

1984

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



U.S. DEPARTMENT of TRANSPORTATION
Maritime Administration

REPORT ON SURVEY OF U.S.
SHIPBUILDING AND REPAIR FACILITIES
1984

Prepared By:
Office of Shipbuilding Costs and Production
Division of Production
December 1984

CONTENTS

	<u>PAGE</u>
Introduction.....	1
General.....	2
Major Shipbuilding Facilities.....	3
ADDSCO Industries, Inc.....	5
Avondale Shipyards, Inc.....	6
Bath Iron Works Corporation.....	8
Bay Shipbuilding Corporation.....	10
Bethlehem Steel Corporation - Beaumont Yard.....	11
Bethlehem Steel Corporation - Sparrows Point Yard.....	12
Coastal Dry Dock and Repair Corporation.....	14
FMC Corporation - Marine and Rail Equipment Division.....	15
Fraser Shipyards, Inc.....	16
General Dynamics Corporation - Electric Boat Division.....	17
General Dynamics Corporation - Quincy Shipbuilding Division.....	17
Halter Marine, Inc.....	18
Ingalls Shipbuilding Division/Litton Systems, Inc.....	19
Levingston Shipbuilding Company - Orange, Texas.....	21
Lockheed Shipbuilding Company.....	22
Marathon LeTourneau Company - Gulf Marine Division.....	24
Marine Power and Equipment Co., Inc.....	25
National Steel and Shipbuilding Company.....	26
Newport News Shipbuilding and Drydock Company.....	27
Norfolk Shipbuilding and Drydock Corporation.....	30

	<u>PAGE</u>
Pennsylvania Shipbuilding Company (formerly Sun Ship, Inc.).....	31
Tacoma Boatbuilding Company.....	33
Tampa Shipyards, Inc.....	34
Texas Gulfport Shipbuilding Company/Levingston.....	36
Todd Shipyards Corporation - Galveston Division.....	36
Todd Pacific Shipyards Corporation - Los Angeles Division.....	38
Todd Shipyards Corporation - San Francisco Division.....	40
Todd Pacific Shipyards Corporation - Seattle Division.....	41
Triple A Shipyards/Division of Triple A Machine Shop.....	42
Employment.....	44
Shipyard Pollution Abatement.....	44
Ship Repair Facilities.....	45
Major Drydocking Facilities.....	48
Major Topside Repair Facilities.....	48
Active Shipbuilding Base.....	49
Exhibit 1 - Shipbuilding Industry in the United States (Map).....	51
Exhibit 2 - ADDSCO Industries - Yard Plan.....	52
Exhibit 3 - Avondale Shipyards - Yard Plan.....	53
Exhibit 4 - Bath Iron Works Corporation - Main Yard Plan.....	54
Exhibit 5 - Bath Iron Works Corporation - Portland Yard Plan.....	55
Exhibit 6 - Bay Shipbuilding - Yard Plan.....	56
Exhibit 7 - Bethlehem, Beaumont - Yard Plan.....	57
Exhibit 8 - Bethlehem, Sparrows Point - Yard Plan.....	58
Exhibit 9 - Coastal Drydock - Yard Plan.....	59
Exhibit 10 - FMC Corporation - Yard Plan.....	60
Exhibit 11 - Fraser Shipyards - Yard Plan.....	61

	<u>PAGE</u>
Exhibit 12 - General Dynamics, Quincy - Yard Plan.....	62
Exhibit 13 - Halter Marine, Inc. (Chickasaw, Ala.) - Yard Plan.....	63
Exhibit 14 - Ingalls/Litton (East Bank) - Yard Plan.....	64
Exhibit 15 - Ingalls/Litton (West Bank) - Yard Plan.....	65
Exhibit 16 - Levingston Shipbuilding (Orange, Texas) - Yard Plan..	66
Exhibit 17 - Lockheed (Plant 1) - Yard Plan.....	67
Exhibit 18 - Lockheed (Plant 2) - Yard Plan.....	68
Exhibit 19 - Marathon, Gulf Marine Division - Yard Plan.....	69
Exhibit 20 - Marine Power & Equipment - Yard 2 Plan.....	70
Exhibit 21 - Marine Power & Equipment - Yard 4 Plan.....	71
Exhibit 22 - National Steel and Shipbuilding - Yard Plan.....	72
Exhibit 23 - Newport News (South Yard) - Yard Plan.....	73
Exhibit 24 - Newport News (North Yard) - Yard Plan.....	74
Exhibit 25 - Norfolk Shipbuilding (Berkley Plant) - Yard Plan.....	75
Exhibit 26 - Pennsylvania Shipbuilding Company - Yard Plan.....	76
Exhibit 27 - Tacoma Boatbuilding (Yards 1 and 2) - Plan.....	77
Exhibit 28 - Tacoma Boatbuilding (Yards 3 and 4) - Plan.....	78
Exhibit 29 - Tampa Shipyards - Yard Plan.....	79
Exhibit 30 - Texas Gulfport Shipbuilding Company - Yard Plan.....	80
Exhibit 31 - Todd, Galveston Division - Yard Plan.....	81
Exhibit 32 - Todd, Los Angeles Division - Yard Plan.....	82
Exhibit 33 - Todd San Francisco Division - Yard Plan.....	83
Exhibit 34 - Todd, Seattle Division - Yard Plan.....	84
Exhibit 35 - Triple A, Hunters Point - Yard Plan.....	85

	<u>PAGE</u>
Exhibit 36 - Merchant Vessels Building or on Order (As of January 1).....	86
Exhibit 37 - Major U.S. Private Shipyards - Number of Shipways by Maximum Length Capability.....	87
Exhibit 38 - Active Shipbuilding Base (Map).....	88
Exhibit 39 - Shipyard Status - Need for New Business.....	89
Exhibit 40 - Shipbuilding Industry Workload Projection.....	90
Table 1 - Ship Construction Capability by Ship Type.....	91
Table 2 - Major U.S. Private Shipyards - Number of Shipbuilding Ways by Length.....	105
Appendix A - Standard Form 17 - Facilities Available for the Construction or Repair of Ships.....	108
Appendix B - Major U.S. Shipbuilding and Repair Facilities.....	117
Appendix C - Major Topside Repair Facilities.....	128

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 1984 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 a 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 the 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 1984 has been completed; and the following 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 1984 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 shipyards. 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 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 29 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 1984 invested some \$338.5 million in facilities modernization and expansion and as of July 1, 1984, planned to spend an additional \$158.5 million during the year ending June 30, 1985, mainly for larger drydocks and support facilities to increase vessel conversion, overhaul, and repair capabilities. Several yards are gearing up for the 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 \$3.4 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 35 are general arrangement plans outlining shipbuilding and repair facilities in 28 of the major yards. Detailed descriptions of these exhibits are included in this report.

As of October 1, 1984, there were 10 deep-draft commercial vessels under construction or on order in U.S. shipyards. This orderbook was comprised of two large crude oil carriers, two incinerator ships, one self-propelled dredge, and five product tankers (for a private shipping company for charter to the Military Sealift Command). Three of these 10 ships were being built with Federal ship financing guarantees (Title XI). Only five offshore drilling rigs were in production or on order in

the United States. Exhibit 36 illustrates the overall decline since the mid-1970's in both the numbers and gross tonnage of merchant ships built in the United States.

On October 1, 1984, there were 77 major combat and auxiliary ships under construction or on order for the Navy and nine medium-endurance cutters for the Coast Guard. In addition, the Navy's multibillion-dollar T-Ship program is providing much-needed near-term relief to U.S. shipbuilders, particularly to those yards which have traditionally relied on construction of new oceangoing merchant ships. (The designation "T", for transportation, distinguishes these auxiliary ships from Navy commissioned ships of the line). As of October 1, 1984, 11 commercial shipyards had been awarded contracts for construction of 22 new T-Ships and for major reconstruction of 23 existing merchant ships. Examples of types of vessels involved in the T-Ship program are: fast sealift ships, maritime prepositioning ships, auxiliary crane ships, and hospital ships.

Table 1 has been prepared to answer the frequent question as to the number of shipbuilding positions available to build a specified ship. 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 historically delivered to commercial service. The total number of building positions varies from 120 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 37 is a histogram displaying the reduction in the number of available shipways as the maximum ship length increases.

Following is a brief description of 29 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, Incorporated

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 work, 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. Since that time, the only construction contract has been the deckhouse steel work for five T-5 tankers being built by Tampa Shipyards. Alabama Maritime expects to complete this deckhouse project in April 1985. During the first three quarters of 1984, ADDSCO's repair business was slow. The only available work was minor ship repair and drill rig repair and maintenance.

ADDSCO Industries, Inc. and its subsidiaries operate four side-launching shipways, each of which can accommodate a maximum ship size of 523 feet by 90 feet (160 m by 27 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 100 feet (229 m by 30.5 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-1984, combined employment totaled 465 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. Avondale Shipyards, Incorporated

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.

New ships completed from January 1, 1982 through October 1, 1984 included two fleet oilers for the Navy, three 2,500-TEU containerships for American President Lines, two oceangoing diesel-propelled hopper dredges, a 17,000-dwt. self-unloading cement barge, and three tankers for Exxon. During the construction of the Exxon tankers, Avondale used a technology transfer arrangement from the Japanese shipbuilder, IHI, known as zone outfitting. These systems were used to an extent of about 90 percent with highly successful results.

From October 1982 to January 1983, the World War II battleship IOWA was in drydock at Avondale for extensive refurbishing and modernization work, before being moved to Ingalls/Litton for completion of the reactivation of the ship.

In 1982, the Navy awarded contracts to Avondale for the major conversion of three former Sea-Land SL-7 class containerships to T-AKR fast sealift ships for the DOD Rapid Deployment Force. Avondale has

completed the reconstruction of the first of these ships, the ANTARES (T-AKR 294), and turned it over to the Navy in July 1984. The second vessel, the ALTAIR (T-AKR 291), is scheduled for redelivery in November 1985; and the third ship, the POLLUX (T-AKR 290), is slated for completion in March 1986.

Avondale's new construction orderbook as of October 1, 1984 consisted of four fleet oilers (T-AO's) and one dock landing ship (LSD), with options to build two additional LSD's. The company is also currently building the forebodies for five 30,000-dwt. T-5 product tankers for Tampa Shipyards.

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 most 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 complements the company's existing drydock and doubles 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 1984, the total labor force was 4,342, down from about 5,180 a year earlier.

Exhibit 3 is a current arrangement plan of Avondale's main plant.

3. 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, dredges, barges, fishing vessels, destroyers, and guided missile frigates. Bath has built a total of 168 destroyers for the Navy.

The last commercial ships built at BIW were two 34,000-dwt. product tankers, the FALCON LEADER, delivered in August 1983, and the FALCON CHAMPION, delivered 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 was the lead shipbuilder for the Navy's guided missile frigate (FFG-7 class) program. The lead ship, the OLIVER HAZARD PERRY, was completed in 1977; and the Navy has awarded the company follow-on contracts for the construction of 23 additional FFG-7 class frigates, the last of which is scheduled for delivery in 1986. As of October 1, 1984, there were six of these ships in various stages of construction.

The Navy in 1982, selected Bath Iron Works as its second source for the high-technology CG 47 class Aegis cruiser program, awarding the company contracts to build two of these Ticonderoga class cruisers (CG-51 and CG-58). The lead shipyard in the program is the Ingalls Shipbuilding Division of Litton Industries which currently has nine of these ships on order or in production.

In the early 1970's, BIW instituted modular construction and preoutfitting processes.

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 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 provide a total of 2,900 linear feet (884 m) for outfitting and repair work.

BIW operates a supporting facility, the 33-acre Hardings fabrication 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.

In a joint industrial development with the State of Maine and the City of Portland, BIW built a new ship overhaul and repair yard in Portland Harbor. The new facility became operational in late 1983. Its centerpiece is a large floating drydock with a lifting capacity of 81,000 long tons (82296 metric tons), greatly expanding the company's capabilities in the overhaul and repair field. Overhaul contracts have already been secured for the new facility.

As of mid-1984, the company's administrative and production work force totaled 6,800, down from 7,720 a year earlier.

Exhibit 4 is a current plot plan of the Bath Iron Works main yard facilities, and Exhibit 5 is a general arrangement drawing of BIW's new repair and overhaul yard in Portland, Maine.

4. 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 other 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/containership PRESIDENT HARRISON to an auxiliary crane ship (T-ACS 1) for the Navy. This project was completed on May 7, 1984. In August 1983, the company was awarded a contract from Lamberts Point Barge Co., Inc. to build a 550-foot (168 m) long oceangoing coal topping-off barge. This 35,000-dwt. self-loading and self-unloading barge was delivered in late June 1984.

On October 22, 1984, Sea-Land Corporation signed a contract to have three new 1,400-TEU containerships constructed at Bay Shipbuilding. This contract is expected to provide some 1,500 additional jobs at the yard. The last of the three ships is scheduled for delivery in May 1987.

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 640 feet by 66 feet (195 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-1984, total employment was 243, slightly less than a year earlier.

Exhibit 6 is a current general arrangement plan showing Bay Shipbuilding's facilities.

5. 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 oil and gas facilities. The Beaumont plant has been one of Bethlehem's most successful operations and has been a world leader 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.

Beaumont is also experienced in fabrication of non-ship industrial products such as process and pressure vessels, oil and LPG storage tanks and spheres, rotary cement kilns, and blast furnace structures. Its bending-roll capacity and stress-relieving furnace are among the largest in the South.

Bethlehem-Beaumont has delivered more than 50 jackup drilling units since building 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. Since then, shipyard work for the depressed offshore oil industry has declined precipitously.

In November 1982 and January 1983, the Navy awarded Bethlehem Steel Corporation 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 are being 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 ELEO MAERSK (renamed the PFC. WILLIAM B. BAUGH) began in January 1983; and the reconstructed vessel was redelivered in October 1984. Work on the second ship, the EMILIE MAERSK (renamed the 1st LT. ALEXANDER BONNYMAN, JR.) started in August 1983 and is slated for redelivery in September 1985.

The Beaumont Yard is highly mechanized. In the early 1970's the company installed a multimillion-dollar panel line and new materials handling facilities. During the past six years, other capital improvements included: installation of 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.

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 1,690 at mid-1984, up from about 1,160 at mid-1983. However, extensive layoffs are expected in the fourth quarter of 1984.

Exhibit 7 is a current layout of the plant and facilities.

In mid-1985, Beaumont will open a new offshore drill rig repair yard in Port Arthur, Texas, utilizing a 56,000-ton (56,896 metric ton) lifting capacity floating drydock acquired in 1984 as surplus from the Navy in Hawaii.

6. Bethlehem Steel Corporation - Sparrows Point Yard

The Sparrows Point shipyard is located on the Patapsco River in the Baltimore, MD, metropolitan area. Established in 1891, the yard became part of the Bethlehem organization in 1916 and served as a major shipbuilder during two world wars. During World War II, Sparrows Point constructed 101 vessels of 16 different classes. During the 1950's and 1960's, it was among the most active yards in the Nation, specializing in series construction of standard sizes of Bethlehem-design tankers, as well as freighters and containerships. Sparrows Point is primarily a shipbuilding yard, and in its building basin, the second largest in the

United States, it is capable of constructing ships 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 the 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 two 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). The first of the ships, renamed the CPL. LOUIS J. HAUGE, JR., was redelivered in September 1984. The second ship, the PFC. JAMES ANDERSON, JR., is scheduled for redelivery in April 1985; and the third vessel, the PVT. HARRY FISHER, is slated for completion in August 1985. As of October 1, 1984, the yard had no other contracts, and unless additional work materializes, there will be large-scale layoffs at Sparrows Point. The company is aggressively pursuing several contracts for both commercial and military projects.

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.

Complementing the large construction basin, which is served by four 100-ton (91 metric ton) tower cranes, Sparrows Point maintains two 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 was 2,240 at mid-1984, up from 1,550 a year earlier.

Exhibit 8 is a current plot plan outlining the company's construction facilities.

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

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

As of October 1, 1984, repair and overhaul work in the yard consisted of two Navy frigates, a DD-963 class destroyer, a Hamilton-class Coast Guard cutter, and an MSC oiler.

Among the facilities Coastal Dry Dock has now 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 1984 totaled 1,150 slightly higher than a year earlier.

Exhibit 9 is a current general arrangement plan of the company's drydocks, piers, and shops.

8. FMC Corporation - Marine and Rail Equipment Division

FMC Corporation's Marine and Rail Equipment Division, originally known as Ginderson Brothers Engineering Corporation, is located on 71 acres of Willamette River waterfront property in Portland, OR. 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. The company built several oceangoing barges in 1983 and in the first half of 1984 built one 340-foot (104 m) deck barge, one 258-foot (79 m) hydraulic dump barge, and completed the conversion of three 400-foot (122 m) single-deck Crowley railcar barges into similar double-deck barges capable of hauling trailers in addition to railcars. As of October 1, 1984, the only major work remaining in the yard consisted of the construction of one tank barge for Sause Brothers.

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 state-of-the-art welding equipment, a 2,500 ton (2270 metric ton) hydraulic press, numerically-controlled burning equipment, and computerized lofting.

Improvement in FMC's barge business necessitated a second major yard expansion, completed in 1982. The side-launch ways capacity was increased to accommodate a maximum vessel size of 800 feet by 130 feet (244 m by 40 m). Crane tracks were lengthened accordingly, and a 1,100 foot (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.

At mid-1984, the labor force employed in marine-related work totaled 200, down from about 300 in July 1983.

Exhibit 10 is a current general arrangement drawing of FMC's marine construction and repair facilities.

9. Fraser Shipyards, Incorporated

The Fraser Yard, the only major American shipyard and drydock operation on the Western end of the Great Lakes, is located on Howards Bay in Superior, WI. Since it was founded in the 1890's by Capt. Alexander McDougall, who built 42 of his famous "whaleback" steamers and barges there, this plant has had a succession of owners. From 1900 to 1926, Superior Shipbuilding Company 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 Company from 1926 to 1945 and then became known as Knudsen Brothers Shipbuilding and Dry Dock Company.

Fraser-Nelson Shipbuilding and Dry Dock Company 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, Incorporated, a Superior, WI, contracting and construction firm, but business continues under the Fraser name.

Since World War II, this complete shipbuilding and ship repair facility has specialized in vessel repair and ship modernization including lengthenings, repowering and engine room automation, and self-unloader conversions. In the past 14 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. BEEGLY 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 July 1984, with only minor repair work in the yard, employment including salaried personnel totaled only 35 people.

In 1981, the Fraser yard 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 expanding facilities and to improve existing capacity. New automated welding equipment and related modern techniques were also instituted to increase productivity.

Fraser maintains 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 barges -- capable of performing repairs on vessels while they are loading or unloading cargoes in Duluth-Superior harbor and adjacent ports.

Exhibit 11 is a current plot plan of Fraser's shipbuilding and ship repair facilities.

10. General Dynamics Corporation - Electric Boat Division

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

11. General Dynamics Corporation - Quincy Shipbuilding Division

One of the Nation's largest and most modern shipbuilding facilities, the Quincy Shipbuilding Division of General Dynamics Corporation is located on the Fore River in Quincy, MA, approximately 10 miles southeast of Boston. Since its founding in 1884 as the Fore River Engine Company, 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.

Quincy Shipbuilding is the world's foremost 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 innovative barge-carrying ships built for Lykes Brothers and several large oceangoing deep-notch petroleum barges.

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.

Additionally, Quincy has also designed a new class of coal-fired self-unloading collier for the coastwise transport of coal. The first of these 32,300-dwt. ships, the ENERGY INDEPENDENCE, was delivered in August 1983 and is carrying approximately two million metric tons of coal annually from mid-Atlantic ports to generating stations of the New England Electric System. This is the first coal-burning collier to be built in the United States since the late 1920's.

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. This is the most important newbuilding effort to get underway at Quincy since the construction of the LNG fleet back in the 1970's.

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 process line 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 including two 200-ton (188 metric ton) transporters; and
- o Completion of a new facility at Charleston, SC, 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.

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 1984 totaled 4,900, up from 2,400 at mid-1983.

Exhibit 12 is a current layout of the Quincy Shipbuilding Division's facilities.

12. Halter Marine, Incorporated

Halter Marine, founded in 1956, is the world's foremost builder of support vessels for the offshore oil and gas industry. This New Orleans-based company has built more than 1,000 small and mid-size vessels for diversified uses throughout the world, including vessels for military applications.

In September 1983, Trinity Industries, Inc. acquired 100 percent of the stock of Halter Marine, including Halter Marine's interest in Bell Halter, Inc.

Halter Marine's shipbuilding operation is unique. The company operates six separately managed yet centrally-controlled shipyards at the following locations on the Gulf Coast: New Orleans, Industrial Canal (also New Orleans area), Lockport, LA, Chalmette, LA, Moss point, MS, and Chickasaw, AL.

While Halter has built few large deep-draft ships, it has this capability. At the company's Chickasaw Division near Mobile, deep-draft ships up to 550 feet by 75 feet (168 m by 23 m) can be launched. As with smaller vessels, the operation would be supported by the other Halter yards. For example, plate cutting would be done at the Industrial Canal facility, and modules and various vessel components could be manufactured or fabricated at the Lockport and Moss Point yards. The preponderance of work -- final assembly, launching, and outfitting -- would take place at Chickasaw.

Sophisticated shipbuilding techniques are used in the Halter yards, including state-of-the-art computerized lofting. Plate cutting, done at the Industrial Canal Division in support of other Halter yards, is done by numerically-controlled, high-speed plasma arc cutting machines. The company combines modular techniques with conventional shipbuilding methods.

Halter's repair and overhaul facilities are located primarily at Chickasaw. At this yard, for repair work on small vessels and drill rigs, there is a floating drydock 160 feet (49 m) in length with 120 feet (37 m) between wing walls. In the Chickasaw yard, there is a total of 2,100 feet (640 m) of pier and bulkhead space available for repair and outfitting work.

In 1982, Halter Marine delivered 53 vessels; and in 1983, twenty vessels were delivered. However, in 1984, new boat orders from offshore operators have slowed considerably.

Seven catamaran tugs (CATUGS) were delivered at the Chickasaw yard during 1982/1984. Each of these was joined to a 47,000-dwt. barge to form an integrated tug-barge.

At mid-1984, employment at Halter Marine's six yards totaled 461. The total work force at the Chickasaw plant was 159.

Exhibit 13 is a general arrangement plan of Halter's Chickasaw yard.

13. Ingalls Shipbuilding Division/Litton Systems, Incorporated

The Ingalls Shipbuilding Division is located on the Gulf of Mexico at Pascagoula, MS. 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.

Shipbuilding for the U.S. Navy is now this shipyard's primary business. Specializing in highly sophisticated naval combat ships, Ingalls has become one of the Nation's foremost designers and builders of destroyers, cruisers, and amphibious assault ships.

Between 1975 and 1983, Ingalls designed, built, and delivered to the Navy 41 surface combatant ships. These included 31 Spruance class (DD-963) destroyers, four Kidd class (DDG-993) guided missile destroyers, five Tarawa class (LHA-1) amphibious assault ships, and the USS TICONDEROGA (CG-47), the lead ship of a new class of Aegis guided missile cruisers. During 1981 and 1982, 13 jackup drill rigs and four semisubmersible drill rigs were also delivered to six offshore drilling companies.

In April 1984, Ingalls completed the complex modernization and reactivation of the World War II battleship IOWA. The underwater work was done at Avondale Shipyards, and the ship arrived at Ingalls in January 1983. The Ingalls yard upgraded shipboard systems, modernized weapons, added new weapons systems, and upgraded electronic systems.

A second Aegis guided missile cruiser, the USS YORKTOWN (CG-48), was delivered to the Navy in May 1984; and as of November 1, 1984, the company held orders for nine additional Aegis cruisers. The last of these ships is scheduled for completion in December 1988.

In February 1984, the Navy awarded Ingalls a contract for design and construction of the lead ship of a new class of multi-purpose amphibious assault ships, the LHD-1. Fabrication work is expected to start in late 1984, with delivery scheduled in 1989.

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), 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 (54 metric ton) maximum capacity provide a total of 3,700 feet (1128 m) of berthing space for outfitting and topside repair.

The newer 600-acre West Bank facility, completed in 1970, was designed and equipped for series production using state-of-the-art 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 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's technical pioneering in shipbuilding is continuing with the introduction of computer-aided design and manufacturing systems, such as integrated CAD/CAM, to streamline and automate the process of designing and building modern warships.

Ingalls Shipbuilding Division at mid-1984 employed a total labor force of 9,730, down from 10,200 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, TX, approximately 30 miles (48.3 km) inland from the Gulf of Mexico. Gulfport Shipbuilding, in Port Arthur, TX, was purchased in 1970 by Levingston to supplement Levingston's construction and repair facilities at the Orange plant. From 1975 to 1980, Levingston was a wholly owned subsidiary of Ashland Oil, Inc., and tug and barge construction was effectively abandoned for the building of larger vessels and offshore drilling rigs.

In April 1984, a newly-formed private investment group, based in Mobile, AL, and headed by Tom Weller, Jr., acquired a "substantial interest" in Paden, Inc. of Orange, TX. Paden is the parent company of both Levingston Industries, Inc. and Pennsylvania Shipbuilding Company. Levingston Shipbuilding Company and Texas Gulfport Shipbuilding Company are subsidiaries of Levingston Industries which purchased these two shipyards from Ashland Oil in 1980.

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 the 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 although they continue to actively seek construction, overhaul and repair contracts.

An expansion and modernization program was completed in 1982 at the Orange, TX, yard to increase steel throughput from about 25,000 tons (22695 metric tons) per year to approximately 50,000 tons (45390 metric tons) per year. Some of the improvements incorporated in the program were: a new flat panel fabrication line, numerically controlled plasma-arc cutting equipment, an automatic blasting and paint shop, 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. One floating drydock with a lift capacity of 3,500 tons (3556 metric tons) and a larger 11,000-ton (11176 metric ton) floating drydock have 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 Levingston's Orange, TX, yard.

15. Lockheed Shipbuilding Company

Lockheed Shipbuilding, a wholly owned subsidiary of Lockheed Corporation, is located in Seattle, WA, on the southern perimeter of Puget Sound's Elliott Bay. This 95-year-old shipyard 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 early 1984 to its present name.

At Lockheed's Seattle plant a wide variety of vessels have been constructed, including light cruisers, destroyers, patrol frigates, ammunition ships, amphibious transports, 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 the 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 the third, the MCKEE (AS-41), was delivered in July 1981.

Lockheed is the lead yard in the construction of a new class of amphibious dock landing ships. In 1981, the Navy awarded the company the contract to support the design as well as to build the first of the class, the WHIDBEY ISLAND (LSD-41). As of October 1, 1984, Lockheed was also building two additional LSD's, the GERMANTOWN (LSD-42), and the LSD-43, as yet unnamed. The last of these three ships is scheduled for delivery in June 1987.

During the first nine months of 1984, the company's repair and overhaul work consisted almost entirely of Navy contracts. Commercial repair work was at its lowest volume in several years.

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 complex 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 a 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 one floating drydock 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-1984 totaled 2,799, down slightly from approximately 3,000 a year earlier. By the end of 1984, 600 layoffs are expected; and unless new contracts are obtained, another 1,300 layoffs are anticipated by the end of 1985.

Exhibits 17 and 18 are current general arrangement drawings of this 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 million dollars. This 133-acre shipyard is located in Brownsville, TX, 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, TX, and Vicksburg, MS.

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.

Three jack-up rigs were delivered at Marathon's Brownsville yard in 1983, and one was delivered during the first three quarters of 1984. As of October 1, 1984, the new construction backlog consisted of two offshore jack up drill rigs for Penrod Drilling Company for delivery in December 1984 and mid-1985. There was also some rig maintenance and repair work in the yard during 1984.

The Brownsville yard operates one launchway with a maximum vessel size of 1,100 feet by 150 feet (335 m by 46 m) on which oceangoing ships could be constructed in the event of national emergency. Steel plate and other materials move from a 400,000 square-foot (37160 m²) in-yard storage area and from four warehouses through a 450-foot by 240-foot (137 m by 73 m) plate shop equipped with a 55-foot (17 m) wide automated panel line. Modular construction techniques are combined with conventional shipbuilding methods. Large module sections are fabricated on a forming and subassembly slab about 400 feet by 200 feet (122 m by 61 m), which is actually an extension of the yard's building way. A 250-ton (227 metric ton) gantry crane travels on rails which run the full length of the slab and the 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-1984, the total work force at the Brownsville plant was 733, down from 900 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, WA, since 1946, is capable of construction, conversion, and repair of a wide variety of vessels, including towing, fishing, oil survey and support vessels, ferries, oil rigs, and Government ships. Marine Power & Equipment Company (MPE) is a subsidiary of WFI Industries, Inc. of Seattle.

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.

From 1979 through 1982, the company's principal ship construction consisted of six passenger/car ferries for the State of Washington.

During 1983 and the first three quarters of 1984, several oceangoing barges and tugs and eight LCM's (landing craft) for the Navy were built at MPE. The largest vessels built were two state-of-the-art triple deck RO/RO barges for Seaway Express. These barges, for service to Alaska, are 487 feet (148 m) in length.

In production, as of October 1, 1984, were one oceangoing barge and 20 LCM's. Repair work during 1984 consisted almost entirely of commercial work.

Although Marine Power's shipbuilding and repair complex comprises five yards, new construction work is done in Yards 2 and 4 with support available from 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 a deep-draft ship from 500 to 600 feet (152 to 183 m) in length, advanced zone-outfitting techniques would be used. Construction and launching would be in the company's yard 4 where a 4,000-ton (4064 metric ton) capacity syncrolift is available for launching or retrieving vessels. Adjacent to the syncrolift is a building site which consists essentially of a flat concrete slab of sufficient dimensions to accommodate one ship. The syncrolift, since it is not sufficiently long for a large vessel in excess of 500 feet (152 m), 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 in 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 oceangoing barges up to 487 feet (148 m) in length.

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 4,280 feet (1305 m).

Total employment at Marine Power & Equipment Co. in July 1984 was 1,100, compared to 400 a year earlier.

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

18. 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, CA. NASSCO is wholly owned by Morrison-Knudsen Company of Boise, ID.

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.

From 1973 to October 1, 1984, 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 were 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; and in March 1984, a large cable repair ship, the ZEUS (T-ARC-7), was delivered to the Navy.

The last commercial newbuilding to leave the yard was the 37,500-dwt. product tanker HUNTER B. ARMISTEAD, delivered in June 1983. However, in August 1984, Exxon Shipping Co. signed a contract with NASSCO for construction of two new 209,000-dwt. crude oil carriers which will provide work at the yard until early 1987.

Other work under contract as of November 1, 1984, at NASSCO consisted of ships being reconstructed, as described below, under the ongoing Navy T-Ship program.

In 1982, NASSCO was awarded contracts to convert three Waterman RO/RO containerships into maritime prepositioning ships to support the DOD Rapid Deployment Force. The first of these ships, renamed the SGT.

MATEJ KOCAK, was redelivered in September 1984. The second Waterman ship, renamed the PFC. EUGENE A. OBREGON, is slated for redelivery in December 1984, and the third vessel, the MAJ. STEPHEN W. PLESS, in April 1985.

In 1982, the Navy awarded NASSCO contracts to reconstruct three former Sea-Land SL-7 class containerships into T-AKR fast sealift ships. The first of the ships, the ALGOL (T-AKR 287), was completed and turned over to the Navy in June 1984; and the second vessel, the BELLARIX (T-AKR 288) was redelivered to the Navy in September 1984. The last of the three T-AKR's, the REGULUS (T-AKR 292), is slated for redelivery in October 1985.

In 1983, the Navy awarded contracts to NASSCO to convert two 90,000-dwt. San Clemente class tankers into 1,000-bed hospital ships (T-AH). The first ship is expected to be redelivered in September 1986, and the second ship is scheduled for completion in April 1987. Work started on the first vessel in August 1984.

Repair and overhaul work in 1984 consisted entirely of Navy contracts.

In the fourth quarter of 1983, NASSCO placed 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 85 feet (209 m by 26 m), can be leased by NASSCO on a use basis.

The company's fabrication and assembly facilities cover 143,000 square feet (13284 m²) of fabrication and subassembly area and have approximately a 2,000-ton (1816 metric ton) per week capacity.

As of mid-1984, the total labor force was 4,770, up from 3,460 at mid-1983.

Exhibit 22 is a current NASSCO plot plan.

19. Newport News Shipbuilding

Newport News Shipbuilding, located at the Port of Hampton Roads

in Newport News, VA, is the largest shipbuilding complex in the Free World. The company, founded in 1886, is a subsidiary of Tenneco, Inc. Newport News has built 23 aircraft carriers, 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. A leader in the application of high technology to shipbuilding, the company provides a variety of engineering and design services to the Navy.

Newport News is the Nation's foremost builder of Navy nuclear warships. The yard as of October 1, 1984, was at work on three Nimitz class aircraft carriers and seven attack submarines. Overhaul and repair of nuclear-powered submarines and surface ships for the Navy is also a principal activity at Newport News. The last commercial vessel built in the yard was the CHEMICAL PIONEER, delivered in September 1983.

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 include zinc, cadmium, lead, copper, chrome, silver and nickel plating. Chemical cleaning, pickling, stripping, buffing and polishing are also available. Other major improvements include upgrading and renovation of outfitting piers and older drydocks.

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 nuclear attack submarines and will be completed in 1988. The project will involve four new building ways, a major new construction facility under cover, and the addition of a new launching dock and a 900 metric-ton crane.

The 150-acre North yard was designed for high production and efficiency and has the capability to handle large components from fabricating areas to final erection. Data storage and retrieval systems control material storage and work flow. The building basin, the largest in the Nation, is 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 older South yard has two inclined shipbuilding ways; the larger of these can each accommodate vessels as large as 715 feet by 93 feet (218 m by 28 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 larger 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 m²) of inside storage including a 106,000 square foot (9847 m²) automated material storage facility.

The labor force at Newport News in July 1984 totaled 28,112, about the same level as a year earlier.

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

20. 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 on an integrated tug/barge. The unfinished barge had been removed from the defunct Seatrain yard in Brooklyn, NY and towed to Norshipco for completion and joining to the completed tug.

Norshipco is currently building a ferry for the Delaware Transportation Department, with delivery slated for 1985. During 1983 and the first three quarters of 1984, the company's repair and overhaul business, although not up to the higher 1982 level, continued at a steady, acceptable pace. During the past year, Navy phased maintenance contracts and Navy selected repair availability (SRA) work have been especially beneficial to Norshipco. In recent months from 20 to 25 percent of the company's repair work has been on commercial contracts.

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 (55,118 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 2,890 in June 1984, down slightly from 3,080 a year earlier.

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

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

Pennsylvania Shipbuilding Company came into existence in February 1982 when its parent company, Paden, Inc., acquired this Chester, PA, yard from the ailing Sun Ship, Inc. In April 1984, a private investment group, based in Mobile, AL, and headed by Tom Weller, Jr., purchased a "substantial interest" in Paden, Inc.

Pennsylvania Shipbuilding Company is one of the largest and best equipped shipyards in the country. It covers 185 acres on a mile of the Delaware River waterfront, just south of Philadelphia, PA.

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 products.

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 the third ship, the THOMAS HEYWARD, was built for Sun by Penn Ship and was delivered in February 1983.

In June 1984, Penn Ship completed the major conversion for the Navy of a former Sea-Land SL-7 containership to a fast sealift ship (T-AKR) for the DOD Rapid Deployment Force. This vessel, renamed the USNS CAPELLA (T-AKR 293) is 946 feet (288 m) in length overall. Penn Ship started work in October 1983 on the conversion of a sistership, the USNS DENEbola (T-AKR 289). This fast sealift ship is scheduled for redelivery to the Navy in October 1985.

In addition to work on the DENEbola, the Chester yard is actively supporting the Philadelphia Naval Shipyard on a number of programs, most notably the Service Life Extension Program (SLEP) of the aircraft carrier FORRESTAL (CVA-59).

In 1976, completion of a major capital improvement program enhanced Sun Ship's ability to fabricate larger, more sophisticated ships. This 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 and completion. The large drydock, which is capable of handling 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 Levingston Shipbuilding Company, its affiliate in Orange, TX, to the Chester, PA, plant. The company, however, is also seeking new construction business -- both naval ships and commercial ships.

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 facilities at six deepwater piers.

Employment at Penn Ship totaled 1,120 at mid-1984, compared with 1,240 a year earlier.

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

22. Tacoma Boatbuilding Company

In operation for over a half of century in Tacoma, WA, 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).

In 1983, Tacoma delivered two medium endurance Coast Guard cutters (WMEC's), the BEAR and the TAMPA; completed a contract with the U.S. Navy for construction of four patrol chaser guided missile ships (PCG's) for a foreign government; and completed the last of a series of six revolutionary-design tractor tugs.

During the first three quarters of 1984, the company delivered two more Coast Guard WMEC's, the HARRIET LANE and the NORTHLAND; and two ocean surveillance ships (T-AGOS), the STALWART and the CONTENDER, were delivered to the Navy. The 12-ship T-AGOS contract has become a focal point for zone outfitting in which various portions or "zones" of a ship are built separately as virtually complete units and then assembled at the launchway.

The ship construction backlog at Tacoma Boat as of October 1, 1984 consisted of 10 T-AGOS ships for the Navy, two 6,200-dwt. incinerator ships for Apollo Company, two tuna purseiners for a Norwegian company, and two corvette missile ships for the Government of Thailand. In addition, the company in 1984 signed a provisional contract for construction of an 800-passenger U.S.-flag cruise ship for

Gulf Pacific Cruise Lines, Inc. of Houston, TX. However, finalizing of the contract is dependent upon funding arrangements and MARAD approval of Title XI financing.

From July to December 1984, Tacoma was also working on a conversion contract awarded by APL to modify a foreign-built containership to meet U.S. Coast Guard operating standards prior to registering the ship under the American flag.

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 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 construction 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. Its width is about 400 feet (122 m). The facility launches into water 20 feet (6 m) deep.

The company operates two floating drydocks. The larger of the two can handle vessels up to 540 feet by 74 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-1984 was 1,770, down from 2,760 a year earlier.

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

23. Tampa Shipyards, Incorporated

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, FL. During World War II, the company built Navy auxiliary vessels and C2 cargo ships for the Maritime Commission.

Since World War II, Tampa Ship has been a major Gulf Coast repair yard, serving many of the tanker fleets operating on the Gulf and

repairing cargo ships, 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., is building five new 30,000-dwt. clean-product, ice-strengthened tankers for charter to Military Sealift Command. The preponderance of work will 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 and other conversions, Tampa Ship has activated, under a three-year lease, the Westinghouse heavy steel fabricating facility on Tampa's Westshore. This facility provides 11 acres of covered fabrication floor, bridge cranes from 200 to 700 ton (182 to 635 metric ton) capacity, and barge loading facilities. The building is two hours by tow from Tampa Ship.

The company currently operates one sliding way that 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 in the yard totals 2,240 feet (683 m).

Tampa Shipyards now has four graving docks operational. The largest (No. 2) can handle ships up to 896 feet by 146 feet (273 m by 45 m). Two of these four graving docks, part of the yard's ongoing expansion program, went into service in the third quarter of 1984. Each of the two new drydocks can accommodate a vessel as large as 746 feet by 121 feet (227 m by 37 m).

The current facilities improvement program also includes a new concrete pier, two wet berths, and additional shops. A new assembly building, containing two 250-ton (227 metric ton) bridge cranes, will cover one end of the new No. 4 graving dock. Most of the expansion project was completed in October 1984.

Tampa Ship currently leases two wet berths north of the main yard at South Slip. These wet berths are 840 feet (256 m) and 700 feet (213 m) long and are leased from Tampa Port Authority and Tampa Electric Company.

At year end 1983, 900 people were on the Tampa payroll with increases up to 1,200 anticipated by the end of 1984.

Exhibit 29 is a general plan of Tampa Ship's main yard showing the existing facilities as well as the additional facilities under construction. Neither the South Slip nor the Westinghouse facility is shown.

24. Texas Gulfport Shipbuilding Company (formerly Gulfport Shipbuilding)

This Port Arthur, TX, shipyard, formerly the Gulfport Division of Levingston Shipbuilding Company, became a wholly owned subsidiary of the newly formed corporation, Levingston Industries, Inc., in May 1981 and 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-1984 totaled 200, about the same as mid-1983.

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

25. 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, TX, 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, this Todd facility 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.

Ship repair and overhaul have for many years been a major segment of work at Galveston; 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 installed a new midbody in the ELEO MAERSK, the first of two Maersk Line cargo ships being converted to maritime prepositioning ships by Bethlehem-Beaumont. In November 1984, installation of the midbody for the second Maersk vessel, the EMILIE MAERSK, was scheduled for completion. In recent months, repair and overhaul contracts at Galveston have consisted of primarily commercial work.

The Navy in May 1984 awarded Todd-Galveston a design contract authorizing design work on the conversion of two RO-RO/containerships, MA Design C5-S-78a, to Aviation Logistics Support Ships (T-AVB). The contract includes options for reconstruction of one of these ships in FY 1985 and one in FY 1986.

At Todd-Galveston, 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.

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. The new 40,000 metric ton drydock, built by Kawasaki Heavy Industries, Ltd. in Japan, is capable of lifting ships as large as 225,000 dwt. and all drill rigs with beams no greater than 160 feet (48.7 m).

As a result of Todd's decision in 1983 to consolidate its Houston yard with its Galveston facility, Houston's new 17,500 ton (17780 metric ton) floating drydock was moved to the company's Galveston shipyard. This drydock, which became operational in May 1984, 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, located within approximately one mile (1.6 km) of the main yard with more than 90,000 square feet (8361 m²) 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-1984, total employment was 587, down from about 900 a year earlier.

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

26. 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 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, this shipyard 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 constructed nine destroyer-type vessels. Since the late 1970's, the Navy has awarded Todd-LA contracts to build a total of 19 sophisticated guided missile frigates (FFG-7 class). As of December 1, 1984, four of these ships were on order or in production. The last frigate is scheduled for delivery in November 1988. During 1983 and 1984, 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 and modernization 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. The completed facility will include a shiplift platform 655 feet by 106 feet (200 m by 32 m) with a lifting capacity for vessels up to 48,000 dwt., a side-transfer system, and five work bays. Phase I of this project, which encompasses the shiplift, side-transfer system, and two work bays capable of handling up to five vessels simultaneously, first became operational in March 1984. Further expansion is to continue in an orderly phased program over the next five years until the total project is completed. According to Todd's management, this \$47 million facility will double the Los Angeles Division's ship construction capacity and increase its repair capability by 250 percent.

Todd-LA operates two floating drydocks, the larger 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 (1,882 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 other 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 3,340 in July 1984, down from 5,000 a year earlier.

Exhibit 32 is a plant map of the Los Angeles Division's facilities.

27. 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 1894, 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 Bethlehem's sale of the yard to Todd Shipyards Corporation in October 1982, no major ship construction or repair work remained.

During 1983 and the first three quarters of 1984, the yard was engaged primarily in ship repair, overhaul, and maintenance work for the Navy. Other work included extensive modifications to passenger accommodations on a large cruise ship, construction of a graving dock caisson for Mare Island Naval Shipyard, and construction of submarine propulsion shafts for General Dynamics-Electric Boat.

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 (66,040 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-1984, the yard's work force totaled 450, down from 750 a year earlier.

Exhibit 33 is a current plot plan of Todd's San Francisco plant and facilities.

28. Todd Pacific Shipyards Corporation - Seattle Division

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

This 42-acre yard has been a prime supplier of fighting ships for the 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 with the first of a series of guided missile frigate (FFG) contracts. As of October 1, 1984, 11 FFG's had been delivered and the remaining two were under construction. The last frigate, the CARR (FFG-52), is scheduled for delivery in July 1985.

Todd-Seattle is currently building a new floating drydock for the Navy, with delivery scheduled for December 1985.

In August 1984, the yard completed the refitting of two large German-built containerships for Lykes Bros. These vessels, the ELBE EXPRESS and the ALSTER EXPRESS, were refitted to bring them up to U.S. Coast Guard and American Bureau of Shipping standards in order that they could be registered under the American flag. Work performed included drydocking, surveying, and modernization of radio and other equipment. The hulls were also coated with copolymer anti-fouling paint to improve the speed of the ships.

This yard has an active ship repair and overhaul operation that annually works on from 200 to 300 commercial and naval vessels. The Seattle Division has been appointed authorized repair and service representative for B&W/M.A.N. Diesel of Denmark and Sulzer Marine Diesels of Switzerland.

The FFG Program provided the impetus for a multimillion-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 new 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 larger 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 1984, total employment at the Seattle plant was 1,730 down from 3,056 a year earlier. With the FFG program winding down, further layoffs are anticipated.

Exhibit 34 is a current plot plan of Todd-Seattle's facilities.

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

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

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

During the first three quarters of 1984, the volume of work slowed considerably compared to a year earlier. A contract for repair and modernization work on the aircraft carrier CARL VINSON (CVN-70) provided work for about four months, and extensive engine room and hull repairs on a Matson RO/RO containership resulted in work for six weeks. The only other recent substantial work at Triple A was a contract to reactivate the passenger/cargo vessel SANTA MERCEDES for the Maritime Administration. The ship was drydocked and repairs were made to her hull and topside areas. Work included changes required by the American Bureau of Shipping and U.S. Coast Guard as well as removal of items to facilitate the ship's later conversion to a training ship for the Massachusetts Maritime Academy.

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 (33 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 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, 1984, employment at the yard totaled 410; but the labor force fluctuates depending upon available repair work.

Exhibit 35 is a current yard plan outlining the Triple A facilities at Hunters Point.

Employment

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

1978 Average	172,000
1979 Average	173,300
1980 Average	178,000
1981 Average	186,700
1982 Average	171,600
1983 Average	147,300
1984 January	151,900
1984 February	155,200
1984 March	155,500
1984 April	154,400
1984 May	156,700
1984 June	154,600
1984 July	156,900
1984 August	158,600
1984 September (Prelim.)	157,700

The Maritime Administration monitors employment in the 23 major U.S. privately owned shipyards in the Active Shipbuilding Base (as identified in Exhibit 38 of this report) on a monthly basis. As of September 1984, employment in these 23 yards totaled 104,916 or approximately 67 percent of the overall shipbuilding and repair industry employment published by the Bureau of Labor Statistics. See Exhibit 40 of this MARAD report for employment projections for 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 1984 saw within the committees a continuation of 1983 activities.

Ship Repair Facilities

While over 200 privately owned firms of varying capabilities are involved in repairing ships in the United States, only 76 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 88 floating drydocks, 51 graving docks, and several marine railways. However, some of these graving docks are committed to new construction. The large organizations which have drydocks generally use extensive waterfront acreage and are capable of all types of ship repair and maintenance. Major shipyards usually combine repair, overhaul, and conversion with shipbuilding capabilities, and employment usually numbers in the thousands. It is difficult to draw a sharp line between shipbuilding yards and ship repair yards, as many of the two engage in both types of work.

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

As of October 1984, the Maritime Administration held lump sum master repair contracts with 103 private ship repair companies; and 150 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 included 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, doubled the main yard's ship repair capacity.

o Bath Iron Works

BIW in December 1983 placed in operation a new \$46.7 million conversion, overhaul, and repair facility in Portland, ME. 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 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 and construction 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. It went into operation in March 1984. According to Todd's management, this multimillion-dollar facility will double the yard's construction capacity and increase its repair capability by 250 percent.

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 Tampa Shipyards, Inc.

As part of the yard's current facilities expansion program, two additional graving docks went into service in the third quarter of 1984, along with a new concrete pier, two wet berths, and additional shops and cranes. Each of these two new drydocks can accommodate vessels up to about 740 feet (225 m) in length, and the wet berths can handle ships up to 900 feet (274 m) in length.

o Continental Maritime of San Francisco, Inc.

In early 1985, this San Francisco topside repair yard, formerly SFW Corporation, will place in operation a new 26,000-ton (26416 metric ton) lifting capacity floating drydock to greatly increase the company's repair, overhaul, and conversion capability. The drydock was built in West Germany.

o Jacksonville Shipyards

A new 30,000-ton (30480 metric ton) lifting capacity 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 placed 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. This drydock was built in Japan.

o Southwest Marine, Inc.

As part of a multimillion-dollar modernization program at its San Diego, CA, shipyard, Southwest Marine in late 1984 put into service a 22,000 metric-ton lift capacity floating drydock built by Kawasaki Heavy Industries of Japan. This new high-tech computer-operated drydock includes many innovative design features. 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, SC, 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 1984, and future prospects are uncertain. Navy repair and overhaul work continued to be a consistent and stable element in the repair industry's endeavors. Competition for all repair contracts has been intense.

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, marine railway, or Syncrolift 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 1984 on 56 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 shipyard 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, 65 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, as identified by the Navy and MARAD, comprises the 23 privately owned U.S. shipyards which are open and currently engaged in or seeking contracts for the construction of major oceangoing or Great Lakes ships 1000 gross tons or over. Exhibit 38 of this report identifies and geographically locates these 23 yards.

Exhibit 39 indicates when each of the yards in the Active Shipbuilding Base needed new contracts as of September 30, 1984, 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.

Exhibit 39 shows that five of the 23 privately owned yards in the Active Shipbuilding Base normally engage in ship repair work, while 18 of the 23 yards are normally ship construction yards. Of these 18 shipyards, only seven (as of September 30, 1984) had an adequate orderbook for the short term--mainly Navy shipbuilding and conversion work.

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.

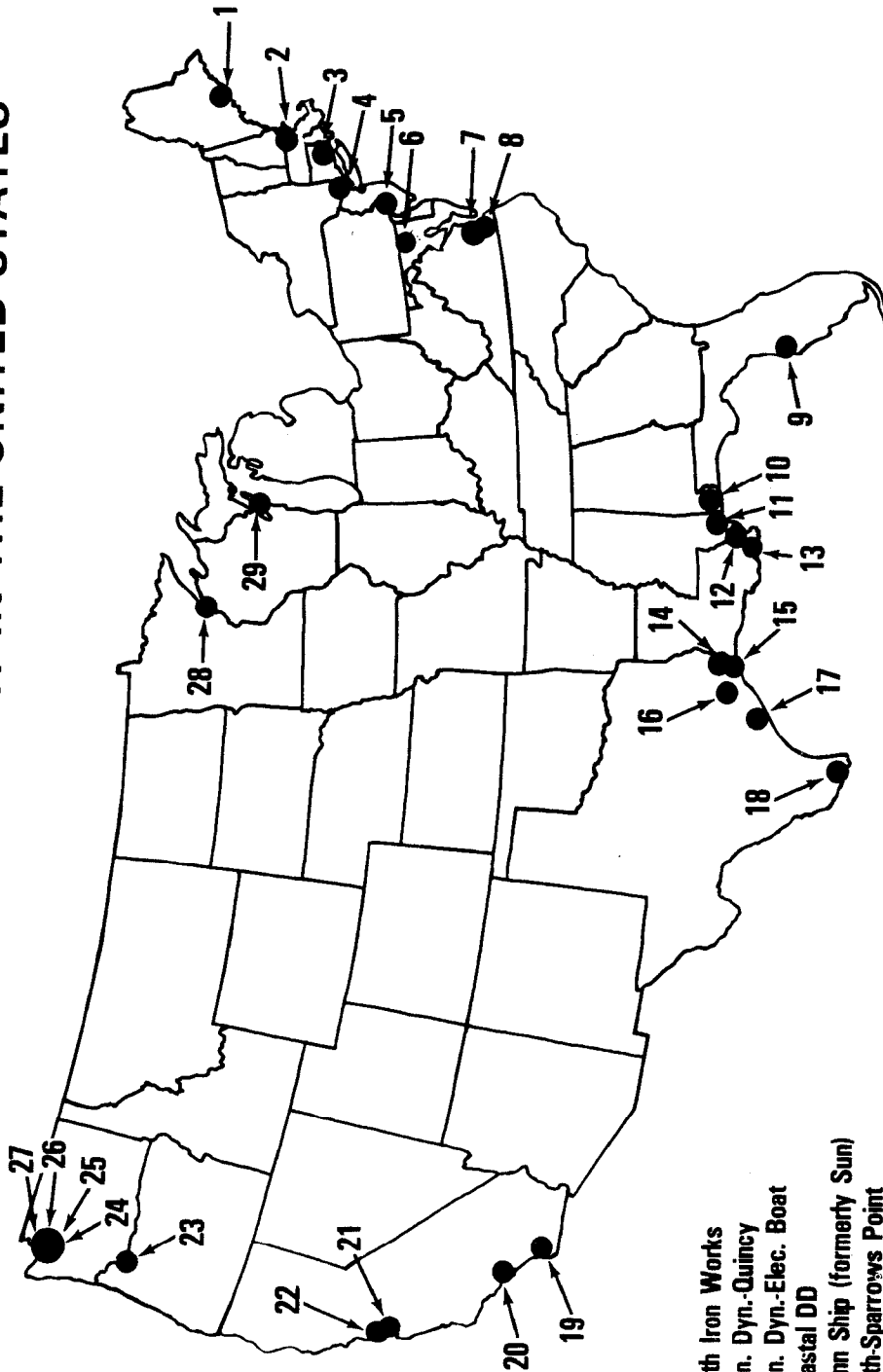
During CY 1983 and the first three quarters of CY 1984, the number of yards in the Active Shipbuilding Base was reduced from 27 to 23 as a result of the closure of Todd's Houston shipyard, The American Ship Building Company's yard in Lorain, Ohio, Maryland Shipbuilding and Drydock Company, and Levingston Shipbuilding Company, Orange, Texas, (temporarily closed on a care-and-maintenance basis). In September 1984, these 23 yards employed roughly 67 percent of the U.S. shipbuilding and repair industry's total work force, as reported by the Bureau of Labor Statistics. At that same time, 84 percent of the production workers in these 23 shipyards were engaged in Navy or Coast Guard ship construction and repair work.

As of December 1984, 12 of the 23 shipyards were engaged in construction of major combat ships and auxiliary vessels for the Navy. Three of the yards were building a total of 10 major commercial vessels, and eight of the yards were engaged in ship construction and conversion work provided by the Navy's T-Ship program. Three of the yards had only repair and overhaul work and a minimal amount of small ship construction.

Employment projections for production workers is shown by Exhibit 40 of this report. 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.

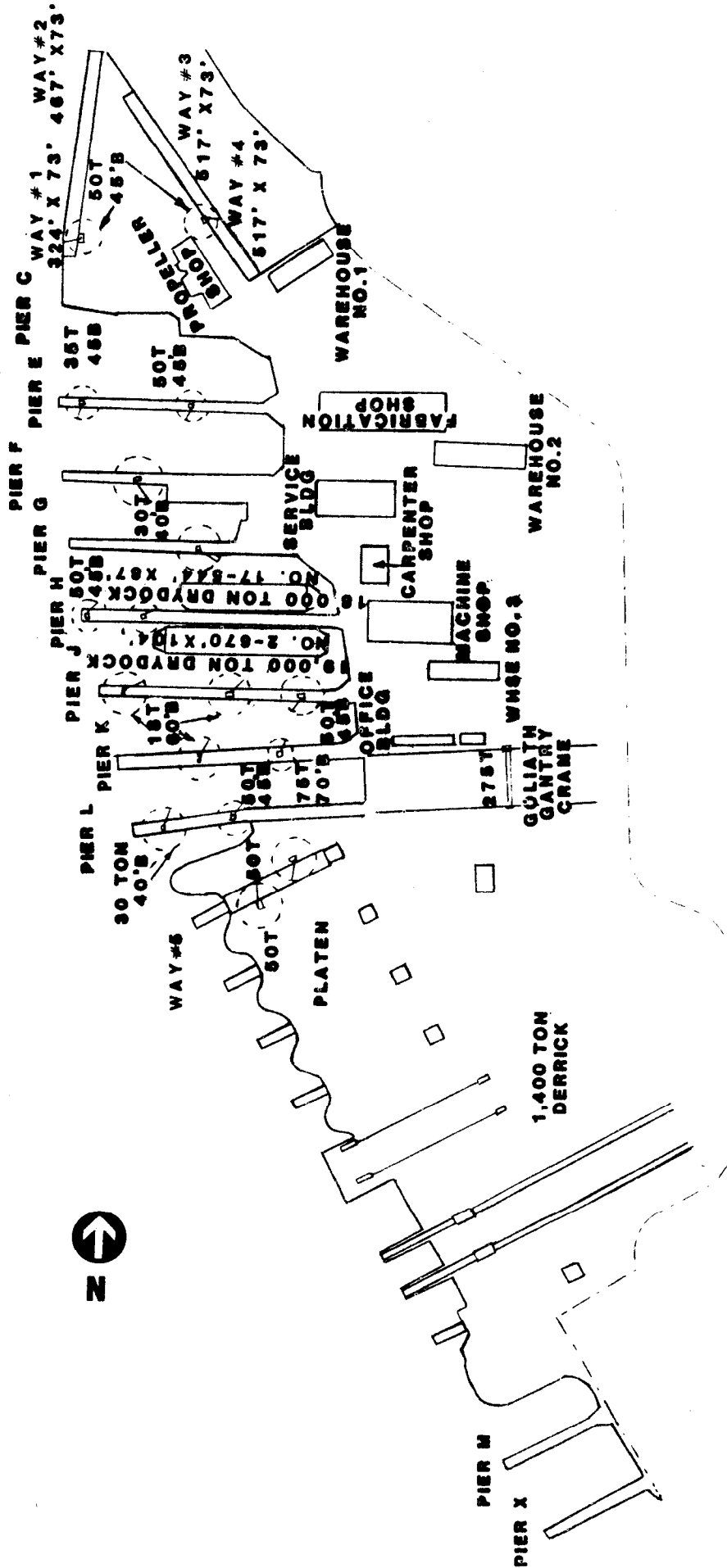
Exhibit 40, dated December 31, 1984, indicates a likely continuing decline during 1985 in production work force levels of the shipyards in the Active Shipbuilding Base, followed by a period of relatively stable work force requirements prior to a recovery expected to commence in mid-1987. These projections are contingent upon near-term economic conditions, the demand for commercial vessels, and upon future Administration and Congressional action with regard to continuation of the proposed Navy shipbuilding and conversion programs.

SHIPBUILDING INDUSTRY IN THE UNITED STATES



- 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. Newport News SB
- 8. Norfolk SB & DD
- 9. Tampa Shipyards
- 10. ADDSCO Industries
- 11. Ingalls/Litton
- 12. Avondale Shipyards
- 13. Halter Marine
- 14. Livingston (Orange, TX)
- 15. Texas Gulfport SB
- 16. Bath-Beaumont
- 17. Todd-Galveston
- 18. Marathon LeTourneau
- 19. NASCO
- 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

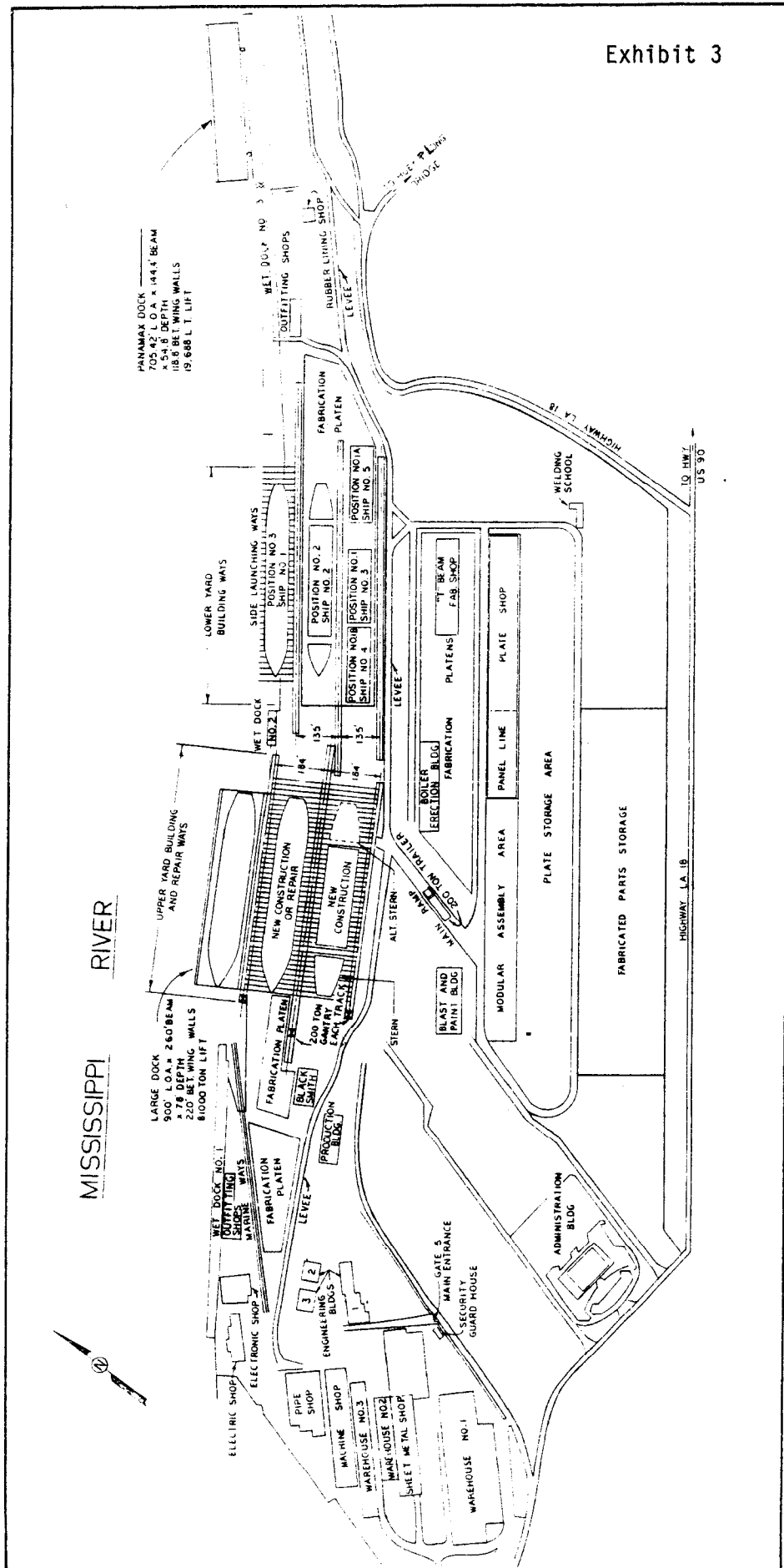
MAJOR U.S. SHIPYARDS
BUILDING CAPACITY - SHIPS 475 FEET IN LENGTH OR OVER

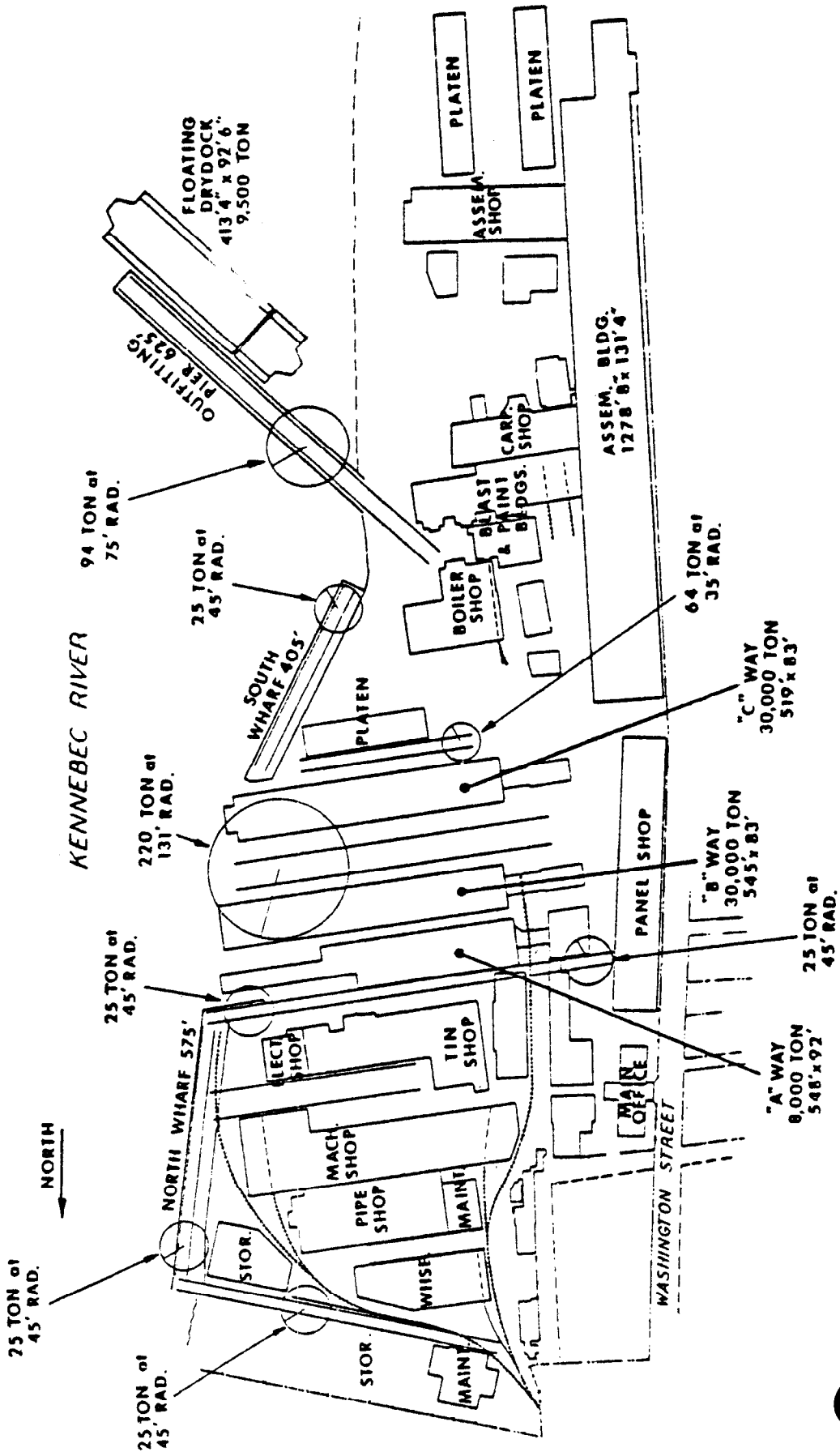


ADDSCO INDUSTRIES, INC.

AVONDALE SHIPYARDS, INC. MAIN PLANT

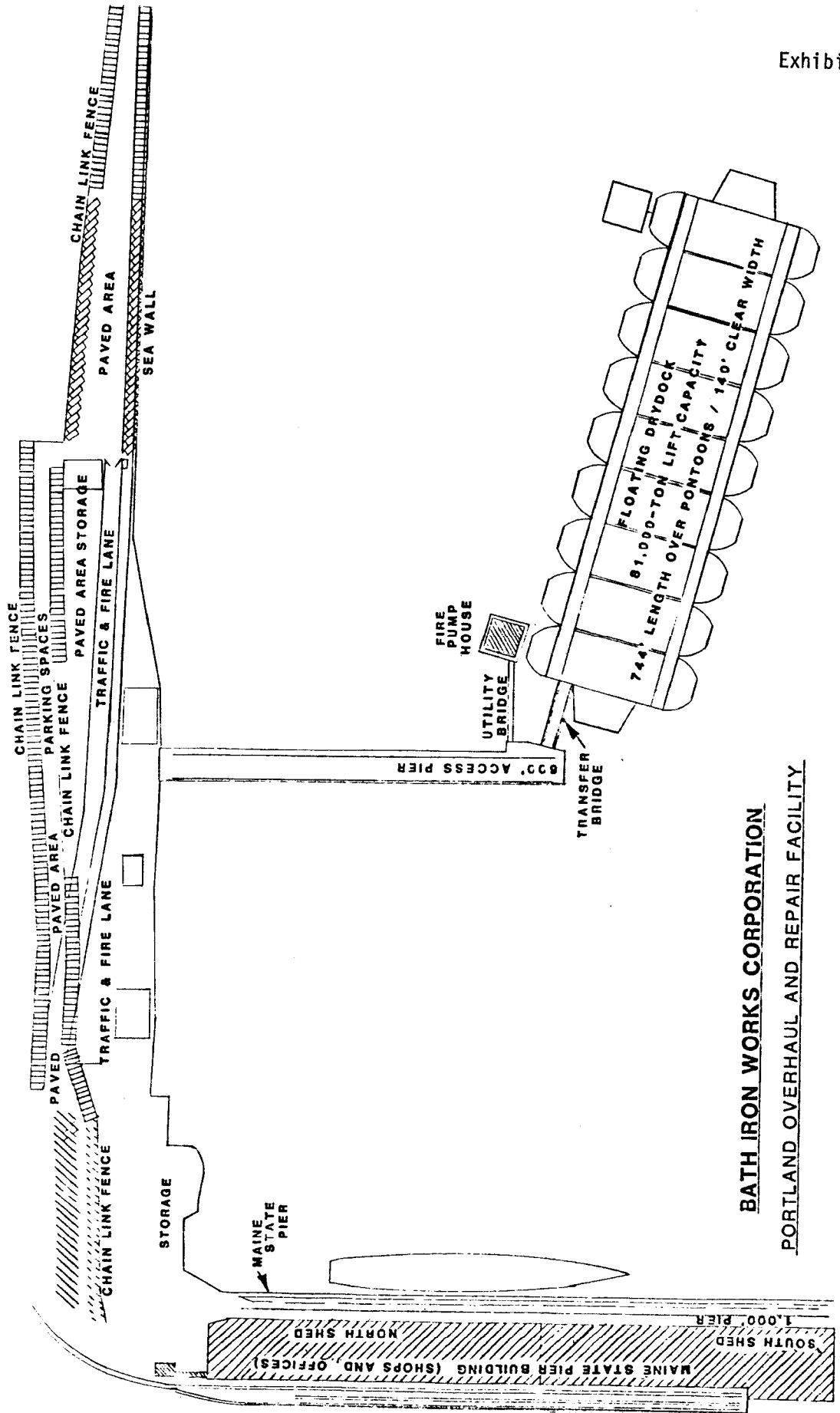
Exhibit 3





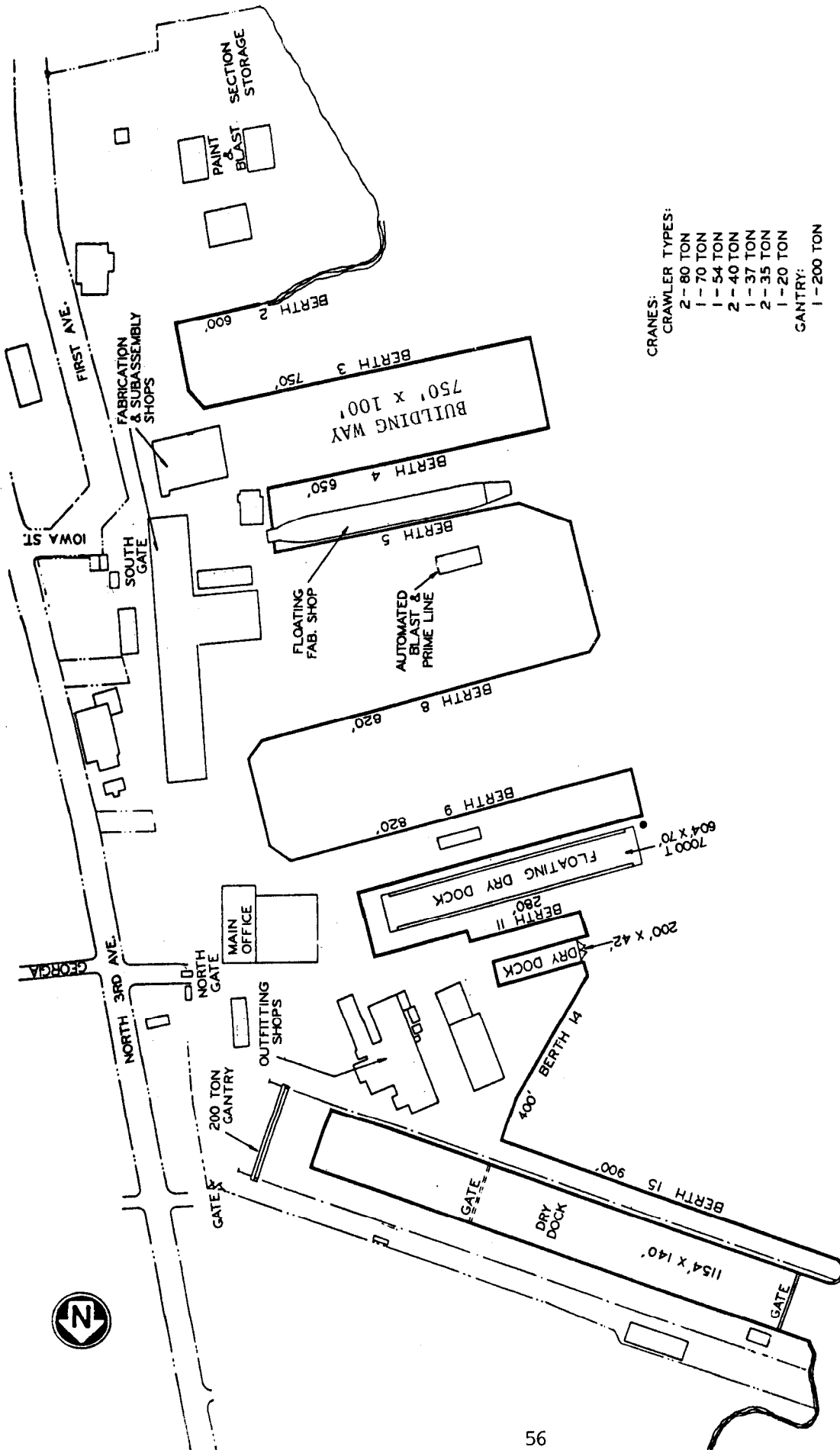
BATH IRON WORKS CORP.





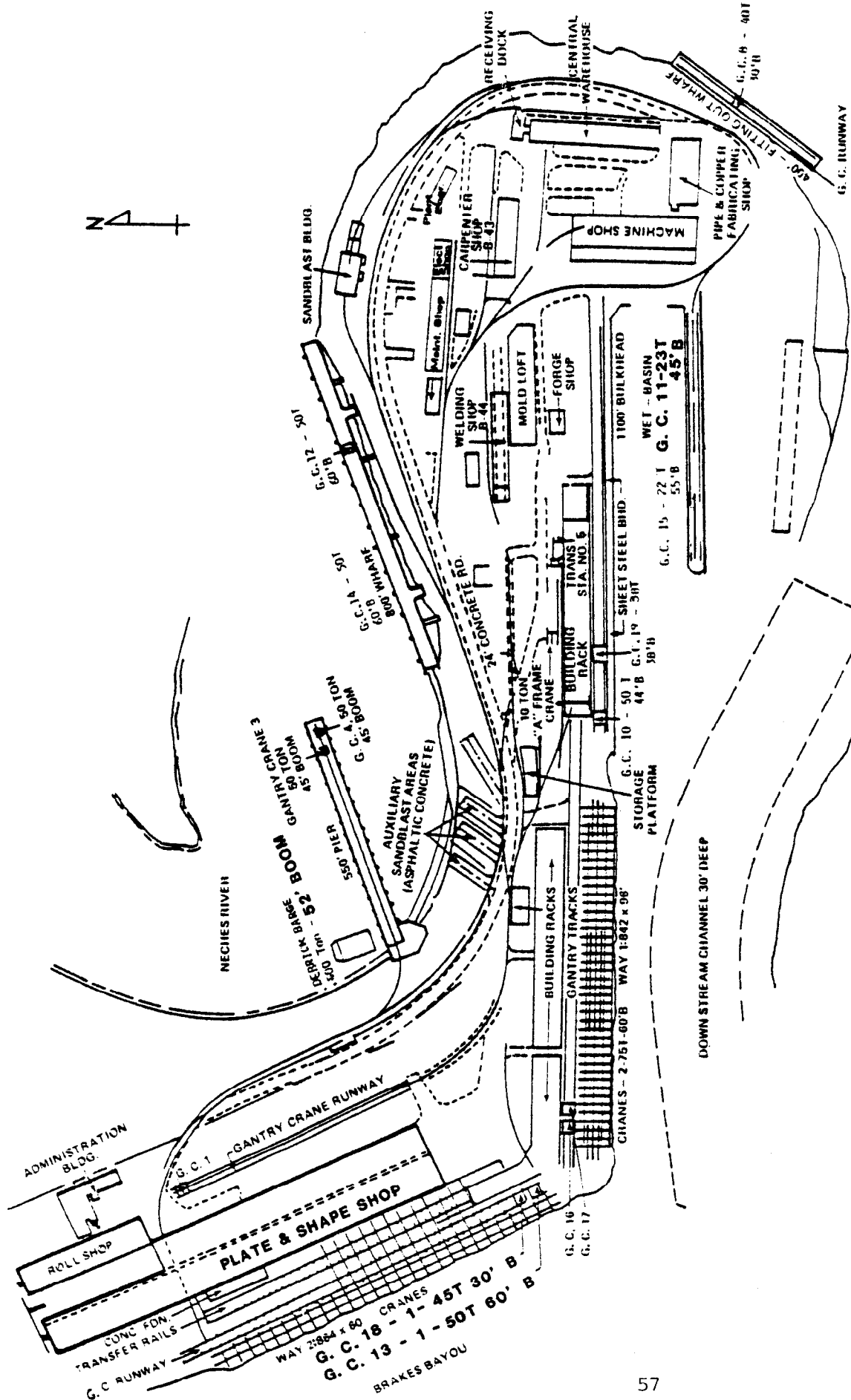
BATH IRON WORKS CORPORATION

PORTLAND OVERHAUL AND REPAIR FACILITY

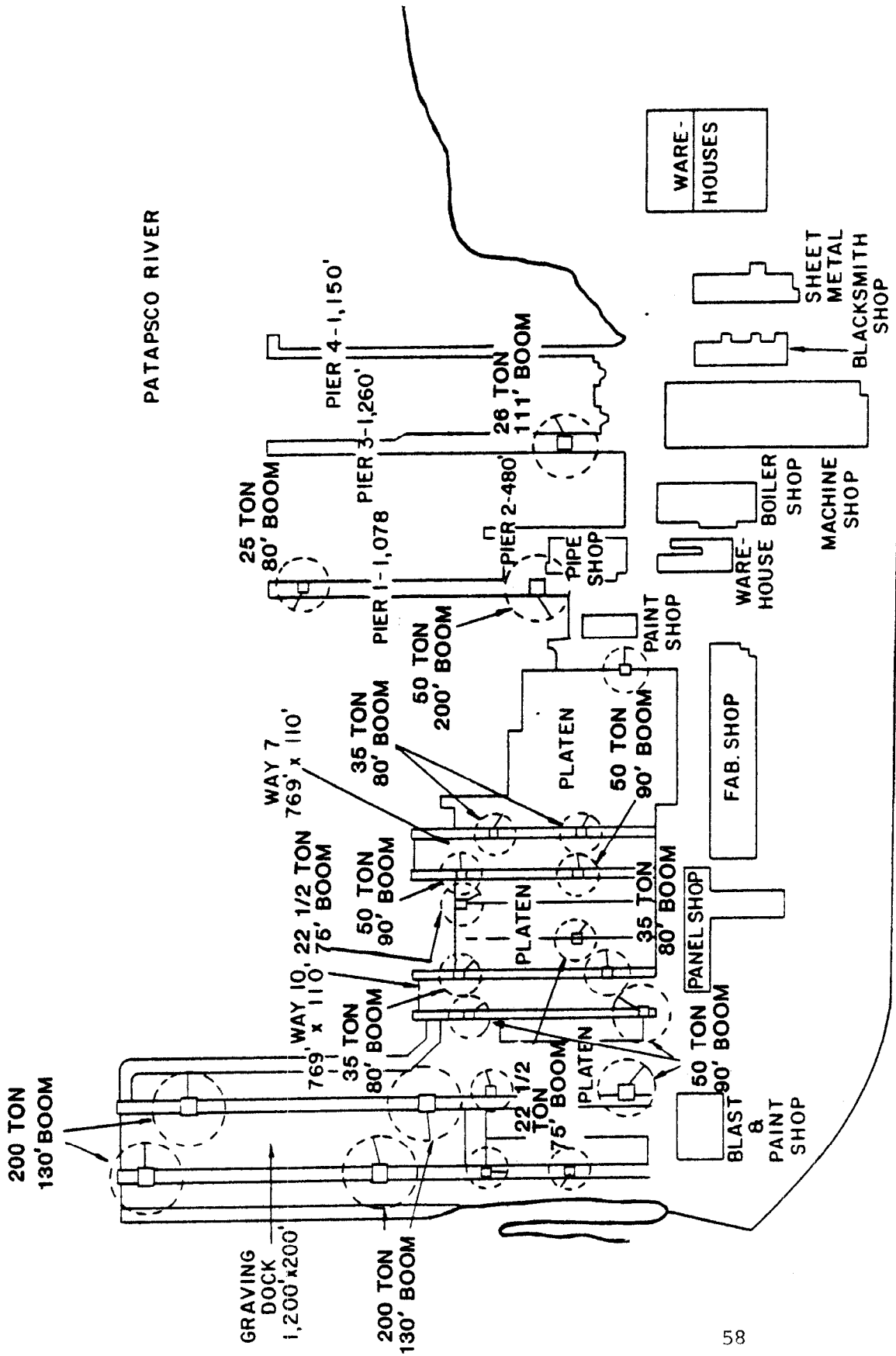


- CRANES:
 CRAWLER TYPES:
 2 - 80 TON
 1 - 70 TON
 1 - 54 TON
 2 - 40 TON
 1 - 37 TON
 2 - 35 TON
 1 - 20 TON
 GANTRY:
 1 - 200 TON

BAY SHIPBUILDING CORPORATION

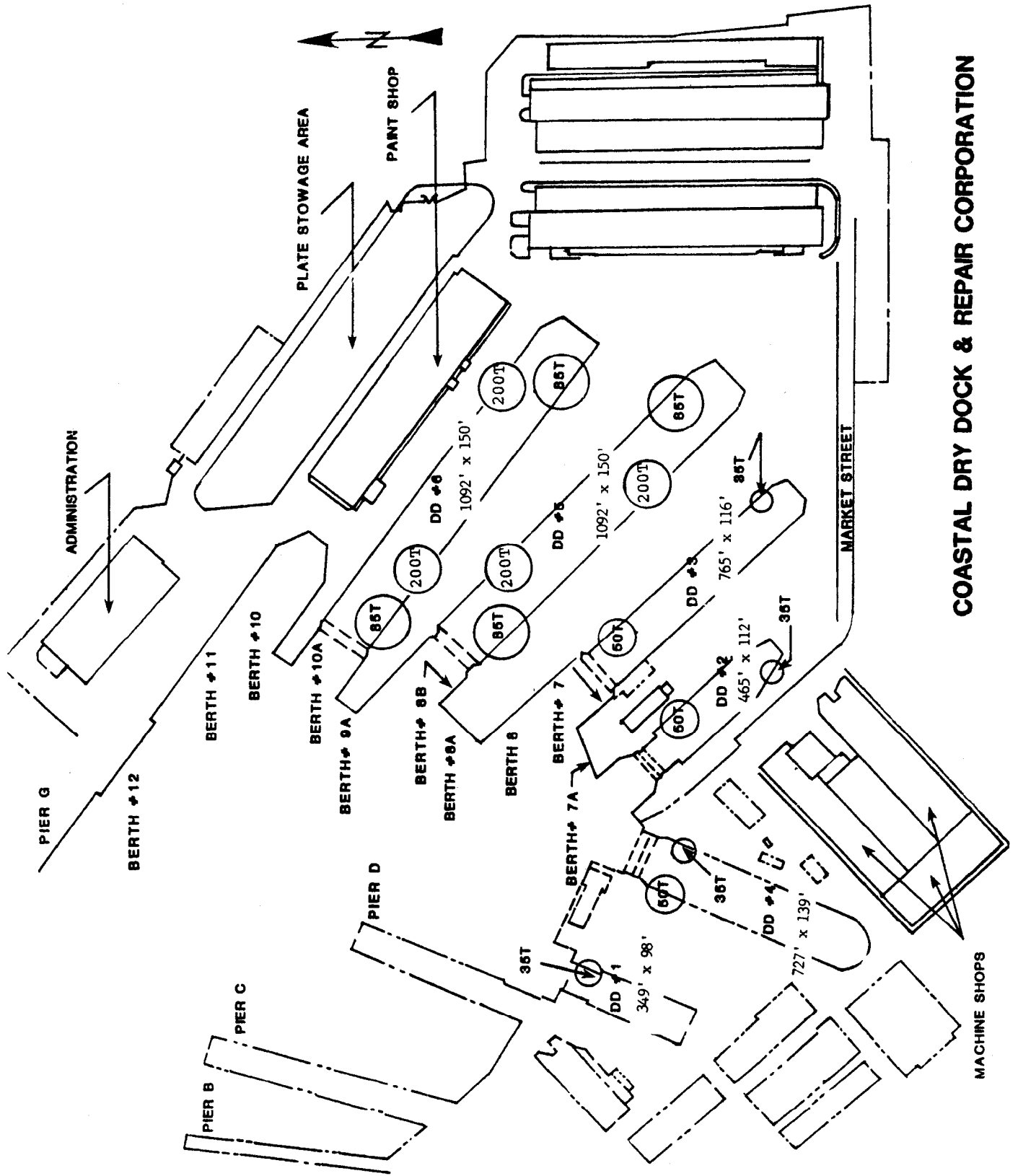


BETHLEHEM STEEL CORP.
BEAUMONT YARD

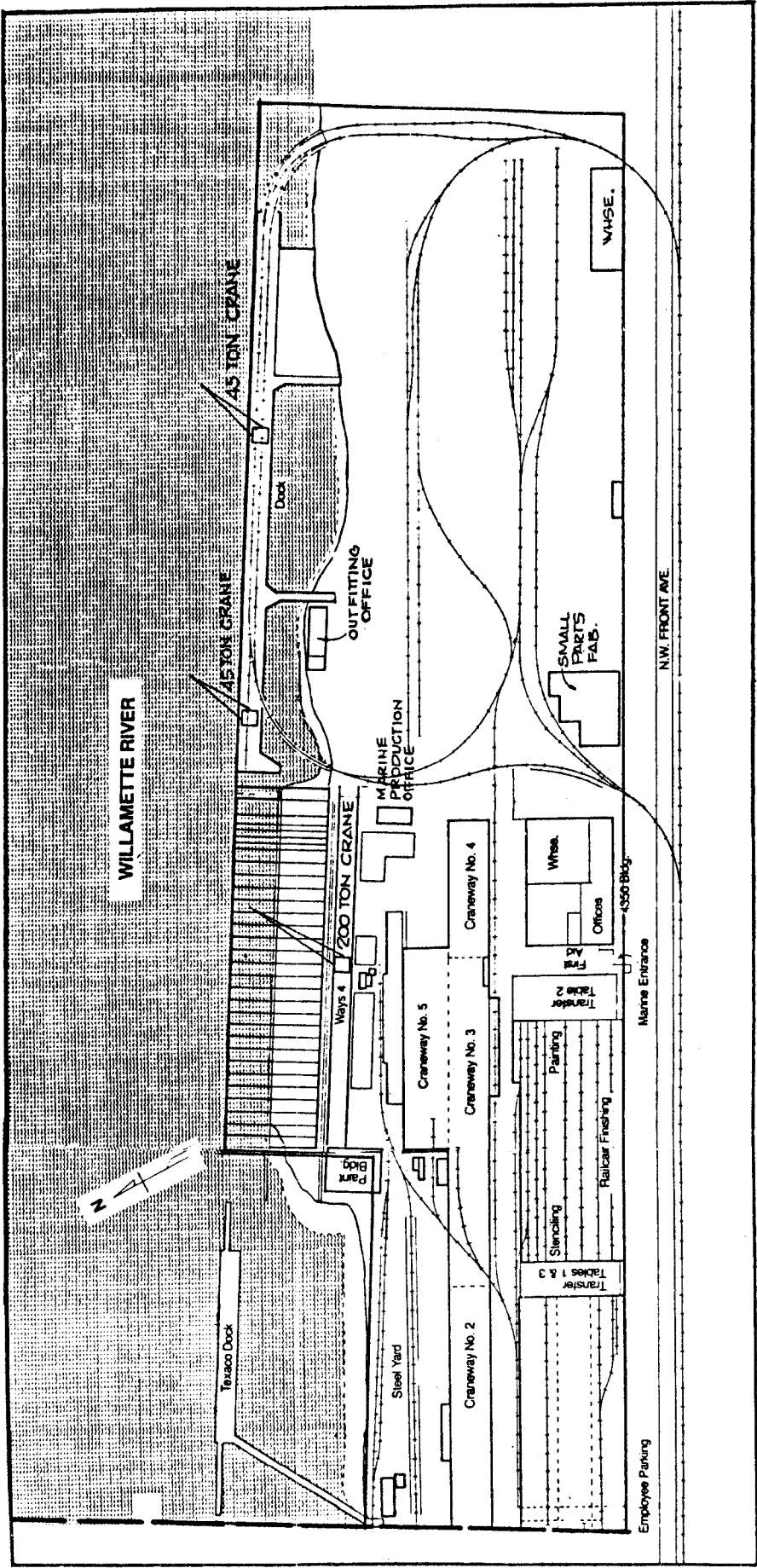


BETHLEHEM STEEL CORPORATION

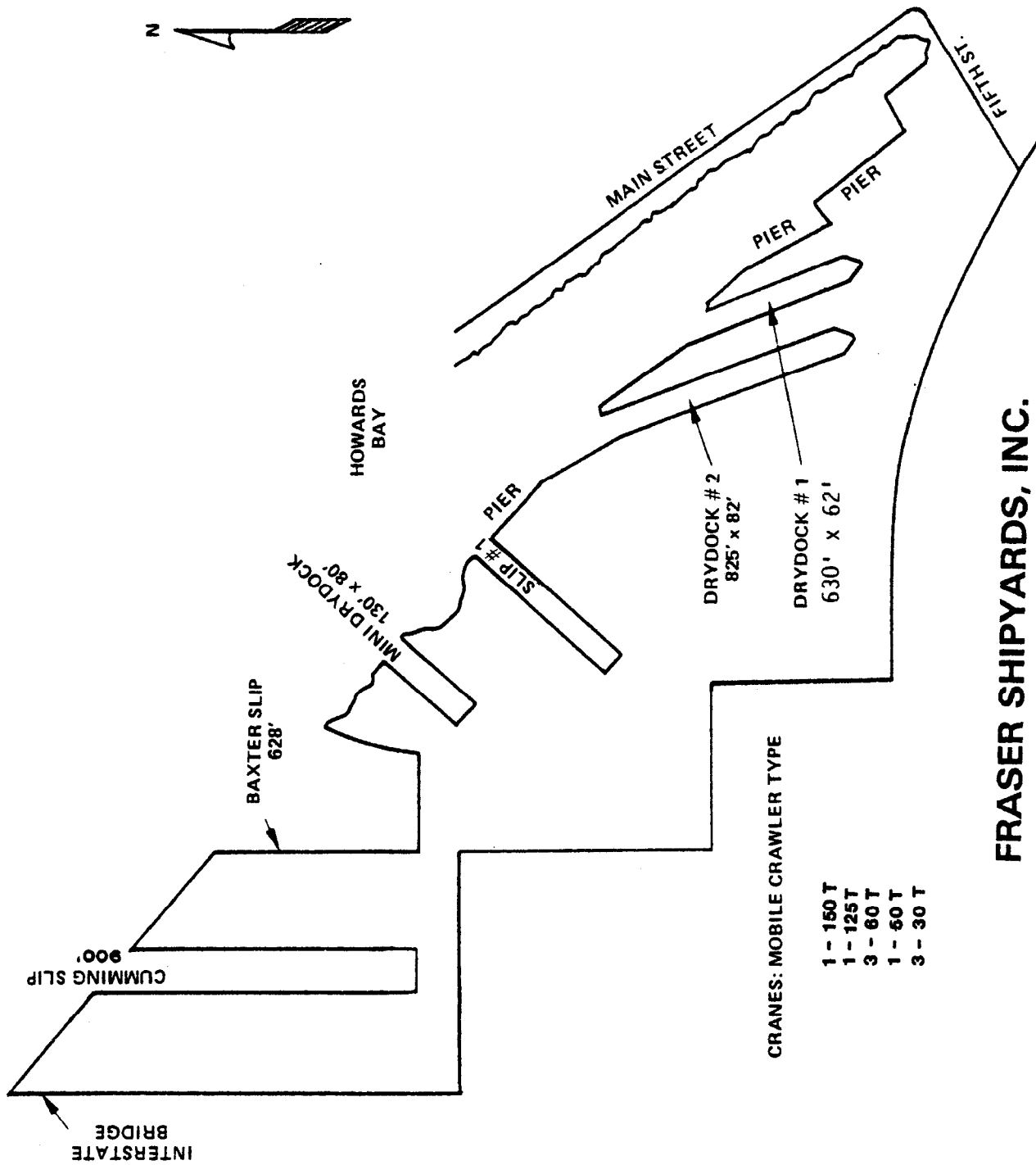
SPARROWS POINT YARD



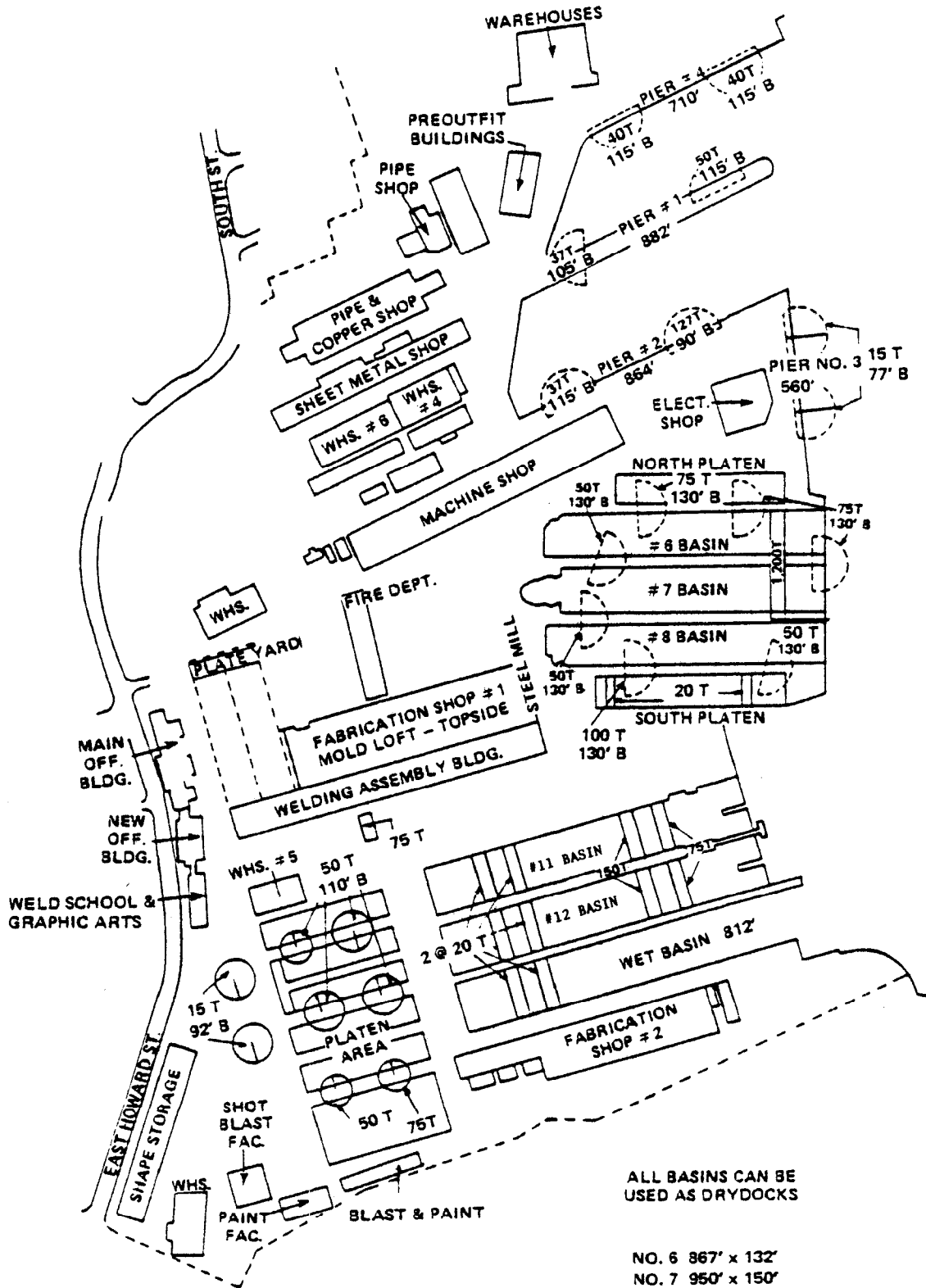
COASTAL DRY DOCK & REPAIR CORPORATION



FMC CORPORATION
Marine & Rail Equipment Division
Portland, Oregon



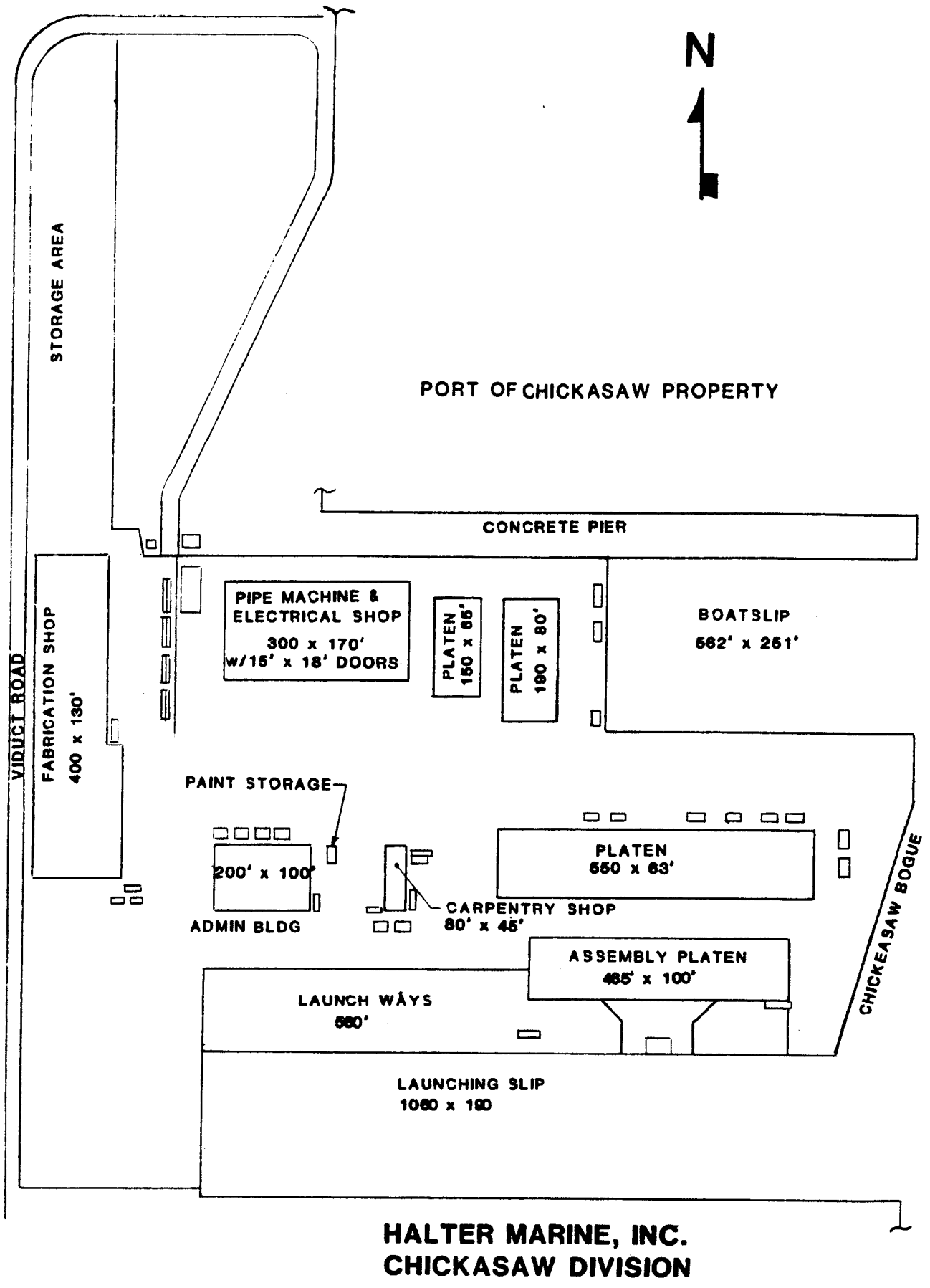
**FRASER SHIPYARDS, INC.
SUPERIOR, WISCONSIN**



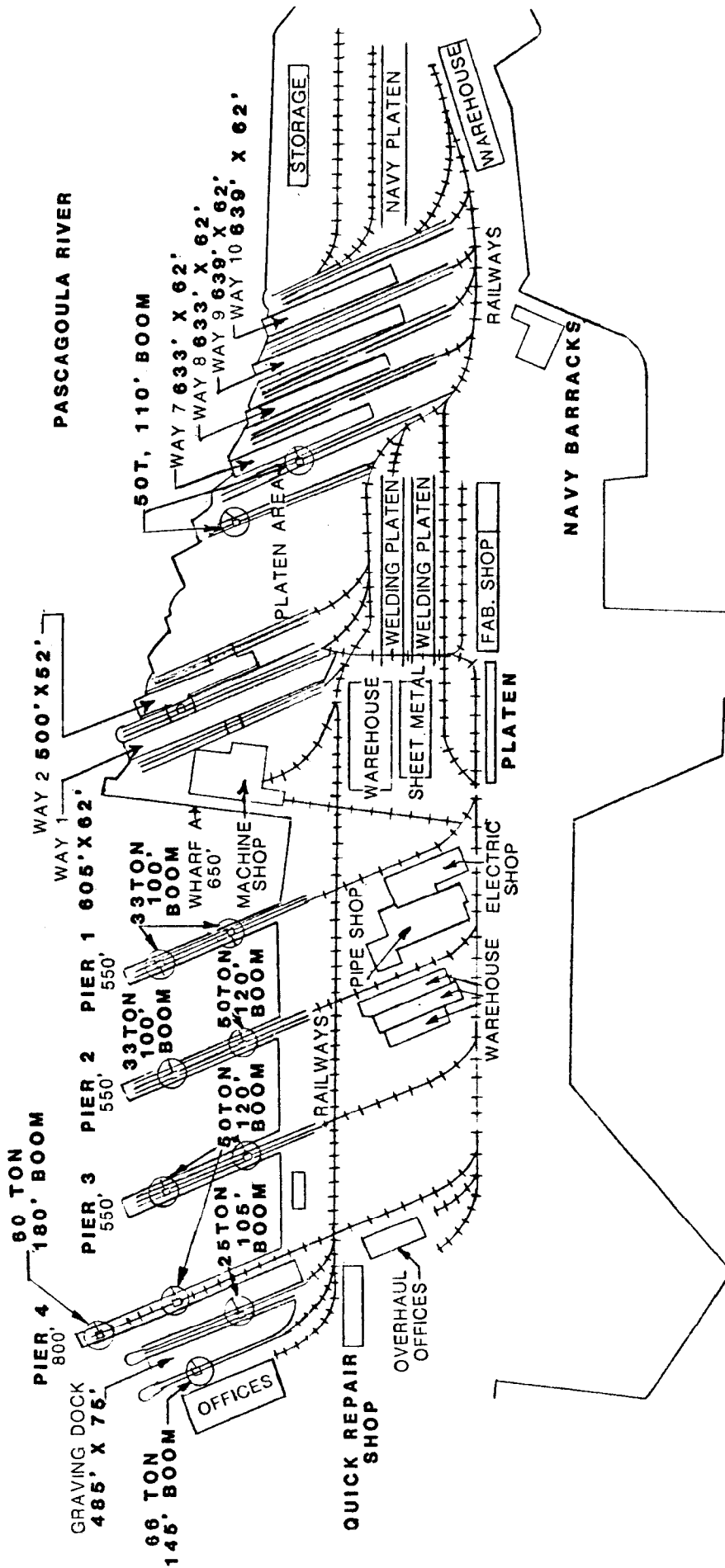
GENERAL DYNAMICS
QUINCY SHIPBUILDING DIVISION

ALL BASINS CAN BE
USED AS DRYDOCKS

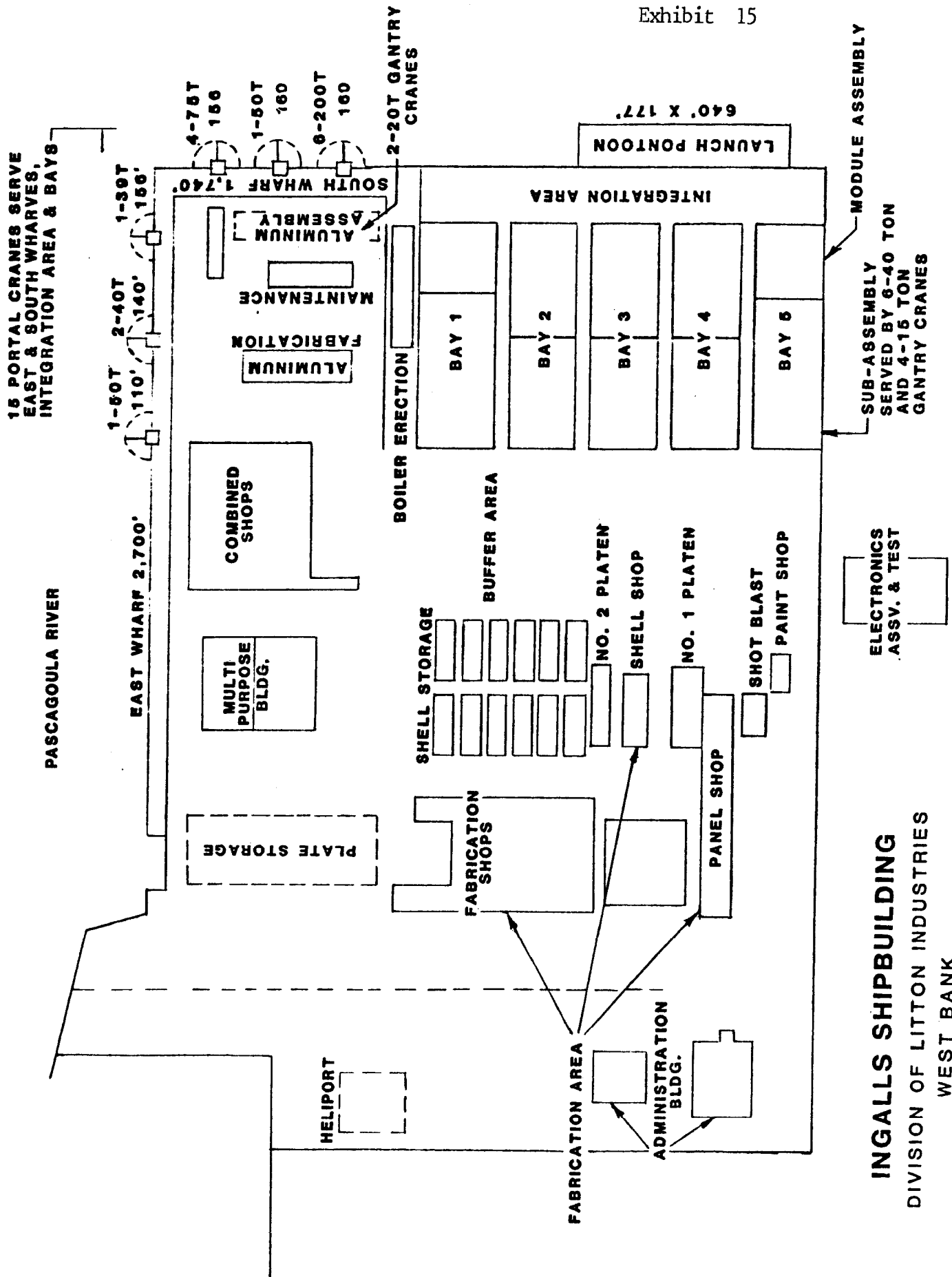
NO. 6 867' x 132'
NO. 7 950' x 150'
NO. 8 867' x 132'
NO. 11 874' x 150'
NO. 12 874' x 150'



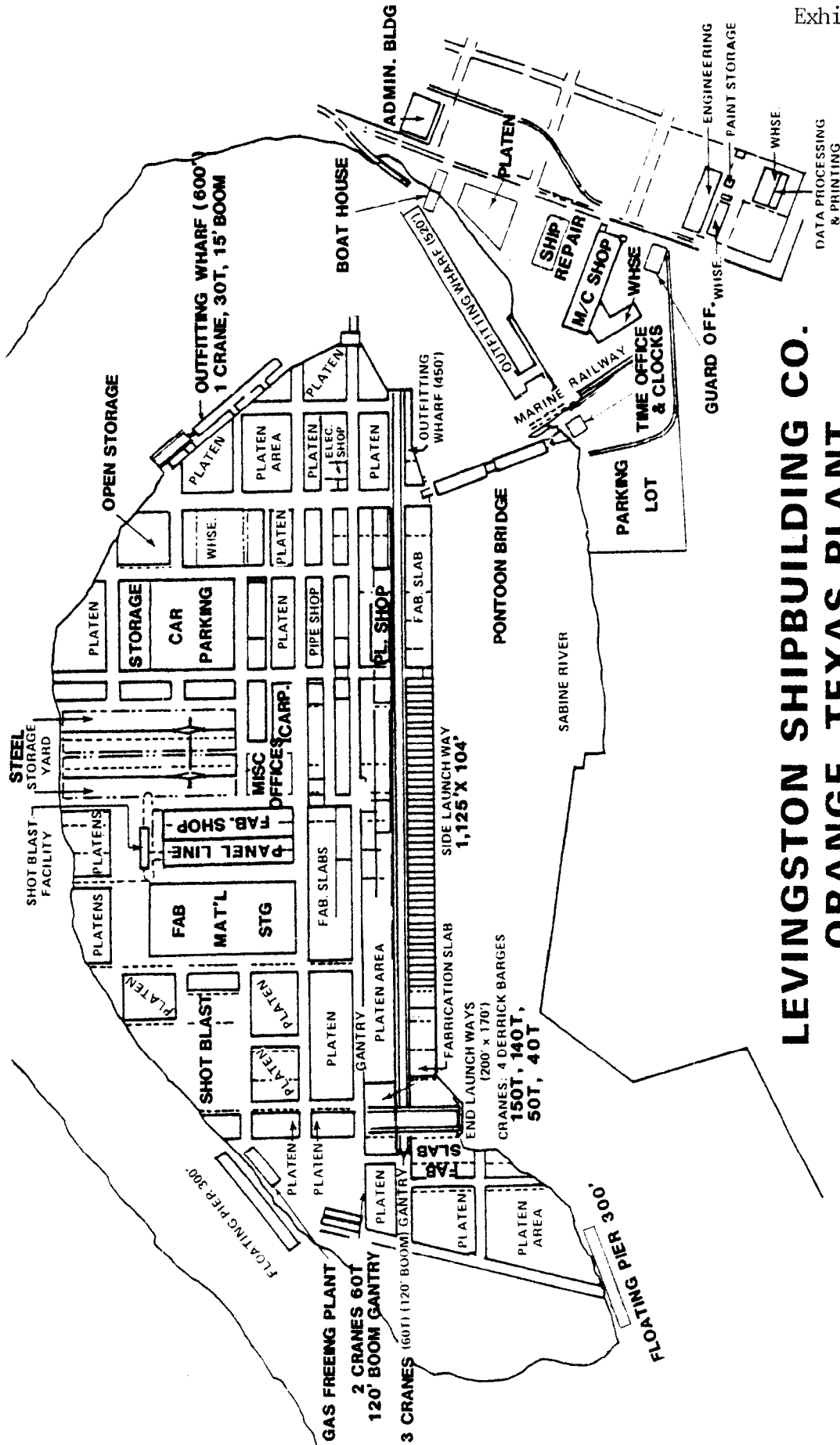
**HALTER MARINE, INC.
CHICKASAW DIVISION**



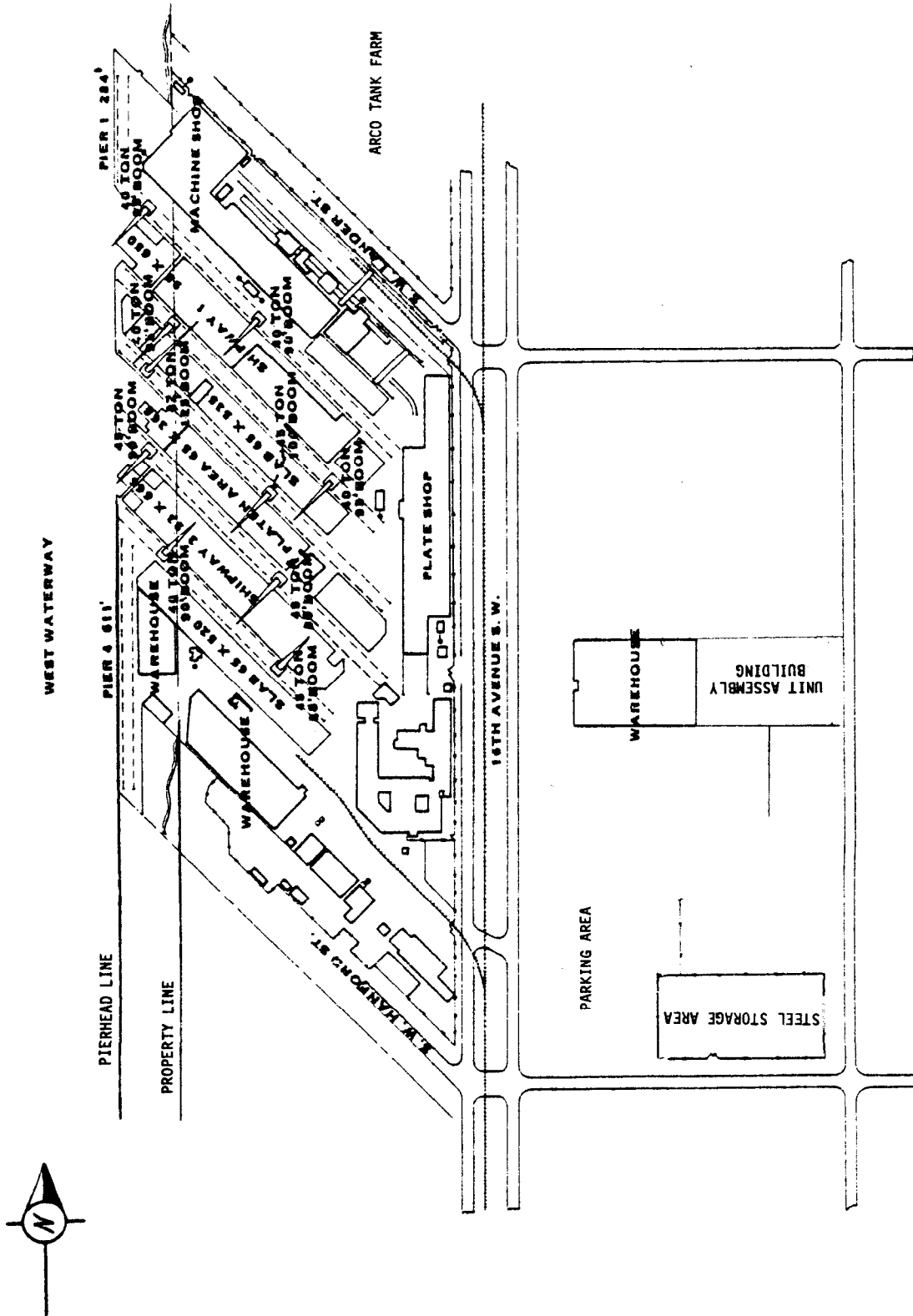
INGALLS SHIPBUILDING
DIVISION OF LITTON INDUSTRIES
EAST BANK FACILITY



INGALLS SHIPBUILDING
 DIVISION OF LITTON INDUSTRIES
 WEST BANK



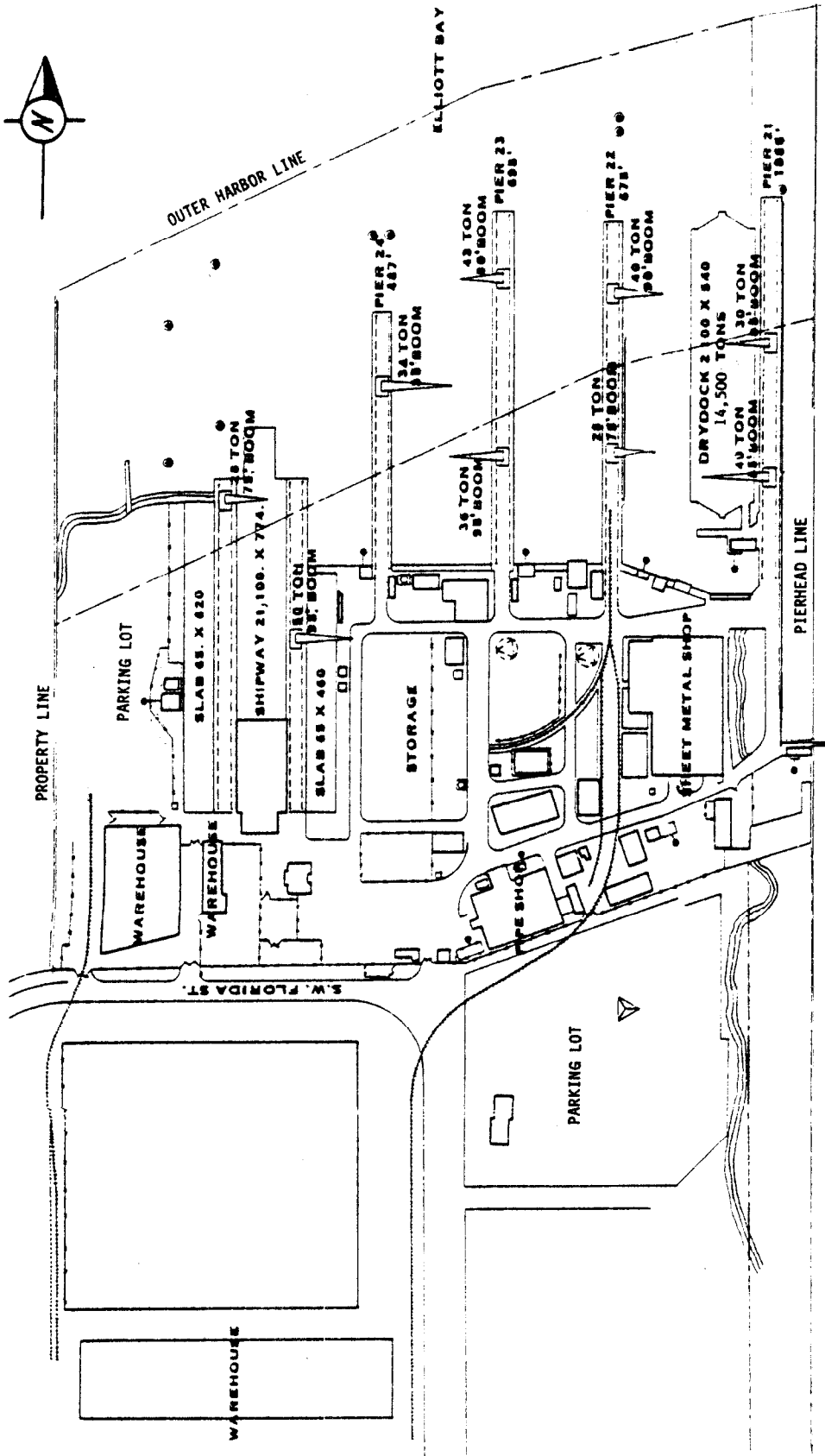
**LEVINGSTON SHIPBUILDING CO.
ORANGE, TEXAS PLANT**



LOCKHEED SHIPBUILDING COMPANY

PLANT ONE

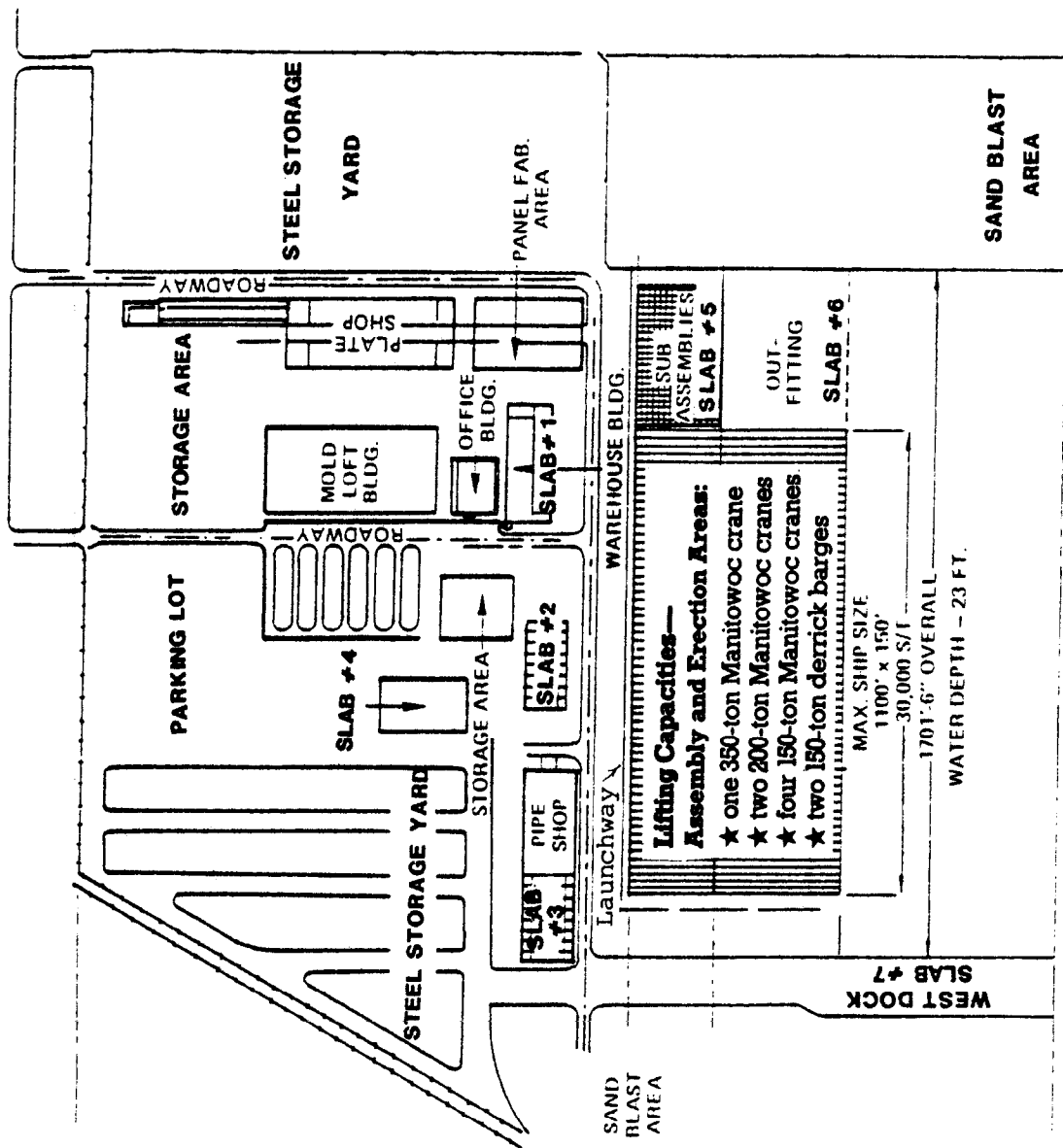
2929 16th AVE S.W., SEATTLE, WASHINGTON



LOCKHEED SHIPBUILDING COMPANY

PLANT TWO

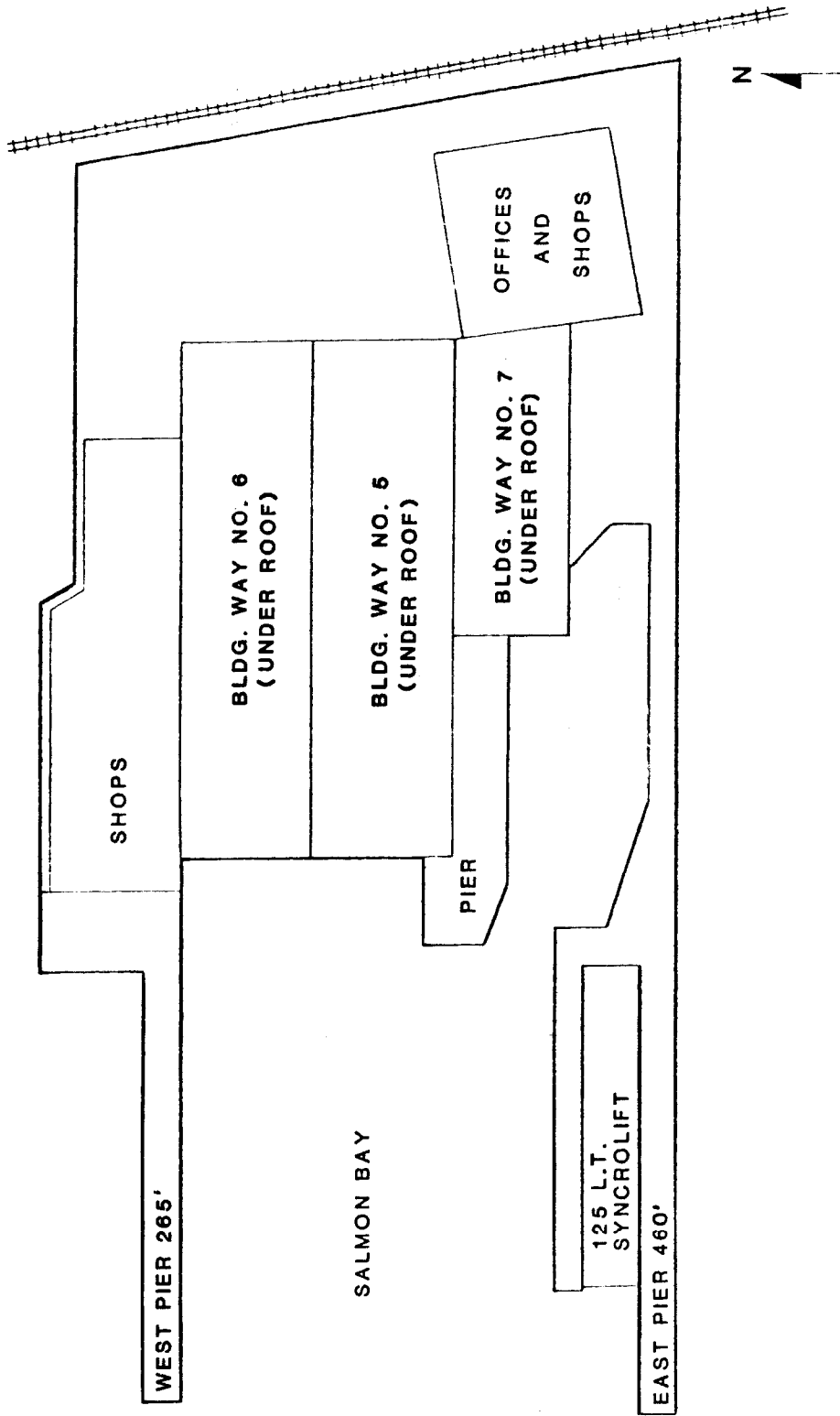
2550 S. W. FLORIDA, SEATTLE, WASHINGTON



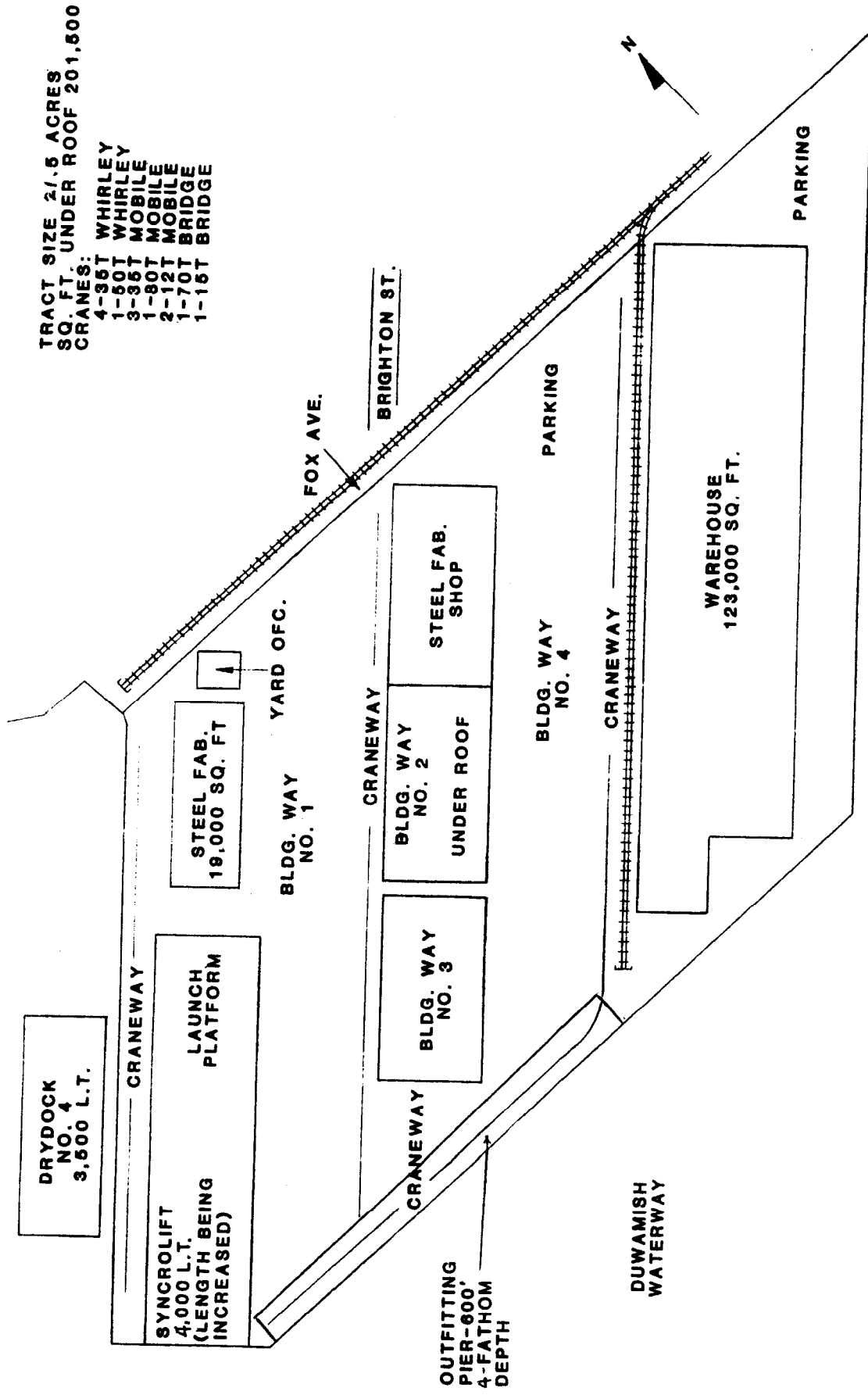
**MARATHON LeTOURNEAU CO.
GULF MARINE DIVISION**

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

CRANES
2-20T BRIDGE
2-35T MOBILE

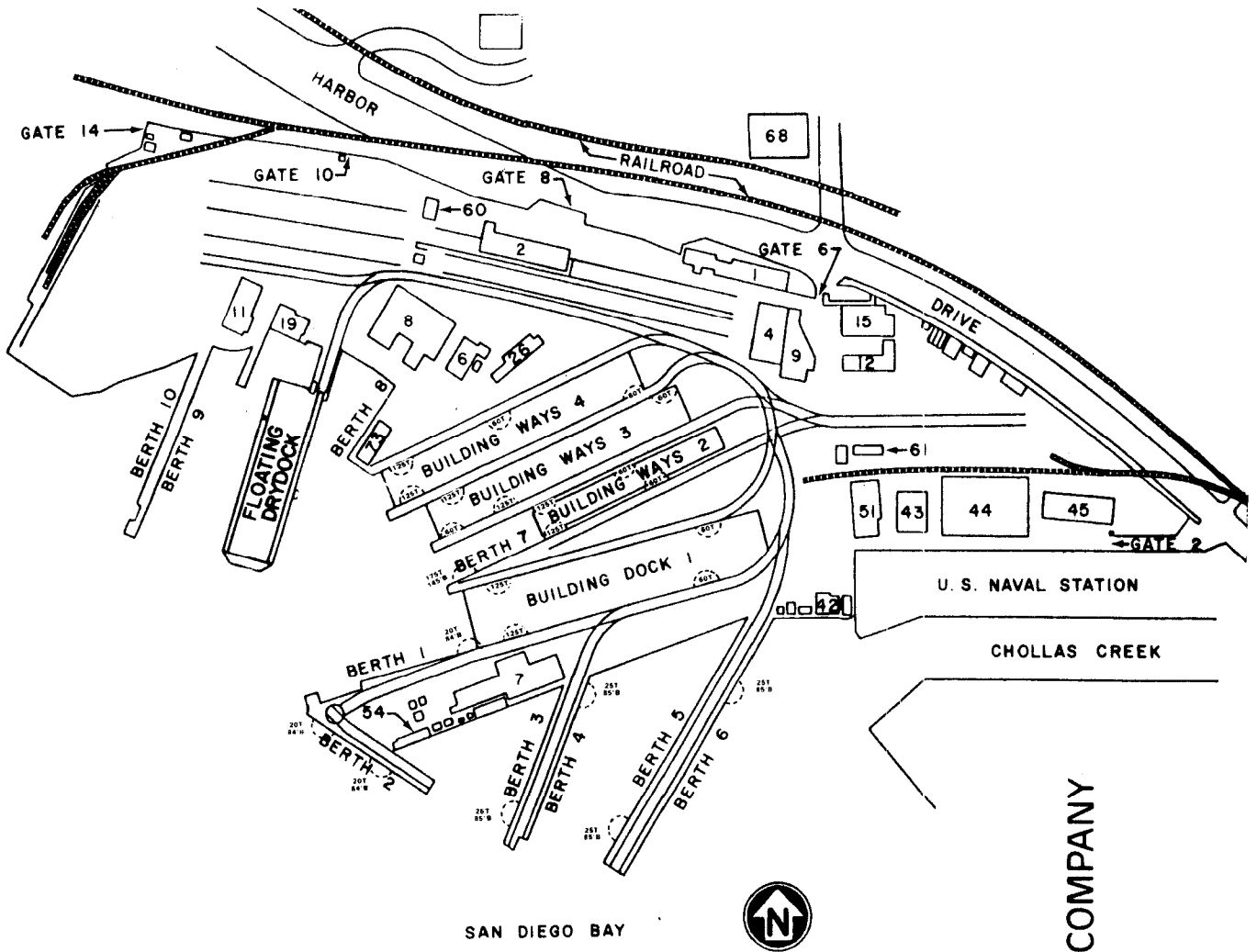


MARINE POWER & EQUIPMENT CO.
YARD 2



TRACT SIZE 21.5 ACRES
 SQ. FT. UNDER ROOF 201,500
 CRANES:
 4-36T WHIRLEY
 1-50T WHIRLEY
 3-35T MOBILE
 1-80T MOBILE
 2-12T MOBILE
 1-70T BRIDGE
 1-16T BRIDGE

MARINE POWER & EQUIPMENT CO.
 YARD 4



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 PLANNER 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
1000' X 176' | BUILDING WAYS 4
905' X 115' |
| BUILDING WAYS 2
675' X 96' | FLOATING DRYDOCK
585' X 170' |
| BUILDING WAYS 3
906' X 115' | (140' CLEAR BETWEEN WINGWALLS)
(OPERATIONAL 12' 83') |

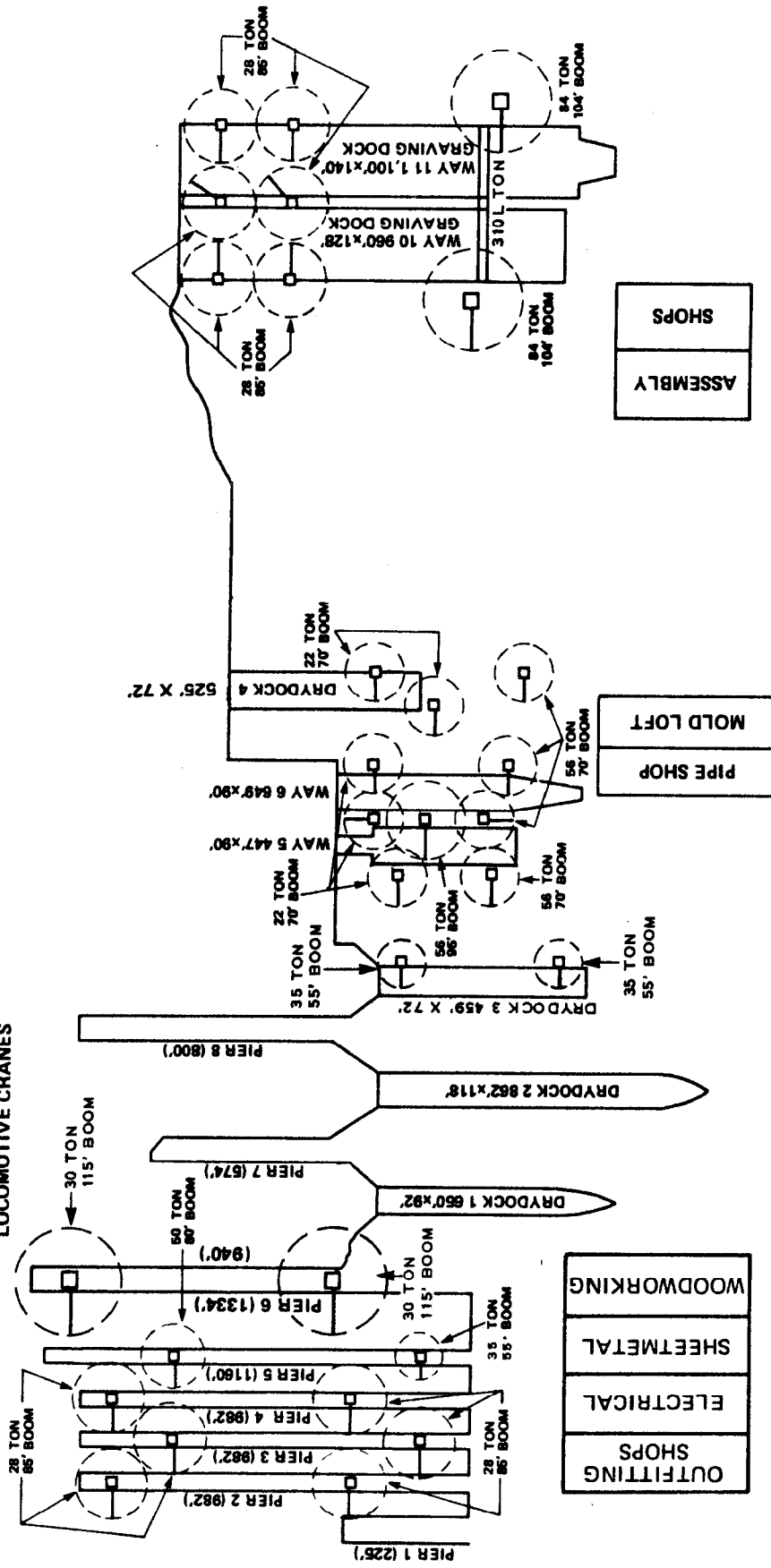
BERTHS

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

NATIONAL STEEL AND SHIPBUILDING COMPANY

JAMES RIVER

PIERS 7, 8 AND DRYDOCKS ARE SERVED BY LOCOMOTIVE CRANES



Newport News Shipbuilding
South Yard

ASSEMBLY
SHOPS

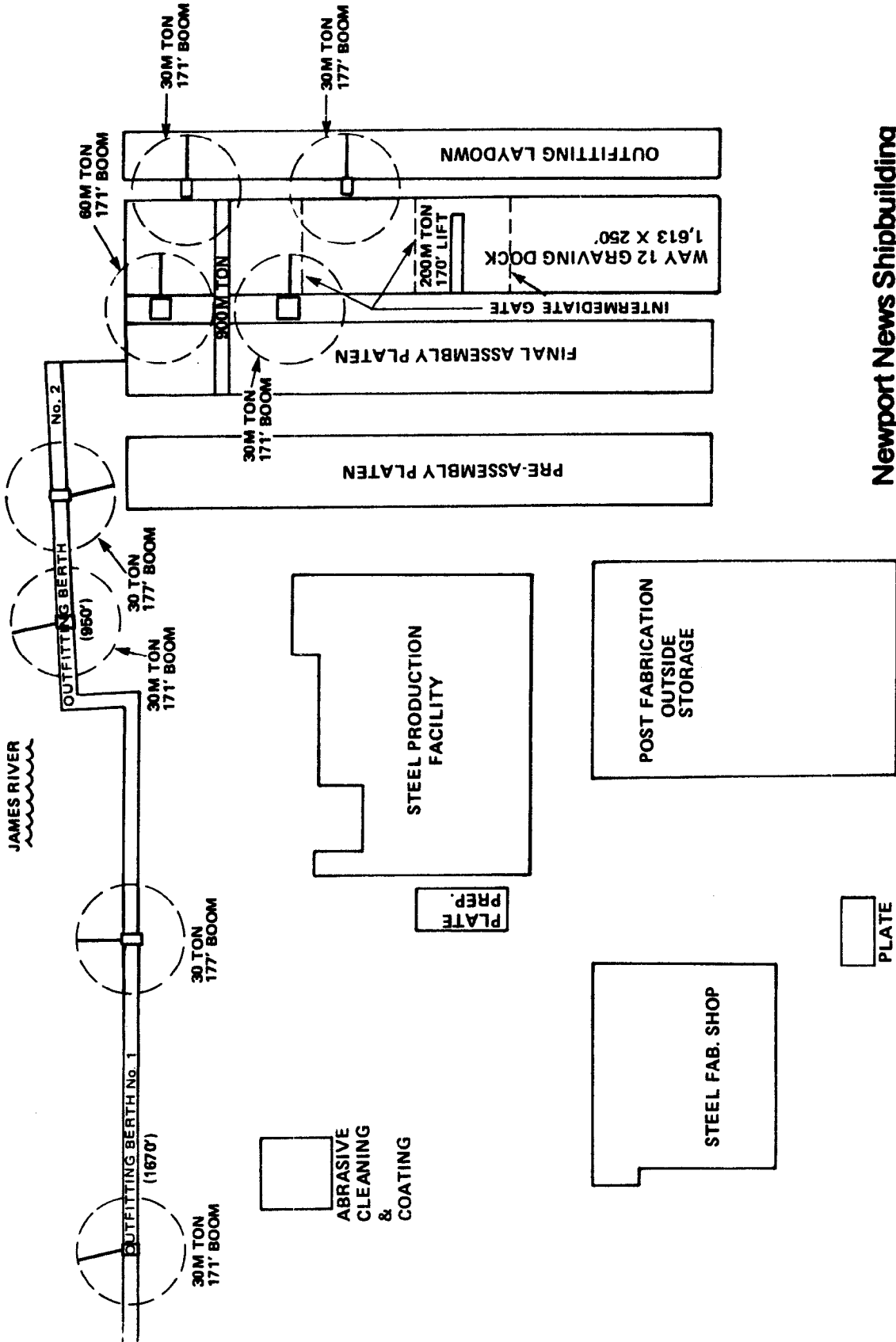
PIPE SHOP
MOLD LOFT

PATTERN-MAKERS
FOUNDRY

WOODWORKING
SHEETMETAL
ELECTRICAL
SHOPS
OUTFITTING

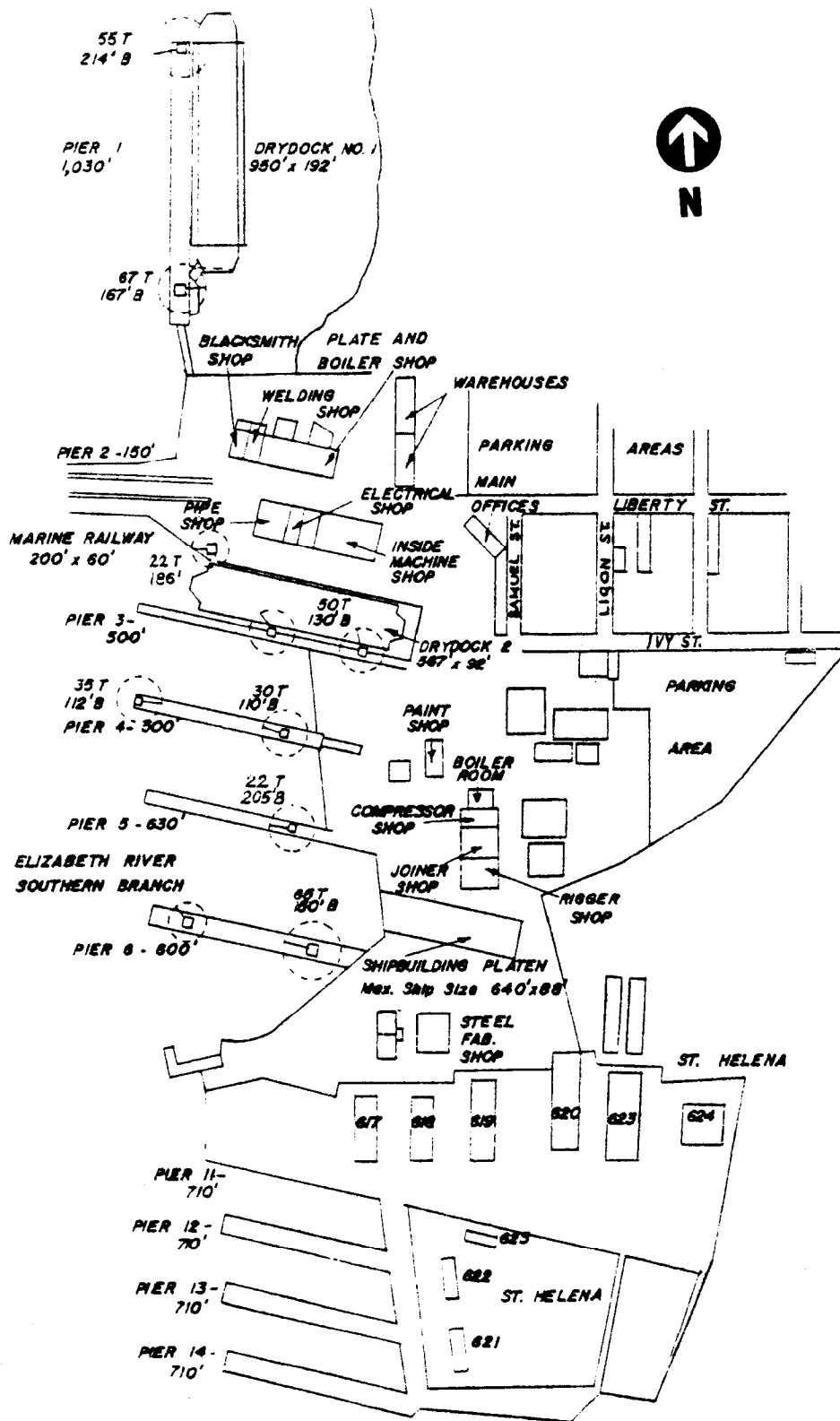
MACHINE SHOPS

CONSOLIDATED WAREHOUSE



Newport News Shipbuilding

NORTH YARD

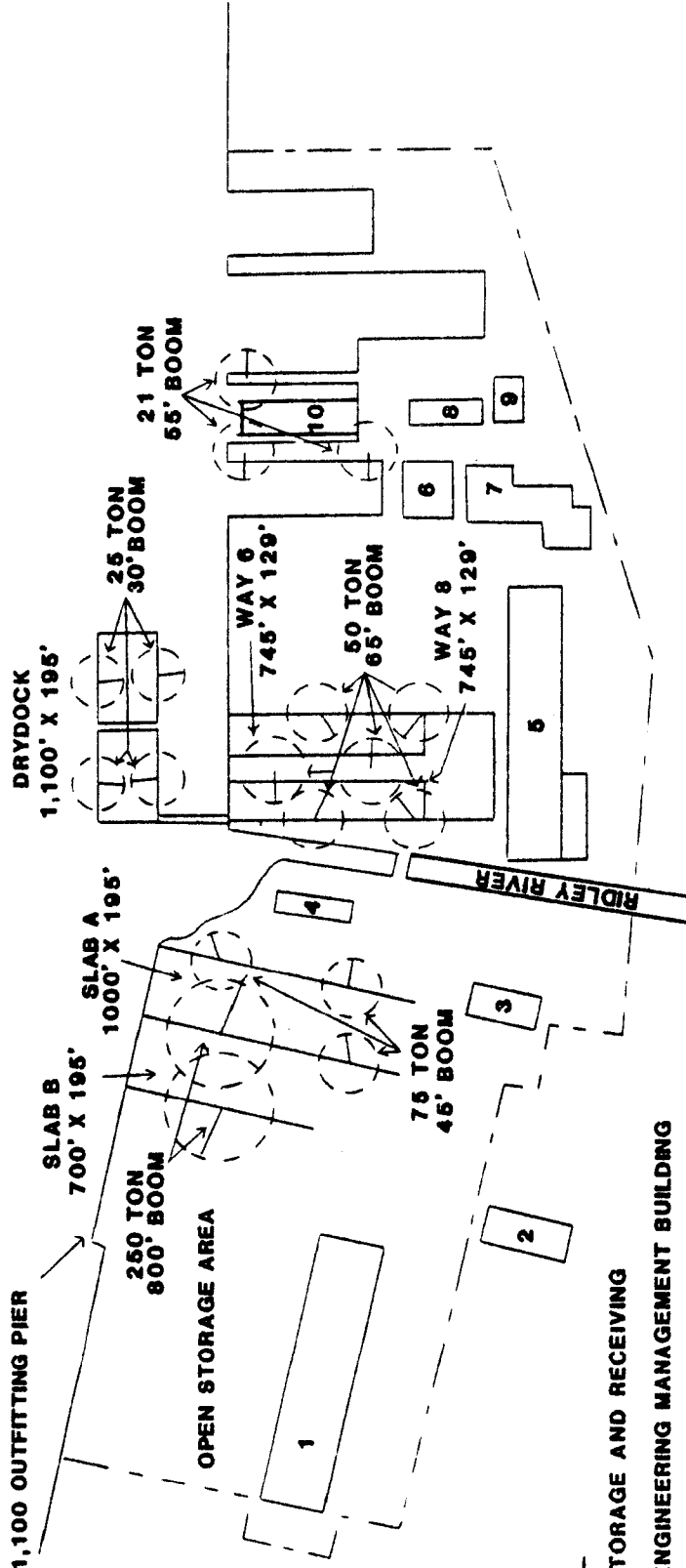


NORFOLK SHIPBUILDING AND
DRYDOCK CORP.
BERKLEY PLANT

CENTRAL YARD

DELAWARE RIVER

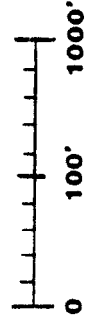
NORTH YARD



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

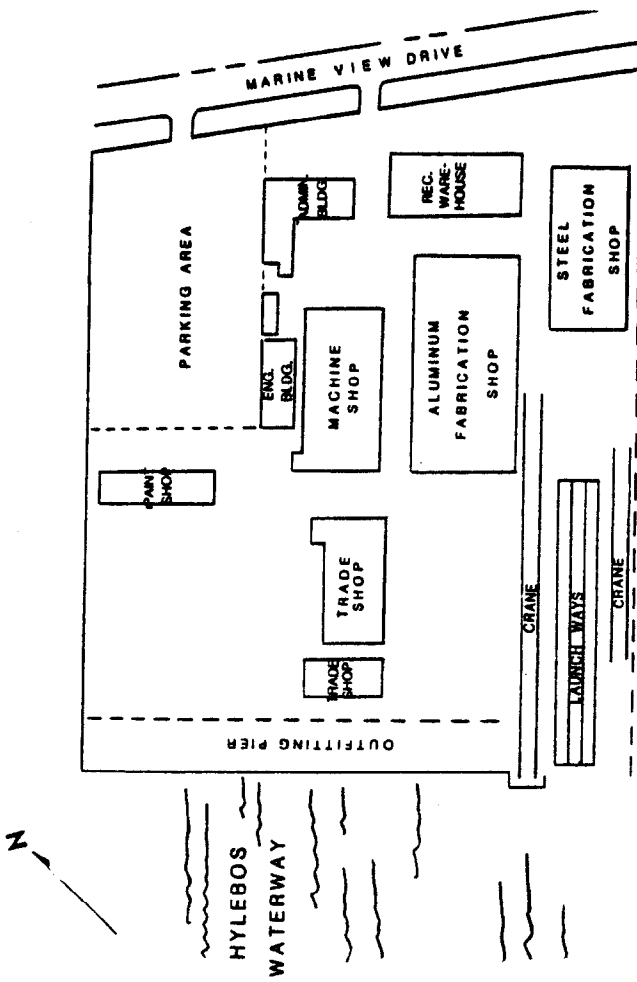
SCALE:



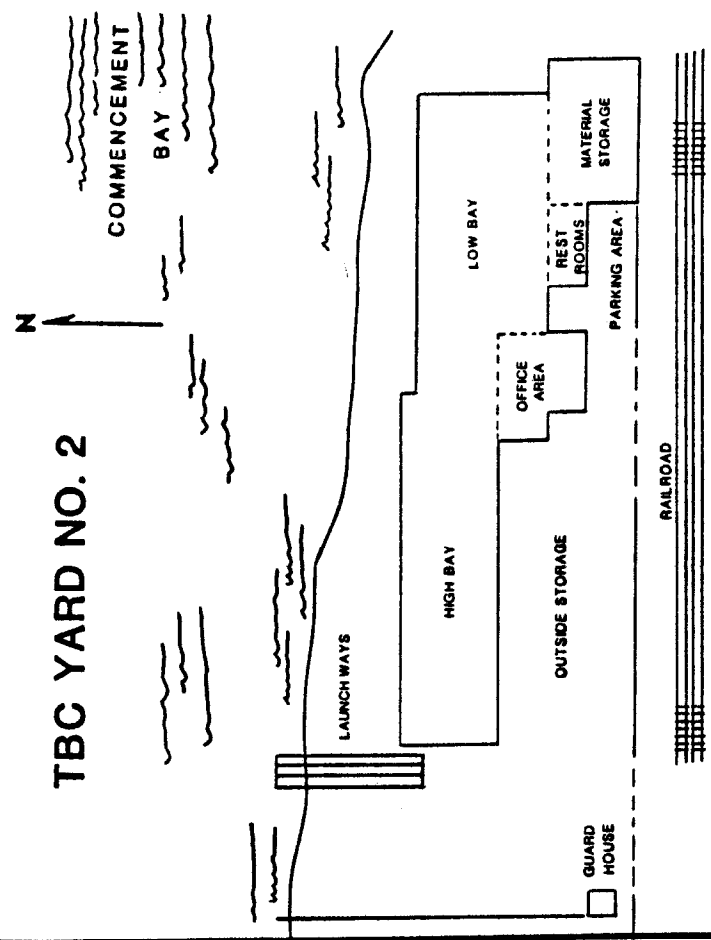
PENNSYLVANIA SHIPBUILDING CO.
 (FORMERLY SUN SHIP INC.)

TACOMA BOATBUILDING COMPANY

TBC YARD NO. 1



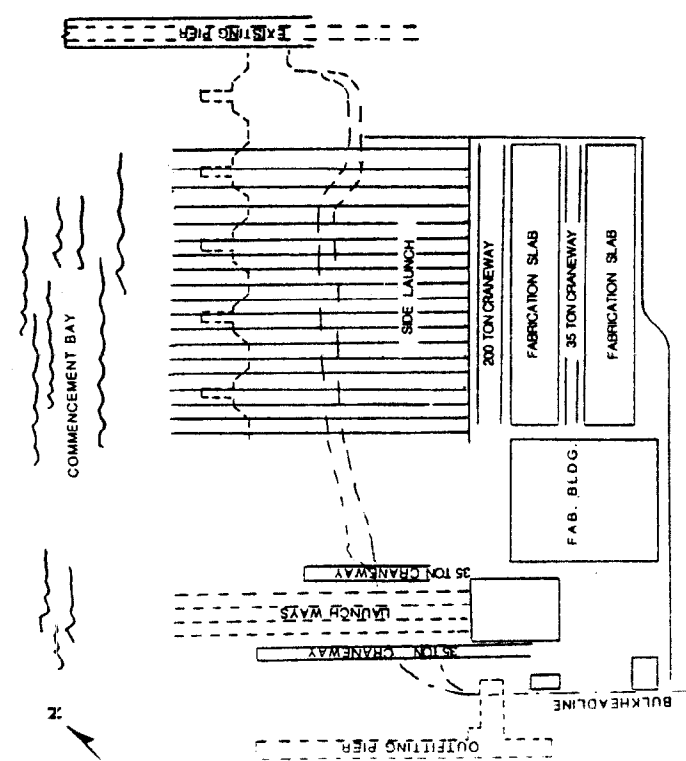
TBC YARD NO. 2



TACOMA BOATBUILDING COMPANY

TBC YARD NO. 3

78



TBC YARD NO. 4

Pier 25 1,100 feet

HYLESBOB WATERWAY

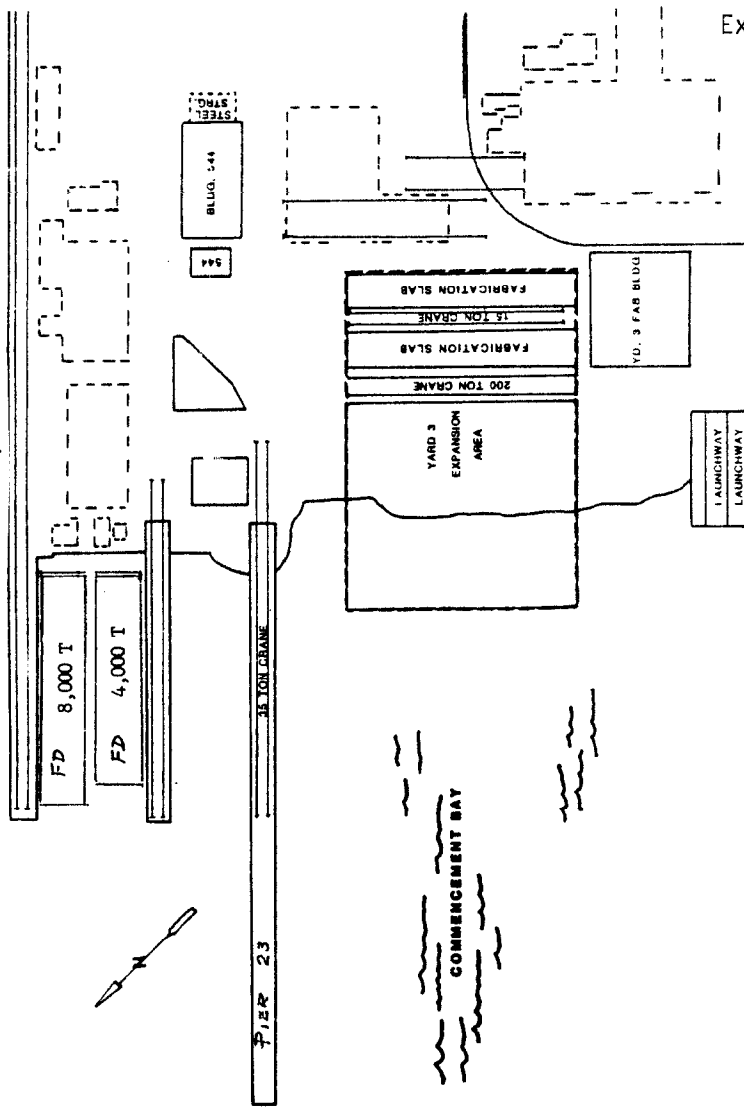
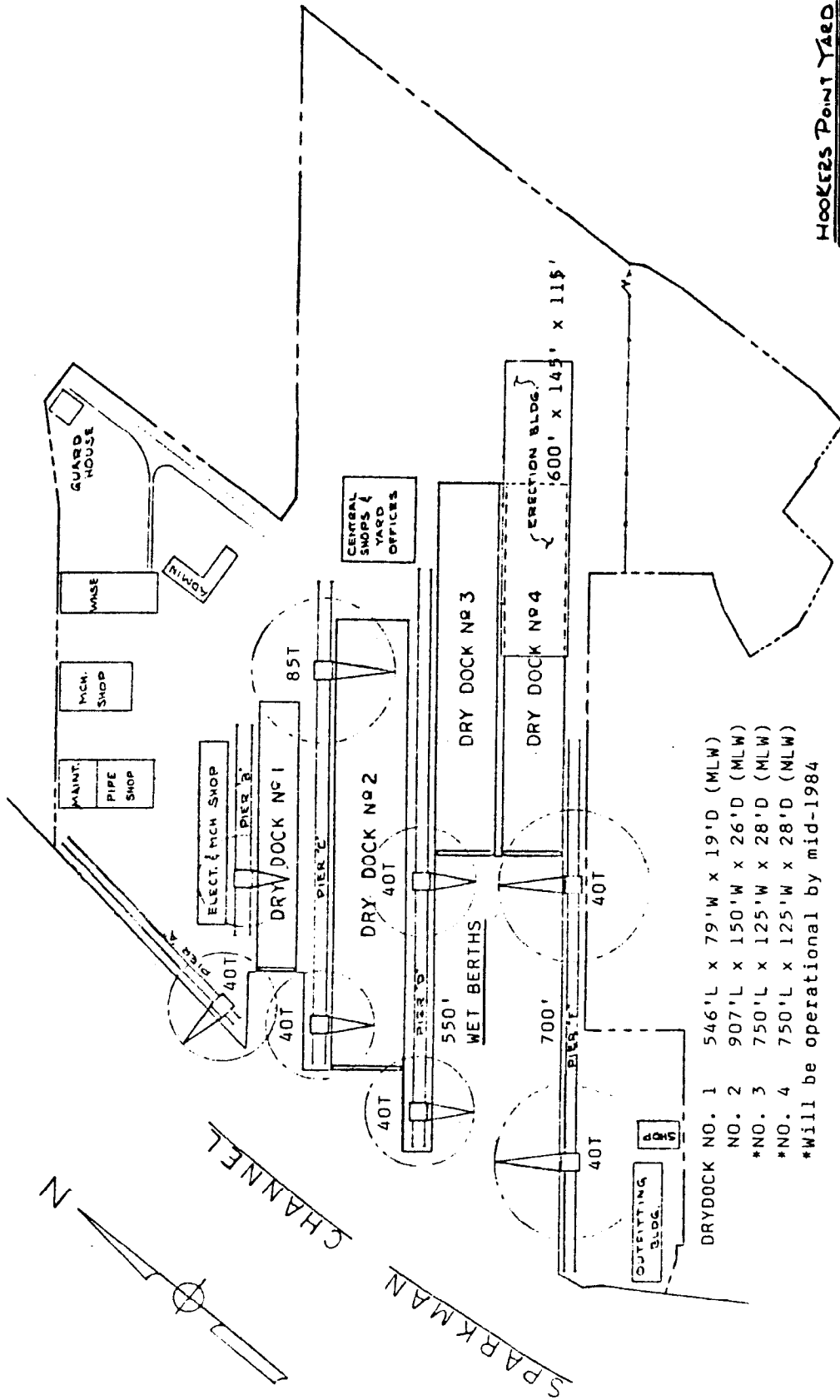



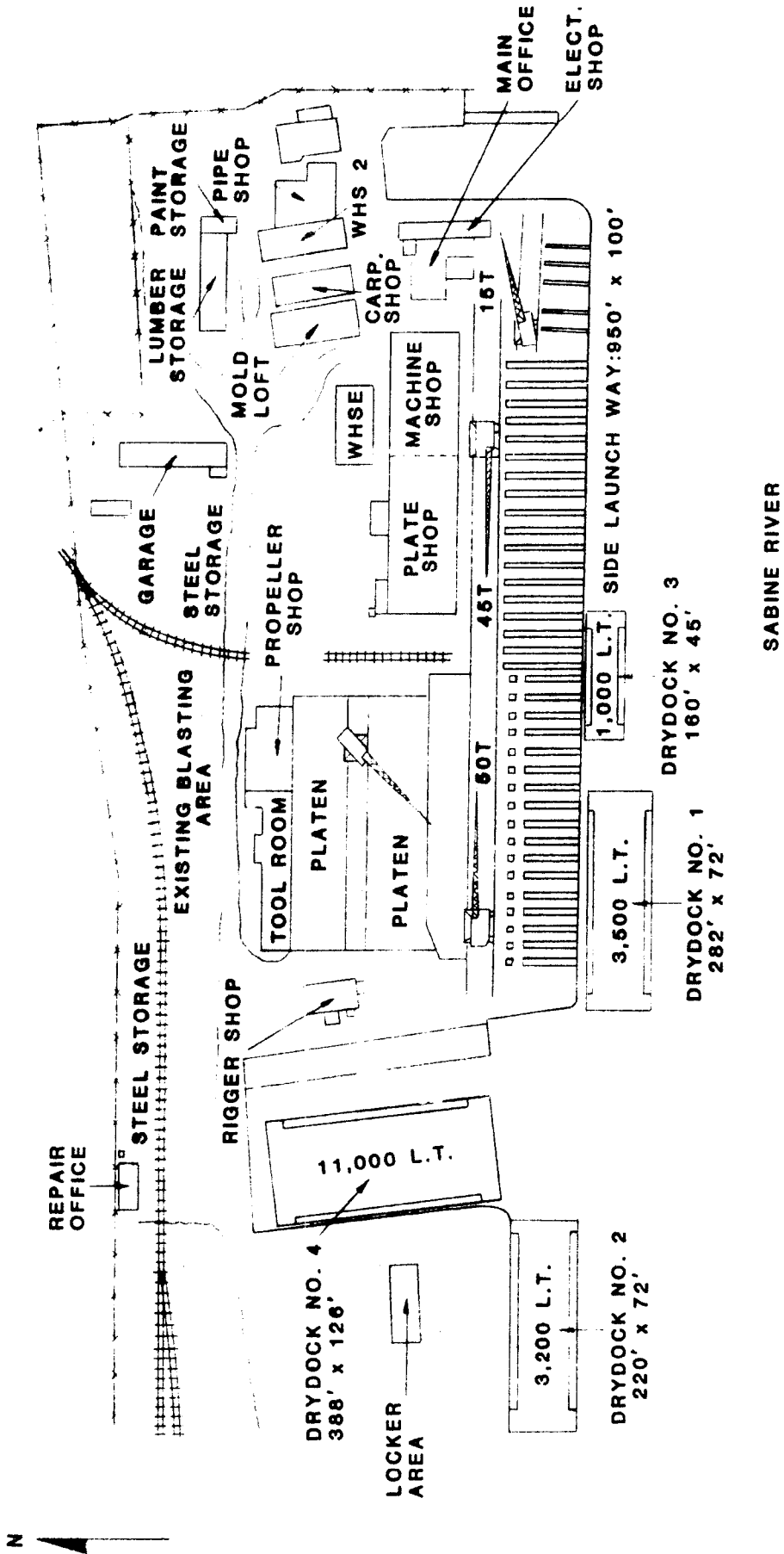
Exhibit 28



- DRYDOCK NO. 1 546'L x 79'W x 19'D (MLW)
 - NO. 2 907'L x 150'W x 26'D (MLW)
 - *NO. 3 750'L x 125'W x 28'D (MLW)
 - *NO. 4 750'L x 125'W x 28'D (MLW)
- *Will be operational by mid-1984

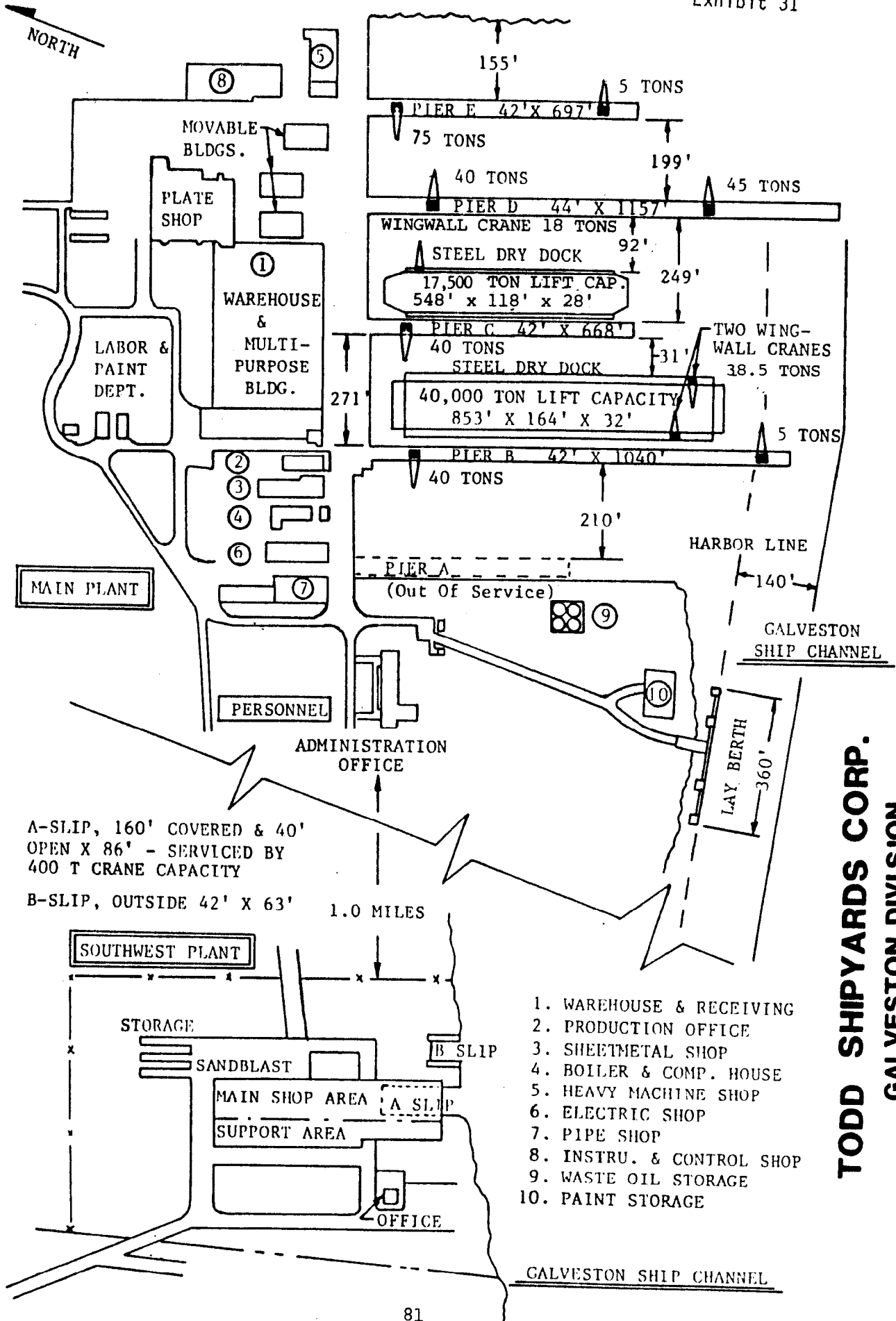
Hookers Point Yard


TAMPA SHIPYARDS INCORPORATED



TEXAS GULFPORT SHIPBUILDING CO.
 (FORMERLY GULFPORT SHIPBUILDING)

SABINE RIVER



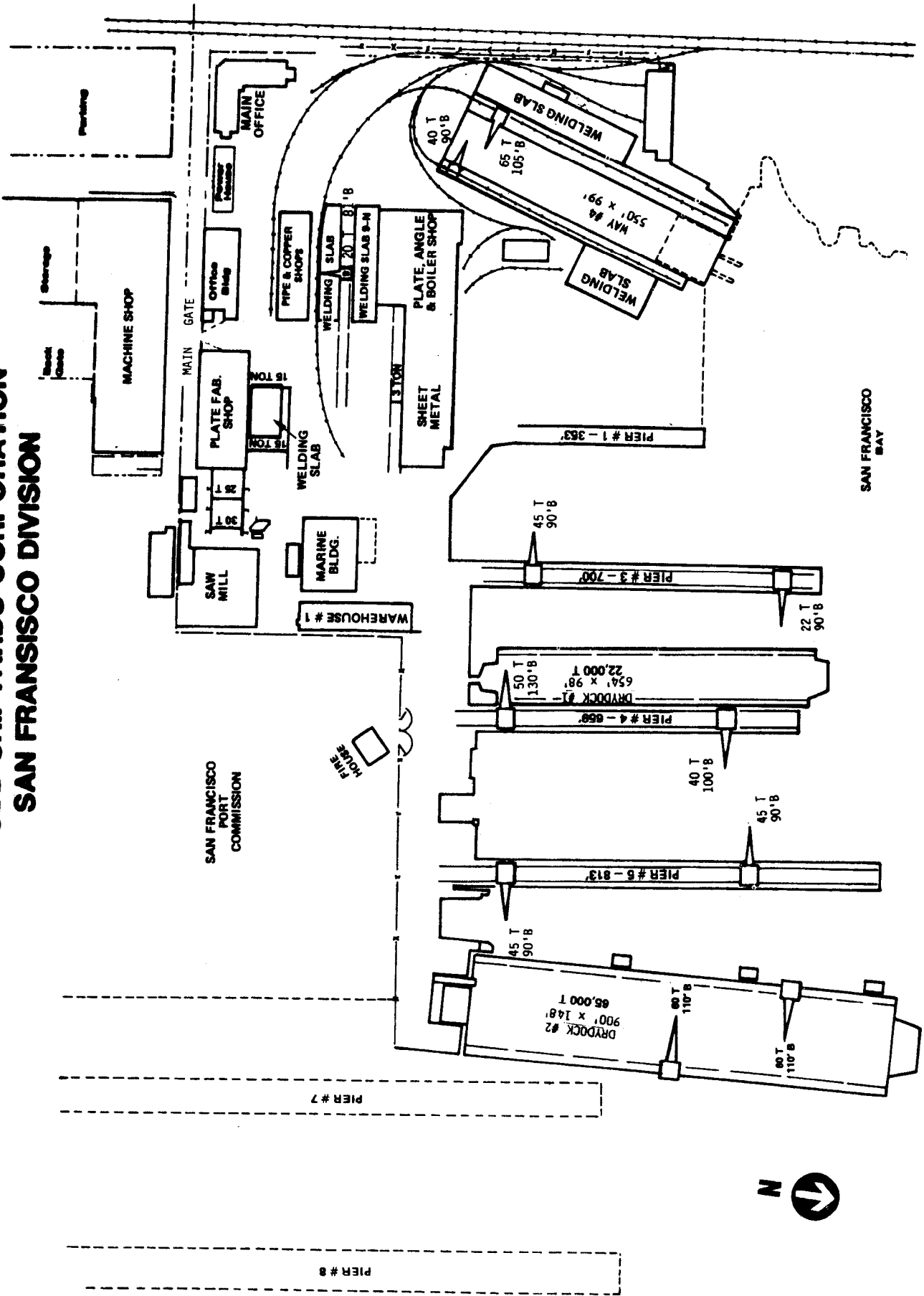
A-SLIP, 160' COVERED & 40' OPEN X 86' - SERVICED BY 400 T CRANE CAPACITY

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

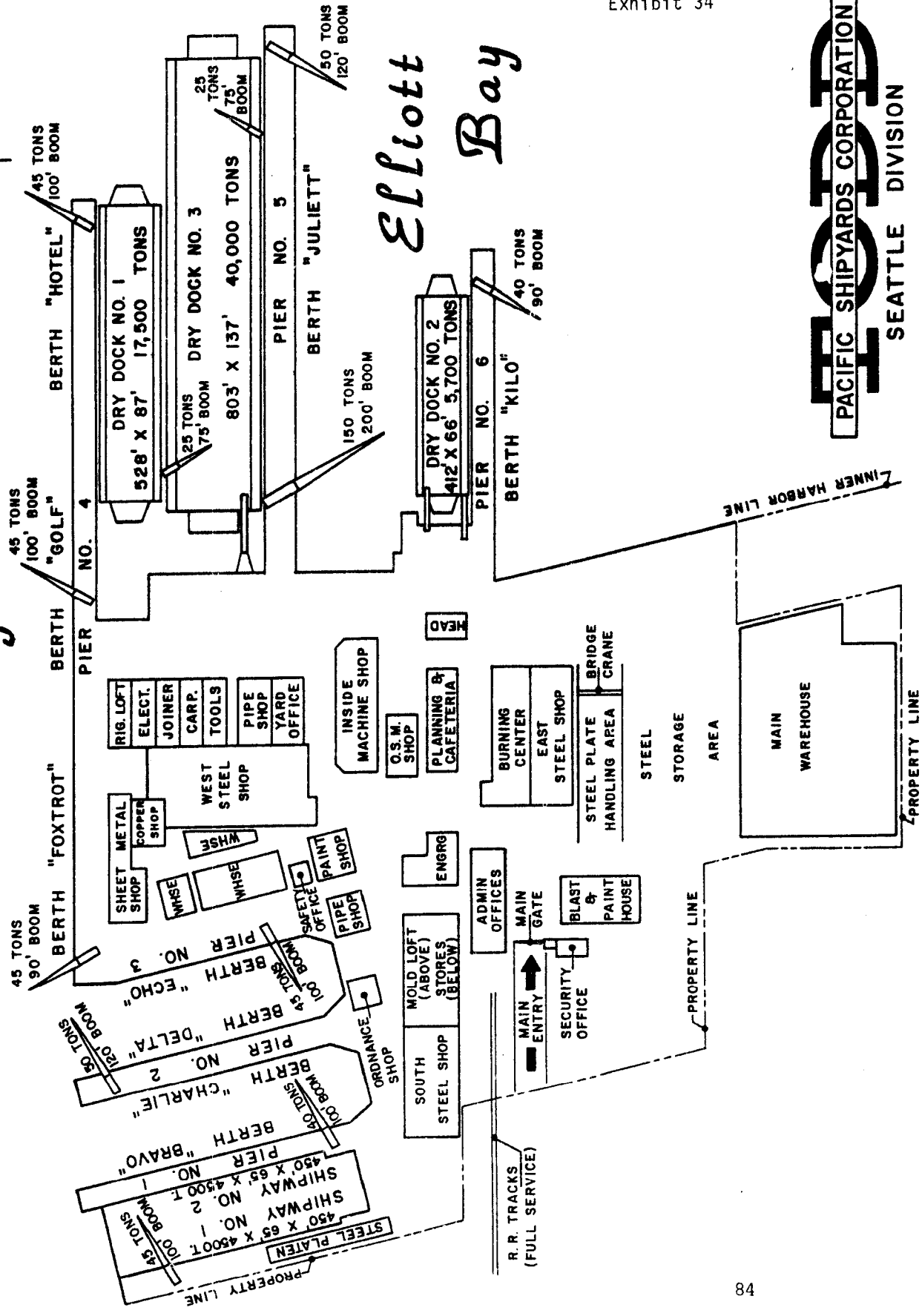
TODD SHIPYARDS CORPORATION SAN FRANCISCO DIVISION



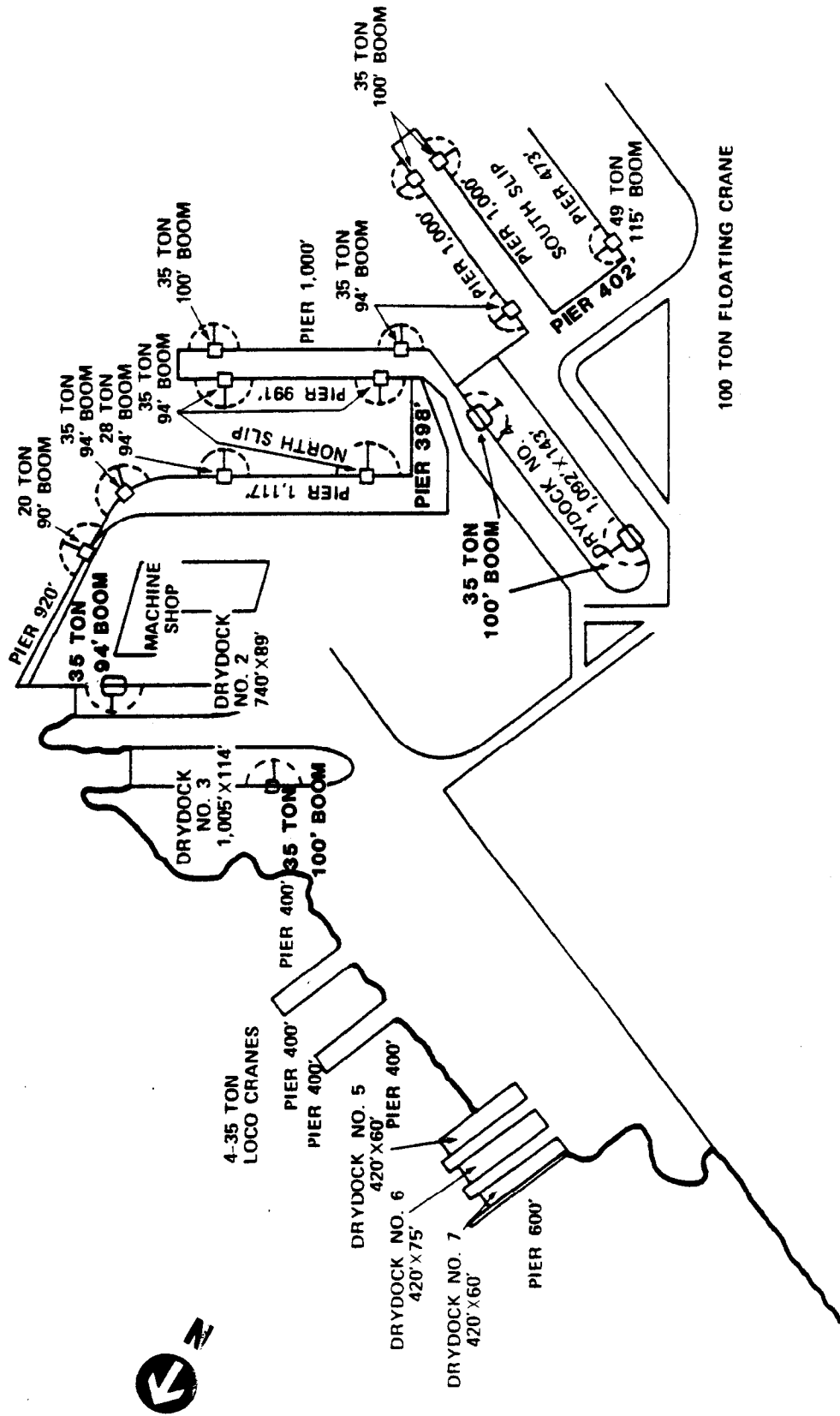


West Water Way

Elliott Bay



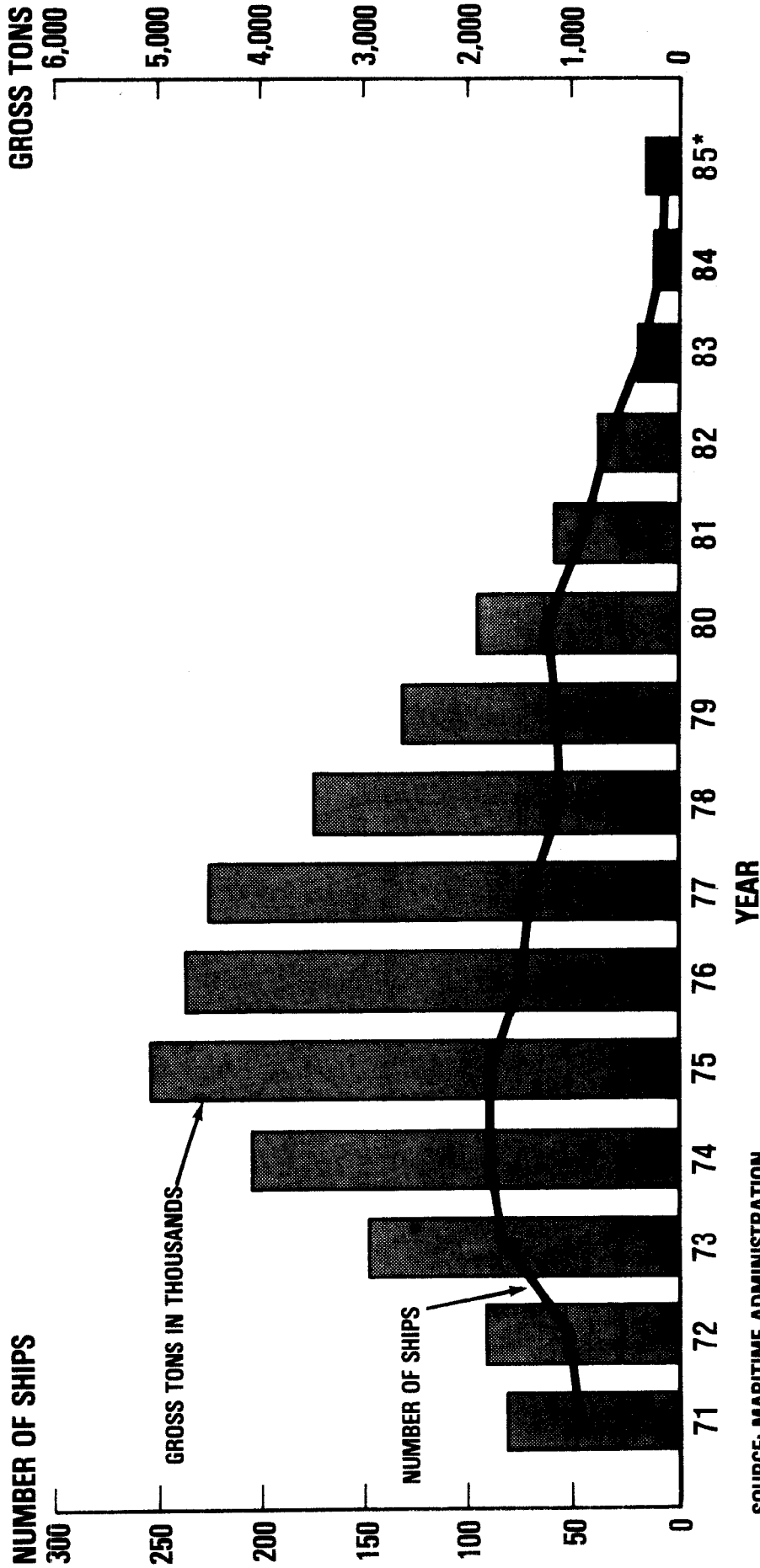
HIGH PORTAL GANTRY CRANES HAVE A TRACK AND SWITCHING NETWORK THAT SERVICES ALL LARGE DRYDOCKS AND DEEP - WATER BERTHS.



TRIPLE A MACHINE SHOP, INC.
HUNTERS POINT

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

SHIPS OF 1,000 GROSS TONS AND LARGER

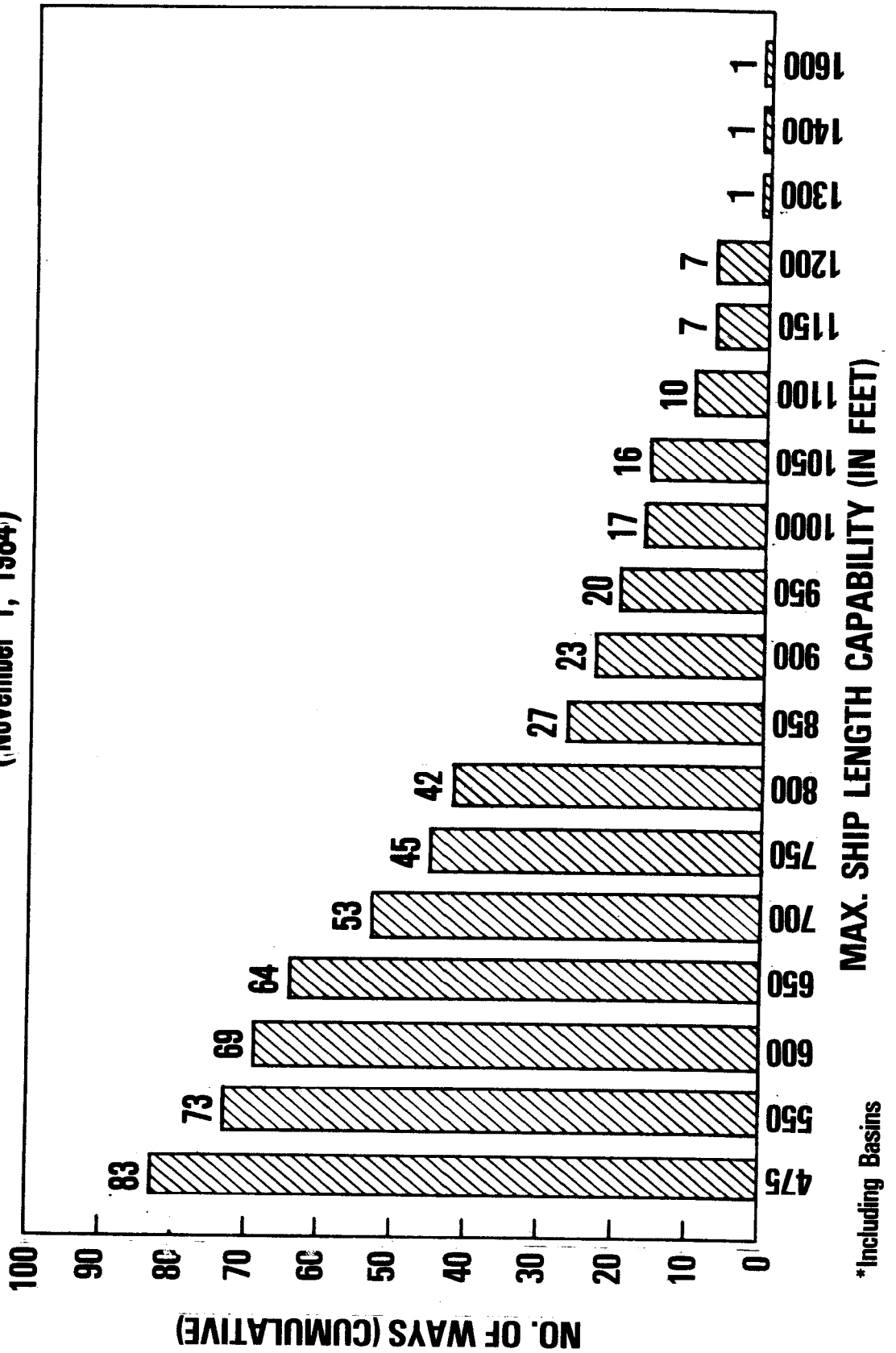


SOURCE: MARITIME ADMINISTRATION

*FORECAST

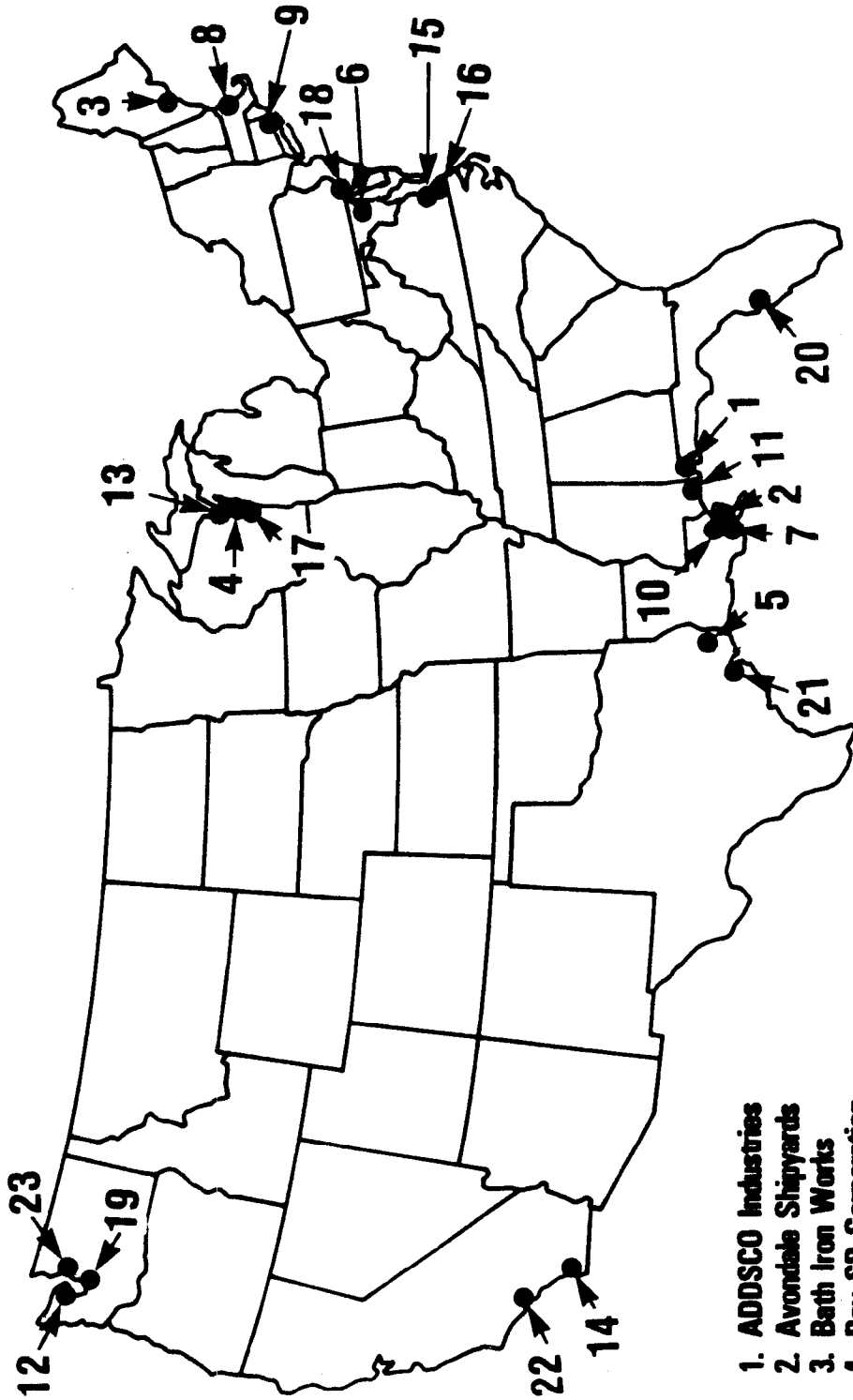
MAJOR U.S. PRIVATE SHIPYARDS

***NUMBER OF SHIPWAYS BY MAXIMUM LENGTH CAPABILITY
(November 1, 1984)**



*Including Basins

ACTIVE U.S. SHIPBUILDING BASE



- 1. ADDSCO Industries
- 2. Avondale Shipyards
- 3. Bath Iron Works
- 4. Bay SB Corporation
- 5. Beth-Besumont
- 6. Beth-Sparrows Point
- 7. Equitable Shipyards
- 8. Gen. Dyn.-Quincy
- 9. Gen. Dyn.-Elec. Boat
- 10. Halter Marine
- 11. Litton/Ingalls

- 12. Lockheed SB
- 13. Marinette
- 14. NASSCO
- 15. Newport News
- 16. Norfolk SB & DD
- 17. Peterson
- 18. Penn Ship

- 19. Tacoma Boat
- 20. Tampa Ship
- 21. Todd-Galveston
- 22. Todd-Los Angeles
- 23. Todd-Seattle

October 1, 1984

U.S. DEPARTMENT OF TRANSPORTATION

SHIPYARD STATUS: NEED FOR NEW BUSINESS
MARITIME ADMINISTRATION

Exhibit 39

TIME NOW



ACTIVE SHIPBUILDING BASE	1983	1984	1985	1986
ADDSCO INDUSTRIES - MOBILE, AL	██████████	██████████	* ██████████	
AVONDALE SHIPYARDS - N.O. LA	██████████	██████████	██████████	
BATH IRON WORKS - BATH, ME	██████████	██████████		
BAY SHIP - STURGEON BAY, WI	██████████	██████████		
BETH STEEL - BEAUMONT, TX	██████████	██████████		
BETH STEEL - SPARROWS PT., MD	██████████	██████████		
EQUITABLE SHIPYARDS, INC., N.O.	██████████	██████████		
GEN DYN E.B. - GROTON, CT	██████████	██████████	██████████	██████████
GEN DYN - QUINCY, MA	██████████	██████████		
HALTER MARINE - CHICKASAW, AL	██████████	██████████		
INGALLS/LITTON - PASCAGOULA, MS	██████████	██████████	██████████	██████████
LOCKHEED SHIP - SEATTLE, WA	██████████	██████████		
MARINETTE - MARINE MARINETTE, WI	██████████	██████████		
NASSCO - SAN DIEGO, CA	██████████	██████████	██████████	
NEWPORT NEWS SB & DO - VA	██████████	██████████	██████████	██████████
NORFOLK SB & DO - VA	██████████	██████████	* ██████████	
PETERSON BLDRS - STURGEON BAY, WI	██████████	██████████	* ██████████	
PENN SHIP - CHESTER, PA (EX-SUN)	██████████	██████████	* ██████████	
TACOMA BOAT - WA	██████████	██████████	* ██████████	
TAMPA SHIP - FL	██████████	██████████	* ██████████	
TODD SHIPYARDS - GALVESTON, TX	██████████	██████████	* ██████████	
TODD SHIPYARDS - SAN PEDRO, CA	██████████	██████████	* ██████████	
TODD SHIPYARDS - SEATTLE, WA.	██████████	██████████		

* Shipyards normally engaged in repair work.

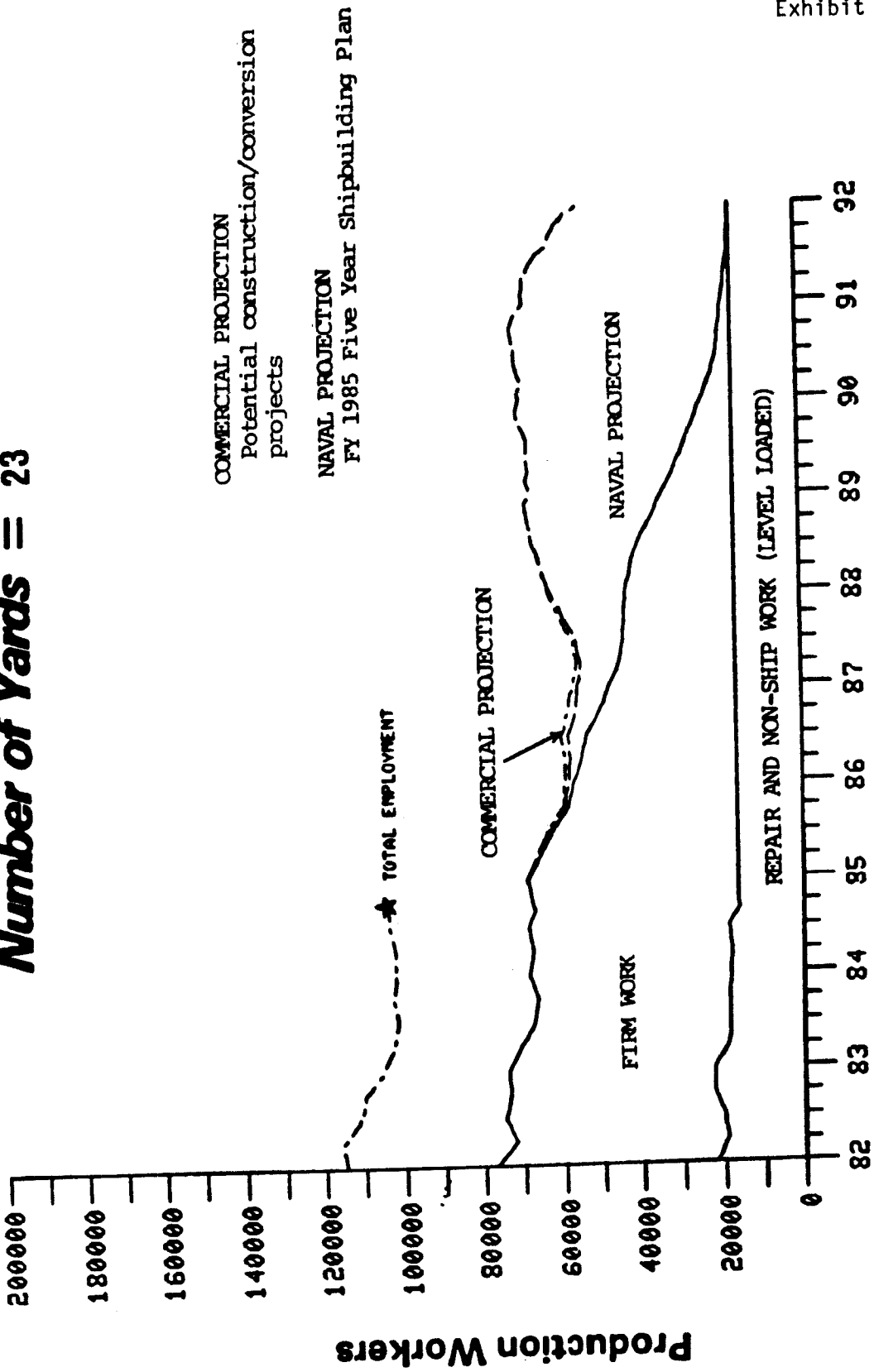
NOTE: END OF BAR EXCEPT FOR YARDS MARKED WITH AN ASTERISK INDICATES WHEN YARD NEEDS NEW CONTRACTS IN ORDER TO MAINTAIN ADEQUATE BACKLOG FOR AVAILABLE FACILITIES AND WORKFORCE. ASSUME 8-MONTH ADMINISTRATIVE AND PRE-FAB TIME (LEAD TIME BEFORE START OF FABRICATION).

September 30, 1984

Shipbuilding Industry Workload Projection

Active Shipbuilding Base Summation

Number of Yards = 23



DECEMBER 31, 1984

SOURCE: SHIPYARD DATA FROM FORM NA-832 WHEN PROVIDED
OFFICE OF SHIPBUILDING COSTS AND PRODUCTION, 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	Mob. Cargo 724 x 106	Container 610 x 90	RO/RO 684 x 102	LASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 x 106		
<u>EAST COAST</u>														
	Bath Iron Works	A	650 x 88	1	0	1	0	0	0	0	0	1	0	0
		B	720 x 130	1	0	1	1	0	0	0	0	1	1	0
		C	720 x 130	1	0	1	1	0	0	0	0	1	1	0
				(3)	(0)	(3)	(2)	(0)	(0)	(0)	(3)	(2)	(0)	
	Bethlehem Steel, Sparrows Point	7	800 x 106	1	1	1	1	0	0	0	1	1	0	0
		10	800 x 95	1	0	1	0	0	0	0	1	0	0	0
		GD	1200 x 192	4	1	3	2	1	1	1	4	3	1	1
				(6)	(2)	(5)	(3)	(1)	(1)	(1)	(6)	(4)	(1)	
	Coastal Drydock	3	755 x 102	1	0	1	1	0	0	0	1	0	0	0
		4	717 x 110	1	0	1	1	0	0	0	1	1	0	0
		5	1082 x 141	3	1	2	1	1	1	1	2	2	1	1
		6	1082 x 141	3	1	2	1	1	1	1	2	2	1	1
				(8)	(2)	(6)	(4)	(2)	(2)	(2)	(6)	(5)	(2)	
	General Dynamics, Quincy	6	860 x 123	2	1	1	1	0	0	0	1	1	0	0
		7	936 x 143	2	1	1	1	1	0	0	1	1	1	1
		8	860 x 123	2	1	1	1	0	0	0	1	1	0	0
		11	860 x 144	2	1	1	1	0	0	0	1	1	0	0
		12	860 x 144	2	1	1	1	0	0	0	1	1	0	0
				(10)	(5)	(5)	(5)	(1)	(0)	(0)	(5)	(5)	(1)	
	Newport News SB	5	649 x 93	1	0	1	0	0	0	0	1	0	0	0
		6	715 x 93	1	0	1	0	0	0	0	1	0	0	0

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

REGION	SHIPYARD	SHIPWAY OR BASIN	MAXIMUM SHIP SIZE	General Cargo							Dry Bulk		
				Gen. Cargo 475 x 68	Mod. Cargo 724 x 106	Container 610 x 90	R0/R0 684 x 102	LASH 893 x 100	Container 947 x 106	21,300 570 x 75	51,000 600 x 105	100,000 900 x 106	
Newport News SB (cont'd)		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 (15)	4 (6)	5 (11)	4 (6)	1 (3)	1 (3)	1 (3)	6 (12)	4 (7)	1 (3)
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	825 x 136 825 x 136 1000 x 195 700 x 195	1 1 4 2 (8)	1 1 1 1 (4)	1 1 2 2 (6)	1 1 1 1 (4)	0 0 1 0 (1)	0 0 1 0 (1)	0 0 1 1 (4)	1 1 2 2 (6)	1 1 1 1 (4)	0 0 1 1 (1)
<u>TOTAL EAST COAST</u>				51	19	36	24	8	7	38	27	8	
<u>GULF COAST</u>	ADDSCO Industries	1	523 x 90	1	0	0	0	0	0	0	0	0	0
		2	523 x 90	1	0	0	0	0	0	0	0	0	0
		3	523 x 90	1	0	0	0	0	0	0	0	0	0
		4	523 x 90	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)	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	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		
Avondale		2	1200 x 126	6	5	5	5	5	5	5	6	6	6	
		3	1020 x 174	6 (12)	3 (8)	3 (8)	3 (8)	3 (8)	3 (8)	3 (8)	3 (9)	3 (9)	3 (9)	
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)	
Halter Marine		-	550 x 75	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	
Livingston (Orange, TX)		1	700 x 100	1 (1)	0 (0)	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	
Litton/Ingalls		1	690 x 85	1	0	0	0	0	0	0	0	1	0	0
		2	550 x 80	1	0	0	0	0	0	0	0	0	0	0
		7	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		8	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		9	650 x 90	1	0	1	0	0	0	0	0	1	0	0
		10	650 x 90	1	0	1	0	0	0	0	0	1	0	0
WB	800 x 173	6 (12)	6 (6)	6 (10)	6 (6)	6 (6)	6 (6)	6 (6)	6 (6)	6 (11)	6 (6)	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)	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

REGION	SHIPYARD	SHIPWAY OR BASIN	MAXIMUM SHIP SIZE	General Cargo							Dry Bulk			
				Gen. Cargo 475 x 68	Mob. Cargo 724 x 106	Container 610 x 90	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		
Tampa Shipyards		3	500 x 105	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Texas Gulfport SB		1	550 x 80	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
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)	0 (0)
TOTAL GULF COAST				<u>39</u>	<u>15</u>	<u>22</u>	<u>15</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>24</u>	<u>16</u>	<u>9</u>	<u>9</u>
<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 SB Co.		1	650 x 88	1	0	0	0	0	0	0	0	1	0	0
		3	650 x 88	1	0	1	0	0	0	0	0	1	0	0
		21	690 x 90	1	0	1	0	0	0	0	1	1	0	0
				(3)	(0)	(1)	(0)	(0)	(0)	(0)	(3)	(0)	(0)	(0)
Marine Power & Equipment Co.		-	600 x 86	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	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 680	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	
National Steel & SB	1		980 x 170	4	1	1	1	1	1	1	2	1	1
	2		690 x 90	1	0	1	0	0	0	0	1	0	0
	3		900 x 106	1	1	1	1	1	1	1	1	1	1
	4		900 x 106	1	1	1	1	1	1	1	1	1	1
				(7)	(3)	(4)	(3)	(3)	(1)	(5)	(3)	(3)	
Tacoma Boat	1		650 x 400	1	0	1	0	0	0	1	1	1	0
				(1)	(0)	(1)	(0)	(0)	(0)	(1)	(1)	(1)	(0)
Todd-LA	1		800 x 87	1	0	0	0	0	0	1	1	0	0
	2		800 x 87	1	0	0	0	0	0	1	1	0	0
	Syncro.		750 x 105	1	0	1	1	0	0	1	1	1	0
	Syncro.		750 x 105	1	0	1	1	0	0	1	1	1	0
				(4)	(0)	(2)	(2)	(0)	(0)	(4)	(2)	(0)	
Todd-SF	-		550 x 96	1	0	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Todd-Seattle	1A		600 x 96	1	0	0	0	0	0	1	1	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(1)	(1)	(0)	(0)
Triple A Hunters Point	2		715 x 82	1	0	0	0	0	0	1	1	0	0
	3		996 x 107	2	1	1	1	1	1	1	1	1	1
	4		1088 x 136	4	1	1	1	1	1	2	1	1	1
				(7)	(2)	(2)	(2)	(2)	(2)	(4)	(2)	(2)	(2)
TOTAL WEST COAST				26	6	11	8	5	3	20	9	5	

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

REGION	SHIPYARD	SHIPWAY OR BASIN	MAXIMUM SHIP SIZE	General Cargo							Dry Bulk		
				Gen. Cargo 475 x 600	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	
GREAT LAKES	Bay SB Corp.	GD1	1100 x 136	2	1*	1*	1*	1*	1*	1*	1	1*	1*
		3	730 x 105	1 (3)	1* (2)	1* (2)	1* (2)	1* (2)	0 (1)	0 (1)	1 (2)	1* (2)	1* (1)
	Fraser Shipyards	GD2	825 x 82	1 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)
TOTAL GREAT LAKES				4	2	2	2	2	1	1	3	2	1
TOTAL POSITIONS ALL YARDS				120	42	71	49	23	20	85	54	23	23

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

TABLE 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						
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	1	1	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	
		10	800 x 95	1	1	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
				(5)	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
		Coastal Dry Dock	3	755 x 102	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	4		717 x 110	1	1	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	
	6		1082 x 141	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				(6)	(4)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
General Dynamics, Quincy	6		860 x 123	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
	7	936 x 143	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	8	860 x 123	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0		
	11	860 x 144	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
		860 x 144	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	12		(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		
		6	715 x 93	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		10	960 x 124	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		11	1100 x 130	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		12	1600 x 246	6	4	2	1	1	1	1	1	1	1	1	1	1	1	1	
				(11)	(7)	(4)	(2)	(2)	(2)	(2)	(2)	(1)	(1)	(1)	(4)	(1)	(1)		
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)	
Penn Ship		6	825 x 136	1	1	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	
		Stab A	1000 x 195	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		Stab B	700 x 195	2	2	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)	
TOTAL EAST COAST				36	28	13	7	7	7	6	3	1	9	3					
GULF COAST	ADDSCO industries	1	523 x 90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		2	523 x 90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	523 x 90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		4	523 x 90	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
				(1)	(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	5	0	
				3	3	3	3	3	0	0	0	0	3	3	
Bethlehem, Beaumont		-	800 x 96	1	1	0	0	0	0	0	0	0	0	0	
				(1)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
Halter Marine		-	550 x 75	0	0	0	0	0	0	0	0	0	0	0	
				(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
Levingston, (Orange, Texas)	1		700 x 100	1	1	0	0	0	0	0	0	0	0	0	
				(1)	(1)	(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	
				2	0	0	0	0	0	0	0	0	0	0	
				7	0	0	0	0	0	0	0	0	0	0	
				8	0	0	0	0	0	0	0	0	0	0	
				9	0	0	0	0	0	0	0	0	0	0	
				10	0	0	0	0	0	0	0	0	0	0	
				WB	6	6	6	0	0	0	0	0	0	0	0
Marathon	-		1100 x 150	(11)	(6)	(6)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
				1	1	1	1	1	1	0	0	1	1		
Tampa Shipyards	3		500 x 105	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(0)	(0)	(1)	(1)	
				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				
	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)
	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)	0 (0)
	TOTAL GULF COAST			<u>23</u>	<u>17</u>	<u>15</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>9</u>	<u>4</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)	0 (0)
	Lockheed SB Co.	1 3 21	650 x 88 650 x 88 690 x 90	1 1 1 (3)	0 0 1 (1)	0 0 0 (0)	0 0 0 (0)	0 0 0 (0)	0 0 0 (0)	0 0 0 (0)	0 0 0 (0)	0 0 0 (0)	0 0 0 (0)	0 0 0 (0)	0 0 0 (0)	0 0 0 (0)	0 0 0 (0)
	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)	0 (0)
	National Steel & SB	1 2 3 4	980 x 170 690 x 90 900 x 106 900 x 106	2 1 1 1 (5)	1 1 1 1 (4)	1 0 1 1 (3)	1 0 0 0 (1)	1 0 0 0 (1)	1 0 0 0 (1)	1 0 0 0 (1)	1 0 0 0 (1)	1 0 0 0 (1)	1 0 0 0 (1)	1 0 0 0 (1)	1 0 0 0 (1)	1 0 0 0 (1)	1 0 0 0 (1)

WEST COAST

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			
	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)
	Todd-LA	1 2 Syncro. Syncro.	800 x 87 800 x 87 750 x 105 750 x 105	1 1 1 1	0 0 1 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
	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)
	Triple A-Hunters Point	2 3 4	715 x 82 996 x 107 1088 x 136	1 1 2	0 1 1	0 1 1	0 1 1	0 1 1	0 1 1	0 1 1	0 1 1	0 1 1	0 1 1	0 1 1	0 1 1	0 0 0
	TOTAL WEST COAST			18	10	5	1	1	1	0	0	0	0	0	3	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				
GREAT LAKES	Bay S/B Corp.	GD1	1100 x 136	1	1*	0	0	0	0	0	0	0	0	0	0	0	0
		GD3	730 x 105	1	1*	0	0	0	0	0	0	0	0	0	0	0	0
				(2)	(2)	(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Fraser Shipyards	GD2	825 x 82	1	0	0	0	0	0	0	0	0	0	0	0	0	0
				(1)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	TOTAL GREAT LAKES			3	2	1	0	0	0	0	0	0	0	0	0	0	0
	TOTAL POSITIONS ALL YARDS			80	57	34	12	12	12	7	7	3	1	22	7	7	7

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

TABLE 1
SHIP CONSTRUCTION CAPABILITY BY SHIP TYPE

SUMMARY

REGION	GENERAL CARGO								DRY BULK			
	GEN. CARGO 475 x 68	MOB. CARGO 724 x 106	CONTAINER 610 x 90	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	51	19	36	24	8	7			38	27	8	
GULF COAST	39	15	22	15	9	9			24	16	9	
WEST COAST	26	6	11	8	5	3			20	9	5	
GREAT LAKES	4	2	2	2	1	1			3	2	1	
TOTAL POSITIONS ALL YARDS	120	42	71	49	23	20			85	54	23	
										080		
REGION	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 COAST	36	28	13	7	7	6	3	1		9	3	
GULF COAST	23	17	15	4	4	1	0	0		9	4	
WEST COAST	18	10	5	1	1	0	0	0		3	0	
GREAT LAKES	3	2	1	0	0	0	0	0		1	0	
TOTAL POSITIONS ALL YARDS	80	57	34	12	12	7	3	1		22	7	

TABLE 2

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

TABLE 2

MAJOR U.S. PRIVATE SHIPYARDS

NUMBER OF 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	2	2	2	2	2	2							
Coastal Dry Dock	4	4	4	4	4	3	2	2	2	2	2	2							
General Dynamics, Quincy	5	5	5	5	5	5	5	5	1										
Newport News SB & DD	4	4	4	4	4	3	3	3	3	3	2	2	2	1	1	1	1	1	1
Norfolk SB & DD	1																		
Penn Ship (formerly Sun)	4	4	4	4	4	3	3	1	1	1	1								
TOTAL	(24)	(23)	(23)	(23)	(22)	(17)	(16)	(12)	(8)	(7)	(6)	(5)	(3)	(2)	(2)	(1)	(1)	(1)	(1)
<u>GULF COAST</u>																			
ADDSCO Industries	5	1	1																
Avondale Shipyards	12	9	9	8	8	8	8	8	8	8	8	8	5	5	5				
Beth-Beaumont	1	1	1	1	1	1	1												
Halter Marine	1	1																	
Ingalls-E. Bank	6	6	5	5															
Ingalls-W. Bank	6	6	6	6	6	6	6	6											
Levingston (Orange, TX)	1	1	1	1	1	1	1	1	1	1	1	1	1						
Marathon LeTourneau	1	1	1	1	1	1	1	1	1	1	1	1	1						
Tampa Shipyards	1																		
Texas Gulfport SB	1	1																	
Todd-Galveston	1																		
TOTAL	(36)	(27)	(24)	(22)	(17)	(16)	(16)	(9)	(9)	(9)	(9)	(9)	(6)	(5)	(5)	(1)	(1)	(1)	(5)

TABLE 2
MAJOR U.S. PRIVATE SHIPYARDS

Length OA (In Feet):	NUMBER OF SHIPBUILDING WAYS BY LENGTH (MAXIMUM SHIP SIZE)																		
	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 Shipbuilding	3	3	3	3															
Marine Power & Equip.	1	1	1	1															
National Steel & SB	4	4	4	4	3	3	3	3	3	1									
Tacoma Boat	1	1	1	1	1	1	1												
Todd-Los Angeles	4	4	4	4	4	4	2												
Todd-SF (formerly Beth)	1	1	1	1															
Todd-Seattle	1	1	1	1															
Triple A-SF	3	3	3	3	3	2	2	2	2	2	1	1							
TOTAL	(19)	(19)	(18)	(16)	(11)	(10)	(8)	(5)	(5)	(3)	(1)	(1)							

GREAT LAKES*

Bay SB Corporation	2	2	2	2	2	1	1	1	1	1	1	1							
Fraser Shipyards	2	2	2	1	1	1	1												
TOTAL	(4)	(4)	(4)	(3)	(3)	(2)	(2)	(1)	(1)	(1)	(1)	(1)	(1)						
GRAND TOTAL ALL COASTS AND GREAT LAKES	83	73	69	64	53	45	42	27	23	20	17	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

STANDARD FORM 17

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

FACILITIES AVAILABLE FOR THE CONSTRUCTION OR REPAIR OF SHIPS

Form Approved
 OMB No. 45-R0283

DATE

TO: (Complete departmental address)

SHIPYARD AND ADDRESS

INSTRUCTIONS

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

BUILDING WAYS (M.L.W.)

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

LENGTH OF LAUNCHING RUN

DEPTH OF RUN AT M.L.W.

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

IS FIRE PROTECTION AVAILABLE ON BUILDING WAY? YES NO

IS SNUBBING NECESSARY? YES NO

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

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

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

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

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

PRINCIPAL SHOPS AND BUILDINGS

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

SHOP OR YARD CRANES (5 tons or over)

BRIDGE TYPE			STATIONARY, RAIL OR MOBILE								
Cap. (Std. tons)	Max. span	Height of hook	Area/shop serviced	Type	Cap. (Std. tons)	Max. reach	Capacity at reach	Bottom len. ft.	Height hinge	Area serviced	Hgt. of hook above brack 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 (a the 36" x 20" b.c., etc.)

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

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

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

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

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

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

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

DESCRIPTION OF TYPES OF WORK NORMALLY SUBCONTRACTED

DISTANCE TO NEAREST RAILROAD CONNECTION

DISTANCE TO NEAREST AIRPORT—IDENTIFY

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

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

MINIMUM CHANNEL TO TIDEWATER

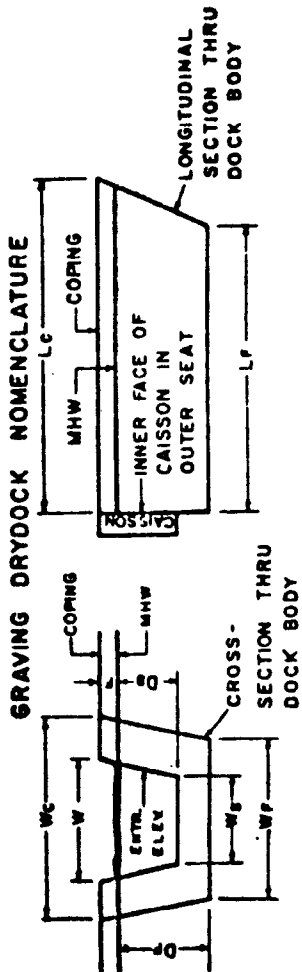
MINIMUM HORIZONTAL AND VERTICAL BRIDGE CLEARANCES TO TIDEWATER (Identify structures)

LIMITING LOCK DIMENSIONS TO TIDEWATER (Identify locks)

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

GRAVING DRYDOCK CHARACTERISTICS SUMMARY

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



DRIYDOCK NUMBER	LENGTH		ENTRANCE DIMENSIONS		DOCK BODY DIMENSIONS			STANDARD DEFINITION	A. C. AMPERES (60 HZ-3Ø)			REMARKS (e.g. indicate dimensions of pits in dock floor)
	FLOOR Lf	COPING Lc	WIDTH	DEPTH	WIDTH	DEPTH	FREEBOARD		480V MAX. HOTEL (INDUST)	2400 V ALT. HOTEL	132KV TEST/CHECK	
1								LC X WC X DF	*	* X *	* X *	
2												
3												
4												
5												

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

FLOATING DRYDOCK CHARACTERISTICS SUMMARY

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

APPENDIX B

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

LEGEND: Remarks Column

1/Type of work usually engaged in

2/Employment - Mid-1984

APPENDIX B

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

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 x 88 SW (2) 720 x 130 SW 550 x 88 FD	<u>850</u> <u>2200</u>	1/ Construction, conversion and repairs - all types of vessels. 2/ 6,800
Beth Steel Corp. Sparrows Point, MD	800 x 106 SW 800 x 95 SW 1200 x 192 GD	<u>1260</u> <u>3970</u>	1/ Construction and conversion - all types of vessels. 2/ 2,240
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	<u>1200</u> <u>7700</u>	1/ Ship repairs, overhaul and conversion. 2/ 1,150 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	<u>893</u> <u>4600</u>	1/ Construction, conversion and repairs - all types of vessels. 2/ 4,900
Newport News SB & DD Co. Newport News, VA	649 x 93 SW 715 x 93 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*	<u>1370</u> <u>14220</u>	1/ Construction, conversion and repairs - all types of vessels. 2/ 28,112 *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*	<u>1030</u> <u>12170</u>	1/ Ship construction, repairs and conversion, all types of vessels. 2/ 2,890 *Located at Brambleton plant.
Pennsylvania SB Co. Chester, PA	(2) 825 x 136 SW 700 x 195 SW 1000 x 195 SW 1100 x 195 FD 400 x 80 FD	<u>1100</u> <u>3900</u>	1/ Ship construction, conversion and repairs - all types of vessels. 2/ 1,120

a/ 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) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers Usable Length in feet <u>Longest</u> Total linear feet	Remarks
<u>EAST COAST</u> <u>REPAIR YARDS WITH</u> <u>DRYDOCK FACILITIES</u>			
Allied Repair Service Norfolk, VA	400 x 77 FD	<u>500</u> 1000	1/ Ship repairs and conversion. <u>2/</u> 65
Atlantic Dry Dock Corp. Ft. George Island, FL	450 x 76 MR	<u>585</u> 1440	1/ Construction of small vessels. Repair and overhaul of small and medium size vessels. <u>2/</u> 321
Bath Iron Works Corp. Portland Shipyard Portland, ME	1000 x 136 FD	<u>1000</u> 1600	1/ Ship repairs and conversion. <u>2/</u> 550
Boston Shipyard Corp. East Boston, MA	690 x 92 FD 533 x 85 FD	<u>1020</u> 3000	1/ Ship repairs and conversion. <u>2/</u> 368
Boston Marine Industrial Park Boston, MA	1150 x 120 GD*	<u>900</u> 2500	*Public drydock in former Boston Naval Annex. Leased to ship repair companies.
Braswell Shipyards Charleston, SC	600 x 91 FD	<u>616</u> 1350	1/ Ship repairs and conversion. <u>2/</u> 355
Caddell DD & Repair Co. Staten Island, NY	330 x 60 FD	<u>666</u> 2802	1/ Ship repairs and conversion. <u>2/</u> 191
Colonna's Shipyard, Inc. Norfolk, VA	400 x 65 MR 400 x 45 MR	<u>900</u> <u>900</u>	1/ General ship repairs. <u>2/</u> 176
Robert E. Derecktor of Rhode Island, Inc. Middletown, RI	450 x 96 FD	1500 <u>6500</u>	1/ Construction of Coast Guard ships and vessels repairs. <u>2/</u> 980
Detyens Shipyards Mt. Pleasant, SC	500 x 85 FD 300 x 88 FD	<u>510</u> 1022	1/ General ship repairs. <u>2/</u> 300

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	
General Ship Corp. East Boston, MA	678 x 90 GD*	900 2530		1/ Ship repairs and overhaul. Construction up to 225' in length. 2/ 326 *GD is located in the Boston Marine Industrial Park in the former Boston Naval Annex and is leased by General Ship Corp.
Hoboken Shipyards, Inc. Division of BSI Corp. Hoboken, NJ	433 x 67 FD 685 x 106 FD 549 x 90 FD 640 x 96 FD 1082 x 138 GD*	923 3000		1/ Ship repairs, overhaul, and conversion. 2/ 400 *Military Ocean Terminal, Bayonne, NJ - leased from Corps of Engineers.
Jackson Engineering Co. Staten Island, NY	425 x 82 FD 550 x 82 FD	653 2600		1/ Ship repairs and conversion. 2/ 125
Jacksonville Shipyards Jacksonville, FL	660 x 90 FD 900 x 140 FD 400 x 53 FD 745 x 127 FD	800 4184		1/ Ship repairs and conversion. Construction of small vessels. 2/ 1,500
Metro Machine Corp. Norfolk, VA	660 x 96 FD	785 1950		1/ Ship repairs and conversion. 2/ 362
Newport Offshore Ltd. Newport, RI	320 x 60 MR	500 2515		1/ Small vessel construction and repairs. 2/ 185
North Florida Shipyards Jacksonville, FL	500 x 66 FD	1600 3390		1/ Ship repairs and conversion. 2/ 323
Perth Amboy DD Co. Perth Amboy, NJ	400 x 68 FD	450 2930		1/ Ship repairs and conversion. 2/ 85
Puerto Rico DD & Marine Terminals San Juan, PR	632 x 80 GD*	940 1632		1/ Ship repairs. 2/ 98 *Leased from the Navy.
Rodermond Industries Jersey City, NJ	775 x 106 FD 425 x 80 FD 300 x 57 FD	842 842		1/ Ship repairs and conversion. 2/ 100
Tracor Marine, Inc. Port Everglades, FL	300 x 80 FD 360 x 80 (Syncrolift)	780 1305		1/ Ship repairs and conversion. 2/ 300

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>GULF COAST SHIPBUILDING YARDS</u>						
ADDSCO Industries, Inc. Mobile, AL	(4)	523 x 90 SW 620 x 90 SW 625 x 83 FD 750 x 100 FD			1132 9370	1/Ship construction, conversion, and repairs. Also drill rig construction. 2/465
Avondale Shipyards, Inc. New Orleans, LA	*(2)	1020 x 174 SW **1200 x 126 SW *** 450 x 90 SW 300 x 50 MR 1000 x 216 FD 380 x 76 FD 750 x 114 FD			2300 6100	1/Ship construction, conversion, and repairs - all types of vessels. 2/4,342 *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 SW			1000 4000	1/Construction of barges and drilling rigs. Also ship repairs and conversion. 2/1,690
Halter Marine, Inc. New Orleans, LA		550 x 75 SW			1000 2100 Chickasaw Division	1/Construction of small and mid-size vessels mainly for offshore oil and gas industry. Can build deep-draft ships at Chickasaw Division. 2/461 (All Halter Yards) 159 (Chickasaw)
Ingalls SB Division Litton Systems, Inc. Pascagoula, MS	(4)	690 x 85 SW 550 x 80 SW 650 x 90 SW 481 x 71 GD *800 x 173 FD			2650 8100	1/Construction, conversion, and repairs - all types of vessels. 2/9,760 *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. 2/733

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	
Tampa Shipyards, Inc. Tampa, FL	500 x 105 SW 542 x 72 GD 896 x 146 GD 746 x 121 GD 746 x 121 GD	845 <u>2240</u>	1/Ship construction, conversion, and repairs. <u>2/770</u>
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. <u>2/200</u>
Todd Shipyards Corp. Galveston, TX	475 x 85 SW 900 x 160 FD 600 x 118 FD	1086 <u>7000</u>	1/Ship construction, repairs, and conversion. <u>2/587</u>
<u>GULF COAST REPAIR YARDS WITH DRYDOCK FACILITIES</u>			
Bender Shipbuilding & Repair Mobile, AL	414 x 55 FD 414 x 45 FD 660 x 89 FD	617 <u>2300</u>	1/Construction of vessels up to 300' in length. Also repairs and conversion. <u>2/685</u>
Bergeron Industries, Inc St. Bernard, LA	300 x 72 MR	100 <u>600</u>	1/Construction and repair of barges, dredges, and small vessels. <u>2/60</u> (Braithwaite Yard)
Bludworth Bond Shipyard Houston, TX	435 x 80 FD	530 <u>1500</u>	1/Ship repairs. <u>2/150</u>
Bollinger Machine Shop and Shipyard Lockport, LA	300 x 72 FD	5400 <u>12180</u>	1/Construction and repair of small vessels. <u>2/203</u>
Delta Shipyard Houma, LA	300 x 56 (Syncrolift) 340 x 88 FD	1200 <u>1200</u>	1/Construction and repair of small ships and barges. <u>2/157</u>
Equitable Shipyards, Inc New Orleans, LA	325 x 90 MR	500 <u>1654</u>	1/Construction and repair of small vessels and barges. <u>2/164</u>
Gretna Machine & Iron Works, Inc. Harvey, LA	300 x 52 GD 500 x 100 GD	340 <u>340</u>	1/Construction and repair of barges. <u>2/40</u>
Gulf-Tampa DD Co. Tampa, FL	500 x 97 FD	800 <u>1100</u>	1/Ship repairs and overhaul. <u>2/310</u>

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	
Ingalls Marine, Inc. Decatur, AL	496 x 81 GD (Barges)	500 500		1/Construction and repair of barges. Yard closed on care and maintenance basis.
McDermott Shipyards Morgan City, LA	325 x 106 FD	600 1190		1/Construction and repair of tugs, supply boats, barges, and drill rigs. 2/393
Newpark SB & Repair, Inc Houston, TX	300 x 72 FD 300 x 84 FD	500 1500		1/Small vessel construction and repairs. 2/220
Platzer Shipyard, Inc. Houston, TX	300 x 60 MR	300 1000		1/Construction and repair of barges. 2/125
Port Allen Marine Service, Inc. Port Allen, LA	300 x 81 FD	1060 1940		1/Construction and repair of boats and barges. 2/338
Saucer Marine Service, Inc. New Orleans, LA	(2) 300 x 56 FD	200 600		1/Repair of barges, dredges, and drill rigs. 2/35
SBA Shipyards, Inc. Jennings, LA	496 x 72 GD	500 2000		1/Construction, conversion, and repair of boats and barges. 2/35
Southern SB Corp. Slidell, LA	350 x 52 GD	200 300		1/Construction and repair of vessels up to 350' in length and not drawing over 15' of water. 2/254
Todd Shipyards, Corp. New Orleans, LA	643 x 82 FD 643 x 80 FD 350 x 60 FD	1725 3756		1/Ship repairs and conversion. 2/273

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	
	MR--Marine Railway			Total linear feet		
WEST COAST SHIPBUILDING YARDS						
FMC Corporation Portland, OR	800 x 130	SW		1100 1100		1/Construction of barges and vessels up to 800' in length. 2/200 Leases drydocks and berths from Port of Portland as required.
Lockheed Shipbuilding Co. Seattle, WA	(2) 650 x 88 690 x 90 643 x 96	SW SW FD		698 6500		1/Ship construction, conversion, and repair - all types of vessels. 2/2,799
Marine Power & Equip. Co. Seattle, WA	600 x 86 400 x 57 400 x 60 300 x 46 400 x 101 (Syncrolift)	SW FD FD FD		620 4230		1/Ship construction, repairs, and conversion. 2/1,100
National Steel & SB Co. San Diego, CA	(2) 980 x 170 690 x 90 900 x 106 750 x 130	GD SW SW FD		1000 6800		1/Construction, conversion, and repairs - all types of vessels. 2/4,770 Large graving dock and piers at U.S. Naval Station is also leased as required.
Tacoma Boatbuilding Co. Tacoma, WA	650 x 400 540 x 74 420 x 64	SW FD FD		1100 4200		1/Ship construction, repairs, and conversion - all types of vessels. 2/1,770
Todd Pacific Shipyards Corp. San Pedro, CA	(2) 800 x 87 (2) 750 x 105 700 x 86 470 x 82 750 x 105* (*Syncrolift)	SW SW* FD FD		700 6175		1/Ship construction, repairs, and conversion - all types of vessels. 2/3,340
Todd Shipyards Corp. San Francisco, CA (formerly Beth. Steel)	550 x 96 700 x 94 950 x 144	SW FD FD		813 3200		1/Barge construction, ship repairs and conversion. Can build C3 and C4 type vessels. 2/450
Todd Pacific Shipyards, Corp. Seattle, WA	600 x 96 650 x 84 420 x 62 943 x 133	SW FD FD FD		1400 6017		1/Ship construction, repairs, and conversion - all types of vessels. 2/1,730

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	
Triple A Shipyards Hunters Point San Francisco, CA	715 x 82 GD 996 x 107 GD 1088 x 136 GD (2) 416 x 56 GD 416 x 71 GD	<u>600</u> 24000	1/ Ship repairs, overhaul, and conversion. 2/ 410 All graving docks are part of inactive Hunters Point Naval Shipyard and are leased from the Navy.
<u>WEST COAST</u> <u>REPAIR YARDS WITH</u> <u>DRYDOCK FACILITIES</u> Arcwel Corporation National City, CA	*	*	1/ Ship repairs and overhaul. 2/ 340 *Graving dock and piers at Naval Station can be leased as required.
Campbell Industries San Diego, CA	(2) 360 x 46 FD	<u>640</u> 2280	1/ Construction of fishing boats. Also ship repairs. 2/ 65 Graving dock at Naval Station can be leased as required.
Concrete Technology Corp. Tacoma, WA	496 x 136 GD	<u>200</u> 200	1/ Construction of floating structures and drydocking of barges. 2/ 170
Continental Maritime of San Diego, Inc. National City, CA	*	*	1/ Ship repairs and overhaul. 2/ 295 *Can rent graving dock and piers at Naval Station and piers from Port of San Diego.
Dillingham Ship Repair Portland, OR	*	*	1/ Ship repairs and conversion. 2/ 1,040 *Leases drydocks and berths from Port of Portland as required.
Dillingham Shipyard Honolulu, HI	400 x 54 FD	<u>600</u> 800	1/ Ship repairs and overhaul. 2/ 81
Kaiser Steel Corp. Napa, CA	379 x 51 GD	<u>500</u> 500	1/ Heavy steel fabrication and erection. Construction and repair of small ships and barges. 2/ 410
Lake Union DD Co. Seattle, WA	340 x 56 FD	<u>1000</u> 4235	1/ Ship repairs and conversion. 2/ 85

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	
Northwest Marine Iron Works Portland, OR	500 x 100 SW (Barge construction only)		1/ Ship repairs, conversion, and barge construction. 2/ 600 Leases drydocks and berths from Port of Portland as required.
Pacific DD & Repair Co. Oakland, CA	400 x 60 FD	<u>600</u> 1155	1/ Ship and barge repairs. 2/ 40
Pacific Marine & Supply Company, Ltd. Honolulu, HI	300 x 76 FD	<u>290</u> 407	1/ Ship repairs and overhaul. 2/ 100
Port of Portland Swan Island Ship Repair Yard Portland, OR	600 x 83 FD 500 x 88 FD 700 x 108 FD 1100 x 181 FD	<u>1000</u> 9100	1/ These are publicly-owned drydocks leased to ship repair companies.
Port Richmond Shipyard Richmond, CA	(3) 571 x 80 GD 583 x 80 GD 733 x 80 GD	<u>1600</u> 2100	1/ Ship repairs, overhaul, and conversion. 2/ 200
RMI, Inc. National City, CA	*	<u>300</u> 300	1/ Ship repairs and overhaul. Construction of small vessels for the Navy. 2/ 110 *Graving dock and piers at Naval Station can be leased as required.
Southwest Marine, Inc. San Diego, CA	600 x 104 FD 360 x 82 FD	<u>700</u> 1722	1/ Ship repairs, overhaul, and conversion. 2/ 344 Graving dock at Naval Station can be leased as required.
Southwest Marine, Inc. Terminal Island San Pedro, CA	720 x 93 FD	<u>1500</u> 4175	1/ Ship repairs, overhaul, and conversion. 2/ 330
Southwest Marine of SF, Inc. San Francisco, CA	400 x 54 FD	<u>700</u> 1950	1/ Ship repairs and overhaul. 2/ 300
Triple A South San Diego, CA	389 x 53 FD	*	1/ Ship repairs and overhaul. 2/ 530 *Graving dock and piers at Naval Station can be leased as required.
U.S. Naval Station San Diego, CA	687 x 85 GD	<u>N.A.</u> 13000	Drydock and piers available for lease to ship repair companies.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES

Name and Location	Maximum Ship Size (LOA--Beam) SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway	Berths/Piers Usable Length in feet <u>Longest</u> Total linear feet	Remarks
<p><u>GREAT LAKES</u> <u>SHIPBUILDING YARDS</u></p>			
<p>(Maximum size ship that can exist St. Lawrence Seaway locks is 730' x 78')</p>			
Bay SB Corporation Sturgeon Bay, WI	730 x 105 SW 640 x 66 FD 1100 x 136 GD	<u>1000</u> 7090	1/ Ship construction, repairs, and conversion. 2/ 243
Fraser Shipyards Superior, WI	825 x 82 GD 620 x 61 GD	<u>900</u> 4450	1/ Ship construction, repairs, and conversion. 2/ 35
<p><u>GREAT LAKES</u> <u>REPAIR YARDS WITH</u> <u>DRYDOCK FACILITIES</u></p>			
Peterson Builders Sturgeon Bay, WI	360 x 36 FD	<u>550</u> 2515	1/ Construction and repair of small ships and boats. 2/ 976

APPENDIX C

MAJOR TOPSIDE REPAIR FACILITIES
SHIPS 400 FEET IN LENGTH AND OVER

APPENDIX C

MAJOR TOPSIDE REPAIR FACILITIES, SHIPS 400 FEET
IN LENGTH AND OVER

EAST COAST

Advex Corporation Hampton, VA	Brady Marine Repair Co., Inc. Elizabeth, NJ
Alco Welding and Machine Co. Norfolk, VA	Camden Ship Repair Co., Inc. Camden, NJ
Allied Repair Service, Inc. Norfolk, VA	Classon Industries Brooklyn, NY
AMT, Inc. Miami, FL	Diesel Injection Sales & Service Norfolk, VA
American Ship Repairs Co., Inc. Brooklyn, NY	E & S Marine Service, Inc. Brooklyn, NY
Intertec Marine Corporation Camden, NJ	Electric Motor & Contracting Co. Norfolk, VA
Applied Marine Technology Mt. Laurel, NJ	Fairhaven Marine, Inc. Fairhaven, MA
Arnessen Electric Company, Inc. Brooklyn, NY	Fisher Marine Repair Corporation Brooklyn, NY
Atco Marine Corporation Brooklyn, NY	Florida Ship, Incorporated Miami, FL
Atlantic B.C. Incorporated Brooklyn, NY	G. Marine Diesel Corporation Brooklyn, NY
Atlantic Marine, Inc. Ft. George Island, FL	G. Marine Diesel Corporation Miami, FL
Atlantic Repair Co., Inc. Brooklyn, NY	General Ship Repair Corporation Baltimore, MD
Banks Ship Rigging Corporation Norfolk, VA	Golten Marine Co., Incorporated Brooklyn, NY
Best Repair Company Norfolk, VA	Golten Service Co., Incorporated Miami, FL
BFC Marine Service, Inc. Brooklyn, NY	

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

Wiley Manufacturing
Port Deposit, MD

Williams & Manchester Shipyard
Newport, RI

GULF COAST

American Marine Corporation
New Orleans, LA

Atlantic Sandblasting & Coatings
Tampa, FL

Automated Marine Propulsion Systems
LaPorte, TX

Boland Marine & Manufacturing Co.
New Orleans, LA

Buck Kreihls Co., Incorporated
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, Incorporated
Panama City, FL

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

Florida Ship Repair
Tampa, FL

General Electric Company
A & ES Marine
Houston, TX

Hahn & Clay
Houston, TX

Harrisburg Machine Co., Inc.
Houston, TX

Hendry Corporation
Tampa, FL

Houston Ship Repair
Channelview, TX

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

Marine Repairs, Incorporated
Houston, TX

Marine Maintenance Industries
Houston, TX

Marine Maintenance Industries
Galveston, 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

Port Houston Marine, Incorporated
Houston, TX

River & Offshore Services
Violet, LA

Runyan Machine & Boiler Works
Pensacola, FL

Vemar, Incorporated
Channelview, TX

WEST COAST

Cavanaugh Machine Works
Wilmington, CA

Charles Lowe Company
Emeryville, CA

Coastal Marine Engineering Co.
San Francisco, CA

Colberg, Incorporated
Stockton, CA

Continental Maritime of San Francisco
San Francisco, CA

Dockside Machine & Ship Repair
Wilmington, CA

Duwamish Shipyard, Incorporated
Seattle, WA

Fulton Shipyard
Antioch, CA

General Engineering & Machine Works
San Francisco, CA

Golten Marine Company
Wilmington, CA

Kettenburg Marine
San Diego, CA

Al Larson Boat Shop
Terminal Island, CA

Marine Industries Northwest, Inc.
Tacoma, WA

Marisco, Ltd.
Honolulu, HI

J. M. Martinac Shipbuilding Corp.
Tacoma, WA

Rowe Machine Works, Incorporated
Seattle, WA

Service Engineering Company
San Francisco, CA

Thomas A. Short Company
Emeryville, CA

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

West Winds, Incorporated
San Francisco, CA

Wilmington Iron Works
Wilmington, CA

GREAT LAKES

Advance Boiler & Tank Company
Milwaukee, WI

American Propeller Company
Toledo, OH

Diversified Piping Company
Cleveland, OH

G. W. Industries, Inc.
Cleveland, OH

Edward E. Gillen Company
Milwaukee, WI

Hans Hansen Welding Co., Inc.
Toledo, OH

Lower Lake Dock Company
Sandusky, OH

Merce Industries, Incorporated
Toledo, OH

Nicholson & Hall Corporation
Buffalo, NY

Nicholson Terminal & Dock Company
River Rouge, MI

Oldman Boiler Works, Incorporated
Buffalo, NY

Perry Shipbuilding Company
Erie, PA

Purvis & Foster
Detroit, MI

Sen-Wel Industries, Incorporated
Buffalo, NY

Ship Repair & Supply Company
Milwaukee, WI

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

