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

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REPORT ON SURVEY OF U.S.
SHIPBUILDING AND REPAIR FACILITIES
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Prepared By:
Office of Shipbuilding Costs and Production
Division of Production
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Introduction

In compliance with the Merchant Marine Act of 1936, as amended, 1/ the Maritime Administration (MARAD) conducts an annual survey to obtain information from the shipbuilding and ship repair industry to be used primarily to determine if an adequate mobilization base exists for national defense and for use in a national emergency. This report on the 1987 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.

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 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.

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 be also identified. The data gathered by the annual survey also is 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 400 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 in the event of national emergency. The Federal Emergency Management Agency (FEMA) also uses information obtained by this survey, as does the U.S. Coast Guard, the U.S. Army Corps of Engineers, and the Commission on Merchant Marine and Defense.

The annual shipyard survey of 1987 has been completed. The information collected has been organized and condensed in the following narratives, exhibits, and tabulations to focus attention on those elements that are most often requested from this office.

GENERAL

A major shipbuilding and repair facility is defined in this report as one that is open and has the capability to construct, drydock, and/or topside repair vessels with a minimum length overall of 400 feet (122 m), provided that water depth in the channel to the facility is at least 12 feet (4 m). Appendix B is a statistical abstract of data gathered from 116 companies responding to MARAD's annual survey which meet this criteria. It lists the facilities sorted on a coastal basis and displays information with respect to the size and type of each building position, drydock, berth space, employment, and remarks regarding principal shipyard activities.

Table 1 has been prepared to answer the frequent question as to the number of shipbuilding positions available to build a complete specified ship. With the exception of the mobilization ship, the ship types listed in Table 1 are those historically delivered to commercial service. Length overall and beam are given for all ships and, in addition, deadweight tonnage is indicated for the bulk carriers. 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 general cargo ships. The total number of building positions varies from 113 for the small cargo ship to four for a huge 265,000-dwt. tanker. An important consideration that is not addressed 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 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 1 addresses only the number of complete ships that can be constructed simultaneously in each building position(s).

Table 2 is a somewhat different presentation of shipyard capability. 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 indicates 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 about that length. Exhibit 28 is a histogram displaying the reduction in the number of available shipways as the maximum ship length increases.

SIGNIFICANT SHIPYARD ACTIVITY

As of October 1, 1987, there was only one commercial vessel over 1,000 gross tons under construction in the U.S. This was a containership scheduled for delivery in November 1987. Exhibit 27 illustrates the overall decline since the mid-1970's in both the number of vessels and gross tonnage of the merchant ship orderbook in the United States.

On October 1, 1987, there were 78 major combat and auxiliary ships under construction or on order for the Navy, 19 of which were T-Ships. In addition, seven merchant ships were under contract for major reconstruction to T-Ships for the Navy. (The prefix "T" designates civilian-manned ships either operated by or under charter to the Military Sealift Command.) Examples of types of vessels involved in the T-Ship program are: auxiliary crane ships, hospital ships, fleet oilers, and ocean surveillance ships. The T-Ship projects have provided much needed near-term relief to U.S. shipbuilders, particularly those yards which have traditionally relied on construction of new oceangoing merchant ships.

Other major new construction activity in U.S. shipyards in October 1987 was the five medium-endurance cutters in production for the Coast Guard.

Despite the continuing worldwide shipping recession and uncertain near-term future prospects, the U.S. shipbuilding and ship repair industry in FY 1987 invested over \$150 million in facilities modernization and expansion and, as of July 1, 1987, planned to spend at least an additional \$70 million during the year ending June 30, 1988.

Since enactment of the Merchant Marine Act of 1970, the U.S. shipbuilding and ship repair industry has invested approximately \$4.1 billion in plant modernization and improvements. These investments have significantly increased the capacity, capability, and productivity of the industry. With the slump in commercial ship construction, the emphasis in recent years has been on expansion of ship repair, overhaul, and conversion facilities.

MAJOR SHIPBUILDING FACILITIES

Following is a brief description of 24 of the major U.S. commercial shipbuilding facilities. Exhibit 1 illustrates the geographical location of these 24 shipyards and Exhibits 2 through 26 are general arrangement plans of each yard's facilities.

1. ADDSCO Industries, Incorporated

ADDSCO Industries, Inc., is the parent or holding company of a group of marine-related companies which were reorganized under the new name in 1984. Alabama Dry Dock and Shipbuilding Corporation, is the repair and conversion subsidiary while Alabama Maritime Corporation is the new construction facility. Prior to 1984, the shipyard was referred to as Alabama Dry Dock and Shipbuilding Company.

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.

Since 1916 the yard has constructed a variety of ships (both commercial and Naval), barges and drill rigs. In recent years, the company has continued its facility improvements, mainly the upgrading and modernization of existing drydocks, piers, shops, and equipment.

In 1985, Alabama Maritime completed the deckhouse steel work for five 30,000 dwt. T-5 tankers and delivered them to Tampa Shipyards. During the past two years, Alabama Drydock and Shipbuilding Corporation was awarded several Navy conversion, overhaul, and reactivation contracts as well as a number of commercial drydocking and repair jobs.

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 end-launch shipway 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 31 m). There is also 9,370 feet (2856 m) of berthing space at seven finger piers for topside 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 1,400 metric tons at a radius of 175 feet (53 m) gives ADDSCO Industries the ability to serve the heavy construction industry and to construct the heavy offshore structures required in today's market.

At mid-1987, combined employment totaled 590 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 Industries, Inc. - Avondale Shipyards Division

Avondale Shipyards Division is located on the west bank of the Mississippi River approximately nine miles upriver from New Orleans, LA. Avondale, previously a wholly-owned subsidiary of Odgen Corporation, was sold in 1985 to its employees in an Employee Stock Ownership Plan (ESOP). Since 1938, Avondale has constructed dry cargo ships, large crude carriers, complex chemical parcel tankers, large high-speed containerships, a full range of 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.

Avondale also maintains an active repair operation for commercial and naval ships. Inland waterway and offshore oil vessels are repaired by Avondale's Westwego and Harvey Divisions. Offshore platforms, jackets, and production modules are constructed for the oil industry by Avondale's Offshore Division in Morgan City, LA. Avondale is also supported by its Harvey propeller manufacturing and repair division, its service foundry casting division and steel sales warehousing division.

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 these ships, the ANTAKES (T-AKR 294), the ALTAIR (T-AKR 291), and the POLLUX (T-AKR 290). The latter was redelivered to the Navy in March 1986.

Also in 1982, the Navy awarded Avondale a contract for construction of the lead T-AO (fleet oiler). Since then, Avondale has been awarded contracts for a total of six of these vessels. The lead ship, HENRY J. KAISER, was delivered in December 1986. During FY 1987, two T-AO's were delivered; the JOSHUA HUMPHREYS, and JOHN LENTHALL.

Avondale's new construction orderbook as of October 1, 1987, consisted of four fleet oilers (T-AO's) (with options for up to two additional T-AO's) and five dock landing ships (LSD's). The company also is in the process of building the Vidalia Hydroelectric Plant.

Avondale's main yard facility totals 222 acres and contains three outfitting docks equipped with supporting shops and over 6,000 feet (1829 m) of pier space, an upper shipbuilding area that is capable of constructing ships up to 300,000 dwt. or three conventional sized ships concurrently, and a lower shipbuilding area that is capable of building five LASH ships concurrently.

Avondale's upper yard shipbuilding area has two large positions to accommodate vessels of up to 1,020 feet (311 m) in length by 175 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. Ships constructed in the upper yard move laterally in three positions for launching by Avondale's large floating drydock which can accommodate ships as large as 1,000 feet by 216 feet (305 m by 66 m), with a lifting capacity of 81,000 long tons (82296 metric tons). This dock is also used for repairs, has frequently made three-vessel lifts and has docked a 217-foot wide (66 m) semi-submersible rig.

Avondale's lower yard has a side-launching construction area that has three large positions to 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). Ships built in the lower yard move laterally toward the river and parallel to the river in five positions. Up to five large vessels, greater than 700 feet (213 m) LOA, can be under construction simultaneously in this lower yard area. A Panamax floating drydock, which was placed in service in 1982, is moored in this area for the repair of ships and to support the docking requirements of new construction. This drydock can accommodate ships up to 750 feet by 110 feet (228 m by 34 m) and has a lifting capacity of 20,000 long tons (20320 metric tons).

Avondale's lifting capability includes: a 600-ton (545 metric ton) floating crane which was recently supplemented by a 250-ton (227 metric ton) turnover rig; a 225-ton (204 metric ton) and three 160-ton (145 metric ton) whirley cranes in the upper yard; and two 150-ton (136 metric ton) plus one 125-ton (113 metric ton) whirley cranes in the lower yard. In addition, Avondale has 29 cranes with 50-ton (45 metric ton) or greater capacity.

Avondale's steel fabricating facilities have the capability to fabricate up to 196,000 tons (177,928 metric tons) of steel per year. There are four primary shops: the Plate Shop, Beam Shop, Blacksmith Shop, and Sheetmetal Shop, which are enclosed within steel and concrete buildings totaling 273,150 square feet (25375 m²). Principal fabricating facilities include a panel line, beam welder, stress relieving and normalizing furnaces, and pickling vats in the structural area. The fabrication of structural units is supported by two paint and blast buildings.

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.

Avondale has invested heavily in facility improvements since 1970. Recent significant improvements include, among others, a new enlarged machinery and piping module assembly building, a non-ferrous pipe fabrication shop to supplement the semi-automated pipe shop, new plasma arc burning equipment, and a new fabricated beam shop.

Avondale has similarly continued its technology transfer and investment program and completed its direct technology transfer program with Ishikawajima-Harima Heavy Industries Co., Ltd. (IHI) of Japan. The program is fully implemented in the current construction of the T-AO 187 class ships. The construction system is supported by the SPADES system of fairing and parts generation, CADAM drafting system, COPICS material control system, and the diversified CIPREC Management Information System.

In July 1987, the total labor force was 6,450, up from about 5,600 a year earlier. Employment is expected to increase as construction escalates on the LSD's.

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

3. Bath Iron Works Corporation

Bath Iron Works Corporation, a wholly-owned subsidiary of Bath Acquisition Corporation, which is itself a subsidiary of Bath Holding 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 type of ships including roll-on/roll-off cargo vessels, containerships, tankers, dredges, barges, fishing vessels, destroyers, guided missile frigates, and Aegis cruisers. Bath has built a total of 198 surface combatants for the Navy.

The last commercial ships built at the yard 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 an industry leader 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 was delivered in 1987.

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 CG-51, THOMAS S. GATES,

was delivered in August 1987. Five additional cruisers of this class are on order - the last of which is scheduled for delivery in 1992.

In 1985, BIW was selected as the lead shipbuilder for the design and construction of the Navy's Arleigh Burke class guided missile destroyer (DDG-51) program. Actual construction of the lead ship started in September 1987 with delivery scheduled for 1989. Also, a contract for another DDG was awarded to BIW in September 1987.

In 1974, Bath completed a major expansion and modernization program. The upgrading of facilities included the reconstruction of two shipways to accommodate ships of 700 feet (213 m) in length 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.

A new pre-outfit building of 200 feet by 410 feet (60 m by 125 m) was opened in 1987. This building has 18 work stations for 216-ton (219 metric ton) erection units. BIW also added in 1987 a new 220-ton (200 metric ton) capacity revolver crane to serve the third shipway. The shipway 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 2,150 linear feet (655 m) for outfitting and repair work.

Complementing its shipbuilding activities, BIW has a fully staffed Overhaul Division and Industrial Products Division.

BIW operates two support facilities in West Bath, located three miles (4.8 km) from the Main plant. The 33-acre Hardings Fabrication Plant is where the initial steel fabrication takes place. 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. A new West Bath facility is the 4 million cubic foot (113,000 cubic meters) Consolidated Warehouse opened in 1986, which uses state of the art equipment to accomplish the transfer, handling, and storage of inventory.

Thirty-five miles (56 km) from the Main Plant, BIW operates the Portland Overhaul and Repair Facility in Portland, ME. The yard is a joint industrial development of BIW, the State of Maine and the City of Portland. Its centerpiece is a large floating drydock with a lifting capacity of 60,000 long tons (65000 metric tons), greatly expanding the company's capabilities in the overhaul and repair field.

As of mid-1987, the company's administrative and production work force totaled 7,500, compared to 6,680 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 Portland Overhaul and Repair Facility.

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 oceangoing and 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 in May 1984. In August 1983, the company was awarded a contract from Lambert 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. Two hydro-pump barges were delivered to Great Lakes Dredge & Dock Company in December 1986. These 277-foot (84 m), split hull barges are the largest vessels of their type in the world. In July 1987, Bay completed the conversion of an out-of-service oil tanker to a 420-foot (128 m), self-unloading cement barge for Cement Transit Company.

On October 22, 1984, Sea-Land Service, Inc., signed a contract to have three 1400-TEU containerships constructed at Bay Shipbuilding. The keel was laid for the first ship in August of 1985 with delivery in July 1987. The second ship was delivered September 1987, and the last of the three ships was delivered in November 1987.

Docking and repairs to the Coast Guard Icebreaker, MAKINAW, is scheduled for fall 1987 with Great Lakes winter fleet repair to follow.

The company in 1977 completed a major facilities expansion program that has enabled the shipyard to build 1,000-foot (305 m) Great Lakes bulk carriers. The new graving dock can accommodate a vessel as large as 1,000 feet by 105 feet (305 m by 32 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 68 feet (195 m by 21 m). There are 7,095 feet (2163 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-1987, total employment was 980 down from 1,500 a year earlier. The decrease is due to completion of the first Sea-Land containership.

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's work for the depressed offshore oil industry has declined.

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 program to support the Rapid Deployment Force. Two of these five ships were converted at the company's Beaumont yard, with some of the work subcontracted to Todd-Galveston. Each vessel was lengthened 157 feet (48.8 m), and the depth was increased from 54 feet (16.4 m) to 70 feet (21.3 m). 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 the reconstructed vessel was redelivered in September 1985.

The Beaumont Yard is highly mechanized. In the early 1970's the company installed a multimillion-dollar panel line and new material handling facilities. During the past several years, other capital improvements included: installation of a CNC plasma burning machine, larger plate bending rolls, larger overhead bridge cranes, pipe burning and bending equipment, an additional pipe fabricating shop, better and more automatic welding equipment, an updated electrical distribution system, mobile cranes, better building platens, automated air compressors, a CAD/CAM system, and an extensive computer network for use in engineering, planning, estimating, and material control.

Bethlehem-Beaumont has one side-launching way that can accommodate ships up to approximately 960 feet by 105 feet (293 m by 32 m) and also operates a smaller side-launching way which is available for barge or module construction.

There are 4,600 feet (1402 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.

In mid-1985, Beaumont opened its Sabine Yard in Port Arthur, Texas, for offshore drill rig repair utilizing a 64,000 long ton (65,069 metric ton) lifting capacity floating drydock, one of the country's largest. This eight-section Navy surplus drydock is leased from the Port of Port Arthur and can accommodate vessels up to 950 feet (290 m) in length.

Employment at Bethlehem's Beaumont and Sabine facilities totaled about 600 in mid-1987, an increase over the mid-1986 level of 250 due to an expanding level of ship repair and steel fabrication work.

As of October 1987, work underway at the yard consisted of the fabrication of one drydock Caisson Gate including installation of all equipment; fabrication of three box girders for Tarrant County; and fabrication of one 387-foot (118 m) container barge.

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

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 engages in the construction, conversion and repair of marine vessels. 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. The yard is also capable of accomplishing repair and conversion work with the building basin serving as a drydock facility in addition to a floating drydock placed in service in 1987.

In November 1977, this shipyard 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. In 1979 and 1980 two containerships (MA Design C8-S-85d) were completed and delivered to Farrell Lines. 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).

In 1985, the yard completed the major conversion of three Maersk Line RO/RO ships to maritime prepositioning ships, as part of the Navy's MPS program to support the Rapid Deployment Force. Each vessel was lengthened 157 feet (48.8 m), and the depth was 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., was redelivered in March 1985; and the third vessel, the PVT. HARRY FISHER, was redelivered in September 1985.

In addition, during 1985, the yard completed the reflagging of five Barber Steamship Lines RO/RO vessels for the Ready Reserve Fleet, the repair of a collier, and the overhaul of a Navy vessel.

In 1986, the yard completed the construction of two feeder barges and repairs on five tug boats, one RO/RO prepositioning ship, one general cargo vessel, one crane ship, one tanker, and two vessels for the City of Baltimore.

As of October 1, 1987, the yard was in the process of constructing two oceanographic survey ships (T-AGS) for the U.S. Navy, and tunnel sections for the Hampton Roads Tunnel Complex for the State of Virginia. These projects are expected to be completed in 1988. In addition, the yard was repairing a dredge.

With its range of skills, tools, and facilities, this yard has been called upon regularly by various industries to produce large-scale steel fabrications, 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; such as, establishing new production and material 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-coating equipment, and expanded machine shop and pipe shop. During the third quarter of 1985, the yard completed the dredging of berth areas, approach channels and in-yard channels.

Since the yard's forecast for ship construction and servicing indicates that demand will center around smaller-sized vessels, a two-position intermediate gate was installed to increase the flexibility of its 1,200-foot (366 m) building basin by dividing it into two sections. In one position the basin's sections are 900 feet and 300 feet (274 m and 91 m) in length. In the second position, the sections are 685 feet and 515 feet (209 m and 157 m) in length.

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. Four outfitting berths are available with a combined length of 3,040 linear feet (927 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.

In August 1987, the Sparrows Point yard announced the addition of a 44,000 ton (44,735 metric ton) floating drydock. This drydock will accommodate vessels up to 900 feet (274 m) in length with a beam of up to 136 feet (41 m) and a draft up to 30 (9 m) feet. The entry channel to the facility is being dredged to a depth of 30 feet (9 m).

The total labor force at Sparrows Point was 1,970 at mid-1987, up from 1,290 a year earlier.

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

7. 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. 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 15 years, Fraser has performed most of the major ship lengthening work on the Great Lakes. At this shipyard, general ship repair also has been an important source of revenue.

In 1981, Fraser completed conversion of the CHARLES M. BEEGHLY from a straight-deck bulk carrier to a self-unloading bulker for Interlake Steamship Company. In May 1982, Fraser Shipyards completed conversion of three ships of U.S. Steel Corporation's Great Lakes fleet -- the ARTHUR M. ANDERSON, CASON J. CALLAWAY, and PHILIP R. CLARKE -- to conveyor-type self-unloaders. Following completion of these vessels, there was no major repair or conversion work, until the conversion to diesel power of the GEORGE A. SLOAN which was completed in June 1985.

In mid-1987, with no work underway in the yard, employment including salaried personnel totaled only 40 people.

In the early 1980's, 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 major repowering of the shipyard to support the expanding facilities and to improve existing capacity. New automated welding equipment and related modern techniques also were 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 dock was added in 1973 to build new midbody sections for the bulk ore freighters under contract for lengthening at that time. There are 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, as well as 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 9 is a current plot plan of Fraser's shipbuilding and ship repair facilities.

8. General Dynamics Corporation - Electric Boat Division

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

9. Ingalls Shipbuilding Division/Litton Systems, Incorporated

The Ingalls Shipbuilding Division of Litton Systems, Inc., is located on the Gulf of Mexico in Pascagoula, MS. Ingalls is a diversified shipbuilding facility experienced in the construction, modernization, conversion, and overhaul of Navy warships and auxiliaries. In addition, the shipyard participates in ship system analysis and ship conceptual and detail 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 October 1987, Ingalls designed, built, and delivered to the Navy 48 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 eight CG-47's, 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 1985, Ingalls completed the complex modernization and reactivation of the World War II battleship, IOWA, and in August 1986 was awarded a contract to reactivate the WISCONSIN, its sistership.

As of October 1, 1987, the company held orders for seven additional Aegis cruisers. The last of these ships is scheduled for completion in 1992. In May 1985, Ingalls laid the keel for the lead ship of a new class of multi-purpose amphibious assault ships, the LHD-1, an Ingalls' design. Delivery is scheduled for the end of 1989. In September 1986, the yard was awarded a contract to build a second LHD scheduled for delivery in 1992, and has options to build the third and fourth ships of the class. In May 1987, the Navy selected Ingalls as its second source for the new DDG 51 class guided missile destroyer to be delivered in 1991. In June 1987, the yard was awarded a contract to build, install, and test a CG-47 propulsion plant for the Great Lakes CG-47 Training Facility. Ingalls also has a regular workload of Navy overhauls and repairs.

Ingalls' East Bank facility has been in operation since 1938, engaging primarily in construction of commercial cargo ships and tankers. In 1974, Ingalls completed a series of highly productive containerships, the last commercial ships built at the yard. The yard maintains six inclined shipways. Maximum ship sizes which can be accommodated are: Four ways 650 by 90 feet (198 m by 27 m), one way 690 feet by 85 feet (210 m by 26 m) and one way 550 by 80 feet (168 m by 24 m).

The East Bank facility has a graving dock which has been used for construction and overhaul of nuclear-powered submarines, but is currently being used for ship repair work. A wharf and four piers serviced by cranes with a 60-ton (54 metric ton) maximum capacity provide a total of 5,450 feet (1661 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 and preoutfitted; these 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 (including outfitting) 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 floating drydock (resting on a submerged grid) which is subsequently floated and moved to a deep-water area where it is ballasted and the ship launched. The drydock can launch or recover a maximum ship size of 850 feet by 173 feet (259 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.

A major productivity improvement program is currently underway at Ingalls. This 12-month project will enhance the proven success of modular shipbuilding through construction of additional facilities and is scheduled for completion in August 1988. About 180,000 square feet (16,722 square meters) of the shipyard's slab area will be brought under roof to increase the amount of early outfitting performed. This area and its support equipment will be operational by April 1988. In addition to the covered work area, improved pipe production facilities, a machinery packaging facility and a new blast and paint station in the steel fabrication shop are being added. This facility improvement will maximize the utilization of more efficient downhand welding and outfitting techniques by increasing early outfitting of machinery, hardware, ventilation and piping systems into the ship assemblies; by consolidating the production process; and by eliminating unnecessary handling and movement of materials.

The company's technical pioneering in shipbuilding is continuing with the use of computer-aided design and manufacturing systems, such as integrated CAD/CAM, to streamline and automate the process of designing and building modern ships.

Ingalls Shipbuilding Division of Litton Industries at mid-1987 employed a total labor force of 11,850, down from 12,700 a year earlier.

Exhibit 10 is the current general arrangement plans of facilities in the Ingalls East Bank and West Bank facilities.

10. Marathon LeTourneau Company - Gulf Marine Division

Marathon Manufacturing Company, a world leader in production of offshore drilling rigs, launched its 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 2,100-foot (640 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 drill ships, 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 Brownsville 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.

One jack-up rig was delivered by Marathon's Brownsville yard in 1984, and another was delivered during the second quarter of 1985 to Penrod Drilling Company. Since then, the yard has built four large production modules, two platform drilling rigs and has been engaged in rig maintenance, repair and conversion work.

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 2,100 feet (640 m).

At mid-1987, the total work force at the Brownsville plant was 320, down from 500 a year earlier.

Exhibit 11 is a plot plan of the yard's construction facilities.

11. Marine Power & Equipment Company, 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.

From 1983 through 1985 several oceangoing barges and tugs and 28 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 February 1986, MPE filed for protection under Chapter 11 of the U.S. bankruptcy law. As of October 1, 1987, the yard was engaged in the repair of both commercial and military vessels.

Although Marine Power's shipbuilding and repair complex comprises five yards, new construction work for vessels over 475 feet (145 m) in length is done in Yard 4 with support available from other divisions. The company operates seven building ways, and the maximum size vessel that can be built is 500 feet by 104 feet (152 m by 32 m).

In this yard, 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 IV system is used for cost scheduling and control. Laser control alignment is used.

During construction of a deep-draft ship from 400 to 500 feet (122 to 152 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 for longer vessels. 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 1,505 feet (459 m).

Total employment at Marine Power & Equipment Company in mid-1987 was 100, compared to 220 a year earlier.

Exhibit 12 is a current general arrangement plan of Yard 4 where the company's new construction work for vessels 475 feet (145 m) in length is accomplished.

12. National Steel and Shipbuilding Company

National Steel and Shipbuilding Company (NASSCO), the largest shipbuilder 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.

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 October 1984. The second and third Waterman ships, renamed the PFC. EUGENE A. OBREGON and the MAJ. STEPHEN W. PLESS, were redelivered in January and May 1985, respectively.

Also 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 USNS ALGOL (T-AKR 287), was completed and turned over to the Navy in June 1984. The second vessel, the USNS BELLARIX (T-AKR 288), was redelivered to the Navy in September 1984. The last of the three T-AKR's, the USNS REGULUS (T-AKR 292), was redelivered in August 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 vessel, U.S.N.S. MERCY, was redelivered in December 1986. The second vessel, U.S.N.S. COMFORT, was redelivered in December 1987.

In August 1984, Exxon Shipping Co. signed a contract with NASSCO for construction of two new 209,000-dwt. crude oil carriers which were delivered in December 1986 and April 1987.

In January 1987, NASSCO was awarded a contract to construct an AOE 6 class fast combat ship (with options for an additional three ships). Construction of the first vessel will commence in early 1988 with delivery in 1991.

Repair and overhaul work in 1986 and 1987 consisted principally of Navy contracts. As of October 1, 1987, NASSCO was performing overhaul and repair work on three Navy vessels.

In the fourth quarter of 1983, NASSCO placed in operation a new 25,000-ton (25400 metric ton) floating drydock which has enabled the yard to respond more fully to both Navy and commercial ship repair markets. Additionally, in 1985 an automated steel plate and shape, blast and prime line was added. In 1986 an automated pipe silo was installed and the pipe shop was improved and expanded.

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).

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.

In 1987, NASSCO acquired two new burning machines, as well as a variety of sophisticated computer software. Engineering CAD equipment, a LSA computer system, a valve test stand, and a living barge also were acquired in 1987.

As of mid-1987, the total labor force was 2,145, down from 3,920 in mid-1986.

Exhibit 13 is a current NASSCO plot plan.

13. Newport News Shipbuilding

Newport News Shipbuilding, located at the Port of Hampton Roads in Newport News, VA, is the largest shipbuilding complex in the United States. The company, founded in 1886, is a subsidiary of Tenneco, Inc. Newport News has built 24 aircraft carriers, 39 nuclear-powered submarines, and 121 other surface ships for the U.S. Navy. Commercial vessels delivered by the yard include 71 cargo ships, 85 tankers, 61 passenger ships (most notably the famed superliner UNITED STATES), and more than 50 other self-propelled vessels. Newport News was a pioneer in the field of jumboizing ships, and since 1957 has completed 34 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, 1987, was at work on two Nimitz class aircraft carriers and ten 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.

Included in Newport News major facilities are the following:

Docks and Shipways - There are eight separate docking facilities. Shipway 12, the largest building basin in the nation, is 1,613 feet (492 m) long, 250 feet (76 m) wide, and 33 feet (10 m) deep. Three positions for the intermediate gate expands the multi-ship construction capability of this dock, permitting simultaneous ship construction and repair. A 900

metric-ton 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).

Shipways 10 and 11 are used for construction work as well as overhaul and repair, and are serviced by a 310 long ton (315 metric ton) gantry crane. The larger of these two graving docks, Shipway 11, can handle ships up to 1,100 feet by 130 feet (335 m by 40 m). The other four graving docks (Dry Docks 1-4) are used mainly for ship repair and overhaul work.

The new Floating Drydock which is 640 feet by 140 feet (195 m by 43 m) will be primarily used as a part of the submarine land level facility.

Inclined Shipways - There are two inclined shipbuilding ways; the larger of these can accommodate vessels as large as 668 feet by 93 feet (204 m by 28 m).

Vessel Berthing - Newport News has two outfitting berths and seven piers in addition to the two small piers included with the submarine land level facility. One 1,670 foot (509 m) outfitting berth and one 950 foot (290 m) outfitting berth are each serviced by 30 metric-ton cranes. The seven piers for outfitting and topside repair provide 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).

Submarine Construction and Repair Complex - This land level facility is currently being used for construction of nuclear attack submarines. It includes a modular outfitting facility (MOF), outboard ways, two small piers, a transporter and transfer system and a floating drydock. The MOF is divided into two bays with two construction ways per bay. Each bay is serviced by two 150-ton (136 metric ton) and three 20-ton (18 metric ton) bridge cranes. The Ring Module Shop was completed in 1985. Individual submarine hull rings are welded together in this shop to form module length units; and, structural tanks including piping are installed, welded and tested.

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 An 11-acre, all-weather steel production facility for assembling structures from small, complex components to 300-ton (272 metric ton) subassemblies;
- o A blast and coating shop which provides an enclosed, environmentally-controlled facility for blasting and coating modules;
- o A fully-equipped wood pattern shop facility;
- o One of the largest foundries in the Nation where steel castings weighing as much as 138,000 lbs. (62597 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 1987 totaled about 25,350.

Exhibit 14 is a current general arrangement drawing showing major facilities at Newport News.

14. Norfolk Shipbuilding & Drydock Corporation

Norfolk Shipbuilding & Drydock Corporation (NORSHIPCO) has three shipyards in the City of Norfolk. The largest of the three, the Berkley Plant covers 100 acres and is located on the Southern branch of the Elizabeth River. The other two shipyards, Brambleton and Southern Plants, are on the Eastern branch of the Elizabeth River.

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.

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 May 1985, NORSHIPCO delivered a 100-car ferry to the Delaware Transportation Department. During the past five years, the company's repair and overhaul business, continued at a steady pace. The start of the fourth quarter of 1987 saw the backlog of repair and conversion work at the highest level in the company's 70-year history.

In August 1986, NORSHIPCO was awarded a contract for the conversion of three merchant ships to auxiliary crane ships (T-ACS) for the Navy. The first vessel converted by NORSHIPCO, T-ACS 4, renamed GOPHER STATE, was redelivered in October 1987. The second, T-ACS 5, to be renamed FLICKERTAIL STATE, is scheduled for redelivery in February 1988; and the third, T-ACS 6, to be renamed CORNHUSKER STATE, is set for delivery in March 1988.

A multi-faceted expansion program emphasizing repair operations was completed in 1979 at the Berkley Plant. 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 52,534 long tons (54,411 metric tons). A new concrete pier, 1,030 feet (314 m) in length, is used for repair and servicing of ships as long as 1,200 feet (366 m). 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 the floating drydock. The crane is also able to service ships alongside the pier.

As part of an ongoing capital investment program, NORSHIPCO purchased and placed in service in 1985 a one-piece steel floating drydock which can accommodate vessels up to 650 feet (198 m) in length by 81-feet (25 m) wide. This drydock has a lifting capacity of 16,000 long tons (16,627 metric tons). In 1986, NORSHIPCO completed the installation of a large diesel engine parts repair facility known as Diesel Marine NORSHIPCO.

For major ship construction, the company's Berkley Plant operates a horizontal building way which can accommodate ships as large as 500 feet (145 m) in length with a beam up to 80 feet (24.4 m). The vessels are constructed on the flat building position and end-launched in one piece hydraulically into a floating drydock.

The largest of the company's marine railways, located in the smaller Brambleton Plant, can accommodate a vessel 460 feet by 70 feet (140 m by 21 m) with a lifting capacity of 6,000 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 workforce totaled 3,370 in June 1987, up from 3,200 a year earlier.

Exhibit 15 is a current plan of the Berkley Plant, the largest of the company's three plants.

15. Pennsylvania Shipbuilding Company

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, acquired a majority interest in the parent company, and thus in Pennsylvania Shipbuilding Company. The parent company's name was changed to Capital Marine Corporation.

Pennsylvania Shipbuilding Company is one of the largest and best equipped shipyards in the country. It covers 150 acres on a mile of the Delaware River waterfront, just south of Philadelphia, PA. During World War II, some 40,000 people worked in the yard which launched one ship per week.

In its 66 years of operation, the shipyard designed and constructed more than 650 vessels, mainly commercial ships. In later years the yard 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.

In 1976, completion of a major capital improvement program enhanced the shipyard'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 level shipbuilding slab has two sections. 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 is capable of handling vessels up to about 300,000 dwt. 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, a 150-ton (136 metric ton) barge crane, and an 800-ton (726 metric ton) barge crane with a 230-foot (70 m) boom.

In addition to the two-section shipbuilding platform, two conventional sliding ways are available. Each can handle a ship as large as 745 feet by 129 feet (227 m by 39 m). The yard has a total of about 6,200 feet (1890 m) of usable berthing space with modern facilities at six deepwater piers.

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 September 1982, in order to handle an increasing volume of repair and overhaul work, Pennsylvania Shipbuilding purchased and moved a medium-size floating drydock from Levingston Shipbuilding Company, its affiliate in Orange, TX, to the Chester, PA, plant.

In June 1984, Pennsylvania Shipbuilding 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. Pennsylvania Shipbuilding started work in October 1983 on the conversion of a sistership, the USNS DENEbola (T-AKR 289) which was redelivered to the Navy in October 1985.

In May 1985, yard was awarded its first new construction contract since 1979. The contract was awarded by the Navy for the construction of two T-AO fleet oilers. The first vessel is scheduled for delivery in March 1989 and the second in December 1989. Since the May 1985 contract, the Navy awarded two additional T-AO contracts to Pennsylvania Shipbuilding -- one vessel is scheduled for delivery in September 1990 and the other in June 1991.

In June 1985, Pennsylvania Shipbuilding retained the services of IHI, a major Japanese shipbuilder, to assist in production planning and implementation of modular construction and preoutfitting techniques.

In 1986, several facility improvements, slated toward further adaptation of product oriented ship construction, were undertaken or completed. Among these were: construction of an entirely new ferrous pipe shop; construction of a "pallet" marshalling yard; extension to the steel fabrication shop for indoor pre-outfit of assemblies; and, rearrangement of machinery and work areas to suit process lane building techniques. Future plans include additional blast and paint facilities and a new warehouse. The company is moving to change the entire technology by which ships are built at Penn Ship.

The extreme north end of the facility, which is not needed for shipbuilding activities, was converted in 1986 to a shipping terminal under a separate company, Penn Terminals, Inc. Loading and unloading of cargo for various ship owners commenced with offloading of steel slabs and loading of palletized drums of oil. Business at Penn Terminals has increased steadily since its inception in September 1986.

Employment at Pennsylvania Shipbuilding totaled 1,870 at mid-1987, compared with 1,200 a year earlier.

Exhibit 16 is the latest available layout of the plant and facilities at Pennsylvania Shipbuilding Company.

16. Peterson Builders Incorporated

Peterson Builders, Inc. (PBI) of Sturgeon Bay, Wisconsin, is a well known Great Lakes shipyard which has steadfastly maintained its reputation for quality, diversification, and innovation since 1933.

Peterson Builders, Inc., is a privately owned, full service, construction and repair shipyard which serves the government, commercial, and service industries with its construction capabilities in wood, steel, fiberglass and aluminum, as well as its design and production expertise. Their continuing backlog of ship construction complemented by conversion, repair, and special projects of unique assembly fabrications, enables PBI to maintain an excellent labor force of the highest standards and keep pace with the latest technologies and developments in the industry. In modular as well as traditional construction techniques and operational functions, Peterson Builders complies with numerous Mil-Q government standards and has earned Certification Status from the U.S. Navy for other procedures and capabilities.

The main yard with seven acres of buildings provides inside construction and production facilities; total area is 13 acres. Extensive waterfront facilities provide berthing for vessels up to 900 feet (274 m) in length. PBI operates two side launching shipways; one can accommodate a maximum ship length of 500 feet (152 m) and the other 225 feet (69 m). Also, inside

ship construction capabilities for vessels up to 230 feet by 60 feet (70 m by 18 m) are available. PBI's floating drydock facilities are Navy-certified for 1,100 long ton (1118 metric tons) with current plans for recertification to 1,300 tons (1322 metric tons). Length overall is 374 feet (114 m) with docking capacity for vessels up to 360 feet by 40 feet (110 m by 12 m).

Current construction contracts underway at PBI include five wooden 224 feet (68 m) Mine Countermeasure Ships (MCMs) for the U.S. Navy. One, the MCM-1 AVENGER, was delivered to the U.S. Navy in August 1987. As part of the Navy's mine warfare renewal program, these MCMs will replace ships in service since the early 1950's. PBI has been a leader in mine craft construction since that time; longer than any other shipyard in the world. This new generation of wooden ships being built at PBI are by far not the only "first of a kind" contracts awarded to the yard. Other recently completed "new class of ship" construction contracts for the U.S. Navy are four steel 255-foot (78 m) ARS Auxiliary Rescue/Salvage ships and seven wooden 108 foot (33 m) YP Yard Patrol craft. PBI also maintains a long-standing history for excellent commercial vessel construction ranging from super tuna seiners, research ships, large passenger/car ferries, and a range of sizes of tugs.

At mid-1987 the company's average total employment was 875.

Exhibit 17 is the current general plot plan of the Peterson Builders main yard in Sturgeon Bay, Wisconsin.

17. Portland Ship Repair Yard

The Portland Ship Repair Yard is part of the Municipal Corporation of the Port of Portland. The 125-acre shipbuilding and ship repair facility is located in Portland, OR, on the Willamette River. It and the major marine terminal facilities of the Port are reached via the Columbia River--a 106-mile passage from the Pacific Ocean via a 40-foot (12 m) deep and 600-foot (183 m) wide navigation channel.

The Portland Ship Repair Yard was developed from the World War II Swan Island Shipbuilding facilities which employed 132,000 persons and delivered 1,076 ocean-going ships. The shipyard currently employs 1,500 persons down from a peak of 4,200 persons, primarily engaged in major ship repair. In 1975, the shipyard constructed two 80-foot by 400-foot (24 m by 122 m) self-unloading covered barges.

The Portland Ship Repair Yard has no current orders for shipbuilding. However, this market is being aggressively pursued. In 1979, the shipyard added an 87,000 ton (88453 metric ton) floating drydock, the largest drydock on the West Coast, and 3,000 feet (914 m) of modern deepwater repair and outfitting wharves with five whirley cranes 75 to 120 tons (68 to 109 metric tons) capacity. The maximum combined crane lift capacity is 246 tons (223 metric tons).

The shipbuilding facilities at the Portland Ship Repair Yard are capable of producing modular type units from 1,500 to 5,000 tons (1525 to 5084 metric tons), which are transported by rubber-tired vehicles, crawler or walker, via launching bridge to two locations. At one ship construction location, a vessel 475 feet by 100 feet (145 m by 30 m) can be constructed using the No. 3 drydock for launching. At the other location, a vessel up to 810 feet by 108 feet (247 m by 33 m) can be constructed using the No. 3 and No. 4 drydocks for launching.

Portland Ship Repair Yard operates three drydocks. The largest two (No. 3 and No. 4) can accommodate vessels up to 810 feet by 108 feet (247 m by 33 m), and 1150 feet by 181 feet (351 m by 55 m) respectively. A total of 10,100 feet (3078 m) of fully serviced pier space with 14 whirley type cranes are employed for outfitting. Recently, a new layberth facility (Berth 315) was added. It can accommodate two 1,100-foot (335 m) VLCCs in lay-up status.

The Portland Ship Repair Yard has 500,000 square feet (46450 m²) of fully-enclosed service shops and warehouse space. The 11 module assembly bays are 323 feet (98 m) long, 70 feet (21m) wide (clear), 60 feet (18 m) high (clear).

The Portland Ship Repair Yard is preparing to expand its modular construction capability by an additional 75 acres, located about six river miles downstream at its Rivergate Industrial Park. This facility will be suitable for constructing ship modules to 5,000 tons (5084 metric tons) which can be crawler transported, barge loaded, and joined and launched on No. 4 Drydock.

The shipbuilding assets of the Portland Ship Repair Yard are augmented by the individual facility user's assets. Northwest Marine Iron Works, Cascade General, Inc., and West State, Inc., are contracted users of the facility.

Significant projects accomplished in 1986 by Portland Ship Repair Yard contractors include conversion of the GRAND CANYON STATE (T-ACS 3), conversion of the CAPE ISABEL to an RRF ship, and complete reconstruction of the machinery spaces on the PRINCE WILLIAM SOUND following a flooding casualty, major overhaul of the USCGC GLACIER (WAGB-4) and USS FORT FISHER (LPD-40), construction of three complete new superstructures for Washington State Ferries, re-engine of the USCGC STORIS, and conversion of the CAPE EDMONT to an RRF ship.

Significant projects during 1987 included overhaul of USS PAUL FOSTER, drydocking and hull repair of the cruiseship, MONTEREY, and the overhauls of two Alaskan oil tankers - EXXON NORTH SLOPE and BROOKS RANGE.

Exhibit 18 is a current general arrangement plan of the Portland Ship Repair Yard facility and ship repair assets.

18. Robert E. Derecktor of Rhode Island, Inc.

Robert E. Derecktor of Rhode Island, Inc., founded in 1979, is located in Middletown, Rhode Island. This Derecktor Shipyard comprises over 44 acres of land situated on Coddington Cove in Narragansett Bay. The facility is approximately 6.5 nautical miles from Brenton Reef Tower (2.5 nautical miles northeast of the Newport Bridge) giving access to any size vessel. In 1975, Derecktor began to develop the 44 acres of waterfront property after the Navy abruptly deactivated most of its Rhode Island (Newport Naval Base) facilities in 1974. In 1979, negotiations with the Navy and the Rhode Island Department of Economic Development were concluded and the yard was officially opened. The first vessels built at the Rhode Island yard were 80-foot (24 m) fishing vessels. Over the years major conversion and repair work performed at the facility include: work on Navy and Coast Guard vessels, LNG tankers, floating drydocks, ferry boats, fire boats, barges, tugs, fishing trawlers, and miscellaneous private craft.

In January 1981, the Rhode Island yard was awarded a significant contract to design and construct nine 270-foot (90 m) medium endurance cutters (WMECs) for the United States Coast Guard. Work commenced on the project in June 1981. Four of the WMECs -- SPENCER, SENECA, ESCANABA, and TAHOMA -- have been delivered. As of October 1, 1987, the yard had five WMECs under construction, with the last vessel scheduled for delivery in May 1989.

In 1985, Derecktor was awarded a contract by the City of New York's Department of Transportation for the construction of two 1,295-passenger ferries for service runs between Manhattan and Staten Island. Both ferries were delivered in 1986.

The Rhode Island facility is one of the most modern and complete in the northeast. This Derecktor yard utilizes a 153,000-square-foot (14213 m²) fabrication and assembly building, several inside shops, warehouses, engineering, design and office buildings, a 300-ton (272 metric ton) crawler crane, a 1,500-foot (457 m) deep water pier, and 6,500 feet (1982 m) of accessible and usable waterfront. In addition, the shipyard operates two floating drydocks which are joinable and thus capable of accommodating a vessel up to 725 feet by 90 feet (221 m by 27 m). For building vessels up to 500 feet (152 m) in length, modules are constructed in the fabrication building, with full erection and launching accomplished at the floating drydocks.

Fully equipped machine, piping, hydraulic, electrical, painting, carpentry and engine overhaul shops, and tank cleaning/storage capabilities enable all work to be done in-house. Over the past five years, extensive machinery and equipment have been put into place.

As of mid-1987, Derecktor's Rhode Island yard workforce totaled 655, compared to 698 in mid-1986.

Exhibit 19 is a current general arrangement of Derecktor's shipbuilding and repair facilities in Rhode Island.

19. Tacoma Boatbuilding Company

In operation since 1926 in Tacoma, WA, this shipyard designs, constructs, and repairs vessels for commercial customers, the Navy and Coast Guard, and foreign governments. Tacoma Boat's overall facilities consist of two yards over 30 acres of company-owned or leased property located adjacent to the Commencement Bay industrial complex.

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 and WMEC cutters 270-foot (75 m) long for the Coast Guard, revolutionary-design tractor tugs, and high-speed patrol ships, gunboats, and minesweepers for the Navy and/or foreign governments. The company also helped design and build an 80-knot surface effect ship (SES).

During the 1984-1987 period, Tacoma delivered 10 ocean surveillance ships (T-AGOS) to the Navy. This 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.

In September 1985 Tacoma filed for protection under Chapter 11 of the U.S. bankruptcy law. In August 1987 a U.S. Bankruptcy court accepted Tacoma's reorganization plan.

As of October 1, 1987, major work underway at Tacoma Boat included the construction of two T-AGOS ships as well as conversion of the HAYES (T-AGOR-16) to a T-AG for the Navy.

The company also designs and manufactures deck machinery under the name of Northern Line.

To broaden the company's shipbuilding base, Tacoma Boat expanded its operations in 1981 with the installation of CAD/CAM (Computer-Aided Design and Computer-Aided Manufacturing) which 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 four end-launch construction ways the largest of which can construct vessels up to 430 feet (131) by 50 feet (15 m).

Available for outfitting and repair work is 1,350 feet (411 m) of berthing space. In addition, a 200-foot by 60-foot (91 m by 18 m) maximum ship capacity marine railway was placed in operation in October 1986.

The total work force at Tacoma Boat at mid-1987 was 265, down from 550 a year earlier.

Exhibits 20 and 21 are current general arrangement drawings of the company's two yards.

20. 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 shipbuilding and repair facility in Florida. It was purchased by The American Ship Building Company in 1972 and is located on the recently deepened 43-foot (13 m) Sparkman Channel 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 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, respectively.

In 1986, Tampa Shipyards, Incorporated, under contracts signed in 1983, with Ocean Carriers, Inc., completed construction of the last two of five new 30,000-dwt. clean-product, ice-strengthened tankers for charter to the Military Sealift Command. The preponderance of work was accomplished at Tampa Shipyards, although Avondale Shipyards built the forebodies and ADDSCO Industries completed the deckhouse steel work. Final assembly and outfitting took place at Tampa Ship. The first three T-5 tankers, the PAUL BUCK, the CUS W. DARNELL, and the SAMUEL COBB, were delivered in June, September, and November 1985, respectively. The RICHARD G. MATTHIESEN was delivered in February 1986 and the LAWRENCE H. GIANELLA was delivered in May 1986.

In order to compete in today's highly technical ship-building industry, Tampa Shipyards embarked on an innovative, expansion program. During 1984, major new facility installations were completed and integrated into the current ship construction program.

Recent additions include: a new concrete pier, two graving docks, two wet berths, additional shops, and an erection/assembly building. The erection/assembly building is 600 feet by 145 feet by 115 feet (183 m by 44 m by 35 m), and is serviced by three overhead bridge cranes with a combined lifting capacity of 1,000 tons (908 metric tons). About 350 feet (107 m) of this building straddles one of the new graving docks, allowing pre-assembled units weighing in excess of 500 tons (508 metric tons) to be erected in a totally enclosed environment.

The company currently has four graving docks operational. The largest can handle ships up to 896 feet by 146 feet (273 m by 45 m). Two of these four graving docks 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).

To provide additional fabricating capability, Tampa Ship has acquired a long-term lease on 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 tons) capacity, and barge loading facilities. The building is two hours by tow from Tampa Ship.

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.

The yard is also upgrading other areas including modernization of the steel fabricating, sheet metal, carpentry, machinery, electrical, and pipe departments, as well as blasting and painting facilities.

As of October 1, 1987, Tampa Shipyards was gearing up for the conversion of two freighters to auxiliary crane ships, T-ACS 7 and 8, for the U.S. Navy, a contract which was awarded in September 1987.

As of mid-1987, 270 people were on the Tampa payroll compared to 300 in mid-1986.

Exhibit 22 is a general plan of Tampa Ship's main yard. Neither the South Slip nor the Westinghouse facility is shown.

21. 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.

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 and 1984, under a contract with Bethlehem Steel, the yard installed a new midbody in the ELEO MAERSK and the EMILIE MAERSK, two cargo ships which were converted to maritime prepositioning ships by Bethlehem-Beaumont.

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), with options for their reconstruction. In December 1984, the Navy exercised the option for the first ship, the YOUNG AMERICA, which was renamed the WRIGHT and redelivered in May 1986. The option for the second vessel, the GREAT REPUBLIC, was exercised in December 1985. This vessel was renamed the CURTIS and redelivered in 1987.

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 beam no greater than 160 feet (48.7 m).

As a result of Todd's decision in 1984 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 six 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 (305 m) in length and 140 feet (43 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-1987, total employment was 345, compared to about 800 a year earlier. The employment level has continued to decline after completion of the Navy T-AVB conversions. As of October 1987, the yard was primarily engaged in private ship repair work.

In August 1987, Todd Shipyard Corporation filed for protection under Chapter 11 of the U.S. bankruptcy code.

Exhibit 23 is a current plan of the main yard and the Southwest Plant.

22. 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 1946. In 1977, Todd's Los Angeles and Seattle Divisions were organized as the Todd Pacific Shipyards Corporation, a wholly-owned subsidiary of Todd Shipyards Corporation, which filed for protection under Chapter 11 of the U.S. bankruptcy code in August 1987.

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, a 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 18 sophisticated guided missile frigates (FFG-7 class). As of October 1, 1987, one of these ships remained in production. This frigate is scheduled for delivery in June 1989.

During the past three years, Todd-LA has performed repair and overhaul work on several types of naval combatant and auxiliary vessels, as well as post shakedown availability work on guided missile frigates and AEGIS class guided-missile cruisers. Reconstruction of the RO/RO vessel, SS MATSONIA, was completed and the vessel redelivered in October 1987.

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 inclined building ways and supporting cranes were modified from three ways, limited to 1950-60 era maritime construction and destroyer class newbuildings, 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, including integrated process flow lanes and work stations for fabrication and full pre-outfitting of modules prior to erection on the building ways.

Shops have been extended in size, platens expanded, craneways extended, and numerically-controlled manufacturing machinery added. One of the first robotic production welding centers in U.S. shipbuilding is also in full operation. Line heating technology was fully implemented in early 1986.

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.

The most recent facility expansion project in this program is the addition of a land-level ship lift (Syncrolift) transfer facility. The presently completed phase of the facility includes 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 two work bays which became operational in March 1984. According to Todd's management, these additions have doubled the Los Angeles Division's ship construction capacity and increased its repair capability by 250 percent.

Other facility projects recently completed include: relocation of the floating drydock with new mooring dolphins (concrete) and modernized utility support; certification of Building Way No. 1 to MIL-STD-1625B; redesign and replacement of the yard's power distribution systems; relocation of a gantry crane to the plate yard; extension of the No. 9 craneway; and installation of a seam welder in the Plate Shop.

Todd-LA operates one floating drydock, which can handle a vessel up to 711 feet by 86 feet (217 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.

Total employment at the yard was 1,548 in mid-1987, down from 2,640 a year earlier.

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

23. 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 from the Seattle Construction and Drydock Company, 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 52-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, constructing over 125 ships as well as repairing and servicing some 2,700 deep-draft vessels of all sizes, types, and flags. However, in 1987 the corporation filed for protection under Chapter 11 of the U.S. bankruptcy code.

In 1952, Todd-Seattle added two shipbuilding ways which further enhanced their capabilities. Since 1952, the yard has built 80 vessels of 20 distinctly different types -- from two self-unloading phosphate barges, to a surface effect craft, to 13 guided missile frigates (FFGs), to a floating drydock especially designed to drydock nuclear-powered attack submarines, as well as 12 barges.

As of October 1, 1987, work in the yard included the modernization of eight Hamilton class Coast Guard cutters with the last scheduled for redelivery in April 1992, and the overhaul of the frigate USS O'CALLAHAN (FF 1051) which is scheduled for redelivery in December 1987. The yard also has been awarded a contract to repower the Washington State ferry, EVERGREEN STATE, which is scheduled for redelivery in May 1988.

This yard has an active ship repair and overhaul operation that annually works on a large number of 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. In 1985, the yard received Navy certification for Master Ordinance Repair (M.O.R.) and the Department of Defense's Quality Excellence Award.

The FFG Program provided the impetus for a multi-million dollar capital investment program for improving productivity of the Seattle yard in ship repair, overhaul, and conversion. In July 1982, the company transferred a 40,000 metric ton floating drydock from its San Francisco Division to Seattle. A 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. Other facility improvements include a new machine shop, a facility for pump and motor testing, special balancing equipment for rotors up to 15,000 pounds, a new valve shop, and a calibration facility. The CAD/CAM capability was recently expanded to link all production, engineering, and material ordering/handling departments. Todd-Seattle is also developing its own oily water (bilge water) processing facility, which will allow direct service for all customer vessel bilge water and sewage requirements. When completed it will be the first and only such facility in a West Coast commercial shipyard.

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 6,017 feet (1834 m) of berthing space for outfitting and repair. The yard is serviced by 15 whirley traveling cranes, with lifting capacities ranging from 25 tons (23 metric tons) to 150 tons (136 metric tons).

In June 1987, total employment at the Seattle plant was 930 up from 850 a year earlier.

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

24. The Toledo Shipyard

In January 1985, the Toledo-Lucas County Port Authority purchased this shipyard from The American Ship Building Company which owned the yard since 1947 and closed it in 1982. In September 1985, the yard was re-opened when Merce Industries, Inc., a 25-year old topside repair firm, entered into an agreement with the Port Authority to operate the shipyard for 25 years. The Toledo Shipyard is a complete, full-service shipyard, equipped for new construction, conversion, repair, and propeller repair.

Since Merce Industries, Inc., began operating the yard, they have made extensive repairs, and they have upgraded, and renovated the facility, including the leveling of the old fit-out building adjacent to one of the drydocks, which improved access to the pier area between the graving docks and the wet slip area. Merce Industries elected not to lease the buildings immediately adjacent to the yard as the firm had existing facilities that were superior and in the nearby area. These existing facilities include a 50,000 sq. ft. (4645 m²) fabricating/propeller repair facility and a 12,000 sq. ft. (1115 m²) machining and pressure vessel shop.

Complete facilities for propeller repair services in all alloys is available through the American Propeller Division.

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

In July 1986, Merce Industries completed construction of a 360-foot wide by 60-foot deep (110 m by 18 m) notch barge for St. Marys Holdings, Inc. The barge is an ocean-going, ice-strengthened vessel with a totally self-contained pneumatic unloading system. In addition, the yard completed the construction of a passenger ferry which will be used locally in the Detroit area. Work at the yard during the first three quarters of 1987 included repair of commercial vessels.

On December 17, 1986, Toledo Shipyard filed for protection under Chapter 11 of the U.S. bankruptcy code.

As of June 1987, employment at the shipyard totaled 54, down from 200 in October 1986. Employment is expected to increase over the winter months as repair activity on the Great Lakes increases.

Exhibit 26 is a current lay-out of The Toledo Shipyard operated by Merce Industries, Inc.

Employment

Total employment trends over the past seven years in privately owned U.S. shipbuilding and ship repair yards (Bureau of Labor Statistics-SIC 3731-figures) are illustrated in the following table:

1980 Average	178,000
1981 Average	186,700
1982 Average	171,600
1983 Average	147,300
1984 Average	155,900
1985 Average	145,100
1986 Average	136,500
1987 January	132,800
1987 February	132,600
1987 March	128,200
1987 April	125,300
1987 May	126,500
1987 June	124,000
1987 July	123,300
1987 August	125,000
1987 September (Prelim.)	127,000

The Bureau of Labor Statistics (BLS) conducts a random sampling of employment in SIC 3731 (shipbuilding and ship repair) industry establishments. From this sample, employment data extrapolations are made and published monthly. It should be noted that the 1987 projections are preliminary and may be subject to extensive revision by BLS.

The Maritime Administration monitors employment in the 21 major U.S. privately-owned shipyards in the Active Shipbuilding Base (as identified in Exhibit 29 of this report) on a monthly basis. As of September 1987, employment in these 21 yards totaled 90,407 or approximately 71 percent of the preliminary overall shipbuilding and repair industry employment published for that month by the Bureau of Labor Statistics.

Ship Repair Industry

While over 200 privately owned firms of varying capabilities are involved in repairing ships in the United States, only 62 yards are capable of drydocking vessels 400 feet in length and over. For ships this size, the U.S. shipbuilding and repair industry is currently operating a total of 61 floating drydocks, 35 graving docks, and 5 marine railways. However, some of these graving docks are committed to new construction. The large organizations which have drydocks generally have 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.

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

In late 1987, Newport News completed building its submarine construction and repair complex. This land level facility is currently being used for construction of nuclear attack submarines. It includes a modular outfitting facility (MOF), outboard ways, two small piers, a transporter and transfer system and a floating drydock. The MOF is divided into two bays with two construction ways per bay. Each bay is serviced by two 150-ton (136 metric ton) and three 20-ton (18 metric ton) bridge cranes. The ring module shop was completed in 1985. Individual submarine hull rings are welded together in this shop to form module length units and structural tanks including piping are installed, welded and tested.

o Norfolk Shipbuilding and Dry Dock Corporation

NORSHIPCO placed in operation in August 1985 a floating drydock which was purchased from Verolme Botlek of the Netherlands. Built in 1960, the drydock can accommodate vessels up to 650 feet by 81 feet (198 m by 25 m), has a lifting capacity of 16,000 long tons (16627 metric tons). In 1986, NORSHIPCO completed the installation of a large diesel engine parts repair facility known as Diesel Marine NORSHIPCO.

o Bethlehem Steel Corporation

A construction project at its Sparrows Point yard was completed in 1986 which involved the installation of a two-position intermediate gate to increase the flexibility of its 1,200 foot (366 m) building basin by dividing it into two sections. In one position, the basin's sections are 300 feet and 900 feet (91 m and 274 m) in length. In the second position, the sections are 685 feet and 515 feet (209 m by 157 m) in length.

Also, in August 1987 the Sparrows Point yard announced the addition of a 44,000 ton (44,735 metric ton) floating drydock. This drydock can accommodate vessels up to 900 feet (274 m) in length. The entry channel to the facility is being dredged to a depth of 30 feet (9 m).

o Pennsylvania Shipbuilding Company

In 1986 facility improvements completed included: construction of a new ferrous pipe shop; construction of a "pallet" marshalling yard; extension of the steel fabrication yard for indoor pre-outfit of assemblies; and rearrangement of machinery and work areas to suit process lane building techniques. Future plans include additional blast and painting facilities and a new warehouse.

o Portland Ship Repair Yard (PSRY)

The PSRY is preparing to expand its modular construction capability by an additional 75 acres, located about six river miles downstream at its Rivergate Industrial Park. This facility will be suitable for constructing ship modules to 5,000 ton (5,084 metric tons) which can be crawler transported, barge loaded, and joined and launched on its No. 4 drydock. In July 1986, a launch system consisting of a 3,000 foot (915 m) roadway, a launching bridge and a dock structure was placed in operation for use in the module construction industry. Also a new layberth facility was added in 1986 which can accommodate two 1,100 foot (335 m) VLCCs in lay-up status.

o Ingalls Shipbuilding Division/Litton Systems, Inc.

A major productivity improvement program is currently underway at Ingalls. This 12-month project will enhance the proven success of modular shipbuilding through construction of additional facilities and is scheduled for completion in August 1988. About 180,000 square feet (16,722 square meters) of the shipyard's slab area will be brought under roof to increase the amount of early outfitting performed. This area and its support equipment will be operational by April 1988. In addition to the covered work area, improved pipe production facilities, a machinery packaging facility, and a new blast and paint station in the steel fabrication shop are being added.

o Bath Iron Works

A new pre-outfit building of 200 feet by 410 feet (60 m by 125 m) was opened in 1987 at BIW. This building has 18 work stations for 216-ton (219 metric ton) erection units. BIW also added in 1987 a new 220-ton (200 metric ton) capacity revolver crane to serve the third shipway. The shipway can accommodate a ship 650 feet by 88 feet (198 m by 27 m).

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 also have 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 grows, 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 each year 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 nominal future workload increase for both naval and private shipyards. However, the large size and complexity of Navy combatant ships naturally restricts participation in this type of Navy work to a limited number of private yards despite the current emphasis on public/private shipyard competition in the repair sector.

Although several firms in the industry are readying their yards for greater future participation in the Navy repair and overhaul market, private ship repair capacity in many areas of the Nation continues to be underutilized.

Repair (with Drydocking) Facilities

Major drydocking facilities are defined in this report as those yards having at least one drydocking facility that can accommodate vessels 400 feet (122 m) in length and over, provided that water depth in the channel to the shipyard itself is at least 12 feet. These facilities may also be capable of constructing a vessel less than 400 feet (122 m) length overall.

Appendix B tabulates information updated through 1987 on 32 of these repair yards by coast. Additional information is available in the Office of Shipbuilding Costs and Production.

Major Topside Repair Facilities

Major topside repair facilities are those that have sufficient berth/pier space for topside repair of ships 400 feet (122 m) in length and over, provided that water depth in the channel to the facility itself is at least 12 feet. These facilities may also have drydocks and/or construction capability

for vessels less than 400 feet (122 m) in length. Services rendered by these firms vary from a simple repair job to a major topside overhaul, particularly when the work on oceangoing ships can be accomplished without taking the ships out of the water. 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 trend creates a particular demand for highly skilled technicians versus the hull trades.

Appendix B also tabulates information through 1987 on the 54 topside repair yards' facilities (berth/pier space). The yards' building ways, drydocks, marine railways, etc., are not addressed herein as they cannot accommodate vessels 400 feet (122 m) in length and over. However, detailed data for these 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, is comprised of 21 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 1,000 gross tons or over. Exhibit 29 of this report identifies and geographically locates these 21 yards.

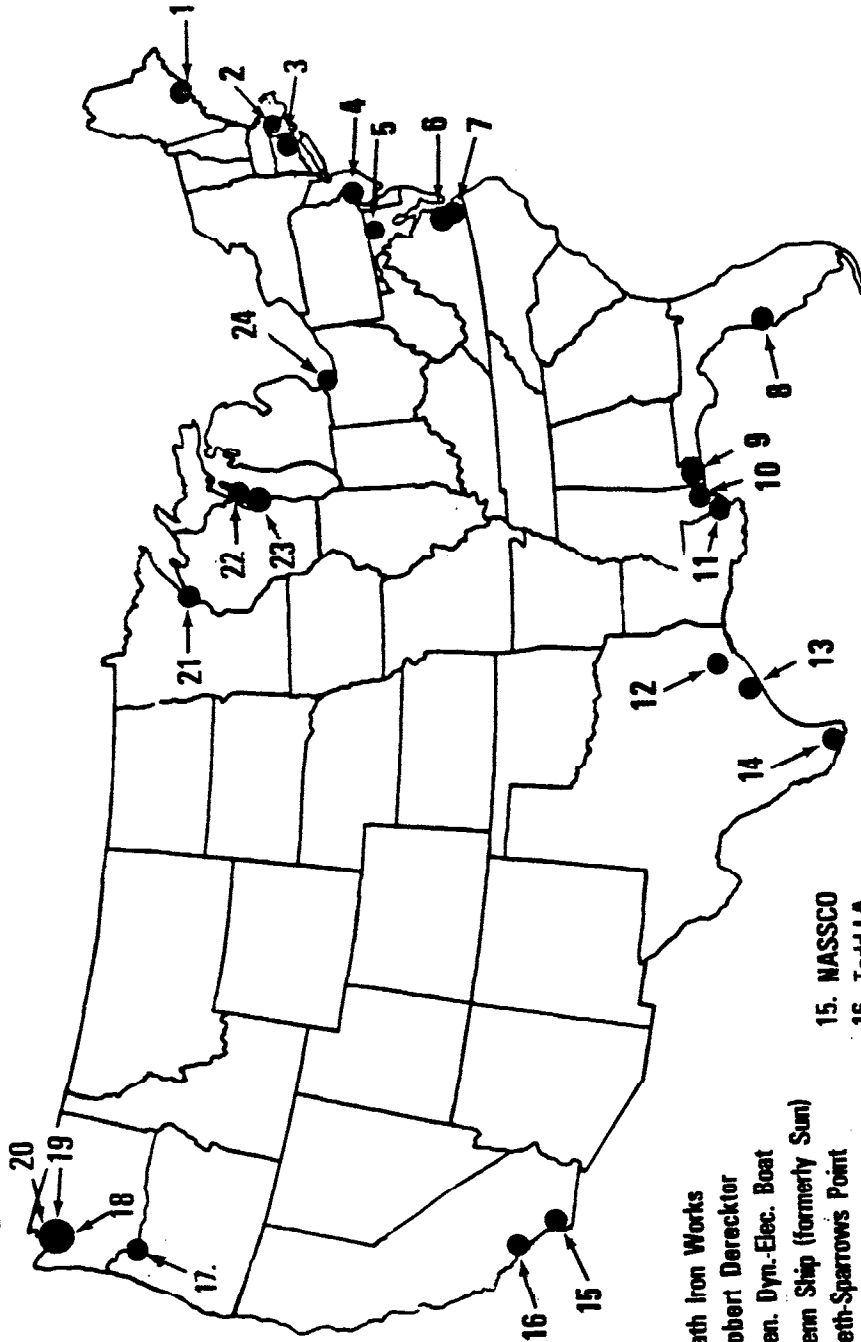
During 1987, the number of yards in the Active Shipbuilding Base was decreased from 22 to 21 as a result of the effective closure of Lockheed Shipbuilding Company's Seattle, Washington, facility. As of September 1987, these 21 yards employed roughly 71 percent of the U.S. shipbuilding and repair industry's total work force, as reported by the Bureau of Labor Statistics under SIC 3731. At that same time, 92 percent of the production workers in these 21 shipyards were engaged in Navy or Coast Guard ship construction and repair work.

As of October 1987, nine of the 21 shipyards were engaged in construction and/or conversion of major combat ships for the Navy. One of the yards was completing construction of one commercial vessel and five of the yards were engaged primarily in ship construction and conversion work provided by the Navy's T-Ship program. Six of the yards had only repair and overhaul work and non-ship construction work.

Employment projections for production workers is shown by Exhibit 30 of this report. This data is generated by overlaying Navy projected five-year shipbuilding and conversion programs onto the estimated work force required to complete the current firm orderbook.

Exhibit 30, dated October 1, 1987, indicates a continuing gradual decline through third quarter 1989 in production workforce levels of the shipyards in the Active Shipbuilding Base, followed by a period of relatively stable workforce requirements through calendar year 1993. These projections are contingent upon near-term economic conditions and future Administration and Congressional action with regard to continuation of the proposed Navy shipbuilding and conversion programs.

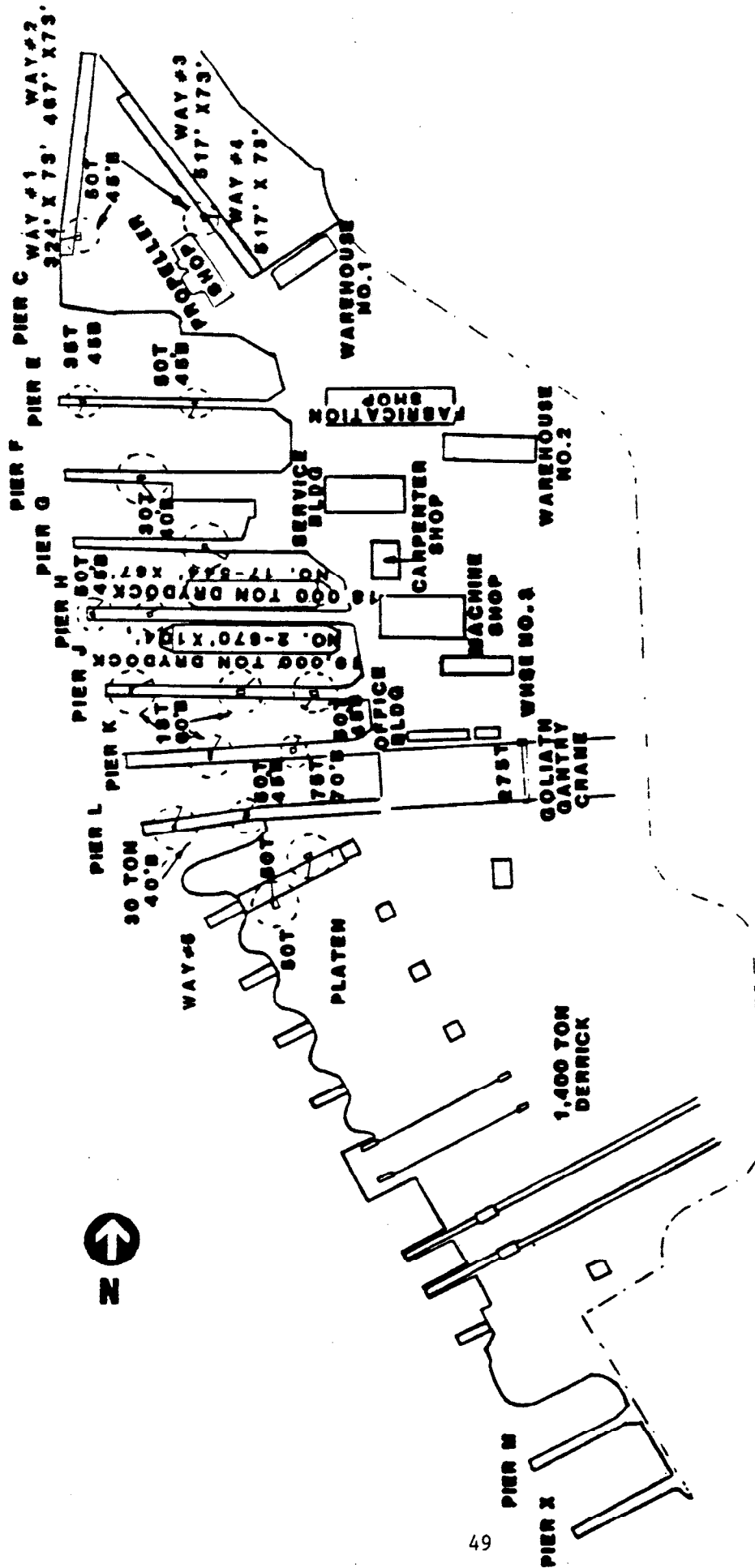
SHIPBUILDING INDUSTRY IN THE UNITED STATES



- 1. Bath Iron Works
- 2. Robert Dereecktor
- 3. Gen. Dyn.-Elec. Boat
- 4. Penn Ship (formerly Sun)
- 5. Beth-Sparrows Point
- 6. Newport News SB
- 7. Norfolk SB & DD
- 8. Tampa Shipyards
- 9. ADDSCO Industries
- 10. Ingalls/Litton
- 11. Avondale Shipyards
- 12. Beth-Beaumont
- 13. Todd-Galveston
- 14. Marathon LeTourneau
- 15. MASSCO
- 16. Todd-LA
- 17. Portland-SRY
- 18. Tacoma Boat
- 19. Marine Power & Equip.
- 20. Todd-Seattle
- 21. Fraser Shipyards
- 22. Bay Shipbuilding
- 23. Peterson Builders
- 24. Toledo Shipyard

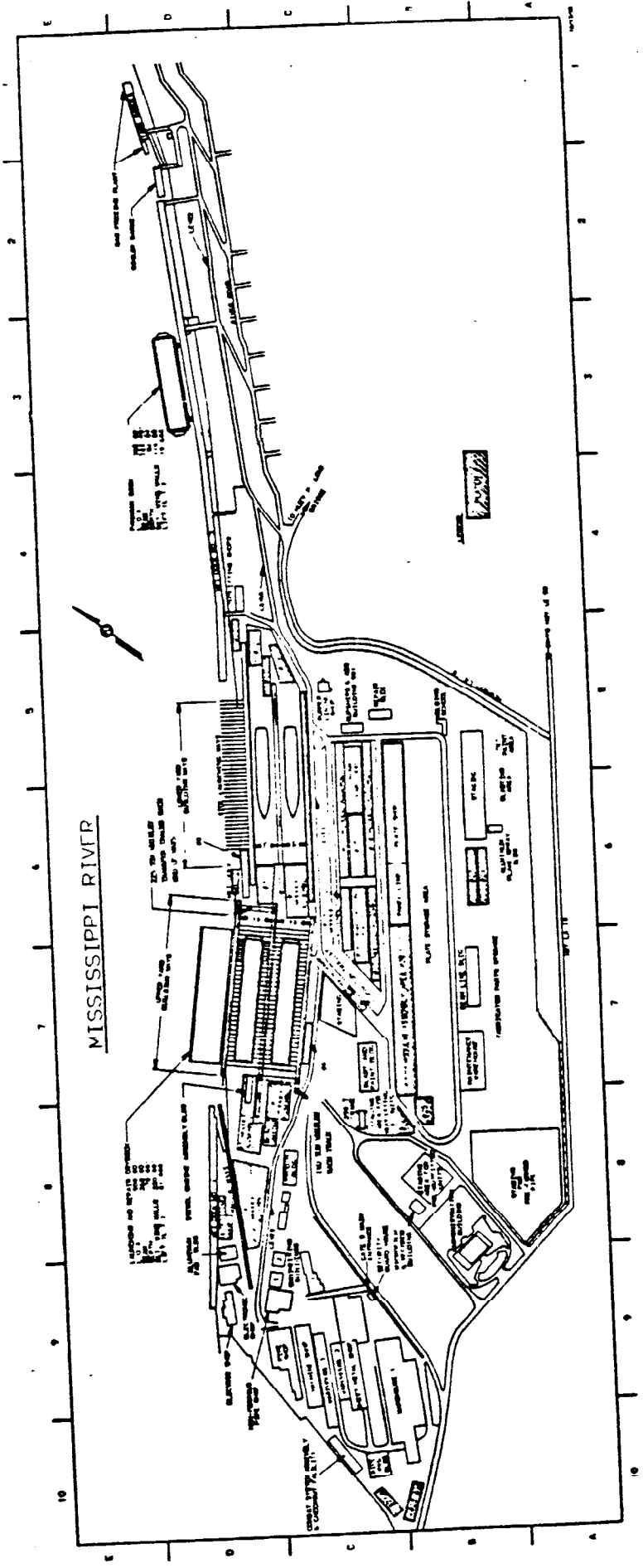
U.S. SHIPBUILDING FACILITIES

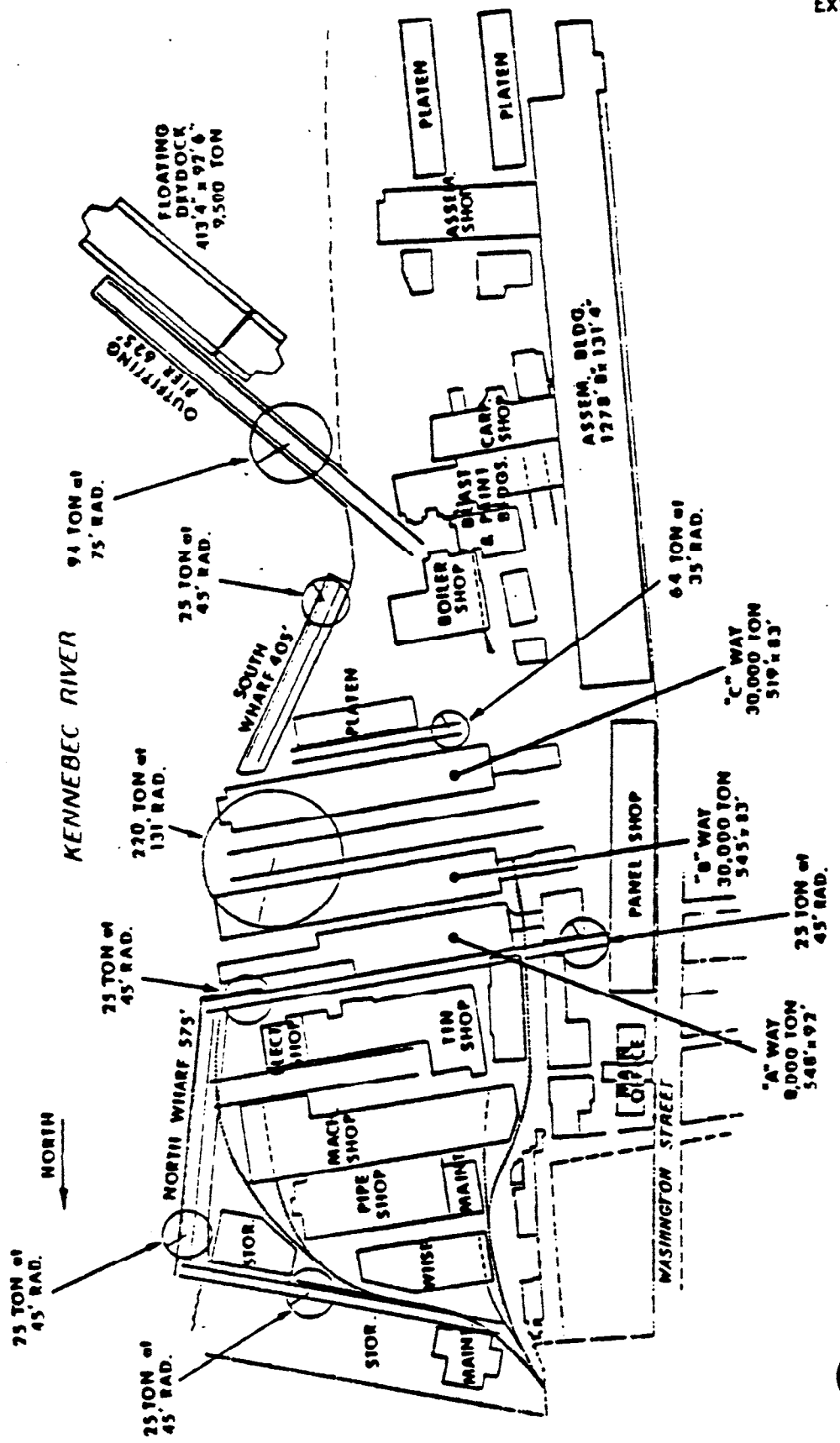
1987



ADDSCO INDUSTRIES, INC.

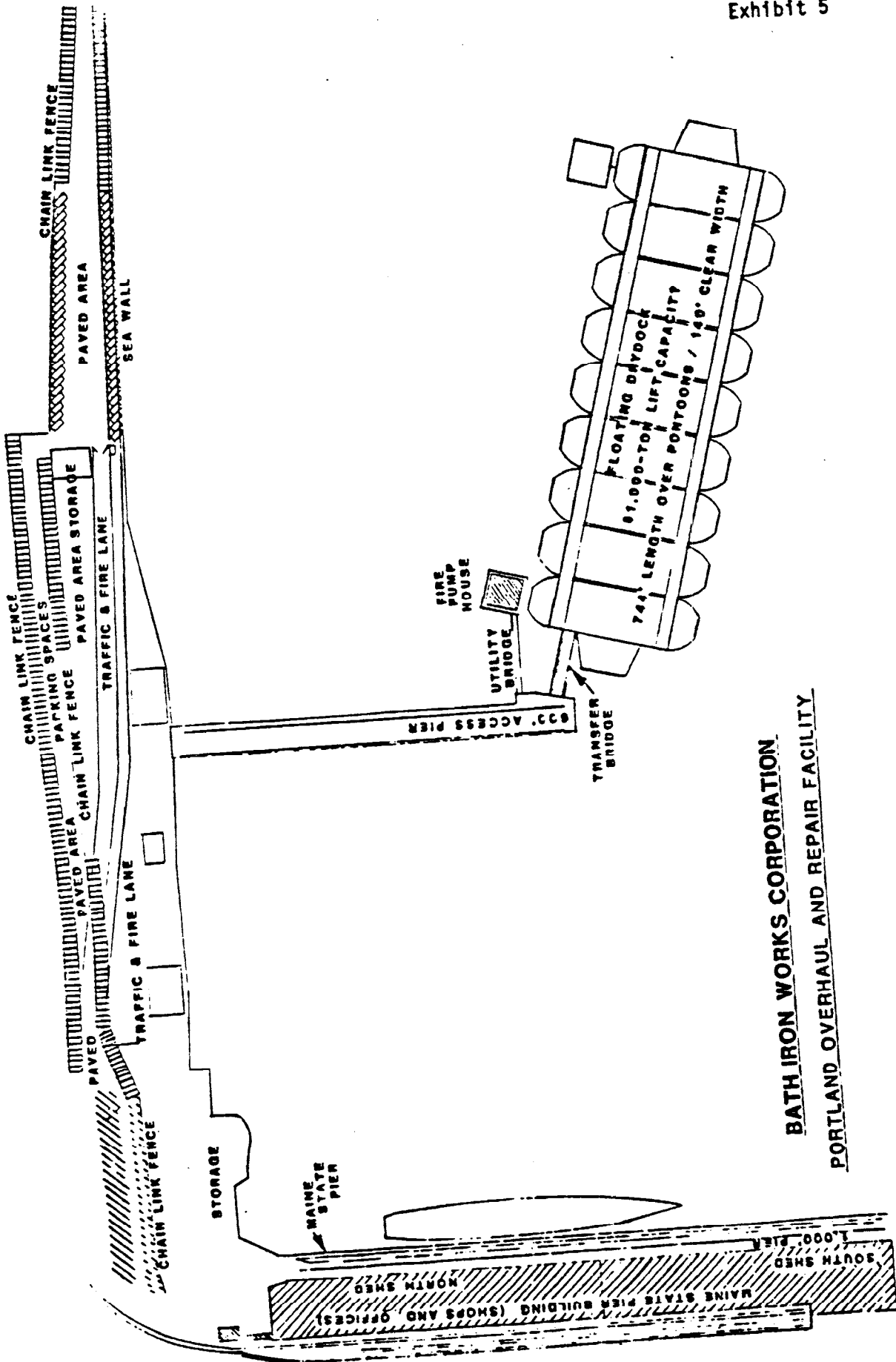
AVONDALE SHIPYARDS, INC. MAIN PLANT



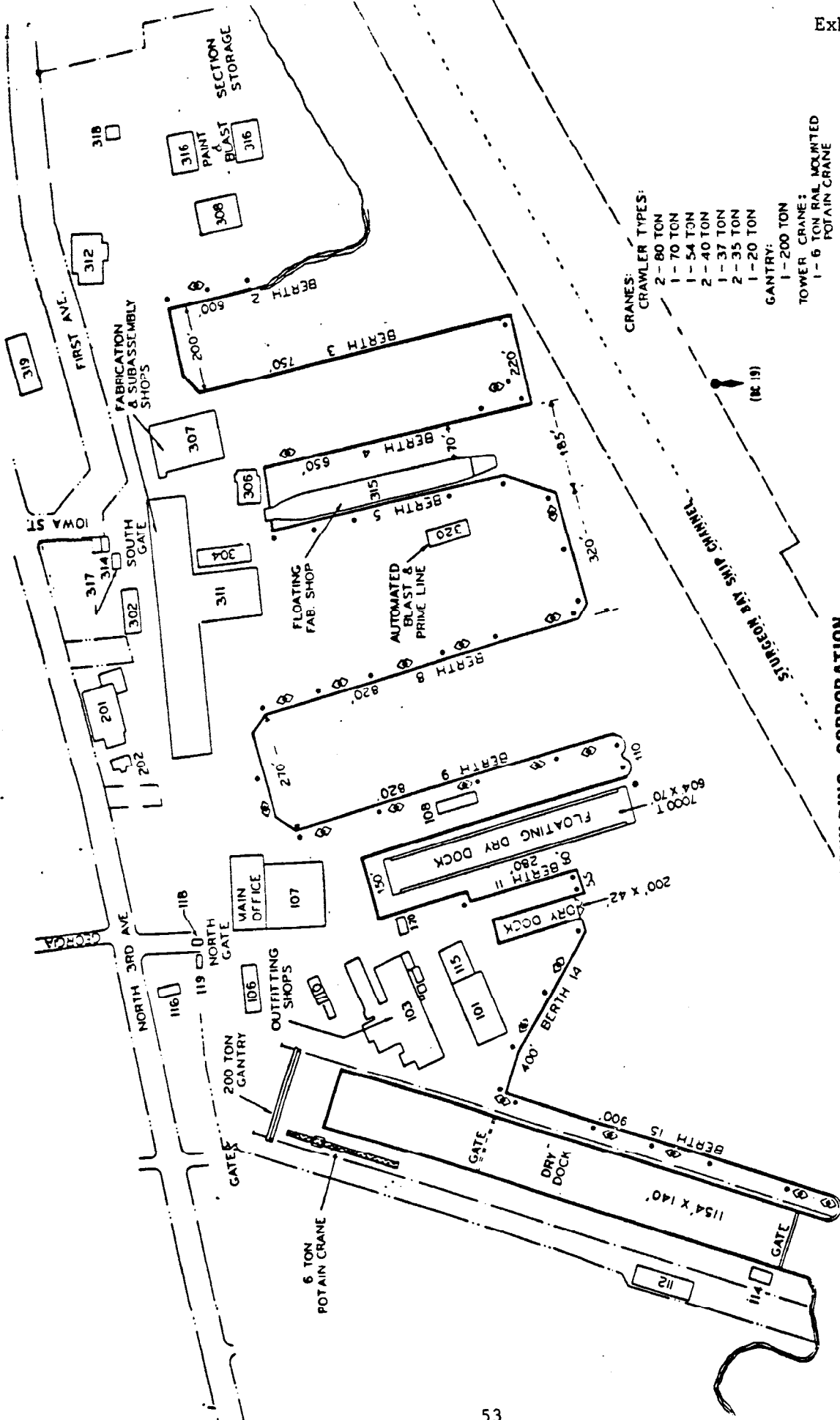


BATH IRON WORKS CORP.



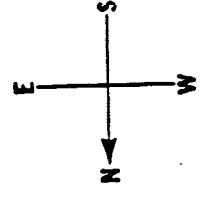


BATH IRON WORKS CORPORATION
PORTLAND OVERHAUL AND REPAIR FACILITY

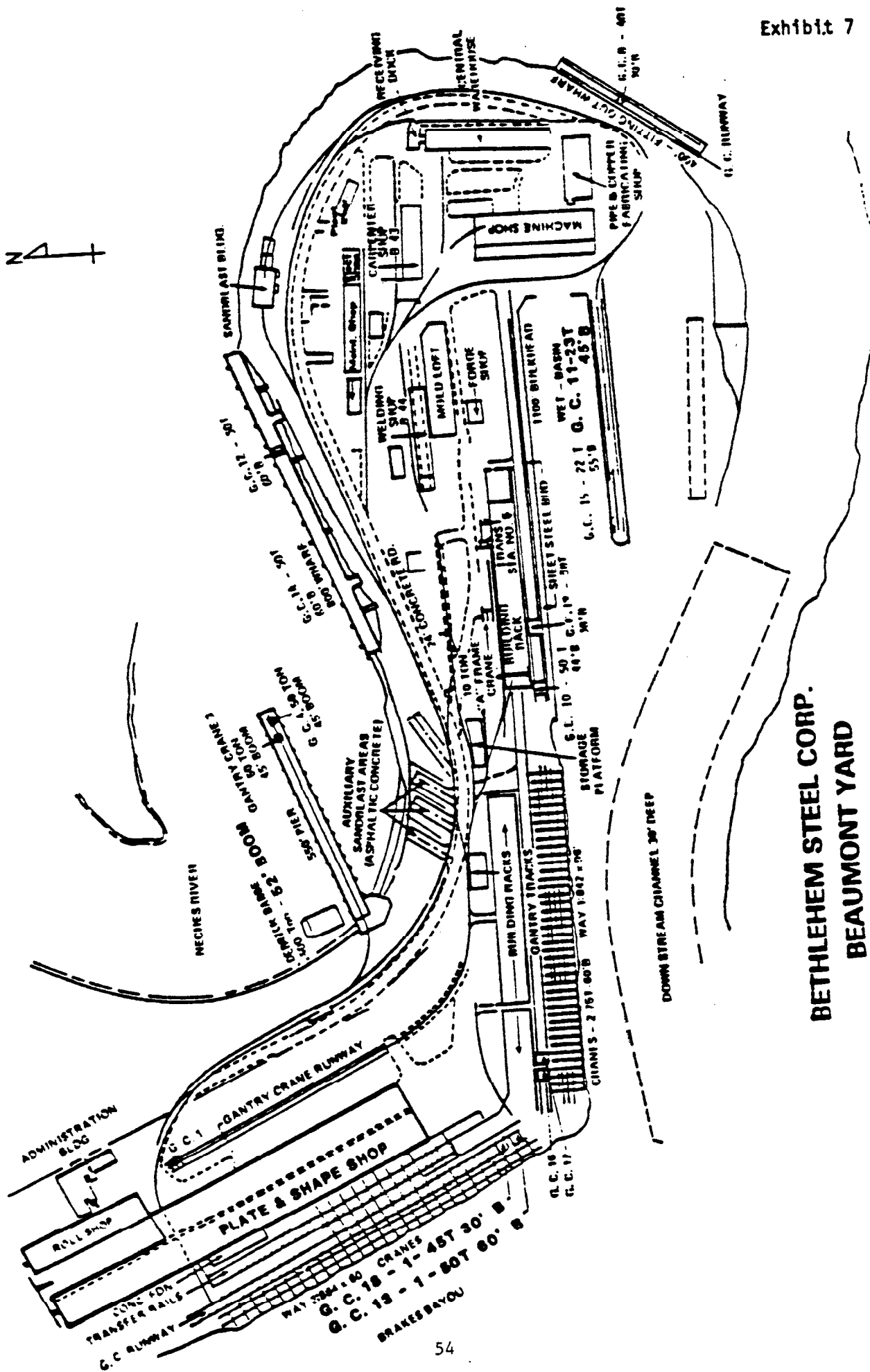


- CRANES:
- CRAWLER TYPES:
 - 2 - 80 TON
 - 1 - 70 TON
 - 1 - 54 TON
 - 2 - 40 TON
 - 1 - 37 TON
 - 2 - 35 TON
 - 1 - 20 TON
- GANTRY:
- 1 - 200 TON
- TOWER CRANE:
- 1 - 6 TON RAIL MOUNTED POTAIN CRANE

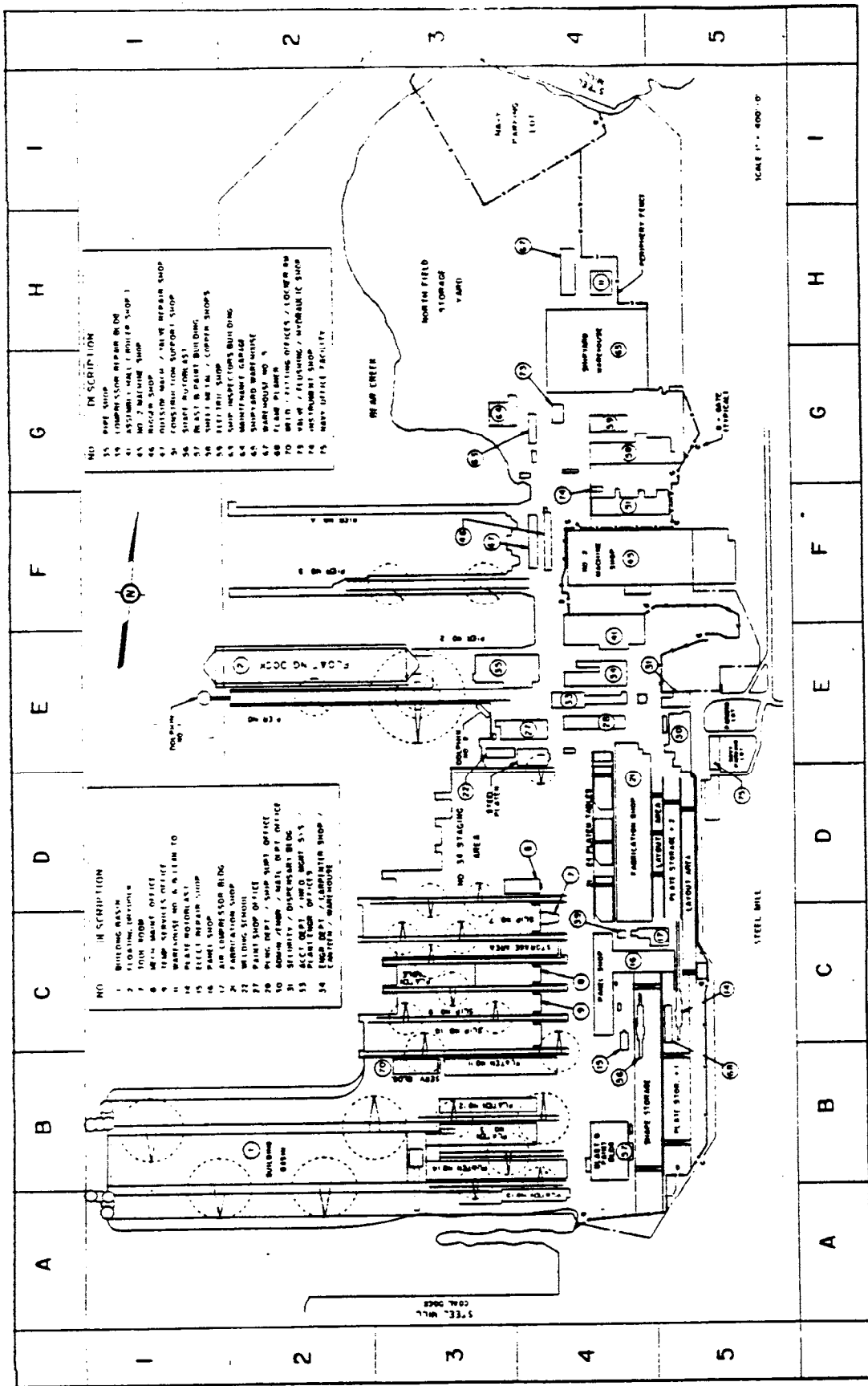
- MOORING BOLLARDS.....
- SHORE POWER.....



BAY SHIPBUILDING CORPORATION
STURGEON BAY, WISCONSIN
(414) 743-5524



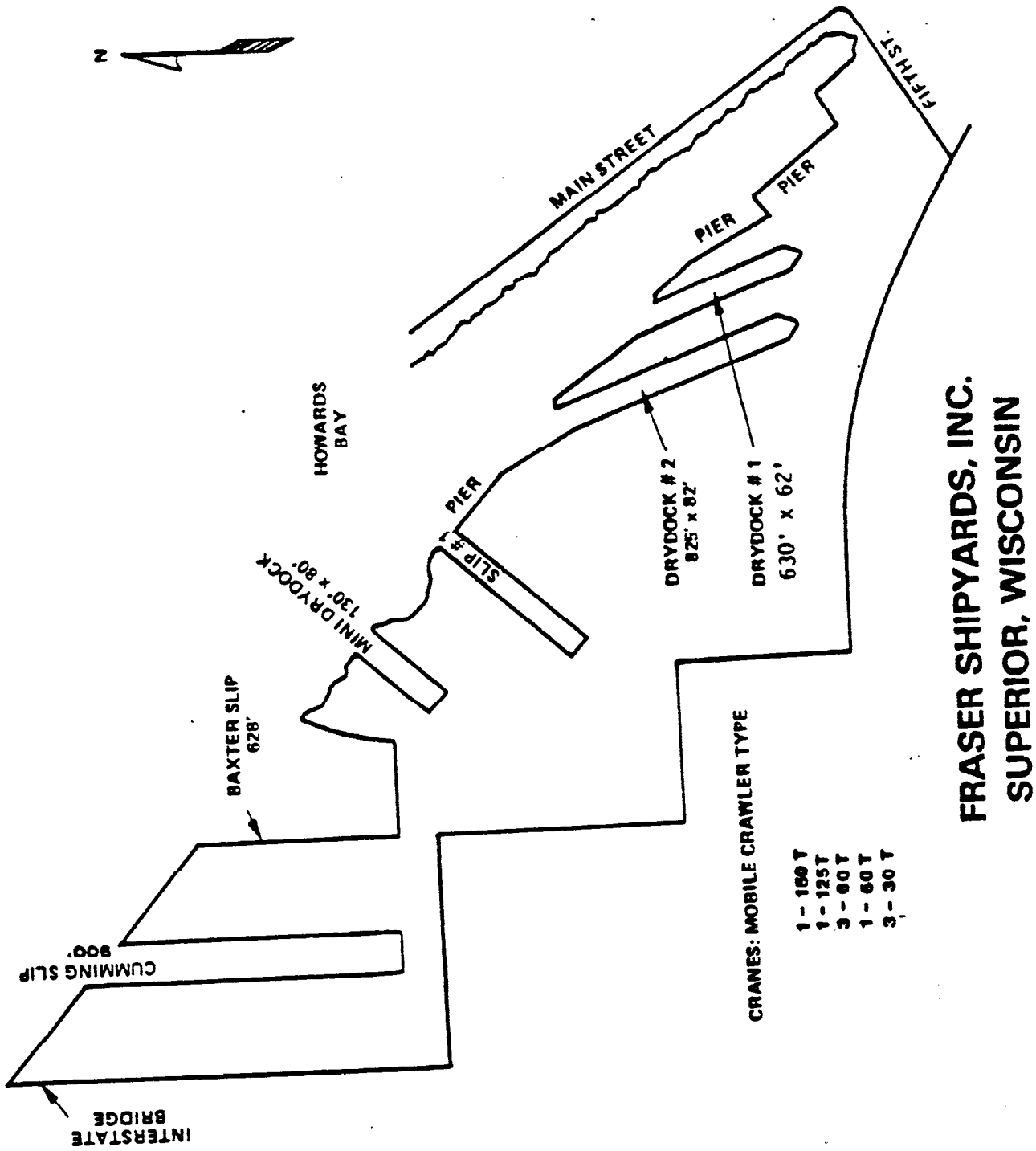
**BETHLEHEM STEEL CORP.
BEAUMONT YARD**

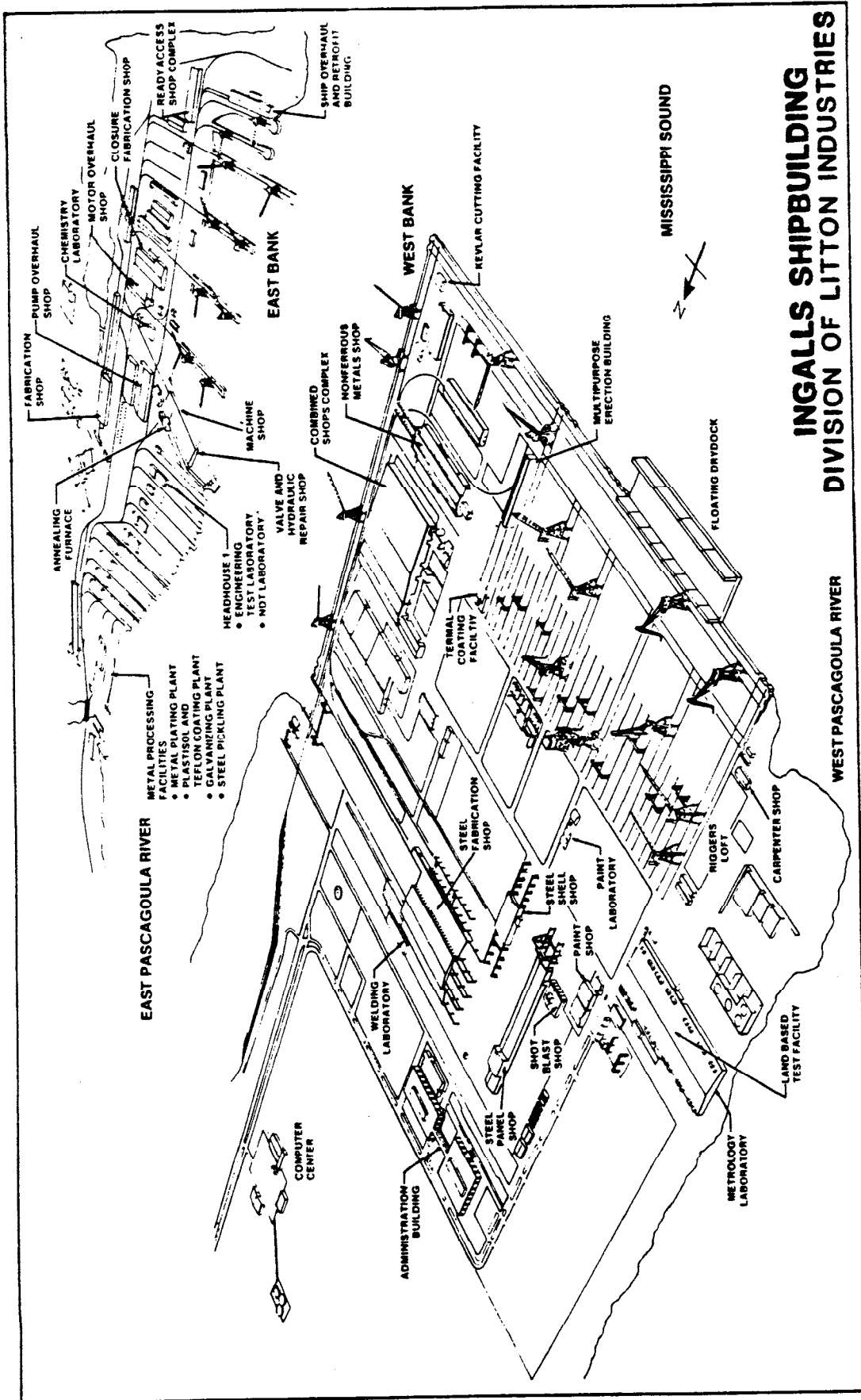


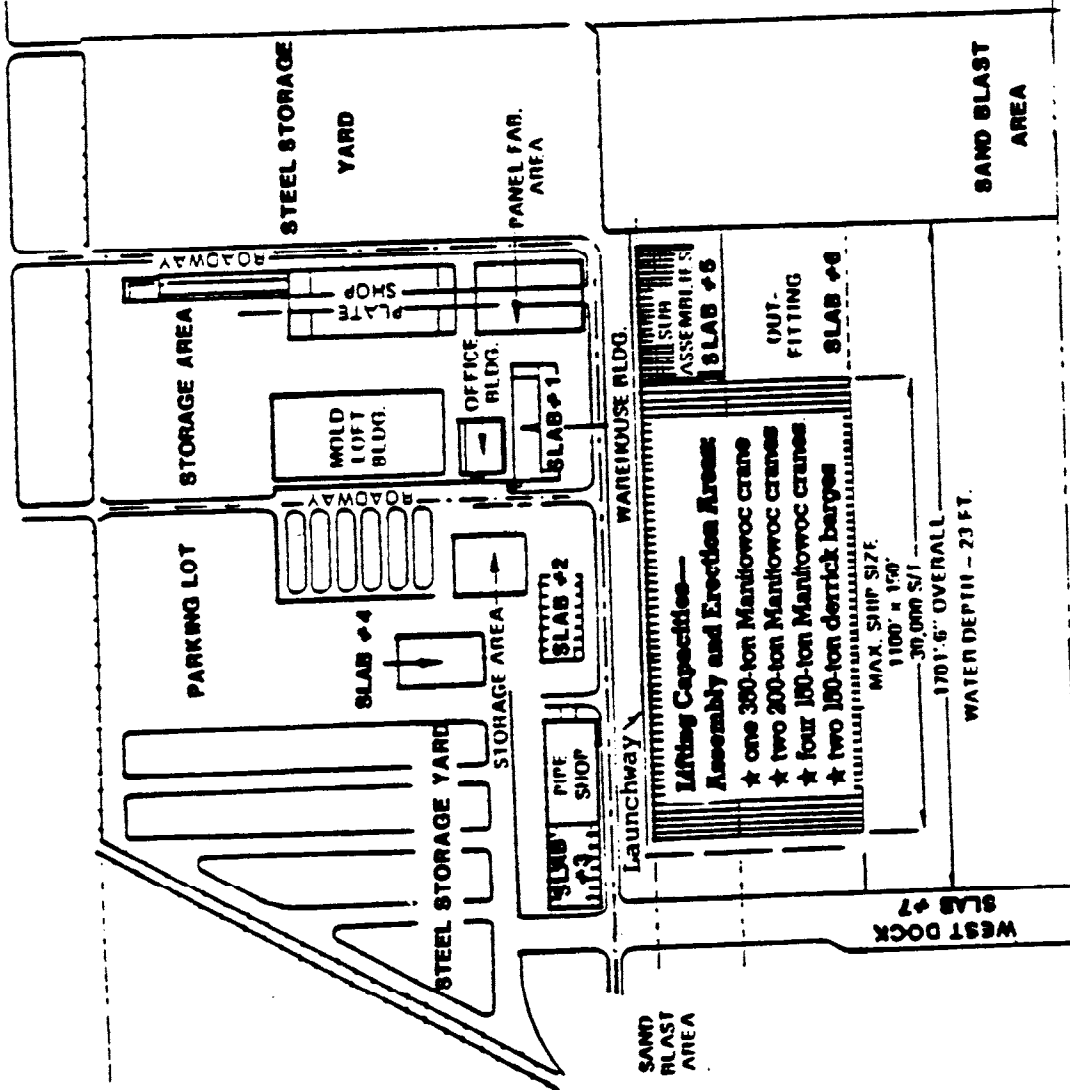
B.S.P.Y. GENERAL ARRANGEMENT

BETHLEHEM STEEL CORPORATION
Sparrows Point Yard

November 1987

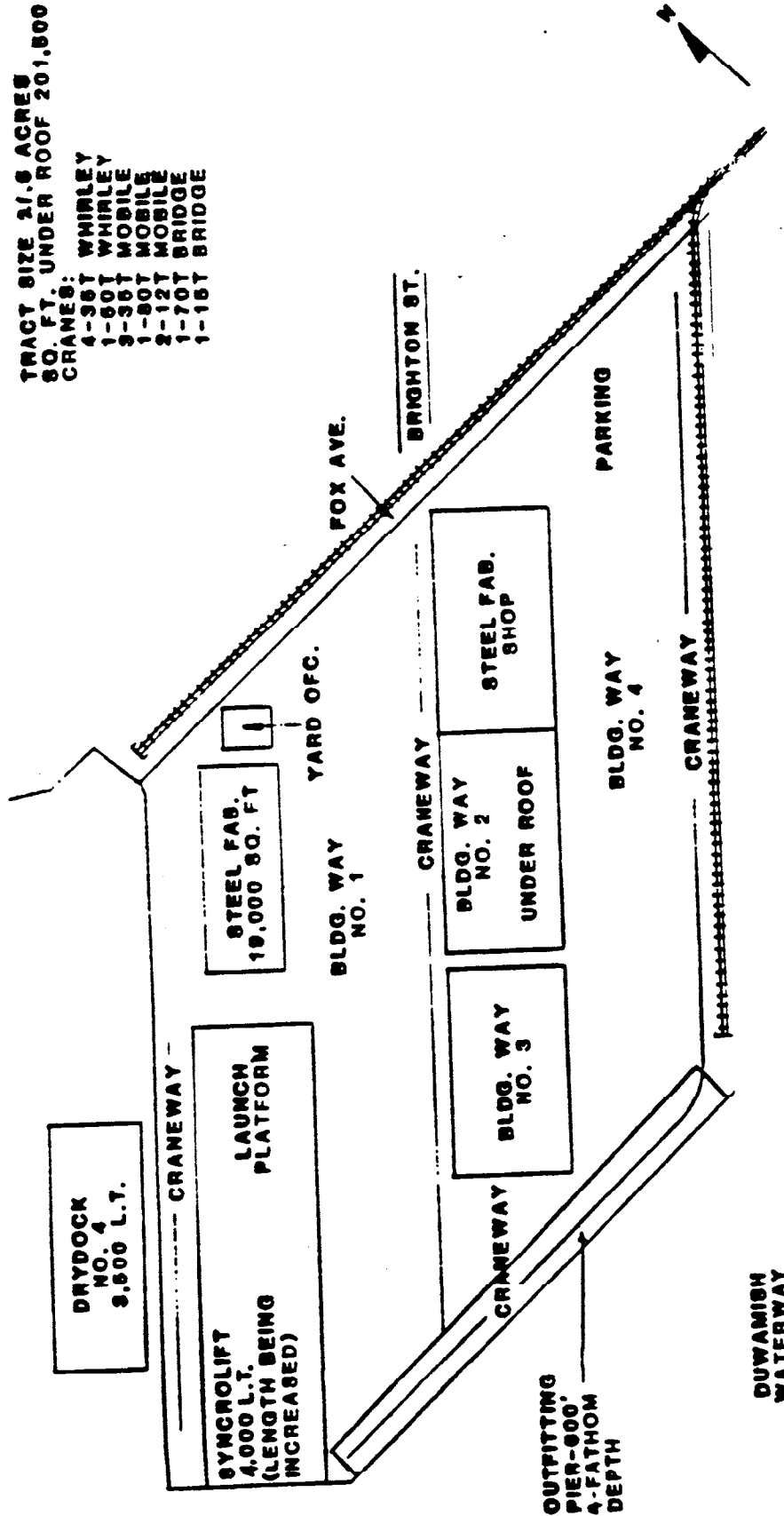






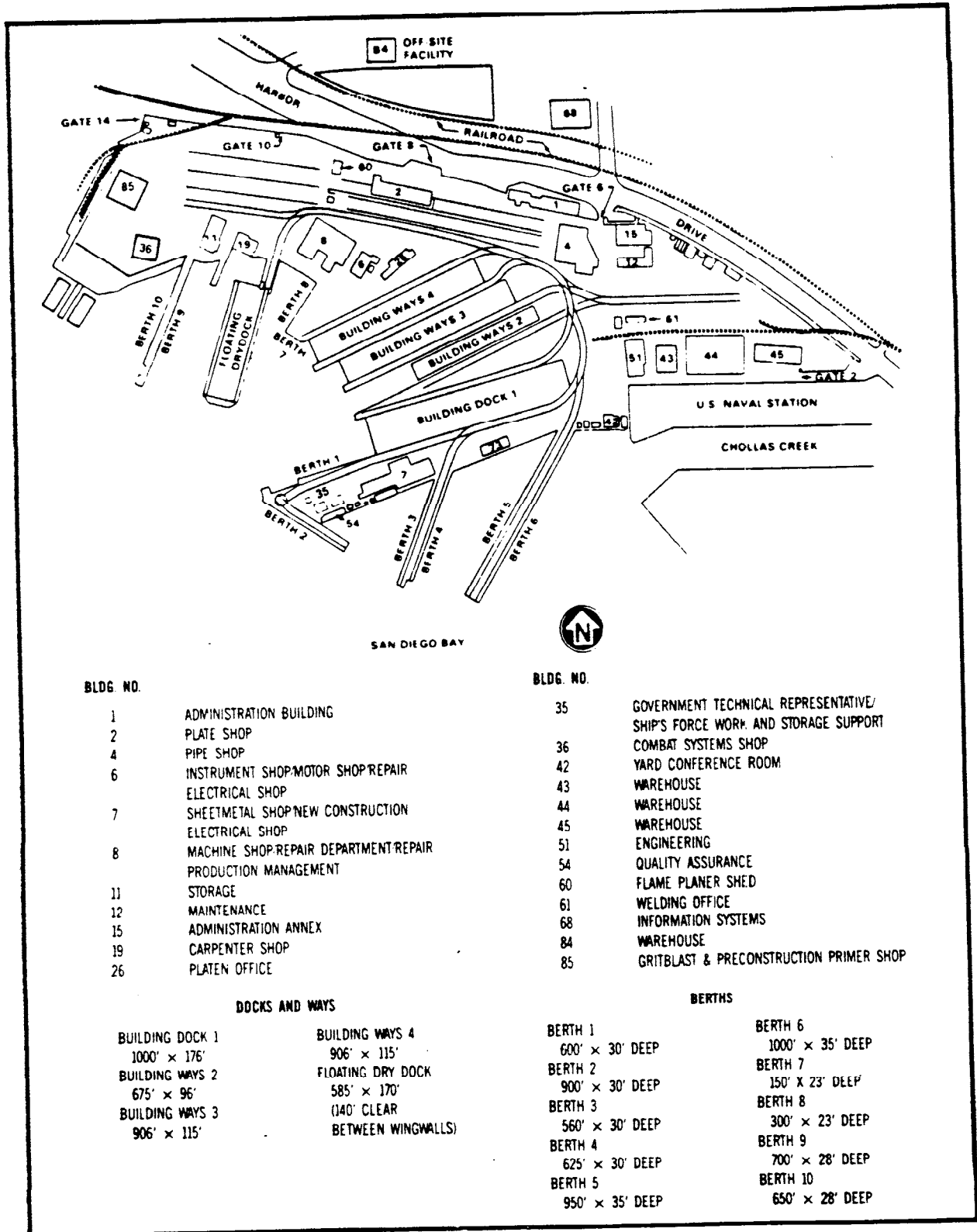
MARATHON LeTOURNEAU CO.
GULF MARINE DIVISION

TRACT SIZE 21.6 ACRES
 80. FT. UNDER ROOF 201,500
 CRANES:
 4-36T WHIRLEY
 1-60T WHIRLEY
 3-35T MOBILE
 1-80T MOBILE
 2-12T MOBILE
 1-70T BRIDGE
 1-16T BRIDGE



MARINE POWER & EQUIPMENT CO.
 YARD 4

NASSCO SHIPYARD LAYOUT



BLDG. NO.

- 1 ADMINISTRATION BUILDING
- 2 PLATE SHOP
- 4 PIPE SHOP
- 6 INSTRUMENT SHOP/MOTOR SHOP REPAIR
ELECTRICAL SHOP
- 7 SHEETMETAL SHOP/NEW CONSTRUCTION
ELECTRICAL SHOP
- 8 MACHINE SHOP/REPAIR DEPARTMENT/REPAIR
PRODUCTION MANAGEMENT
- 11 STORAGE
- 12 MAINTENANCE
- 15 ADMINISTRATION ANNEX
- 19 CARPENTER SHOP
- 26 PLATEN OFFICE

BLDG. NO.

- 35 GOVERNMENT TECHNICAL REPRESENTATIVE/
SHIP'S FORCE WORK. AND STORAGE SUPPORT
- 36 COMBAT SYSTEMS SHOP
- 42 YARD CONFERENCE ROOM
- 43 WAREHOUSE
- 44 WAREHOUSE
- 45 WAREHOUSE
- 51 ENGINEERING
- 54 QUALITY ASSURANCE
- 60 FLAME PLANER SHED
- 61 WELDING OFFICE
- 68 INFORMATION SYSTEMS
- 84 WAREHOUSE
- 85 GRITBLAST & PRECONSTRUCTION PRIMER SHOP

DOCKS AND WAYS

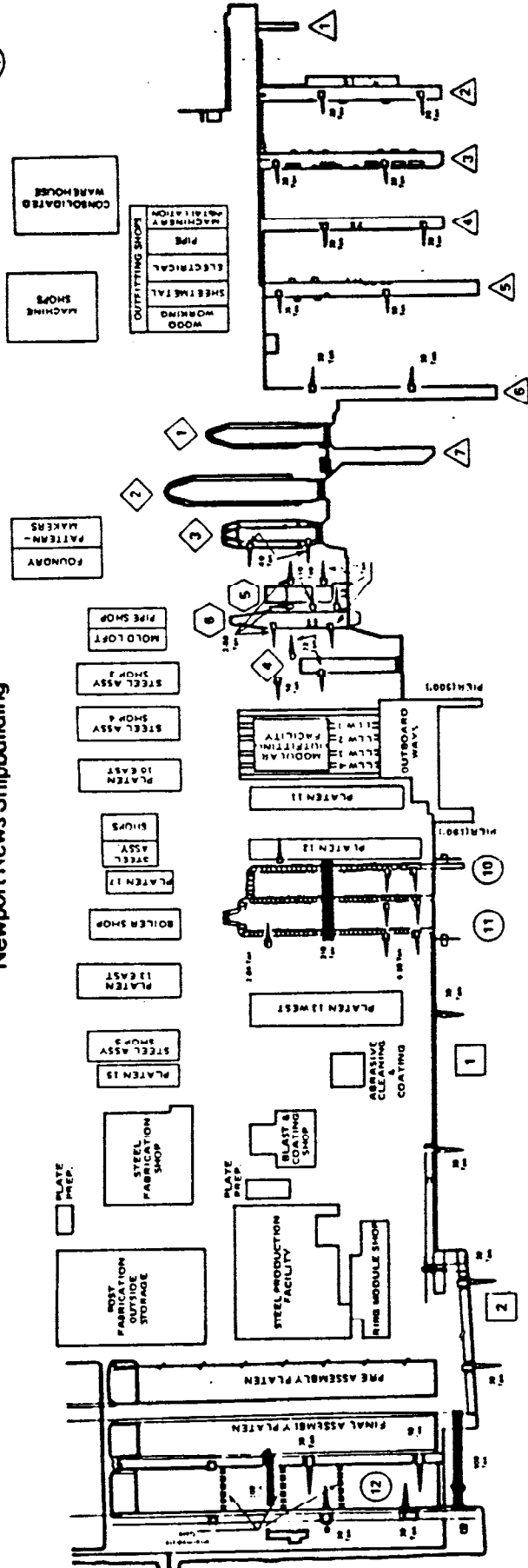
- | | |
|---------------------------------|-----------------------------------|
| BUILDING DOCK 1
1000' x 176' | BUILDING WAYS 4
906' x 115' |
| BUILDING WAYS 2
675' x 96' | FLOATING DRY DOCK
585' x 170' |
| BUILDING WAYS 3
906' x 115' | (140' CLEAR
BETWEEN WINGWALLS) |

BERTHS

- | | |
|----------------------------|-----------------------------|
| BERTH 1
600' x 30' DEEP | BERTH 6
1000' x 35' DEEP |
| BERTH 2
900' x 30' DEEP | BERTH 7
150' x 23' DEEP |
| BERTH 3
560' x 30' DEEP | BERTH 8
300' x 23' DEEP |
| BERTH 4
625' x 30' DEEP | BERTH 9
700' x 28' DEEP |
| BERTH 5
950' x 35' DEEP | BERTH 10
650' x 28' DEEP |



Newport News Shipbuilding



James River



VESSEL BERTHING FACILITIES

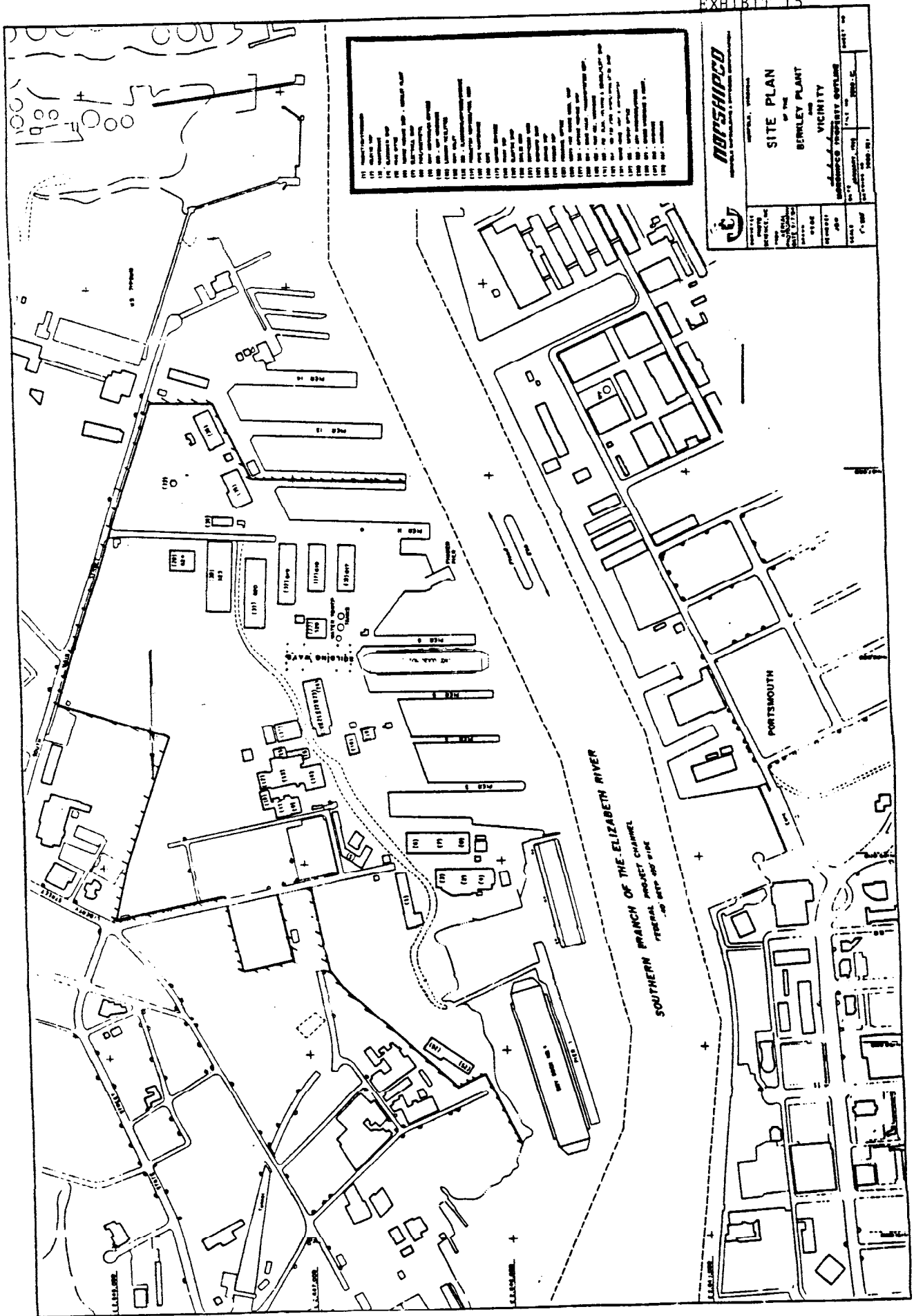
	Length	Width	Water Depth (ft)	Inboard	Outboard
Plat 1	280	70	14	480/714	17
Plat 2	160	60	34	360/500	34
Plat 3	160	70	34	360/500	34
Plat 4	1100	60	34	280/320	34
Plat 5	6400/13300	62	62	280/320	34/100
Plat 6	170	50	38	360/500	38
Outfitting Berth 1	170	50	38		
Outfitting Berth 2	160	50	38		

INCLINED SHIPWAYS

	Length	Width
Shipways 5	447	60
Shipways 6	640	60

DOCKS

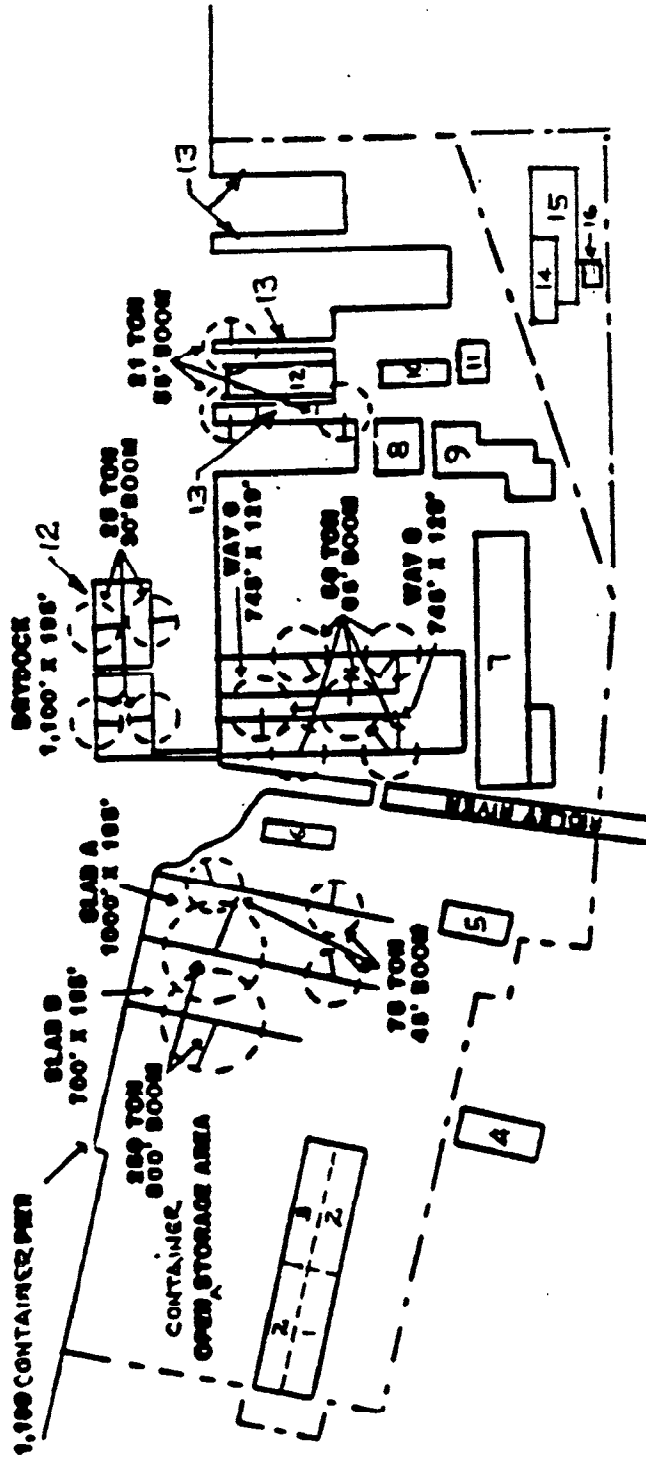
Length	Width	Water Depth (ft)	
		Over	Under
080	82	33	28
082	100	31	29 (HALT)
440	72	33	29.8
820	78	33	30
042	120	36	30
1100	140	40	30
1813	200	53	31
140 Berthing Facility	840	-	37.5



CENTRAL YARD

DELAWARE RIVER

NORTH YARD



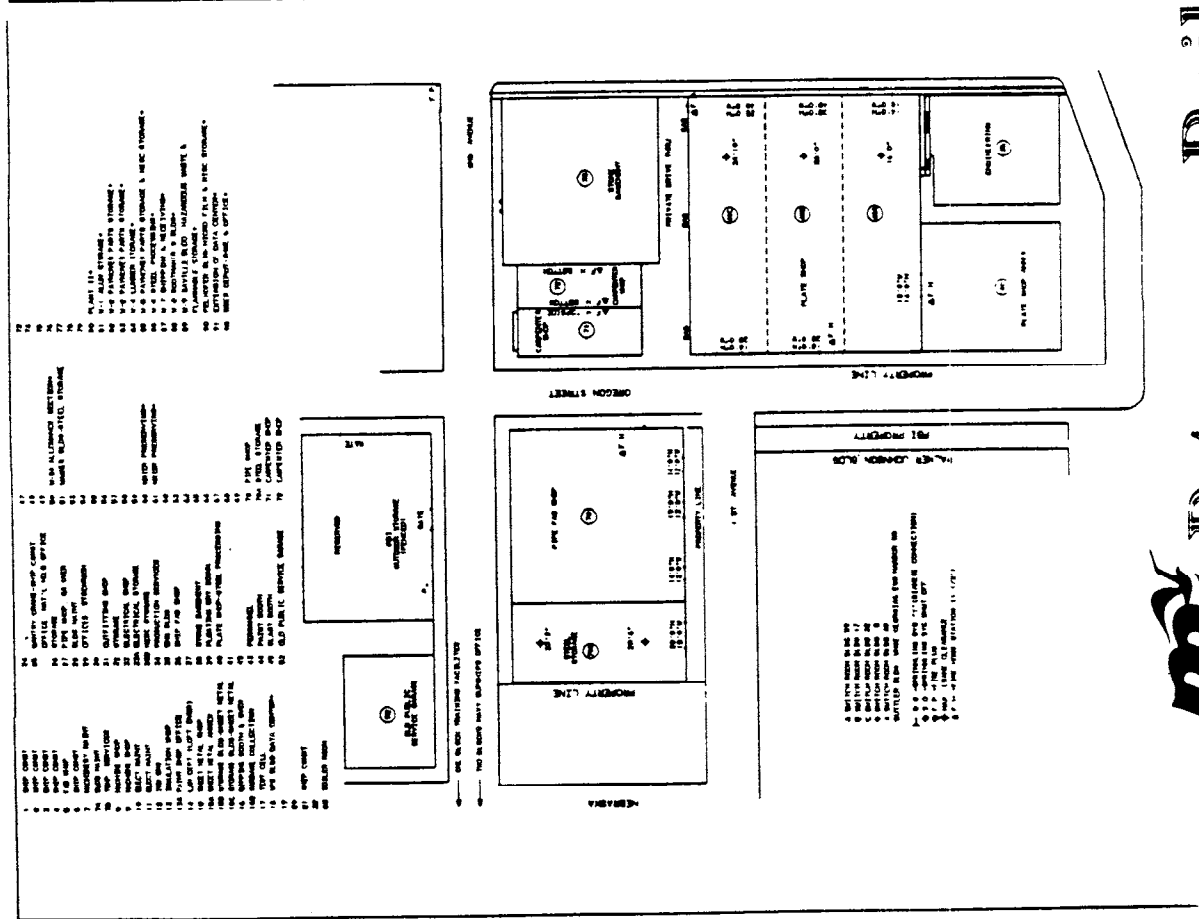
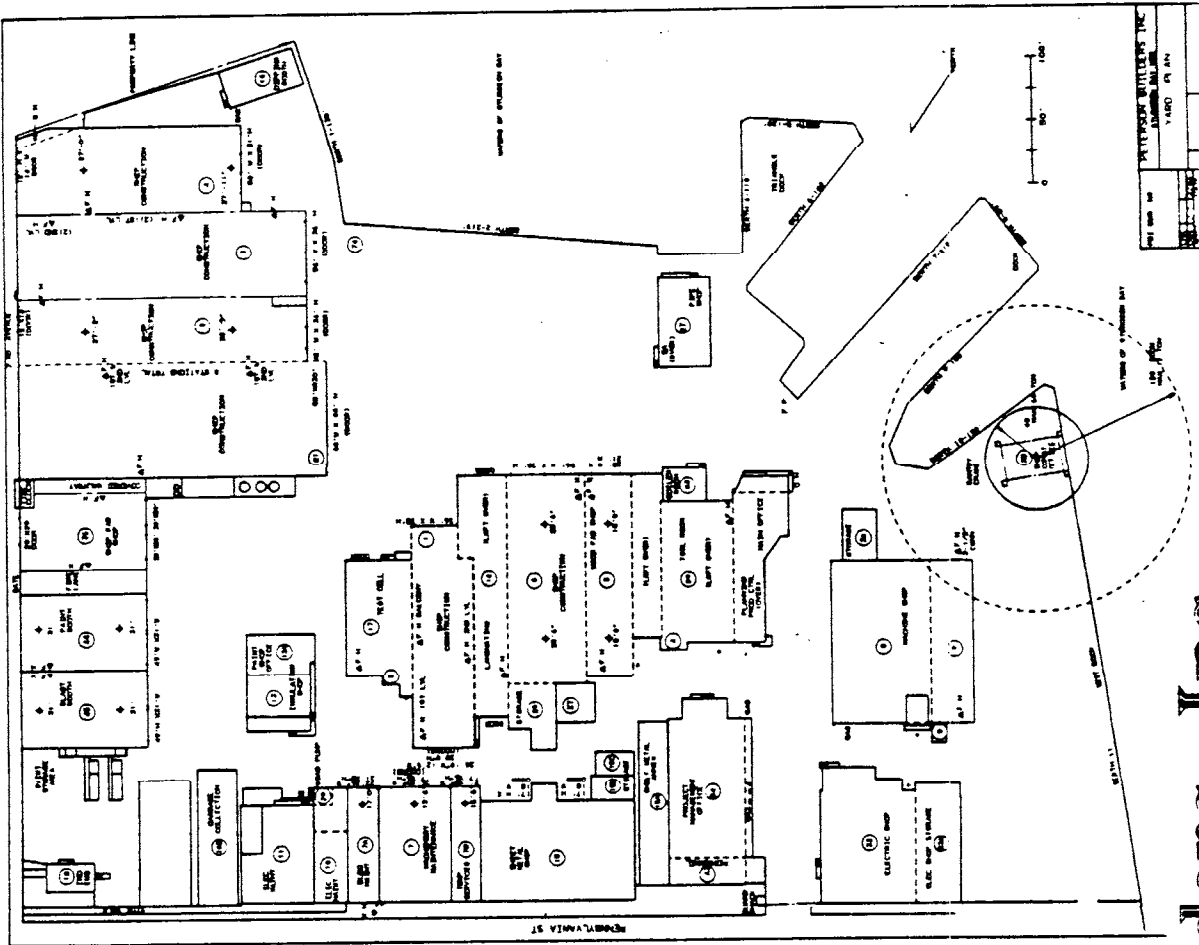
SCALE:



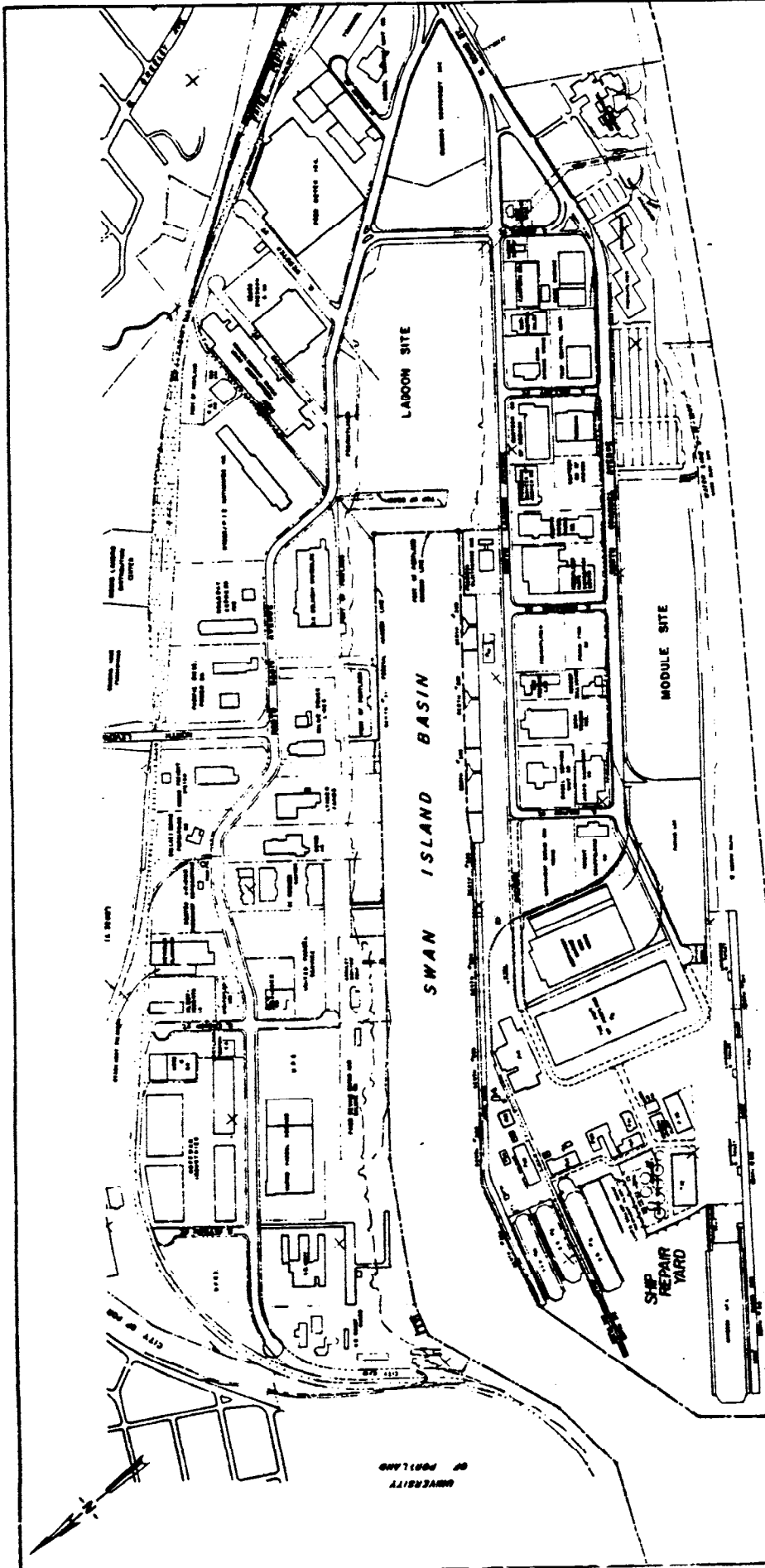
Key:

1. Storage & Receiving
2. Container Terminal
3. Outfit Shop
4. Engineering Management Building
5. Blast & Paint Facility
6. Operations Management Building
7. Fabrication Shop
8. Plant Facilities Building
9. Hull Outfit Building
10. Steel Shop
11. Main Office
12. Drydocks
13. Outfit Piers
14. Non-Ferrous Pipe Shop
15. Storage Yard
16. Barracks Building & Offices

PENNSYLVANIA SHIPBUILDING CO.



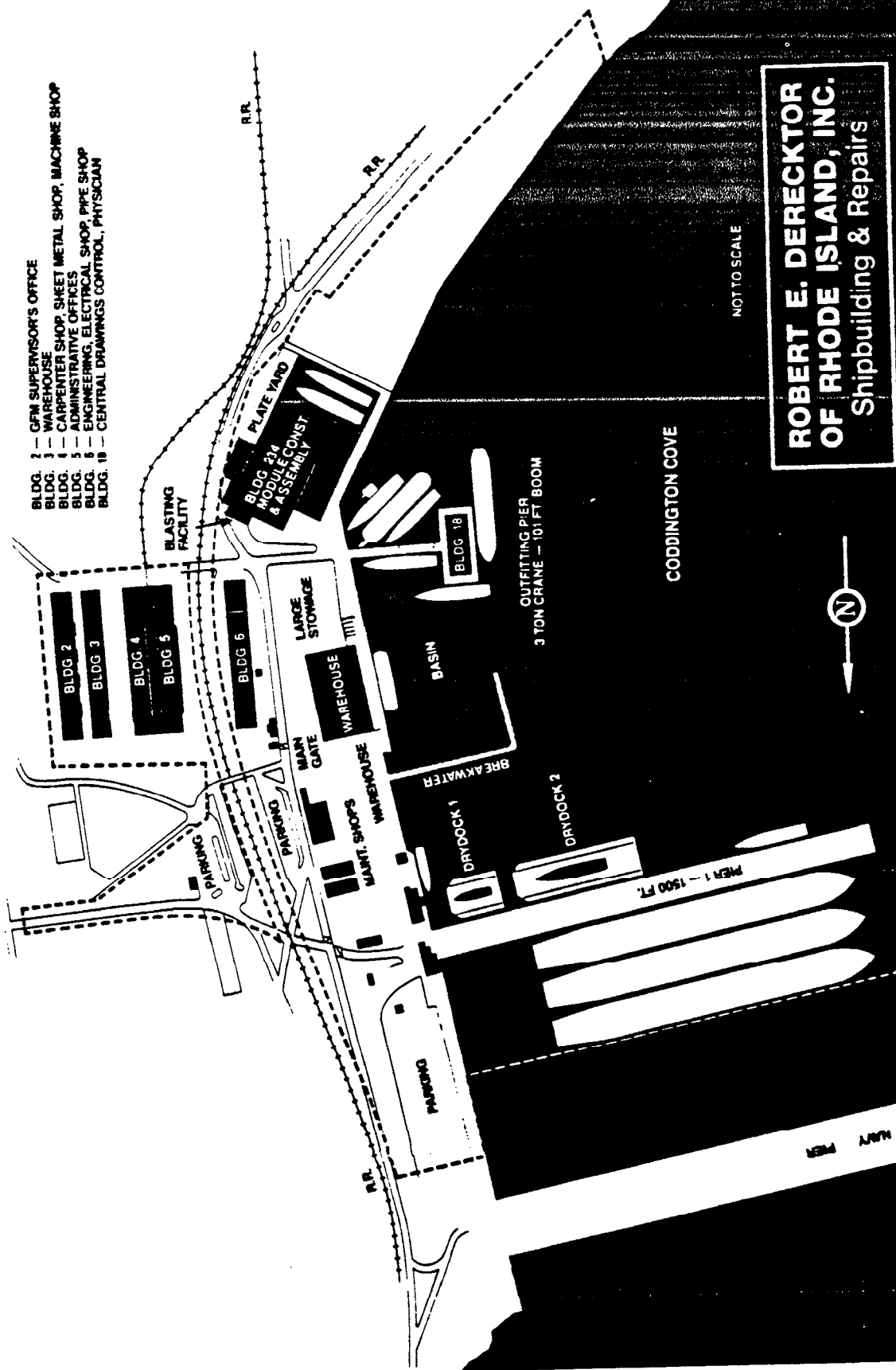
ABT Peterson Builders, Inc.



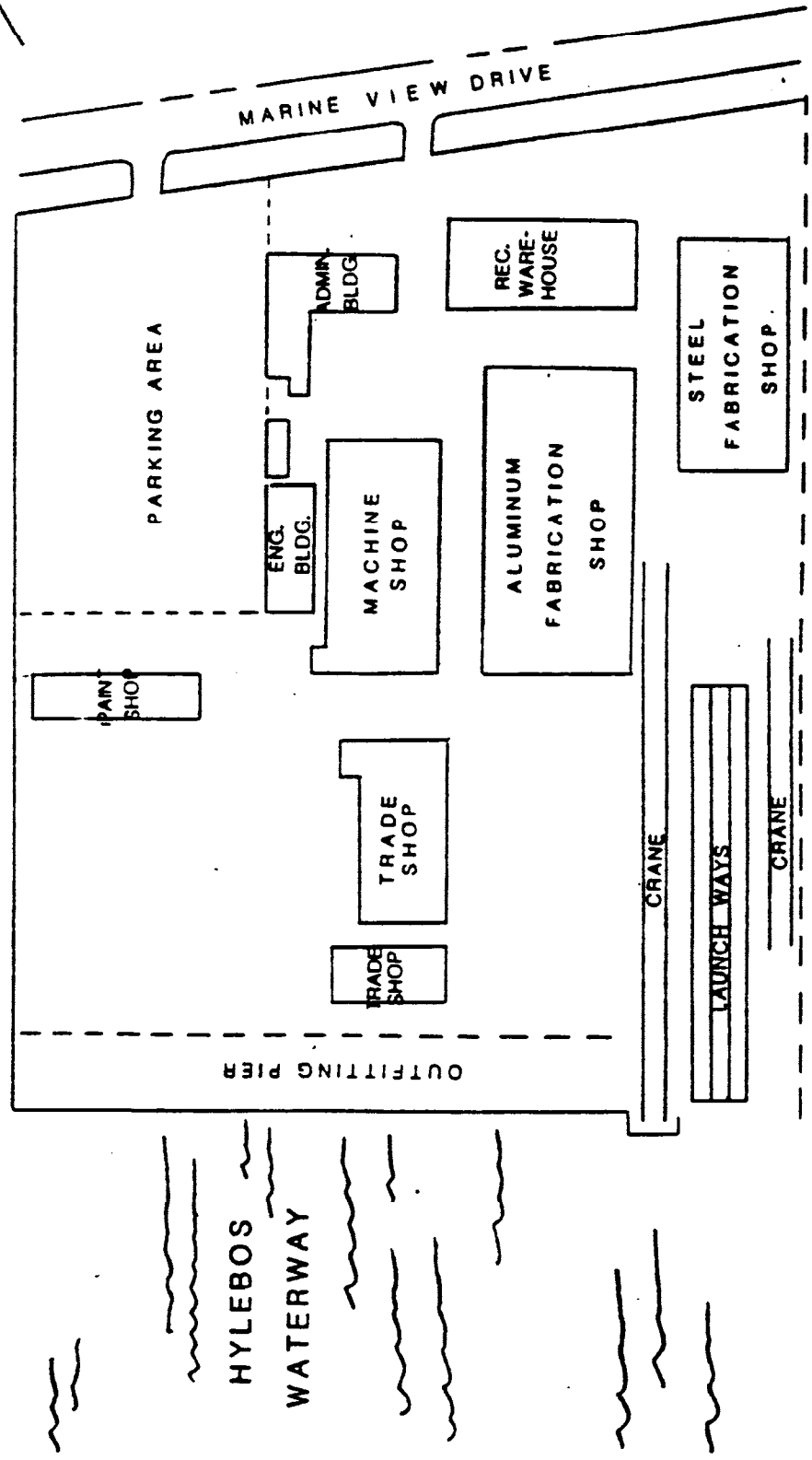
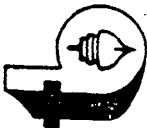
← WILLAMETTE RIVER

PORTLAND SHIP REPAIR YARD SITE PLAN	
DESIGNED BY L. THORNE	CHECKED BY V. MALLOTT
DRAWN BY S. MALLOTT	DATE SEPTEMBER - 1947
PORT OF PORTLAND PORTLAND, OREGON	
SHEET NO. 1	TOTAL SHEETS 1
DRAWN BY	CHECKED BY
DATE	PROJECT NO.

- BLDG. 2 — GPM SUPERVISOR'S OFFICE
- BLDG. 3 — WAREHOUSE
- BLDG. 4 — CARPENTER SHOP, SHEET METAL SHOP, MACHINE SHOP
- BLDG. 5 — ADMINISTRATIVE OFFICES
- BLDG. 6 — ENGINEERING, ELECTRICAL SHOP, PIPE SHOP
- BLDG. 18 — CENTRAL DRAWINGS CONTROL, PHYSICIAN

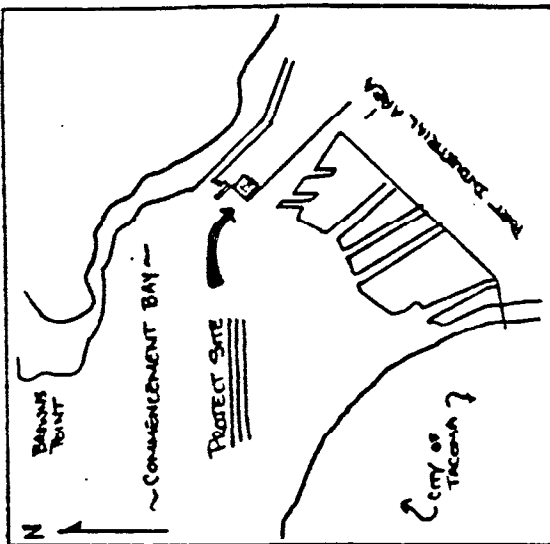


**ROBERT E. DEREKTOR
OF RHODE ISLAND, INC.**
Shipbuilding & Repairs



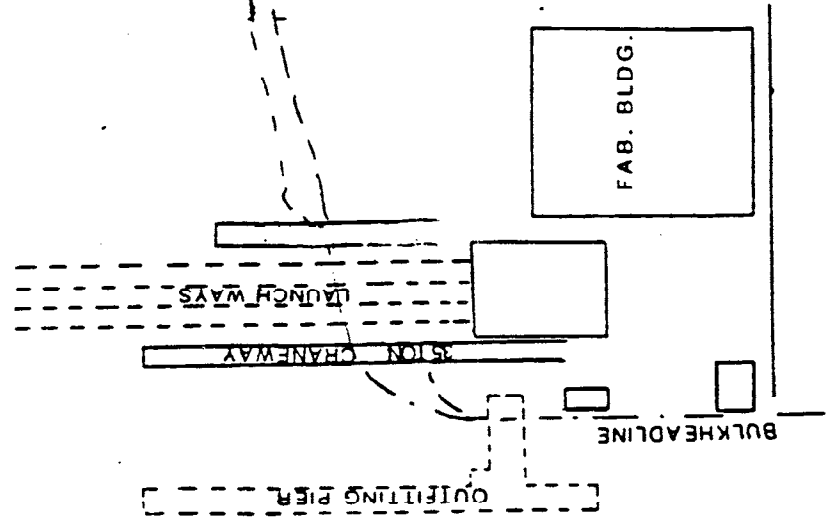
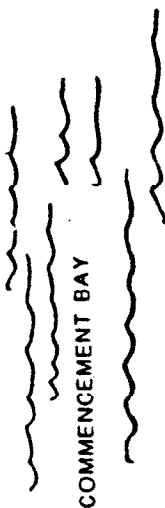
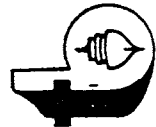
YARD 1 SITE PLAN

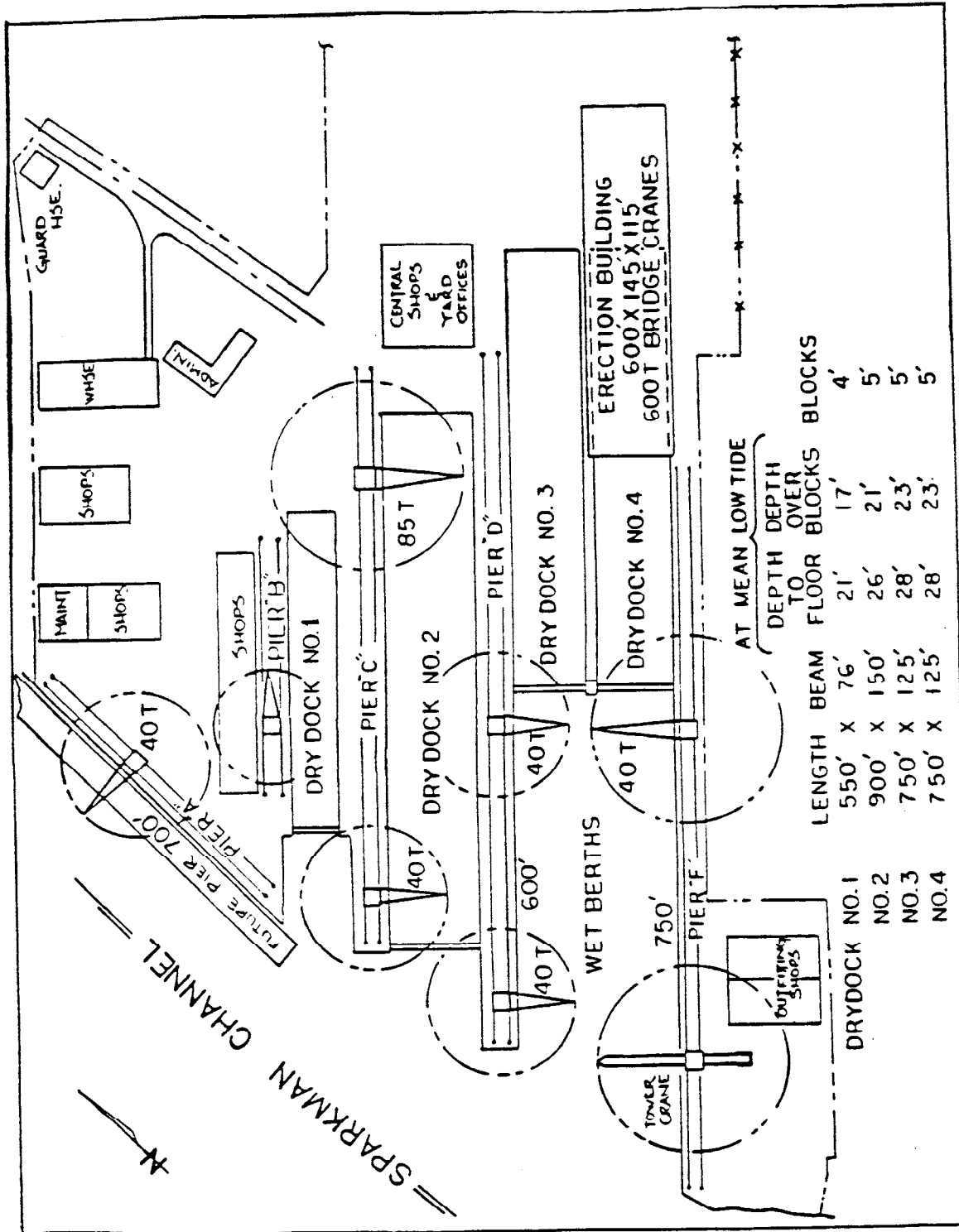
TACOMA BOATBUILDING COMPANY



YD 3 SITE PLAN

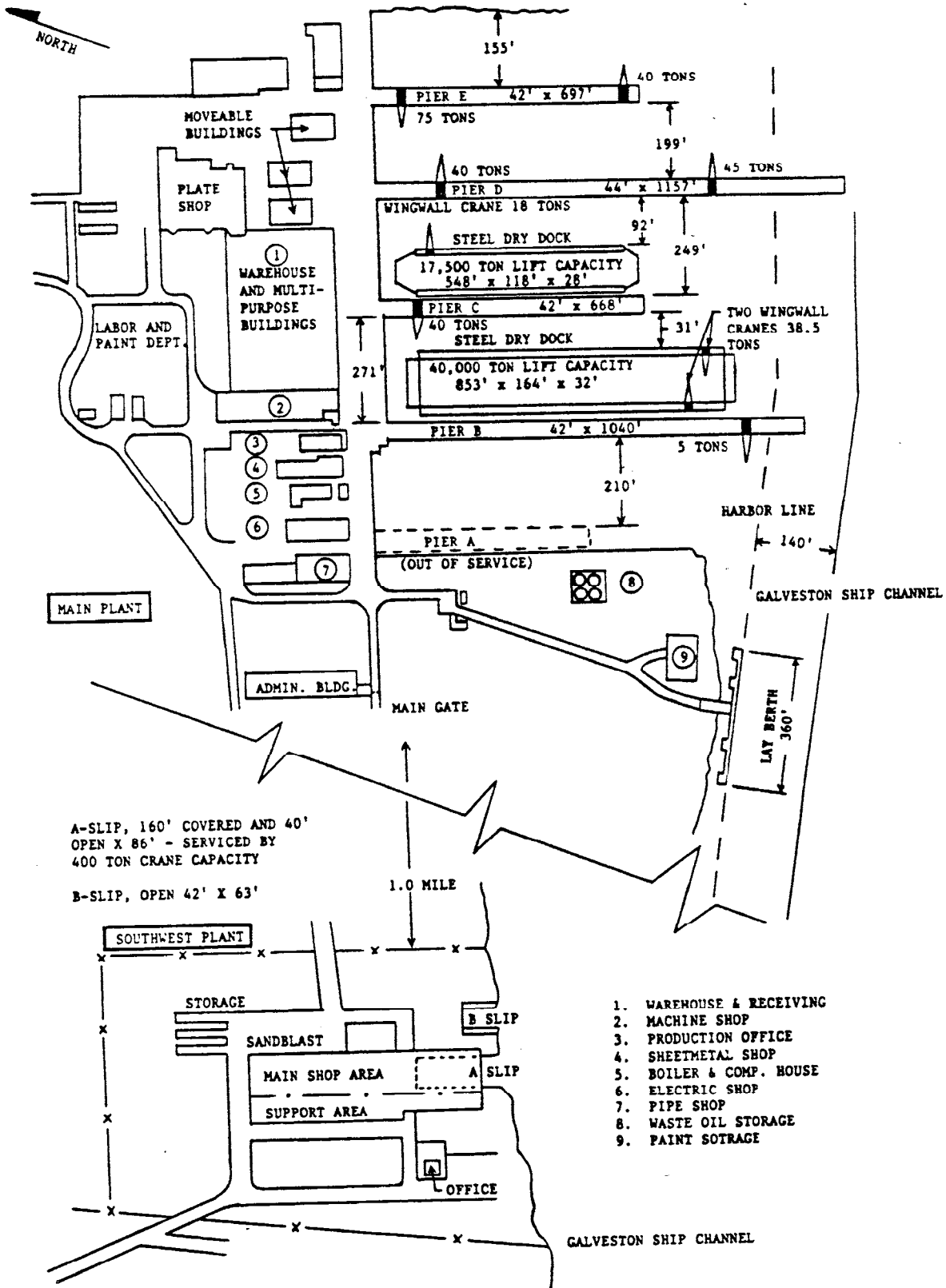
TACOMA BOATBUILDING COMPANY





Hookers Point Yard

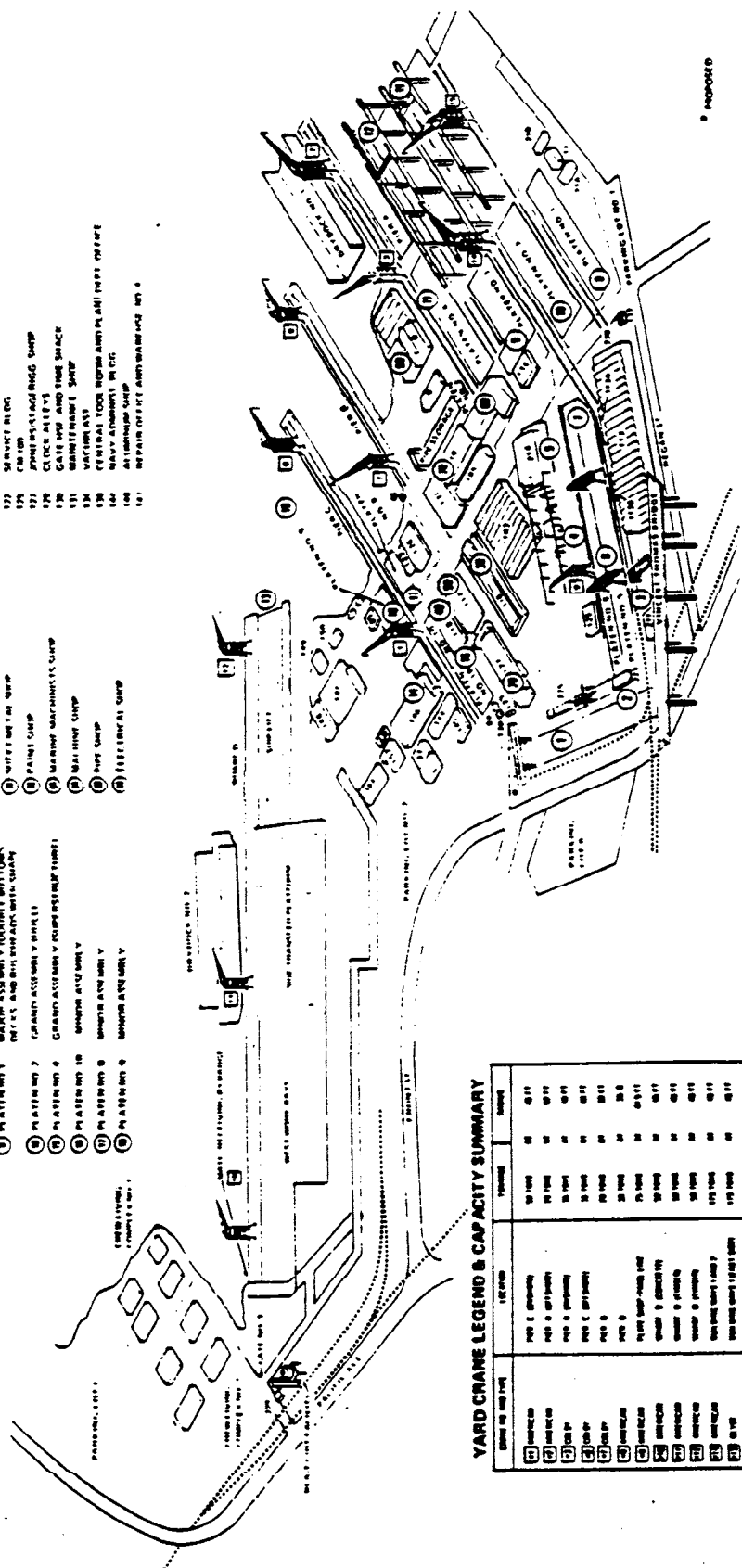
TAMPA SHIPYARDS INCORPORATED



**TODD SHIPYARDS CORP.
GALVESTON DIVISION**

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

- PREPARATION STATIONS**
- 1 PLATE YARD AND MOTION AS
 - 2 CHOP AND CUTTING
 - 3 CHOPS AND SMALL PLATES
 - 4 SHIP MACHINE BY
- ASSEMBLY STATIONS**
- 5 PLATE SHOP
 - 6 PANEL LOW ASSEMBLIES
 - 7 PANEL LOW MACHINE ASSEMBLY'S STARTING AREA
 - 8 PLATE MNT 1 MAJOR ASSEMBLY FOR USE IN ASSEMBLY
 - 9 PLATE MNT 2 MAJOR ASSEMBLY FOR USE IN ASSEMBLY
 - 10 PLATE MNT 3 CRANES ASSEMBLY FOR USE IN ASSEMBLY
 - 11 PLATE MNT 4 CRANES ASSEMBLY FOR USE IN ASSEMBLY
 - 12 PLATE MNT 5 CRANES ASSEMBLY FOR USE IN ASSEMBLY
 - 13 PLATE MNT 6 CRANES ASSEMBLY FOR USE IN ASSEMBLY
 - 14 PLATE MNT 7 CRANES ASSEMBLY FOR USE IN ASSEMBLY
 - 15 PLATE MNT 8 CRANES ASSEMBLY FOR USE IN ASSEMBLY
 - 16 PLATE MNT 9 CRANES ASSEMBLY FOR USE IN ASSEMBLY
- ERECTOR STATIONS**
- 17 WAY 1
 - 18 WAY 2
 - 19 WAY 3
 - 20 WAY 4
- POST-LAUNCH OUTFITTING STATION**
- 21 ALL WORK ON THE SHIP AFTER LAUNCH TO BE DONE BY THE FOLLOWING STATIONS AND THE SHIP
- SHOP STATIONS**
- 22 FABRICATING SHOP
 - 23 PAINT SHOP
 - 24 WELDING SHOP
 - 25 WIRE CUTTING SHOP
 - 26 PAINT SHOP
 - 27 MARINE MACHINERY SHOP
 - 28 MILLING SHOP
 - 29 TANK SHOP
 - 30 ELECTRICAL SHOP
- BUILDING NUMBER AND FUNCTION**
- 100 SHIP YARD AND MOTION AS
 - 101 SHIP YARD
 - 102 SHIP YARD
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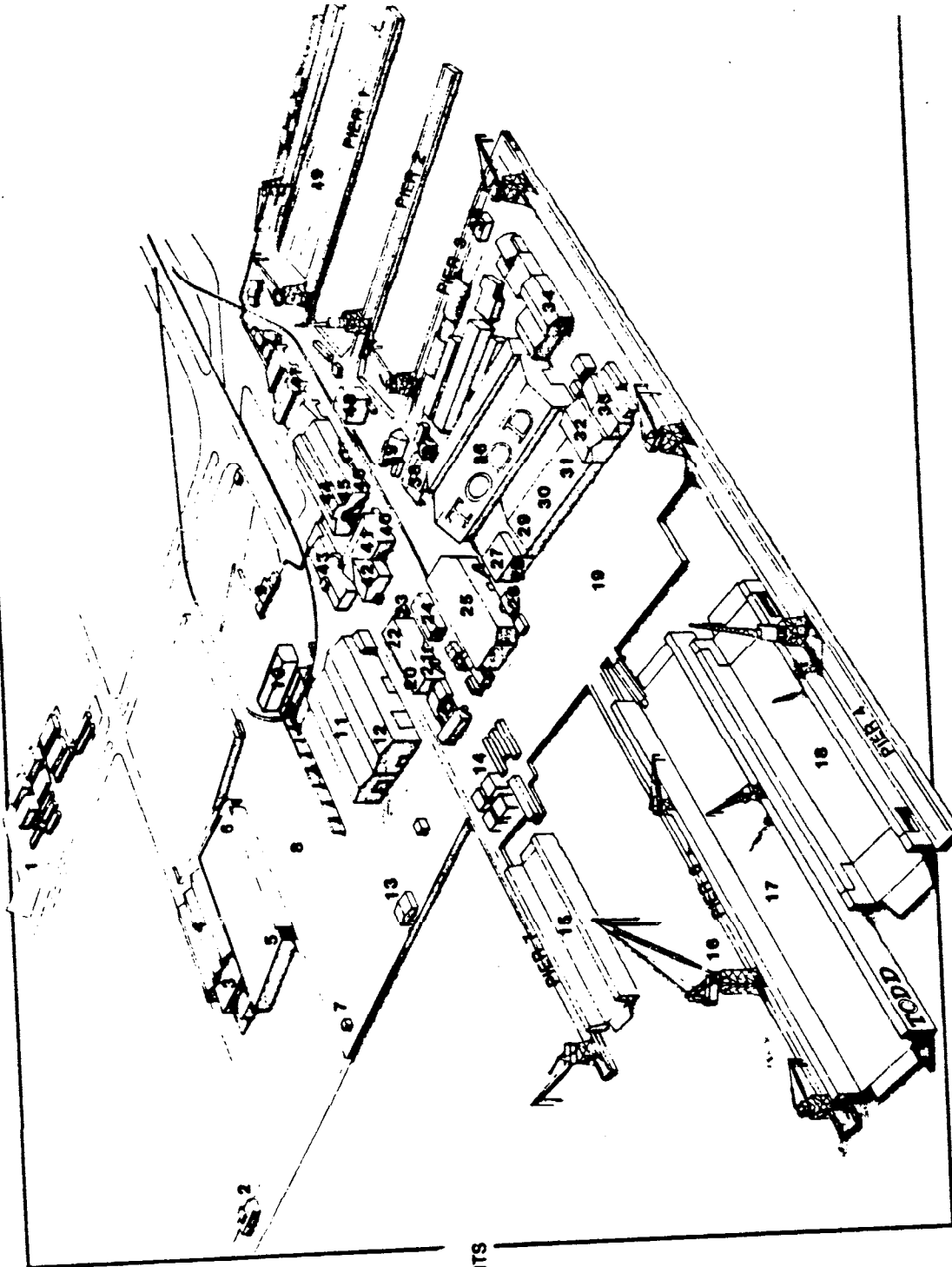


YARD CRANE LEGEND & CAPACITY SUMMARY

CRANE NO.	CRANE TYPE	CRANE CAPACITY	CRANE LOCATION
1	100 TON	100 TON	YARD 1
2	100 TON	100 TON	YARD 2
3	100 TON	100 TON	YARD 3
4	100 TON	100 TON	YARD 4
5	100 TON	100 TON	YARD 5
6	100 TON	100 TON	YARD 6
7	100 TON	100 TON	YARD 7
8	100 TON	100 TON	YARD 8
9	100 TON	100 TON	YARD 9
10	100 TON	100 TON	YARD 10
11	100 TON	100 TON	YARD 11
12	100 TON	100 TON	YARD 12
13	100 TON	100 TON	YARD 13
14	100 TON	100 TON	YARD 14
15	100 TON	100 TON	YARD 15
16	100 TON	100 TON	YARD 16
17	100 TON	100 TON	YARD 17
18	100 TON	100 TON	YARD 18
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21	100 TON	100 TON	YARD 21
22	100 TON	100 TON	YARD 22
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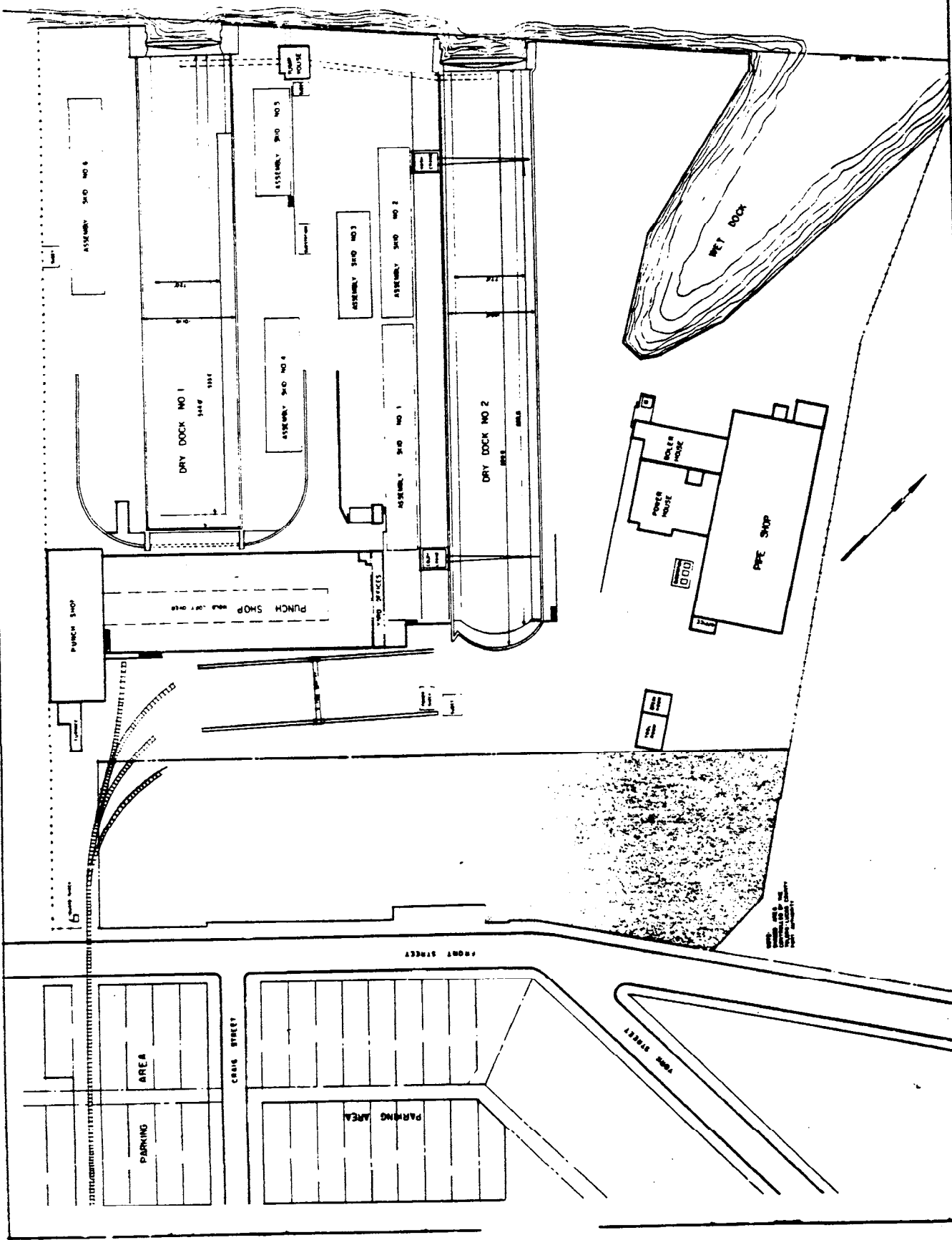
11-45128

TODD PACIFIC SHIPYARDS CORPORATION
LOS ANGELES DIVISION



- 1. CREW'S BERTHING
- 2. MESSING FACILITY
- 3. SHIPPING/RECEIVING
- 4. WAREHOUSE
- 5. DATA PROCESSING
- 6. PURCHASING
- 7. SMALL BOAT COVERED WORK AREA
- 8. STEEL STORAGE AREA
- 9. MAIN GATE/SECURITY
- 10. SHOT BLAST FACILITY
- 11. ALUMINUM FABRICATION
- 12. AUTOMATED BURNING EQUIPMENT
- 13. ACID BATH CLEANING
- 14. SITE OF SHIP'S OFFICE AND DUTY BERTHING
- 15. DRYDOCK NO. 2
- 16. 150 TON WHIRLEY CRANE
- 17. DRYDOCK NO. 3 "EMERALD SEA"
- 18. DRYDOCK NO. 1
- 19. STAGING AREA
- 20. PRODUCTION PLANNING
- 21. CAFETERIA
- 22. NEW CONSTRUCTION SHIP SUPERINTENDENTS
- 23. COMBAT SYSTEMS DEPARTMENT
- 24. OUTSIDE MACHINE SHOP
- 25. INSIDE MACHINE SHOP
- 26. PORT ENGINEERS OFFICE
- 27. REPAIR SUPERINTENDENTS
- 28. YARD OFFICE
- 29. PIPE SHOP
- 30. CENTRAL TOOL ROOM
- 31. CARPENTER SHOP
- 32. ELECTRIC SHOP
- 33. RIGGING LOFT
- 34. SHEET METAL
- 35. QUALITY ASSURANCE
- 36. MAIN STEEL SHOP
- 37. MARINE CHEMIST/FIRE DEPT.
- 38. PUMP, MOTOR & VALVE SHOP/TEST FACILI
- 39. PAINT SHOP
- 40. DISPENSARY/CLAIMS DEPT.
- 41. ENGINEERING
- 42. NAVY PROGRAM OFFICE
- 43. ADMINISTRATION OFFICES
- 44. TECHNICAL LIBRARY DRAWING CONTROL
- 45. TEST & TRIAL OFFICE
- 46. GENERAL SUPERINTENDENTS
- 47. SOUTH STEEL SHOP
- 48. MISSILE LAUNCHER ASSEMBLY BUILDING
- 49. CONSTRUCTION WAYS

MAUMEE RIVER



THE TOLEDO SHIPYARD

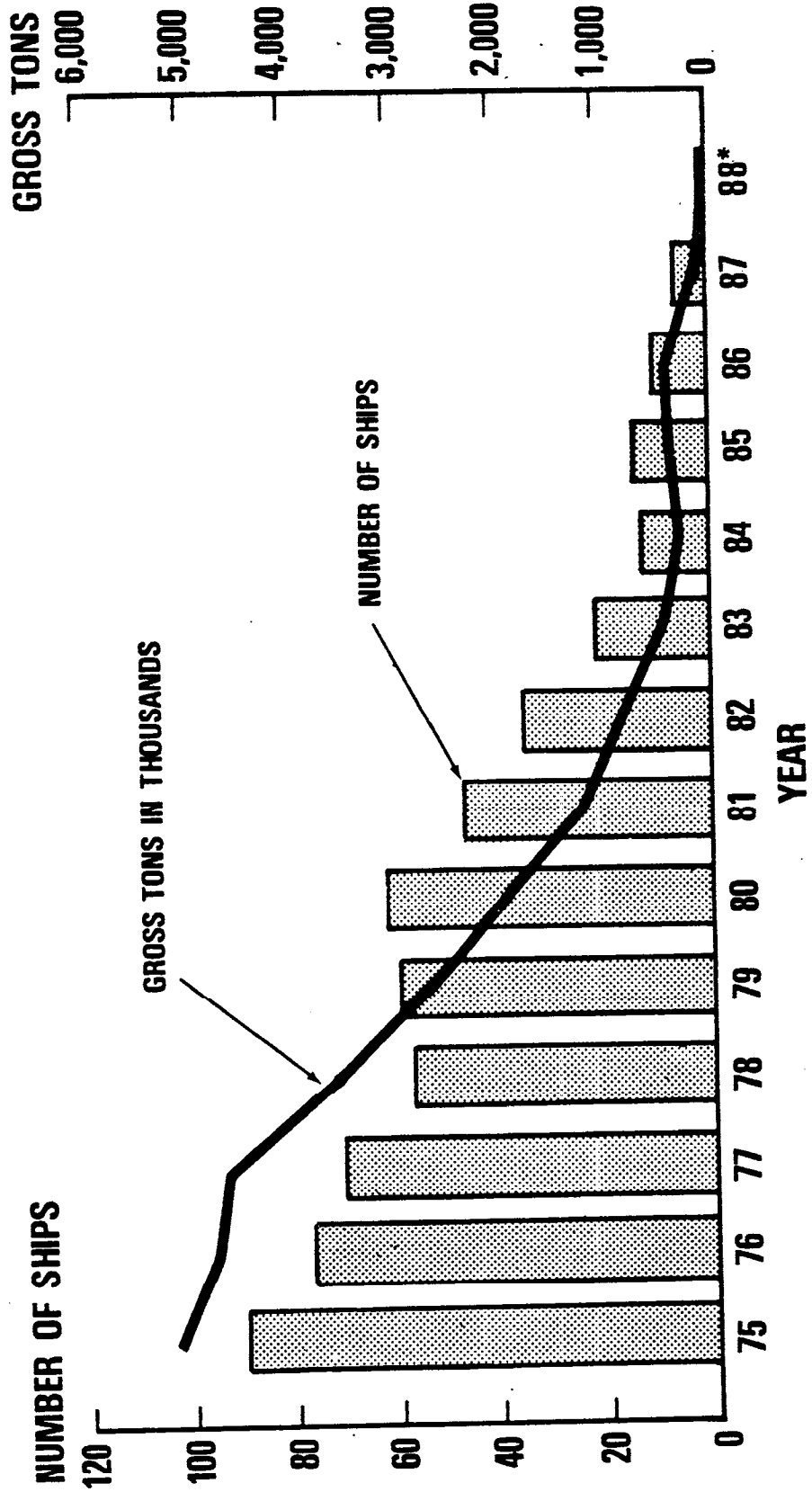
GENERAL ARRANGEMENT

MERCER INDUSTRIES
 1700 FULTON ST. TOLEDO, OHIO

DATE: 10-13-55

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

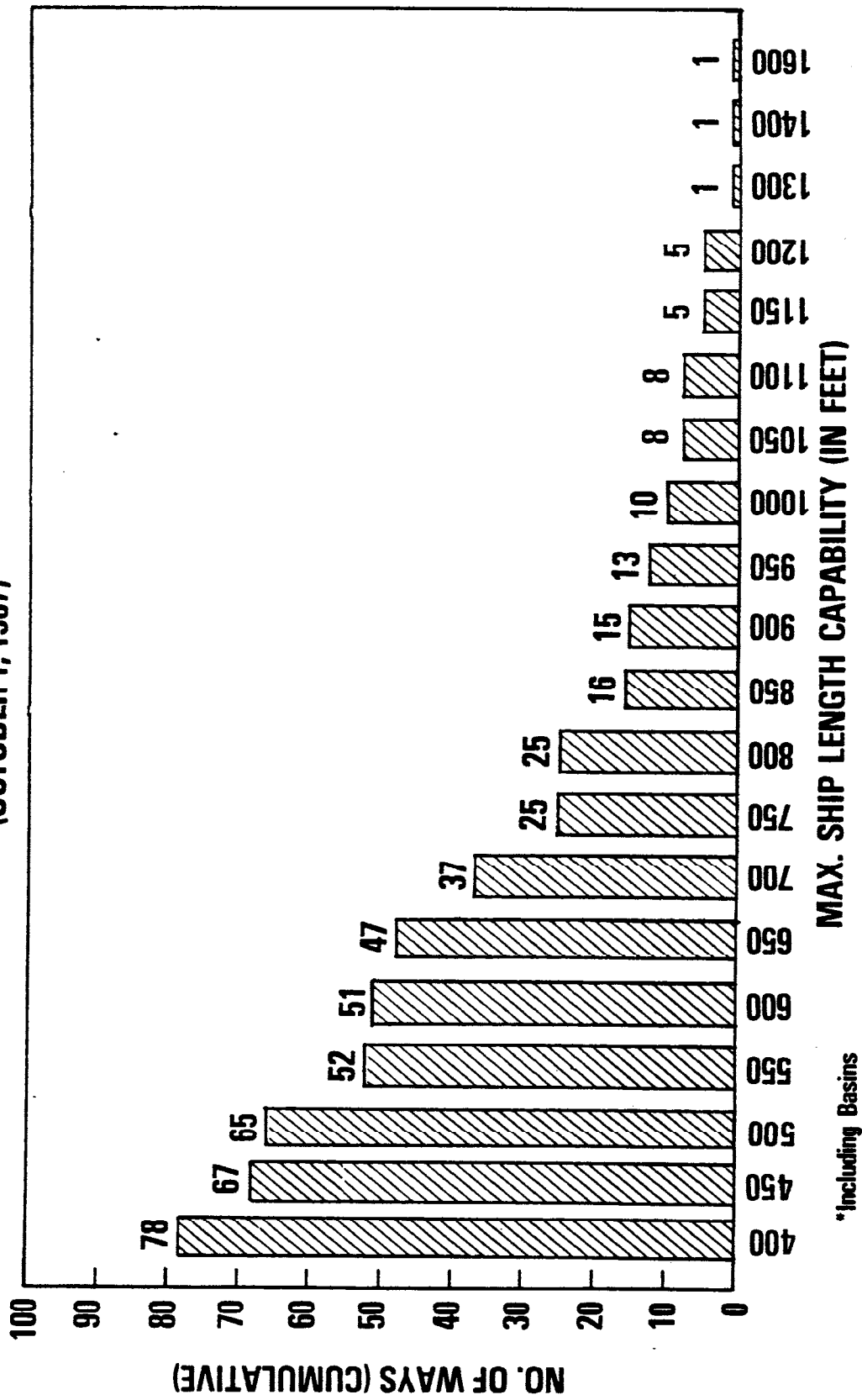
SHIPS OF 1,000 GROSS TONS AND OVER



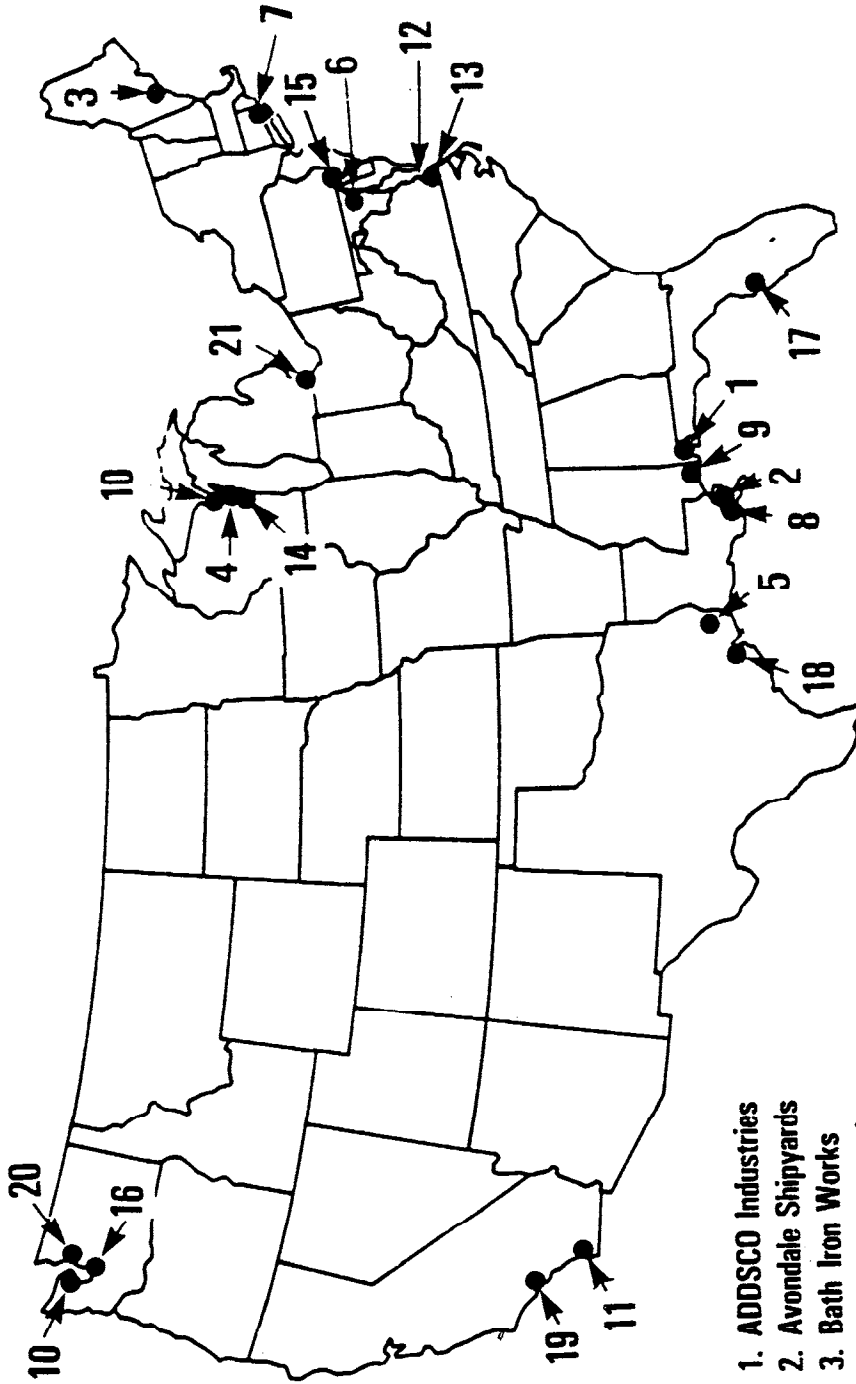
SOURCE: MARITIME ADMINISTRATION

*FORECAST

MAJOR U.S. SHIPBUILDING FACILITIES
***NUMBER OF SHIPWAYS BY MAXIMUM LENGTH**
CAPABILITY
(OCTOBER 1, 1987)



ACTIVE U.S. SHIPBUILDING BASE



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

- 10. Marinette
- 11. NASSCO
- 12. Newport News
- 13. Norfolk SB & DD
- 14. Peterson
- 15. Penn Ship
- 16. Tacoma Boat
- 17. Tampa Ship
- 18. Todd-Galveston
- 19. Todd-Los Angeles
- 20. Todd-Seattle
- 21. Toledo Shipyard

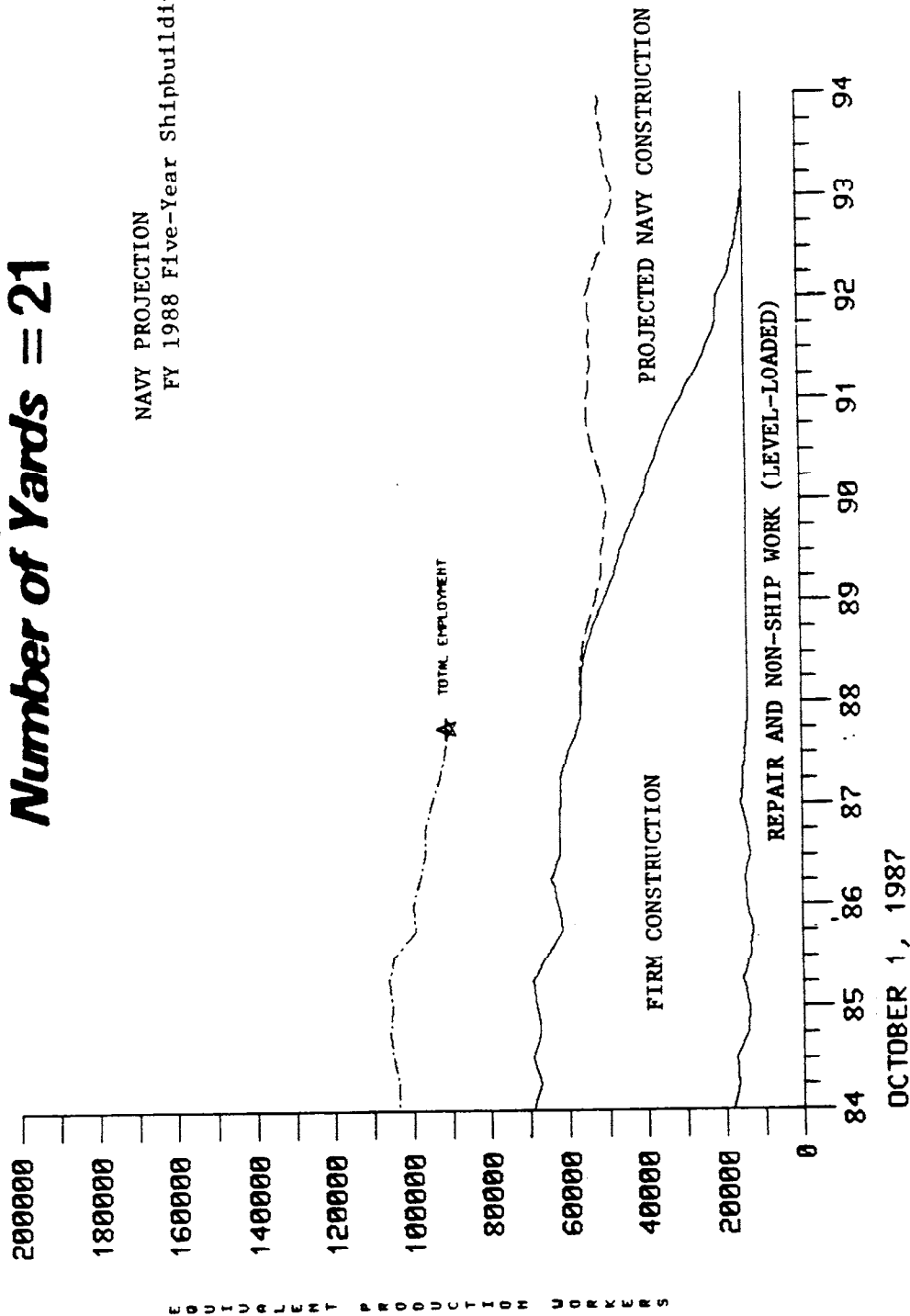
1987

Shipbuilding Industry Workload Projection

Active Shipbuilding Base Summation

Number of Yards = 21

NAVY PROJECTION
 FY 1988 Five-Year Shipbuilding Plan



OCTOBER 1, 1987

SOURCE: SHIPYARD DATA FROM FORM 19832 WHEN PROVIDED
 OFFICE OF SHIP CONSTRUCTION, MARITIME ADMINISTRATION

TABLE 1

SHIP CONSTRUCTION CAPABILITY

BY

SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

1/ Legend

Maximum Ship Size
(LOA x Beam)
SW=Shipway
GD=Graving Dock
LL=Land Level Position
SL=Syncrolift

SHIP CONSTRUCTION CAPABILITY

BY

SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

SHIPYARD	BUILDING POSITION (Number)	General Cargo						Dry Bulk		
		Gen. Cargo 475 X 68	Mob. Cargo 724 X 105	Container 610 X 90	RO/RO 684 X 102	LASH 893 X 100	Container 947 X 105	21,300 570 X 75	51,000 600 X 105	100,000 900 X 105
EAST COAST										
Bath Iron Works	650 X 88SW (2) 700 X 130SW	1 2 3	0 0 0	1 2 3	0 2 2	0 0 0	0 0 0	1 2 3	0 2 2	0 0 0
Bethlehem Steel, Sparrows Point	800 X 106SW 800 X 95SW 1200 X 192GD	1 1 4 6	1 0 1 2	1 1 3 5	1 0 2 3	0 0 1 1	0 0 1 1	1 1 4 6	1 0 2 3	0 0 1 1
Newport News	668 X 93SW 958 X 124GD 1100 X 130GD 1609 X 246GD	1 2 2 9 14	0 1 1 4 6	1 2 2 5 10	0 1 1 4 6	0 1 1 2 4	0 1 1 2 4	1 2 2 6 11	0 1 1 2 4 7	0 1 1 1 1 3
Norfolk SB & DD	500 X 80SW	1 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Penn Ship	(2) 745 X 129SW 720 X 195LL 1100 X 195LL	2 1 2 5	2 1 1 4	2 1 1 4	2 1 1 4	0 0 1 1	0 0 1 1	2 1 1 4	2 1 1 4	0 0 1 1

1/ Legend

Maximum Ship Size
(LOA x Beam)
SM=Shipway
GD=Graving Dock
LL=Land level Position
SL=Syncrolift

SHIP CONSTRUCTION CAPABILITY

BY

SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

SHIPYARD	BUILDING POSITION (Number)	General Cargo							Dry Bulk		
		Gen. Cargo 475 X 68	Mob. Cargo 724 X 105	Container 610 X 90	RO/RO 684 X 102	LASH 893 X 100	Container 947 X 105	21,300 570 X 75	51,000 600 X 105	100,000 900 X 105	
Robert Derecktor	500 X 90LL	1/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	
<u>GULF COAST</u>											
ADDSCO	(4) 523 X 90SW 620 X 90SW	4/1/5	0/0/0	0/1/1	0/0/0	0/0/0	0/0/1	0/0/1	0/0/0	0/0/0	
Avondale	(2) 1020 X 175LL (3) 1200 X 126LL	8/6/14	2/4/6	3/5/8	3/4/7	2/4/6	2/3/5	6/6/12	3/5/8	2/3/5	
Bethlehs, Beaumont	960 X 105SW	1/1	1/1	1/1	1/1	1/1	0/0	1/1	1/1	1/1	
Littona/Ingalls E. & W. Banks	690 X 85SW 530 X 80SW (4) 650 X 90SW (5) 844 X 260LL * 1540 X 180LL *	1/1/25/3/34	0/0/0/11/2/13	0/0/4/13/2/19	0/0/0/11/2/13	0/0/0/0/0/0	0/0/0/0/0/0	0/0/4/16/2/23	1/0/4/11/2/23	0/0/0/11/2/13	0/0/0/0/0/0

* Ship size constrained by maximum launching capability of 850' X 173'.

1/ Legend

Maximum Ship Size
(LOA x Beam)
SW=Shipway
GD=Graving Dock
LL=Land Level Position
SL=Syncrolift

SHIP CONSTRUCTION CAPABILITY

BY

SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

SHIPYARD	BUILDING POSITION (Number)	General Cargo										Dry Bulk						
		Gen. Cargo 475 X 68	Mob. Cargo 724 X 105	Container 610 X 90	RO/RO 684 X 102	LASH 893 X 100	Container 947 X 105	21,300 570 X 75	51,000 600 X 105	100,000 900 X 105								
Marathon, Brownsville	1100 K 150SW	4/4	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
Tampa Shipyards	(2) 746 K 121GD	2/2	2/2	2/2	2/2	0/0	2/2	0/0	0/0	0/0	0/0	2/2	2/2	2/2	2/2	2/2	2/2	0/0
Todd-Galveston	475 X 85SW	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
<u>WEST COAST</u>																		
Marine Power & Equipment	(2) 500 X 104LL	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
National Steel & Shipbuilding Co.	690 X 90SW (2) 900 X 106SW 980 X 170GD	1/2/4	0/2/1	1/2/1	0/2/1	0/2/1	0/2/1	0/2/1	0/2/1	0/2/1	0/2/1	1/2/2	2/2/2	2/2/2	1/2/2	2/2/2	1/2/2	0/2/2

1/ Legend

- Maximum Ship Size
(LOA x Beam)
- SH=Shipway
- GD=Graving Dock
- LL=Land Level Position
- SL=Syncrolift

SHIP CONSTRUCTION CAPABILITY
BY
SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

SHIPYARD	BUILDING POSITION (Number)	General Cargo							Dry Bulk		
		Gen. Cargo 475 X 68	Mob. Cargo 724 X 105	Container 610 X 90	RO/RO 684 X 102	LASH 893 X 100	Container 947 X 105	21,300 570 X 75	51,000 600 X 105	100,000 900 X 105	
Portland SRY	475 X 100LL	1	0	0	0	0	0	0	0	0	0
	810 X 108LL	$\frac{1}{2}$	$\frac{1}{1}$	$\frac{1}{1}$	$\frac{1}{1}$	$\frac{0}{0}$	$\frac{0}{0}$	$\frac{1}{1}$	$\frac{1}{1}$	$\frac{1}{1}$	$\frac{0}{0}$
Todd-LA	(2) 725 X 87SW	2	0	0	0	0	0	2	0	0	0
	826 X 147LL *	3	1	2	0	0	0	2	2	2	0
	545 X 116LL *	$\frac{5}{1}$	$\frac{1}{1}$	$\frac{2}{2}$	$\frac{0}{0}$	$\frac{0}{0}$	$\frac{0}{0}$	$\frac{4}{4}$	$\frac{2}{2}$	$\frac{2}{2}$	$\frac{0}{0}$
Todd-Seattle	600 X 96SW	$\frac{1}{1}$	$\frac{0}{0}$	$\frac{0}{0}$	$\frac{0}{0}$	$\frac{0}{0}$	$\frac{0}{0}$	$\frac{1}{1}$	$\frac{0}{0}$	$\frac{0}{0}$	$\frac{0}{0}$

* Ship size constrained by 655' X 106' syncrolift capacity.

1/ Legend

Maximum Ship Size
(LOA x Beam)
SH=Shipway
GD=Graving Dock
LL=Land Level Position
SL=Syncrolift

SHIP CONSTRUCTION CAPABILITY

BY

SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

SHIPYARD	BUILDING POSITION (Number)	General Cargo										Dry Bulk		
		Gen. Cargo 475 X 68	Mob. Cargo 724 X 105	Container 610 X 90	RO/NO 684 X 102	LASH 893 X 100	Container 947 X 105	21,300 570 X 75	51,000 600 X 105	100,000 900 X 105				
GREAT LAKES *														
Bay SB Corp.	1000 X 105GD	2	0	0	0	0	0	0	0	0	0	1	0	0
	730 X 105SW	1/3	0	0	0	0	0	0	0	0	0	1/2	0	0
Fraser Shipyards	825 X 82GD	1/1	0	0	0	0	0	0	0	0	0	1/1	0	0
	540 X 68GD 680 X 78GD	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

* (NOTE: Maximum size ship that can exit the St. Lawrence Seaway is 730' X 78'.)

1/ Legend

Maximum Ship Size
 (LOA x Beam)
 SW=Shipway
 GD=Graving Dock
 LL=Land Level Position
 SL=Syncrolift

SHIP CONSTRUCTION CAPABILITY
 BY
 SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

		Tankers											OBO
SHIPYARD	BUILDING POSITION (Number)	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	80,000 886 X 105	160,000 998 X 143			
EAST COAST													
Meth Iron Works	650 X 86SW (2) 700 X 130SW	1 2 3	0 2 2	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	
Bethlehem Steel, Sparrows Point	800 X 106SW 800 X 95SW 1200 X 192GD	1 1 3 5	1 1 2 4	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	
Newport News	668 X 93SW 958 X 124GD 1100 X 130GD 1609 X 246GD	1 1 1 6 9	1 1 1 4 7	0 1 1 2 4	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 2 4	0 0 0 1 1	0 0 0 1 1	
Norfolk SB & DD	500 X 80SW	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	
Penn Ship	(2) 745 X 129SW 720 X 195LL 1100 X 195LL	2 1 1 4	2 1 1 4	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	0 0 1 1	

1/ Legend

Maximum Ship Size
(LOA x Beam)

SW=Shipway

GD=Graving Dock

LL=Land Level Position

SL=Syncrolift

SHIP CONSTRUCTION CAPABILITY

BY

SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

SHIPYARD	BUILDING POSITION (Number)	Tankers										OBO
		25,000 620 X 75	38,000 894 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	80,000 886 X 105	160,000 998 X 143		
Robert Derector	500 X 90LL	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
<u>GULF COAST</u>												
ADDSCO	(4) 523 X 90SW 620 X 90SW	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Avondale	(2) 1020 X 175LL (3) 1200 X 126LL	3/5	3/4	2/4	2/0	2/0	1/0	1/0	1/0	1/0	2/4	1/3
Bethlehem, Beaumont	960 X 105SW	1/1	1/1	1/1	0/0	0/0	0/0	0/0	0/0	0/0	1/1	0/0
Litton/Ingalls E. & W. Banks	690 X 85SW 550 X 80SW (4) 650 X 90SW (5) 844 X 260LL * 1540 X 180LL *	1/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0

* Ship size constrained by maximum launching capability of 850' X 173' vessels.

1/ Legend

Maximum Ship Size
 (LOA x Beam)
 S=Shipway
 G=Graving Dock
 LL=Land Level Position
 SL=Syncrolift

SHIP CONSTRUCTION CAPABILITY

BY

SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

SHIPYARD	Tankers										OBO
	BUILDING POSITION (Number)	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	80,000 886 X 105	160,000 998 X 143	
Marathon, Brownsville	1100 X 150SW	1/1	1/1	1/1	1/1	1/1	1/1	0/0	1/1	1/1	1/1
Tampa Shipyards	(2) 746 X 12IGD	2/2	2/2	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Todd-Galveston	475 X 85SW	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
<u>WEST COAST</u>											
Marine Power & Equipment	(2) 500 X 104LL	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
National Steel & Shipbuilding Co.	690 X 90SW (2) 900 X 106SW 980 X 170GD	1/2/2 2/2/2 2/2/2	1/2/1 2/2/1 1/4/4	0/2/1 2/0/1 1/3/3	0/0/1 0/0/1 1/1/1	0/0/1 0/0/1 1/1/1	0/0/0 0/0/0 0/0/0	0/0/0 0/0/0 0/0/0	0/0/1 0/0/1 1/1/1	0/0/0 0/0/0 0/0/0	

1/ Legend

- Maximum Ship Size
(LOA x Beam)
- SW=Shipway
- GD=Graving Dock
- LL=Land Level Position
- SL=Syncrolift

SHIP CONSTRUCTION CAPABILITY

BY

SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

SHIPYARD	BUILDING POSITION (Number)	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	80,000 886 X 105	160,000 998 X 143		
Portland SRY	475 X 100LL 810 X 108LL	0 1	0 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
Todd-LA	(2) 725 X 87SW 826 X 147LL * 945 X 116LL *	2 2 4	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-Seattle	600 X 96SW	0	0	0	0	0	0	0	0	0	0	0

* Ship size constrained by 655' X 106' syncrolift capacity.

1/ Legend

- Maximum Ship Size
(LOA x Beam)
- SM=Shipway
- GD=Graving Dock
- LL=Land Level Position
- SL=Syncrolift

SHIP CONSTRUCTION CAPABILITY
BY
SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

SHIPYARD	BUILDING POSITION (Number)	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	80,000 886 X 105	160,000 998 X 143		
GREAT LAKES *												
Ray SB Corp.	1000 X 1056D	1	0	0	0	0	0	0	0	0	0	0
	730 X 1055W	2	0	0	0	0	0	0	0	0	0	0
Fraser Shipyards	825 X 826D	1	0	0	0	0	0	0	0	0	0	0
		1	0	0	0	0	0	0	0	0	0	0
The Toledo Shipyard	540 X 686D	0	0	0	0	0	0	0	0	0	0	0
	680 X 786D	0	0	0	0	0	0	0	0	0	0	0

* (NOTE: Maximum size ship that can exit the St. Lawrence Seaway is 730' X 78'.)

SHIP CONSTRUCTION CAPABILITY BY SHIP TYPES HISTORICALLY DELIVERED TO COMMERCIAL SERVICE

SUMMARY

REGION	General Cargo										Dry Bulk	
	Gen. Cargo 475 X 68	Mob. Cargo 724 X 105	Container 610 X 90	RO/RO 684 X 102	LASH 893 X 100	Container 947 X 105	21,300 570 X 75	51,000 600 X 105	100,000 900 X 105			
EAST COAST	30	12	22	15	6	6	24	16	5			
GULF COAST	61	23	32	24	8	6	40	25	7			
WEST COAST	17	5	7	4	3	1	11	6	3			
GREAT LAKES *	5	0	0	0	0	0	3	0	0			
TOTAL POSITIONS - ALL YARDS	113	40	61	43	17	13	78	47	15			

REGION	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	80,000 886 X 105	160,000 998 X 143			
EAST COAST	21	17	6	3	3	3	3	6	3			
GULF COAST	36	26	8	3	3	2	1	8	5			
WEST COAST	10	5	3	1	1	0	0	1	0			
GREAT LAKES *	3	0	0	0	0	0	0	0	0			
TOTAL POSITIONS - ALL YARDS	70	48	17	7	7	5	4	15	8			

* (NOTE: Maximum size ship that can exit the St. Lawrence Seaway is 730' X 78'.)

TABLE 2

NUMBER OF SHIPBUILDING WAYS BY LENGTH
(MAXIMUM SHIP SIZE)

NUMBER OF BUILDING WAYS BY LENGTH (MAXIMUM SHIP SIZE) *

Length OA (In feet):	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1300	1400	1600
<u>EAST OMAH</u>																				
Atlantic Marine, Inc.	1																			
Bath Iron Works	3	3	3	3	3	3	2													
Beth-Sparrows Point	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1			
General Dynamics, E. Boat **																				
Jacksonville - Bellinger	1	1																		
Newport News SB & DD	5	5	5	5	4	3	3	3	3	3	3	2	2	2	2	1	1	1	1	1
Norfolk SB & DD	1	1	1																	
Penn Ship (formerly Sun)	4	4	4	4	4	4	4	1	1	1	1	1	1	1	1					
Robert Deterktor	1	1	1																	
TOTAL	(19)	(18)	(17)	(15)	(15)	(14)	(12)	(7)	(7)	(5)	(5)	(5)	(4)	(4)	(4)	(2)	(2)	(1)	(1)	(1)
<u>GULF OMAH</u>																				
ADSCO Industries	5	5	5	1	1															
American Marine	1																			
Avondale Shipyards	6	6	6	5	5	5	5	5	5	5	5	5	5	3	3	3	3			
Beth-Beaumont	1	1	1	1	1	1	1	1	1	1	1	1								
Eastern Marine	1																			
Gretna Machine & Iron	1																			
Ingalls-E. & W. Banks	13	12	12	12	11	11	6	6	6	1										
Marathon LeTourneau	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Moss Point Marine	1																			
Tampa Shipyards	2	2	2	2	2	2	2	2												
Todd-Galveston	1	1																		
TOTAL	(33)	(28)	(27)	(22)	(21)	(20)	(15)	(13)	(13)	(8)	(7)	(7)	(6)	(4)	(4)	(3)	(3)			

* Including basins.
 ** Engaged exclusively in U.S. Navy submarine construction.

NUMBER OF BUILDING WAYS BY LENGTH (MAXIMUM SHIP SIZE) *

Length OA (In Feet):	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1300	1400	1600	
<u>WEST COAST</u>																					
Marine Power & Equip.	3	3	3	4	4	4	3	3	3	3	3	3	1								
National Steel & SB	4	4	4	4	4	4	3	3	3	3	3	3	1								
Portland Ship Repair	2	2	2	1	1	1	1	1	1	1	1										
Tacoma Boat	4																				
Todd-Los Angeles	5	5	5	4	4	4	3	3	3	3	3	1	1								
Todd-Seattle	1	1	1	1	1	1															
TOTAL	(19)	(15)	(15)	(10)	(10)	(9)	(7)	(5)	(5)	(3)	(3)	(3)	(1)								
<u>GREAT LAKES **</u>																					
Bay SB Corporation	2	2	2	2	2	2	2	2	2	2	2	2	2								
Fraser Shipyards	2	2	2	2	2	2	1	1	1	1	1	1	1								
Peterson Builders	1																				
Toledo Shipyards	2	2	2	1	1	1	1	1	1	1	1	1	1								
TOTAL	(7)	(6)	(6)	(5)	(5)	(4)	(3)														
GRAND TOTAL ALL COASTS AND GREAT LAKES	(78)	(67)	(65)	(52)	(51)	(47)	(37)	(25)	(25)	(16)	(15)	(13)	(10)	(8)	(8)	(5)	(5)	(1)	(1)	(1)	(1)

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

APPENDIX A

STANDARD FORM 17

FACILITIES AVAILABLE FOR THE CONSTRUCTION
OR REPAIR OF SHIPS

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

NO.	TYPE	LENGTH (Actual and usable)	WATER DEPTH		HEIGHT OF DOCK	USE REPAIR AND/OR OUTFITTING	SERVICE AVAILABLE (Use abbreviations of services and listed under legend)	No.	CRANES SERVING BERTHS, ETC.	
			Inboard	Outboard					Type (Hook height above M.L.W.)	Lift Capacity (Standard tons)
	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.H.R.—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..... F.P.—G.P.M.—P.S.I.
 Sanitary sewer..... S.S.—Yes or No.
 Sheet 2 of 6

PRINCIPAL SHOPS AND BUILDINGS										ALL OTHER SHOPS (List names and dimensions, include mold loft, if any)			
NAME OF SHOP OR BUILDING	DIMENSIONS OF SHOP OR BUILDING	MATERIALS PROCESSED (See note)	LARGEST EXIT		WEIGHT OF MATERIAL OR NUMBER AND SIZE OF UNITS PRODUCED PER 8 HOURS (See note)								
			Width	Height									
Fabricating													
Plate			X X X X	X X X X									
Sheet metal													
Subassembly													
Carpenter			X X X X	X X X X	X X X X X X X								
Woodworking			X X X X	X X X X	X X X X X X X								
Boat assembly or molding													
Machine		X X X X X X	X X X X	X X X X	X X X X X X X								
Electrical		X X X X X X	X X X X	X X X X	X X X X X X X								
Electronic		X X X X X X	X X X X	X X X X	X X X X X X X								
Pipe													
Galvanizing													
Foundry													
Rigger		X X X X X X	X X X X	X X X X	X X X X								

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

SHOP OR YARD CRANES (5 tons or over)

STATIONARY, RAIL OR MOBILE

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

<p>MAJOR ITEMS OF MACHINE TOOLS AND EQUIPMENT (List briefly such of the large items as will indicate the capacities of all important shops and equipment, with work piece size, e.g., 30' plate bending rolls, 10' plate shears, 400 ton Hyd. press, 30' plate furnace, engine lathe 36" x 20" b.c., etc.)</p>	<p>STORAGE SPACE (Sq. Ft.) FOR COMPONENTS AND MATERIALS (Less boat storage) (List dimensions for each area, plus type material stored)</p>	
<p>ACREAGE LEGALLY CONTROLLED</p>		
<p>RAW STEEL STORAGE (Sq. ft.)</p>	<p>WELDING AND ASSEMBLY (Sq. ft.)</p>	
<p>IN USE</p>	<p>DEVELOPED (including in use)</p>	<p>TOTAL (including undeveloped)</p>
<p>EXISTING LOCAL ORDINANCES LIMITING PRODUCTIVE USE</p>		
<p>LIMITATIONS IMPOSED BY PROPERTY ZONING CLASSIFICATION</p>		
<p>YARD LAYOUT—PLEASE FURNISH A PLOT PLAN OF YARD OR PLANT, IF AVAILABLE</p>		

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

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

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

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

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

DISTANCE TO NEAREST RAILROAD CONNECTION

DISTANCE TO NEAREST AIRPORT—IDENTIFY

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

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

MINIMUM CHANNEL TO TIDEWATER

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

LIMITING LOCK DIMENSIONS TO TIDEWATER (Identify locks)

DESCRIPTION OF TYPES OF WORK NORMALLY SUBCONTRACTED

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

FLOATING DRYDOCK CHARACTERISTICS SUMMARY

FLOATING DRYDOCK	MAXIMUM LENGTH OF PONTOON	MAXIMUM DEPTH OVER BLOCKS	CLEAR WIDTH BETWEEN WINGWALLS	LIFT CAPACITY (TONS)	NORMAL KEEL BLOCK HEIGHT	A.C. AMPHERES (60HZ-30)			REMARKS (Indicate existence of hauling blocks, if end selection can be lowered, and max. length of ship DD can accomodate).
						480V MAX. HOTEL (Indus.)	2400V ALT. HOTEL	13.2KV TEST/ CHECK	

APPENDIX B

MAJOR U.S. SHIPBUILDING, REPAIR (WITH
DRYDOCKING), AND TOPSIDE REPAIR FACILITIES

CLASSIFICATION DEFINITIONS

- Shipbuilding: Facilities that are open, having at least one shipbuilding position, either an inclined way, a side-launching platform, or a building basin--provided that water depth in the channel to the facility itself is at least 12 feet--capable of accommodating a minimum ship size of 400' in length. With few exceptions, these shipbuilding facilities are also major repair facilities with drydocking capability.
- Repair (With Drydocking): Drydocking facilities for ships 400' in length and over, provided that water depth in the channel to the facility itself is at least 12 feet. These facilities may also be capable of constructing vessels less than 400' in length.
- Topside Repair: Facilities with sufficient berth/pier space for topside repair of ships 400' in length and over, provided that water depth in the channel to the facility itself is at least 12 feet. These facilities may also be capable of constructing and/or drydocking vessels less than 400' in length.

NOTE

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 the ship and the inside of the dock at the floor. The maximum beam was determined by allowing a two-foot (.6 m) clearance on each side between the ship and each side of the dock entrance at the sill, unless the shipyard indicated more clearance is required.

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 U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Longest Total linear feet	
<u>EAST COAST</u>			
Shipbuilding Yards			
Atlantic Marine, Inc. P.O. Box 138 Fort George Island, FL 32226	500 X 90 MR	<u>585</u> 1440	<u>1/</u> Construction of small vessels. Repair and overhaul of small and medium size vessels. <u>2/</u> 320
Bath Iron Works 700 Washington Street Bath, ME 04530	650 X 88 SW (2) 700 X 130 SW 550 X 88 FD	<u>850</u> 2150	<u>1/</u> Construction, conversion and repairs - all types of vessels. <u>2/</u> 7,500
Bethlehem Steel Corp. Sparrows Point Yard Sparrows Point, MD 21219	800 X 106 SW 800 X 95 SW 1200 X 192 GD 900 X 136 FD	<u>1260</u> 3040	<u>1/</u> Construction, conversion and repairs of marine vessels. <u>2/</u> 1,970
General Dynamics Electric Boat Division Eastern Point Road Groton, CT 06340	See Note <u>1/</u>	<u>750</u> 3506	<u>1/</u> Engaged exclusively in construction of submarines for the U.S. Navy. <u>2/</u> 19,808
Jacksonville Shipyards Bellinger Division 13911 Atlantic Blvd. Jacksonville, FL 32211	400 X 53 FD 450 X 70 SW	<u>600</u> 1822	<u>1/</u> Construction and repair of small vessels. <u>2/</u> 300

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size	Berths/Piers	Remarks
	(LOA—Beam)	Usable Length in feet	
	SW—Shipway		1/ Type of work usually engaged in
	GD—Graving Drydock		
	FD—Floating Drydock	Longest	2/ Employment - Mid-1987
	MR—Marine Railway	Total linear	
	LL—Land Level Position	feet	
	SL—Syncrolift		
<hr/>			
<u>EAST COAST</u>			
Shipbuilding Yards			
<hr/>			
Newport News Shipbuilding & Drydock Company 4101 Washington Avenue Newport News, VA 23607	447 X 93 SW 668 X 93 SW 958 X 124 GD * 1100 X 130 GD * 646 X 88 GD ** 858 X 102 GD ** 455 X 68 GD ** 521 X 68 GD ** 1609 X 246 GD * 636 X 136 FD	1670 12000	1/ Construction, conversion and repairs - all types of vessels. 2/ 25,350 * Used for construction. ** Used for repair and overhaul.
<hr/>			
Norfolk Shipbuilding & Drydock Corporation P.O. Box 2100 Foot of Liberty Street Norfolk, VA 23501	500 X 80 SW 650 X 81 FD 950 X 154 FD 460 X 70 MR *	1030 12170	1/ Ship construction, conversion and repairs - all types of vessels. 2/ 3,370 * Located at Brambleton plant.
<hr/>			
Pennsylvania Shipbuilding Co. P.O. Box 498 Chester, PA 19013	(2) 745 X 129 SW 720 X 195 LL 1100 X 195 LL 1100 X 195 FD 400 X 84 FD	1100 6200	1/ Ship construction, conversion and repair - all types of vessels. 2/ 1,870
<hr/>			
Robert E. Derecktor of Rhode Island, Inc. Coddington Cove Middleton, RI 02840	725 X 90 FD 500 X 90 LL	1525 6500	1/ Construction of Coast Guard ships and vessel repairs. 2/ 655
<hr/>			

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Longest Total linear feet	
<u>EAST COAST</u> Repair Yards with Drydock Facilities			
Bath Iron Works Corp. Commercial & Franklin Sts. Portland, ME 04101	844 X 136 FD	<u>1000</u> 1500	<u>1/</u> Ship repairs and conversion. <u>2/</u> 178
Boston Graving Dock Corp. 256 Marginal Street East Boston, MA 02128	690 X 92 FD	<u>1020</u> 3111	<u>1/</u> General ship repair. <u>2/</u> 50
Boston Marine Industrial Park (E.D.I.C.) 38 Chauncy Street Boston, MA 02211	1150 X 120 GD	<u>900</u> 2500	<u>1/</u> Leases public drydock in former Boston Naval Annex to local ship repair companies. <u>2/</u> 20
Caddell Drydock & Repair Company P.O. Box 327 Staten Island, NY 10310	450 X 70 FD	<u>820</u> 1900	<u>1/</u> General ship repair. <u>2/</u> 170
Colonna's Shipyard, Inc. 400 E. Indian River Rd. Norfolk, VA 23523	(2) 400 X 65 MR 720 X 84 FD	<u>900</u> 2675	<u>1/</u> General ship repairs. <u>2/</u> 587

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Longest Total linear feet	1/ Type of work usually engaged in 2/ Employment - Mid-1987
<u>EAST COAST</u>			
Repair Yards with Drydock Facilities			
Detyens Shipyard Rt. 2, Box 180 Mt. Pleasant, SC 29464	500 X 85 FD	<u>510</u> 1022	1/ General ship repair and conversion. 2/ 304
General Ship Corp. 400 Border Street East Boston, MA 02128	678 X 90 GD *	<u>900</u> 2530	1/ Ship repairs, overhauls and modernizations. 2/ 215 * GD is long-term leased from Boston Marine Industrial Park in the former Boston Naval Annex.
Jacksonville Shipyards Commercial Division P.O. Box 2347 Jacksonville, FL 32203	900 X 140 FD 745 X 127 FD	<u>800</u> 6084	1/ Ship repair and conversion. 2/ 1,800
Metro Machine Corp. P.O. Box 1860 Norfolk, VA 23501	675 X 96 FD	<u>785</u> 2030	1/ Ship repairs and conversion. 2/ 625
New York Shipyard Corp. One Beard St. Brooklyn, NY 14231	686 X 86 GD 710 X 105 FD 475 X 76 FD 600 X 106 FD	<u>1152</u> 4047	1/ General ship repairs. 2/ 150

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway		<u>1/</u> Type of work usually engaged in
	GD—Graving Drydock		<u>2/</u> Employment - Mid-1987
	FD—Floating Drydock	<u>Longest</u>	
	MR—Marine Railway	Total linear	
	LL—Land Level Position	feet	
	SL—Syncrolift		
<u>EAST COAST</u>			
Repair Yards with Drydock Facilities			
North Florida Shipyards P.O. Box 3255 Jacksonville, FL 32206	500 X 66 FD	<u>950</u> 3240	<u>1/</u> Ship repairs and conversion. <u>2/</u> 332
Perth Amboy Drydock Co. Foot of Commerce St. P.O. Box 348 Perth Amboy, NJ 08862	400 X 68 FD 443 X 70 FD 545 X 90 FD	<u>600</u> 2180	<u>1/</u> General ship repair and conversion. <u>2/</u> 100

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	in feet Longest Total linear feet	
<u>EAST COAST</u>			
Topside Repair Yards			
Associated Naval Architects 3400 Shipwright Street Portsmouth, VA 23703		$\frac{400}{1390}$	<u>1/</u> General ship repair and overhaul. <u>2/</u> 93
Braswell Shipyards 3 Braswell St. Charleston, SC 29405		$\frac{720}{1080}$	<u>1/</u> Ship repairs and conversion. <u>2/</u> 197
Delta Marine, Inc. P.O. Box 2191 Wilmington, NC 28402		$\frac{1000}{1650}$	<u>1/</u> General ship repair. <u>2/</u> 49
Eastern Technical Enterprises 2429 Ferry Rd. Virginia Beach, VA 23455		$\frac{600}{600}$	<u>1/</u> Ship repair, overhaul, and modification. <u>2/</u> 56
General Ship Repair Corp. 1449 Key Highway Baltimore, MD 21230		$\frac{435}{845}$	<u>1/</u> General ship repair. <u>2/</u> 42
Gowen, Inc. 72 Commercial Street Portland, ME 04104		$\frac{500}{1500}$	<u>1/</u> General ship repair. <u>2/</u> 25
JOMAR Corporation of Tidewater P.O. Box 5119 Suffock, VA 23435		$\frac{500}{500}$	<u>1/</u> General ship repair. <u>2/</u> 80

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway		<u>1/</u> Type of work usually engaged in
	GD—Graving Drydock	<u>Longest</u>	<u>2/</u> Employment - Mid-1967
	FD—Floating Drydock	<u>Total linear</u>	
	MR—Marine Railway	feet	
	LL—Land Level Position		
	SL—Syncrolift		
<u>EAST COAST</u>			
Topside Repair Yards			
Jonathan Corporation Little Creek Shipyard Virginia Beach, VA 23455		<u>558</u> 1116	<u>1/</u> General ship repair, particularly naval vessels. <u>2/</u> 200
Jonathan Corporation 701 Front Street Norfolk, VA 23510		<u>700</u> 1106	<u>1/</u> Ship repair and overhaul. <u>2/</u> 560
Marine Hydraulics International, Inc. 800 East Indian River Rd. Norfolk, VA 23523		<u>650</u> 2150	<u>1/</u> General ship repair. <u>2/</u> 281
Melville Marine Industries One Little Harbor Landing Portsmouth, RI 02871		<u>1200</u> 1200	<u>1/</u> General ship repair. <u>2/</u> 100
Metal Trades, Inc. P.O. Box 129 Hollywood, SC 29449-0129		<u>320</u> * 500	<u>1/</u> General ship repair. <u>2/</u> 309 * Can do topside repair to vessel 400' in length.
Moon Engineering 545 Front Street Norfolk, VA 23510		<u>550</u> 550	<u>1/</u> General ship repair, primarily for Navy. <u>2/</u> 88
Moon Engineering Two Harper Avenue Portsmouth, VA 23707		<u>613</u> 1226	<u>1/</u> General ship repairs. <u>2/</u> 176

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA--Beam)	Berths/Piers Usable Length in feet	Remarks
	SW--Shipway GD--Graving Drydock FD--Floating Drydock MR--Marine Railway LL--Land Level Position SL--Syncrolift	Longest Total linear feet	1/ Type of work usually engaged in 2/ Employment - Mid-1987
<u>EAST COAST</u>			
Topside Repair Yards			
M & W Marine Service, Inc. 601 Jefferson Ave. Newport News, VA 23607-6113		<u>450</u> 450	<u>1/</u> General ship repair. <u>2/</u> 78
Newport Offshore, Ltd. One Washington Street Newport, RI 02840		<u>400</u> 1200	<u>1/</u> General ship repair. <u>2/</u> 120
Promet Marine Services Corp. 242 Allens Ave. Providence, RI 02905		<u>750</u> 2250	<u>1/</u> General ship repair. <u>2/</u> 29
Reynolds Shipyard Corp. 200 Edgewater Street Staten Island, NY 10305		<u>440</u> 440	<u>1/</u> General ship repairs. <u>2/</u> 40
Steel Style, Inc. 401 South Water Street Newburgh, NY 12550		<u>500</u> 600	<u>1/</u> General ship repair. <u>2/</u> 82
Swygert Shipyard, Inc. P.O. Box 308 St. John's Island, SC 29455		<u>500</u> 900	<u>1/</u> General ship repair. <u>2/</u> 225

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Longest Total linear feet	1/ Type of work usually engaged in 2/ Employment - Mid-1987
<u>GULF COAST</u>			
Shipbuilding Yards			
ADDSCO Industries, Inc. P.O. Box 190 Mobile, AL 36601	(4) 523 X 90 SW 620 X 90 SW 625 X 83 FD 750 X 100 FD	<u>1132</u> <u>9370</u>	1/ Ship construction, conversion and repairs. Also drill rig construction. 2/ 590
American Marine Corp. 3900 Jourdan Rd. New Orleans, LA 70182	400 X 75 LL	<u>800</u> <u>800</u>	1/ Construction of offshore oil vessels and barges. 2/ 145
Avondale Industries, Inc. P.O. Box 50280 New Orleans, LA 70150-0280	(2) 1020 X 175 LL * 1000 X 216 FD * 750 X 110 FD ** (3) 1200 X 126 LL ** 450 X 90 SW ***	<u>2300</u> <u>6100</u>	1/ Modular ship construction, conversion, and repairs - all types of vessels. 2/ 6,450 * Upper main yard. ** Lower main yard. *** Westwego Plant.
Bethlehem Steel Corp. Beaumont Yard P.O. Box 3031 Beaumont, TX 77704	960 X 105 SW	<u>1100</u> <u>4600</u>	1/ Construction of barges and drilling rigs. Also ship repair and conversion. 2/ 500
Eastern Marine, Inc. Box 104-B Allanton Rd. Allanton, FL 32404	400 X 68 SW	<u>600</u> <u>600</u>	1/ General ship repair and construction. 2/ 75
Gretna Machine and Iron Works P.O. Box 215 Harvey, LA 70059	500 X 100 GD	<u>1499</u> <u>1499</u>	1/ Construction and repair of vessels and barges. 2/ 167

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size	Berths/Piers	Remarks
	(LOA—Beam)	Usable Length in feet	
	SW—Shipway		1/ Type of work usually engaged in
	GD—Graving Drydock		
	FD—Floating Drydock	Longest	2/ Employment - Mid-1987
	MR—Marine Railway	Total linear	
	LL—Land Level Position	feet	
	SL—Syncrolift		
<u>GULF COAST</u>			
Shipbuilding Yards			
Litton/Ingalls Shipbuilding Division P.O. Box 149 Pascagoula, MS 39568-0149	690 X 85 SW 550 X 80 SW (4) 650 X 90 SW 460 X 60 GD 850 X 173 FD * (5) 844 X 260 LL * 1540 X 180 LL *	<u>2650</u> 9850	1/ Construction, conversion, and repairs - all types of vessels. 2/ 11,850 * West Bank can only launch ships up to 850' X 173'. Land Level Positions constrained by launching capability.
Marathon LeTourneau Co. P.O. Box 3189 Brownsville, TX 78520	1100 X 150 SW	<u>1600</u> 2100	1/ Construction of drillings rigs. Yard has capability of building large oceangoing ships. 2/ 320
Moss Point Marine P.O. Box 1310 Escatawpa, MS 39552	400 X 82 SW	<u>400</u> 900	1/ Construction, conversion and repair of ships, boats, barges. 2/ 320
Tampa Shipyards, Inc. P.O. Box 1277 Tampa, FL 33601	542 X 72 GD* 896 X 146 GD* (2) 746 X 121 GD**	<u>840</u> 2240	1/ Ship construction, conversion and repairs. 2/ 270 * Used for ship repair. ** Used for ship construction.
Todd Shipyards Corp. Galveston Division P.O. Box 1550 Galveston, TX 77553	475 X 85 SW * 900 X 160 FD 600 X 118 FD	<u>1086</u> 6400	1/ Ship construction, repairs and conversion. 2/ 345 * Vessels constructed on launching pontoon and launched on drydock.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	in feet <u>Longest</u> Total linear feet	
<u>GULF COAST</u>			
Repair Yards with Drydock Facilities			
Bender Shipbuilding & Repair Co., Inc. 265 South Water Street Mobile, AL 36601	660 X 89 FD 414 X 55 FD 414 X 45 FD	<u>617</u> 5000	<u>1/</u> Construction of vessels up to 300' in length. Also repairs and conversion. <u>2/</u> 500
Bethlehem Steel Corp. Sabine Yard P.O. Box 1448 Port Arthur, TX 77641	950 X 118 FD	<u>600</u> 600	<u>1/</u> Repair of offshore oil rigs but can repair oceangoing ships. <u>2/</u> 118
Bludworth Bond Shipyard P.O. Box 5065 Houston, TX 77262	435 X 80 FD *	<u>630</u> 1900	<u>1/</u> General ship repairs. <u>2/</u> 150 * Two drydocks are combined.
Gulf Coast Fabrication P.O. Box 529 Pass Christian, MS 39571	400 X 100 GD	<u>500</u> 4000	<u>1/</u> General ship repair. <u>2/</u> 100
Gulf-Tampa Drydock Co. 1200 Sertoma Drive Tampa, FL 36605	500 X 97 FD	<u>800</u> 1100	<u>1/</u> Ship repairs and overhaul. <u>2/</u> 300

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Longest Total linear feet	1/ Type of work usually engaged in 2/ Employment - Mid-1987
<u>GULF COAST</u>			
Topside Repair Yards			
Baker Marine Corp. P.O. Box 190 Ingleside, TX 78362		<u>550</u> 550	1/ General ship repair. 2/ 230
Boland Marine Manufacturing P.O. Box 53287 New Orleans, LA 70153		<u>800</u> 1100	1/ General ship repairs. 2/ 110
Bollinger Machine Shop and Shipyard P.O. Box 250 Lockport, LA 70374		<u>5400</u> 12180	1/ Coast Guard vessel construction. 2/ 442
Buck Kreihns Co. P.O. Box 53305 2225 Tchoupitoulas St. New Orleans, LA 70153-3305		<u>1120</u> 1120	1/ Ship repairs and conversion. 2/ 95
Coastal Iron Works P.O. Box 2548 1133 E. Port Ave. Corpus Christie, TX 78403		<u>487</u> 487	1/ General ship repair. 2/ 80
Coastal Marine Service of Texas 1051 Houston Avenue Port Arthur, TX 77640		<u>840</u> 1440	1/ General ship repair. 2/ 200

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Longest Total linear feet	
<u>GULF COAST</u>			
Topside Repair Yards			
Dixie Machine Welding P.O. Box 53355 New Orleans, LA 70153		<u>1333</u> 1333	<u>1/</u> General ship repairs. <u>2/</u> 249
Fredeman Shipyard P.O. Box 129 Sulphur, LA 70663		<u>450</u> 1700	<u>1/</u> Construction and repair of offshore vessels. <u>2/</u> 150
Gulf Copper & Manufacturing Corp. 320 Houston Avenue Port Arthur, TX 77640		<u>2400</u> 2400	<u>1/</u> General ship repair. <u>2/</u> 100
Halter Marine, Inc. Equitable Division P.O. Box 8001 New Orleans, LA 70182		<u>400</u> 1318	<u>1/</u> Construction and repair of small vessels and barges. <u>2/</u> 98
Hendry Corp. P.O. Box 13288 5107 S. Westshore Blvd. Tampa, FL 33611		<u>1000</u> 1000	<u>1/</u> General ship repairs. <u>2/</u> 112
Houston Ship Repair, Inc. 16201 Wood Drive Houston, TX 77530		<u>750</u> 750	<u>1/</u> General ship repair and conversion. <u>2/</u> 140

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Longest Total linear feet	1/ Type of work usually engaged in 2/ Employment - Mid-1987
<u>GULF COAST</u>			
Topside Repair Yards			
International Ship Repair & Marine Service, Inc. 1616 Perry Street Tampa, FL 33605		$\frac{675}{675}$	1/ General ship repair. 2/ 150
McDermott Shipyard P.O. Box 188 Morgan City, LA 70381		$\frac{600}{1170}$	1/ Construction and repair of tugs, supply boats, barges, and drill rigs. 2/ 405
Newpark Shipbuilding P.O. Box 5426 Houston, TX 77012		$\frac{500}{1600}$	1/ Small vessel construction and repairs. 2/ 180
Port Allen Marine Service P.O. Box 108 Port Allen, LA 70767		$\frac{500}{1940}$	1/ General ship repair. 2/ 120
Textron Marine Systems 6800 Plaza Drive New Orleans, LA 70127-2956		$\frac{900}{1500}$	1/ General ship repair. 2/ 328
Vessel Repair, Inc. P.O. Box 2207 Port Arthur, TX 77640		$\frac{1100}{2100}$	1/ General ship repair. 2/ 45
Violet Dock Port, Inc. P.O. Box 357 Violet, LA 70092		$\frac{1000}{4000}$	1/ General ship repair. 2/ 35

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size	Berths/Piers	Remarks
	(LOA—Beam) SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Usable Length in feet Longest Total linear feet	 1/ Type of work usually engaged in 2/ Employment - Mid-1987
<u>WEST COAST</u>			
Shipbuilding Yards			
Marine Power & Equipment Yard No. 4 6701 Fox Avenue S. Seattle, WA 98108	400 X 57 FD (2) 500 X 104 LL 400 X 105 SL	<u>620</u> 1,505	1/ Ship construction, repairs, and conversion. 2/ 100
National Steel & Shipbuilding Co. Harbor Drive & 28th St. P.O. Box 85278 San Diego, CA 92138	690 X 90 SW (2) 900 X 106 SW 980 X 170 GD 750 X 130 FD	<u>1000</u> 7250	1/ Construction, conversion, and repairs - all types of vessels. 2/ 2,145 Graving dock and piers at U.S. Naval Station also leased, as required.
Portland Ship Repair Yard 5555 N. Channel Avenue P.O. Box 3529 Portland, OR 97208	475 X 100 LL 810 X 108 LL 650 X 84 FD 550 X 88 FD 810 X 108 FD	<u>1000</u> 10200	1/ Ship construction, repair and conversion - all types of vessels. 2/ 1,500
Facilities also leased by: 1. Cascade General, Inc. 2. Northwest Marine Iron 3. West State, Inc.	1150 X 181 FD		
Tacoma Boatbuilding 1840 Marine View Drive Tacoma, WA 98422	(2) 425 X 45 SW * (2) 430 X 50 SW *	<u>680</u> 1350	1/ Ship construction, repairs, and conversion - all types of vessels. 2/ 265 * Vessel with beam up to 98 feet can be constructed by joining the two shipways.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size	Berths/Piers	Remarks
	(LOA—Beam) SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Usable Length in feet Longest Total linear feet	1/ Type of work usually engaged in 2/ Employment - Mid-1987
<u>WEST COAST</u>			
Shipbuilding Yards			
Todd Pacific Shipyards Los Angeles Division 710 Front Street San Pedro, CA 90733	(2) 725 X 87 SW 826 X 147 LL 545 X 116 LL 711 X 86 FD 655 X 106 SL	700 6175	1/ Modular ship construction, conversion, and repairs - all types of vessels. 2/ 1,548
Todd Pacific Shipyards Seattle Division 1801-16th Avenue, S.W. Seattle, WA 98124	600 X 96 SW * 420 X 62 FD 650 X 84 FD 943 X 133 FD	1400 6017	1/ Ship construction, repairs, and conversion - all types of vessels. 2/ 930 * Max. ship size is 600' X 96' using two 450' X 50' SWS.

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	in feet <u>Longest</u> Total linear feet	<u>1/</u> Type of work usually engaged in <u>2/</u> Employment - Mid-1987
WEST COAST			
Repair Yards with Drydock Facilities			
AK-WA, Inc. 401 Alexander-Bldg. 588 P.O. Box 872 Tacoma, WA 98421	500 X 84 FD	<u>1000</u> 3200	<u>1/</u> Ship repair and conversion. <u>2/</u> 144
Continental Maritime of San Francisco, Inc. Pier 50-54 San Francisco, CA 94107	750 X 134 FD	<u>1100</u> 4100 *	<u>1/</u> Ship repair and conversion. <u>2/</u> 820 * Pier space long-term leased from San Francisco Port Commission.
Hunters Point Naval Shipyard San Francisco, CA 94124	705 X 82 GD 986 X 108 GD 1088 X 138 GD (2) 416 X 56 GD 416 X 71 GD	<u>1390</u> 24000	<u>1/</u> Ship repairs, overhaul, and conversion. <u>2/</u> N/A Facilities leased to private ship repair firms on an as-needed basis.
Marine Power & Equipment Yard No. 1 1441 N. Northlake Drive N. Seattle, WA 98103	400 X 60 FD	<u>360</u> 510	<u>1/</u> General ship repairs. <u>2/</u> 100
Maritime Contractors, Inc. 201 Harris Avenue Bellingham, WA 98225	400 X 60 FD	<u>1350</u> 2200	<u>1/</u> General ship repair. <u>2/</u> 90
Pacific Drydock & Repair Co. 321 & 1441 Embarcadero Oakland, CA 94606	400 X 52 FD	<u>600</u> 1155	<u>1/</u> Ship and barge repairs. <u>2/</u> 110

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size	Berths/Piers	Remarks
	(LUA—Beam)	Usable Length	
	SW—Shipway	in feet	<u>1/</u> Type of work usually engaged in
	GD—Graving Drydock		
	FD—Floating Drydock	<u>Longest</u>	<u>2/</u> Employment - Mid-1987
	MR—Marine Railway	Total linear	
	LL—Land Level Position	feet	
	SL—Syncrolift		
<u>WEST COAST</u>			
Repair Yards with Drydock Facilities			
Southern Oregon Marine P.O. Box 1220 Coos Bay, OR 97420	400 X 100 MR	<u>400</u> <u>400</u>	<u>1/</u> General ship repair and barge construction. <u>2/</u> 115
Southwest Marine, Inc. P.O. Box 13308 Foot of Sampson St. San Diego, CA 92113-0308	655 X 104 FD 418 X 58 FD	<u>700</u> <u>2972</u>	<u>1/</u> Ship repairs, overhaul, and conversion. <u>2/</u> 997 Graving dock at Naval Station can be leased as required.
Southwest Marine, Inc. San Pedro Division 985 S. Seaside Terminal Island, CA 90731-7331	720 X 93 FD	<u>1500</u> <u>4175</u>	<u>1/</u> Ship repairs, overhaul, and conversion. <u>2/</u> 599
Southwest Marine of San Francisco P.O. Box 7644 San Francisco, CA 94120-7644	950 X 148 FD 700 X 97 FD	<u>700</u> <u>4885</u>	<u>1/</u> Ship repairs and overhaul. <u>2/</u> 450
U.S. Naval Station P.O. Box 119 San Diego, CA 92136	683 X 85 GD	<u>N.A.</u> <u>13000</u>	<u>1/</u> Facilities leased to following ship repair companies as well as others previously noted: <u>a/</u> Pacific Ship Repair <u>b/</u> RMI, Inc. <u>2/</u> N/A

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Longest Total linear feet	1/ Type of work usually engaged in 2/ Employment - Mid-1987
<u>WEST COAST</u>			
Topside Repair Yards			
Billfish, Inc. Berth 44, Outer Harbor San Pedro, CA 90731		<u>620</u> 620	1/ General ship repair. 2/ 95
Campbell Industries P.O. Box 1870 501 E. Harbor Drive San Diego, CA 92112		<u>640</u> 2185	1/ General ship repair and construction of vessels up to 300' in length. 2/ 395
Commercial Marine Service, Inc. 258 Cannery Street Terminal Island, CA 90731		<u>420</u> 840	1/ General ship repair. 2/ 22
Continental Maritime of San Diego 1445 Crosby Street San Diego, CA 92113		<u>650</u> 4017	1/ General ship repair. 2/ 400
Fishermen's Boat Shop 1016 14th Street Everett, WA 98201		<u>450</u> 450	1/ General ship repair and modifications. 2/ 41
Foss Shipyard 660 West Ewing Street Seattle, WA 98119		<u>460</u> 2575	1/ Vessel repair, alteration, and overhaul. 2/ 95

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Longest Total linear feet	
<u>WEST COAST</u>			
Topside Repair Yards			
Lake Union Drydock 1515 Fairview Avenue East Seattle, WA 98102		<u>1000</u> <u>4235</u>	<u>1/</u> Ship repair and conversion. <u>2/</u> 58
Larson Boat Shop 1046 S. Seaside Ave. Terminal Island, CA 90731		<u>400</u> <u>600</u>	<u>1/</u> Ship and boat repair. <u>2/</u> 125
Pacific Fishermen, Inc. 5351 24th Avenue Seattle, WA 98107		<u>500</u> <u>1300</u>	<u>1/</u> Construction and repair of small vessels. Topside repair of large vessels. <u>2/</u> 83
Service Engineering Co. P.O. Box 7714 San Francisco, CA 94120		<u>800</u> <u>2450</u>	<u>1/</u> General ship repair and conversion. <u>2/</u> 471

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size (LOA—Beam)	Berths/Piers Usable Length in feet	Remarks
	SW—Shipway GD—Graving Drydock FD—Floating Drydock MR—Marine Railway LL—Land Level Position SL—Syncrolift	Longest Total linear feet	1/ Type of work usually engaged in 2/ Employment - Mid-1987

GREAT LAKES

Maximum ship size that can exit the St. Lawrence Seaway locks is 730' X 78'.)

Shipbuilding Yards

Bay Shipbuilding Corp. 605 North Third Ave. Sturgeon Bay, WI 54235	730 X 105 SW 640 X 68 FD 1000 X 105 GD	1000 7095	1/ Ship construction, repairs, and conversion. 2/ 980
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Fraser Shipyards P.O. Box 997 Superior, WI 54880	825 X 82 GD 620 X 61 GD	900 4450	1/ Ship construction, repairs, and conversion. 2/ 40
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Peterson Builders 101 Pennsylvania St. P.O. Box 650 Sturgeon Bay, WI 54235-0650	410 X 68 SW	900 2515	1/ Ship construction, repair, and conversion. 2/ 875
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The Toledo Shipyard * 3135 Front Street Toledo, OH 43605	540 X 68 GD 680 X 78 GD	800 1610	1/ Ship construction, repair, and conversion. 2/ 54
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* Leased by Merce Industries, Inc.

Repair Yards with
Drydock Facilities

NONE

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size	Berths/Piers	Remarks
	(LOA—Beam)	Usable Length	
	SW—Shipway	in feet	<u>1/</u> Type of work usually engaged in
	GD—Graving Drydock		
	FD—Floating Drydock	<u>Longest</u>	<u>2/</u> Employment - Mid-1987
	MR—Marine Railway	Total linear	
	LL—Land Level Position	feet	
	SL—Syncrolift		
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<u>GREAT LAKES</u>			
Maximum ship size that can exit the St. Lawrence Seaway locks is 730' X 78'.)			
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<u>Topside Repair Yards</u>			
H. Hanson Industries 2824 Summit Street Toledo, OH 43611		<u>740</u> 1480	<u>1/</u> General ship repair. <u>2/</u> 47
G & W Industries, Inc. 1898 Carter Road Cleveland, OH 44112		<u>650</u> 650	<u>1/</u> General ship repair. <u>2/</u> 30
Marinette Marine Corp. Foot of Ely Street Marinette, WI 54143		<u>2136</u> 2136	<u>1/</u> Ship construction, repair, and conversion. <u>2/</u> 929
Nicholson Terminal & Dock Company P.O. Box 66 River Rouge, MI 48218		<u>2000</u> 3500	<u>1/</u> General ship repair. <u>2/</u> 125
R. J. Rotundo, Inc. 400 Lake Street Ontonagon, MI 49953		<u>610</u> 610	<u>1/</u> Construction and repair of integrated tug barges. <u>2/</u> 70

MAJOR U.S. SHIPBUILDING AND REPAIR FACILITIES
(Vessels 400' in Length and Over)

Name and Address	Maximum Ship Size	Berths/Piers	Remarks
	(LOA—Beam)	Usable Length	
	SW—Shipway	in feet	<u>1/</u> Type of work usually engaged in
	GD—Graving Drydock		
	FD—Floating Drydock	<u>Longest</u>	<u>2/</u> Employment - Mid-1987
	MR—Marine Railway	<u>Total linear</u>	
	LL—Land Level Position	feet	
	SL—Syncrolift		
<hr/>			
<u>NON-CONUS</u>			
<u>Shipbuilding Yards</u>			
NONE			
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<u>Repair Yards with Drydock Facilities</u>			
Honolulu Shipyard, Inc. P.O. Box 30989 Honolulu, HI 96820	400 X 57 FD	<u>645</u> 645	<u>1/</u> General ship repair and overhaul. <u>2/</u> 240
Ketchikan Shipyard, Inc. P.O. Box 7178 Ketchikan, AK 99907	450 X 110 FD	<u>1000</u> 1000	<u>1/</u> General ship repair. <u>2/</u> 35
Marisco, Ltd. 607 Ala Moana Blvd. Honolulu, HI 96813	520 X 74 FD	*	<u>1/</u> General ship repair. <u>2/</u> 90 * Leased from Port Commission.
Puerto Rico Drydock & Marine Terminals P.O. Box 2209 San Juan, PR 00903	632 X 80 GD	<u>1000</u> 3300	<u>1/</u> General ship repairs. <u>2/</u> 110
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<u>Topside Repair Yards</u>			
NONE			

