

**1983**

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

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

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

1983

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## Introduction

In compliance with the Merchant Marine Act of 1936, as amended, 1/ the Maritime Administration (MARAD) 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 1983 survey of U.S shipyard facilities was prepared by the Division of Production, Office of Shipbuilding Costs and Production, and is for general use within the Maritime Administration and other Government agencies.

The statistical data accumulated by the survey is a major input into the Shipyard Evaluation Analysis System Model (SEAS), 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.

### 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 enactment of this Act or thereafter built in the United States."

### Section 502(f)

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

The 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 230 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 dock characteristics summary and 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 Department of Transportation and the Department of Defense can use such facilities to the best advantage. The Federal Emergency Management Agency (FEMA) also uses information obtained by this survey, as does the U.S. Coast Guard and U.S. Army Corps of Engineers.

### General

The annual shipyard survey of 1983 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 1983 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 30 shipyards in this category, which are identified and geographically located in Exhibit 1.

Despite the continuing worldwide shipping recession, uncertain near-term future prospects, and declining commercial orderbooks, the U.S. shipbuilding and ship repair industry in FY 1983 invested some \$321 million in facilities modernization and expansion and as of July 1, 1983, planned to spend an additional \$217.8 million during the year ending June 30, 1984, 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 \$3.1 billion in plant modernization and improvements. These investments have significantly increased the capacity, capability, and productivity of the industry. With the slump in commercial 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 29 of the major yards. Detailed descriptions of these exhibits are included in this report.

As of October 1, 1983, 15 deep-draft commercial vessels were under construction in U.S. shipyards. Only one of the 15 was being built with aid of construction-differential subsidy, while five of these ships carried Title XI Federal ship financing guarantees. Only four offshore drilling rigs were in production or on order in the United States. MARAD was providing Title XI financing guarantees for a variety of commercial vessels and barges under construction in 13 American shipyards (see Exhibit 37). Exhibit 38 illustrates the continuing overall decline since the mid-1970's in both the numbers and gross tonnage of merchant ships being built in the United States.



On October 1, 1983, there were 80 major combat and auxiliary ships under construction or on order for the Navy and 12 270-foot cutters for the Coast Guard. In addition, five new maritime prepositioning ships were on order, part of the Navy's T-Ship program (the designation "T", for transportation, distinguishes these auxiliary ships from Navy commissioned ships of the line). Contracts had also been awarded under the T-Ship program for the major conversion of 14 merchant vessels to four fast sealift ships, eight maritime prepositioning ships, one hospital ship and one auxiliary crane ship.

Table 1 has been prepared to answer the frequent question as to the number of shipbuilding positions 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 in Table 1 are mainly those presently under construction or recently delivered to commercial service. The total number of building positions varies from 125 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 (186 m) containership and the stern section of a second ship could be constructed simultaneously. This production procedure, analyzed periodically by SEAS, 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 those 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 39 is a histogram displaying the reduction in the number of available shipways as the maximum ship length increases.

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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 SEAS output.

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

1. ADDSCO Industries, Inc.

As a result of a major reorganization during the past year, the shipyard name previously referred to as Alabama Dry Dock and Shipbuilding Company has been changed to ADDSCO Industries, Inc., as the parent or holding company of a newly-formed group of marine-related companies. A new corporation, Alabama Dry Dock and Shipbuilding Corporation has been formed to handle all marine repair work. Alabama Maritime Corporation, also a subsidiary of the parent company, is in charge of all new construction.

Both the repair and new construction facilities are located on the Tenn-Tom Waterway, across the River from Mobile, Alabama, about 30 miles from the Gulf of Mexico.

During World War II, 102 tankers and 20 cargo ships were constructed at this facility. Following this period, the yard constructed a variety of ships, barges and drill rigs. 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 ship repair and overhaul business, ADDSCO Industries' wholly owned subsidiary, Alabama Maritime Corporation, in early 1983, completed a series of three semi-submersible offshore drilling rigs for Diamond M Company.

Work in the yard in the fall of 1983 included major repair and maintenance work on the aircraft carrier LEXINGTON and on an offshore drilling rig. ADDSCO has contracted to do the deckhouse steel work for the five T5 tankers being built by Tampa Shipyards.

ADDSCO Industries, Inc. and its subsidiaries operate 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). There are two floating drydocks available for repair and conversion; 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 at seven finger piers for topside and inboard repairs. ADDSCO Industries and its subsidiaries have 19 revolving gantry cranes with capacities up to 75 tons (67 metric tons) 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 utilized for construction and outfitting.

Mobile Giant Erectors, Inc., also a nearby subsidiary of ADDSCO Industries, operates the largest capacity lifting facility on the Gulf Coast. 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 Industries, Inc. the ability to serve the heavy construction industry and to construct the heavy offshore structures required in today's market.

At mid-1983, combined employment totaled 450 at the ADDSCO subsidiaries that handle ship construction and ship repair--Alabama Dry Dock and Shipbuilding Corporation (repair work) and Alabama Maritime Corporation (new construction).

Exhibit 2 is a current general arrangement plan of these two ADDSCO 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.

During the World War II period, the company's Lorain yard 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's Lorain facility possesses a high degree of sophistication in production methods. In 1971, the company completed an extensive modernization and improvement program at this shipyard, including new computer control programs and management information systems. The 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. Three of four vessels were reconstructed at the company's subsidiary, Tampa Shipyards, Inc., and one ship, the MORMACLYNX, was reconstructed at the Lorain yard. Work on this ship was completed in October 1982, but since that time the yard has had no major construction or conversion work.

In the Lorain facility, graving dock No. 3, with a maximum ship size of about 1,021 feet by 211 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-1983, the payroll at Lorain totaled 50, down from about 400 at mid-1982.

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

THE AMERICAN SHIP BUILDING COMPANY ON NOVEMBER 30, 1983, ANNOUNCED THE IMMEDIATE, PERMANENT CLOSING OF ITS SHIPYARD IN LORAIN, OHIO. SINCE THIS REPORT WAS PREPARED PRIOR TO AMSHIP'S ANNOUNCEMENT, ALL DATA WITH REGARD TO THE LORAIN YARD REMAINS IN THIS REPORT.

3. 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 it 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 1982 and through October 1, 1983, included two fleet oilers for the Navy, three 2,500-TEU containerships for American President Lines, two oceangoing diesel-propelled hopper dredges, and a 17,000-dwt. self-unloading cement barge. From October 1982 to January 1983, the World War II battleship IOWA was drydocked at Avondale for extensive refurbishing and modernization work--the initial phase of the reactivation of the IOWA. Litton/Ingalls is completing the reactivation work.

As of October 1, 1983, Avondale's ship construction backlog consisted of two large fleet oilers for the Navy and three tankers for Exxon. The yard was also converting a Sea-Land SL-7 containership to a fast sealift ship for the Navy; and on October 31, 1983, the company also contracted to build the forebodies for five T-5 tankers under construction at Tampa Shipyards.

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, are 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) 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 completed 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 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 greater capability and increased capacity to perform major 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 114 feet (35 m) wide. Lifting capacity is 20,000 long tons (20320 metric tons).

Avondale's nearby Westwego, La., facility is capable of building vessels 450 feet (137 m) long by 90 feet (27 m) 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 1983, the total labor force was 5,188, down from about 5,360 a year earlier.

Exhibit 4 is a current arrangement plan of Avondale's main plant.

#### 4. Bath Iron Works Corporation

Bath Iron Works Corporation, a subsidiary of Congoleum Corporation, is located on the Kennebec River in Bath, Maine. 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 Bath delivered a large diesel-propelled hopper dredge for the Corps of Engineers in March 1983. In August 1983 a 34,000-dwt. product tanker (MA Design T6-M-136a) was delivered to Falcon I Sea Transport Company; a sistership is scheduled for completion in January 1984.

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 construction of 23 additional FFG-7 class frigates, the last of which is scheduled for delivery in 1987. As of October 1, 1983, there were nine 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 management expects additional Aegis cruiser contracts. The lead shipyard in the program is the Ingalls Shipbuilding Division of Litton Industries which currently has eight of these ships on order or in production.

In 1974, Bath completed a major expansion and modernization program. The upgrading of facilities included the reconstruction of two shipways to accommodate ships of 720 feet (220 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 both 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 an additional 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.

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 at its main yard, 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 provided 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 coated, 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 Hardings 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, Maine. The new facility, scheduled for completion in the fall of 1983, will allow BIW to expand its repair and overhaul capabilities to include all non-nuclear surface combatant Navy ships except aircraft carriers and will accommodate commercial vessels up to the supertanker class. A major component of the new shipyard will be an 81,000-ton (82296 metric ton) lift capacity floating drydock.

As of mid-1983, the company's administrative and production work force totaled 7,720, up from 7,300 a year earlier.

Exhibit 5 is a current plot plan of the Bath Iron Works main yard facilities, and Exhibit 6 is a general arrangement drawing of BIW's new repair and overhaul yard in Portland, Maine.

#### 5. Bay Shipbuilding Corporation

Bay Shipbuilding Corporation, in Sturgeon Bay, Wisconsin, 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 site has channel access from both Lake Michigan and Green Bay and provides ample dock space for Great Lakes vessel repair and new construction.

Bay Shipbuilding, a full-service shipyard, has built more modern self-unloading drybulk ships than any yard in the United States. From 1973 through 1981, 15 self-unloading Great Lakes ore carriers were delivered, including six 1000-foot-long (305 m) vessels.

With declining orders for construction of Great Lakes ore carriers, Bay Shipbuilding in 1980 entered salt water shipbuilding competition by delivering a 396-foot-long (121 m) tank barge and a 407-foot-long (124 m) tank barge. 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 a tug/barge to Amoco Oil Company for service on the Lakes, no new construction work remained in the yard. Overhaul of the Coast Guard Cutter MACKINAW and tank top renewal of the ore carrier WILLIAM CLAY FORD provided work until April 1983. Bay Shipbuilding in March 1983 was awarded a contract for conversion of the former general cargo/container ship PRESIDENT HARRISON to an auxiliary crane ship (T-ACS 1) for the Navy. This project will provide employment through April 1984. In August 1983, the Company received a contract from Lamberts Point Barge Co., Inc. to build a 550-foot (168 m) oceangoing coal topping-off barge.

The company in 1977 completed a major facilities expansion program that has enabled the shipyard to build 1000-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 in the Lakes. It is serviced by a 200-ton (182 metric ton) traveling gantry crane and several crawler cranes. More recently the following facilities were added to the yard's modern plant: an additional 2,400 linear feet (732 m) of new dock wall; an extensive expansion of the fabrication shop with 200-ton (182 metric ton) bridge crane lifting 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 730 feet by 105 feet (223 m by 32 m), and one floating drydock having a lift capacity of 7,000 tons (7112 metric tons) is available which can handle ships up to 650 feet by 66 feet (198 m by 20 m). There is 7,090 feet (216 m) of berthing space for repair and outfitting. The 14 available piers are serviced by crawler cranes of up to 80 tons (73 metric tons) capacity each.

At mid-1983, total employment was 273, down from approximately 1,000 a year earlier.

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

#### 6. 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 C1-A cargo ships and Navy minesweepers during World War II. Bethlehem acquired the yard in 1947 and has pioneered in the design and production of mobile offshore drilling rigs and offshore facilities needed to find and produce oil and gas from under the world's continental shelves. The Beaumont plant has been one of Bethlehem's most successful operations and 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 and has also designed and built both semisubmersibles and drillships. The yard's last drilling rig was delivered in November 1982.

In November 1982 and January 1983, the Navy awarded Bethlehem Steel Corporation firm contracts to reconstruct five Maersk Line RO/RO ships to maritime prepositioning ships, as part of the Navy's MPS program to support the Rapid Deployment Force. Two of these five ships will be converted at the company's Beaumont yard, with some of the work subcontracted to Todd-Galveston. Each vessel is being lengthened 157 feet (48.8 m), and the depth is being increased from 54 feet (16.4 m) to 70 feet (21.3 m). Upon completion, the ships will be time-chartered to the Military Sealift Command. Work on the first ship, the ELEM MAERSK, began in January 1983; and the two conversion projects will provide employment at Beaumont through September 1985.



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 pierside or anchorage. With a 500-ton (508 metric ton) lift capacity, the company's barge-mounted "Big Bessie" is the largest floating derrick between Houston and New Orleans.

Employment at Bethlehem-Beaumont totaled 1,167 at mid-1983, down from about 1,500 at mid-1982.

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

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

The Sparrows Point shipyard is located on the Patapsco River in the Baltimore, Maryland 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, this facility 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 1979, and second containership, the AUSTRAL PURITAN, was completed in 1980.

Since 1979, Sparrows Point has built six Bethlehem-design offshore drilling rigs and six 47,000-dwt. oceangoing tug/barge tankers. (Construction of the tug portion was subcontracted to Halter Marine).

The yard is currently engaged in the major conversion of three Maersk Line RO/RO ships to maritime prepositioning ships, as part of the Navy's MPS program to support the Rapid Deployment Force. Each vessel is being lengthened 157 feet (48.8 m), and the depth is being increased from 54 feet (16.4 m) to 70 feet (21.3 m). Work on the first ship, the ESTELLE MAERSK, commenced in January 1983. These three reconstruction projects will provide work at Sparrows Point through September 1985.

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 new 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. One way can accommodate a maximum ship size of 800 feet by 106 feet (244 m by 32 m), and the other a maximum ship size of 800 feet by 95 feet (244 m by 29 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 the conversion of the Maersk Line ships. 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 Sparrows Point rose to 1,556 in July 1983, compared to 500 a year earlier.

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

#### 8. 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 September 1, 1983, repair and overhaul work in the yard consisted of three frigates and an antisubmarine destroyer. 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 349 feet (106 m) to 1,092 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 was completed in early 1983, includes reactivation and modernization of the yard's six graving docks. Each of these drydocks has been certified by the Navy.

Coastal's work force in July 1983 totaled 1,000 slightly higher than a year earlier.

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

#### 9. 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, Oregon. FMC, also a major manufacturer of railroad freight cars, is an experienced builder of oceangoing and river barges, tugs, tankers, ferry boats, small military craft, and a wide range of marine structures. The facility is also engaged in general marine overhaul and repair.

Since 1977, FMC 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 ft. by 105 ft. (177 m by 32 m); a variety of 400 ft. x 100 ft. (122 m x 30 m) and combination deck cargo/tank barges; and specialized self-dumping hopper barges -- all certified for ocean service. An especially significant barge delivered in December 1982 was a 420 ft. x 98 ft. (128 m x 30 m) crane barge. The barge was fitted with a 500-ton (454 metric ton) Clyde Model 42 whirley crane, a 4,000 cubic yard gravel bin and a 200-ton (182 metric ton) crawler crane.

Six oceangoing barges were delivered during the first nine months of 1983. As of October 1, 1983, the yard's new construction backlog consisted of one 340-foot (104 m) deck barge for Alaska Marine Lines.

To expand its barge building capabilities, FMC made substantial capital investments during the 1970's. Included were additions of a 200-ton (182 metric ton) whirley crane, new types of welding equipment, a 2,500 ton (2270 metric ton) hydraulic press, numerically-controlled burning equipment, and computerized lofting.

Recent strength in FMC's barge business necessitated a second major yard expansion, completed in early 1982. The side-launch ways capacity was increased to accommodate a maximum vessel size of 800 ft. by 130 ft. (244 m by 40 m). Crane tracks were lengthened accordingly, and a 1,100 ft. (335 m) outfitting dock serviced by two whirley cranes and railroad tracks was also acquired. Drydocking is done at the nearby Port of Portland facility.

FMC's panel line and subassembly buildings are serviced by several overhead cranes with capacities to 40 tons (36 metric tons). Steel modules weighing up to 200 tons (182 metric tons) are fabricated to streamline hull assembly.

During the year, the labor force involved in marine work varied between 300 and 500. Exhibit 11 is a current general arrangement drawing of FMC's marine construction and repair facilities.

#### 10. 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, Wisconsin. 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, Wisconsin, 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 12 years, Fraser has performed most of the major ship lengthening work on the Great Lakes. At this shipyard, general ship repair has also been 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 May 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, there has been no major repair or conversion work. As of October 1, 1983, with only minor repair work in the yard, employment including salaried personnel totaled only 45 people. During the coming winter, three or four ore carriers are scheduled to be in the yard for their five-year inspection and survey.

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 to 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.

11. 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.

12. General Dynamics Corporation - Quincy Shipbuilding Division

One of the Nation's largest shipbuilding facilities, the Quincy Shipbuilding Division of General Dynamics Corporation is located on the Fore River in Quincy, Mass., approximately 10 miles southeast of Boston. Since its

founding at the turn of the century, this shipyard has designed and built more than 500 vessels of all sizes and types, including 285 ships for the Navy and 215 commercial ships. The yard was purchased from Bethlehem Steel Corporation in 1964.

Currently under construction are five new Quincy-designed maritime prepositioning ships, part of the Navy's MPS program to support the Rapid Deployment Force. These ships, to be time-chartered to the Military Sealift Command, will provide work at the Quincy yard through the first quarter of 1986.

Additionally, Quincy has also designed a new class of coal-fired self-unloading collier for the intercoastal transport of coal. The first of these 32,300-dwt. ships, the ENERGY INDEPENDENCE, was delivered in August 1983 and will carry two million metric tons of coal annually from mid-Atlantic ports to generating stations of the New England Electric System.

In recent years, the yard has also delivered to the Navy two ammunition ships, six replenishment oilers, two submarine tenders, and four dock landing ships. Quincy Shipbuilding also carries out a substantial volume of overhaul and repair work for the Navy. In April 1983, the company delivered the RO/RO containership CHARLES CARROLL (built for Sun Ship) to Waterman Steamship Corporation.

Quincy Shipbuilding is the world's leading designer and builder of LNG tankers, delivering 10 of these 935-foot (285 m) high-technology carriers during the late 1970's. The shipyard's present facilities reflect the substantial investments made in new technology to achieve efficient series production of these ships.

Other commercial construction has included three barge-carrying ships built for Lykes Bros. and several large oceangoing deep-notch barges.

In 1975, Quincy Shipbuilding completed a major expansion and renovation of its 180-acre facility. Among the major improvements were:

- o Conversion of two conventional sliding ways to large construction basins;
- o A new steel fabrication facility with updated equipment including a doubled-bed flat bar stripper, a web cutter with 19 torches in tandem, a T-beam fabricator, two plate stiffeners, a one-sided butt welding gantry and two 40-ton (36 metric ton) cranes;
- o A 1,200-ton (1089 metric ton) Goliath bridge crane, the largest in the Western Hemisphere;
- o New materials handling equipment and two 200-ton (188 metric ton) transporters; and
- o Completion of a new facility at Charleston, South Carolina, especially designed for the fabrication of spherical LNG cargo tanks but also capable of fabricating a wide range of

pressure vessels, drill rigs and platforms, and similar structures. Complete facilities are also in place for pipe and sheet metal fabrication, welding, machining, blast and paint.

There are five building basins at the Quincy shipyard. The largest of these can accommodate a maximum ship size of 936 feet by 143 feet (285 m x 44 m). The shipyard also has extensive facilities for topside and inboard repair work. Four piers and a wet basin are available with a total dockside accessibility of 4,600 feet (1402 m). There is ample crane capacity together with all utilities and services needed for outfitting and general repair work. The building basins are available as drydocks when not in use for new construction.

In addition to its shipyard construction and repair facilities, Quincy Shipbuilding also has a total capability in virtually all aspects of marine engineering and design.

Employment at mid-year 1983 was approximately 2,400 and is expected to climb to 5,100 in 1984 at the peak of the current maritime repositioning ship construction program.

Exhibit 13 is a current layout of the Quincy Shipbuilding Division's facilities.

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

The Ingalls Shipbuilding Division is located on the Gulf of Mexico at Pascagoula, Miss. Ingalls is a diversified shipbuilding facility experienced in the construction, conversion and overhaul of commercial ships and Navy warships and auxiliaries. In addition, the shipyard participates in ship system analysis and ship conceptual design. Ingalls was a pioneer in the application of modular construction in the U.S. shipbuilding industry.

Ingalls delivered 35 sophisticated warships to the U.S. Navy fleet between 1975 and 1980 -- 60 percent of all the combat ships delivered during that period. Thirty ships of the original Spruance (DD-963) class contract and five TARAWA (LHA-1) class amphibious assault ships were built by Ingalls using proven modular construction methods.

In 1981 and 1982, Ingalls delivered four Kidd (DDG-993) class guided missile destroyers to the Navy; and in 1982 the 31st Spruance class destroyer built by Ingalls and one Aegis guided missile cruiser, USS TICONDEROGA (CG-47), were delivered to the Navy. During this same period, 13 jackup drill rigs and four semisubmersible drill rigs were delivered to six drilling companies. As of October 1983, the new construction backlog consisted of eight AEGIS guided missile cruisers. The shipyard is also preparing for future construction of the LHD-1 class of amphibious assault ships and is modernizing and reactivating the battleship IOWA (BB-61). In addition to being the lead shipbuilder for four new classes of Navy ships since 1975, the company has been active in the repair, modification, and overhaul of U.S. Navy combatants, construction, overhaul and repair of mobile offshore drilling rigs, and the fabrication and assembly of railroad cars.

The ICWA arrived at Ingalls in January 1983 for modernization and reactivation. The underwater work was completed by Avondale Shipyards, Inc. in New Orleans, working under contract to Ingalls. Ingalls is upgrading shipboard systems, modernizing weapons, adding new weapons systems, and upgrading electronics systems. The ICWA is scheduled for redelivery to the Navy in June 1984.

Ingalls' East Bank facility has been in operation since 1938, 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 facility has a graving dock which has been used for construction and overhaul of nuclear-powered submarines, but is currently being used for ship repair work. A wharf and four piers serviced by cranes with a 60-ton (59 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 facility, completed in 1970, was designed and equipped for series production using modular construction methods. The yard is geared to assembly-line construction of large Navy and merchant ships.

The West Bank yard does not have conventional inclined shipbuilding ways. Instead, fabricated steel and 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 which is subsequently floated and moved to a deep water area where it is ballasted and the ship launched. The pontoon can launch a maximum ship size of 800 feet by 173 feet (244 m by 53 m). 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-1983 employed a total labor force of 10,200, down from 12,300 a year earlier.

Exhibits 14 and 15 are current general arrangement plans of facilities in the Ingalls East Bank and West Bank Yards.

#### 14. 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.

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, semisubmersibles, jackup rigs, and barges and tenders of various types. The company has also built 167 vessels for the U.S. Government, including frigates, a surface-effect ship, and 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.

In May 1981, Levingston, Orange, delivered the 36,000-dwt. dry-bulk carrier PRIDE OF TEXAS, followed by completion of a sistership, the STAR OF TEXAS, in January 1982. The SPIRIT OF TEXAS, the last in a series of three of these 612-foot (187 m) vessels, was delivered in December 1982. These were the largest ships ever built in the yard.

The delivery of the three dry-bulk vessels and delivery of an offshore drilling rig in December 1982 completed Levingston's backlog of new construction contracts. Since that time, the yard has been closed on a care-and-maintenance basis due to a lack of work. Vessel repair work at the Orange facility has been transferred to the company's Texas Gulfport plant. However, Levingston-Orange continues to actively seek ship construction, overhaul and repair contracts.

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, 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 one floating drydock with a lift capacity of 3,500 tons (3556 metric tons). A larger 11,000-ton (11176 metric ton) floating drydock has been transferred to the company's Texas Gulfport yard in Port Arthur. Total usable berthing space is about 2,400 lineal feet (732 m) at the Orange plant.

Exhibit 16 is a current general arrangement drawing showing construction facilities at Livingston's Orange, Texas, yard.

15. Lockheed Marine -- Shipbuilding Division

Lockheed Marine-Shipbuilding Division, a wholly owned subsidiary of Lockheed Corporation, is located in Seattle, Washington, on the southern perimeter of Puget Sound's Elliott Bay. This 94-year-old company was known as Puget Sound Bridge and Drydock Company when acquired in 1959 by Lockheed. In 1965, the company's name was changed to Lockheed Shipbuilding and Construction Company and was changed again in 1983 to its present name. Concurrent with the name change, Lockheed Marine assumed operational control of the Advanced Marine Systems Division formerly controlled by the Lockheed Missiles & Space Co. (Sunnyvale, California). The high-technology business pursuits of that group now are administered and controlled by Lockheed Marine in Seattle. That line of business includes: deep submergence rescue vehicles, mine neutralization technology, advanced marine architectural and marine engineering activities, ocean mining, corrosion control methodology, and unmanned Navy vehicles.

At Lockheed's Seattle plant a wide variety of vessels have been constructed, including light cruisers, destroyers, patrol frigates, ammunition ships, amphibious transport docks, oil drilling vessels, the world's largest 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 delivered in July 1981.

Currently under construction at Lockheed for the Navy are three Whidbey Island class amphibious dock landing ships, the LSD-41, LSD-42, and the LSD-43. The company is optimistic with regard to winning future construction contracts for additional LSD's. On the repair side, Lockheed in early 1983 completed 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 repair contracts for Washington and Alaska ferries. Lockheed normally drydocks, repairs, and overhauls more than 100 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 ship 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 two 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 100 tons (90 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-1983 totaled 3,000, up from approximately 2,000 a year earlier.

Exhibits 17 and 18 are current general arrangement drawings of the Seattle yard's Plant No. 1 and Plant No. 2.

16. Marathon LeTourneau Company - Gulf Marine Division

Marathon Manufacturing Company, a world leader in production of offshore drilling rigs, launched its new Gulf Coast shipyard, the Gulf Marine Division, in 1971 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. Since it was founded, this Marathon yard has built and launched semi-submersible and jackup drilling rigs totaling more than 150,000 tons of production and has the capability to build and launch drillships, crane barges, work boats, tugs, and large commercial vessels. 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.

The Gulf Marine Division provides major repair, modification, and conversion work on offshore drilling rigs and other oceangoing vessels at Brownsville and has sent repair and maintenance teams to locations around the world. The yard can also fabricate packaged mobile power plants and other types of equipment as well as perform heavy metal fabrication.

As of October 1, 1983, the Gulf Marine Division's new construction backlog was down to one offshore drilling rig. This was a Marathon-design Super 300 cantilever and slot jackup rig, which is the first of its kind to be constructed in the United States. Delivery to Global Marine, Inc. is scheduled for December 1983.

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 m<sup>2</sup>) 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).

At mid 1983, the total work force at the Brownsville plant was 900, down from 1,300 a year earlier.

Exhibit 19 is a plot plan of the yard's construction facilities.

17. Marine Power & Equipment Co., Inc.

This medium-size shipyard, in business in Seattle, Washington since 1946, is capable of construction, conversion, and repair of a wide variety of vessels, including towing, fishing, oil survey and support vessels, ferries, and Government ships. Marine Power & Equipment Co. (MPE) is the parent company of Washington Steel Corp., Seaway Express Corp., Olympic Propeller Corp., Propulsion Systems Inc., and Marine Logistics Corp.

MPE is a full service shipyard complete with drydocks, fabricating and welding shops, machine shops, electrical and electronic shops, and other shops and essential marine oriented services including fixed and variable pitch propeller manufacture and repair.

Vessels built by this company during the past two years consisted of two oceangoing tugs and nine oceangoing barges; and from 1979/1981 six passenger ferries for the State of Washington were constructed. Currently in production are two oceangoing tugs, two large oceangoing barges, and 21 LCM's (landing craft) for the Navy. In early October 1983, the company signed a \$230 million conditional contract for construction of two 540-foot (165 m) American-flag cruise ships for newly-formed Contessa Cruise Line, Inc. of Houston, Texas. Final signing of the contract has not been consummated.

Although Marine Power's shipbuilding and repair complex comprises six yards, new construction work is done in Yards 2 and 4 with support available from the other divisions. The company operates seven building ways, and the maximum size vessel that can be built is 600 feet by 86 feet (183 m by 26 m).

Modular construction techniques are combined with conventional shipbuilding methods. Production facilities have been upgraded by the installation of a modernized numerically controlled steel cutting system and a semi-automatic steel fabrication panel line. CAD/CAM systems are used for lofting and design, and a Vision 4 system is used for cost scheduling and control. Laser control alignment is used.

During construction of the 540-foot (165 m) Contessa passenger ships, advanced zone-outfitting techniques would be used. Construction and launching would be in the company's Yard 4 where a 5,000-ton (5305 metric ton) lift capacity syncrolift is available for launching or retrieving vessels. Adjacent to the syncrolift is the proposed building site which consists essentially of a flat concrete slab of sufficient dimensions to accommodate one Contessa ship. The syncrolift, since it is not sufficiently long for the proposed vessel dimensions, would need to be extended in length. Movement of the ship from the construction site to the adjacent launching position would be accomplished by hydrolift. A film of water is introduced between the lifting platform and the concrete slab to reduce friction, and trucks and/or winches would be used to push or pull the vessel sideways onto the syncrolift. This construction method and the hydrolift movement were used successfully in the construction of the six Washington State ferries and several 400-foot (122 m) oceangoing barges.

In addition to the syncrolift, the company operates seven floating drydocks, the largest of which can handle vessels up to 400 feet by 57 feet (122 m by 17 m). Usable berthing space for outfitting and repair work totals 4,230 feet (1289 m).

Total employment at Marine Power & Equipment Co. in July 1983 was approximately 400 and is expected to increase to 900 in 1984.

Exhibits 20 and 21 are current general arrangement plans of Yards 2 and 4 where the company's new construction work is done.

#### 18. 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, Maryland. This yard, which has been in business for 61 years, offers full facilities for ship construction, conversion, overhaul, and repair. Although primarily a repair and conversion yard, Maryland during the 1960's and 1970's has built 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 40 naval vessels of many different types. This was in addition to the yard's workload of commercial ship repair.

During 1983, Maryland's repair and overhaul business and non-ship work has been at its lowest level in several years, and since mid-1982 the yard's work force has declined precipitously. However, the company is continuing to bid on both Navy and commercial work.

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

- o Installation of a new floating drydock 827 feet (252 m) long by 150 feet (46 m) between wing walls

with a lifting capacity of 36,000 long tons (36576 metric tons). This dock is used for launching newly constructed vessels from the building way, as well as for ship repair and conversion work; and

- o Lengthening of the yard's one building way to permit construction of ships up to 850 feet by 110 feet (259 m by 34 m) compared to the previous maximum of 630 feet by 96 feet (198 m by 29 m).

Maryland has recently added a new pipe shop with automatic bending capabilities for pipe up to 16 inches (406 mm) in diameter and a new and larger steel plate roll.

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-1983 was approximately 300, compared to about 1,200 at mid-1982.

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

#### 19. National Steel and Shipbuilding Company

National Steel and Shipbuilding Company (NASSCO), the largest shipbuilding complex on the West Coast, participates in the commercial and U.S. Navy shipbuilding, repair and conversion markets. 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 Of 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 1, 1983, 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, three La Jolla class product carriers (44,000 dwt.), and two Ingram class (37,500 dwt.) product carriers. The San Diego class tankers are the largest vessels ever built on the West Coast. In July 1983, the company delivered the SHENANDOAH (AD-44), the last of a series of four Gompers class destroyer tenders built at NASSCO. Under construction for the Navy as of October 1983 was a cable repair ship (T-ARC-7).

NASSCO is adapting its capabilities in response to a changing market. While the company had been predominantly a new construction yard, current work in progress or on order includes the conversion of three SL-7 Sea-Land containerships to fast sealift ships for the DOD Rapid Deployment Force. The

third ship is slated for redelivery in early 1986. Contracts have also been signed for the conversion of three Waterman RO/RO containerships to maritime repositioning ships, which will provide work through April 1985.

In June 1983, the Navy awarded the company a contract to convert a NASSCO-built San Clemente class tanker to a 1,000-bed hospital ship (T-AH). The contract includes an option for conversion of a second vessel. Production is scheduled to start in October 1984 with completion of the project set for October 1986.

NASSCO's Repair Department performs a significant amount of repair and overhaul work on commercial ships and on combat and auxiliary ships for the Navy. During 1983, the company's repair work included inert gas retrofit of two commercial tankers. Navy work consisted of regular overhauls on five LST's and two FF's, and the repair and modernization of five CG's, two FF's, one CV, and one AD.

In the fourth quarter of 1983, NASSCO will place in operation a new 25,000-ton (25400 metric ton) floating drydock which will enable the yard to respond more fully to both Navy and commercial ship repair markets.

NASSCO's facilities include a building dock in which ships up to 980 feet by 170 feet (299 m by 52 m) can be constructed. In addition, the company operates three inclined building ways. Two of these 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). Cranes are available that can provide lifts up to 175 tons (159 metric tons). Berthing is available at 10 full-service berths that can accommodate ships with drafts up to 35 feet (10.6 m) and lengths up to 1,000 feet (305 m). For overhaul and repair work, a large graving dock at the nearby U.S. Naval Station, that is capable of handling a maximum ship size of 687 feet by 90 feet (209 m by 27 m), can be leased by NASSCO on a use basis.

The company's fabrication and assembly facilities cover 143,000 square feet (13284 m<sup>2</sup>) of fabrication and subassembly area and have approximately a 2,000-ton (1816 metric ton) per week capacity.

As of mid-1983, the total labor force was 3,463, down from 6,000 at mid-1982.

Exhibit 23 is a current NASSCO plot plan.

## 20. Newport News Shipbuilding

Newport News Shipbuilding, located at the Port of Hampton Roads in Newport News, Virginia, 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, 32 nuclear-powered submarines, and 121 other surface ships for the U.S. Navy. Commercial vessels delivered by the yard include 71 cargo ships, 84 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 lines.

Newport News is the Nation's foremost builder of Navy nuclear warships. The yard, as of October 1, 1983, was at work on three Nimitz class aircraft carriers and eight attack submarines. 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 completion in 1982 of a new 1,334-foot (407 m) pier complex with two 30-ton (27 metric ton) cranes. Capability has been provided for transferring, via transfer rail, one 30-ton (27 metric ton) crane for use at Drydock 1. A new electroplating facility became available in mid-1983. Capabilities will include zinc, cadmium, lead, copper, chrome, silver and nickel plating. Chemical cleaning, pickling, stripping, buffing and polishing will also be available. Extensive modernization and upgrading of two older drydocks will be completed by year's end. Other major improvements include upgrading and renovation of outfitting piers.

In July 1983, Newport News announced plans to build a new \$300 million submarine construction and repair complex. The facility will be used mainly for Navy attack submarines and will be completed in 1987. The project will involve four new building ways, a major new construction facility under cover, and the addition of a new launching dock.

The 150-acre North yard has been converted from solely the construction of merchant vessels to include 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 1613 feet (492 m) long, 250 feet (76 m) wide, and 33 feet (10 m) deep. The addition during 1982 of two 30 metric ton cranes and a third position for the intermediate gate further expands the multi-ship construction capability of this dock, permitting simultaneous ship construction and repair. A 900 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 each of which had one additional 30 metric ton crane installed during 1982.

The South yard has four inclined shipbuilding ways, and the two largest of these can each accommodate vessels as large as 940 feet by 125 feet (287 m by 38 m). In the South yard, there are six graving docks in operation, two of which are used for construction work and are serviced by a 310 long ton (315 metric ton) gantry crane. The largest of these two basins can handle ships up to 1,100 feet by 130 feet (335 m by 40 m). The other four of the six graving docks in the South yard are used mainly for ship repair and overhaul work. 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;
- 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 and small electrical switchboards and panels; and
- o A computer center, testing laboratories, and over 1,000,000 square feet (92900 m<sup>2</sup>) of inside storage including a 106,000 square foot (9847 m<sup>2</sup>) automated material storage facility.

The total labor force at Newport News increased from 26,000 in mid-1982 to 28,260 in mid-1983.

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

#### 21. 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 delivered the diesel-powered oceangoing hopper dredge YAQUINA to the Corps of Engineers. During 1982, three major construction projects were completed: (1) a large passenger ferry; (2) a new fully-equipped 2,800-ton (2845 metric ton) 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, Norshipco's repair and overhaul business was thriving during most of 1983. Completed during the first nine months of the year was the major overhaul of a frigate and a tank landing ship for the Navy, the modification of a large offshore drillship, and a variety of commercial overhaul and repair jobs. As of October 1983, work was underway on the overhaul of a tank landing ship and a floating drydock for the Navy; and other Navy work was due in the yard later in the year. By the end of 1983, a total of seven foreign-flag cruise ships will have been at Norshipco for drydock and repair during the year.

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 many 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. Lifting capacity is 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 large floating drydock. A giant Kroll L-1800 hammerhead jib trolley crane is located on this pier and spans the width of this floating drydock. The crane is also able to service the outboard side of the new pier.

During 1982 and 1983, Norshipco's ongoing capital investment program continued, with expansion and modernization of both the Berkley and Brambleton yards.

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) beam. 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 is an older floating drydock in the Berkley Plant 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).

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 3,080 in June 1983, up from 2,540 a year earlier.

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

## 22. Pennsylvania Shipbuilding Company (Formerly Sun Ship, Inc.)

Pennsylvania-Texas, Inc. (an affiliate of Paden, Inc.) in February 1982 acquired the operating assets of the ailing Sun Ship located in Chester, Pa. The yard's corporate name is now 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.

Sun Ship, in early 1981, announced its decision to phase out its ship construction business and concentrate on ship repair and conversion. At that time, the company had under construction or on order three RO/RO containerships for Waterman Steamship Corporation. Sun completed the first vessel, the JOHN B. WATERMAN. The second ship, the CHARLES CARROLL, was built for Sun by General Dynamics, Quincy; and third ship, the THOMAS HEYWARD, was built for Sun by Penn Ship and was delivered in February 1983.

In October 1982, work began at Penn Ship on the major conversion for the Navy of a Sea-Land SL-7 containership to a fast sealift ship for the DOD Rapid Deployment Force. The vessel, renamed the USNS CAPELLA, is 946 feet (288 m) in length overall. This reconstruction project will provide work through mid-1984. On October 31, 1983, the Navy awarded Penn Ship an additional SL-7 conversion. Redelivery is scheduled for February 1986.

In 1976, completion of a major capital improvement program enhanced this 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 tank vessels up to about 300,000 dwt., is one of the world's largest floating drydocks. It is serviced by two 23-ton (21 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 with a 230-foot (70 m) boom.

In September 1982, in order to handle an increasing volume of repair and overhaul work, Penn Ship purchased and moved a medium-size floating drydock from Livingston 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. Each can handle a ship as large as 825 feet by 136 feet (251 m by 41.5 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 1,240 at mid-1983.

Exhibit 27 is the latest available layout of the plant and facilities at Pennsylvania Shipbuilding Company.

### 23. 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 offshore 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). During the first three quarters of 1983, one Coast Guard cutter (WMEC) and last of a series of six revolutionary design tractor tugs were delivered.

Tacoma Boat's backlog of ship construction as of October 1, 1983, included the following military contracts: three medium-endurance cutters (WMEC's) for the Coast Guard, 12 T-AGOS ocean surveillance ships for the Navy, and (in the engineering and design stage) two corvette missile ships for the Government of Thailand. On the commercial side, the company had under construction two tuna purseiners and two U.S.-flag incinerator ships, the first ships of this type ever built 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, is used in conjunction with zone outfitting techniques. The Navy T-AGOS program is the first Tacoma Boat contract to use zone outfitting exclusively.

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 (184 metric 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 540 feet by 75 feet (165 m by 23 m) and has a lifting capacity of 8,000 tons (8128 metric tons). Available for outfitting and repair work is 4,200 feet (1280 m) of berthing space.

Total work force at Tacoma Boat at mid-1983 was 2,760, about the same as a year earlier.

Exhibits 28 and 29 are current general arrangement drawings of the company's four yards.

#### 24. 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, Florida. 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.

In July 1981, Tampa Ship's parent company, The American Ship Building Company, was awarded a \$73 million contract to convert four Moore McCormack C4 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 the second was completed at the company's Lorain yard in October 1982, with the third and fourth completed at Tampa in December 1982 and June 1983.

The American Ship Building Company, under contracts signed June 30, 1983, with Ocean Carriers, Inc., will construct five new 30,000-dwt. clean-product, ice-strengthened tankers for charter to Military Sealift Command. Present plans call for the preponderance of work to be accomplished at Tampa Shipyards, although Avondale Shipyards will build the forebodies and ADDSCO Industries has contracted to do the deckhouse steel work. Final assembly and outfitting will take place at Tampa Ship. This five-ship program is expected to provide work at Tampa through February 1986.

To provide additional fabricating capability for the tanker program, Tampa Ship will reactivate, under a three-year lease, the modern Westinghouse heavy-steel fabricating facility on Tampa's west shore. This Westinghouse plant has available a 700-ton (635 metric ton) crane. The building is two hours by tow from Tampa Ship.

Tampa Shipyards presently has two graving docks; the largest can handle ships up to 896 feet by 146 feet (273 m by 45 m). As part of the yard's current expansion program, two additional graving docks are under construction along with a new concrete pier, two wet berths, and additional shops. Each of these two new drydocks will be able to accommodate a vessel 746 feet by 121 feet (227 m by 37 m). A new assembly building, containing two 250-ton (227 metric ton) bridge cranes will cover one end of the new No. 4 graving dock under construction. Major portions of the company's main yard will also be paved, additional cranes will be installed, and new shops will be constructed to upgrade the yard's ship repair capability.

Tampa Ship 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. Usable berthing space totals 2,240 feet (683 m).

At mid-1983, 940 people were on the Tampa payroll, up from about 820 in July 1982.

Exhibit 30 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 is leased from the Tampa Port Authority.

#### 25. 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 was 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) 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 has been repair of offshore rigs, small vessels, and barges.

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 four floating drydocks, the largest can accommodate a vessel 420 feet by 122 feet (128 m by 37 m). There is a total of 1,270 feet (387 m) of pierside berthing.

Texas Gulfport's labor force at mid-1983 totaled 200, about the same as mid-1982.

Exhibit 31 is a plot plan of the main portion of the yard. Because of the attenuated shape of the yard as a whole, this plan does not show downstream outfit and repair berths or tank-cleaning and gas-freeing facilities.

#### 26. Todd Shipyards Corporation - Galveston Division

The Galveston Division of Todd Shipyards Corporation was founded in 1934 on Pelican Island on the Galveston Ship Channel. The yard, located directly across from the City of Galveston, Texas, is a ship construction, repair and conversion complex with a work force experienced in custom industrial steel fabrications. The shipyard was awarded the Navy's "E" Award for its substantial contribution during World War II in the field of ship repair.

In the past decade, the yard has become an important part of the Gulf Coast oil drilling industry, turning out an impressive inventory of modern oil-related ships, barges, and specialized craft. The most outstanding 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 constructed.

Hundreds of ships and drilling rigs, American and foreign-flag, normally enter this shipyard every year for repair, overhaul or drydocking; but conversion work has also been a mainstay of the company. Over the past 15 years, 25 major conversions were successfully accomplished. During 1981 and 1982, Todd's Galveston Division delivered four large oceangoing barges. In 1983, under a contract with Bethlehem Steel, the yard began work on the ELEO MAERSK, the first of two Maersk Line cargo ships being converted to maritime prepositioning ships (formerly T-AKX) by Bethlehem-Beaumont. Todd-Galveston is drydocking the ship, cutting it in two, installing the new midbody built at Beaumont, and performing the joining work before turning the vessel over to Bethlehem-Beaumont for final completion scheduled for September 1984.

Vessels up to 475 feet by 85 feet (145 m by 26 m) can be constructed under roof on a launching pontoon and then launched into one of the yard's floating drydocks.

For several years, the yard has operated a 15,000-ton (15240 metric ton) floating drydock, which can handle ships and barges as large as 670 feet by 86 feet (204 m by 26 m).

In its continuing effort to increase its repair business, Todd in April 1982 also put into operation at its Galveston plant one of the largest floating drydocks on the Gulf Coast. This new 40000 metric ton drydock, built by Kawasaki Heavy Industries, Ltd. in Japan, is capable of lifting ships as large as 225,000 dwt. and all drill rigs with beams no greater than 160 feet (48.7 m). Forty vessels were drydocked on this drydock during 1982 and the first quarter of 1983.

As a result of Todd's decision to consolidate its Houston yard with its Galveston facility, Houston's new 17,500-ton (17780 metric ton) floating drydock was expected to be moved in late 1983 or early 1984 to the company's Galveston shipyard. This drydock can accommodate vessels up to 600 feet by 118 feet (183 m by 36 m).

There are four piers at the main Galveston yard. The usable berthing for outfitting and repair work totals about 6,400 linear feet (1950 m). These piers are serviced by seven rail-mounted, revolving gantry cranes, ranging from five tons (4.5 metric tons) to 75 tons (68 metric tons), that also service the platen areas. In addition to the outfitting and repair berthing piers, a new layberth with support facilities, other than gantry, was placed into operation in late 1982. This layberth can accommodate ships up to 1,000 feet (304.8 m) in length and 140 feet (42.67 m) beam.

Completing Todd's Galveston complex is the Southwest Plant support facility, within approximately one mile (1.6 km) of the main yard, with more than 90,000 square feet (8361 m<sup>2</sup>) of covered manufacturing area. 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) are covered.

As of mid-1983, total employment was 918, down from about 1,000 a year earlier.

Exhibit 32 is a current plan of the main yard and the Southwest Plant.

#### 27. Todd Pacific Shipyards Corporation - Los Angeles Division

Todd's Los Angeles Division is located on a city-leased 116-acre site in the West Basin of the Port of Los Angeles. This facility, formerly the Los Angeles Shipbuilding and Drydock Company, was managed for the Navy by Todd beginning in 1942. Todd purchased the shipyard facilities in 1947. In 1977, the Todd Los Angeles and Seattle Divisions were organized as the Todd Pacific Shipyards Corporation, a wholly owned subsidiary of Todd Shipyards Corporation.

The facility is a full-service, design, construction, conversion, and repair shipyard, having continually expanded over the years to fill the needs and meet the future challenges of the maritime industries and the national defense base.



During World War II, Todd-LA built 10 major Navy auxiliary ships, including destroyer tenders (AD) and repair ships (AR). Since that time, the yard has engaged in construction, conversion, and repair of both commercial and Navy ships. On the commercial side, the company built five cargo ships, eight product tankers, and several barges and specialty craft. Commercial reconstruction included eight conversions from cargo ships to container vessels, an LPG forebody, and numerous midbody projects.

In the 1950's and 1960's, in addition to the conversion of several major Navy auxiliary ships, the yard has constructed nine destroyer-type vessels. Also from the late 1970's until October 1, 1983, Todd-LA has built 10 sophisticated guided missile frigates (FFG-7 class). Seven of these FFG's are currently under construction, which will provide employment through October 1986. During 1983, Todd-LA has performed repair and overhaul work on several types of naval auxiliary vessels, as well as post shakedown availability work on guided missile frigates.

Over the past 15 years, the yard has pursued an ongoing facilities expansion program in parallel with shipbuilding, conversion, and repair work. The underlying inclined building ways and supporting cranes were modified from three ways, limited to 1950-60 era maritime construction and destroyer class buildings, to two ways capable of "Panamax" and cruiser class construction. Complementing the building ways capabilities expansion, the upland construction areas have been developed into a fully-equipped, sophisticated production line for fabrication and movement of modules from semi- and fully-automatic welding units to the building ways area.

Shops have been extended in size, platens expanded, craneways extended,, and new construction manufacturing machinery added. One of the first robotic production welding centers in U.S. shipbuilding is also in full operation. The most recent facility expansion project in this program is the addition of a land-level ship lift (syncrolift) facility presently under construction. The syncrolift platform is 656 feet by 106 feet (200 m by 32 m) with a lifting capacity for vessels up to 48,000 dwt. An adjacent transfer system will enable the yard to service two maximum size ships ashore simultaneously. The platform, transfer facility, and two work bays are scheduled to come on stream in early 1984.

Todd-LA operates two floating drydocks, the largest of which can handle a vessel up to 700 feet by 86 feet (213 m by 26 m). Berthing space in the yard totals 6,175 feet (1882 m).

Two complete shoreside Navy crew living complexes are available to accommodate crew members while their ships are undergoing PSA, SRA, overhaul, or other repair work at the shipyard.

A full computer-aided engineering center is operational, providing numerical control for lofting and automated machinery for production, as well as design and production services. Production planning, purchasing, and material control systems are also computer assisted.

R&D in shipbuilding technology continues to be an important aspect of the shipyard's management. Presently the yard sponsors two SNAME/SPC technical panels: Outfit Planning (SP-2) and Flexible Automation (SP-10). Research under

other SNAME/SPC panels is being conducted in areas of robotics, waterborne coatings, shipbuilding standards, and outfitting aids. The Los Angeles Division has been established as the Todd corporate center for R&D and advanced shipbuilding technology development. An independent research and development program for other projects having special interest or impact on the corporation is also conducted at the shipyard.

Total employment at the yard was 5,000 in July 1983, down from 5,700 a year earlier.

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

#### 28. 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 reportedly the oldest yard in the United States from the standpoint of continuous service. One of the larger and more 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 commercial 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 in October 1982, no major ship-construction or repair work remained in the yard.

During the first half of 1983, work at the yard included construction of a caisson gate for Mare Island Naval Shipyard, construction of Navy submarine propulsion shafts under contract to General Dynamics-Electric Boat, and repair

of propulsion shafts for naval and commercial ships. In addition, two guided missile destroyers, the CALLAGHAN and the CHANDLER, were drydocked for below-water repair work; and work was started on the regular overhaul of the fleet oiler ROANOKE. Repair and maintenance work was also performed on the NIAGARA FALLS, a large naval auxiliary refrigeration ship.

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 mid-1983, the yard's work force totaled 750.

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

#### 29. Todd Pacific Shipyards Corporation - Seattle Division

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

This 45-acre yard has been a prime supplier of fighting ships for 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 250 people. In the early 1950's, the yard embarked anew on vessel construction and industrial production, completing a formidable array of tugs, barges, dredges, pile drivers, floating cranes, etc. In 1958, the company re-entered destroyer construction and by 1964 had delivered four guided missile destroyers to the Navy. The Seattle Division then became lead yard for a class of 26 frigates, seven of which were built there. During this period, the yard also built the Navy's only catamaran oceanographic vessel.

From mid-1971 until early 1976, Todd-Seattle built the Washington State ferry system's two 200-car double-ended ferries, a surface effect ship for the U.S. Navy, seven tug-supply vessels designed for North Sea conditions, and several barges. Containership conversions were performed for American President Lines and Sea-Land. In late 1976, the yard once again began combat ship construction under the first of a series of guided missile frigate (FFG)

contracts. As of October 1, 1983, nine FFG's had been delivered and the remaining four were under construction.

In October 1982, the U.S. Navy awarded Todd-Seattle a 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 an active ship repair and overhaul operation that annually works on from 300 to 400 commercial and naval vessels. The Seattle Division has been appointed authorized repair and service representative for B&W Diesel of Denmark and Sulzer Marine Diesels of Switzerland.

The FFG Program provided the impetus for a multi-million dollar capital investment program for improving productivity of the Seattle yard in ship repair, overhaul, and conversion. In July 1982, the company transferred a 40,000 metric ton floating drydock from its San Francisco Division to Seattle. A 150-ton (137 metric ton) traveling whirley crane on the adjacent 1,000-foot (305 m) concrete pier serves the floating drydock and the adjacent berths. A second pier was rebuilt in concrete and lengthened to give the yard a 1,000-foot (305 m) berth with a 40-foot (12.2 m) water depth.

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 simultaneous construction of two ships with beams of 50 feet (15 m) or less. A small side-launch building way was added in 1974. In addition to the 40,000 metric ton drydock, 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).

Two wharves and five piers provide a total of 6017 feet (1834 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 1983, total employment at the Seattle plant was 3,056, down from 4,500 a year earlier. With the FFG program winding down, further layoffs are anticipated.

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

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

Triple A Machine Shop was in business in San Francisco, 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.

Repair work moved at a slow pace during the first quarter of 1983, but a contract for repair and modernization of the nuclear-powered aircraft carrier ENTERPRISE (CVN-65) provided substantial employment from May until July 26 when

a two-month strike of production workers began. Work on the ENTERPRISE was completed at Mare Island Naval Shipyard with Triple A supervision. In late 1983, Triple A will begin work on a four-month contract to repair and modernize the aircraft carrier CARL VINSON (CVN-70).

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 July 1, 1983, employment at the yard totaled 770; 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 six years in privately owned U.S. shipbuilding and ship repair yards (Bureau of Labor Statistics figures) is shown in the following table:

1978 Average	170,200
1979 Average	171,600
1980 Average	170,400
1981 Average	177,800
1982 Average	168,700
1983 January	154,100
1983 February	149,800
1983 March	156,900
1983 April	153,900
1983 May	154,200
1983 June	152,700
1983 July	156,900
1983 August	150,800
1983 September (Prelim.)	152,900

The Maritime Administration monitors employment in the 26 major U.S. privately owned shipyards in the Active Shipbuilding Base (as identified in Exhibit 40 of this report) on a monthly basis. As of September 1983, employment in these 26 yards totaled 101,145 or approximately 66 percent of the overall shipbuilding and repair industry employment published by the Bureau of Labor Statistics. See Exhibit 43 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 Shipbuilding Costs and Production.

## 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, its Industrial Health and Safety Committee, and its Ad Hoc Committee on Carcinogen Policy. 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 involved with pollution abatement within local and State governments as well as the Federal Government.

Fiscal Year 1983 saw within the committees a continuation of 1982 activities.

## Ship Repair Facilities

While over 200 privately owned firms of varying capabilities are involved in repairing ships in the United States, only 70 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 95 floating drydocks, 55 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 transport labor and material to the work site. Topside yards often employ less than 100 people.

As of October 1983, the Maritime Administration held lump sum master repair contracts with 82 private ship repair companies; and 184 private shipyards were included in the Navy's master ship repair list.

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. In July 1983, Newport News announced plans to build a new \$300 million submarine construction and repair complex which will be completed in 1987. This project will involve four new building ways, a major new construction facility under cover, and the addition of a new launching dock.

- o Norfolk Shipbuilding and Dry Dock Corporation

In addition to a major expansion program completed in 1979, consisting of a new 54,000-ton (54064 metric ton) floating drydock, a new concrete pier 1,030 feet (314 m) in length, and support facilities, the company in 1982 also completed a \$4.5 million modernization program including a new 2,800-ton (2844 metric ton) steel floating drydock and

other facilities to further increase repair and conversion capability.

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 in November 1983 will put into operation a new \$46.7 million conversion and repair facility in Portland, Maine. The centerpiece of this fully-equipped, self-contained shipyard is an 81,000 long ton (82296 metric ton) lift capacity floating drydock, 844 feet (257 m) in length with a 140-foot (43 m) clear docking width.

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. In addition, a new 17,500-ton (17780 metric ton) floating drydock, built by Bender Shipbuilding for Todd's Houston Division in 1982, was transferred to Todd-Galveston in late 1983.

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 two vessels simultaneously and is scheduled to go into operation by the end of January 1984.

Todd's facility upgrading program also included 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 has been modified to accommodate naval combatants and auxiliaries, as well as commercial ships.



o Jacksonville Shipyards

A new 30,000-ton (30480 metric ton) floating drydock, built in West Germany, was put into service in July 1983 in Jacksonville's main plant. This drydock which can accommodate ships up to 725 feet by 127 feet (221 m by 39 m) complements the main yard's two large floating drydocks presently in operation.

o National Steel and Shipbuilding Company

In late 1983, NASSCO will place in operation a new 25,000-ton (25400 metric ton) floating drydock, which will enable the yard to respond more fully to both Navy and commercial ship repair markets.

o Metro Machine Corporation

In 1982, this Norfolk, Virginia, repair yard installed a new 14,000-ton (14224 metric ton) floating drydock, built in Spain. Prior to acquisition of this drydock, Metro Machine was limited to topside work.

o Southwest Marine, Inc.

In late 1982, Southwest Marine announced a multimillion-dollar renovation at its San Diego repair yard, highlighted by the signing of a contract with Kawasaki Heavy Industries, Ltd. of Japan for construction of a new high-tech computerized floating drydock. This 22000 metric-ton lift capacity drydock will be delivered in late 1984. According to company management, the planned addition of two shore platforms and other support equipment to be used in conjunction with this unique end-transfer drydock will provide the capability to transfer ships up to 600 feet (183 m) in length onto the two platforms for dry berthing. Using this concept, three large ships can be repaired simultaneously out-of-water -- one on each platform and one in the new floating drydock.

o Braswell Shipyards

A new 10,000-ton (10160 metric ton) floating drydock, built in West Germany, began operations in 1983 at the company's Charleston, South Carolina repair yard.

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 Navy 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 continued to be generally weak during 1983, and future prospects are uncertain. Navy repair and overhaul work continued to be a consistent and stable element in our repair industry's endeavors.

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 many 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 or marine railway 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 1983 on 55 of these repair yards on a coastal basis. Additional data is available in the Office of Shipbuilding Costs and Production.

#### 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, 59 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 Shipbuilding Costs and Production.

#### Active Shipbuilding Base

The Active Shipbuilding Base comprises the 26 privately owned U.S. shipyards currently engaged in or seeking contracts for the construction of naval ships and/or major oceangoing or Great Lakes merchant ships. Exhibit 40 of this report identifies and geographically locates these 26 yards. Exhibit 41 tabulates the number and contract value of commercial vessels and barges, large and small, under construction or on order as of September 30, 1983, in these shipyards; and Exhibit 42 indicates when each of the yards in the Active Shipbuilding Base needed new contracts as of September 30, 1983, 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 Evaluation Analysis System Model (SEAS). 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.

In August 1983, the number of yards in the Active Shipbuilding Base was reduced from 27 to 26 as a result of the closure of Todd's Houston Division and its consolidation with Todd-Galveston.

As of September 30, 1983, 12 of the 26 shipyards were engaged in construction of major combat ships and auxiliary vessels for the Navy, six of the yards were building a total of 15 major commercial vessels, and seven of the yards were engaged in ship construction and conversion work provided by the Navy's T-Ship program. Six of the yards had only repair, overhaul, or conversion work; and one of the 26 shipyards was closed and being maintained on a caretaker basis.

As of September 1983, 86 percent of the production workers in these 26 shipyards were engaged in Navy or Coast Guard ship construction and repair work.

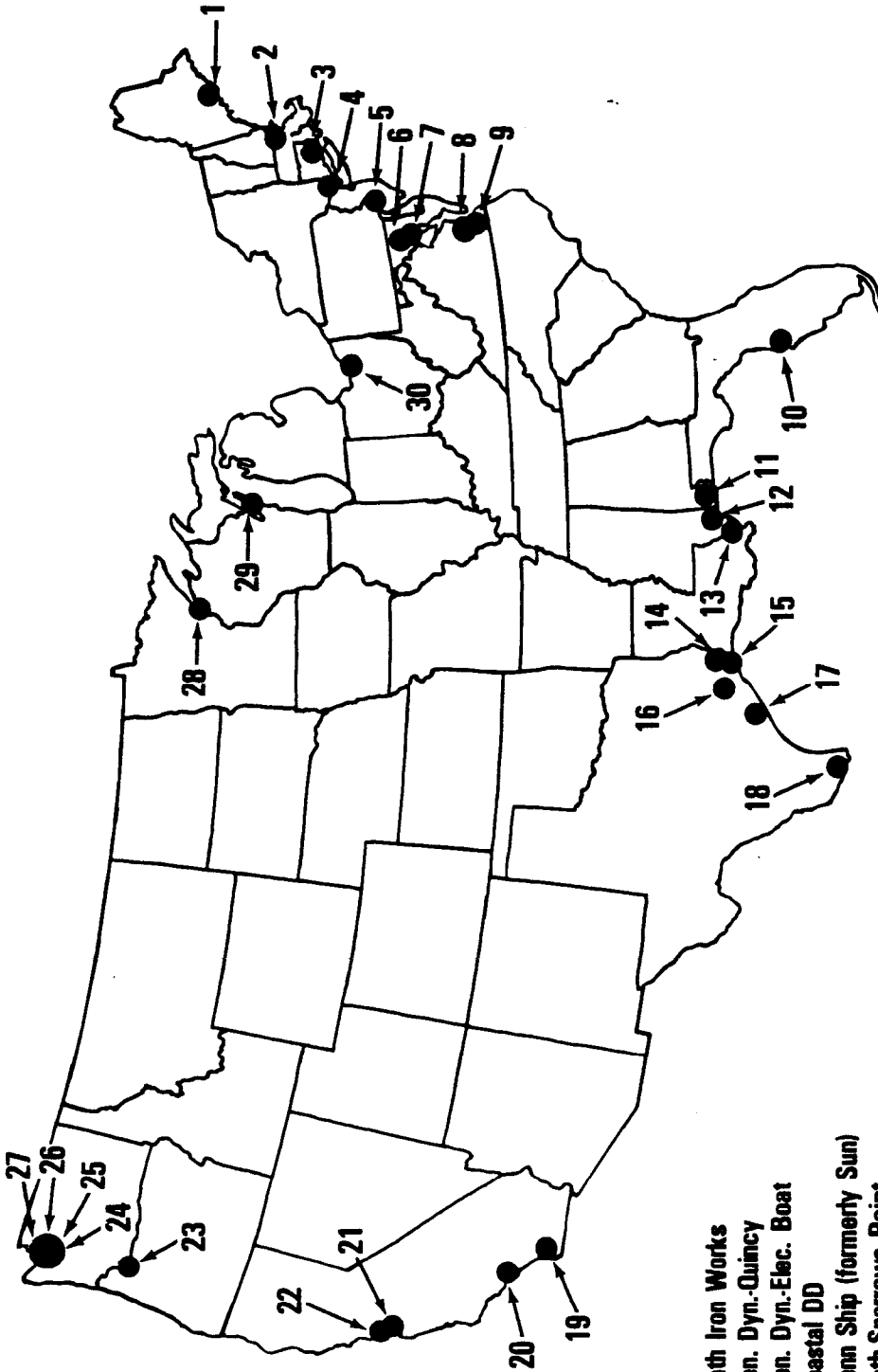
Employment projections for equivalent production workers is shown by Exhibit 43. This data is generated by overlaying Navy and private projected five-year shipbuilding and conversion programs onto the estimated work force required to complete the current firm orderbook.

Exhibit 43 indicates a continuing steady decline in work force levels during 1984 and 1985 resulting in the loss of up to 8,000 jobs. However, an upturn in shipyard employment beginning in the first quarter of 1986 and

continuing through most of 1988 is expected to increase the production work force in the Active Shipbuilding Base by approximately 20,000 during this time period.

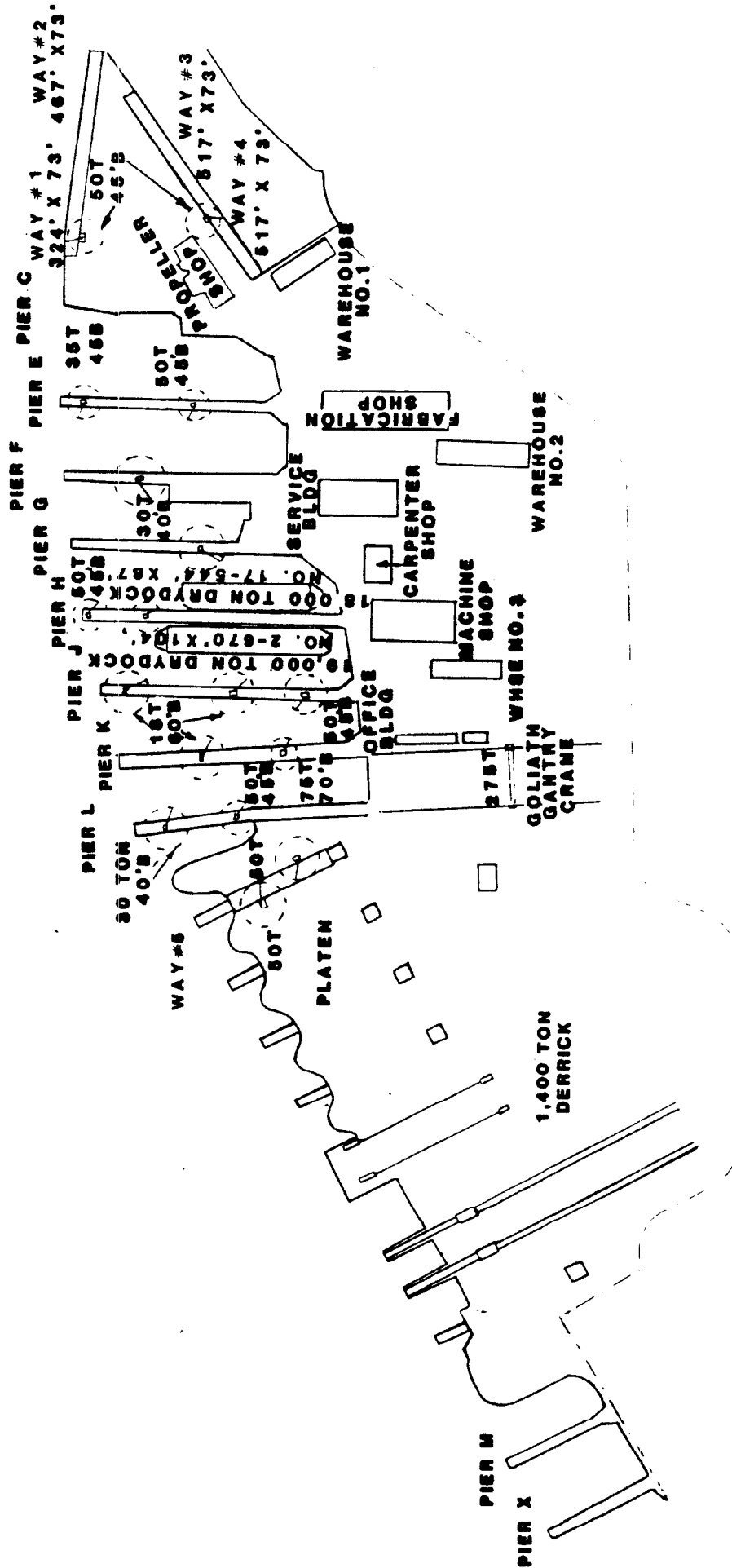
These projections are contingent upon near-term economic conditions, the demand for commercial vessels, and upon future Administration and Congressional action with regard to the proposed increase in the Navy workload.

# SHIPBUILDING INDUSTRY IN THE UNITED STATES

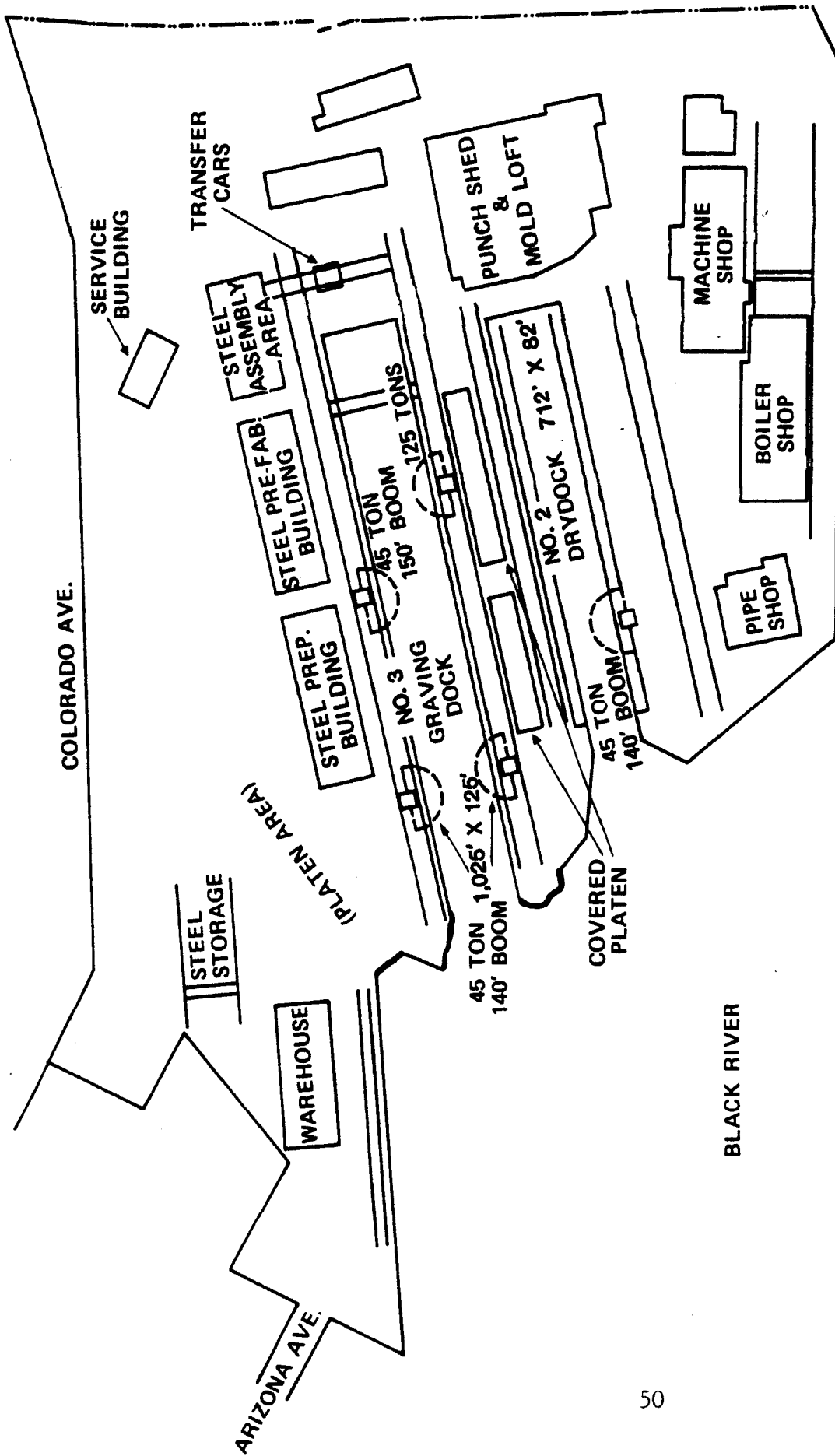


**MAJOR U.S. SHIPYARDS  
BUILDING CAPACITY - SHIPS 475 FEET IN LENGTH OR OVER**

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



**ADDSCO INDUSTRIES, INC.**

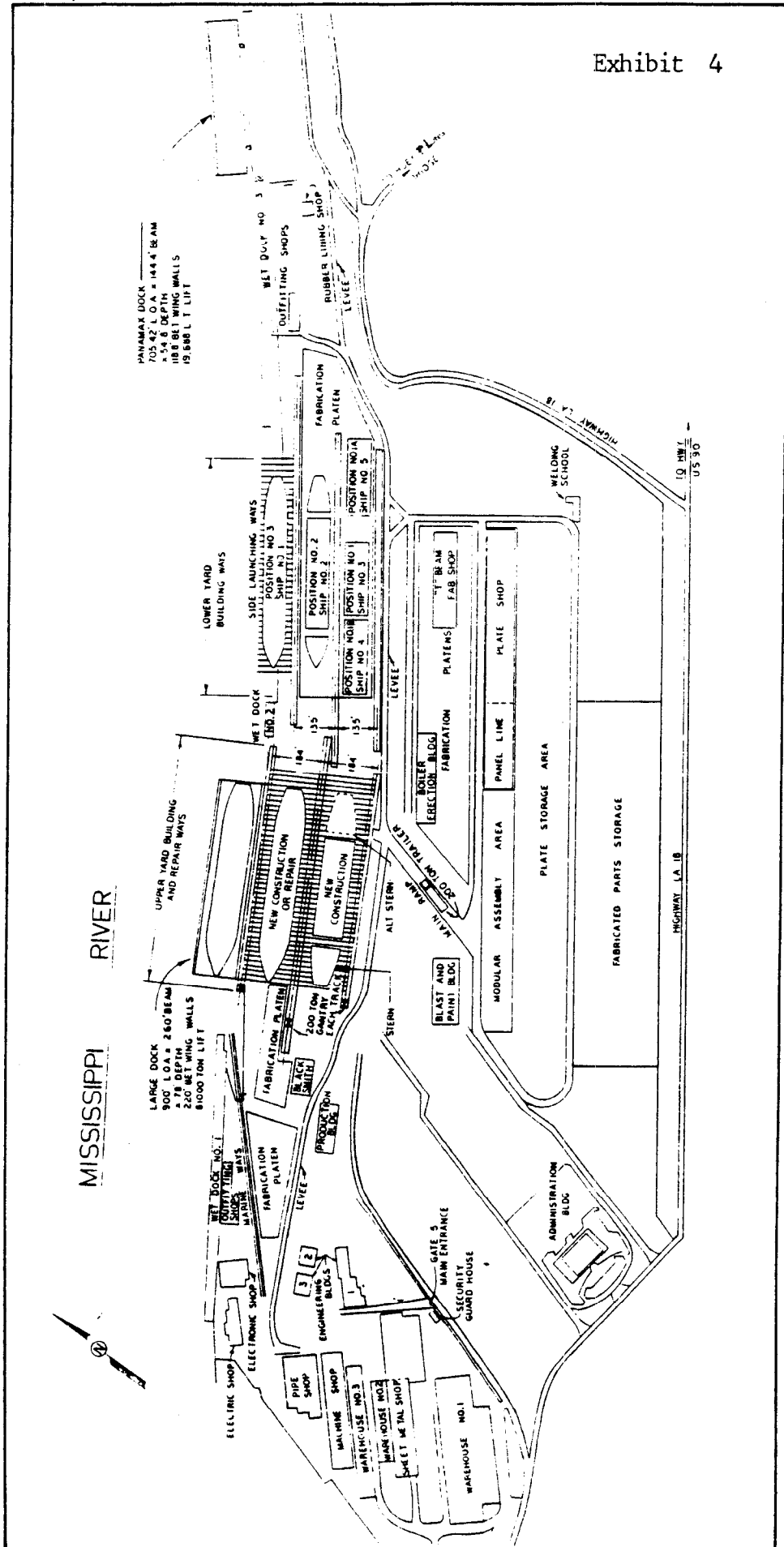


# AMERICAN SHIP BUILDING CO.

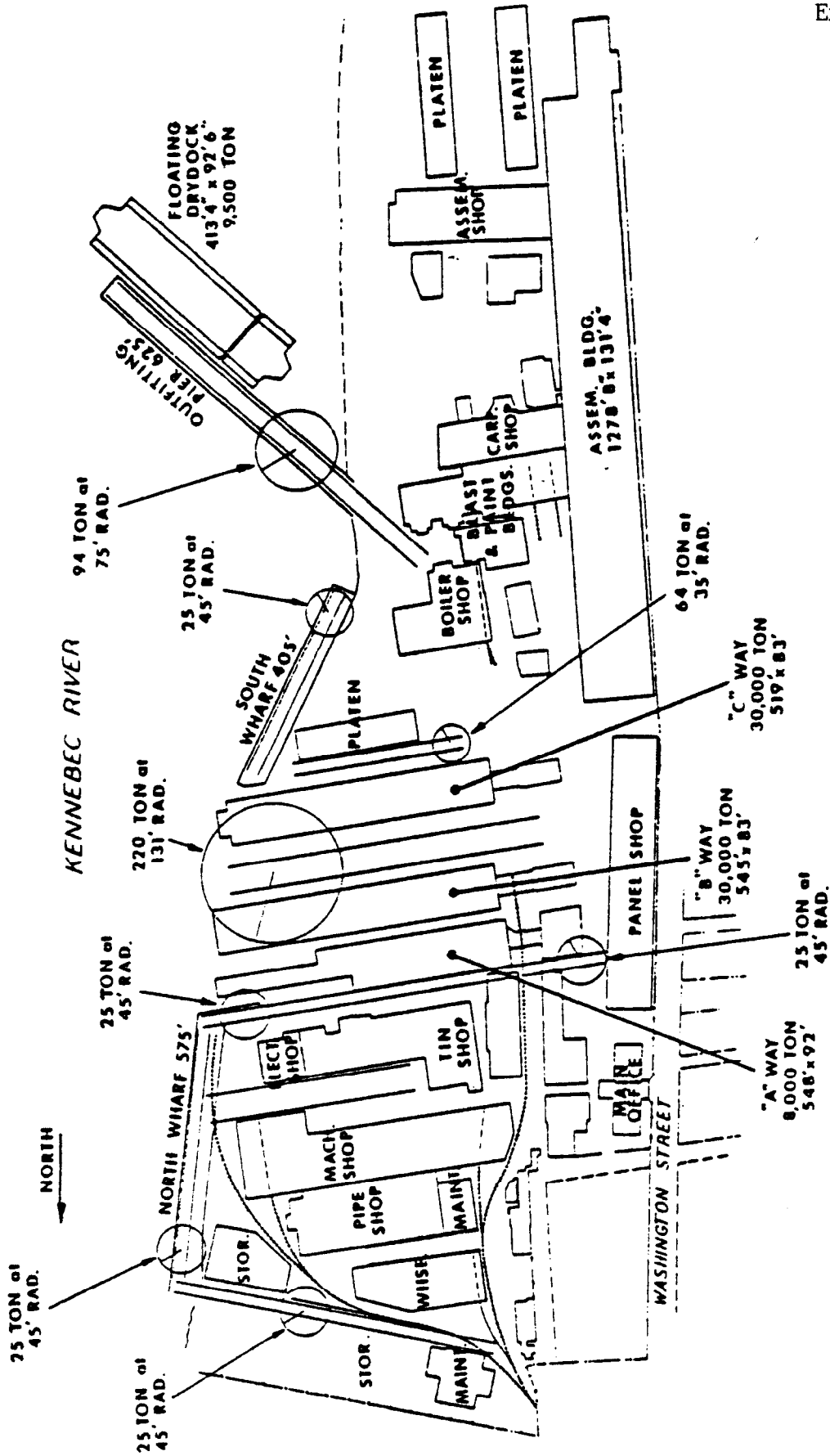
LORAIN YARD

# AVONDALE SHIPYARDS, INC. MAIN PLANT

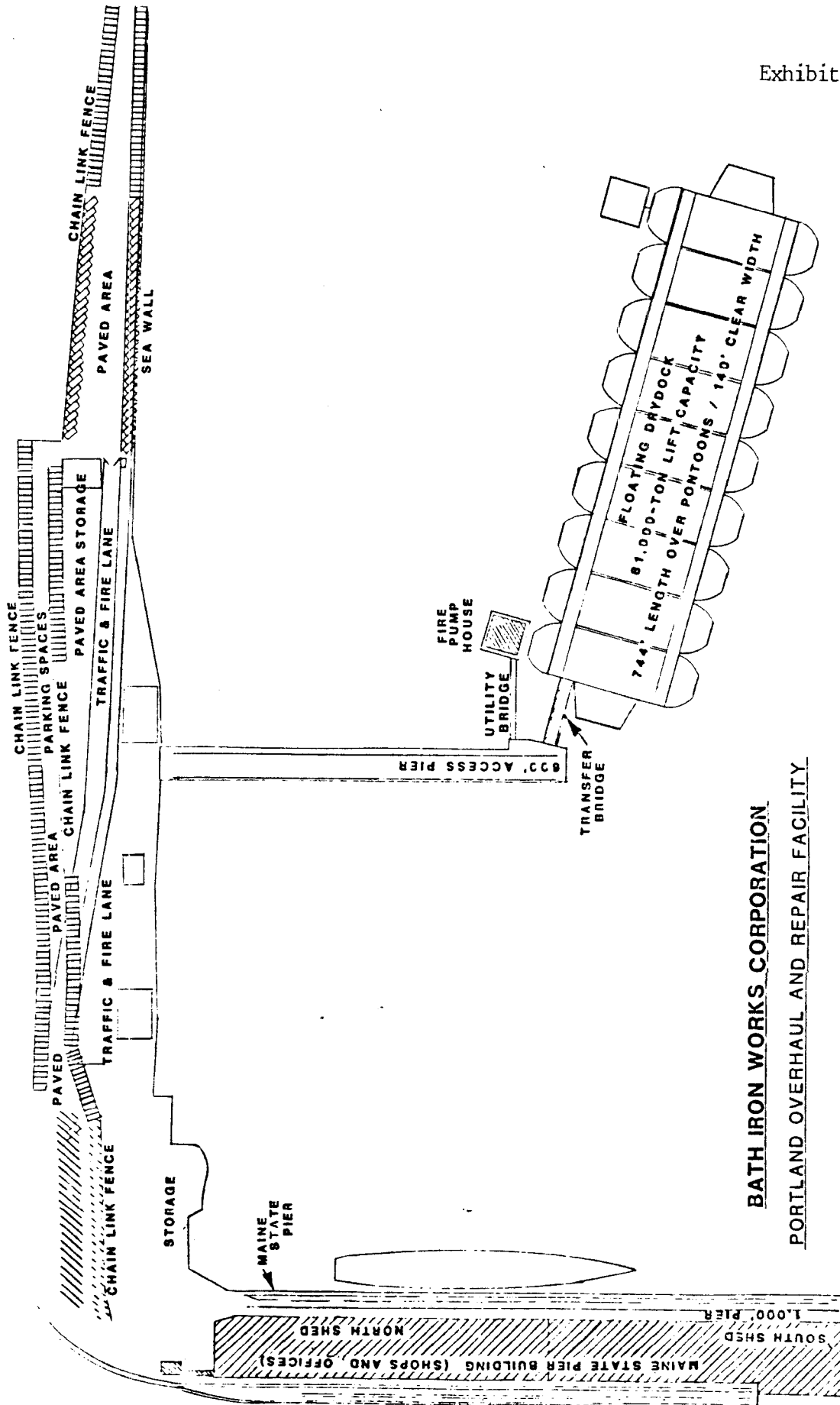
Exhibit 4



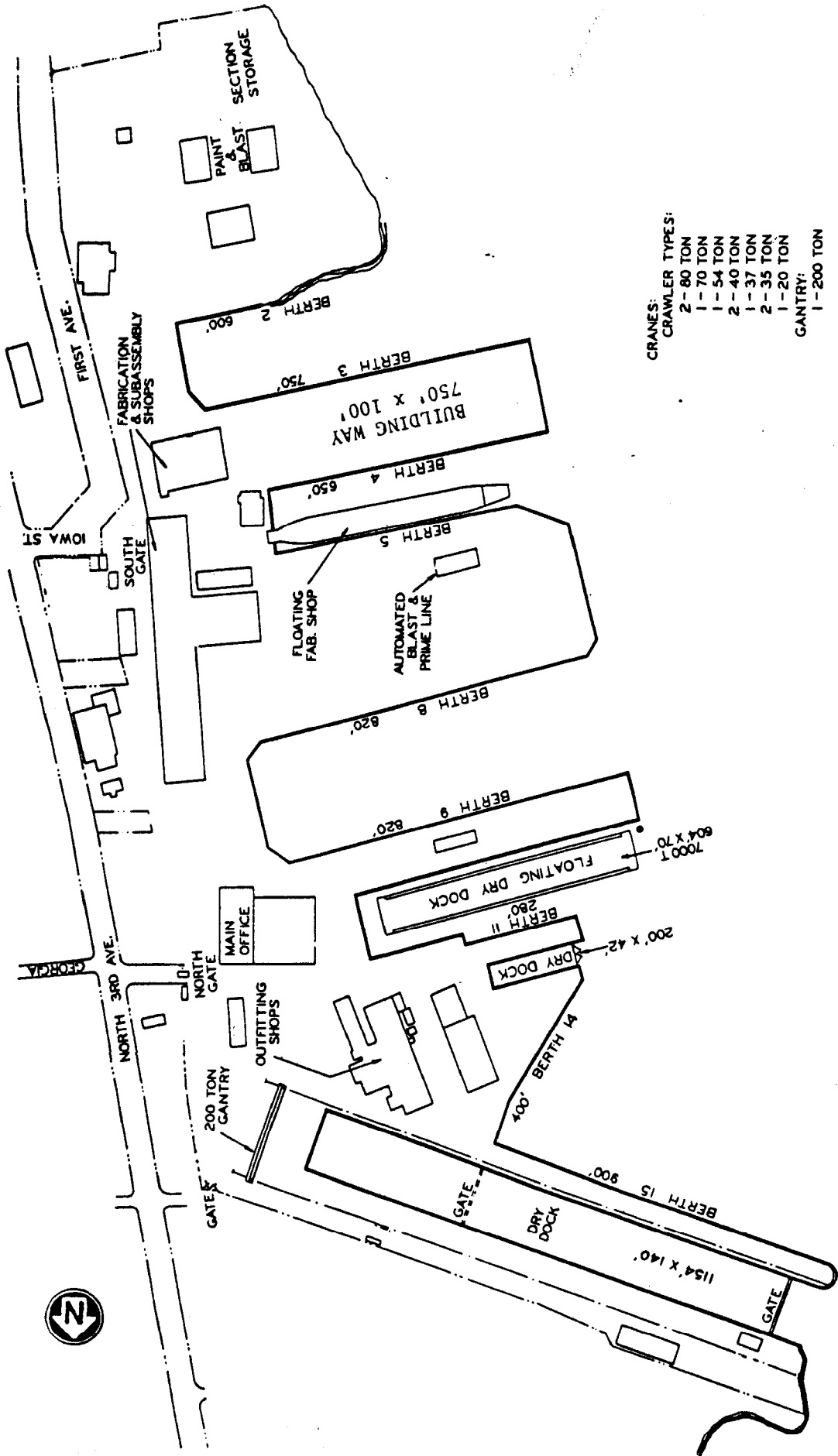




# BATH IRON WORKS CORP.

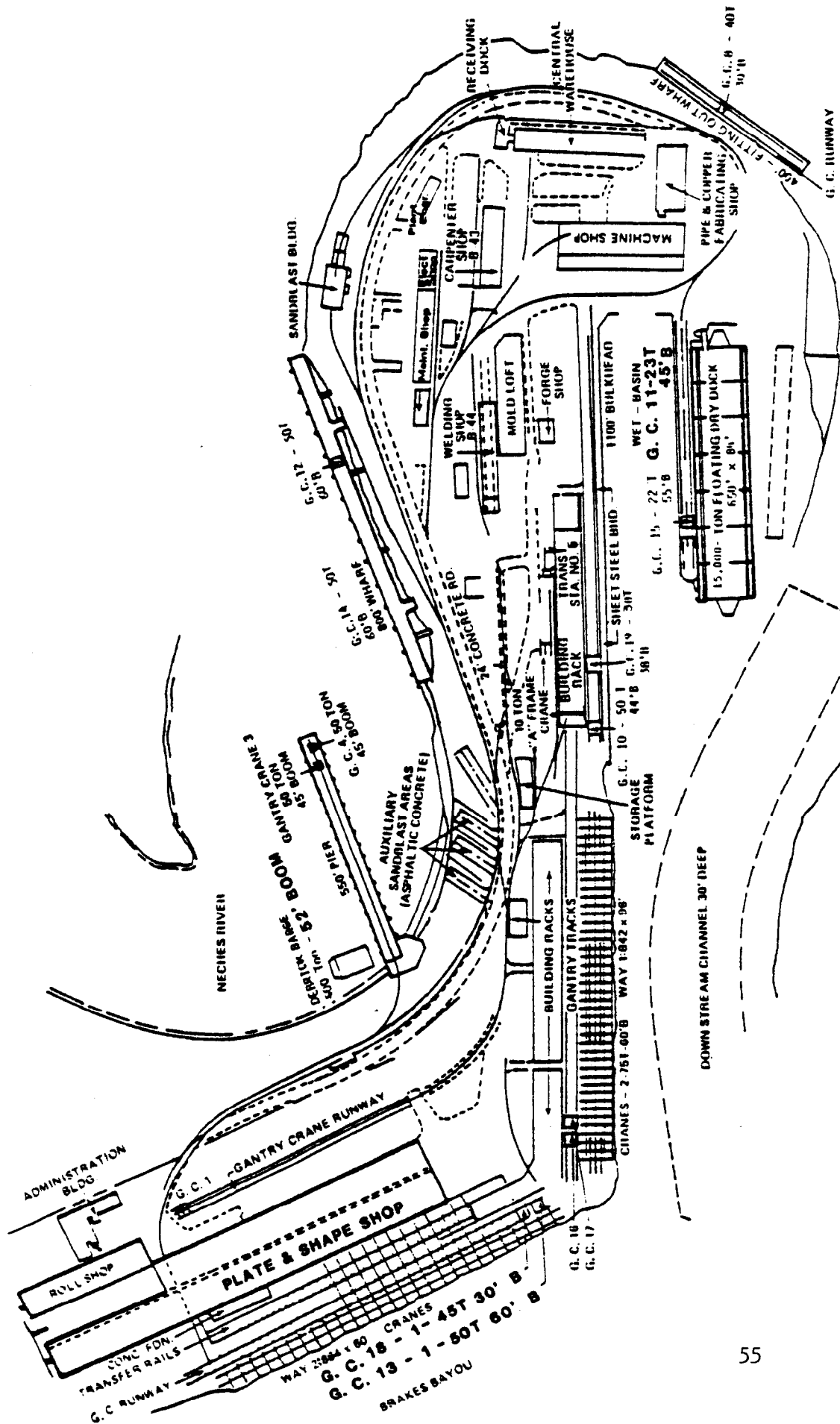


**BATH IRON WORKS CORPORATION**  
**PORTLAND OVERHAUL AND REPAIR FACILITY**

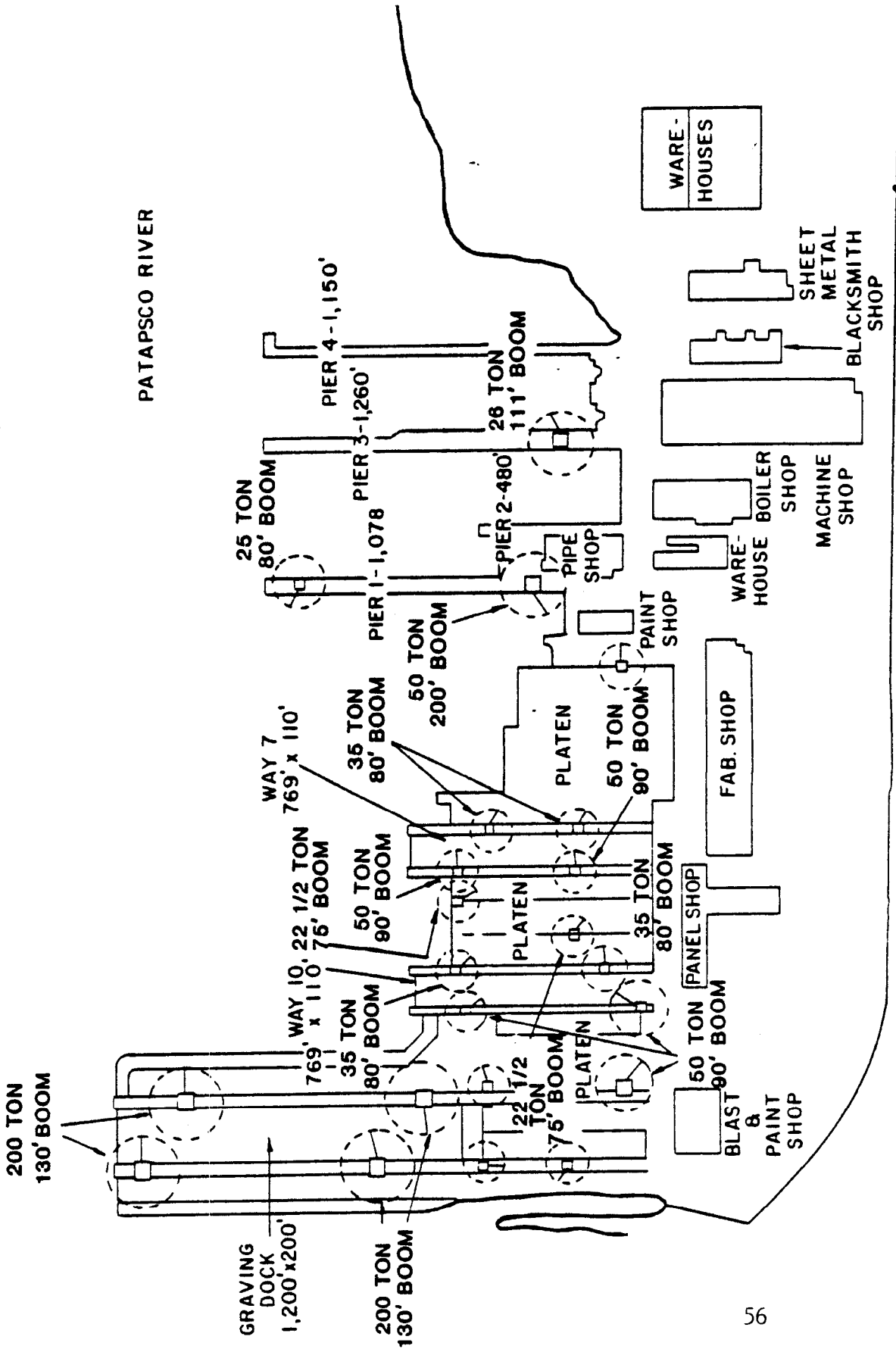


- CRANES:
- CRAWLER TYPES:
  - 2 - 80 TON
  - 1 - 70 TON
  - 1 - 54 TON
  - 2 - 40 TON
  - 1 - 37 TON
  - 2 - 35 TON
  - 1 - 20 TON
- GANTRY:
- 1 - 200 TON

BAY SHIPBUILDING CORPORATION

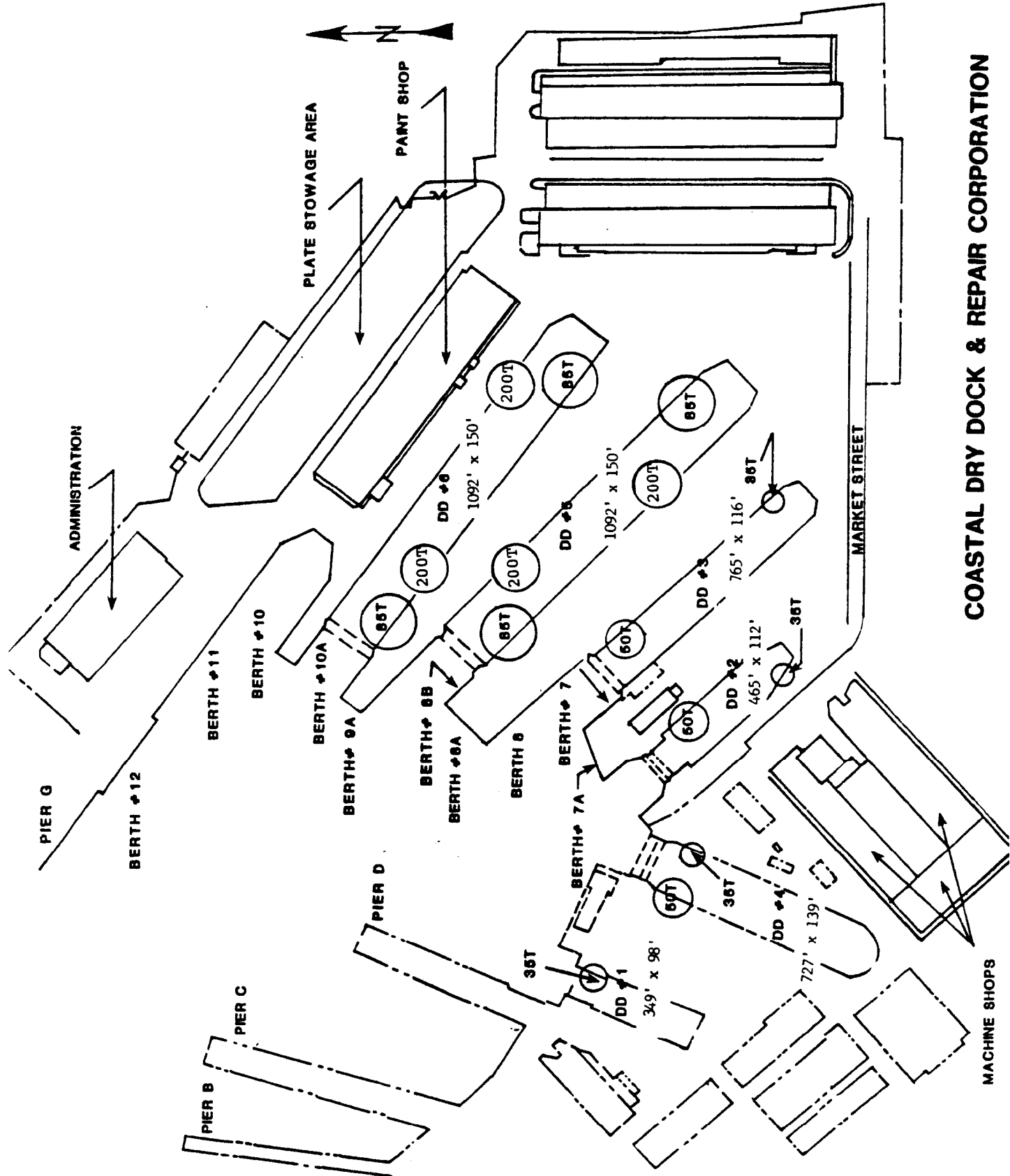


**BETHLEHEM STEEL CORP.  
BEAUMONT YARD**

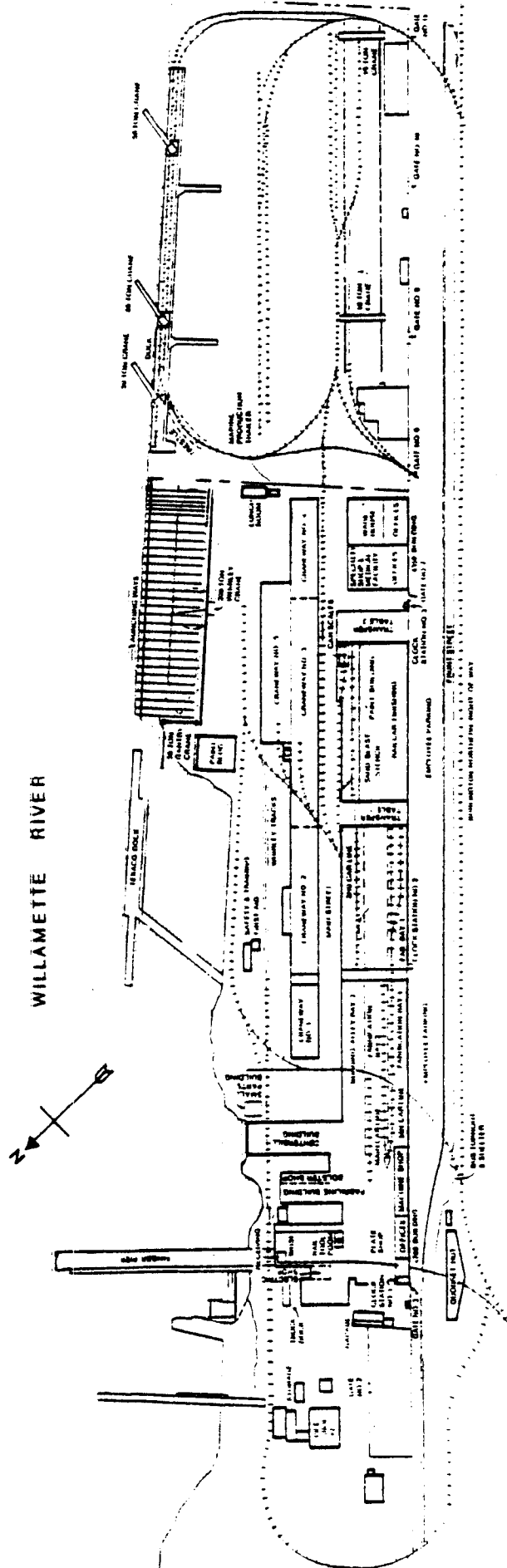


# BETHLEHEM STEEL CORPORATION

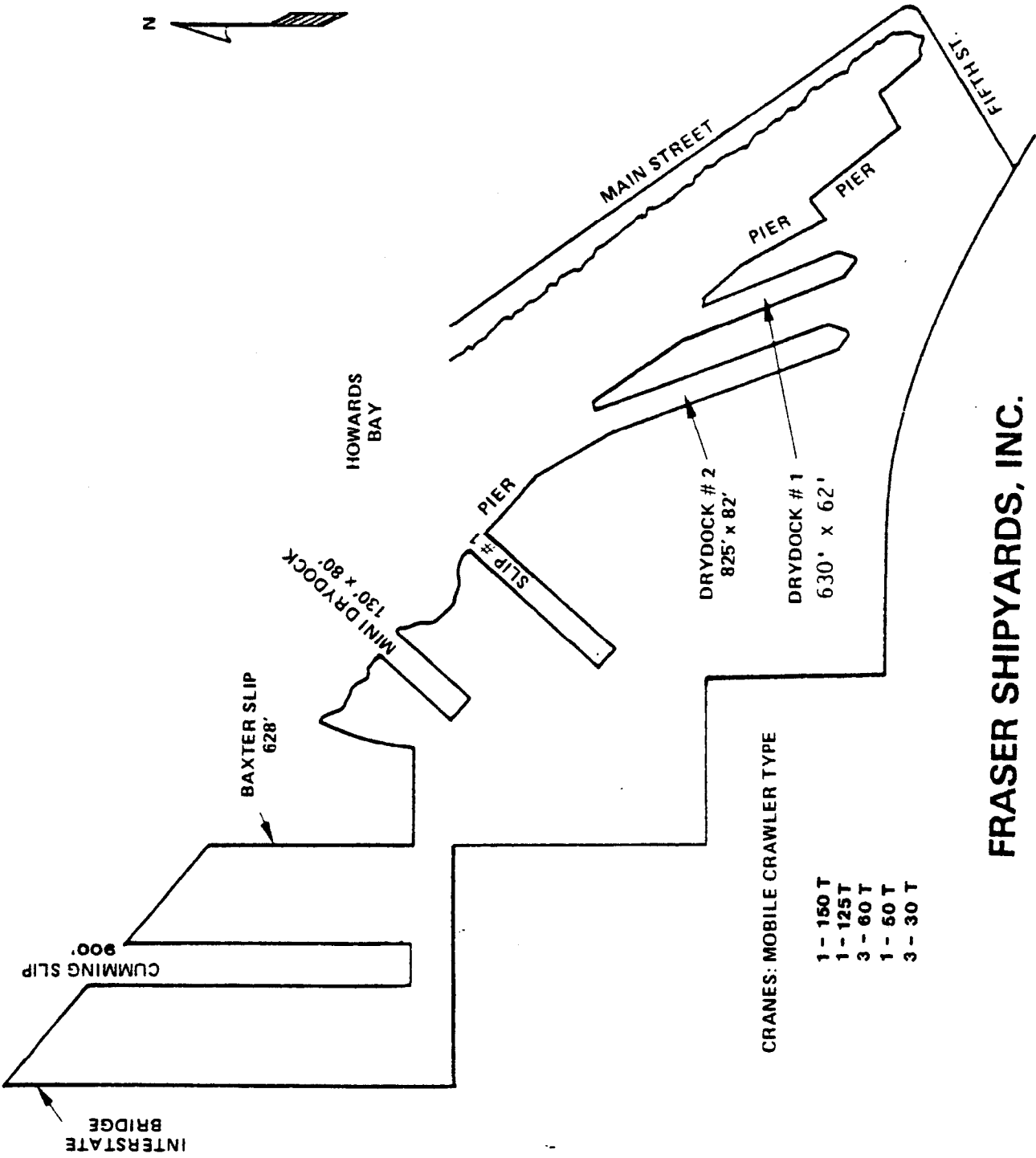
SPARROWS POINT YARD



**COASTAL DRY DOCK & REPAIR CORPORATION**



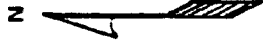
**FMC CORPORATION**  
**Marine & Rail Equipment Division**  
**Portland, Oregon**



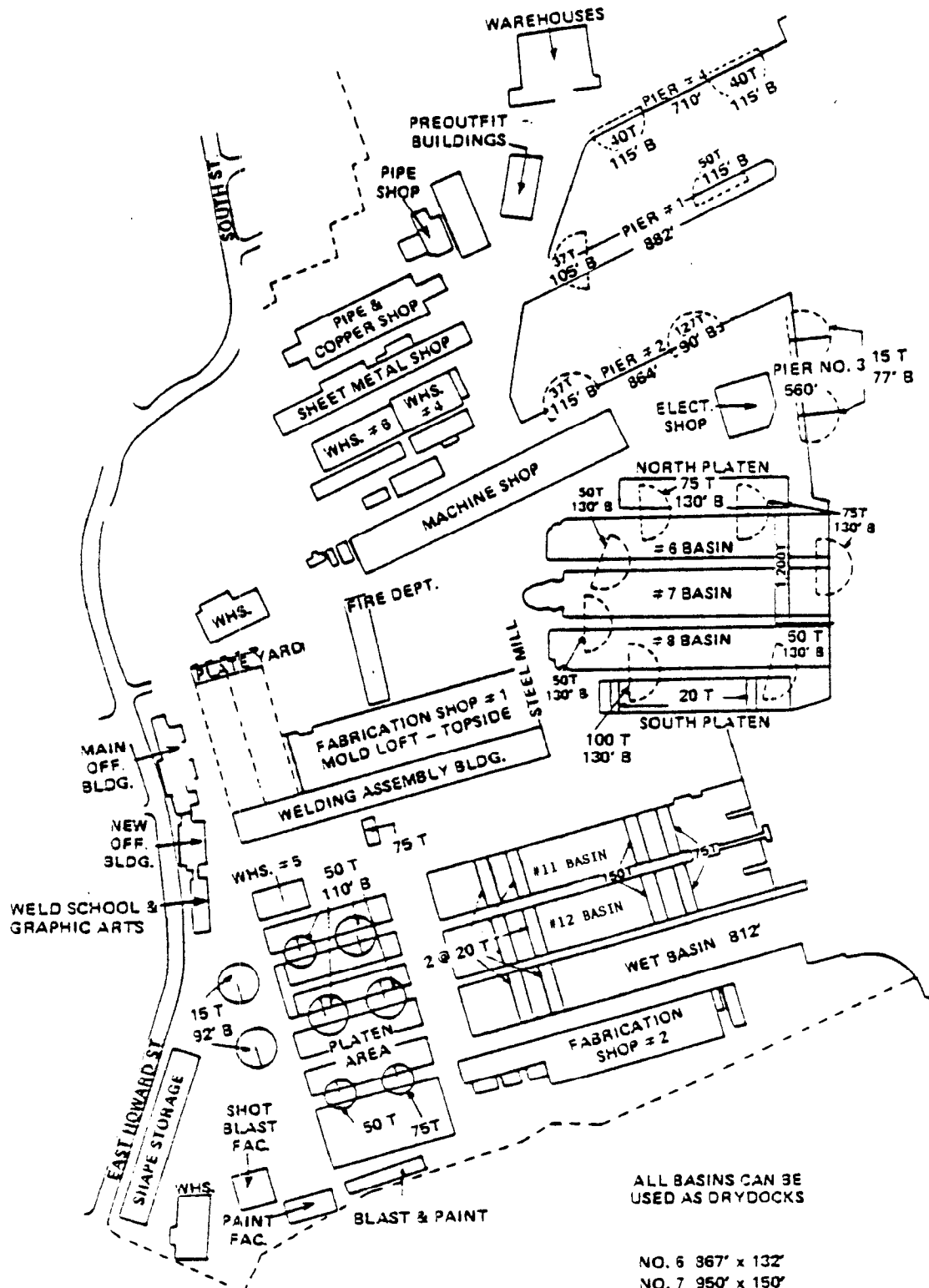
**FRASER SHIPYARDS, INC.  
SUPERIOR, WISCONSIN**

CRANES: MOBILE CRAWLER TYPE

- 1 - 150 T
- 1 - 125 T
- 3 - 60 T
- 1 - 50 T
- 3 - 30 T





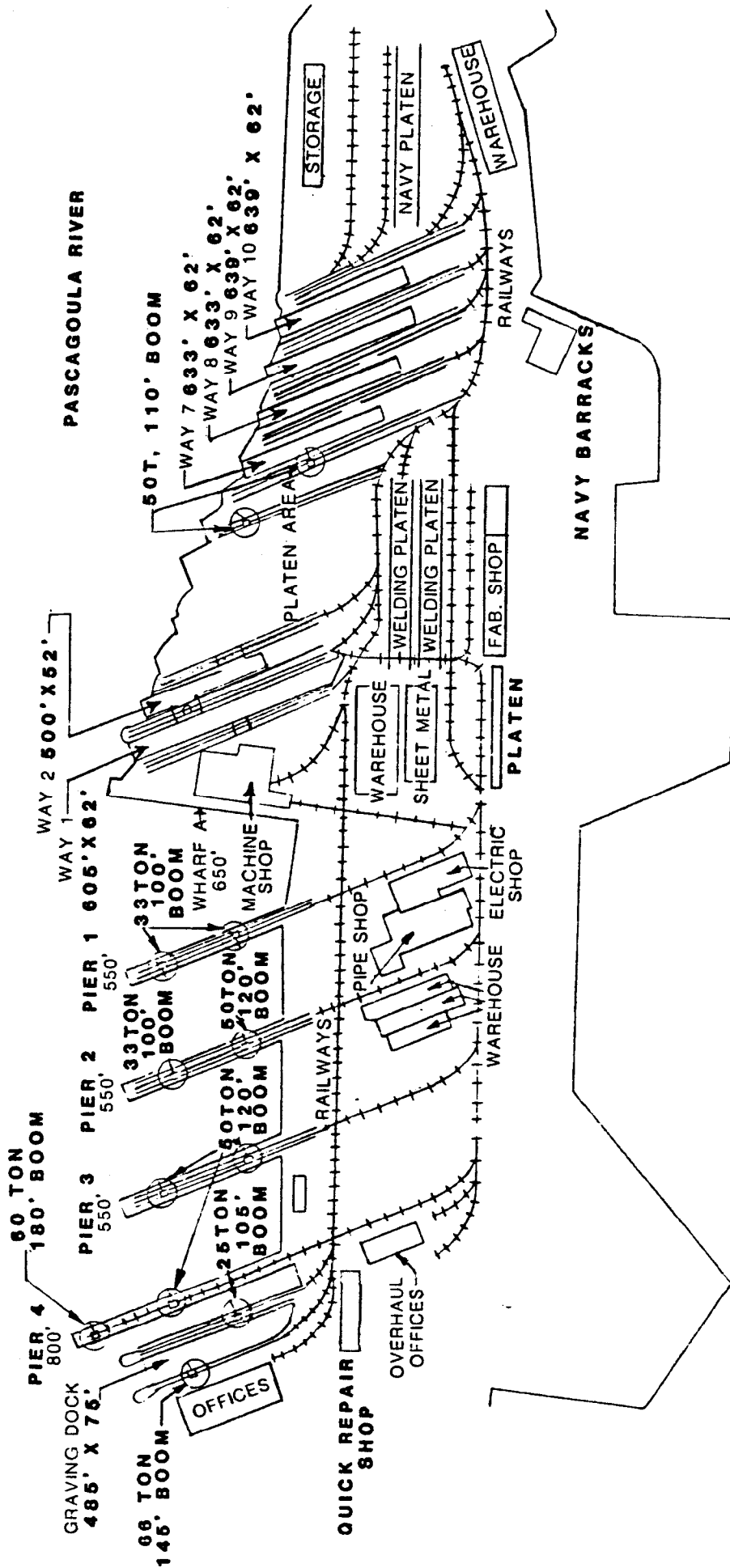


FORE RIVER

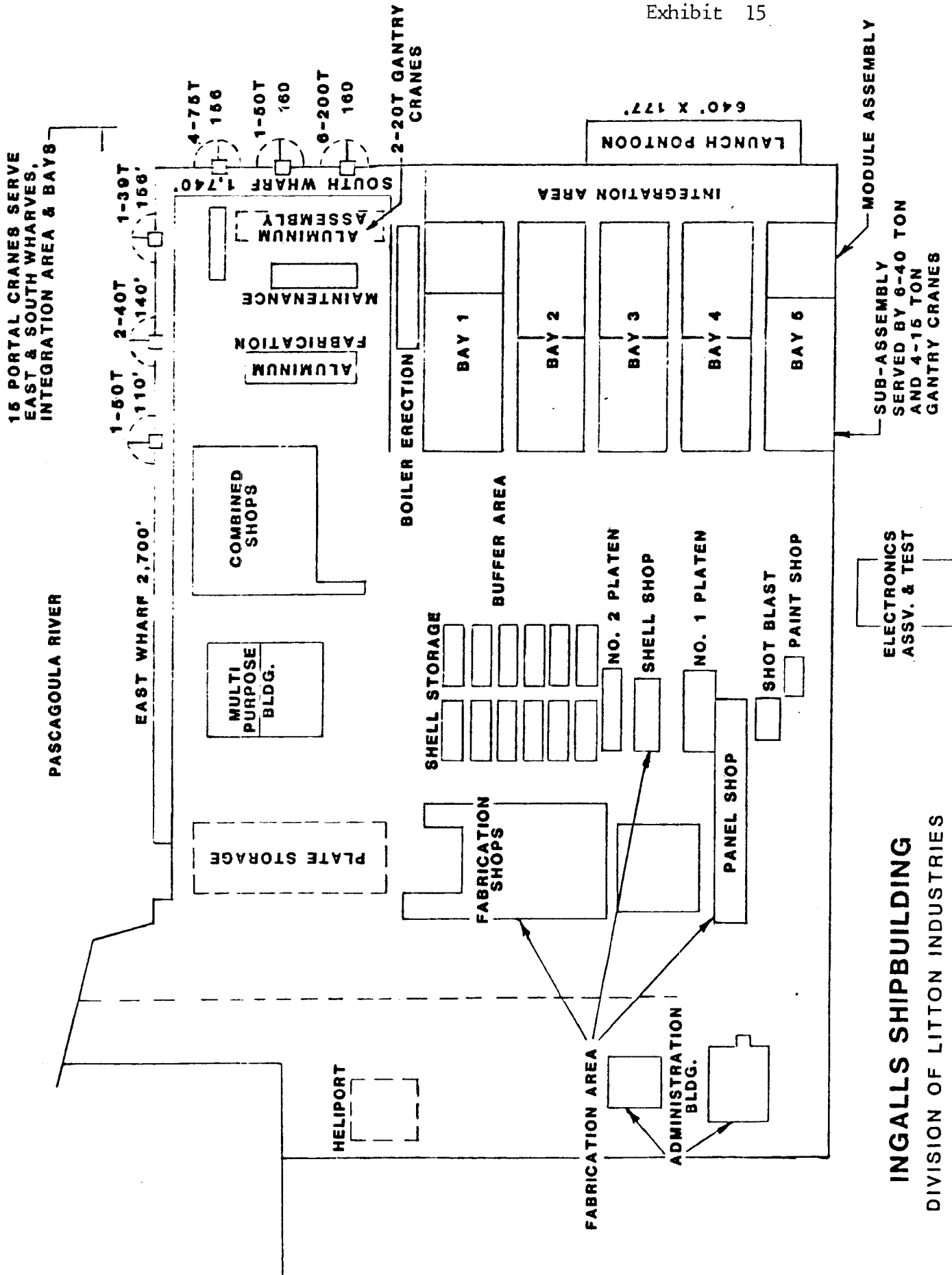
GENERAL DYNAMICS  
QUINCY SHIPBUILDING DIVISION

ALL BASINS CAN BE USED AS DRYDOCKS

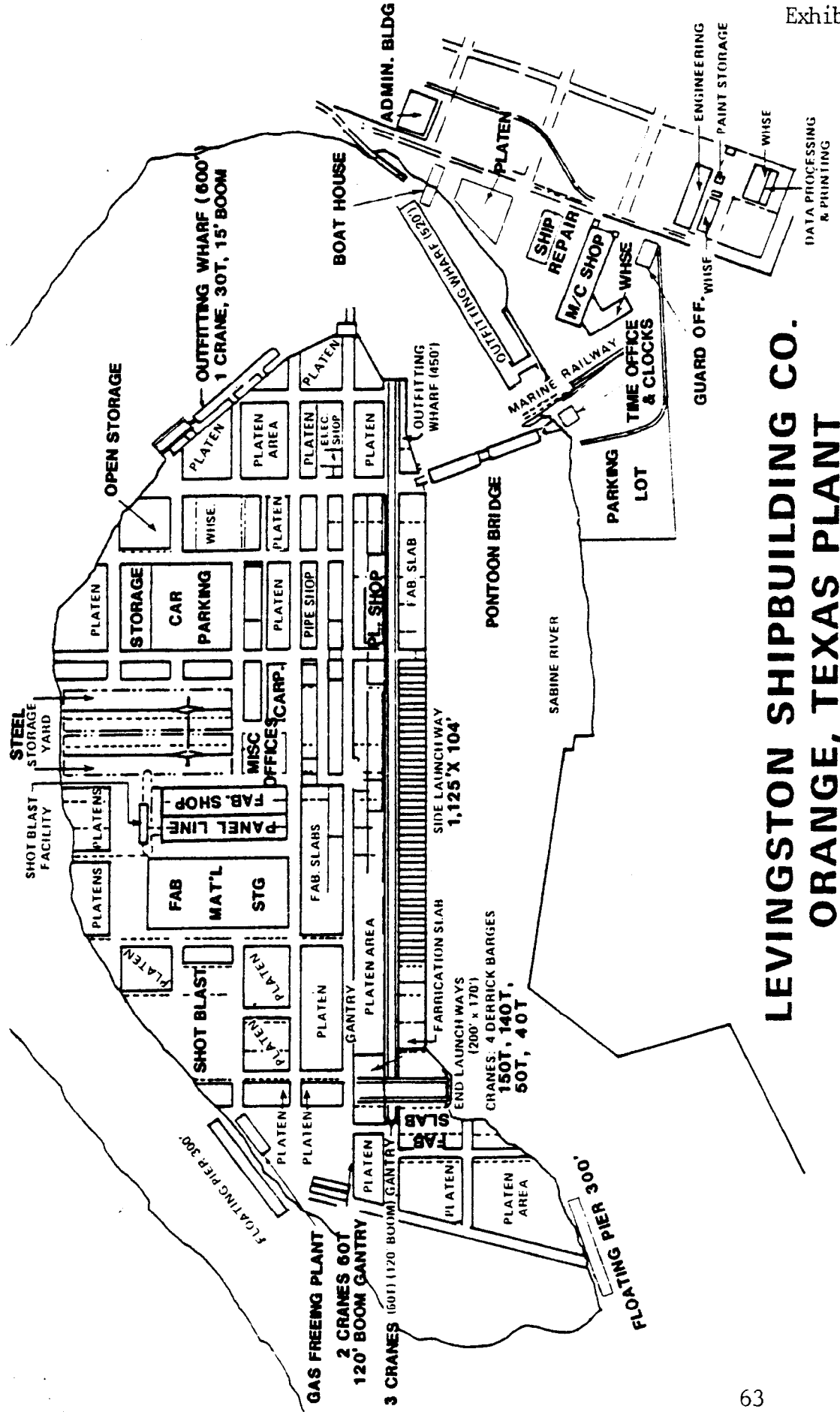
- NO. 6 367' x 132'
- NO. 7 950' x 150'
- NO. 8 887' x 132'
- NO. 11 374' x 150'
- NO. 12 374' x 150'



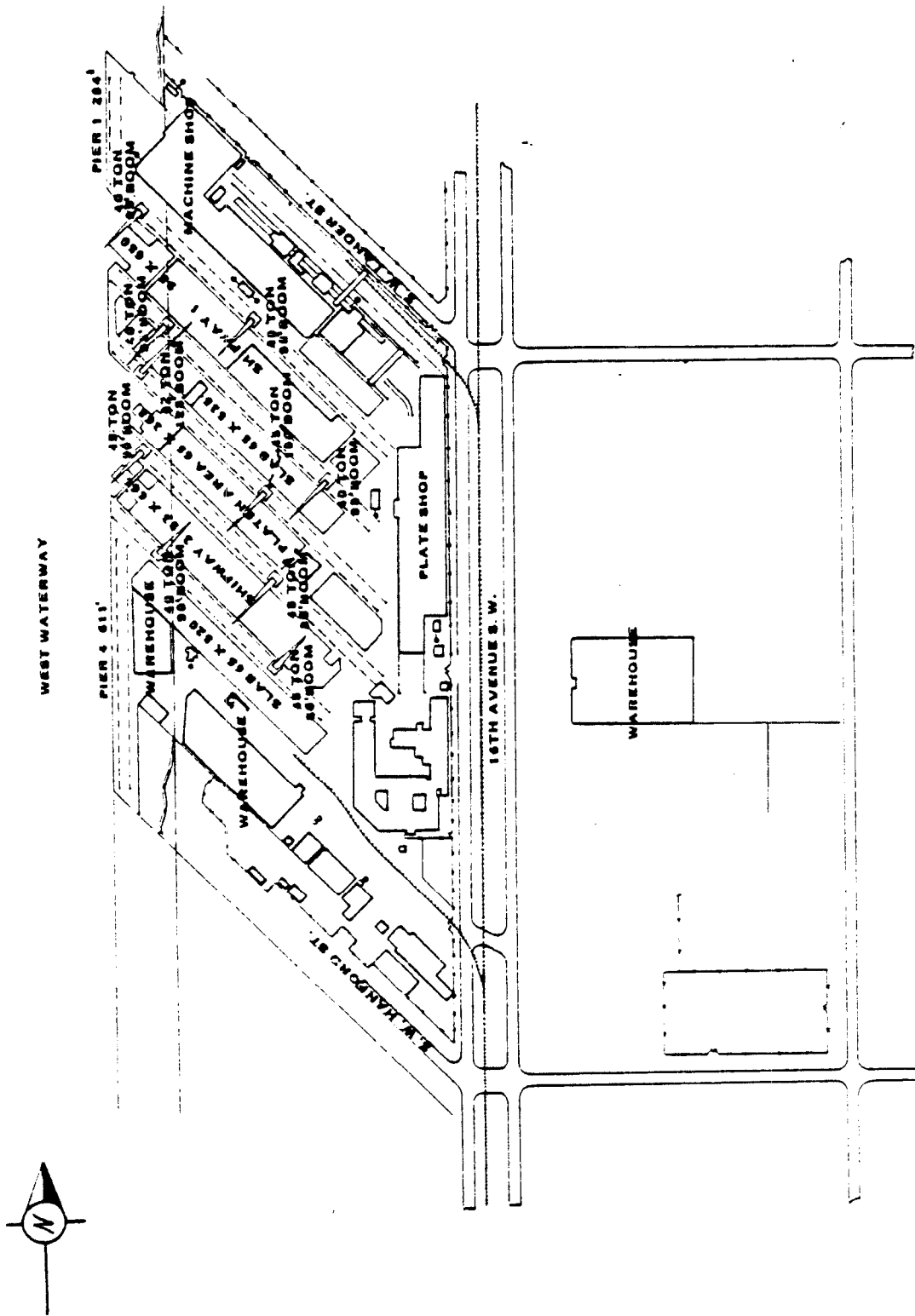
**INGALLS SHIPBUILDING**  
DIVISION OF LITTON INDUSTRIES  
EAST BANK FACILITY



**INGALLS SHIPBUILDING**  
 DIVISION OF LITTON INDUSTRIES  
 WEST BANK

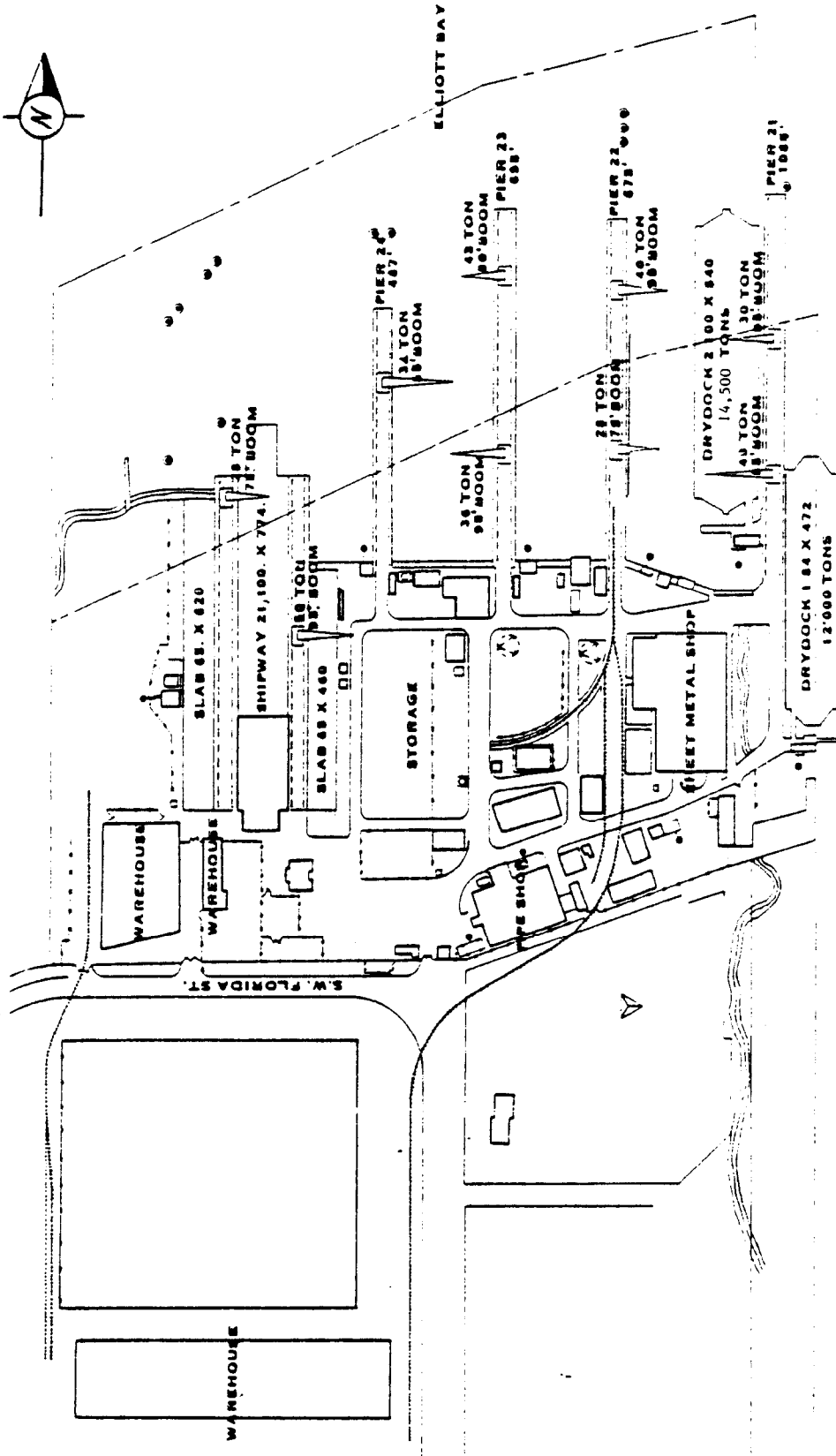


**LEVINGSTON SHIPBUILDING CO.  
ORANGE, TEXAS PLANT**

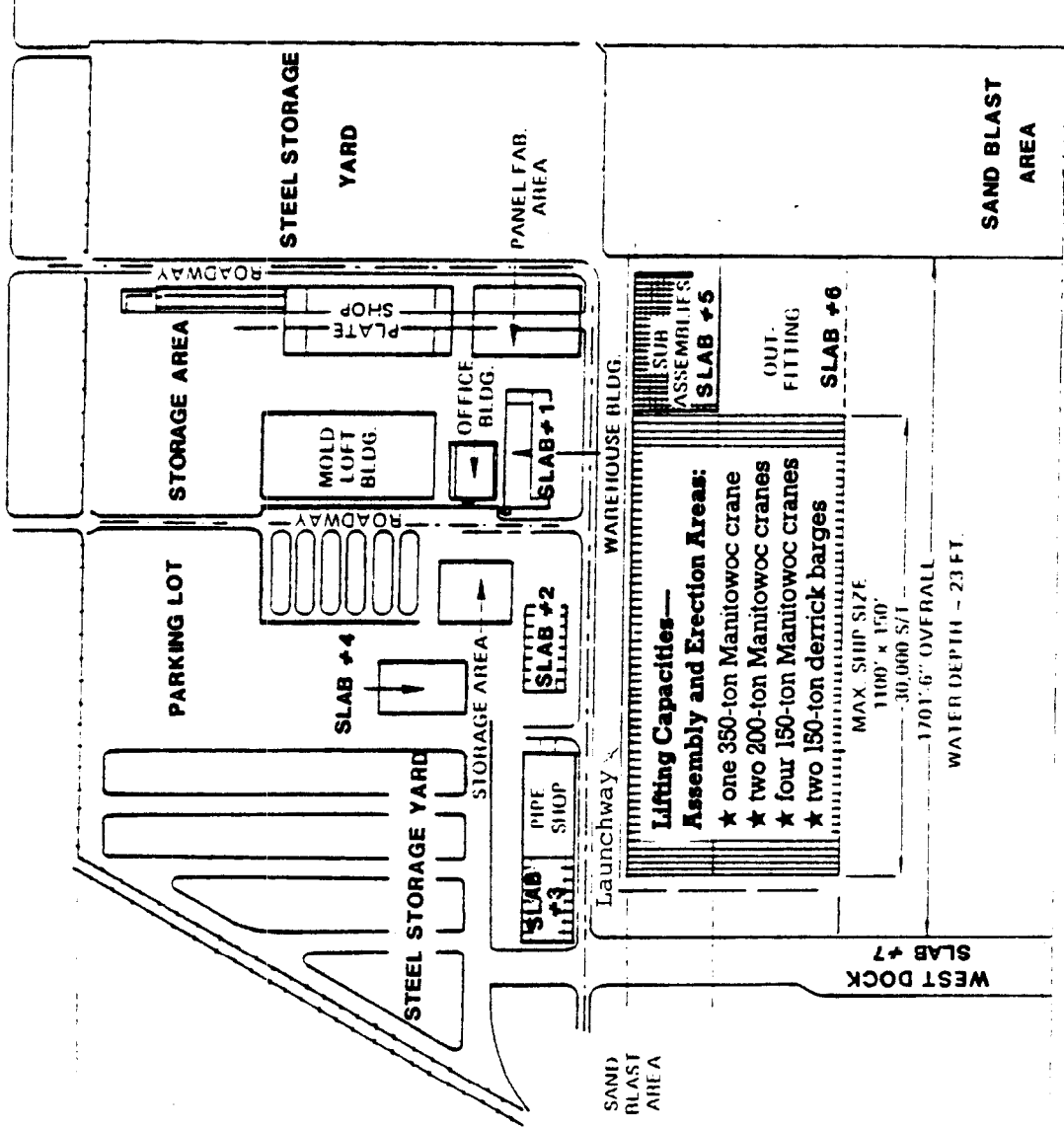


LOCKHEED MARINE - SHIPBUILDING DIVISION  
PLANT ONE

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



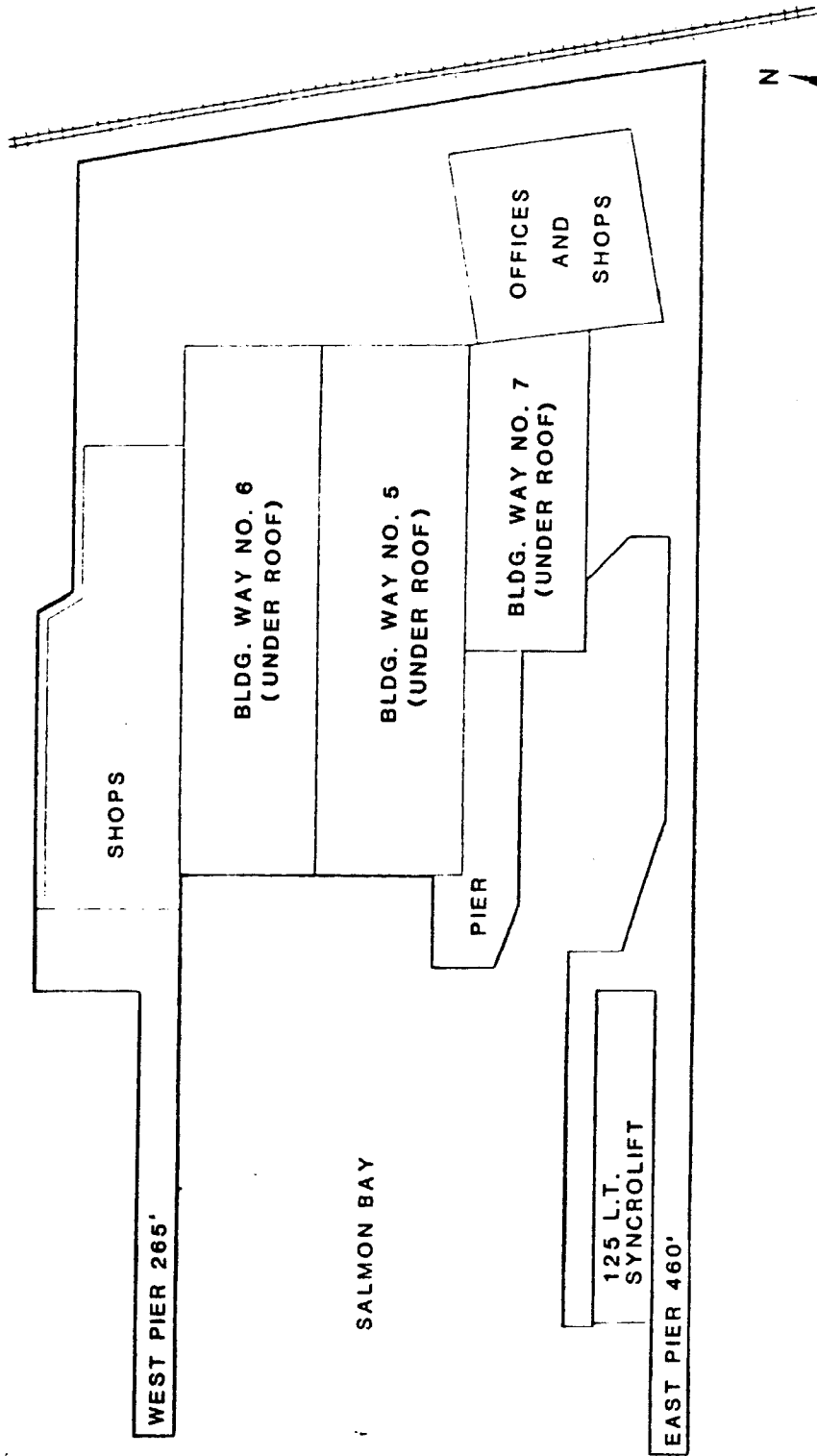
LOCKHEED MARINE - SHIPBUILDING DIVISION  
 PLANT TWO  
 2550 S. W. FLORIDA, SEATTLE, WASHINGTON



**MARATHON LeTOURNEAU CO.**  
**GULF MARINE DIVISION**

TRACT SIZE: 4 ACRES  
SQ. FT. UNDER ROOF  
41,998

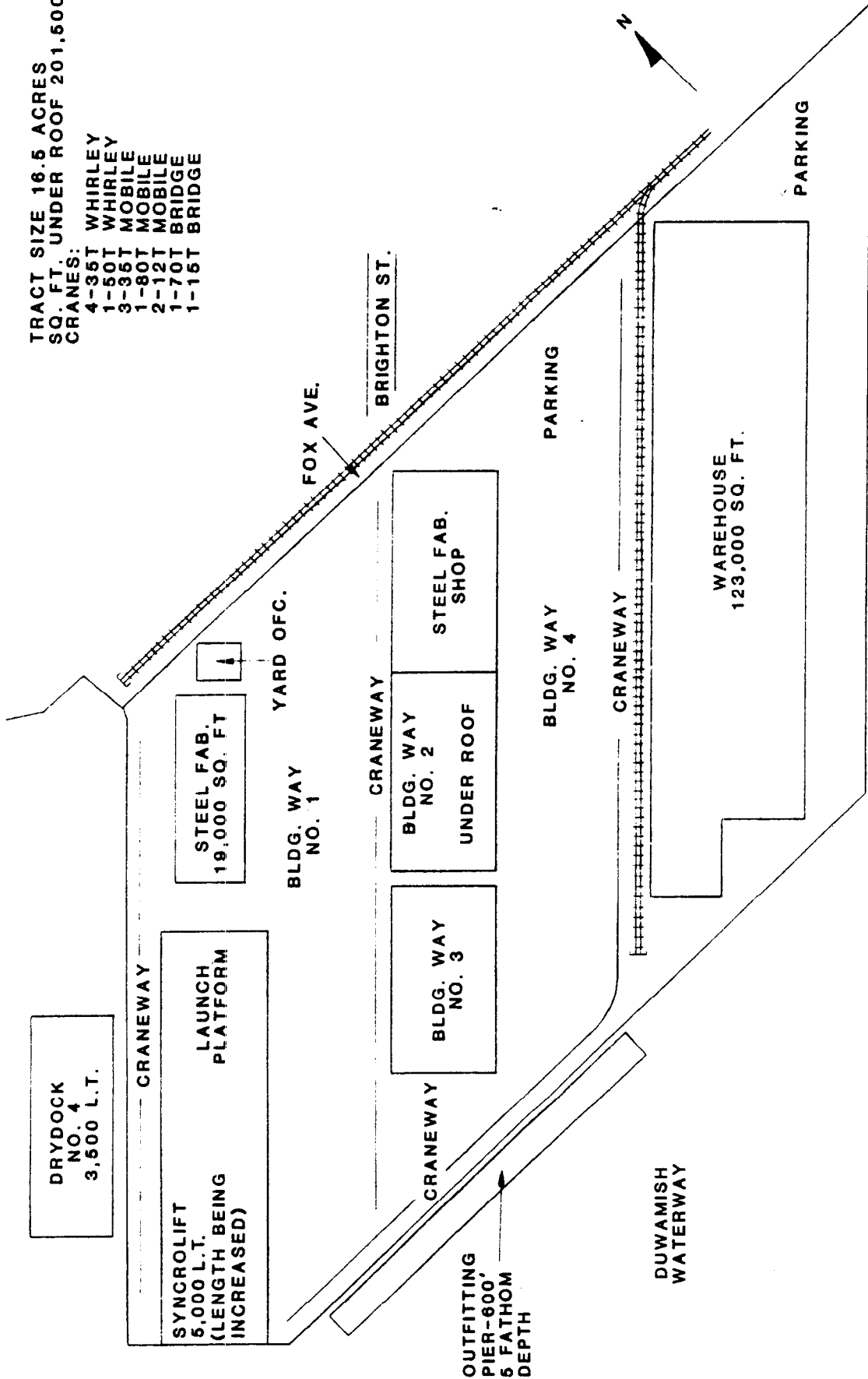
CRANES  
2-20T BRIDGE  
2-35T MOBILE



**MARINE POWER & EQUIPMENT CO.**  
YARD 2

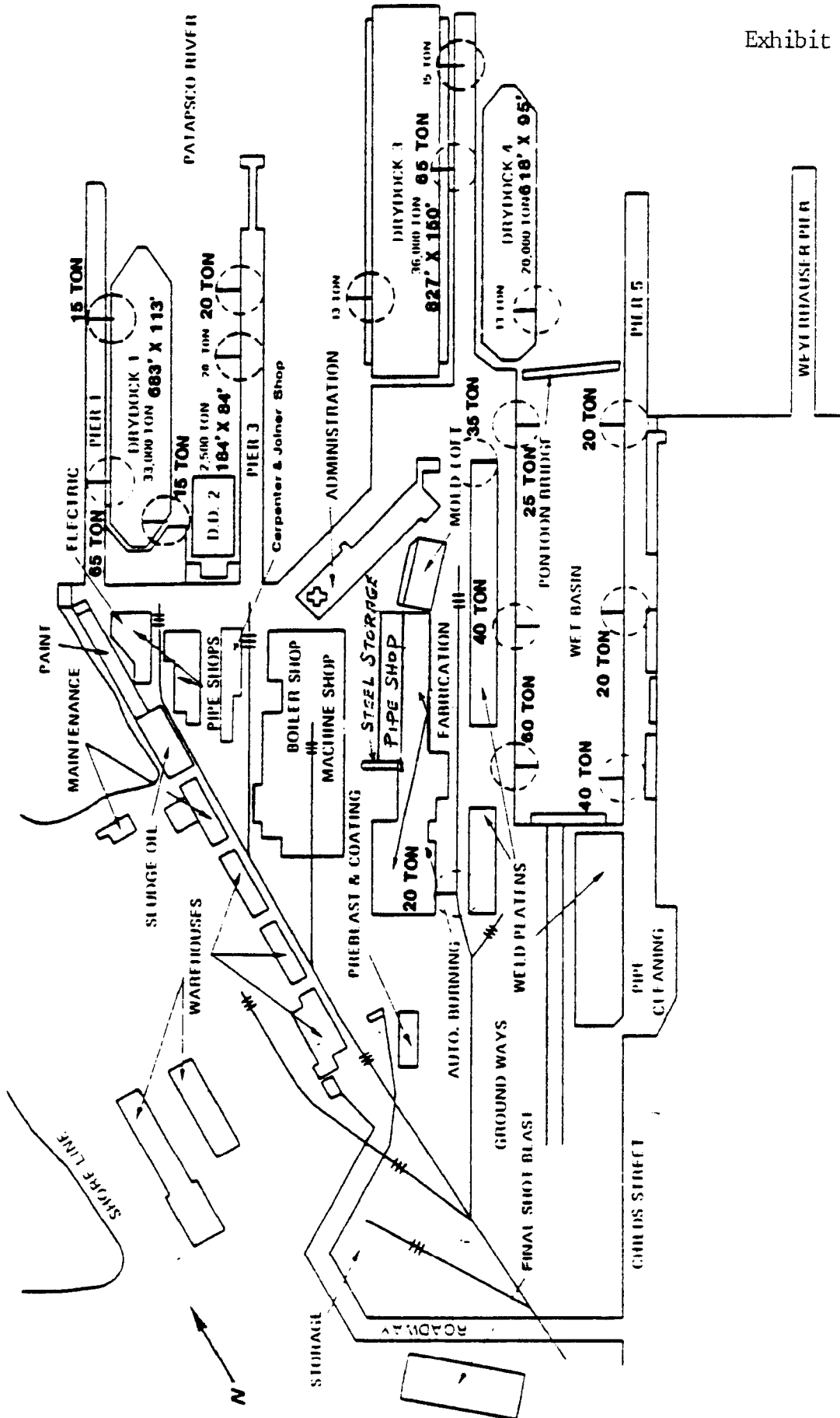


TRACT SIZE 16.5 ACRES  
SQ. FT. UNDER ROOF 201,600  
CRANES:  
4-36T WHIRLEY  
1-50T WHIRLEY  
3-36T MOBILE  
1-80T MOBILE  
2-12T MOBILE  
1-70T BRIDGE  
1-16T BRIDGE

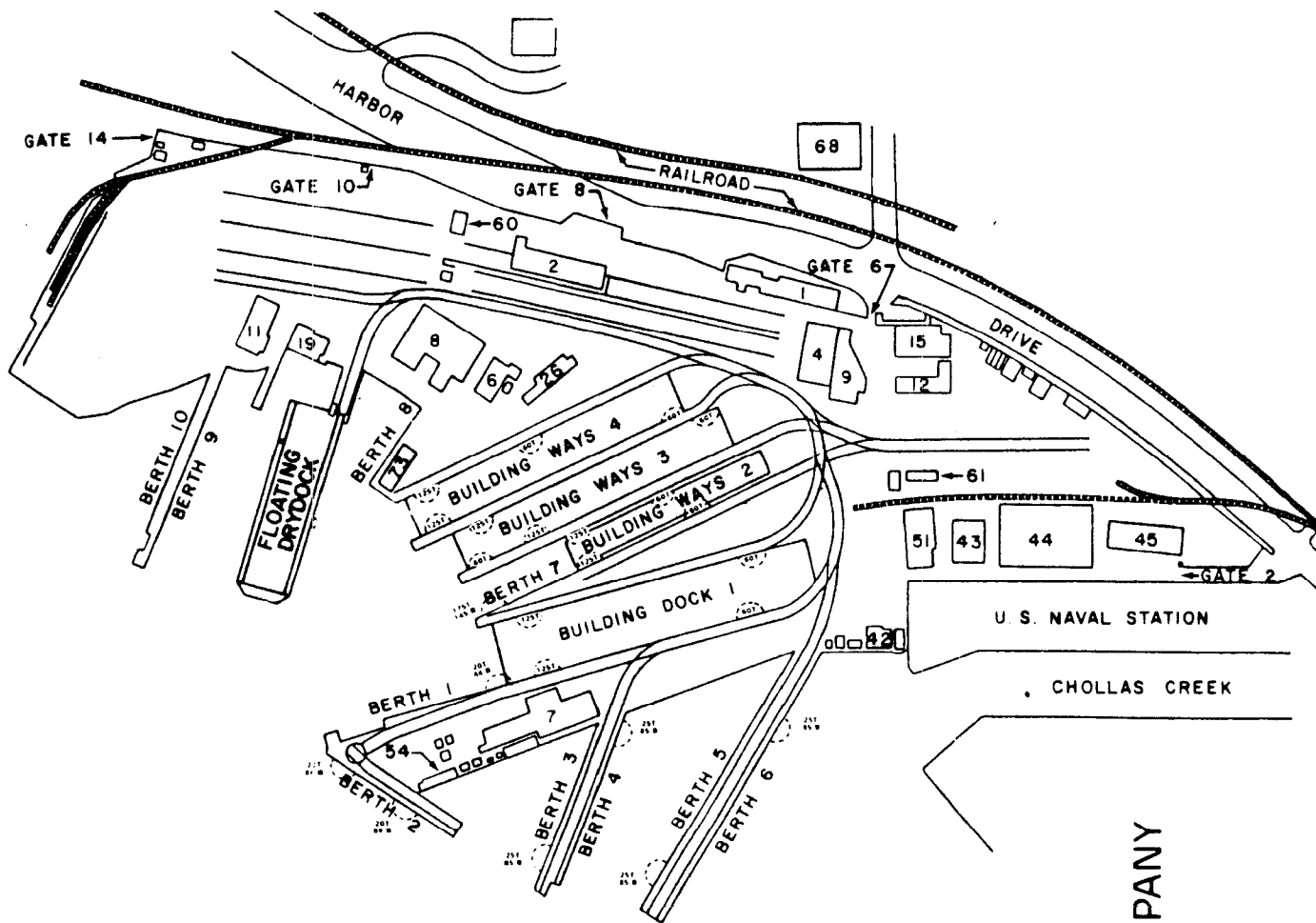


**MARINE POWER & EQUIPMENT CO.**

YARD 4



MARYLAND SHIPBUILDING & DRYDOCK CO.



SAN DIEGO BAY



**BUILDINGS**

- |                           |                         |
|---------------------------|-------------------------|
| 1 ADMINISTRATION BUILDING | 26 PLATEN OFFICE        |
| 2 PLATE SHOP              | 42 YARD CONFERENCE ROOM |
| 4 PIPE SHOP               | 43 WAREHOUSE            |
| 6 ELECTRIC SHOP           | 44 WAREHOUSE            |
| 7 SHEETMETAL SHOP         | 51 ENGINEERING          |
| 8 PRODUCTION OFFICES      | 54 QUALITY ASSURANCE    |
| PLANNING MACHINE SHOP     | 60 FLAME PLASER SHED    |
| 9 FOUNDRY                 | 61 WELDING OFFICE       |
| 11 STOREROOM              | 68 INFORMATION SYSTEMS  |
| 12 MAINTENANCE            | 72 WAREHOUSE            |
| 15 ADMINISTRATION ANNEX   | 73 BOILER SHOP          |
| 19 CARPENTER SHOP         |                         |

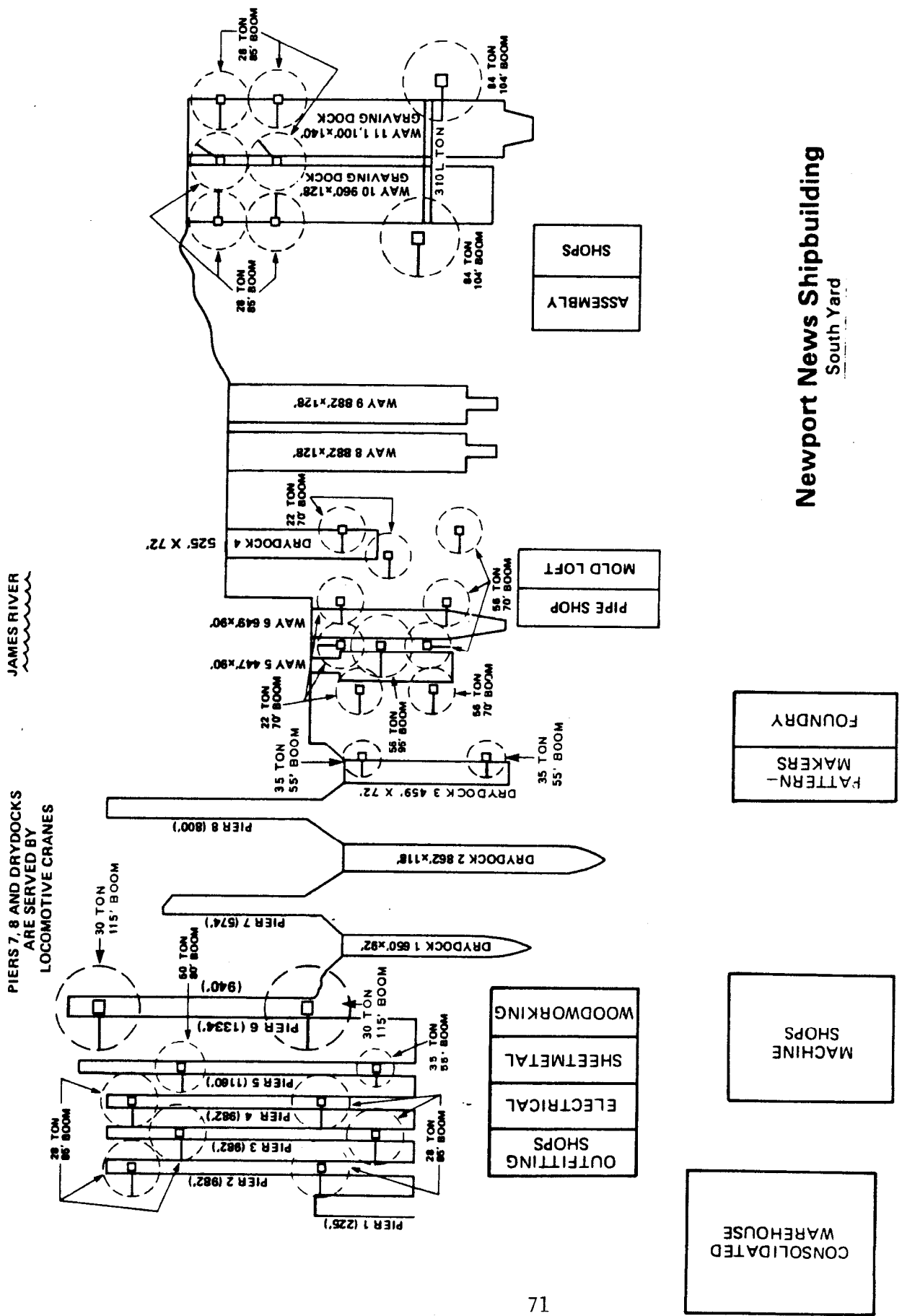
**DOCKS AND WAYS**

- |                               |                                                    |
|-------------------------------|----------------------------------------------------|
| BUILDING DOCK 1<br>1000 X 176 | BUILDING WAYS 4<br>905 X 115                       |
| BUILDING WAYS 2<br>575 X 96   | FLOATING DRYDOCK<br>585 X 170                      |
| BUILDING WAYS 3<br>906 X 115  | 140 CLEAR BETWEEN WINGWALLS<br>(OPERATIONAL 12 83) |

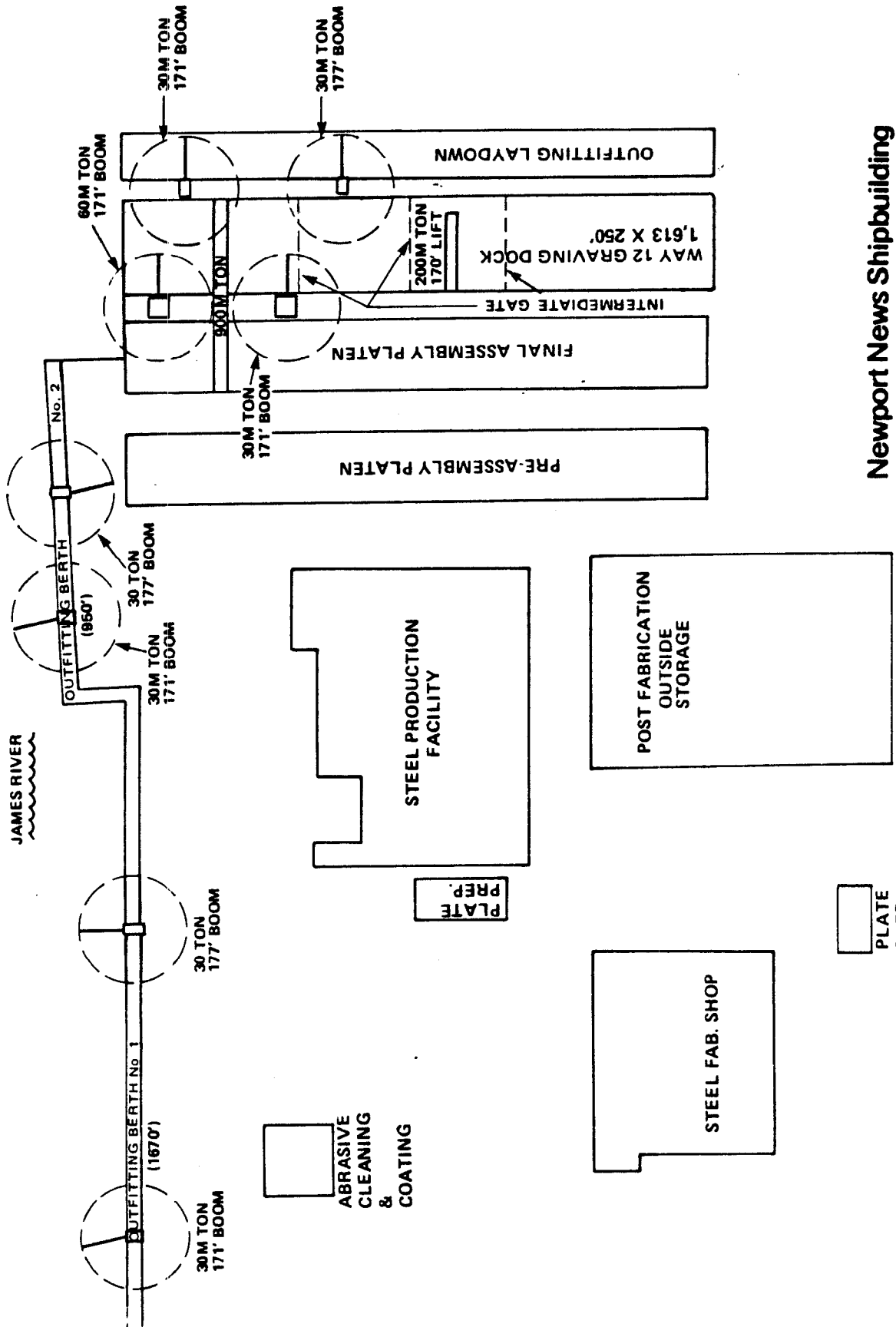
**BERTHS**

- |                          |                           |
|--------------------------|---------------------------|
| BERTH 1<br>620 X 30 DEEP | BERTH 6<br>1090 X 35 DEEP |
| BERTH 2<br>900 X 30 DEEP | BERTH 7<br>350 X 23 DEEP  |
| BERTH 3<br>980 X 30 DEEP | BERTH 8<br>300 X 23 DEEP  |
| BERTH 4<br>625 X 31 DEEP | BERTH 9<br>825 X 25 DEEP  |
| BERTH 5<br>965 X 35 DEEP | BERTH 10<br>775 X 25 DEEP |

NATIONAL STEEL AND SHIPBUILDING COMPANY

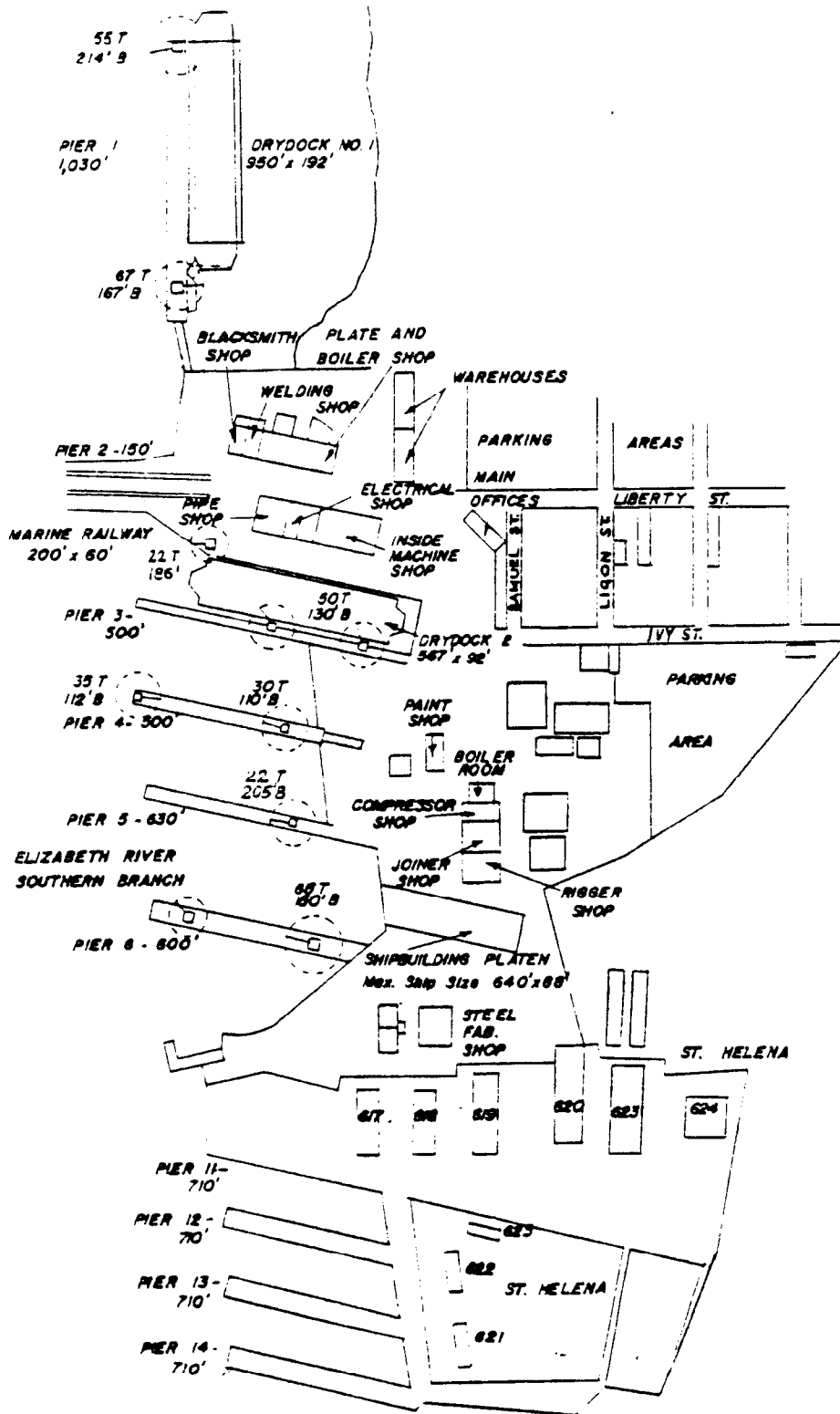


**Newport News Shipbuilding**  
South Yard



# Newport News Shipbuilding

NORTH YARD

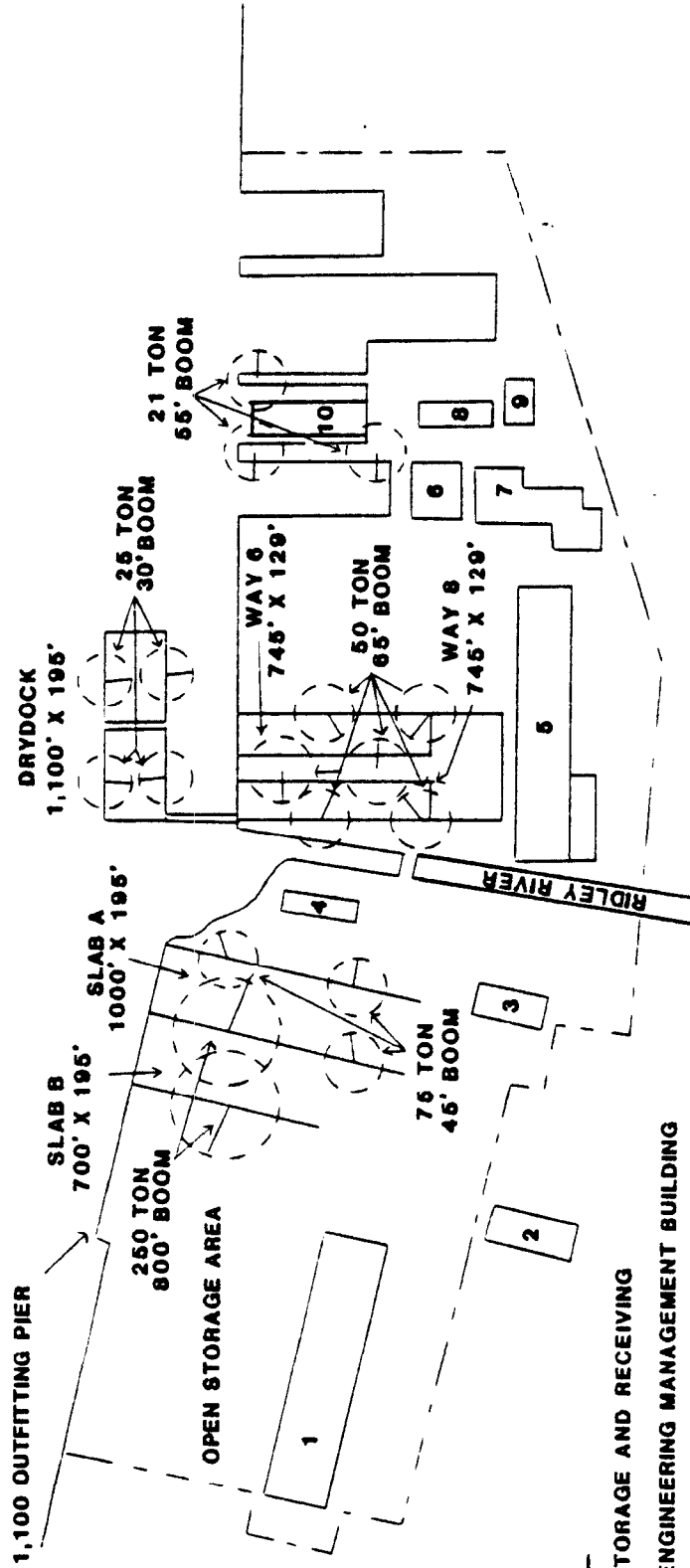


NORFOLK SHIPBUILDING AND  
DRYDOCK CORP.  
BERKLEY PLANT

CENTRAL YARD

DELAWARE RIVER

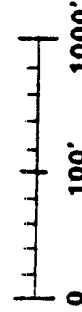
NORTH YARD



**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

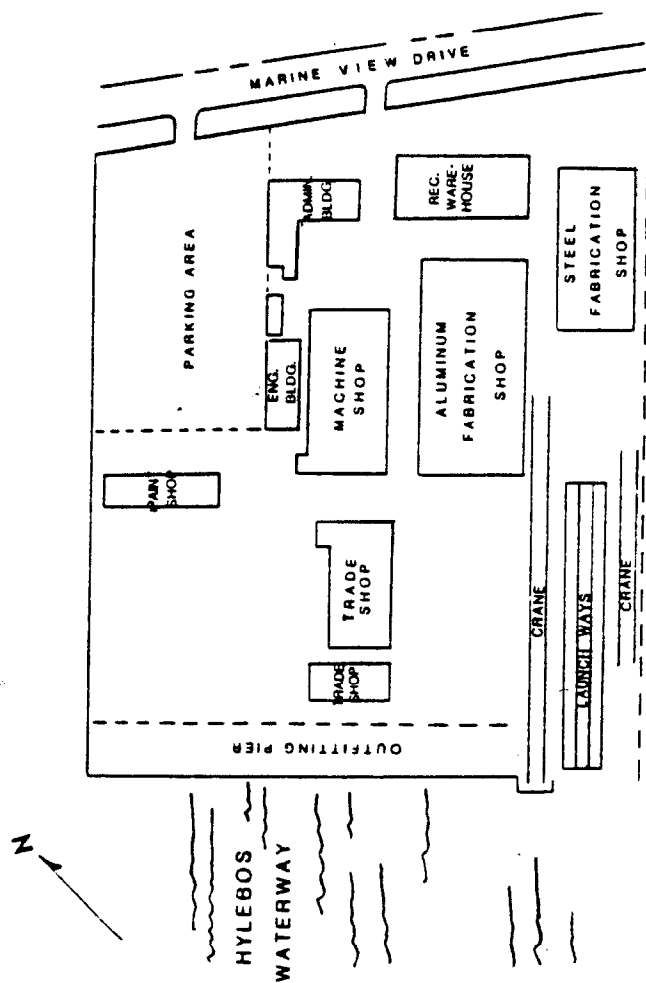
SCALE:



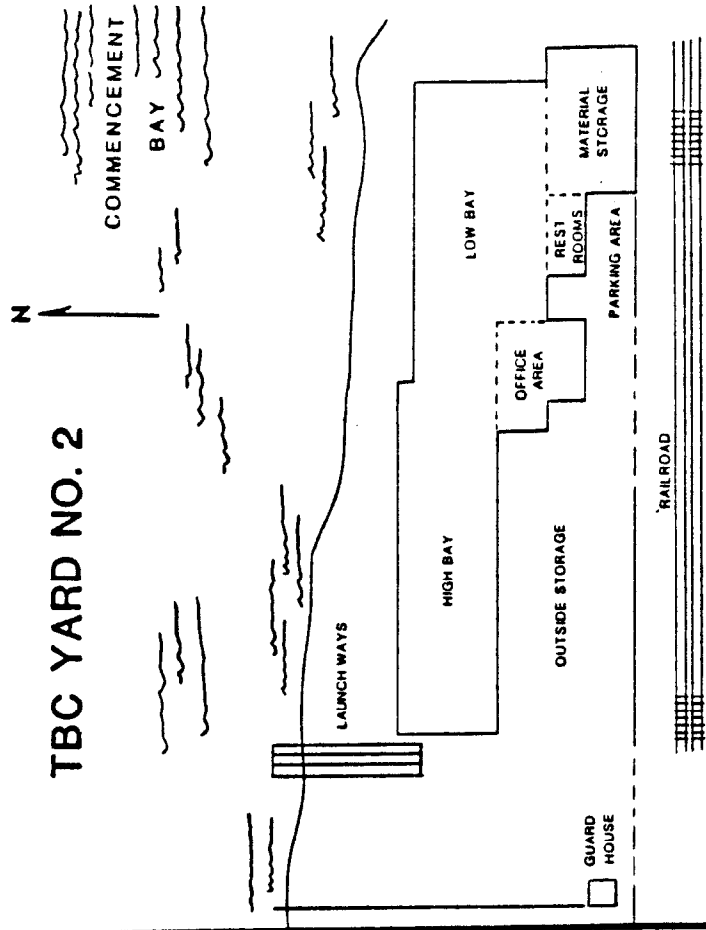
**PENNSYLVANIA SHIPBUILDING CO.**  
 (FORMERLY SUN SHIP INC.)

# TACOMA BOATBUILDING COMPANY

## TBC YARD NO. 1



## TBC YARD NO. 2





# TACOMA BOATBUILDING COMPANY

## TBC YARD NO. 3

## TBC YARD NO. 4

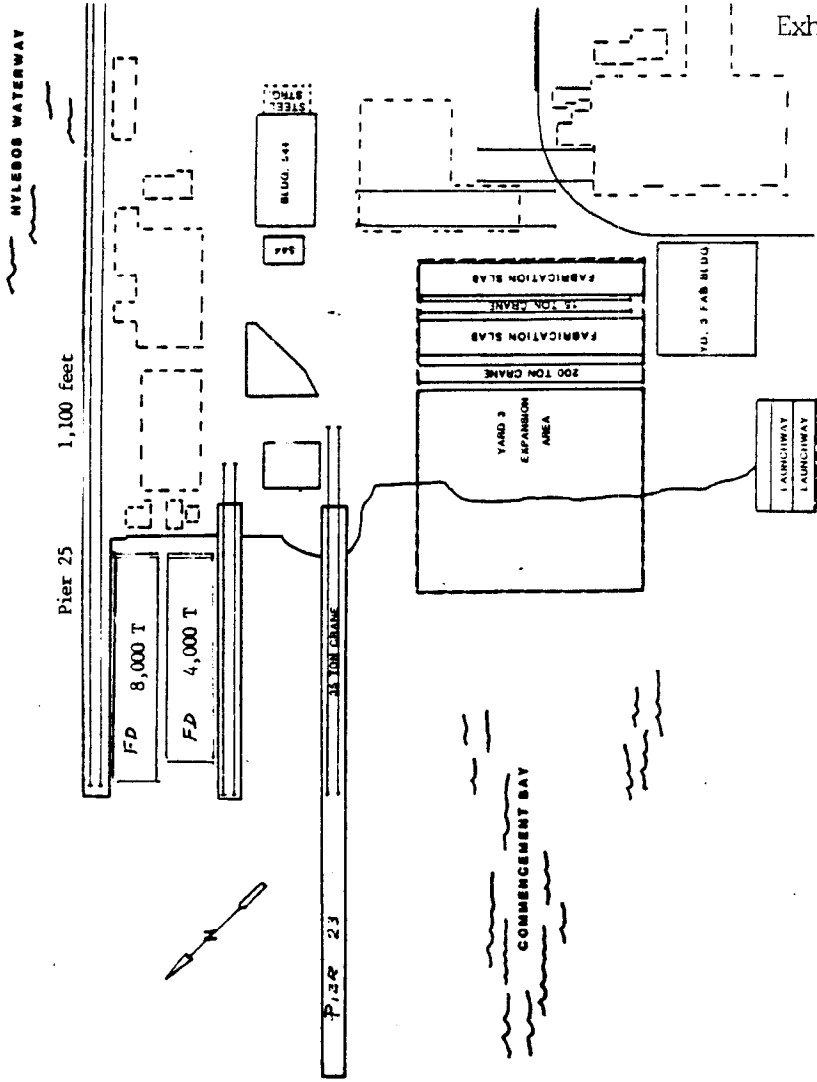
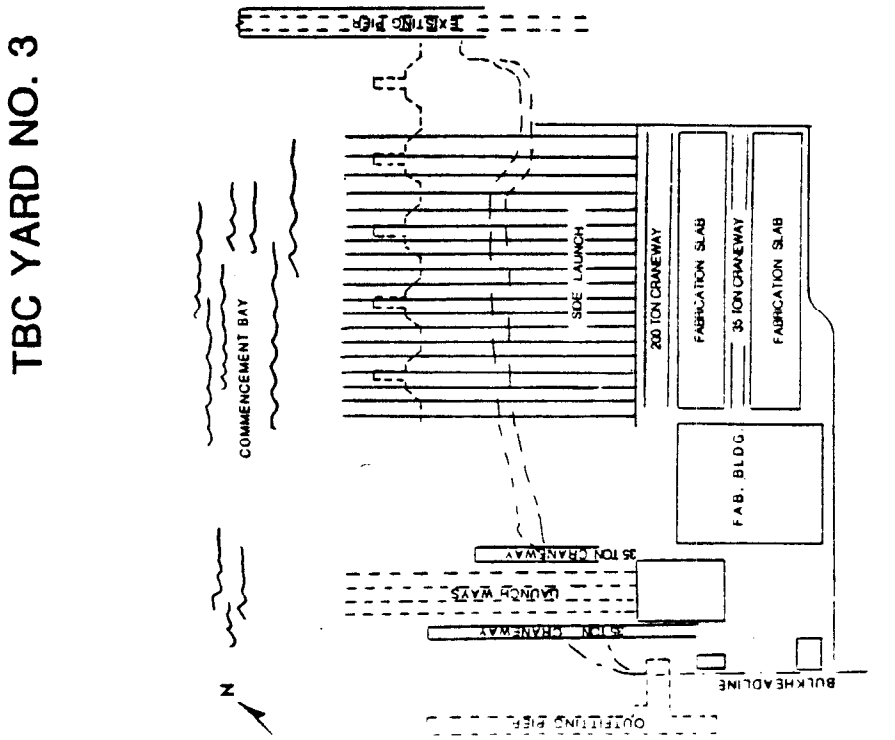
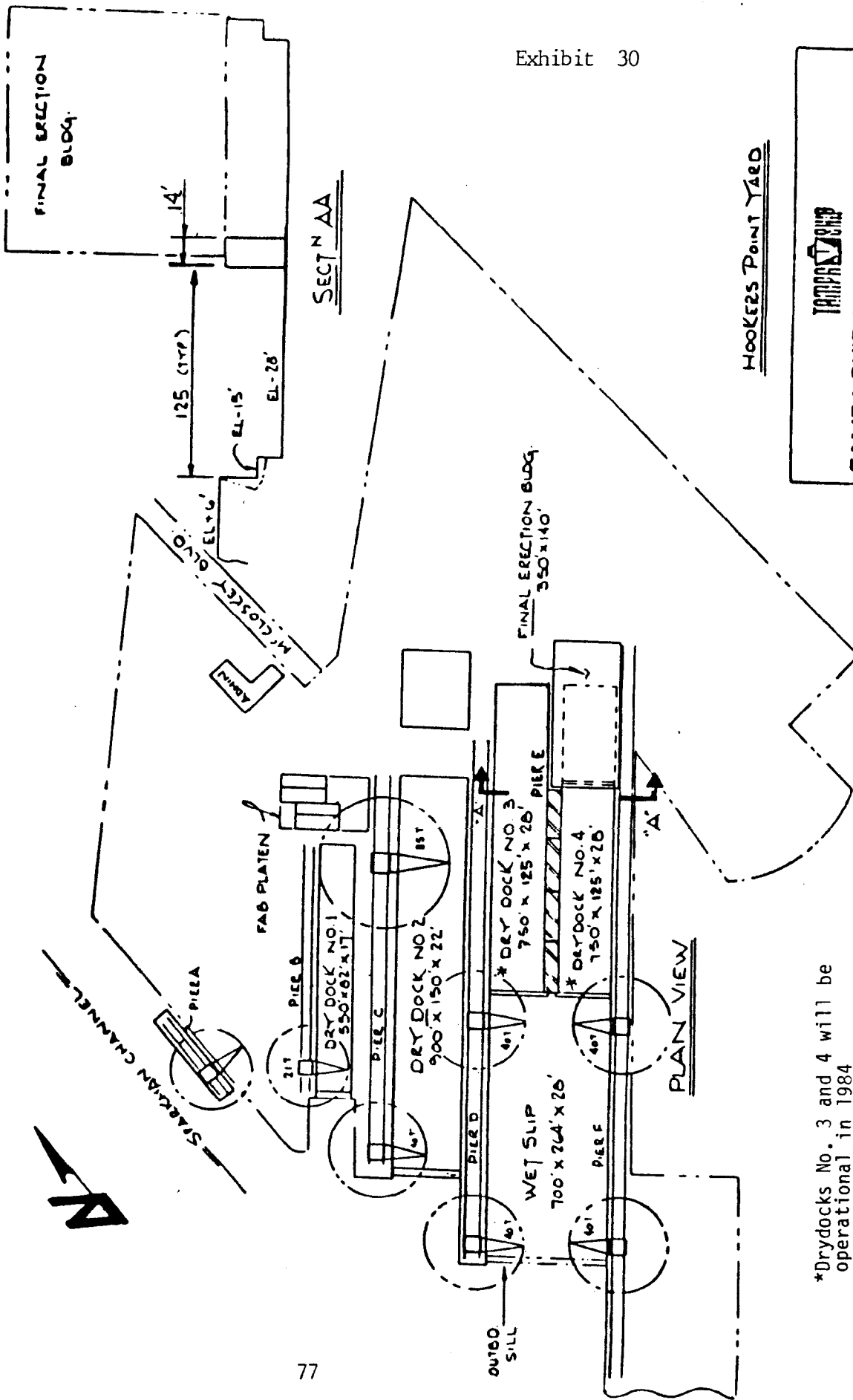



Exhibit 29

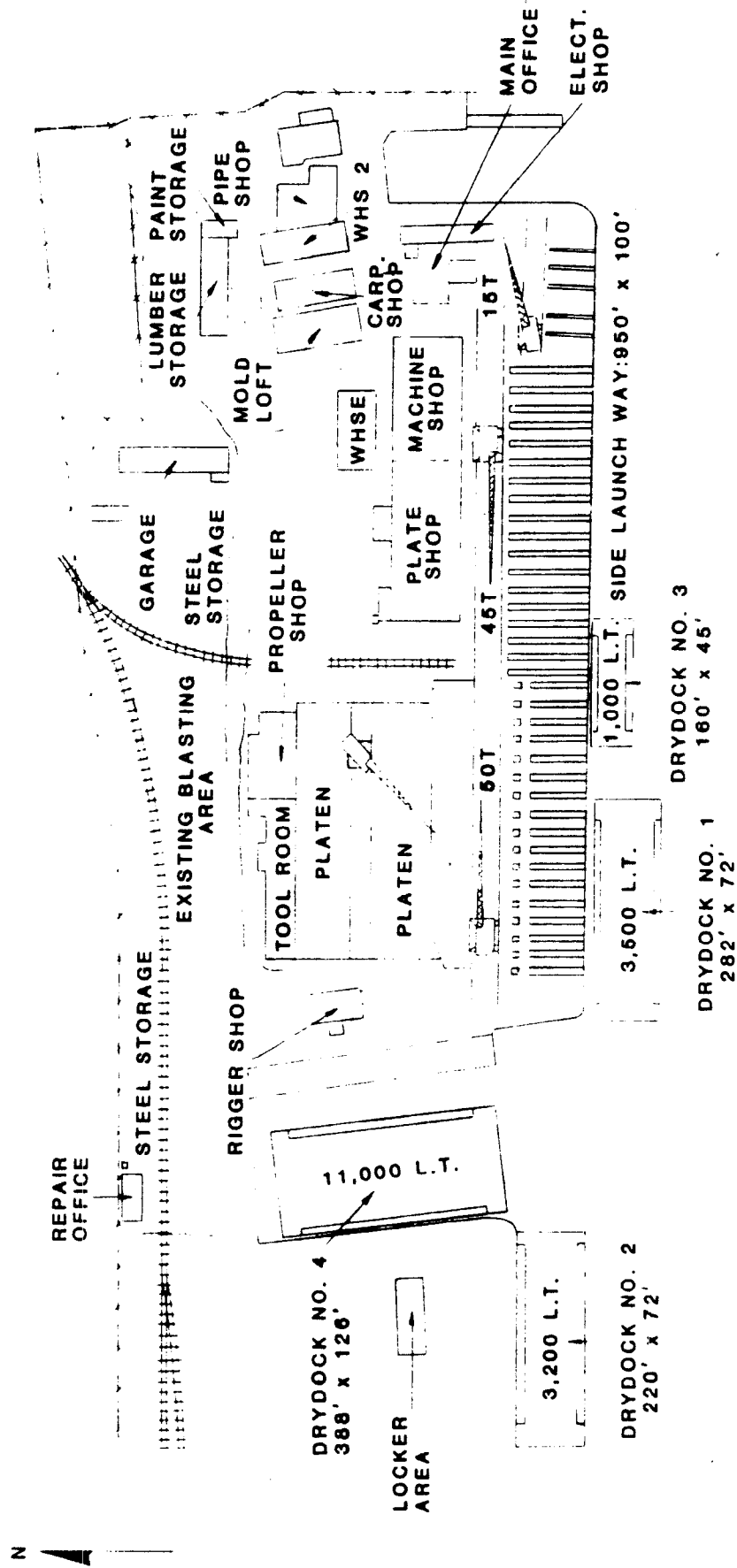




HOOKERS POINT YARD

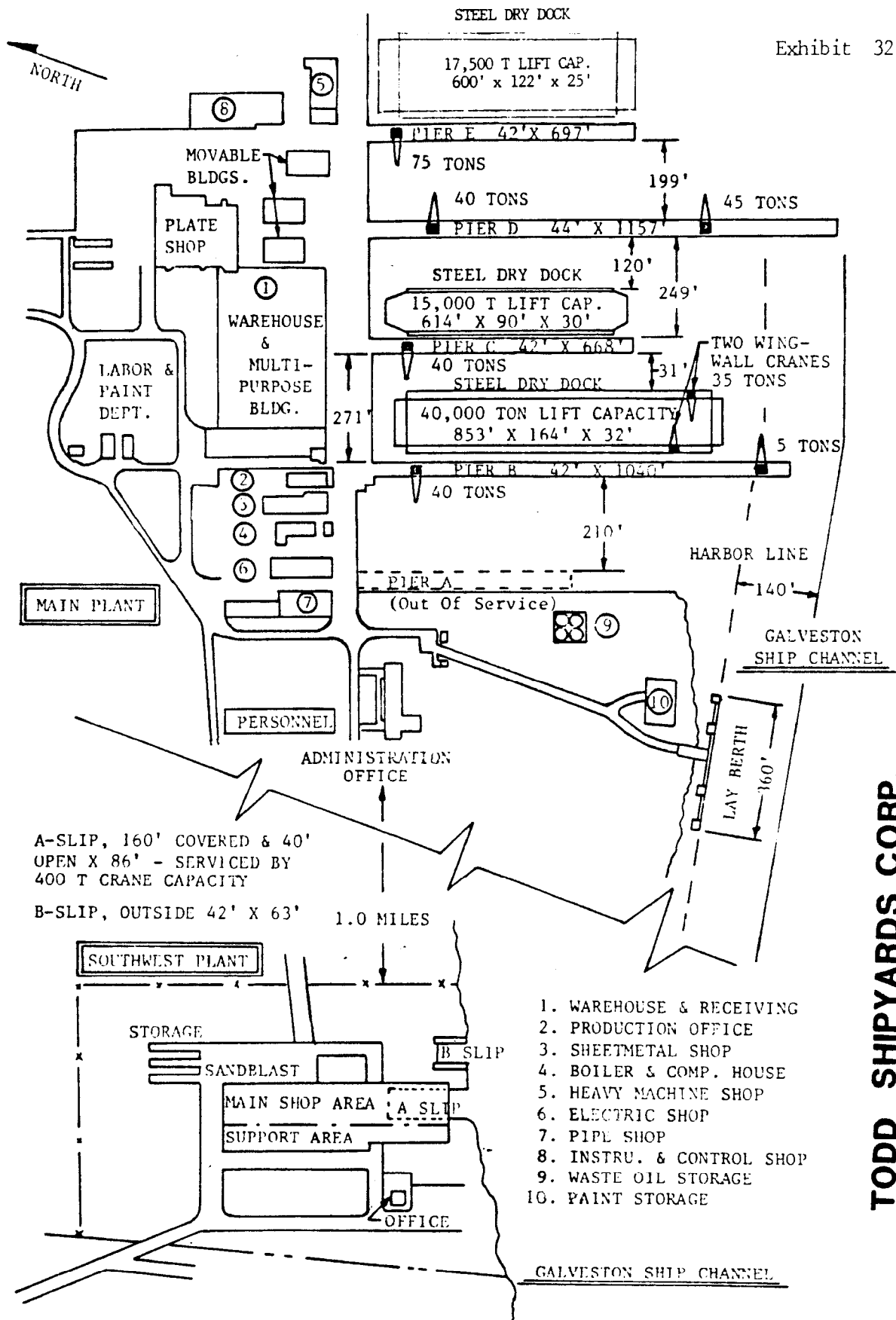
  
**TAMPA SHIPYARDS INCORPORATED**

\*Drydocks No. 3 and 4 will be operational in 1984



SABINE RIVER

**TEXAS GULFPORT SHIPBUILDING CO.**  
 (FORMERLY GULFPORT SHIPBUILDING)

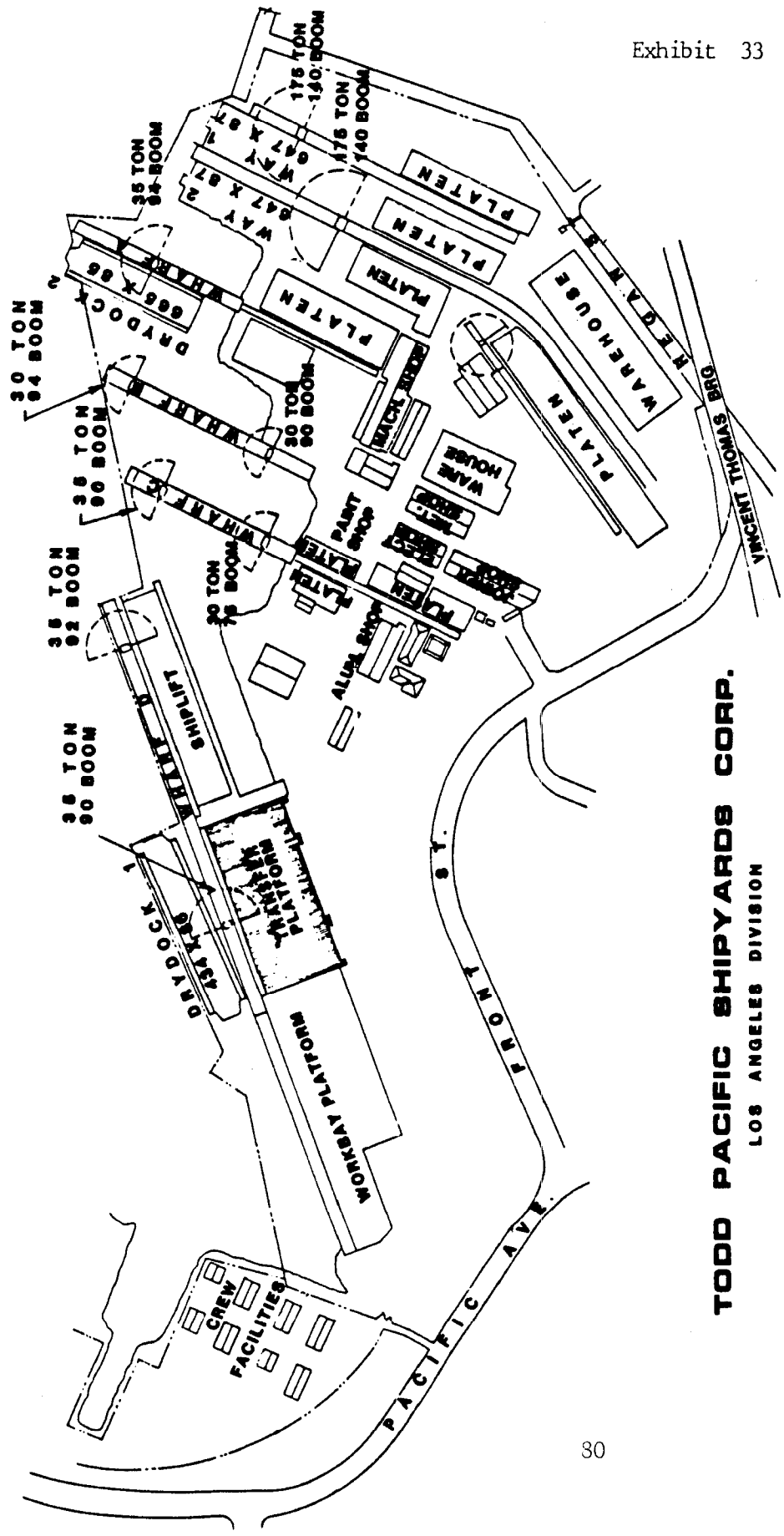


A-SLIP, 160' COVERED & 40' OPEN X 86' - SERVICED BY 400 T CRANE CAPACITY

B-SLIP, OUTSIDE 42' X 63' 1.0 MILES

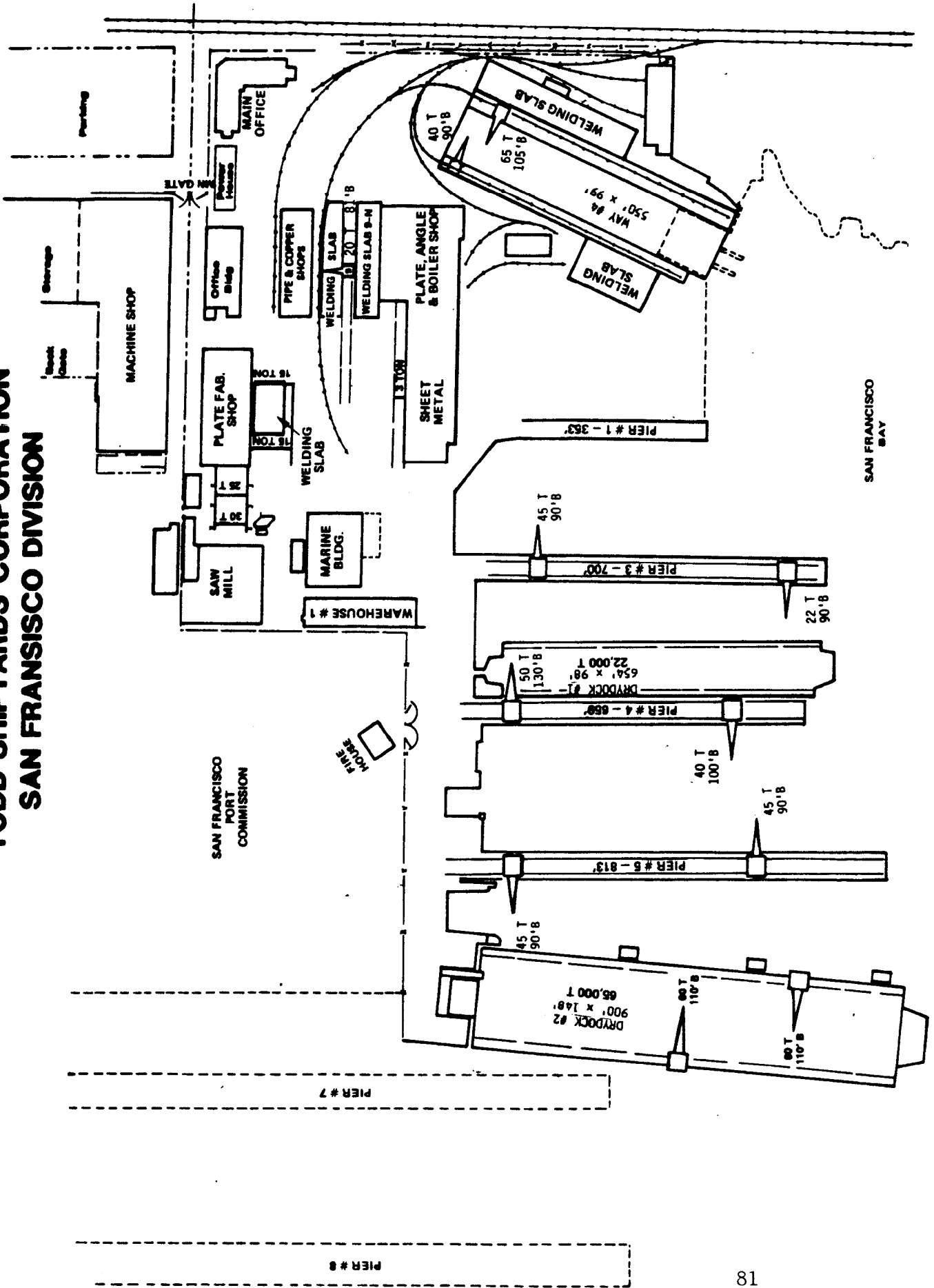
- 1. WAREHOUSE & RECEIVING
- 2. PRODUCTION OFFICE
- 3. SHEETMETAL SHOP
- 4. BOILER & COMP. HOUSE
- 5. HEAVY MACHINE SHOP
- 6. ELECTRIC SHOP
- 7. PIPE SHOP
- 8. INSTRU. & CONTROL SHOP
- 9. WASTE OIL STORAGE
- 10. PAINT STORAGE

**TODD SHIPYARDS CORP.  
GALVESTON DIVISION**



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

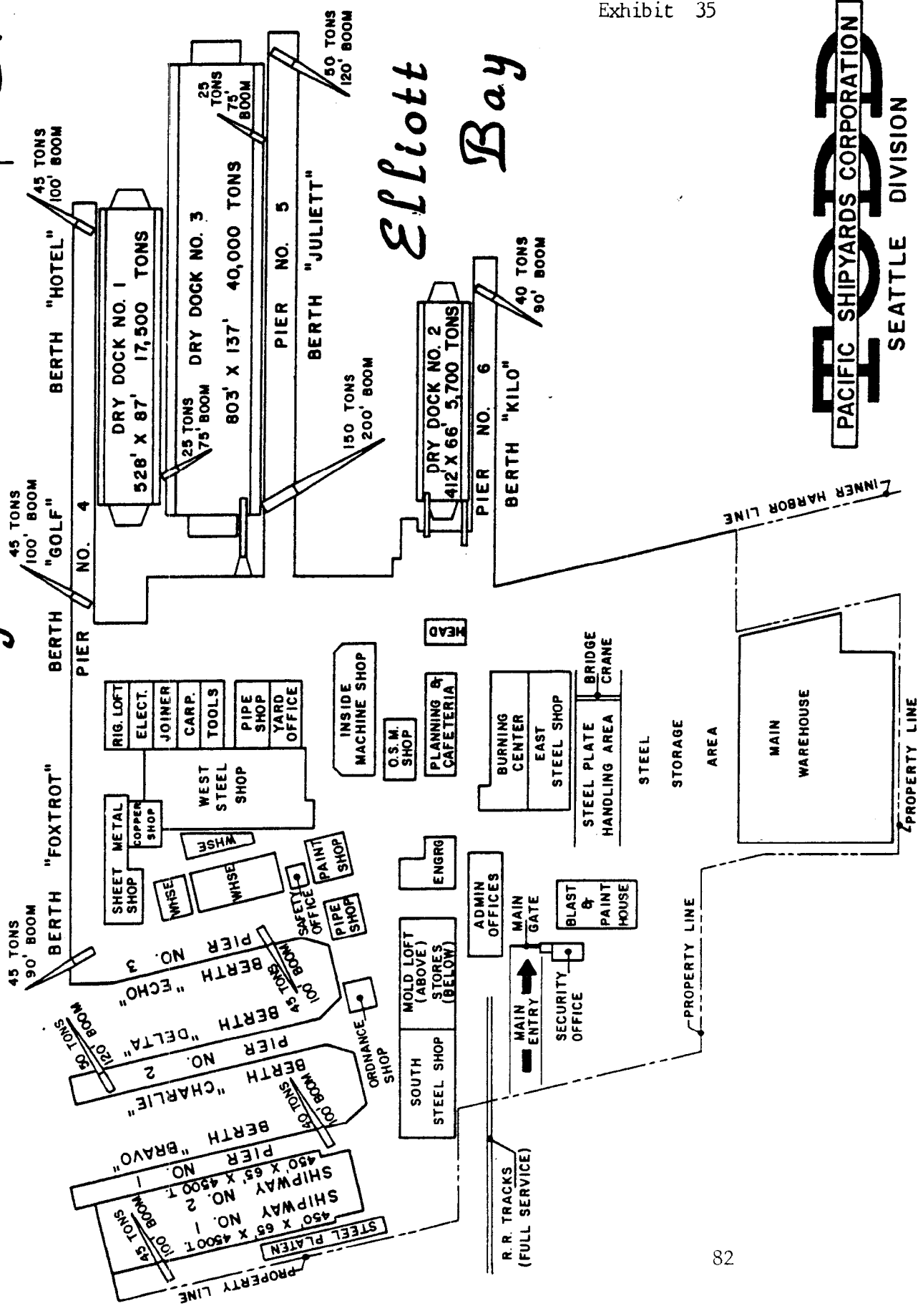
# TODD SHIPYARDS CORPORATION SAN FRANCISCO DIVISION



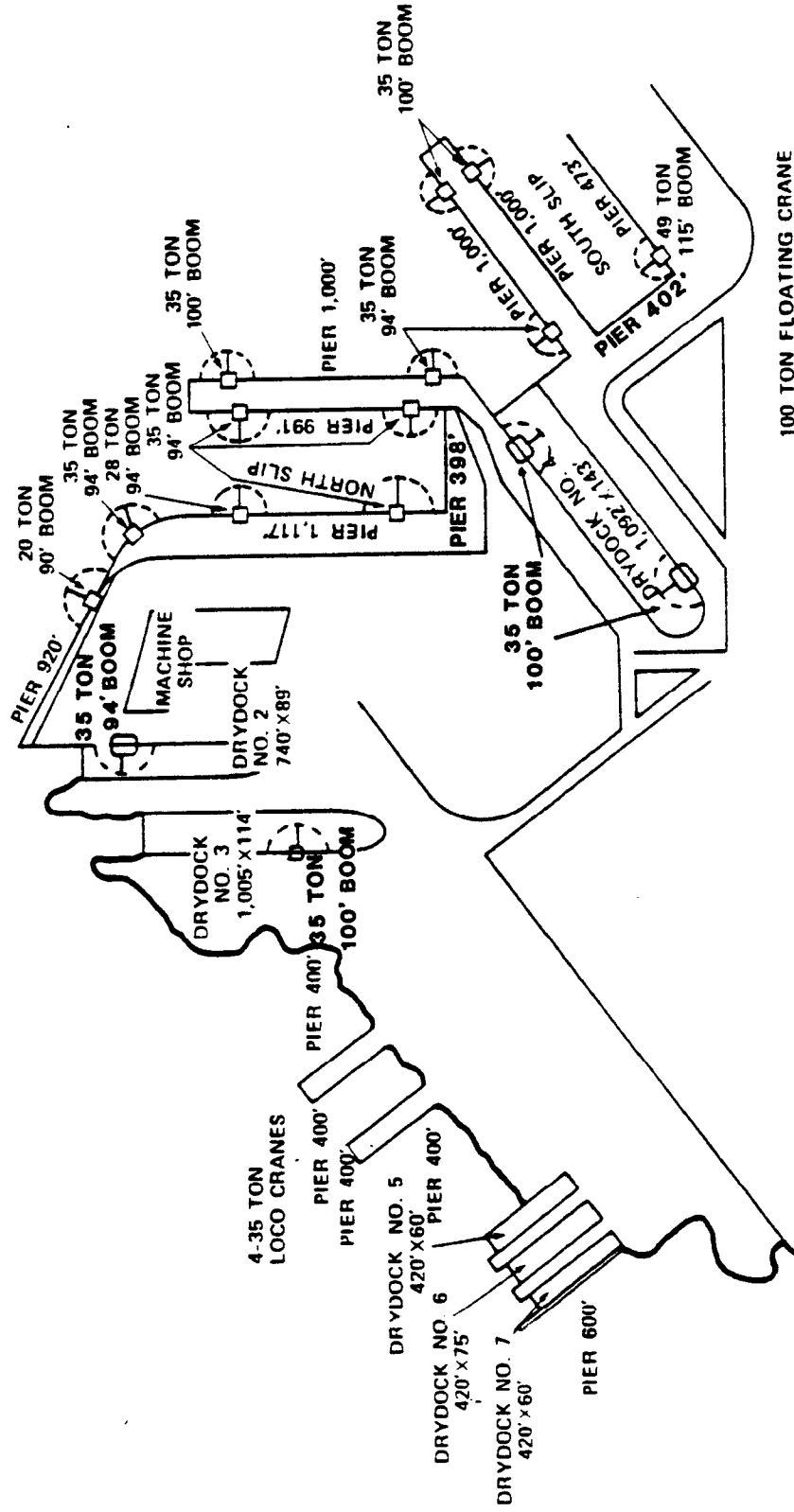


# West Water Way

# Elliott Bay



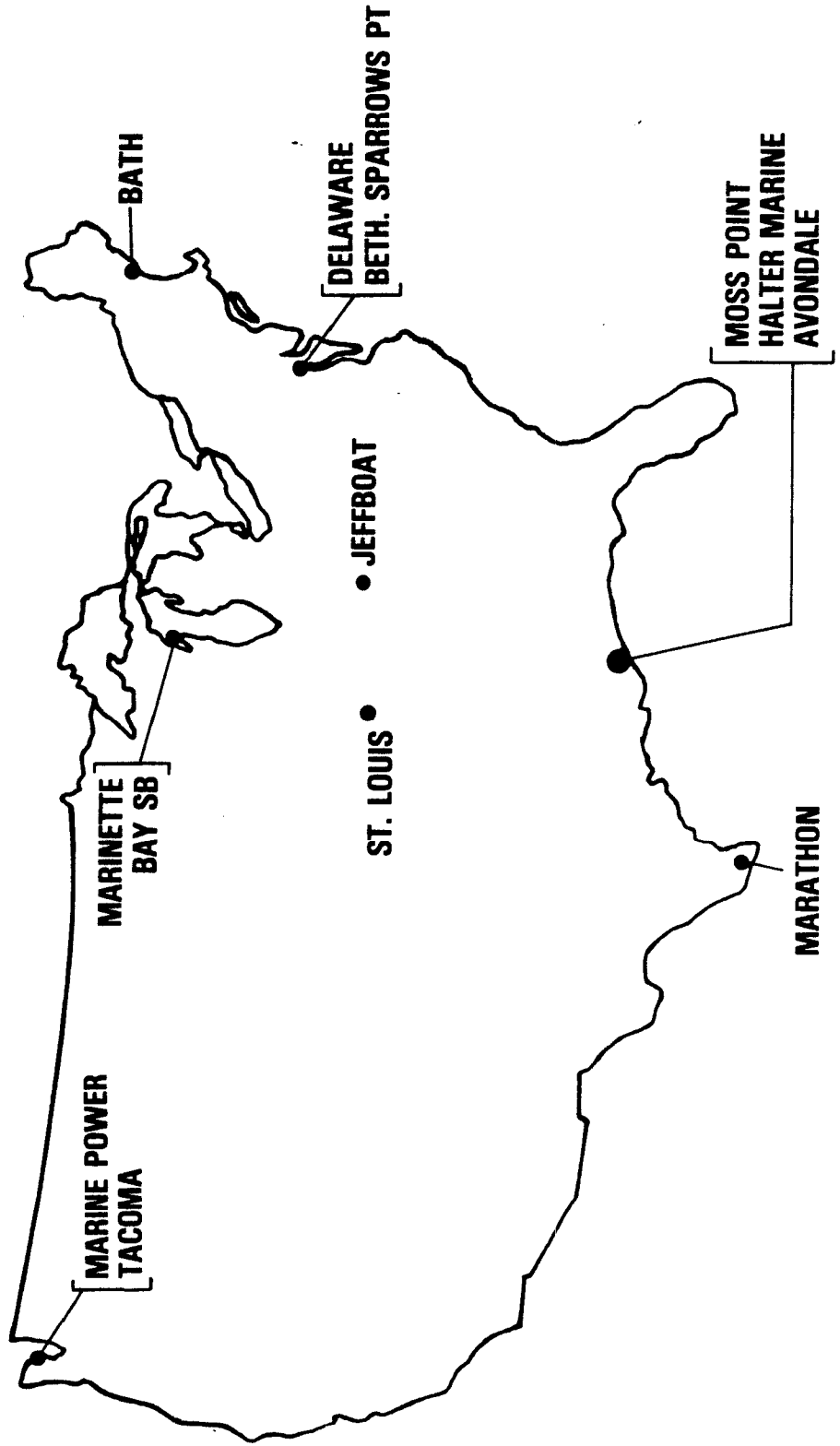
HIGH PORTAL GANTRY CRANES HAVE A TRACK AND SWITCHING NETWORK THAT SERVICES ALL LARGE DRYDOCKS AND DEEP - WATER BERTHS.



TRIPLE A MACHINE SHOP, INC.  
HUNTERS POINT

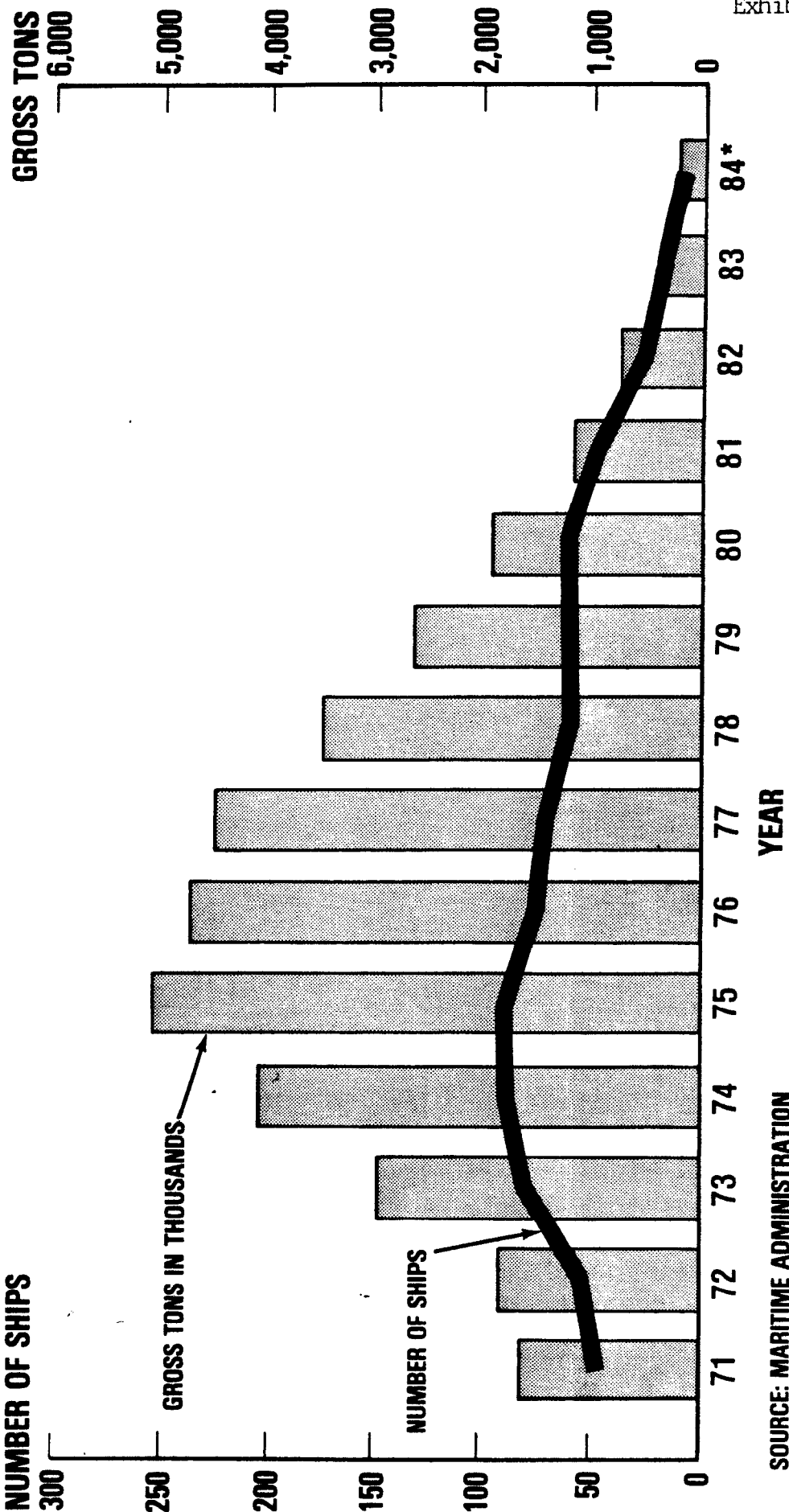


**SHIP FINANCING GUARANTEE CONSTRUCTION PROGRAM  
(TITLE XI)  
OFFICE OF SHIP CONSTRUCTION  
WORK UNDER CONTRACT SEPTEMBER 30, 1983**



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

SHIPS OF 1,000 GROSS TONS AND LARGER

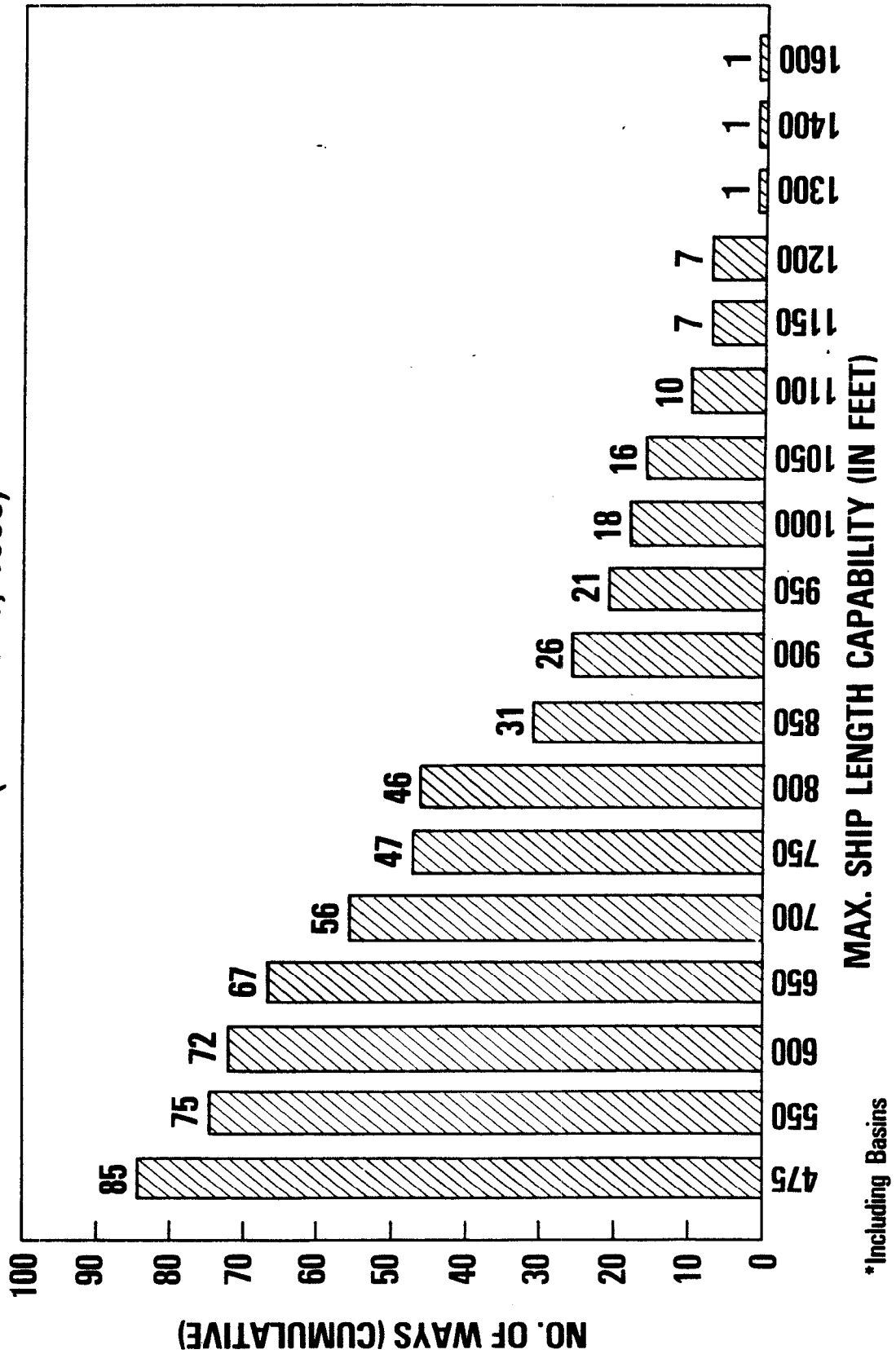


SOURCE: MARITIME ADMINISTRATION

\*FORECAST

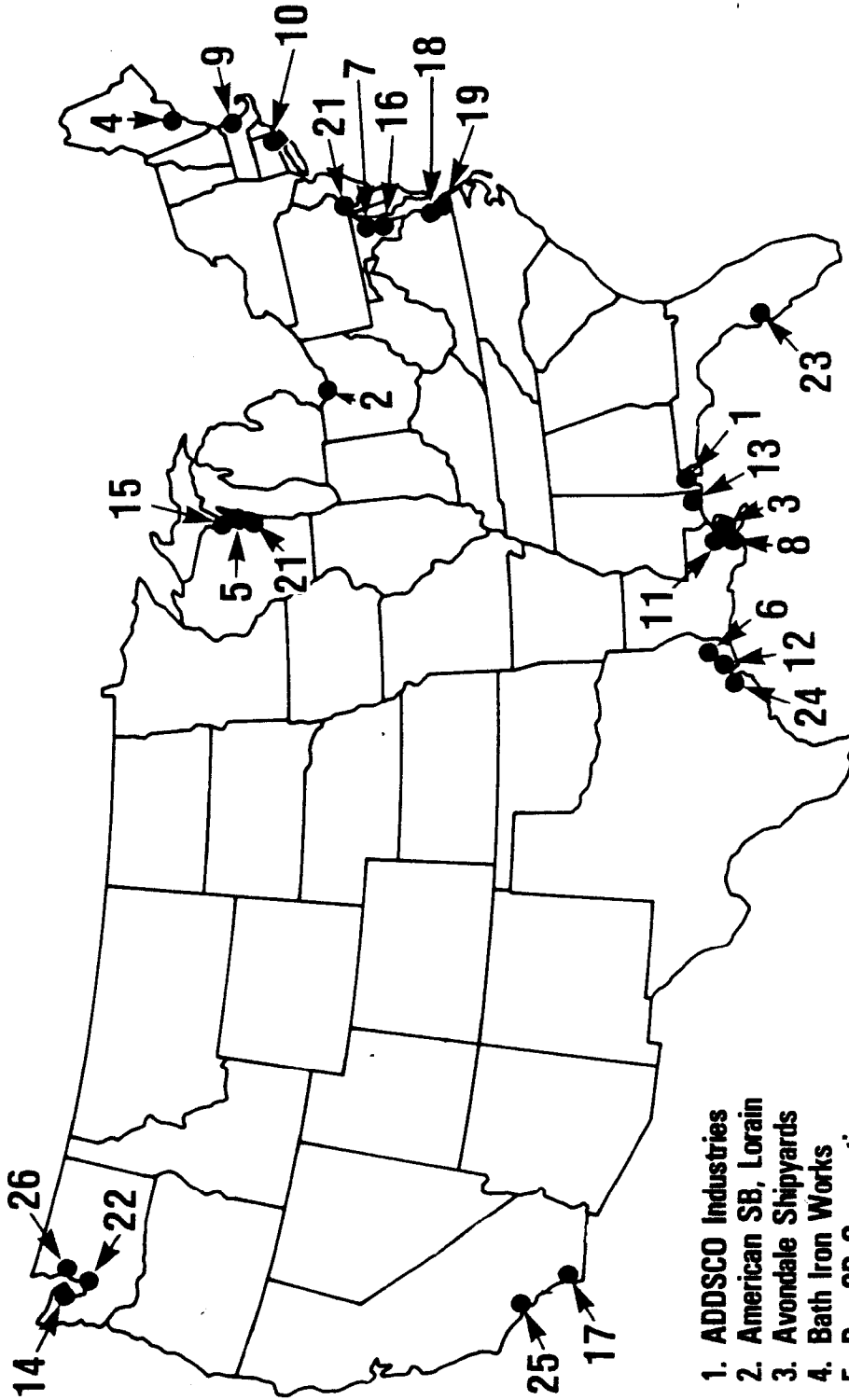
# MAJOR U.S. PRIVATE SHIPYARDS

**\*NUMBER OF SHIPWAYS BY MAXIMUM LENGTH CAPABILITY  
(November 1, 1983)**



\*Including Basins

# ACTIVE U.S. SHIPBUILDING BASE



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

COMMERCIAL VESSELS UNDER CONSTRUCTION OR ON ORDER IN U.S.  
SHIPYARDS IN ACTIVE SHIPBUILDING BASE (SEPTEMBER 30, 1983)

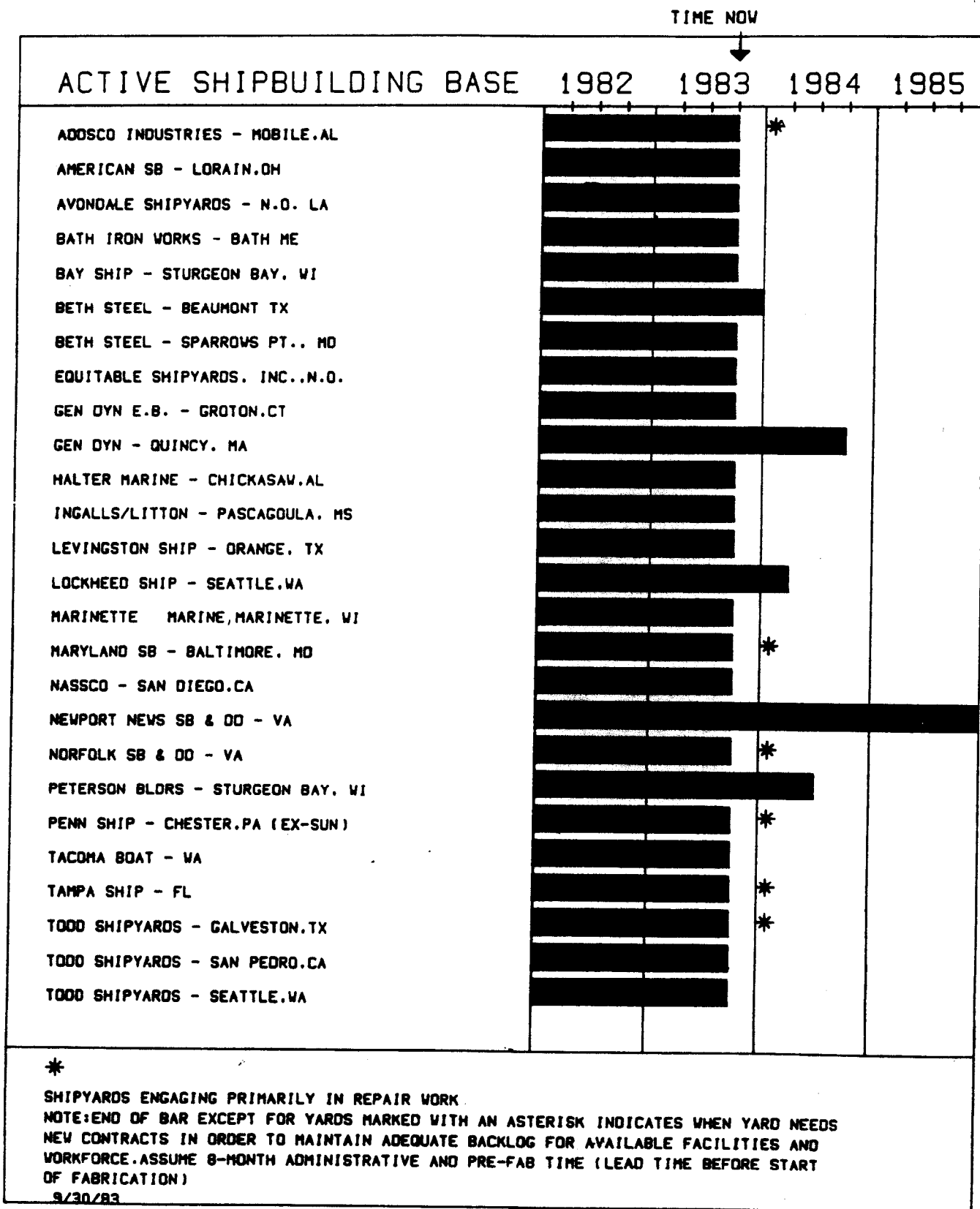
<u>SHIPYARDS</u>	<u>NO. CDS VESSELS</u>	<u>CONTRACT \$ VALUE CDS VESSELS (MILLIONS)</u>	<u>PRIVATE VESSELS</u>	<u>CONTRACT \$ VALUE PVT. VESSELS (MILLIONS)</u>	<u>TOTAL ALL VESSELS</u>	<u>TOTAL CONTRACT \$ VALUE (MILLIONS)</u>
ADESCO Industries	-	-	-	-	-	-
AmShip-Lorain	-	-	-	-	-	-
Avondale	-	-	3	300.0	3	300.0
Bath Iron Works	1	71.0	-	-	1	71.0
Bay SB	-	-	-	-	-	-
Beth., Beaumont	-	-	-	-	-	-
Beth., Sp. Pt.	-	-	2	143.6	2	143.6
Equitable	-	-	-	-	-	-
Gen. Dyn. Quincy	-	-	-	-	-	-
Gen Dyn. E. Boat	(Exclusively Navy Ship Construction)					
Halter Marine	-	-	-	-	-	-
Levingston	-	-	-	-	-	-
Litton/Ingalls	-	-	-	-	-	-
Lockheed	-	-	-	-	-	-
Marinette	-	-	1	30.0	1	30.0
Maryland SB	-	-	-	-	-	-
National Steel	-	-	-	-	-	-
Newport News	-	-	-	-	-	-
Norfolk SB	-	-	-	-	-	-
Peterson	-	-	-	-	-	-
Penn Ship (ex-Sun)	-	-	-	-	-	-
Tacoma Boat	-	-	4	90.7	4	90.7
Tampa Ship	-	-	5	288.6	5	288.6
Todd, Galveston	-	-	-	-	-	-
Todd, LA	-	-	-	-	-	-
Todd, Seattle	-	-	-	-	-	-
<b>TOTALS</b>	<b>1</b>	<b>\$71.0</b>	<b>15</b>	<b>\$852.9</b>	<b>16</b>	<b>\$923.9</b>

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

# SHIPYARD STATUS: NEED FOR NEW BUSINESS

MARITIME ADMINISTRATION  
DEPARTMENT OF TRANSPORTATION

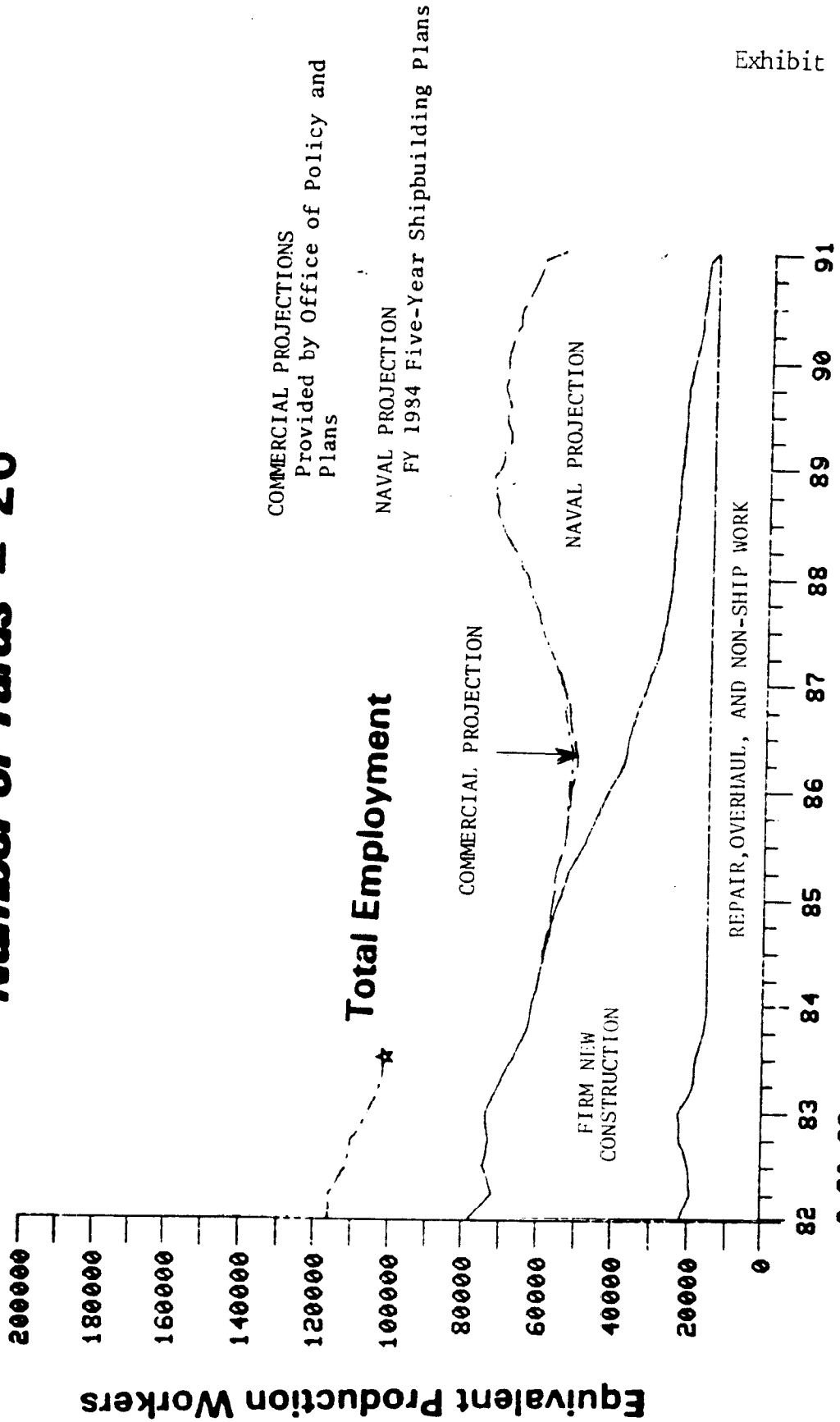
Exhibit 42



# Shipbuilding Industry Workload Projection

## Active Shipbuilding Base Summation

### Number of Yards = 26



SOURCE: SHIPYARD DATA FROM FORM NA332 WHEN PROVIDED  
OFFICE OF SHIP CONSTRUCTION, MARITIME ADMINISTRATION

TABLE 1

SHIP CONSTRUCTION CAPABILITY

BY SHIP TYPE



TABLE 1  
SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

REGION	SHIPYARD	SHIPWAY OR BASIN	MAXIMUM SHIP SIZE	General Cargo							Dry Bulk		
				Gen. Cargo 475 x 68	Job. 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
EAST COAST	Bath Iron Works	A	650 x 88	1	0	1	0	0	0	0	1	0	0
		B	720 x 130	1	0	1	1	0	0	0	1	1	0
		C	720 x 130	1	0	1	1	0	0	0	1	1	0
	Bethlehem Steel, Sparrows Point	7	800 x 106	1	1	1	1	0	0	0	1	1	0
		10	800 x 95	1	0	1	0	0	0	0	1	0	0
		GD	1200 x 192	4	1	3	2	1	1	1	4	3	1
	Coastal Dry Dock	3	755 x 102	1	0	1	1	0	0	0	1	0	0
		4	717 x 110	1	0	1	1	0	0	0	1	1	0
		5	1082 x 141	3	1	2	1	1	1	1	2	2	1
		6	1082 x 141	3	1	2	1	1	1	1	2	2	1
				(8)	(2)	(6)	(4)	(2)	(2)	(2)	(9)	(5)	(2)
General Dynamics, Quincy	6	860 x 123	2	1	1	1	0	0	0	1	1	0	
	7	936 x 143	2	1	1	1	1	1	0	1	1	1	
	8	860 x 123	2	1	1	1	0	0	0	1	1	0	
	11	860 x 144	2	1	1	1	0	0	0	1	1	0	
	12	860 x 144	2	1	1	1	0	0	0	1	1	0	
			(10)	(5)	(5)	(5)	(1)	(0)	(0)	(5)	(5)	(1)	
Maryland SB & DD	1	850 x 110	1	1	1	1	0	0	0	1	1	0	
			(1)	(1)	(1)	(1)	(0)	(0)	(0)	(1)	(1)	(0)	
Newport News SB	5	649 x 93	1	0	1	0	0	0	0	1	0	0	
	6	715 x 93	1	0	1	0	0	0	0	1	0	0	
	8	940 x 125	2	1	1	1	1	1	1	1	1	1	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

REGION	SHIPYARD	SHIPWAY OR BASIN	MAXIMUM SHIP SIZE	General Cargo							Dry Bulk		
				Gen. Cargo 475 x 58	Mod. 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	
	Newport News SB (cont'd)	9	940 x 125	2	1	1	1	1	1	0	1	1	1
		10	960 x 124	2	1	2	1	1	1	1	2	1	1
		11	1100 x 130	2	1	2	1	1	1	1	2	2	1
		12	1600 x 246	9 (19)	4 (8)	5 (13)	4 (8)	1 (5)	1 (5)	1 (3)	6 (14)	4 (9)	1 (5)
	Norfolk SB & DD	-	475 x 85	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Penn Ship	6	825 x 136	1	1	1	1	0	0	0	1	1	0
		8	825 x 136	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	1	0	0	2	1	0
				(8)	(4)	(6)	(4)	(1)	(1)	(1)	(6)	(4)	(1)
	<u>TOTAL EAST COAST</u>			56	22	39	27	10	7	41	30	10	
<u>GULF COAST</u>	ADDSCO Industries	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 (5)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

REGION	SHIPYARD	SHIPWAY OR BASIN	MAXIMUM SHIP SIZE	General Cargo							Dry Bulk		
				Gen. Cargo 475 x 68	Job. 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
Avondale		2	1200 x 126	6	5	5	5	5	5	5	6	6	5
		3	1020 x 174	6 (12)	3 (8)	3 (8)	3 (8)	3 (8)	3 (8)	3 (8)	3 (9)	3 (9)	3 (8)
Bethlehem, Beaumont		-	800 x 96	1 (1)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)
Levingston (Orange, Texas)		1	700 x 100	1 (1)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)
Litton/Ingalls		1	690 x 85	1	0	0	0	0	0	0	1	0	0
		2	550 x 80	1	0	0	0	0	0	0	0	0	0
		7	650 x 90	1	0	1	0	0	0	0	1	0	0
		8	650 x 90	1	0	1	0	0	0	0	1	0	0
		9	650 x 90	1	0	1	0	0	0	0	1	0	0
		10 WB	650 x 90 800 x 173	1 6 (12)	1 6 (10)	1 6 (6)	1 6 (6)	1 6 (6)	1 6 (6)	1 6 (6)	1 6 (6)	1 6 (11)	1 6 (6)
Marathon		1100 x 150	4 (4)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	
Tampa Shipyards		500 x 105	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
Texas Gulfport SB		550 x 80	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
Todd-Galveston		475 x 85	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
<u>TOTAL GULF COAST</u>				<u>38</u>	<u>15</u>	<u>22</u>	<u>15</u>	<u>9</u>	<u>9</u>	<u>24</u>	<u>18</u>	<u>9</u>	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE.

REGION	SHIPYARD	SHIPWAY OR BASIN	MAXIMUM SHIP SIZE	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mod. 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>WEST COAST</u>														
	FMC Corporation	4	800 x 130	1 (1)	1 (1)	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	1 (1)	0 (0)
	Lockheed Marine	1	650 x 88	1	0	0	0	0	0	0	0	1	0	0
		3	650 x 88	1	0	0	0	0	0	0	0	1	0	0
		21	690 x 90	1	0	1	0	0	0	0	0	1	0	0
				(3)	(0)	(1)	(0)	(0)	(0)	(0)	(0)	(3)	(0)	(0)
	Marine Power & Equipment Co.	-	600 x 86	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)
	National Steel & SB	1	980 x 170	4	1	1	1	1	1	1	1	2	1	1
		2	690 x 90	1	0	1	0	0	0	0	0	1	0	0
		3	900 x 106	1	1	1	1	1	1	1	1	1	1	1
		4	900 x 106	1	1	1	1	1	1	1	1	1	1	1
				(7)	(3)	(4)	(3)	(3)	(3)	(1)	(1)	(5)	(3)	(3)
	Tacoma Boat	1	650 x 400	1 (1)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	1 (1)	0 (0)
	Todd-LA	1	800 x 87	1	0	0	0	0	0	0	0	1	0	0
		2	800 x 87	1	0	0	0	0	0	0	0	1	0	0
				(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(2)	(0)	(0)
	Todd-SF	-	550 x 96	1 (1)	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	General Cargo							Dry Bulk		
				Gen. Cargo 475 x 60	Mod. 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	
	Todd-Seattle	1A	600 x 96	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	
	Triple A	2	715 x 82	1	0	0	0	0	0	1	0	0	
	Hunters Point	3	996 x 107	2	1	1	1	1	1	1	1	1	
		4	1088 x 136	4	1	1	1	1	1	2	1	1	
				(7)	(2)	(2)	(2)	(2)	(2)	(4)	(2)	(2)	
	<u>TOTAL WEST COAST</u>			<u>24</u>	<u>6</u>	<u>9</u>	<u>6</u>	<u>5</u>	<u>3</u>	<u>16</u>	<u>7</u>	<u>5</u>	
	<u>GREAT LAKES</u>												
	American SB-Lorain	GD2	708 x 78	1	0	0	0	0	0	1	0	0	
		GD3	1021 x 121	2 (3)	1* (1)	1* (1)	1* (1)	1* (1)	1* (1)	1 (2)	1* (1)	1* (1)	
	Bay SB Corporation	GD1	1100 x 136	2	1*	1*	1*	1*	1*	1	1*	1*	
		3	730 x 105	1 (3)	1* (2)	1* (2)	1* (2)	0 (1)	0 (1)	1 (2)	1* (2)	0 (1)	
	Fraser Shipyards	GD2	825 x 82	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	
	<u>TOTAL GREAT LAKES</u>			<u>7</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>5</u>	<u>3</u>	<u>2</u>	
	<u>TOTAL POSITIONS ALL YARDS</u>			<u>125</u>	<u>46</u>	<u>73</u>	<u>51</u>	<u>26</u>	<u>21</u>	<u>88</u>	<u>56</u>	<u>26</u>	

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

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers								OBO							
				25,000 620 x 75	38,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000 Cu. m. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143						
EAST	Bath Iron Works	A	650 x 88	1	0	0	0	0	0	0	0	0	0	0	0	0	0		
		B	720 x 130	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		C	720 x 130	(3)	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Bethlehem Steel, Sparrows Point	7	800 x 106	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		10	800 x 95	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GD	1200 x 192	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Coastal Dry Dock	3	755 x 102	(5)	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		4	717 x 110	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	1082 x 141	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		6	1082 x 141	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	General Dynamics, Quincy	6	860 x 123	(6)	(4)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
		7	936 x 143	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
8		860 x 123	1	1	1	0	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	0	
12		860 x 144	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Maryland S/B & D/D	1	850 x 110	(5)	(5)	(5)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(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										
Newport News S/B		5	649 x 93	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
		6	715 x 93	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		8	940 x 125	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		9	940 x 125	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		10	960 x 124	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		11	1100 x 130	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		12	1600 x 246	6	4	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				(13)	(9)	(6)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
		Norfolk SB & DD		-	475 x 85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
						(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
		Penn Ship		6	825 x 136	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				8	825 x 136	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slab A	1000 x 195			2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Slab B	700 x 195			2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		(6)	(6)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		
<u>TOTAL EAST COAST</u>				39	31	15	7	7	7	6	3	1	1	11	5								
<u>GULF COAST</u>	ADDSCO Industries	1	523 x 68	0	0	0	0	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	0	0	0	0	0	
		3	523 x 68	0	0	0	0	0	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	0	0	0	0	0	
		5	620 x 90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(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					
Avondale		2	1200 x 126	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0
		3	1020 x 174	3 (8)	3 (8)	3 (8)	3 (3)	3 (3)	0	0	0	0	0	0	0	0	0	0
Bethlehem, Beaumont		-	800 x 96	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		1	700 x 100	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Litton/Ingalls		1	690 x 85	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	550 x 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	650 x 90	1	0	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	0
		9	650 x 90	1	0	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	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)	0 (0)
Marathon		-	1100 x 150	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)	1 (1)
		3	500 x 105	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	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)	0 (0)	0 (0)



SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers										OBO		
				25,000 620 x 75	38,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000 Cu.m. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143			
	Todd-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)
<u>TOTAL GULF COAST</u>				23	17	15	4	4	1	1	0	0	0	9	4	
<u>WEST COAST</u>																
	FMC Corporation	4	800 x 130	1 (1)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Lockheed Marine	1	650 x 88	1	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
		21	690 x 90	1 (3)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Marine Power and Equipment Co.	-	600 x 86	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)
	National Steel & SB	1	980 x 170	2	1	1	1	1	1	1	1	1	1	1	1	0
		2	690 x 90	1	1	0	0	0	0	0	0	0	0	0	0	0
		3	900 x 106	1	1	1	0	0	0	0	0	0	0	0	0	0
		4	900 x 106	1 (5)	1 (4)	1 (3)	0 (1)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (0)
	Todd-LA	1	800 x 87	1	0	0	0	0	0	0	0	0	0	0	0	0
		2	800 x 87	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

Region	Shipyard	Shipway or Basin	Maximum Ship Size	Tankers										OBO		
				25,000	620 x 75	38,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000 Cu. m. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143		
	Todd-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)
	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)
	Tacoma Boat	1	650 x 400	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Triple A - Hunters Point	2	715 x 82	1	0	0	0	0	0	0	0	0	0	0	0	0
		3	996 x 107	1	1	1	1	0	0	0	0	0	0	0	0	0
		4	1088 x 136	2	1	1	1	0	0	0	0	0	0	0	1	1
				(4)	(2)	(2)	(2)	(0)	(0)	(0)	(0)	(0)	(0)	(2)	(2)	(0)
	<u>TOTAL WEST COAST</u>			16	8	5	1	1	1	1	0	0	0	0	3	0
	American S/B - Lorain	GD2	708 x 78	1	0	0	0	0	0	0	0	0	0	0	0	0
		GD3	1021 x 121	1 (2)	1* (1)	1* (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1* (1)	0 (0)
	Bay S/B Corporation	GD1	1100 x 136	1	1* (2)	1* (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1* (1)	0 (0)
		GD3	730 x 105	1 (2)	1* (2)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (1)	0 (0)

GREAT LAKES

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				
	Fraser Shipyards	GD2	825 x 82	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	<u>TOTAL GREAT LAKES</u>			5	3	2	1	0	0	0	0	0	0	0	0	2	0
	<u>TOTAL POSITIONS ALL YARDS</u>			83	59	37	12	12	12	7	3	1	25	9			

\*\*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	22	39	27	10	7		41		30		10	
GULF COAST	38	15	22	15	9	9		24		16		9	
WEST COAST	24	6	9	6	5	3		18		7		5	
GREAT LAKES	7	3	3	3	2	2		5		3		2	
TOTAL POSITIONS ALL YARDS	125	46	73	51	26	21		88		56		26	
REGION	TANKERS										OBO		
	25,000 620 x 75	38,000 688 x 90	89,000 894 x 105	120,000 920 x 138	125,000cu.M. 932 x 140	225,000 1100 x 140	265,000 1100 x 178	390,770 1204 x 228	80,000 886 x 106	160,000 998 x 143			
EAST COAST	39	31	15	7	7	6	1		11		5		
GULF COAST	23	17	15	4	4	1	0		9		4		
WEST COAST	16	8	5	1	1	0	0		3		0		
GREAT LAKES	5	3	2	0	0	0	0		2		0		
TOTAL POSITIONS ALL YARDS	83	59	37	12	12	7	1		25		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	1	1	1	1	1	1	1					
Beth-Sparrows Point	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1				
Coastal Dry Dock	4	4	4	4	4	3	2	2	2	2	2	2	2	1	1				
General Dynamics, Quincy	5	5	5	5	5	5	5	5	1										
Maryland SB & DD	1	1	1	1	1	1	1	1	1										
Newport News SB & DD	6	6	6	6	6	5	5	5	5	3	2	2	2	1	1	1	1	1	1
Norfolk SB & DD	1																		
Perm Ship (formerly Sun)	4	4	4	4	4	3	3	1	1	1	1								
TOTAL	(27)	(26)	(26)	(26)	(25)	(20)	(19)	(15)	(10)	(7)	(6)	(5)	(3)	(2)	(2)	(1)	(1)	(1)	(1)
<u>GULF COAST</u>																			
ADDSCO Industries	5	1	1	1															
Avondale Shipyards	12	9	9	8	8	8	8	8	8	8	8	8	5	5	5				
Beth-Beaumont	1	1	1	1	1	1	1												
Ingalls-E. Bank	6	6	5	5	6	6	6												
Ingalls-W. Bank	6	6	6	6	6	6	6												
Levingston (Orange, TX)	1	1	1	1	1	1	1												
Marathon LeTourneau	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Tampa Shipyards	1	1	1	1	1	1	1												
Texas Gulfport SB	1	1	1	1	1	1	1												
Todd-Galveston	1	1	1	1	1	1	1												
TOTAL	(35)	(26)	(24)	(22)	(17)	(16)	(16)	(9)	(9)	(9)	(9)	(9)	(6)	(5)	(5)	(2)	(1)	(1)	(1)

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	1												
Lockheed Marine	3	3	3	3															
Marine Power & Equip.	1	1	1																
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	(17)	(17)	(16)	(14)	(9)	(8)	(8)	(5)	(5)	(3)	(1)	(1)							
<u>GREAT LAKES**</u>																			
American SB-Lorain	2	2	2	2	2	1	1	1	1	1	1								
Ray SB Corporation	2	2	2	2	2	1	1	1	1	1	1	1							
Fraser Shipyards	2	2	2	1	1	1	1												
TOTAL	(6)	(6)	(6)	(5)	(5)	(3)	(3)	(2)	(2)	(2)	(2)	(1)	(1)						
GRAND TOTAL																			
ALL COASTS AND GREAT LAKES	85	75	72	67	56	47	46	31	26	21	18	16	10	7	7	1	1	1	1

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

APPENDIX A

STANDARD FORM 17

FACILITIES AVAILABLE FOR THE CONSTRUCTION  
OR REPAIR OF SHIPS





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

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

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

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

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

PRINCIPAL SHOPS AND BUILDINGS							WEIGHT OF MATERIAL OR NUMBER AND SIZE OF UNITS PRODUCED PER 8 HOURS (See note)	ALL OTHER SHOPS (List names and dimensions. include mold loft, if any)
NAME OF SHOP OR BUILDING	DIMENSIONS OF SHOP OR BUILDING	MATERIALS PROCESSED (See note)	LARGEST EXIT		Height	Area serviced		
			Width	Height				
Fabricating								
Plate			X X X X	X X X X	X X X X			
Sheet metal								
Subassembly								
Carpenter			X X X X	X X X X	X X X X	X X X X X X X		
Woodworking			X X X X	X X X X	X X X X	X X X X X X X		
Boat assembly or molding								
Machine		X X X X X X	X X X X	X X X X	X X X X	X X X X X X X		
Electrical		X X X X X X	X X X X	X X X X	X X X X	X X X X X X X		
Electronic		X X X X X X	X X X X	X X X X	X X X X	X X X X X X X		
Pipe								
Galvanizing								NOTE—Indicate materials as steel, aluminum, reinforced plastic, wood, plywood, sheet metal, etc.
Foundry								
Rigger		X X X X X X	X X X X	X X X X	X X X X			

SHOP OR YARD CRANES (5 tons or over)										
BRIDGE TYPE					STATIONARY, RAIL OR MOBILE					
Cap. (Std. tons)	Max. span	Height of hook	Area/shop serviced	Type	Cap. (Std. tons)	Max. reach	Capacity at reach	Boom length	Height hinge	Hgt. of hook above base at out reach

**MAJOR ITEMS OF MACHINE TOOLS AND EQUIPMENT** (List briefly such of the large items as will indicate the capacities of all important shops in maximum work piece size, e.g., 30' plate bending rolls, 10' plate shears, 400 ton Hyd. press, 30' plate furnace, engine lathe 36" x 20' b.c., etc.)

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

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

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

LOCATION OF PRODUCTION FACILITIES FOR PRODUCTS LISTED IN ITEM 11. OF STD. FORM 129		ON WATERFRONT	
EMPLOYMENT	CURRENT	CURRENT NO. SHIFTS	MOBILIZATION—SHIFTS
Management, administration			
Professional, engineering			
Professional, technical (All others)			
Production, skilled			
Production, semiskilled			
Production, unskilled			
Nonproduction			
Total		x x x x x x	x x x x

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

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

DESCRIPTION OF TYPES OF WORK NORMALLY SUBCONTRACTED

DISTANCE TO NEAREST RAILROAD CONNECTION

DISTANCE TO NEAREST AIRPORT—IDENTIFY

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

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

MINIMUM CHANNEL TO TIDEWATER

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

LIMITING LOCK DIMENSIONS TO TIDEWATER (Identify locks)

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

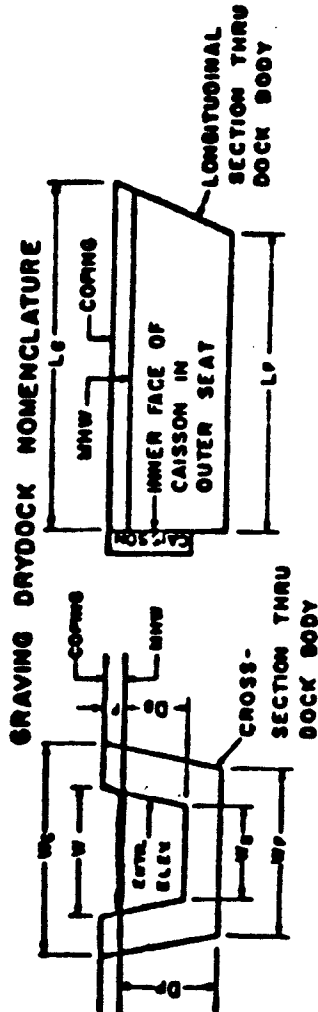
**FLOATING DRYDOCK CHARACTERISTICS SUMMARY**

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

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



DRYDOCK NUMBER	ENTRANCE DIMENSIONS		DOCK BODY DIMENSIONS			SUPERFLOORING	STANDARD DEFINITION	A. C. AMPERES (60 HZ-30)			REMARKS (e.g. indicate dimensions of pits in dock floor)	
	LENGTH	WIDTH	DEPTH	WIDTH	DEPTH			FREEBOARD	400V MAX. HOTEL (INDUST)	2400 V ALT. TEST/ CHECK		132 KV TEST/ CHECK
FLOOR	SILL	COPING	M.H.W.	FLOOR	M.H.W.		Lc	Wc	DF	WS	WF	F
1	LP	Ws	W	Wf	DF	F						
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-1983

APPENDIX B

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

Name and Location	Maximum Ship Size (LOA--Beam)	Berths/Piers	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Usable Length in feet  Longest  Total linear feet	
<u>EAST COAST</u>			
<u>SHIPBUILDING YARDS</u>			
Bath Iron Works Corp. Bath, ME	650 (+) 88 SW (2) 720 x 130 SW 550 x 88 FD 850 x 136 FD*	840 2900 (Main Yard)	1/ Construction, conversion and repairs - all types of vessels. 2/ 7,720 *Located in the company's new Portland overhaul and repair facility.
Beth. Steel Corp. Sparrows Point, MD	800 x 106 SW 800 x 95 SW 1200 x 192 GD	1260 3970	1/ New ship construction - to vessels 1200' in length. 2/ 1,556
Coastal DD & Repair Corp. Brooklyn, NY	318 x 39 GD 451 x 72 GD 755 x 102 GD 717 x 110 GD (2) 1082 x 141 GD	1200 7700	1/ Ship repairs, overhaul and conversion. 2/ 1,000 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/ 2,400
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 repairs - all types of vessels. 2/ 300
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 130 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 repairs - all types of vessels. 2/ 28,260 *Used for construction **Used for repairs and overhaul.
Norfolk SB & DD Corp. Norfolk, VA	475 x 85 SW 650 x 83 FD 1100 x 156 FD 441 x 60 MR* 325 x 60 FD*	1030 12170	1/ Ship construction, repairs and conversion - all types of vessels. 2/ 3,080 *Located at Brambleton plant.
North Florida Shipyards Jacksonville, FL	550 x 66 FD <i>Transfer to</i>	1600 3390 <i>P-119</i>	1/ Ship repair and conversion 2/ 325

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

Repair: drydocking facilities for ships 300' in length and 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	Longest	
	FD--Floating Drydock	MR--Marine Railway	Total linear feet		
Pennsylvania SB Co. Chester, PA (formerly Sun Ship, Inc)	(2) 825 x 136 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/ 1,240
<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 456 x 44 GD		964 13000		1/ Ship repairs and conversion. Yards are closed pending sale.
Boston Shipyard Corp. East Boston, MA (formerly Beth-Boston)	690 x 92 FD 533 x 86 FD		1020 3000		1/ Ship repairs and conversion. 2/ 225
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.
Braswell Shipyards Charleston, SC	600 x 92 FD		545 1350		1/ Ship repairs and conversion. 2/ 340
Caddell DD & Repair Co. Staten Island, NY	330 x 60 FD		666 2802		1/ Ship repairs and conversion. 2/ 160
Colonna's Shipyard, Inc. Norfolk, VA	300 x 40 MR 360 x 65 MR		950 2200		1/ General ship repairs. 2/ 146
Robert E. Derecktor of Rhode Island, Inc. Middletown, RI	450 x 96 FD		1500 6500		1/ Construction of Coast Guard ships and vessel repair. 2/ 800
Detyens Shipyards Mt. Pleasant, SC	500 x 85 FD 300 x 88 FD		510 1022		1/ General ship repairs. 2/ 350
General Ship Corp. East Boston, MA	674 x 68 GD*		900 2530		1/ Ship repairs and overhaul. Construction up to 225' in length. 2/ 270 *GD is located in the Boston Marine Industrial Park in the former Boston Naval Annex and is leased by General Ship Corp.

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 <u>Longest</u> Total linear feet	
Jackson Engineering Co. Staten Island, NY	425 x 82 FD 550 x 82 FD	<u>653</u> 2600	1/ Ship repairs and conversion. 2/ 50
Jacksonville Shipyards Jacksonville, FL	660 x 90 FD 900 x 140 FD 400 x 53 FD 745 x 127 FD	<u>680</u> 4184	1/ Ship repairs and conversion. Construction of small vessels. 2/ 2390
Metro Machine Corp. Norfolk, VA	660 x 96 FD	<u>475</u> 1500	1/ Ship repairs and conversion. 2/ 263
Newport Ship Yard, Inc. Newport, RI	320 x 60 MR	<u>500</u> 2515	1/ Small vessel construction and repairs. 2/ 170
Perth Amboy DD Co. Perth Amboy, NJ	400 x 68 FD	<u>400</u> 2930	1/ Ship repairs and conversion. 2/ 119
Hoboken Shipyards, Inc. Division of BSI Corp. Hoboken, NJ (formerly Beth-Hoboken)	433 x 67 FD 685 x 106 FD 549 x 90 FD 640 x 96 FD 1082 x 138 GD*	<u>923</u> 3000	1/ Ship repairs, overhaul, and conversion. 2/ 300 *Military Ocean Terminal, Bayonne, NJ-- leased from Corps of Engineers.
Puerto Rico DD & Marine Terminals San Juan, PR	632 x 80 GD*	<u>940</u> 1632	1/ Ship repairs. 2/ 95 *Leased from Navy.
Rodermond Industries Jersey City, NJ	775 x 106 FD 425 x 80 FD 350 x 60 FD 300 x 57 FD	<u>842</u> 842	1/ Ship repairs and conversion. 2/ 70
Savannah Shipyard Co. Savannah, GA	532 x 64 GD	<u>382</u> 1563	1/ Ship repairs and conversion. 2/ 85
Todd Shipyards Corp. Brooklyn, NY	700 x 85 GD	<u>1152</u> 7653	1/ Ship repairs and conversion. Yard is closed pending sale.
Tracor Marine, Inc. Port Everglades, FL	300 x 80 FD 360 x 80 (Syncrolift)	<u>780</u> 1305	1/ Ship repairs and conversion. 2/ 200

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and Location	Maximum Ship Size (LOA--Beam)			Berths/Piers		Remarks
	SW--Shipway	GD--Graving Drydock	FD--Floating Drydock	Usable Length in feet	-Longest	
				Total linear feet		
<u>GULF COAST</u>						
<u>SHIPBUILDING YARDS</u>						
ADDSCO Industries, Inc. Mobile, AL	(4)	523 x 68 620 x 90 625 x 83 750 x 98	SW SW FD FD	1132 9370		1/ Ship construction, conversion and repairs. Also drill rig construction. 2/ 2700
Avondale Shipyards, Inc. New Orleans, LA	* (2)	1020 x 174 **1200 x 126 ***450 x 90 300 x 50 1000 x 216 380 x 76 750 x 114	SW SW SW MR FD FD FD	2300 6100		1/ Ship construction, conversion and repairs = all types of vessels. 2/ 5188 *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.
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/ 1167
Ingalls SB Division Litton Systems, Inc. Pascagoula, MS	(4)	690 x 85 550 x 80 650 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/ 10,200 *West Bank can launch ships up to 800' x 173'. Equivalent of six conventional inclined ways in terms of ships delivered annually.
Levingston SB Co. Orange, TX		700 x 100	SW	600 2400		1/ Construction of drilling rigs, barges, and large commercial vessels. Repairs and conversion - all types of vessels.  Yard is closed on a care and maintenance basis
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/ 900
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/ 940

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and Location	Maximum Ship Size (LOA--Beam)	Berths/Piers	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Usable Length in feet  Longest  Total linear feet	
Texas Gulfport SB Co. Port Arthur, TX	(2) 550 x 80 SW 400 x 80 SW 325 x 68 FD 420 x 122 FD	590 <u>1270</u>	1/ Construction of drilling rigs and barges. Ship repairs and conversion. 2/ 200
Todd Shipyards Corp. Galveston, TX	475 x 85 SW 670 x 86 FD 850 x 160 FD 600 x 118 FD	1042 <u>7000</u>	1/ Ship construction, repairs and conversion. 2/ 918
<u>GULF COAST</u> <u>REPAIR YARDS WITH</u> <u>DRYDOCK FACILITIES</u>			
Bender Shipbuilding & Repair Mobile, AL	414 x 55 FD 414 x 45 FD 543 x 89 FD	617 <u>2300</u>	1/ Construction of vessels up to 300' in length. 2/ 785
Delta Shipyard Houma, LA	300 x 56 (Syncrolift) 350 x 88 FD	1200 <u>1200</u>	1/ Construction and repair of vessels up to 350' in length. 2/ 35
Bergeron Industries, Inc. St. Bernard, LA	300 x 72 MR	100 <u>600</u>	1/ Construction and repair of barges, dredges, and small vessels. 2/ 115 (Braithwaite Yard)
Bludworth Bond Shipyard Houston, TX	435 x 80 FD	530 <u>1500</u>	1/ Ship repairs. 2/ 150
Equitable Shipyards, Inc. New Orleans, LA	325 x 90 MR	500 <u>1654</u>	1/ Construction and repair of small vessels and barges. 2/ 75
Gretna Machine & Iron Works, Inc. Harvey, LA	330 x 54 GD 465 x 75 GD	340 <u>340</u>	1/ Construction and repair of barges. 2/ 70
Gulf-Tampa DD Co. Tampa, FL	500 x 97 FD	800 <u>1100</u>	1/ Ship repairs and overhaul. 2/ 185
Ingalls Marine, Inc. Decatur, AL	496 x 81 GD (Barges)	500 <u>500</u>	1/ Construction and repair of barges. 2/ 10

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	
McDermott Shipyards Morgan City, LA	325 x 106 FD	470 <u>1190</u>		1/ Construction and repair of tugs, supply boats, barges, and drill rigs. 2/ 306
Newpark SB & Repair, Inc. Houston, TX	300 x 72 FD 300 x 84 FD	500 <u>1500</u>		1/ Small vessel construction and repairs. 2/ 211
Platzer Shipyard, Inc. Houston, TX	300 x 60 MR	300 <u>1000</u>		1/ Construction and repair of barges. 2/ 125
Port Allen Marine Service Port Allen, LA	300 x 81 FD	390 <u>390</u>		1/ Construction and repair of boats and barges. 2/ 267
Saucer Marine Service, Inc. New Orleans, LA	(2) 300 x 56 FD	200 <u>600</u>		1/ Repair of barges, dredges, and drill rigs. 2/ 45
SBA Shipyards, Inc. Jennings, LA	496 x 72 GD	500 <u>2000</u>		1/ Construction, conversion, and repair of boats and barges. 2/ 15
Southern SB Corp. Slidell, LA	350 x 52 GD	200 <u>300</u>		1/ Construction and repair of vessels up to 350' in length and not drawing over 15' of water. 2/ 254
Teh Tung Steamship Orange, TX	600 x 96 FD	840 <u>840</u>		1/ General ship repairs and overhaul. 2/ 30
Todd Shipyards Corp. New Orleans, LA	643 x 80 FD 350 x 60 FD	1725 <u>4956</u>		1/ Ship repairs and conversion. 2/ 289
<u>WEST COAST</u> <u>SHIPBUILDING YARDS</u> FMC Corporation Portland, OR	800 x 130 SW	1100 <u>1100</u>		1/ Construction of barges and vessels up to 800' in length. 2/ 300 Leases drydocks and berths from Port of Portland as required.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and Location	Maximum Ship Size (LOA--Beam)		Berths/Piers		Remarks
	SW--Shipway	GD--Graving Drydock	Usable Length in feet	Longest	
		FD--Floating Drydock	Total linear feet		
		MR--Marine Railway			
Lockheed Marine -- Shipbuilding Division Seattle, WA	(2) 650 x 88 SW 690 x 90 SW 530 x 80 FD 643 x 96 FD		800 <u>6500</u>		1/ Ship construction, conversion, and repair = all types of vessels. 2/ 3,000
Marine Power & Equip. Co. Seattle, WA	600 x 86 SW 400 x 57 FD 400 x 60 FD 300 x 46 FD 400 x 101 (Syncrolift)		620 <u>4230</u>		1/ Ship construction, repairs, and conversion. 2/ 400
National Steel & SB Co. San Diego, CA	(2) 980 x 170 GD 690 x 90 SW 900 x 106 SW 785 x 132 FD		1000 <u>6800</u>		1/ Construction, conversion and repairs - all types of vessels. 2/ 3,463  Large graving dock at U.S. Naval Station is also leased as required.
Tacoma Boatbuilding Co. Tacoma, WA	650 x 400 SW 540 x 75 FD 420 x 64 FD		1100 <u>4200</u>		1/ Ship construction, repairs, and conversion - all types of vessels. 2/ 2,760
Todd Pacific Shipyards, Corp. San Pedro, CA	(2) 800 x 87 SW 700 x 86 FD 470 x 82 FD		680 <u>6175</u>		1/ Ship construction, repairs, and conversion = all types of vessels. 2/ 5,000
Todd Shipyards Corp. San Francisco, CA (formerly Beth. Steel)	550 x 96 SW 700 x 94 FD 950 x 144 FD		813 <u>3200</u>		1/ Barge construction, ship repairs and conversion. Can build C3 and C4 type vessels 2/ 750
Todd Pacific Shipyards Corp. Seattle, WA	600 x 96 SW 650 x 84 FD 420 x 62 FD 943 x 133 FD		1400 <u>6017</u>		1/ Ship construction, repairs, and conversion = all types of vessels. 2/ 3,056
Triple A Shipyards Hunters Point San Francisco, CA	(2) 715 x 82 GD 996 x 107 GD 1088 x 136 GD 416 x 56 GD 416 x 71 GD		600 <u>24000</u>		1/ Ship repairs, overhaul and conversion. 2/ 770  All graving docks are part of the inactive Hunters Point Naval Shipyard and are leased from the U.S. Navy.



MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and Location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers		Remarks
		Usable Length in feet	Longest Total linear feet	
<u>WEST COAST</u>				
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>				
Atkinson Marine Corp. National City, LA	*	540 540		1/ Ship repairs and conversion. 2/ 20 *Graving dock at U.S. Naval Station can be leased as required.
Campbell Industries San Diego, CA	(2) 360 x 46 FD	640 2280		1/ Construction of fishing boats. Also ship repairs. 2/ 180 Graving dock at U.S. Naval Station can be leased as required.
Concrete Technology Corp. Tacoma, WA	496 x 136 GD	200 200		1/ Construction of floating structures and drydocking of barges. 2/ 150
Dillingham Marine & Mfg. Company Portland, OR	*			1/ Ship repairs and conversion. 2/ 650 *Leases drydocks and berths from Port of Portland as required.
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 GD 364 x 51 GD	500 500		1/ Heavy steel fabrication and erection. Construction and repair of small ships and barges. 2/ 350
Lake Union DD Co. Seattle, WA	340 x 56 FD	1000 4235		1/ Ship repairs and conversion. 2/ 100
Northwest Marine Iron Works Portland, OR	500 x 100 SW (Barge construction only)			1/ Ship repairs, conversion, and barge construction. 2/ 900 Leases drydocks and berths from Port of Portland as required.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and Location	Maximum Ship Size (LOA--Beam)			Berths/Piers		Remarks
	SW--Shipway	GD--Graving Drydock	FD--Floating Drydock	Usable Length in feet	Longest Total linear feet	
Pacific DD & Repair Co. Oakland, CA	400 x	60	FD	<u>600</u> 1155		<u>1/</u> Ship and barge repairs. <u>2/</u> 30
Pacific Marine & Supply Company, Ltd. Honolulu, HI	300 x	76	FD	<u>317</u> 724		<u>1/</u> Ship repairs and overhaul. <u>2/</u> 100
Port of Portland Swan Island Ship Repair Yard Portland, OR	600 x 500 x 700 x 1100 x	83 88 108 181	FD FD FD FD	<u>1000</u> 9100		Port of Portland owns these drydocks which are leased to ship repair companies on an as-required basis.
Port Richmond Shipyard Richmond, CA	(3) 571 x 583 x 733 x	80 80 80	GD GD GD	<u>1600</u> 2100		<u>1/</u> Ship repairs, overhaul, and conversion. <u>2/</u> 200
Southwest Marine, Inc. San Diego, CA	628 x 360 x	106 58	FD FD	<u>630</u> 1855		<u>1/</u> Ship repairs and overhaul. Construction of vessels up to 250' in length. <u>2/</u> 300 Graving dock at U.S. Naval Station can be leased as required.
Southwest Marine, Inc. Terminal Island San Pedro, CA	720 x	93	FD	<u>1800</u> 4175		<u>1/</u> Ship repairs, overhaul, and conversion. <u>2/</u> 330
Southwest Marine of SF, Inc. San Francisco, CA	400 x	46	FD	<u>700</u> 1950		<u>1/</u> Ship repairs and overhaul. <u>2/</u> 300
Triple A South San Diego, CA	389 x	53	FD	None*		<u>1/</u> Ship repairs and overhaul. <u>2/</u> 244 Graving dock at U.S. Naval Station can be leased as required. *Ships are worked at Navy piers.
U.S. Naval Station San Diego, CA	687 x	90	GD	<u>N.A.</u> 13000		Drydock available for lease to ship repair companies.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and Location	Maximum Ship Size (LOA--Beam)	Berths/Piers	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Usable Length in feet <u>Longest</u> Total linear feet	
<u>GREAT LAKES</u>			
<u>SHIPBUILDING YARDS</u>			
(Maximum size ship that can exist St. Lawrence Seaway locks is 730' x 78')			
American SB Co. Lorain, OH	708 x 78 GD 1021 x 121 GD	900 <u>1800</u>	1/ Ship construction, repairs, and conversion. 2/ 50
Bay SB Corporation Sturgeon Bay, WI	730 x 105 SW 650 x 66 FD 1100 x 136 GD	900 <u>7090</u>	1/ Ship construction, repairs, and conversion. 2/ 273
Fraser Shipyards Superior, WI	825 x 82 GD 620 x 61 GD	900 <u>4450</u>	1/ Ship construction, repairs, and conversion. 2/ 45
<u>GREAT LAKES</u>			
<u>REPAIR YARDS WITH DRYDOCK FACILITIES</u>			
Peterson Builders Sturgeon Bay, WI	360 x 36 FD	550 <u>2515</u>	1/ Construction and repair of small ships and boats. 2/ 657

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 B.C. Inc.  
Brooklyn, NY

Atlantic Marine, Inc.  
Fort George Island, FL

Atlantic Repair Co., Inc.  
Brooklyn, NY

Auto Marine Sales Corporation  
Ft. Lauderdale, FL

Banks Ship Rigging Corporation  
Norfolk, VA

Best Repair Company  
Norfolk, VA

Brady Marine Repair Co., Inc.  
Elizabeth, NJ

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 Service Co., Inc.  
Miami, FL

Gowen, Inc.  
Portland, ME

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

Holmes Bros., Inc.  
Portsmouth, VA

Horne Bothers, Inc.  
Newport News, VA

Hudson Engineering Company  
Hoboken, NJ

Ind-Mar Diesel Services Jacksonville, FL	Nordic Diesel & Machine Co. Brooklyn, NY
Industrial Welding & Machine, Inc. Portland, ME	Norlantic Diesel, Inc. Fairhaven, MA
Jackson Engineering Co., Inc. Hoboken, NJ	
The Jonathan Corporation Norfolk, VA	Phillyship Philadelphia, PA
Kurt's Marine Diesel, Inc. Ft. Lauderdale, FL	Promet Marine Services Corp. East Providence, RI
Lyon Shipyard, Inc. Norfolk, VA	Reynolds Shipyard Corporation Staten Island, NY
Marine Contractors Co., Inc. East Boston, MA	Rollinson Electric Contractors Savannah, GA
Marine Electric Corporation Brooklyn, NY	South Portland Shipyard & Marine Railways Corporation South Portland, ME
Marine Hydraulics International Norfolk, VA	Stephen Ransom, Inc. Port Newark, NJ
Merrill-Stevens DD Company Miami, FL	
Metal Trades, Inc. Hollywood, SC	Swygert Shipyard, Inc. John's Island, SC
Mieier & Oelhaf Company, Inc. New York, NY	Thames Shipyard & Repair Co. New London, CT
A. Moe & Co., Inc. Philadelphia, PA	Tickle Engineering Works, Inc. Brooklyn, NY
Moon Engineering Co., Inc. Norfolk, VA	Todd Electric Company Norfolk, VA
Munro Drydock, Inc. Chelsea, MA	Tony Stamis Engineering Co. Ridgefield, NJ
National Marine Service, Inc. Norfolk, VA	Williams & Manchester Shipyard Newport, RI
Neptune Machine Works, Inc. Brooklyn, NY	Wilmington Shipyard, 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 Kreihls 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

Eastern Marine, Inc.  
Panama City, FL

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

Florida Ship Repair  
Tampa, FL

General Electric Co.  
A & ES Marine  
Houston, TX

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  
Galveston, TX

Marine Maintenance Industries  
Houston, TX

Marine Services Unlimited, Inc.  
Tampa, FL

McDermott Shipyards  
Gulfport, MS

McDermott Shipyards  
New Iberia, LA

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

Vemar, Inc.  
Channelview, TX

WEST COAST

Arcwel 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 Industries Northwest, Inc.  
Tacoma, WA

Marisco, Ltd.  
Honolulu, HI

Palau Corporation  
San Francisco, CA

Rowe Machine Works, Inc.  
Seattle, WA

SDIS Fabricating Corp.  
San Diego, CA

Service Engineering Co.  
San Francisco, CA

SFW Corporation  
San Francisco, CA

Thomas A. Short Co.  
Emeryville, 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

Zidell Explorations, Inc.  
Portland, OR

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

William Farrel, Inc.  
Toledo, OH

