAXIMUM SHIP SIZE)

Length OA (In Feet):	475	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1300	1400	1600	
<u>ATLANTIC COAST</u>																			
Bath Iron Works	3	3	3	3	2	3	3	3	3	1	1	1	1	1	1				
Beth-Sparrows Point	3	3	3	3	3	3	2	2	2	2	2	2							
Coastal Dry Dock	4	4	4	4	4	3	2	2	2	2	2								
General Dynamics, Quincy	5	5	5	5	5	5	5	5	1										
Maryland SB & DD	1	1	1	1	1	1	1	1	1	3	2	2	2	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				
Norfolk SB & DD	1	4	4	4	4	2	2	2	2	2	2	1	1						
Penn Ship	4																		
TOTAL	(27)	(26)	(26)	(26)	(25)	(19)	(18)	(18)	(13)	(8)	(7)	(6)	(4)	(2)	(2)	(1)	(1)	(1)	(1)

GULF COAST

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

TABLE 2

MAJOR U.S. PRIVATE SHIPYARDS

NUMBER OF SHIPBUILDING WAYS BY LENGTH (MAXIMUM SIZE SHIP)

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>																			
FMC Corporation	1	1	1	1	1	1													
Lockheed SB	3	3	3	3															
National Steel & SB	4	4	4	4	3	3	3	3	3	1									
Tacoma Boat	1	1	1	1															
Todd-Los Angeles	2	2	2	2	2	2	2												
Todd-SF (Formerly Beth)	1	1	1																
Todd-Seattle	1	1	1																
Triple A	3	3	3	3	3	2	2	2	2	2	1	1							
TOTAL	(16)	(16)	(15)	(14)	(9)	(8)	(7)	(5)	(5)	(3)	(1)	(1)							

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GREAT LAKES*

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)						

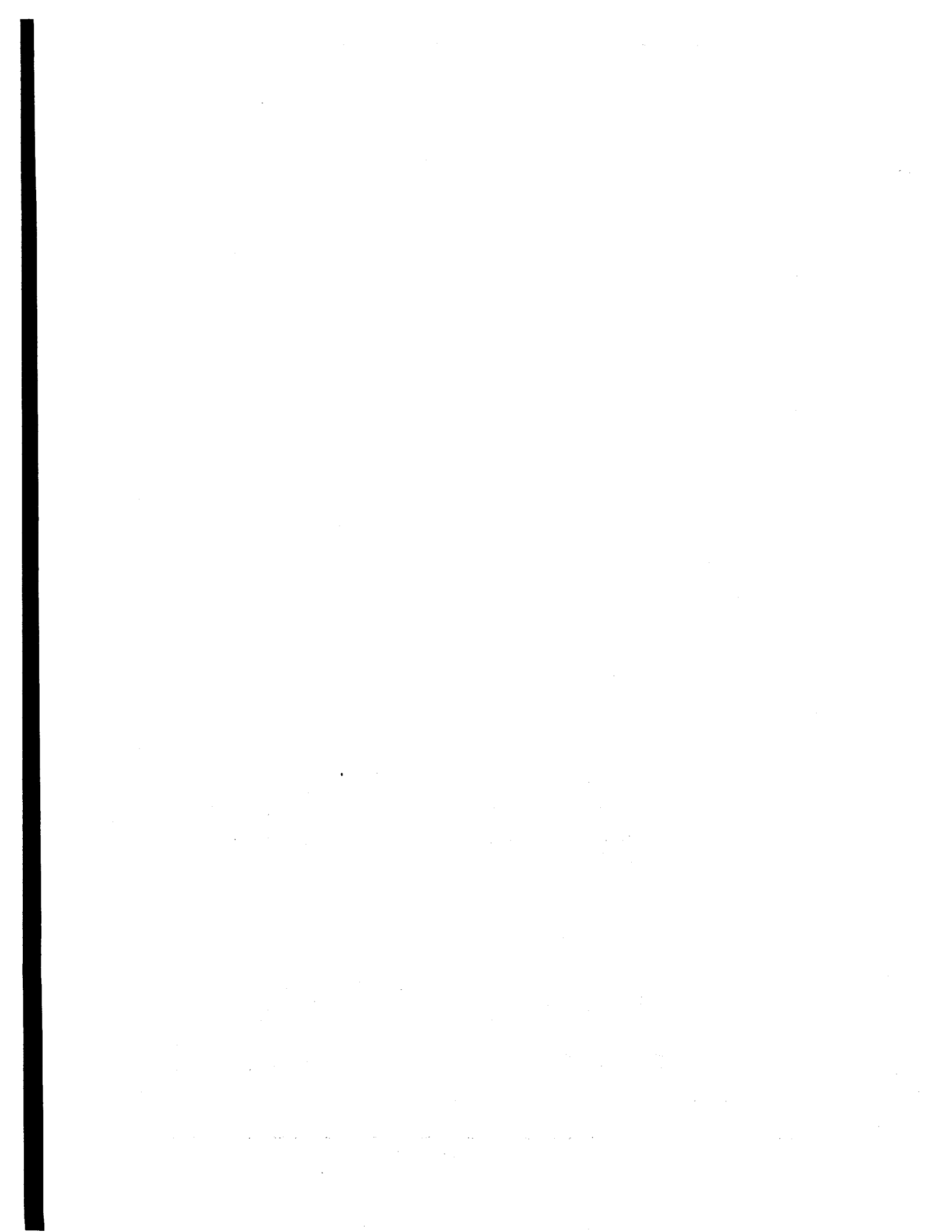
GRAND TOTAL
ALL COASTS AND
GREAT LAKES

88	77	74	69	57	47	44	34	29	22	19	17	11	7	7	1	1	1	1	1
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* Maximum size ship that can exit St. Lawrence Seaway locks is 730' x 78'.

APPENDIX A

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



FACILITIES AVAILABLE FOR THE CONSTRUCTION OR REPAIR OF SHIPS

DATE

TO: (Complete departmental address)

SHIPYARD AND ADDRESS

INSTRUCTIONS

(Forward original copy to appropriate Department of Defense Office or Maritime Administration, Washington, D.C.)

BUILDING WAYS (M.L.W.)

NO. OF WAY	LAUNCHING (Check one)	DIMENSIONS	MAXIMUM SHIP SIZE (Ton 2,240 lbs.)	DEPTH OF WATER		CONDITION OF WAY	CRANES SERVING WAY		LIFT Capacity (Std. tons)
				Over way end	At drop off		No.	Type (Plus hook height for bridge cranes)	
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						
	<input type="checkbox"/> End <input type="checkbox"/> Side <input type="checkbox"/> Basin	Length Width Depth	Length O.A. Beam Weight						

TIDAL RANGE (Difference M.L.-M.H.)

IS FIRE PROTECTION AVAILABLE ON BUILDING WAY? YES NO

IS SNUBBING NECESSARY? YES NO

DEPTH OF RUN AT M.L.W.

LENGTH OF LAUNCHING RUN

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 portons (FD)	At keel blocks; on cradle (MR)	At top; cradle (MR)	At keel blocks	Over sill (GD)	Over floor	Over keel blocks		

LEGEND: (Abbreviations of Services)
 Fresh water..... F.W.—G.P.M.—P.S.I.
 Salt water..... S.W.—G.P.M.—P.S.I.
 Steam..... S-P/MR-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..... FF-G.P.M.—P.S.I.
 Sanitary sewer..... SS—Yes or No.
 Sheet 2 of 6

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

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

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 plate size, e.g., 30' plate bending rolls, 10' plate shears, 400 ton Hyd. press, 30' plate furnace, engine lathe 36" x 20" b.c., etc.)

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

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

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

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

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

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

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

DISTANCE TO NEAREST RAILROAD CONNECTION DISTANCE TO NEAREST AIRPORT—IDENTIFY

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

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

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

LIMITING LOCK DIMENSIONS TO TIDEWATER (Identify locks)

DESCRIPTION OF TYPES OF WORK NORMALLY SUBCONTRACTED

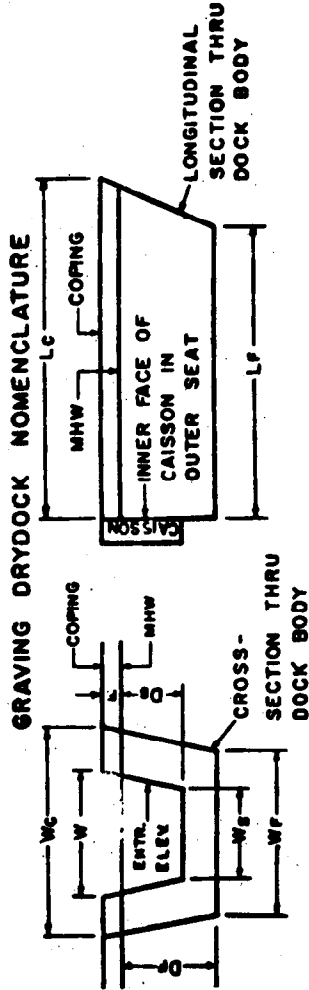
PRODUCTION EXPERIENCE (List at least three of the largest and the most complex ships or boats constructed, indicating (1) date completed, (2) hull length, beam, and molded depth, (3) type propulsion unit (fully described), (4) horsepower, (5) electrical and/or electronic installation, (6) special piping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

FLOATING DRYDOCK CHARACTERISTICS SUMMARY

FLOATING DRYDOCK	MAXIMUM LENGTH OF PONTON	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	13.2 KV TEST/ CHECK	

GRAVING DRYDOCK CHARACTERISTICS SUMMARY

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



DRYDOCK NUMBER	ENTRANCE DIMENSIONS		DOCK BODY DIMENSIONS		SUPERFLOODING	STANDARD DEFINITION	A. C. AMPERES (60 HZ-3Φ)			REMARKS (e.g. indicate dimensions of pits in dock floor)						
	LENGTH	WIDTH	DEPTH	DEPTH			WIDTH	FREEBOARD	480V MAX. HOTEL (INDUST)		2400 V ALT. HOTEL	13.2 KV TEST/CHECK				
FLOOR	COPING	SILL	COPING	M.H.W.	FLOOR	M.H.W.	LC	WC	DF	WF	WS	DF	WS	DF	WS	DF
1																
2																
3																
4																
5																

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

APPENDIX B

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

LEGEND: Remarks Column

1/Type of work usually engaged in

2/Employment - Mid-1982

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

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable length in feet	Longest Total linear feet	
<u>EAST COAST</u>				
<u>SHIPBUILDING YARDS</u>				
Bath Iron Works Corp. Bath, ME	(2) 650 (+) x 88 SW 700 x 130 SW 550 x 88 FD	840 2900		1/ Construction, conversion and repairs - all types of vessels. 2/ 7,300 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/ 500
Coastal DD & Repair Corp. Brooklyn, NY	343 x 47 GD 463 x 75 GD 758 x 104 GD 727 x 112 GD (2) 1093 x 143 GD	1200 7700		1/ Ship repairs, overhaul and conversion. 2/ 800/900 Facilities are part of former Brooklyn Navy Yard and are leased from the City of New York.
General Dynamics Corp. Quincy SB Division Quincy, MA	(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/ 2,800
Maryland SB and DD Co. Baltimore, MD	850 x 110 SW 775 x 110 FD 715 x 91 FD 900 x 146 FD	1902 5620		1/ Construction, conversion and repair - all types of vessels. 2/ 1,200
Newport News SB & DD Co. Newport News, VA	649 x 93 SW 715 x 93 SW (2) 940 x 125 SW 960 x 124 GD* 1100 x 136 GD* 646 x 88 GD** 858 x 102 GD** 455 x 68 GD** 521 x 68 GD** 1600 x 246 GD*	1670 14220		1/ Construction, conversion and repair - all types of vessels. 2/ 25,000 *Used for construction **Used for repairs and overhaul.

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

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

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)		Berths/Piers	Remarks
	SW--Shipway	GD--Graving Drydock	Usable length in feet	
	FD--Floating Drydock	MR--Marine Railway	Longest Total linear feet	
Norfolk SB & DD Corp. Norfolk, VA	475 x 85 SW 650 x 83 FD 1100 x 156 FD 441 x 60 MR* 325 x 60 FD*		1030 12170	1/ Ship construction, repairs, and conversion - all types of vessels. 2/ 2,544 *Located at Brambleton plant.
Pennsylvania SB Co. Chester, PA (formerly Sun Ship, Inc.)	(2) 745 x 129 SW 700 x 195 SW 1000 x 195 SW 1100 x 195 FD 400 x 80 FD		1100 3900	1/ Ship construction, conversion and repairs - all types of vessels. 2/ 1,450
<u>EAST COAST</u> <u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>				
Beth. Steel Corp. Baltimore, MD	490 x 81 FD 900 x 136 FD 585 x 71 GD		964 13000	1/ Ship repairs and conversion. 2/ 500
Beth. Steel Corp. Hoboken, NJ	433 x 67 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/ 630 *Military Ocean Terminal, Bayonne, NJ - leased from Corps of Engineers.
Boston Marine Industrial Park Boston, MA	1145 x 119 GD*		1000 2500	*GD #3 is a public drydock in former Boston Naval Annex, owned by Economic Development Industrial Corp. of Boston and leased to ship repair companies.
Caddell DD & Repair Co. Staten Island, NY	400 x 63 FD		450 1400	1/ Ship repairs and conversion. 2/ 200
Colonna's Shipyard, Inc. Norfolk, VA	320 x 54 MR 380 x 65 MR		950 2200	1/ General ship repairs. 2/ 160

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)	Berths/Piers Usable length in feet	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway		
Robert E. Derecktor of Rhode Island, Inc. Middletown, RI	450 x 96 FD	<u>1500</u> N.A.	<u>1/</u> Construction of Coast Guard ships and vessel repair. <u>2/</u> 520 (Nov. 1, 1982)
Detyens Shipyards Mt. Pleasant, SC	560 x 82 FD 300 x 82 FD	<u>300</u> <u>600</u>	<u>1/</u> General ship repairs. <u>2/</u> 400
General Ship Corp. East Boston, MA	680 x 90 GD*	<u>900</u> <u>2530</u>	<u>1/</u> Ship repairs and overhaul. Construction up to 225' in length. <u>2/</u> 400 *GD is located in the Boston Marine Industrial Park in the former Boston Naval Annex and is leased by General Ship Corp.
Jackson Engineering Co., Inc. Staten Island, NY	425 x 82 FD 550 x 82 FD	<u>653</u> <u>2600</u>	<u>1/</u> Ship repairs and conversion. <u>2/</u> 125
Jacksonville Shipyards Jacksonville, FL	660 x 90 FD* 900 x 140 FD 400 x 53 FD*	<u>680</u> <u>4184</u>	<u>1/</u> Ship repairs and conversion. Construction of small vessels. <u>2/</u> 2,000 *Leased from the Navy.
Metro Machine Corp. Norfolk, VA	600 x 96 FD	<u>480</u> <u>1500</u>	<u>1/</u> Ship repairs and conversion. <u>2/</u> 400
Newport Ship Yard, Inc. Newport, RI	320 x 60 MR	<u>500</u> <u>2515</u>	<u>1/</u> Small vessel construction, conversion, and repairs. <u>2/</u> 180
Perth Amboy DD Co. Perth Amboy, NJ	400 x 68 FD	<u>400</u> <u>2930</u>	<u>1/</u> Ship repairs and conversion. <u>2/</u> 145

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)	Berths/Piers Usable length in feet	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway		
Puerto Rico DD & and Marine Terminals San Juan, PR	632 x 83 GD*	1000 1632	1/ Ship repairs. 2/ 150 *Leased from Navy.
Rodermond Industries Jersey City, NJ	775 x 106 FD 425 x 80 FD 350 x 60 FD 300 x 57 FD	842 842	1/ Ship repairs and conversion. 2/ 130
Savannah Shipyard Co. Savannah, GA	532 x 64 GD	382 1563	1/ Ship repairs and conversion 2/ 400
Todd Shipyards Corp. Brooklyn, NY	700 x 85 GD	1152 7653	1/ Ship repairs and conversion. 2/ 380
Tracor Marine, Inc. Port Everglades, FL	300 x 80 FD 360 x 80 (Syncrolift)	780 1305	1/ Ship repairs and conversion 2/ 355
<u>GULF COAST SHIPBUILDING YARDS</u>			
Alabama DD & SB Co. Mobile, AL	(4) 523 x 68 SW 620 x 90 SW 665 x 83 FD 750 x 98 FD	1132 9370	1/ Ship construction, conversion and repairs. Also drill rig construction. 2/ 2,900
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 750 x 115 FD	2300 6100	1/ Ship construction, conversion and repairs - all types of vessels. 2/ 5360 *Three vessels up to 1020' x 174' can be constructed simultaneously. **Five large, greater than 600' LOA, vessels can be under construction simultaneously in this area. ***Westwego Plant - Two 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, TX	800 x 96 650 x 84	SW FD	1100 4000		1/ Construction of barges and drilling rigs. Also ship repairs and conversion. 2/ 1,500
Galveston SB Co. Galveston, TX	700 x 120	SW	None*		1/ Construction of barges, tugs and oceangoing integrated tug/barge units. 2/ 150 *City wharf in Galveston is available.
Ingalls SB Division Litton Systems, Inc. Pascagoula, MS	690 x 85 550 x 80 (4) 650 x 90 481 x 71 *800 x 173	SW SW SW GD FD	2700 8100		1/ Construction, conversion, and repairs - all types of vessels. 2/ 12,350 *West Bank can launch ships up to 800' x 173'. Equivalent of six conventional inclined ways in terms of ships delivered annually.
Levingston SB Co. Orange, TX	700 x 100 420 x 122	SW FD	600 2400		1/ Construction of offshore drilling rigs, barges and large commercial vessels. Repairs and conversion - all types of vessels. 2/ 1,000
Marathon LeTourneau Co. Gulf Marine Division Brownsville, TX	1100 x 150	SW	600 1100		1/ Construction of drilling rigs. Yard has capability of building large oceangoing ships. 2/ 1,300
Tampa Shipyards, Inc. Tampa, FL	500 x 105 542 x 72 896 x 146	SW GD GD	845 2240		1/ Ship construction, conversion, and repairs. 2/ 820
Texas Gulfport SB Co. Port Arthur, TX	550 x 80 400 x 80 (2) 325 x 68	SW SW FD	590 1270		1/ Construction of drilling rigs and barges. Ship repairs and conversion. 2/ 200

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)	Berths/Piers Usable length in feet	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway		
Todd Shipyards Corp. Galveston, TX	475 x 85 SW 670 x 86 FD 850 x 160 FD	1042 7000	1/ Ship construction, repairs and conversion. 2/ 1,000
Todd Shipyards Corp. Houston, TX	600 x 118 SW 600 x 118 FD	1844 3200	1/ Ship construction, repairs and conversion. 2/ 250
<u>GULF COAST REPAIR YARDS WITH DRYDOCK FACILITIES</u>			
Bender Shipbuilding & Repair Mobile, AL	420 x 45 FD 420 x 55 FD 420 x 51 FD	617 2300	1/ Construction of vessels up to 260' in length. Also ship repairs. 2/ 800
Delta Shipyard Houma, LA	300 x 56 (Syncrolift) 340 x 88 FD	700 700	1/ Construction and repair of vessels up to 340' in length. 2/ 240
Bergeron Industries, Inc. St. Bernard, LA	300 x 72 MR	100 600	1/ Construction and repair of barges, dredges, and floating drydocks. 2/ 500(Braithwaite Yard)
Equitable Shipyards, Inc. New Orleans, LA	325 x 90 MR	500 1654	1/ Construction and repair of small vessels and barges. 2/ 250
Gretna Machine & Iron Works, Inc. Harvey, LA	330 x 54 GD 465 x 75 GD	340 340	1/ Construction and repair of barges. 2/ 190
Gulf-Tampa DD Co. Tampa, FL	348 x 47 FD		1/ Ship repairs and overhaul. 2/ 185

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	
Ingalls Marine, Inc. Decatur, AL	496 x 81 GD	$\frac{500}{500}$	1/ Construction and repair of barges. 2/ 90
Platzer Shipyard, Inc. Houston, TX	300 x 60 MR	$\frac{300}{1000}$	1/ Construction and repair of barges. 2/ 150
Port Allen Marine Service, Inc. Port Allen, LA	300 x 81 FD	$\frac{390}{390}$	1/ Construction and repair of boats and barges. 2/ 460
Saucer Marine Service, Inc. New Orleans, LA	(2) 300 x 56 FD	$\frac{200}{600}$	1/ Repair of barges, dredges, and drill rigs. 2/ 40
SBA Shipyards, Inc. Jennings, LA	496 x 72 GD	$\frac{1000}{2000}$	1/ Construction, conversion, and repair of boats and barges. 2/ 120
Southern SB Corp. Slidell, LA	350 x 47 GD	$\frac{200}{300}$	1/ Construction and repair of vessels up to 350' in length and not drawing over 15' of water. 2/ 300
Todd Shipyards Corp. New Orleans, LA	696 x 86 FD 643 x 80 FD 350 x 60 FD	$\frac{1725}{4956}$	1/ Ship repairs and conversion. 2/ 440

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam)	Berths/Piers Usable length in feet	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Longest Total linear feet	
<u>WEST COAST</u> <u>SHIPBUILDING YARDS</u> FMC Corp. Portland, OR	750 x 130 SW	<u>1100</u> 1100	<u>1/</u> Construction of barges and vessels up to 750' in length. <u>2/</u> 300 Leases drydocks and berths from Port of Portland as required.
Lockheed SB & Construction Co. Seattle, WA	(2) 650 x 88 SW 690 x 90 SW 400 x 46 FD 530 x 80 FD 643 x 96 FD	<u>800</u> 6500	<u>1/</u> Ship construction, conversion, and repairs - all types of vessels. <u>2/</u> 2,000
National Steel and SB Co. San Diego, CA	980 x 170 GD 690 x 90 SW (2) 900 x 106 SW	<u>1090</u> 7075	<u>1/</u> Construction, conversion, and repairs - all types of vessels. <u>2/</u> 6,180 Large graving dock is leased from Unified Port District of San Diego as needed.
Tacoma Boatbuilding Co. Tacoma, WA	650 x 400 SW 539 x 98 FD	<u>1100</u> 1780	<u>1/</u> Ship construction, repairs, and conversion - all types of vessels. <u>2/</u> 2,630
Todd Pacific Shipyards Corp. San Pedro, CA	(2) 800 x 84 SW 700 x 86 FD 470 x 82 FD	<u>680</u> 4255	<u>1/</u> Ship construction, repairs, and conversion - all types of vessels. <u>2/</u> 5,761
Todd Shipyards Corp. San Francisco, CA (formerly Beth. Steel)	550 x 96 SW 700 x 94 FD 950 x 144 FD	<u>813</u> 3200	<u>1/</u> Barge construction, ship repairs and conversion. Can build C3 and C4 type vessels. <u>2/</u> 100

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers Usable length in feet Longest Total linear feet	Remarks
Todd Pacific Shipyards Corp. Seattle, WA	600 x 96 SW 650 x 84 FD 420 x 62 FD 943 x 133 FD	<u>1137</u> 5000	<u>1/</u> Ship construction, repairs and conversion - all types of vessels. <u>2/</u> 4,500
Triple A Shipyards Hunters Point San Francisco, CA	715 x 82 GD 996 x 107 GD 1088 x 136 GD (2) 416 x 56 GD 416 x 71 GD	<u>600</u> 24000	<u>1/</u> Ship repairs, overhaul and conversion. <u>2/</u> 900 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>			
Atkinson Marine Corp. National City, LA		<u>540</u> 540	<u>1/</u> Ship repairs and conversion. <u>2/</u> 460 Graving dock is leased from Unified Port District of San Diego as required.
California SB & DD Co. Long Beach, CA	400 x 52 FD	<u>600</u> 1700	<u>1/</u> Ship repairs and conversion. <u>2/</u> 60
Campbell Industries San Diego, CA	(2) 360 x 46 FD	<u>640</u> 2280	<u>1/</u> Construction of fishing boats. Also ship repairs. <u>2/</u> 400 Graving dock is leased from Unified Port District of San Diego as required.
Dillingham Marine & Mfg. Co. Portland, OR		<u>260</u> 260	<u>1/</u> Ship repairs and conversion. <u>2/</u> 550 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 Usable length in feet Longest Total linear feet	Remarks
Dillingham Shipyard Honolulu, HI	384 x 54 FD	650 850	1/ Ship repairs and overhaul. 2/ 210
Kaiser Steel Corp. Napa, CA	304 x 51 FD 364 x 51 FD	500 500	1/ Heavy steel fabrication and erection. Construction and repair of small ships and barges. 2/ 1,240
Lake Union DD Co. Seattle, WA	340 x 56 FD	1000 4235	1/ Ship repairs and conversion. 2/ 90
Marine Power & Equip. Co. Seattle, WA	400 x 57 FD 400 x 60 FD 400 x 101 (Syncrolift) 300 x 46 FD	832 2700	1/ Construction of small vessels and barges; also ship repairs. 2/ 650
Pacific DD & Repair Co. Oakland, CA	320 x 52 FD	600 1155	1/ Ship and barge repairs. 2/ 50
Northwest Marine Iron Works Portland, OR	500 x 100 SW (Barge construc- tion only)		1/ Ship repairs, conversion and barge construction. 2/ 1,400 Leases drydocks and berths from Port of Portland as required.
Port of Portland Swan Island Ship Repair Yard Portland, OR	600 x 83 FD 500 x 88 FD 700 x 108 FD 1100 x 181 FD	1000 6360	Port of Portland owns these drydocks which are leased to ship repair companies on an as-required basis.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers Usable length in feet Longest Total linear feet	Remarks
Port of San Diego Unified Port District San Diego, CA	687 x 90 GD 397 x 52 FD	N.A. 13000	Drydocks available for lease to ship repair companies.
Southwest Marine, Inc. San Diego, CA	400 x 82 FD	$\frac{600}{1855}$	1/ Ship repairs and overhaul. Construction of vessels up to 250' in length. 2/ 300 Graving dock is leased from Unified Port District of San Diego as required.
Southwest Marine, Inc. Terminal Island San Pedro, CA	720 x 93 FD	$\frac{1800}{4175}$	1/ Ship repairs, overhaul, and conversion. 2/ 200
Todd Shipyards Corp. Alameda, CA	523 x 80 FD	$\frac{800}{2485}$	1/ Ship repairs, overhaul, and conversion. 2/ 650
Triple A South San Diego, CA	389 x 57 FD	None*	1/ Ship repairs and overhaul. 2/ 214 Graving dock is leased from Unified Port District of San Diego as required. * Ships are worked at Navy piers.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers Usable length in feet Longest Total linear feet	Remarks
<p><u>GREAT LAKES</u> <u>SHIPBUILDING YARDS</u></p>			
<p>(Maximum size ship that can exist St. Lawrence Seaway locks is 730' x 78')</p> <p>American SB Co. Lorain, OH</p>	<p>708 x 78 GD 1021 x 121 GD</p>	<p><u>900</u> 1800</p>	<p><u>1/</u> Ship construction, repairs, and conversion. <u>2/</u> 360</p>
<p>American SB Co. Toledo, OH</p>	<p>680 x 78 GD 540 x 68 GD</p>	<p><u>800</u> 1600</p>	<p><u>1/</u> Ship construction, repairs, and conversion. <u>2/</u> Yard closed April 1982, on temporary indefinite basis due to lack of work.</p>
<p>Bay SB Corp. Sturgeon Bay, WI</p>	<p>750 x 105 SW 650 x 66 FD 1100 x 136 GD</p>	<p><u>900</u> 7090</p>	<p><u>1/</u> Ship construction, repairs and conversion. <u>2/</u> 1,100</p>
<p>Fraser Shipyards Superior, WI</p>	<p>825 x 82 GD 620 x 61 GD</p>	<p><u>900</u> 4450</p>	<p><u>1/</u> Ship construction, conversion and repairs. <u>2/</u> 35</p>
<p><u>GREAT LAKES</u> <u>REPAIR YARDS WITH</u> <u>DRYDOCK FACILITIES</u></p>			
<p>Peterson Builders Sturgeon Bay, WI</p>	<p>360 x 36 FD</p>	<p><u>550</u> 2515</p>	<p><u>1/</u> Construction and repair of small ships and boats. <u>2/</u> 600</p>

APPENDIX C

MAJOR TOPSIDE REPAIR FACILITIES
SHIPS 300 FEET IN LENGTH AND OVER

APPENDIX C

MAJOR TOPSIDE REPAIR FACILITIES, SHIPS 300 FEET

IN LENGTH AND OVER

EAST COAST

Allied Repair Service, Inc.
Norfolk, VA

AMT, Inc.
Miami, FL

American Ship Repairs Co., Inc.
Brooklyn, NY

Arnessen Electric Company, Inc.
Brooklyn, NY

Atco Marine Corporation
Brooklyn, NY

Atlantic Marine, Inc.
Fort George Island, FL

Auto Marine Sales Corporation
Ft. Lauderdale, FL

B & A Marine Co., Inc.
Brooklyn, NY

Banks Ship Rigging Corporation
Brooklyn, NY

Best Repair Company
Norfolk, VA

Brady Marine Repair Co., Inc.
Elizabeth, NJ

Braswell Shipyards, Inc.
Mt. Pleasant, SC

Camden Ship Repair Co., Inc.
Camden, NJ

Charlton Marine, Inc.
Jersey City, NJ

Classon Industries
Brooklyn, NY

Diesel Injection Sales & Service
Norfolk, VA

Electric Motor and Contracting Co.
Norfolk, VA

Fisher Marine Repair Corporation
Brooklyn, NY

General Ship Repair Corporation
Baltimore, MD

Golten Marine Co., Inc.
Brooklyn, NY

Golten Ship Repair, Inc.
Portland, ME

Golten Service Co., Inc.
Miami, FL

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

Holmes Bros., Inc.
Portsmouth, VA

Horne Brothers, Inc.
Newport News, VA

Hudson Engineering Company
Hoboken, NJ

Ind-Mar Diesel Services
Jacksonville, FL

Industrial Welding & Machine, Inc.
Portland, ME

Jackson Engineering Co., Inc.
Hoboken, NJ

Jonathan Corporation
Norfolk, VA

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

Marine Contractors Co., Inc.
East Boston, MA

Marine Electric Corporation
Brooklyn, NY

Marine Metal Associates
Newark, NJ

Meier & Oelhaf Company, Inc.
New York, NY

Merrill-Stevens DD Company
Miami, FL

Metal Trades, Inc.
Hollywood, SC

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

Moon Engineering Co., Inc.
Norfolk, VA

Munro Drydock, Inc.
Chelsea, MA

Neptune Machine Works, Inc.
Brooklyn, NY

Nordic Diesel & Machine Co.
Brooklyn, NY

Norlantic Diesel, Inc.
Fairhaven, MA

North Florida Shipyards
Jacksonville, FL

Phillyship
Philadelphia, PA

Promet Marine Services Corp.
East Providence, RI

Reynolds Shipyard Corporation
Staten Island, NY

Rollinson Electric Contractors
Savannah, GA

Sandblasters, Inc.
John's Island, 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

Tony Stamis Engineering Co.
Ridgefield, NJ

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

AMT, Inc.
New Orleans, LA

Atlantic Sandblasting & Coatings
Tampa, FL

Boland Marine & Manufacturing Co.
New Orleans, LA

Buck Kreihs Co., Inc.
New Orleans, LA

Coastal Iron Works, Inc.
Corpus Christi, TX

Coastal Marine Service of Texas
Port Arthur, TX

Dixie Machine Welding & Metal Works
New Orleans, LA

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

Florida Ship Repair
Tampa, FL

General Engineering Co.
New Orleans, LA

Hahn & Clay
Houston, TX

Harrisburg Machine Co., Inc.
Houston, TX

Hendry Corporation
Tampa, FL

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

Marine Repairs, Inc.
Houston, TX

Marine Maintenance Industries
Houston, TX

McDonough Iron Works
Galveston, TX

Misener Industries, Inc.
Tampa, FL

Modern Diesel Power, Inc.
New Orleans, LA

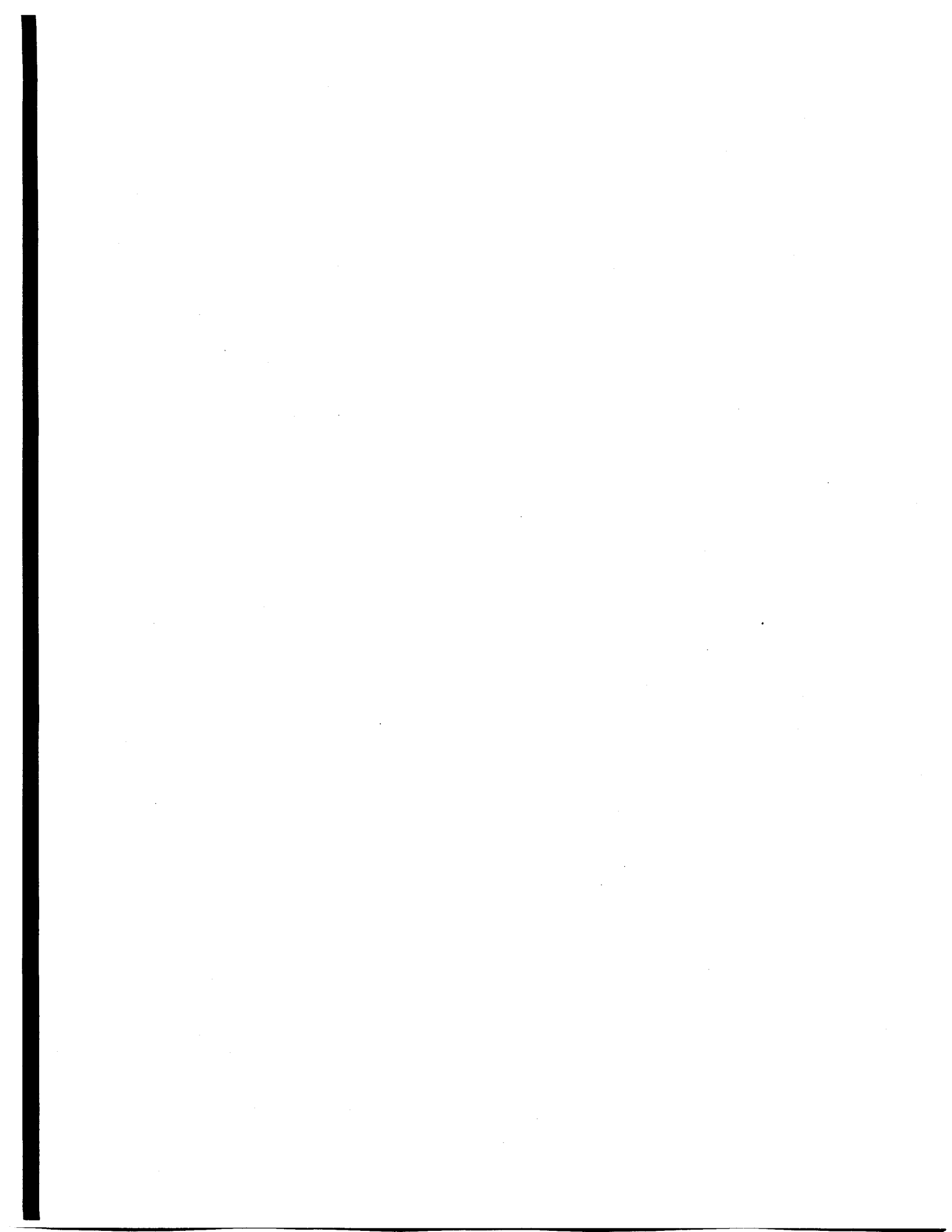
National Marine Service
Harvey, LA

Newpark SB & Repair, Inc.
Houston, TX

Port Houston Marine, Inc.
Houston, TX

Runyan Machine & Boiler Works
Pensacola, FL

Sherman Shipyard
Panama City, FL



WEST COAST

Arcwell Corporation
San Diego, CA

Cavanaugh Machine Works
Wilmington, CA

Coastal Marine Engineering Co.
San Francisco, CA

Colberg, Inc.
Stockton, CA

Dockside Machine & Ship Repair
Wilmington, CA

Duwamish Shipyard, Inc.
Seattle, WA

Electro-Mechanical Co.
Portland, OR

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

Franklin Machine Works, Inc.
San Francisco, CA

Fulton Shipyard
Antioch, CA

General Engineering & Machine Works
San Francisco, CA

Golten Marine Co., Inc.
Wilmington, CA

Kettenburg Marine
San Diego, CA

Marine Ways Corporation
Portland, OR

Marisco, Ltd.
Honolulu, HI

Pacific Marine & Supply Co.
Honolulu, HI

Palau Corporation
San Francisco, CA

Rowe Machine Works, Inc.
Seattle, WA

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

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

Service Engineering Co.
San Francisco, CA

Southwest Marine of SF
San Francisco, CA

Triple A South
San Diego, CA

Western Maritime, Inc.
Tacoma, WA

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

West Winds, Inc.
San Francisco, CA

Wilmington Iron Works
Wilmington, CA

Wilmington Welding & Boiler Works
Wilmington, CA

GREAT LAKES

Advance Boiler & Tank Co.
Milwaukee, WI

American Propeller Company
Toledo, OH

Diversified Piping Company
Avon Lake, OH

Erie Machine & Iron Works
Toledo, OH

G & W Industries, Inc.
Cleveland, OH

Edward E. Gillen Co.
Milwaukee, WI

Hans Hansen Welding Co., Inc.
Toledo, OH

Lower Lake Dock Company
Sandusky, OH

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

Niagara Industries, Inc.
Erie, PA

Nicholson & Hall Corporation
Buffalo, NY

Nicholson Terminal & Dock Co.
River Rouge, MI

Oldman Boiler Works, Inc.
Buffalo, NY

Perry Shipbuilding Co.
Erie, PA

Purvis & Foster
Detroit, MI

Soo Drydock Company
Sault Ste. Marie, MI

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

Sen-Wel Industries, Inc.
Buffalo, NY

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

William Farrel, Inc.
Toledo, OH