
# *U.S. Military Vessel Procurement and Great Lakes Shipyards*

GREAT LAKES COMMISSION STAFF

May 1985

Great Lakes Commission
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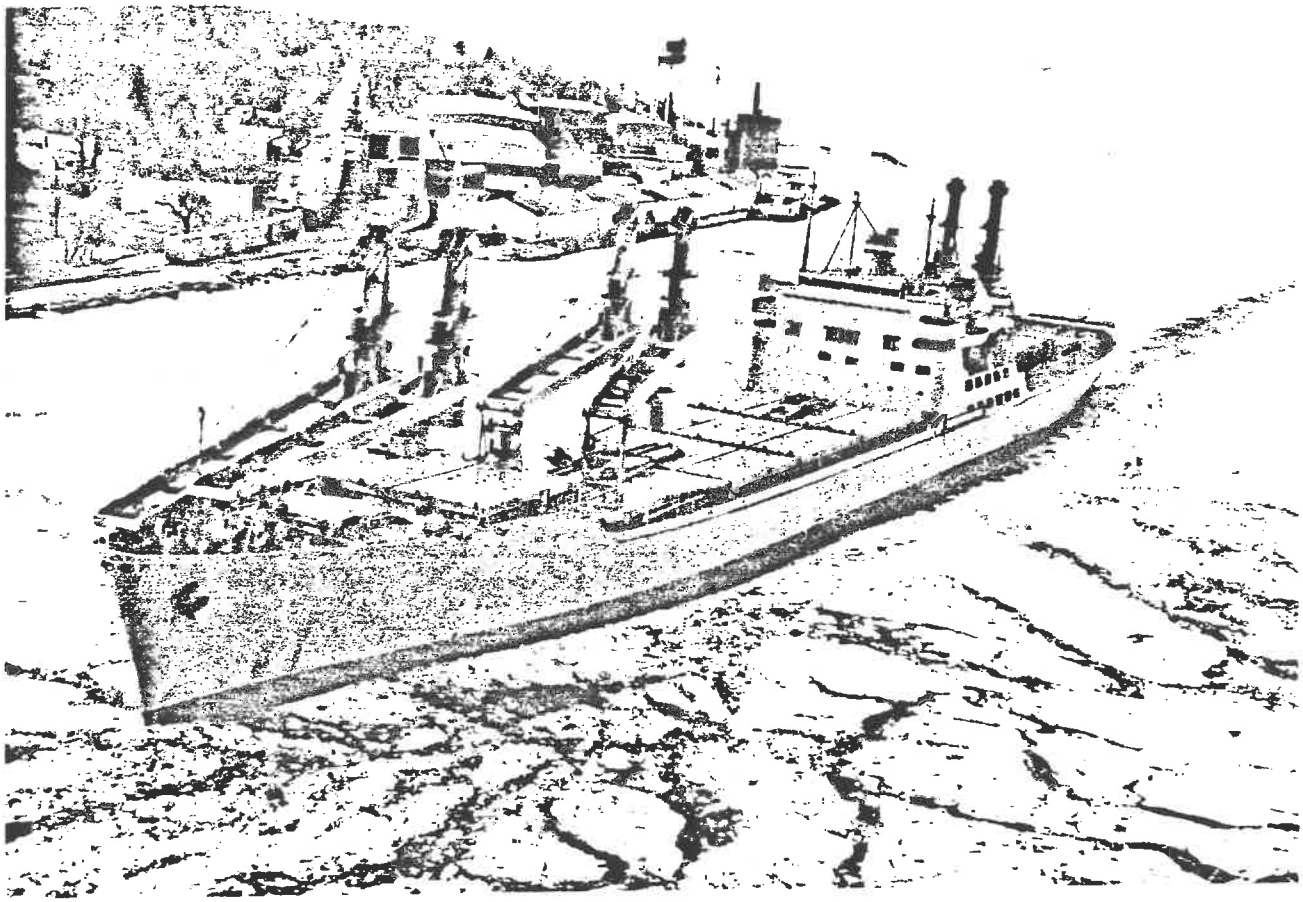

A. Ballert

Great Lakes Commission

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The Great Lakes Commission is an interstate compact commission comprised of legislatively mandated and gubernatorially appointed representatives of the eight Great Lakes states.

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## INTRODUCTION

The U.S. shipbuilding industry has been plagued by the recent downturn in world shipping as well as foreign competition. New order lists have been shrinking and so has employment. Bureau of Census figures indicate shipyard employment fell from 175,200 workers in 1981 to 145,000 in 1983. At the 25 major tidewater and Great Lakes shipyards that comprise the Active Shipbuilding Base, the Maritime Administration (MarAd) estimated 1984 employment at 100,000. The Active Shipbuilding Base includes privately owned shipyards currently engaged in naval ship or major commercial vessel construction (see Appendix). The Great Lakes region has only three of the 25 U.S. shipyards in the Shipbuilding Base. MarAd predicts that total U.S. shipyard employment will decline even further by up to 8,000 jobs before scheduled Navy work beginning in 1986 will produce a modest upswing. Without the current military construction work, many of the two dozen major shipyards would have slipped into bankruptcy. With less than three percent of new Navy ship construction underway in Great Lakes shipyards and longer-term prospects for substantial commercial contracts not bright, part of the nation's shipbuilding mobilization base is threatened by underutilization. U.S. yards on the Great Lakes have an admirable record with regard to Navy and Coast Guard vessel construction. Since the beginning of World War II, Great Lakes shipyards have built around 15,000 military and Coast Guard vessels representing a broad spectrum of ship types. Notwithstanding current Navy vessel construction, those Great Lakes shipyards capable of increased military and Coast Guard vessel construction deserve a greater share of future contracts.

The Navy is now the largest single customer of the U.S. shipbuilding industry. According to MarAd, 12 of the 25 major shipyards were engaged in construction of major Navy combat ships and auxilliary vessels in 1984. In addition, conversion of cargo vessels for Navy use was underway at seven other yards. Ninety-six naval vessels of 1000 light tons and over were listed by the Shipbuilders Council of America as under construction in late 1984. Currently, about 80% of the workers at U.S. shipyards are working on Coast Guard, Navy or other military vessels. In earlier years, new construction was split between Navy yards and private builders, but as technology needs grew, the Navy became less dependent on its own yards. By the early 1960's, Navy yards were responsible for only a few auxiliary ships, landing craft and nuclear submarines. The last ship was assigned to a Navy yard in 1967, and all Navy vessels are now privately built. The Navy does maintain eight yards for some repairs and refitting. Also, the Coast Guard retains one government-owned and operated yard on the East Coast.

Many shipyards had less interest in military vessel contracts during the 1960's and early 1970's because of the abundance of commercial work and a diminishing surface fleet. The recent decline in commercial shipbuilding coupled with plans for Navy fleet expansion has resulted in a surge of interest in military vessel procurement. The current Administration has been an ardent proponent of increased defense spending particularly as it affects major weapons systems. The interest in an improved U.S. defense posture has tracked along two paths. One route is directed at maintaining the so-called

triad of strategic forces encompassing intercontinental bombers, land-based rockets, and submarine-launched missiles. The other path, leading to improved conventional military capability, has considerable support and this route promises to underpin increased federal expenditure for seapower forces in addition to the missile submarine fleet.

The relationship between the Navy and the private shipbuilding industry has been described as symbiotic; many of the larger yards have come to depend on lucrative Navy contracts, and the Department of Defense (DoD) has become accustomed to the prompt, efficient work tailored to every detailed specification provided by private shipbuilders. However, it appears that this mutual reliance is possibly becoming one-sided. Most of the larger private yards are now part of large conglomerates with parent companies becoming less and less specialized. According to a National Security Affairs paper, the trend toward diversification should result in less dependence on government contracts, giving private shipbuilders both "the capability and will to change the ground rules for procurement" (Cole, 1979).

Compared with the tidewater shipyards, the Great Lakes shipbuilding industry has a different complexion. At present there are 17 U.S. shipyards and repair facilities located on the Great Lakes. Only one of the three Great Lakes yards listed as part of the Active Shipbuilding Base is a subsidiary of a partially diversified parent corporation. The three yards have an excellent military contract performance record but none of them are in a class with the major tidewater yards with respect to capital (large combat) ship construction. As a result, their competitive efforts on behalf of military bid participation could be thought of as extraordinary. In many cases, though, they are not in direct competition with larger yards. For example, certain Navy vessels cannot be built on the Great Lakes because of the lock constraints of the St. Lawrence Seaway. In other cases, bid solicitation rules may restrict bidding to "small business" shipyards for which particular Lakes builders could qualify but many others with work underway could not. Nonetheless, contract awards for many new military vessels have eluded Great Lakes yards on past occasions. When a non-Great Lakes yard gains a new vessel construction contract, the submittal of a lower bid can only explain part of the award process. Such predisposing factors as political influence, particular labor agreements, a "track record" for certain kinds of construction and an appropriate physical plant can be factored into the bid and ultimately into the contract award. Shipyards on the Great Lakes that are capable of military vessel construction would benefit greatly if more attention was given to reasons for building in the Great Lakes than to those reasons for not building there.

## GREAT LAKES MILITARY VESSEL CONSTRUCTION HISTORY: 1796 TO WORLD WAR II

In 1793, Jim Connoly and Captain Peter Curry built a sailing vessel on the River Rouge just below Detroit. Their sloop named Detroit was purchased by the United States government three years later for the purpose of carrying troops and supplies between Presque Isle (Erie, Pa.) and other points on the Lakes. From that time up to the hostilities with the British in 1812, 37 other sailing vessels were built for American military forces stationed on the Great Lakes. Commodore Perry's victory at Put-in-Bay (Lake Erie) in 1813 signaled a long-term decline in U.S. naval vessel construction on the Great Lakes.

The Rush-Bagot Treaty signed in 1817 required that the warring parties maintain no more than three warships on the four Great Lakes that share the international border, with Lake Ontario restricted to one vessel. In 1843 the Navy's first iron-hull warship was built at Erie. The 685-ton back-rigged, Michigan, was also fitted with a steam power plant. The vessel later underwent a name change to Wolverine and remained on the Navy register until 1943 and then unfortunately was scrapped in 1949. The Michigan was the only U.S. Navy vessel constructed on the Great Lakes from 1812 to World War I. However, Great Lakes shipyards and regional river yards produced about one-third of the U.S. merchant vessel tonnage during the same period. From 1918 to 1920, Great Lakes yards produced 448 "lakers" many of which became part of the "Bridge to France." In addition, submarine chasers, minesweepers and military tugs were built at Lakes yards. Henry Ford's shipbuilding facility at River Rouge pioneered in assembly-line techniques and set the national stage for the next major war effort. During the 1920's and 1930's, 25 Coast Guard cutters ranging between 100 and 165 feet in length were the only substantial military vessels constructed on the Lakes. Three yards at Duluth, Minnesota, Manitowoc, Wisconsin and Bay City, Michigan shared in the work.

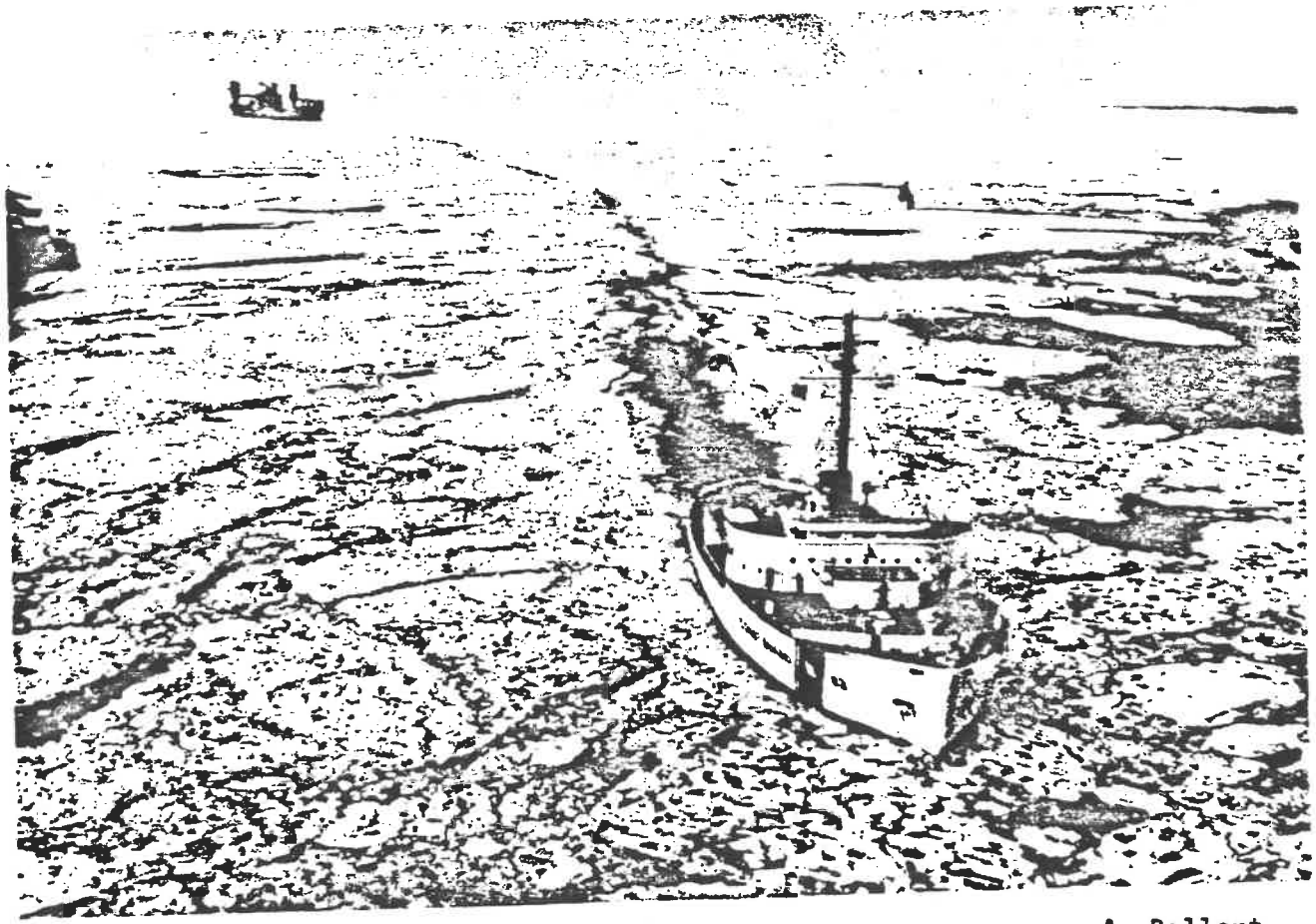
In 1939, the Navy's small craft program resulted in several experimental contracts for area builders. Among the vessels produced were: two torpedo boats and one wooden hull subchaser for Fisher Boat Works in Detroit, two steel hull subchasers and three harbor tugs for Defoe Boat and Engine Works in Bay City, and twelve net tenders for American Ship Building Company yards at Lorain and Cleveland. In September 1940, a big contract was let and it included 10 submarines for Manitowoc Shipbuilding. A total of twenty-eight submarines were launched eventually in Wisconsin, all built at Manitowoc.

From 1941 until the end of the war, Great Lakes shipyards played an invaluable role in building Navy, Army, Coast Guard and commercial vessels (bulk carriers) for government accounts. The United States was faced with the problem of distributing shipbuilding work among the many yards that had geared up for the war effort. There would occur, at times, regional shortages of skilled manpower as well as clogged order books and shipways. In one case, the Maritime Commission asked the American Ship Building Company to be the source of management manpower for a new Liberty vessel shipyard on the Gulf Coast.

Besides the inevitable competition with larger, more established shipyards and a government policy of geographic contract distribution, the Great Lakes shipbuilding facilities suffered from a major disadvantage - that of no suitable, navigable route to salt water. The St. Lawrence River would permit "canaller-sized" vessels to move in and out of the Lakes but not the larger naval vessels needed for the global conflict (the smallest lock on the St. Lawrence River was only 252 feet long and 44 feet wide). As a result, much of the large vessel fleet had to be built outside of the Great Lakes. However, an important technical solution did allow Great Lakes shipyards to build military ships and float them to the Gulf through the Illinois-Mississippi river system. Floating drydocks or "camels" permitted the Manitowoc subs and many 285-foot frigates, landing craft and 306-foot destroyer escorts (DE) to be "shipped" to the ocean for trials and eventual combat action. It should be noted that the camel system was first pioneered in the Lake Erie yards of the early 1800s when river mouths served as protected and defensible building places. The DEs were the first ocean-going surface combat vessels to be built in the Great Lakes.

A brief accounting of unusual but innovative World Wart II shipbuilding activities would be deficient unless mention was made of the "upside down" construction techniques invented at Defoe as well as the two aircraft carriers built specifically for Great Lakes use. At Defoe, large vessel hulls were built upside down which allowed for less hull support structure and expedited welding operations. Special "turn-over" trunnions permitted the hulls to be rolled into an upright position for superstructure and deck work. The two carriers, Wolverine and Sable, were both conversions of sidewheel passenger liners that had plied the Lakes for many years. In 1942 the Navy needed a secure place for its pilots to practice flattop landings away from U-boat attacks and heavy escort requirements. Lake Michigan, off Chicago, was just the place. American Ship Building's Buffalo yard received the contract on a cost plus 6 per cent basis and performed the work in record time.

Small craft construction was the mainstay of the Great Lakes builders during the War. Patrol craft, mine and sub warfare vessels and various kinds of landing craft dominated in numbers. During the war period, eight U.S. Great Lakes shipyards produced nearly 14,000 military craft of 100 displacement tons or less. The majority of these vessels were built at Algonac, Michigan by the Chris Craft Corporation. Even though certain craft types were heavily represented, other vessels such as tugs, rescue boats and barges were built in significant numbers. As for larger ships, twenty-five U.S. Great Lakes shipyards were responsible for nearly 700 military contract vessels of 100 tons or over during the war. Two of the larger vessels were built for the U.S. Coast Guard. American Shipbuilding at Toledo completed the 250-foot ice-strengthened tender, Storis, and the most complex military vessel built on the Lakes during the war, the 290-foot icebreaker Mackinaw. Total Navy, Army,



U.S.C.G. Mackinaw



A. Ballert

Coast Guard and Maritime Commission contracts value for the Great Lakes region shipyards including those on the river during the war was pegged at $1 billion. This figure included directly-related region subcontract work. The Great Lakes shipyards held their own during the war with respect to numbers of military-order vessels. Nevertheless, the remarkable dollar value of the contracts represented only 2 percent of national wartime shipbuilding expenditures for both commercial and military vessels.

## GREAT LAKES MILITARY VESSEL AND COAST GUARD CONSTRUCTION: 1946 TO PRESENT

New orders for military craft naturally fell off after the war. The surplus of vessels was so great that many ships were disposed of through foreign military sales and equipment transfers. And, of course, the mothball fleet evolved into a major, although inactive force. Under these circumstances, many shipyards that had reaped windfall defense orders in previous years had to shutdown, diversify rapidly into non-military lines or gradually reduce operations. The Defoe yard on Lake Huron is good example. Defoe produced 154 military vessels during the war but only two, a Coast Guard light ship and a technical breakthrough project, a plastic minesweeper in 1956, during the decade that followed. Chris-Craft, which has the record for number of military vessels built in the Great Lakes, turned to the recreational boater to maintain its bottom line. However, in the five year period, 1951-56, the Algonac, Michigan firm did land a defense contract for two 52-foot rescue boats. Over at American Shipbuilding, the stage was much the same. During the War years, AmShip at its several lake shipyards built 65 military vessels, 45 of which came from Lorain, Ohio. From 1946 to the late sixties, two landing craft, three jumboizing Navy oiler constructions (mid-bodies), a Navy oceanographic research ship and seven 210-foot Coast Guard cutters were built at Lorain. AmShip was awarded a Navy oiler contract in 1982 for two vessels and options for three. The company planned to do most of the work at Lorain but moved the work to Tampa, Florida with major subcontract work to Avondale Shipyards in New Orleans. AmShip's Toledo yard managed only three post-war "defense" contracts, an Army Crops of Engineers derrick barge launched in 1954, a research vessel for the Coast and Geodetic Survey in 1968 and a frigate for transfer to Thailand in 1971. The firm bid successfully on two destroyer escorts in the sixties, but because of project cost problems, the company subcontracted the work to a Gulf Coast yard. Eventually, the Navy cancelled the contract.

From World War II until the mid-fifties, the number of Great Lakes shipbuilders doing military work decreased from 33 to 24. The Korean conflict prompted new orders for the region. From the beginning of that war until 1956, a total of 638 military vessels were launched in the Lakes. During this period, the Great Lakes builders managed 5% of total U.S. naval construction tonnage. As new Navy shipbuilding contracts dwindled through the late fifties for most of the Great Lakes builders, the number of yards capable of doing such work continued to decline. However, a few yards did well and actually improved their military order lot at this time. Marinette Marine Corp (MMC) on Green Bay scored in 1955 with a contract for 148 56-foot landing craft. In the next five years, over 250 other small military craft were built at MMC. Petersen Builders Inc. (PBI) at Sturgeon Bay, WI built wooden minesweepers during the fifties and gun boat, patrol boat and mine warfare vessel orders sustained the firm through the transition period.

The general transition was one of consolidation and commercial work initiatives for several of the shipbuilding firms. American Shipbuilding moved its headquarters from Lorain to Tampa, Florida in 1976, closed its Buffalo yard in 1962, its Chicago yard in 1981, its Toledo yard in 1983, and also closed its Lorain facility in late 1983. The company kept its Great Lakes operations afloat with contracts for bulk lakers and non-military craft. AmShip was the first shipbuilder in the Great Lakes to build the 1000-foot super lakers. In 1966, the company even received a $26 million contract to jumboize three saltwater tankers. Diversification into different kinds of vessels and products assisted regional shipyards also. Again, AmShip is a good example. In the late fifties, the company purchased a trucking firm, a small-crew submarine factory, and began making vessel sewage disposal units, bowthrusters, and ship propellors. Bay Shipbuilding Corp., of Sturgeon Bay, WI and a division of Manitowoc Co., Inc., began operations in 1968, taking over where the Smith and Christy firms and their military contract work left off. Bay Shipbuilding became the premier yard on the Lakes engaged in self-unloader laker construction, particularly the 1000-foot bulkers. It wasn't until 1984 that Bay completed work on its first Navy contract, a conversion of a cargo ship into an auxilliary crane ship. Bay did complete a Corps of Engineers boat in 1971 and currently is making alterations on 11 Coast Guard 41-foot utility boats.

Over the last quarter century, Army and Navy new shipbuilding was concentrated in the Great Lakes at three shipyards: Defoe (Bay City, Michigan), Marinette Marine Corporation (Marinette, Wisconsin), and Peterson Builders, Inc. (Sturgeon Bay, Wisconsin). Several military vessels built by AmShip on the Lakes have already been mentioned. Together, these three yards built a wide variety of military vessels as well as commercial craft. The military construction ranged from 437-foot guided missile destroyers (Defoe) to 27-foot bridge erection boats (Marinette). Defoe completed its last vessel in 1973 and ceased operations thereafter. From 1955 until the shipyard's closure, Defoe built forty Navy vessels. Seven of these vessels were sophisticated guided missile destroyers that made their way to the ocean via the St. Lawrence Seaway. These destroyers were the largest military combat craft ever built on the Lakes. In the mid-sixties, three of the destroyers were turned over to the Australian Navy making them the first major combat ships specifically built in the Great Lakes for another country.

When the Peterson Boat Works (now Peterson Builders, Inc.) was established in 1933, the company began building fishing tugs and pleasure craft. Today, fifty-two years later, Peterson has a superb record with respect to military and commercial craft construction. The shipyard has the capability to build vessel hulls out of aluminum, steel, fiberglass and wood. During the last twenty-five years, Peterson has built over 280 vessels for the Army and Navy. PBI is the only U.S. shipyard that claims the capability to build non-magnetic wooden minesweepers. Currently, the shipyard has three kinds of Navy vessels under construction for a total of 14 vessels. These contracts which have generated a 985 person payroll include: four 225-foot rescue/salvage vessels (all launched), three wood hull mine countermeasures vessels and seven yard patrol craft. The 108-foot wood patrol craft are intended for use by the Naval Academy for training purposes. In addition to its military shipbuilding, PBI builds research vessels, tuna seiners, recreational boats, airport "Pay-mover" tractors, gas turbine generator sets, ferries and other vessels.

Marinette Marine Corporation was created in 1942 in response to the demand for military shipbuilding. By the end of the fifties, Marinette had become a major supplier of small naval vessels. Assemblyline techniques were perfected for some vessel types including landing craft where 56-footers were being produced every two days. Such production methods have allowed Marinette to launch around 1100 vessels since it began operations. Although MMC's order book has contained many different kinds of vessels, both commercial and military, one of the more unusual vessels built has been the Navy barracks barges. These floating hotels can provide accommodations for 260 sailors and are designed to be towed to a site. In 1983, the largest vessel ever built at the yard was launched, the research vessel, Shell America, measuring 300 feet from bow to stern. Current military vessels under construction or planned include: 52 workboats, 2 mine countermeasures vessels, ten 120-foot torpedo weapons retrievers and 13 yard patrol craft. Recently, Marinette Marine competed in a design contract for a new class of minesweepers. The Bell Aerospace yard (New Orleans) was awarded the lead vessel contract in late 1984.

The Upper Penninsula Shipbulding Company at Ontonagon, Michigan went bankrupt in 1982 culminating a short but complicated history of cost overruns and litigation. The demise of the firm left unfinished a tug and barge project contracted for by the state of Michigan. In 1984, a New York firm and defense contractor, Wedtech Corp., took over the operation and transferred a part of a Navy pontoon-causeway contract to the Lake Superior site. The pontoon-causeways are 22 feet wide and 90 feet long and are to be used to transfer military cargo from anchored vessels to shore where docking facilities are inadequate. Wedtech expects to assemble 12 causeway units at Ontonagon in early 1985 and 39 additional units will be fabricated and assembled in the future. Although not a traditional shipbuilding contract, the $24 million pontoon-causeway project could position the company for future military vessel construction.

## MILITARY VESSEL PROCUREMENT PROCESS

Several general federal procurement reforms are underway, primarily as a result of Executive Order 12352 - issued in March of 1982 after Congress, in reauthorization hearings for the Office of Federal Procurement Policy, concluded that there was a lack of focus and direction. The directive's four goals, as outlined in a report by the Comptroller General (GAO/PCRD, 1983), are: 1) the establishment of a system in each agency for procurement management; 2) development of a professional procurement work force; 3) increasing competition in the procurement process; and 4) simplification of the procurement system. Underlying the Order is Congress' desire for a "unform, comprehensive, innovative procurement system for use by all federal agencies." Among the specific requirements of the Order are the designation of a procurement executive in each agency, establishment of clear lines of contracting authority and accountability, and the formation of career management programs to encouarge professionalism in the procurement work force. Six interagency task groups have been formed for policy guidance.

The Department of Defense alone accounts for over 80% of the federal government's procurement expenditures. In recognition of this, the Comptroller General's reform progress report, which reviewed 12 agencies, addressed eleven of them collectively (including NASA, Energy, GSA) and considered the Defense Department separately. Furthermore, four of the six task forces already referred to are headed by DoD procurement experts.

Department of Defense officials have been hesitant to accept the recommendations of Executive Order 12352, because they feel many of the guidelines either should not apply to the Defense Department or have already been accounted for in the highly developed (relative to other agencies) DoD procurement system. There is probably some merit to this argument, though certainly the Defense Department's procurement process is flawed by some of the same problems which inspired EO 12352, particularly those concerning the complexity of over-regulation now characterizing the process.

The Navy's procurement system is complex with respect to both organization and process. The Navy hierarcy responsible for shipbuilding is headed by the Naval Sea Systems Command (NAVSEA), the office most involved with Navy vessel procurement. The Commander of NAVSEA is ultimately responsible for the awarding and administration of contracts. Below the NAVSEA commander are the Ship Acquisition Project Managers, who report directly to the NAVSEA Commander and Deputy Commander. Contracts are negotiated and awarded by the Deputy Commander for Contracts, after which they are administered by one of sixteen field offices headed by a Supervisor of Shipbuilding, Conversion and Repair, or Supship (one of which is located in Sturgeon Bay, WI), who reports to the NAVSEA Commander through the Deputy Commander for Industrial and Facility Management. The Supship has specific responsiblities as detailed in various directives, for example, Armed Services Procurement Regulations, Navy Procurement Directives, Ship Acquisition Contract Administration Manual, etc. The bureaucracy separating the shipbuilder from the procurement executives in NAVSEA is considerable. The fact that there exists seven distinct organizational entities and many other secondary lines makes for a complicated, often cumbersome decision-making process. Nevertheless, the shipbuilders in the Great Lakes and elsewhere have been able to establish a good communication channel with NAVSEA.

Contracts for Navy vessels generally are price competitive and of the negotiated purchase type. According to NAVSEA, 95% of naval construction in the past ten years has been done through negotiated purchase. It has been suggested that many of the shipbuilding industry's complaints and problems concerning Navy procurement policy can be attributed to the nearly exclusive use of this relatively involved approach rather than a more straightforward sealed bid/fixed price method (Cole, 1979). However, the latter provides greater opportunity for bid irregularities, and thus the use of negotiated purchase contracts is important from the standpoint of the DoD budget and contract controls.

With the Navy as the principal customer for the U.S. shipbuilding industry, Navy procurement practices have become the object of considerable interest among shipbuilders and members of Congress. The number of Navy contracts awarded through competitive bidding has increased in recent years and accounted for 37 percent of Navy spending during the period. However, single sources are still a fact of business especially for hardware subsystems. The Navy, as well as the other armed services, has undertaken major contracting initiatives to infuse more competition in the shipbuilding and major component supplier sectors. Some shipyards complain that the concerted emphasis on shipbuiding and ship overhaul competition has weakened some companies by forcing profit-thin bids. In these budget-conscious times, large cost overruns are no longer subject to automatic reimbursement and protracted lititgation may, in fact, work against the contractor. Recent reported cases

of fraud and bid-contract irregularities among large defense contractors will create a more cautious contracting environment.

The contracting procedure begins with the annual budgetary process at the Office of Management and Budget, through which funds are requested from Congress for specific ships. After a vessel is authorized and funds appropriated, the Navy issues a solicitation, complete with detailed specifications, to the shipbuilding industry in order to draw proposals. Shipyards have 90 days to submit price proposals, which are subseqently analyzed by Navy auditors for negotiation purposes. Negotiations make up the next step, followed finally by internal approval and the awarding of the contract. The entire process is lengthy; the pre-negotiation audit of proposals alone typically lasts from three to six months. In the 1984 fiscal year, for the first time, all of the ships given Congressional clearance were contracted for in the same fiscal year.

## PROCUREMENT TRENDS

Table I provides a breakdown of a recent year-period construction completions by vessel type and builder. For the last five years, the number of major ship deliveries to the Navy was: 1980-19, 1981-26, 1982-18, 1983-22 and 1984-31.

TABLE I

QUANTITY, TYPE AND BUILDER OF NAVAL VESSELS DELIVERED
BETWEEN APRIL 1, 1982 AND MARCH 31, 1983

| Quantity | Vessel Type/Class | Builder(s) |
|---|---|---|
| 11 | FFG Guided Missile Figate | Todd pacific (San Pedro)<br>Bath Iron Works |
| 4 | F-PGG Patrol Gunboats<br>(for Saudi Arabia Navy) | Peterson |
| 3 | SNN Sumbarines<br>Electric Boat Div. | General Dynamics |
| 2 | SSBN Ballistic Missile Sub<br>(Trident) | General Dynamics<br>(Electric Boat) |
| 1 | WMEC Med. Endurance Cutter | Tacoma Boatbuilding |
| 3 | F-PCG Patrol Chasers<br>(for Saudi Arabia Navy) | Tacoma |
| 4 | PHM Patrol Hydrofoils | Boeing |
| 1 | AD Destroyer Tender | National Steel & S.B. |
| 1 | AD Oiler | Avondale Shipyards |
| 1 | CG Guided Missile Cruiser | Ingalls Shipbuilding |
| 1 | DD Destroyer | Ingalls |

Source: Alden, 1983

The number of military and Coast Guard vessels under current contract in the U.S. - including the design phase is about 220, with a total value of $19 billion. The ships include: FFG guided missile frigates (17 total), AEGIS Cruisers (11 total), SSN submarines (17 total), SSBN ballistic missile (Trident) submarines (8 total), CVN nuclear aircraft carrier (3 total), AGDS surveillance ships (8 total) and minesweepers (21 total) - see Appendix B. Of the total number of military and Coast Guard vessels under construction in 1984 or in the design phase, 77 vessels including 52 small workboats are listed for Great Lakes shipyards. The estimated military and Coast Guard prime contract value for the Great Lakes yards is about $500 million. Bay Shipbuilding completed a major military cargo vessel conversion in 1984 and is currently working on a small Coast Guard craft repair project. The Great Lakes shipbuilding contracts represent about 2.5% share of the total dollars tied up in current Navy contracts. By comparison, Newport News Shipbuilding alone is working on Navy contracts for 9 vessels (the 3 CVN carriers plus 6 SSN subs) worth about $6 billion or about one-third of the total federal outlay. The following table presents current (1984) Great Lakes military shipbuilding (Bay Shipbuilding's auxillary crane ship contract is not listed).

TABLE II

CURRENT GREAT LAKES MILITARY SHIPBUILDING - 1984

| | MARINETTE MARINE CORP. | | | PETERSON BUILDERS, INC. | | |
|---|---|---|---|---|---|---|
| | # of Ships | Contract Price | Delivery Date | # of Ships | Contract Price | Delivery Date |
| Mine Cntrmrs. Ship (MCM) | 2 | $88,000,000 | 1986 | 3 | $173,000,000 | 1985-86 |
| Salvage Ship (ARS) | -- | - - - - - - | -- | 4 | $227,900,000 | 1984 |
| Workboats | 28<br>24 | $7,000,000<br>N/A | 1985--<br>1985-- | -- | - - - - - - | -- |
| Patrol Craft (YP) | 13 | N/A | 1985-- | 7 | $36,357,752 | 1984-86 |
| Torpedo Weapons Retreiver (TWR) | 8<br>2 | $19,200,000<br>N/A | 1985<br>N/A | -- | - - - - - - | -- |
| Minesweeper Hunter Ship (MSH) | 1 | $1,000,000 * | | -- | - - - - - - | -- |

*Design Phase (completed)

The Navy is aiming at a combat fleet of 600 deployable battle force ships including appropriate auxilliaries and rescue ships, a goal which government officials now believe is attainable by 1989. At present, the Navy has over 530 deployable battle force ships and a total inventory of about 570 vessels. With those under construction, the number of deployable vessels will increase to 555 in FY 1986. Also, there are over 250 cargo-support vessels in the National Defense Reserve Fleet. These vessels are not in active service but are deployed in various salt water anchorages subject to variable call-up periods.

The Administration's original Navy construction plan for 1983-1988 was altered due to Congressional resistance to increases in defense spending. In 1984, Defense Secretary Weinberger proposed a $13.9 billion reduction in proposed defense spending for FY 1985 after the FY 85 budget had been submitted. The Administration's current proposed budget for defense spending is $322.2 billion in budget authority and $285.7 billion in outlays for fiscal year 1986. The Navy's FY 86 proposed budget plan for shipbuilding and conversions is $11.4 billion. At present, Navy contracts represent a little over a third of all Pentagon equipment contracts. With respect to the 1983-88 period, a revised Navy building program contains reduced levels of new construction in each year, with 21 fewer ships proposed for the entire period in the revised plan (see table III). The new schedule also calls for an increase in relatively inexpensive (compared to new construction) conversions, acquisitions and reactivations.

TABLE III

UPDATED AND ORIGINAL (in parenthesis) CONSTRUCTION PROGRAMS
FOR FY 1983 - 1988

| | FY 83 | FY 84 | FY 85 | FY 86 | FY 87 | FY 88 |
|---|---|---|---|---|---|---|
| CVN Aircraft Carrier | 2 | | | | | 1 |
| CG-47 Class GM Cruiser | 3 | 3 | 3 | 3 (4) | 3 (4) | 2 |
| DDG-GM Destroyer | | | 1 | | 3 | 5 |
| DD-963 Class Destroyer | | | | 0 (2) | 0 (1) | 1 |
| FFG-7 GM Frigate | 2 | 0 (2) | 0 (2) | 0 (3) | 0 (3) | |
| SSBN Trident Submarine | 1 (2) | 1 | 1 | 1 | 1 | 1 |
| SSN-688 Class Submarine | 2 | 3 | 4 | 4* | 5 (4) | 5 |
| MCM-1 Mine Cntmsr Ship | 1 (4) | 5 | 4 (5) | 4 (0) | | |
| MSH-1 Minswpr/Hunter | | 1** | | 4 (5) | 4 (5) | |
| LSD-41 Cl Dock Lnd Ship | 1 | 2 | 2 | 2 | 2 | 2 |
| LHD-a Amph. Assault Ship | | 1 | | 1 (0) | 0 (1) | 1 |
| LPDX Landing Pltfrm Dock | | | | | | 1 |
| AD Destroyer Tender | | | | 0 (1) | 1 | 1 |
| AE Ammunition Ship | | | 0 (1) | 1 (2) | 1 | 1 |
| AFS Stores Ship | | | | | 1 (0) | |
| AOE Fast Combat Spt. Ship | | | 0 (1) | 1 | 1 (2) | 1 |
| T-AO-187 Class Oiler | 1 | 3 | 4 | 4 | 4 (6) | 4 |
| T-AGOS Surveillance Ship | | 0 (1) | 2 (0) | 2 | 2 (3) | |
| T-ARC Cable Repair Ship | | | | 1 | | |
| ARS Salvage Ship | 1 | 0 (1) | | | | |
| Total New Construction | 14 (18) | 17 (21) | 21 (24) | 28 (32) | 28 (38) | 30 |

*Defense Department proposal of 5/3/84 requests (4) SSN for FY 1986 be reduced to (3) SSN.
**Design.

Source: Alden, 1983

Note: Certain smaller vessel classes - harbor tugs, workboats, torpedo weapons retreivers and landing craft - were not listed in the Alden article. These vessel categories are usually well-represented in the order books of Great Lakes military shipbuilders.

With the federal budget deficit debate everpresent, there are near-term prospects that some proposed shipbuilding monies may be reduced. The probable outcome of this development would be a deferment in certain vessel construction programs, although in 1984, one nuclear attack submarine was eliminated from the Navy's multi-year building program. Future ship construction may be affected by cost-cutting measures aimed at defense spending. Big ticket ships are a logical target. One new class of destroyers is very expensive--the 466-foot vessels are the ultimate in technological sophistication and when fully equipped, could cost $1 billion a piece. Sixty-three destroyers are planned with quantity production beginning in 1987. The lead ship contract was awarded to Bath Iron Works in Maine in early 1985. Navy memoranda made available to the media reveals considerable success in Navy contract negotiations resulting in a savings of over $2 billion from budgeted expenditures over the last three years. These savings may be used to justify possible cutbacks or a slowdown in Navy shipbuilding. Congressional and Justice Department investigations have detected instances of contractor fraud and have also showed that cost overruns and related shipbuilder claims for payment are commonplace on certain ship constructions. All of these factors may condition Congress to keep a closer eye on Navy shipbuilding.

## PROCUREMENT TRENDS AND EVOLVING NAVAL STRATEGY: GREAT LAKES SHIPYARD IMPLICATIONS

Military procurement trends invariably reflect equipment replacement schedules and evolving mission requirements. With respect to the Navy, these two factors are particularly important. Naval strategy is being continually reviewed and periodically revised. For example, the lessons of the Falklands conflict pointed out vessel vulnerability to missile attack as well as the vital role of sealift and logistical capacity. U.S. naval action off the coast of Lebanon may prompt a Pentagon review of vessel-to-shore bombardment capability. In other cases, the mining of Nicaraguan harbors and global Soviet naval exercises will no doubt provide new information for strategy devisors.

U.S. naval strategy has come under increasing scrutiny in Congress, from the press and even from the Navy brass. Navy Secretary, John Lehman, a former Navy pilot, has made it his highest priority to get more vessel bang for the budget buck. He envisions a Navy capable of multiple missions in widely dispersed areas that is, above all, flexible. He is also a champion of the "forward strategy" which calls for carrier battle group deployment to forward areas (near enemy territory) during early offensive operations. Former admiral and CIA Director, Stansfield Turner, has recently written about the Navy's future look. He sees the Navy having three main missions: sea lane control, amphibious assault/support and naval bombardment by ships or aircraft.

Adm. Turner and others worry that the present surface Navy and plans for it may not be adequate in light of probable future missions and enemy capability. The carrier task force which is the backbone of theater surface fleet deployment may become too unwieldly and vulnerable to attack. The concern here is not just the super carriers but also their escort "screen" ships. This aspect of modern U.S. naval warfare is based on the concept of a "defense in depth" formation made of ever-widening circles of defensive weapons (ships, subs and aircraft) around the carriers. The protection hinges on high-power electronic detection technology which, in turn, may enhance the prospects of

successful homing missile attack. These carrier task forces are dependent on large support vessel contingents as well as escorts further reducing geographic response flexibiilty and permitting easier enemy detection.

In Congress, more representatives have begun to question the "big is better" idea and the carrier-based surface fleet strategy. Instead they call for smaller, faster vessels with potent weaponry such as homing torpedoes and cruise missiles. As this view gains credibility and support, Great Lakes shipyard activity could increase, for these kinds of craft are more likely to be successful bids for the region's lake yards. Mine warfare, amphibious/ landing craft and military sealift forces are other areas where Great Lakes shipbuilders have had and should continue to have a large stake.

Military sealift capacity refers to the ability to deploy military forces anywhere in the world as rapidly as needed and to sustain them as long as operational requirements dictate. The U.S. merchant marine fleet (commercial cargo) has a role to play in sealift and in times of emergency, could be used to supplement actual Navy-owned vessels for sealift purposes. Today, the number of militarily useful dry cargo ships under U.S. control is arond 440. Some of these vessels are privately owned and currently in service, but most are part of the Military Sealift Command (MSC) which includes the National Defense Reserve Fleet (253), and the Ready Reserve Force Fleet (capable of quick activation). In addition to the dry cargo vessels, the MSC has control of 30 tankers (as of 1983) some of which are operated on a charter basis with contracted crews. The Joint Chiefs of Staff have stated that sealift would provide more than 90% of dry cargo needs and 99% of petroleum product movement in the event of a transoceanic military crisis.

1983-84 U.S. Naval exercises and the developing trend toward prepositioning vessel-borne materiel have strained U.S. sealift capability. In contrast to the U.S., the Soviet Union has embarked on a large cargo shipbuilding program which emphasizes military-commerical compatibility. Their high seas logistics support capability is far ahead of U.S. levels according to military experts. In 1983, the Soviets had a merchant force of 2,456 vessels, sixth largest in the world. The projection of naval power around the globe is a key element in U.S. military posture and therefore the necessary logistical support for distant land operations plays an important backup role.

The Navy, cognizant of its sealift needs, has begun a sealift enhancement program to improve capability. As part of a prepositioning strategy, the Navy has chartered 17 ships and stationed them in the Indian Ocean. An additional 13 cargo vessels are under contract to be built. The first vessel delivered under the Maritime Pre-positioning Ships program was christened in early 1985 at the General Dynamics Corp. Quincy, Mass. yard. The 22,700 ton ship is 671 feet long and has nearly four acres of cargo space on seven decks. The MPS vessels will carry diverse military cargoes thus reducing single ship load vulnerability. This MPS fleet, when operational, will provide support for a 48,000-man force.

Conversion programs are another facet of the program. The Great Lakes shipbuilding industry (Bay Shipbuilding) has recently fitted a general cargo vessel with cranes and made other vessel improvements as part of the Navy's Support Ship Conversion program. Another container ship conversion is now underway at a Pacific shipyard and nine additional such conversions are

(7) research and development on maintaining submarine invulnerability."

Although Marinette Marine has been the chief beneficiary of landing craft and other amphibious assault vessel contracts over the years, Peterson has a capability in this area. Along with the smaller military personnel transport vessels, amphibious operations require shallow draft patrol gunboats, mine warfare craft and logistical support vessels. All of these categories have been or could become the Great Lakes military shipbuilders' "bread and butter."

With respect to mine warfare forces, replacement needs and strategic thinking have combined to create new work for Marinette and Peterson. Mine warfare has come a long way since WWII. New mines can be programmed to remain dormant for long periods as well as be selective with respect to targets. The Soviet Union and its allied forces have a tremendous stockpile of mines and today there is near universal recognition within military circles that mines could play an important role in future naval conflict. For example, ports, military and commercial, could be effectively bottled up and strategic passages such as the Persian Gulf's Strait of Hormuz could be blocked. What is needed is an effective anti-mine capability in the U.S. Navy. The Navy currently has 21 minesweepers, all of them over 30 years old and obsolete, and only three are in active service.

Marinette Marine and Peterson both are building wooden non-magnetic mine countermeasures vessels (2 and 3 respectively). These 224-foot vessels are part of a proposed 14 vessel program. It would appear likely that the two Wisconsin shipyards will share the remaining vessel construction work. Marinette has also designed a prototype minesweeper hunter vessel (MSH). MMC was locked in a competitive design battle with Bell Aerospace (New Orleans) for this future program. In late 1984, Bell was awarded a $27.3 million contract for one MSH with options to build up to eight. The Bell MSH is a "surface effect" ship based on air cushion hull technology. Eventually 40 vessels will possibly be ordered and foreign orders could boost the total even more. At the near-initial bid price per vessel, the construction program may be worth more than a billion dollars. Marinette's proposed vessel was 164-feet long with a shock-resistant plastic hull that would run silent and create minimal pressure waves with a low magnetic profile. The vessel could be armed and would carry a 45-man crew. Marinette has prepared for mine warfare vessel orders by recently building a new facility, a structure designed especially for construction of such vessels at a rate of two per year. Besides freeing the rest of the yard for the construction of steel and aluminum vessels, it is expected that the new facility will lower vessel delivery costs and strengthen Marinette Marine's hand in future contract competition.

## MILITARY PROCUREMENT EXPENDITURES AND THE ROLE OF SUPPLIERS

Federal expenditures have been imbalanced with respect to the Northeast and Midwest regions compared with other areas. On a tax flow/revenue return basis, the 18 state area had in FY 1982, an average 86-87 cent return for every tax dollar sent to Washington. Defense Department expenditures which would account for 29 cents of every dollar to be spent in the President's most recent budget illustrate the expenditure imbalance. The NE-MW region with 44 percent of the nation's population received only 32 percent of all defense expenditures in 1982 and had 33 percent of all defense installations, 17 per-

cent of all personnel and accounted for 37% of all military prime contract expenditures. Recent DoD budgets have had a large procurement component - the FY 1986 proposed budget earmarks $106.8 billion for procurement or about one-third of the DoD outlay.

The Northeast-Midwest Institute has estimated that the NE-MW region received $47 billion in military prime contract awards for fiscal 1984, or about 38 percent of the national total. This figure amounted to $455 per capita compared with $580 per capita for the South and West. The figures are estimates because DoD discontinued publication of subcontract data in 1979. For the eight Great Lakes states, the prime contracts amounted to around $24.7 billion or 20 percent of the national total. It is widely accepted that subcontract dollar totals make up at least half of prime contract awards. Military subcontract dollars for prime contracts awarded in the Great Lakes region would have been about $12.4 billion in FY 1984 using the 50% formula. However, the impression that all subcontractors are region-based is not correct and with respect to sophisticated weaponry and associated parts, the South and West are major suppliers.

Navy contracts can have dramatic effects on both a shipyard's revenue and on local/regional economies. For example, the American Shipbuilding Company's Navy tanker contract will be worth a total of $300 million, which is 50% more than the company's total revenues in its best year (Brown, 1983). The loss of this work to its Lorain, Ohio yard (transfer to Tampa and subcontractors) and the yard's subsequent shutdown created 1500 layoffs. An illustration of the possible macro benefits from a Navy contract is General Dynamics' Qunicy, Mass. yard, which was awarded a contract for five military cargo ships at a price of over $600 million. This new work enabled General Dynamics to add 2,000 employees to its workforce which had been operating at reduced levels. Interestingly, there were not enough appropriately skilled workers in the Quincy area at that time, and it was actually necessary to recruit employees from outside the region. The Wedtech operation at Ontonagon, Michigan illustrates the same phenomenon but on a much smaller scale. After taking over the bankrupt Upper Penninsula Shipbuilding Co. in fall, 1984, Wedtech arranged to transfer from a tidewater site its Navy pontoon-causeway contract to the Lake Superior shipyard-factory. The fabrication and assembly activities will employ around 150 people by spring, 1985, up from a skeleton, caretaking workforce only months before. In 1982, UPSCO had 400 employees.

A Navy contract also results in secondary benefits which accrue to the local/regional economy as related industries are stimulated. The dimension of military subcontract work in naval shipbuilding cannot be described easily. One thing that is clear though, is that current Great Lakes shipbuilders have considerable contract work with region suppliers. The industrial Midwest historically has been the home of numerous military subcontractors ranging from computer systems manufacturers to vessel equipment machiners to steel producers. For example, the provision of three sets of twin shipboard cranes for the recently completed 668-foot general cargo/container vessel conversion at Bay Shipbuilding (Keystone State) was accomplished through a Michigan company. The cranes were fabricated by Lake Shore Engineering of Iron Mountain, Michigan. The company has plant sites at Marquette and Kingsford, Michigan. Parts of the 60-ton cranes were built at both places and then trucked to the Sturgeon Bay, WI shipyard. Lake Shore has a similar contract with a West Coast shipbuilder. The Michigan firm began as a supplier to the fledgling

iron ore mining industry in the Upper Peninsula. Through gradual diversification and expansion, the firm now is a supplier of vessel deck equipment including winches, davits and deck cranes. Another example illustrates the generalized countrywide benefits attributable to the construction of a super carrier. The Roosevelt, being built at Newport News provides 20,000 jobs for site workers, but over 300,000 workers nationwide are employed indirectly through subcontractors. In fact, 45 states are involved, including all eight Great Lakes states. A 1983 ABC news program "Nightline" which discussed the widespread benefits of naval procurement cited a Detroit machine shop which had gained a multi-million dollar contract for valve tooling for the new super carrier.

A 1983 compilation of major shipbuilder suppliers put together by a maritime union listed over 860 U.S. businesses. The Great Lakes states had 292 firms on the list which is a very respectable 34% of the total. In fact, of the top ten states in terms of numbers of companies, the region placed five states in that category. New York with its deep roots in major military shipbuilding and industrial activity was the top region state and second only to California. The following list of selected suppliers shows the range of shipbuilding products supplied through subcontract arrangements.

| | | |
|---|---|---|
| Caterpillar Tractor, Peoria IL | - | Diesel generators |
| Electro Motive Diesel (G.M.), LaGrange, IL | - | Diesel engines |
| American Bearing, Indianapolis, IN | - | Bearings |
| Bethlehem Steel, Burns Harbor, IN | - | Steel plates |
| King Engineering, Ann Arbor, MI | - | Gauges |
| Jared-Brown Bros., Birmingham, MI | - | Capstans |
| Graco, Minneapolis, MN | - | Paint & spraying equipment |
| Empro, Edina, MN | - | Foam & floatation devices |
| Bird-Johnson, New York, NY | - | Propellors/bow thrusters |
| Buffalo Forge, Buffalo, NY | - | Blowers/fans |
| Babcox and Wilson, N.Canton, OH | - | Boilers |
| S.P. Manufacturing, Cleveland, OH | - | Hydraulic cylinders |
| Baldt Anchor, Chester PA | - | Anchor chain |
| Murlin Manufacturing, Quakertown,PA | - | Water treatment systems |
| Ansul, Marinette, WI | - | Fire equipment |
| Ladish, Cudahy, WI | - | Pipe Fittings |

## COMPETITIVE CHALLENGES FOR GREAT LAKES MILITARY SHIPBUILDERS

The best way to succeed in the pursuit of Navy work is simply to submit low bids for the price competitive contracts. The ability of a builder to bid low relative to his competition is a function of factors such as general operating efficiency, the scale of operation (a large yard with many concurrent projects would be more willing to reduce single project profit by bidding low), and relative building costs. A 1982 Maritime Administration report, Relative Cost of Shipbuilding, found that there is a regional difference in shipbuilding costs due to variation in the prices of steel, labor and overhead. West Coast costs were found to be highest, followed by the Atlantic Coast and Great Lakes (these two were approximately equal - 4.4% less than Pacific), and finally the Gulf Coast, where builders have the lowest costs (about 5.6% lower than those on the West Coast). However, MarAd concluded, on the basis of their continual study, that shipyard competition (among coasts) exists on an

equalized basis and the cost differences are not significant for standard commercial cargo vessel construction. Naval construction was not assessed but certain parallels can be assumed even though built-in advantages such as particular facilities or multiple construction capability can distort coastal comparisons among individual shipyards.

Economic efficiency aside, there are other factors which affect the competitiveness of a shipyard with respect to a given Navy contract. For example, a smaller builder may qualify for certain jobs because of the size of its operation, that is, some contracts are given only to shipyards with "small business" status. Under current federal law, certain federal agencies, including DoD are required to set aside particular contracts and a portion of their total procurement expenditures for "small businesses." A small business in the shipbuilding sector is one that has an average of 1000 employees or less during the prior year period. Peterson Builders, Inc. has been certified as a Small Business Concern for over 50 years, with a present employment of 985 employees. Marinette, although presently far below the threshold level, does plan additional new hires and call backs but will still remain eligible for such contract treatment. Bay Shipbuilding has one large commercial job (three container ships) and several Coast Guard small boat repairs at the moment and will likely exceed the 1000 level in 1985.

Other government-related factors that may enhance a shipyard's and associated suppliers competitive posture are price differential purchase programs targeted at labor surplus areas - areas having unemployment levels 20% higher than the national average and local government-arranged tax abatement and other financial incentives. AmShip's Lorain, Ohio yard is a case in point. In 1975 and 1980 the Lorain Port Authority issued industrial revenue bonds to help finance shipyard improvements. Coupled with another bond-port authority financing of a large drydock, the total amount has been around $14 million. In 1982 AmShip attributed, in part, its successful bid on two Navy tankers (option for three more) to the fact that Lorain was a designated labor surplus area at the time. AmShip later moved the construction work to its Tampa facility in order to save 30% on labor costs. AmShip has said that archaic work rules and high wages at Lorain were major factors in the $30 million loss the company incurred at Lorain during its last five years of operation. With the Lorain yard now closed and up for sale, the state government has stepped in with a $2.5 million low interest loan as bait for a prospective buyer. Government funds are also available for retraining of workers, if needed. A local college is building a technical jobs training center which may be of interest and use to a new employer. The role of vocational training centers is an important factor in providing local shipyards with a supply of skilled workers and retraining opportunities. A good example of the shipbuilder-school relationship is the Northwest Technical Institute in Sturgeon Bay, Wisconsin. That school has maintained programs for various skilled trades represented at the two local shipyards.

Another factor involves the shipyard facilities themselves and the accessibility thereof. Whenever feasible, the Navy attempts to "spread the money around" by splitting construction of a new class or group of vessels among builders. This procudure preserves competition as well as helps to maintain the shipbuilding base. However, there are vessels which can be built only in a limited number of yards because of the facilities required. An example is the nuclear aircraft carrier contracts which automatically, or

nearly so, have gone to Newport News because the facilities there can best accommodate new construction of the supercarriers and because of another important factor: a proven track record with respect to that class of vessels.

Great Lakes builders will have little chance of obtaining prime construction contracts for most of the "big ticket" proposed Navy vessel construction programs. The guided missile frigate program, which has dominated the list of recent completions and will likely continue to do so for the next few years, is nearing termination. Besides, even a renewed interest in the guided missile frigate program would have no effect on Great Lakes builders, as the contracts would undoubtedly continue to go to proven frigate builders such as Todd Pacific and Bath Iron Works. Likewise, the Navy's plan for a new class of destroyers and a new attack submarine hold no promise, as these prime contracts will likely be awarded to the firms of Ingalls, Bath, Todd Pacific, General Dynamics, Newport News and Lockheed.

The fact that some facilities are accessible only to vessels of certain size is also significant, and the best illustration of this is the constraint imposed by the St. Lawrence Seaway locks and system draft; regulations limit the length of ships to 222.5 meters (730 feet), and the beam to 23.16 meters (76 feet), and the draft to 7.92 meters (26 feet). Length and beam limits can be extended for a few feet for special passages. These constraints have handicapped Great Lakes builders in competing in a number of vessel categories. However, the following vessels from the current proposed construction program can be built or repaired in the Great Lakes:

T-AO Oiler
FFG Frigate
ARS Salvage Ship
MCM Mine Countermeasures Ship
YP Patrol Craft
T-AGOS Surveillance Ship
MSH Mineswepper
WMEC Cutter
LSD Dock Landing Ship
T-ACS Auxilliary Crane
YTB Harbor Tug
T-ARC Cable Repair Ship
TWR Torpedo Weapons Retreiver
AD Destroyer Tender
Workboats/Utility
AFS Stores Ship
LC Landing Craft

It cannot be overlooked that Seaway constraints can be overcome in some cases with innovative building and assembly procedures. For example, parts of vessels could be built in the Lakes and then towed to tidewater yards for final construction/assembly. Although this has not yet been accomplished, the reverse has been true. For example, the present 826-foot self-unloader William Clay Ford (the former Walter A. Sterling), which started out as a Navy tanker has been modified and lengthened several times during its period of service. One major conversion occurred when a 243-foot mid-section was built in West Germany and towed to AmShip's Lorain shipyard where the section was welded to the divided sections of the former tanker. Another example, although not directly related to a Great Lakes shipyard, was the construction of a sea-going hopper dredge in South St. Paul, Minnesota. Much of the major work was done in Minnesota and the vessel was barged down the Mississippi River to the Gulf where final superstructure assembly took place. Limited clearance under bridges precluded complete construction in Minnesota.

## GREAT LAKES SHIPYARDS: MILITARY AND COAST GUARD VESSEL REPAIRS AND THE NATIONAL DEFENSE RESERVE FLEET

The Great Lakes do not ordinarily harbor active U.S. combat ships. On occasion a surface combat vessel (usually a destroyer) will make a "good will" cruise into the Great Lakes with several ports of call. The Great Lakes U.S. Naval Training Center in Illinois does not even maintain any vessels on the Lakes. The Coast Guard operates one large cutter, the 290-foot Mackinaw, five 180-foot seagoing tenders, five 140-foot harbor tugs and one 100-foot buoy tender on the Great Lakes. In addition, there are many utility, rescue, and patrol craft located at the 49 Great Lakes search and rescue stations. The U.S. Army Corps of Engineers maintains four large seagoing tugs, nine harbor tugs, twelve 45-foot tenders and several mechanical dredges in the Lakes. The Coast Guard in the Great Lakes will occasionally schedule vessels for major repairs and overhaul at its own East Coast yard, otherwise periodic maintenance can be done at Great Lakes yards and repair facilities. Corps vessel repairs are also accomplished in the region.

It is apparent that the military vessel and Coast Guard repair work that is undertaken at Great Lakes facilities is not substantial enough to keep such facilities busy or to be financially remunerative on a regular basis. There are seventeen "open" U.S. shipyards and repair facilities on the Great Lakes. One of these, the former Upper Peninsula Shipbuilding Co. (now Wedtech) is working on a Navy pontoon-causeway contract and does not have any actual vessel construction at the moment. Some of the others are virtually inactive due to a dearth of new orders or repairs and a few specialize in particular work. The Great Lakes Towing Company of Cleveland has its own repair yard to do work on its large fleet of tugs as well as dredges. Fraser Shipyards, Inc. of Superior, Wisconsin has been one of the major repair yards on the Lakes in recent years. Their last major work was the conversion of three straight-deckers to self-unloaders in 1982-83. Unfortunately, because of little current work, the yard is now operating with only a limited crew.

One new opportunity for Great Lakes ship repair is a proposal that has been advanced by George Geiger, President of Bay Shipbuilding in Sturgeon Bay, Wisconsin. He recently suggested that part of the National Defense Reserve Fleet could be redeployed to the Great Lakes. This relocation from saltwater anchorages would help preserve the structural integrity of the hulls and superstructures as well as provide opportunities for needed maintenance and refitting work for area shipyards. The Reserve Fleet consisted of 253 vessels as of January 1984. The fleet is comprised of: 14 transport and passenger cargo vessels; 40 military auxiliaries (combat stores, tenders and repair vessels, etc.); 17 tankers; and 182 dry cargo ships. The current deployment of the Reserve Fleet is divided among three saltwater anchorages: James River, Virginia, 126 vessels; Beaumont, Texas, 39 vessels; and Suisun Bay, California, 88 vessels (see Appendix C). Of the total vessels in the Reserve Fleet, 46 are designated as the Ready Reserve Force (RRF) subject to rapid call-up when the need is present. All are dry cargo ships and the call-up categories are divided into five-day and 10-day notice periods. The RRF fleet consists of newer vessels and is maintained in a high state of readiness. The Navy recently expanded the Ready Reserve Force. During Spring 1984, MarAd purchased 19 cargo ships for inclusion in the Ready Reserve Force. The 19 vessels were officially transferred late in 1984 and are anchored at James Bay and Beaumont.

The Great Lakes connecting channels and St. Lawrence Seaway are icebound for around three months each winter at which time the Seaway locks are shut down for scheduled maintenance. For this reason none of the vessels in the Ready Reserve Force would be eligible for redeployment to the Great Lakes. However, a number of the remaining vessels in the Reserve Fleet could be relocated without jeopardizing national security. The chief of the U.S. Coast Guard's Systems Technology Division, W.H. Campbell, Jr., has argued that resupply of NATO during times of crisis would be better accomplished if the Great Lakes/Seaway were heavily utilized. He says the ice season on the system could be dealt with through sufficient icebreaking capacity but that a precision radio navigation system would be a necessity. The technology for such a navigation system has been mostly developed. Mr. Campbell also suggests that vessel size restrictions may not be that relevant. Many of the vessels in the Reserve Fleet could operate in the Seaway but at less than maximum draft - a point that would not be critical in a resupply effort. Perhaps only those vessels expected to be called up last or subject to sixty days or longer call-ups could be considered. The vessels in the Reserve Fleet are maintained under contract by the Maritime Administration which is reimbursed by the Navy. MarAd contracts with private parties for the purpose of regular cleaning and conditioning. The estimated annual maintenance expense for each vessel is over $10,000. In addition to regular maintenance, a charge would be incurred for towing and also a fee for anchorage would probably apply. This fee would be tantamount to rent for storage space. Port authorities or shipyards could conceivably be the beneficiaries.

The advantages for the Navy and the Great Lakes region of a partial Reserve Fleet redeployment from saltwater anchorages are many. Saltwater corrosion, particularly for the superstructure and deck fittings, can be eliminated if the vessels are moved to new freshwater havens. However, the Navy claims that they have neutralized much of the corrosion with electric charging of the hulls and internal dehumidifying equipment. The Great Lakes would be safe harbors for the vessels away from enemy sea-based attack. Convoy escort requirements from the Gulf of St. Lawrence would be substantially reduced because of shorter European transit distances than from the saltwater anchorages. This fact would certainly reduce the complexity of the antisubmarine warfare situation particularly as it reduces shipping exposure to Carribean hostile action and enemy port containment action on the Atlantic Coast. Nearby Great Lakes shipyards and repair facilities have the most advanced technology available for repair and reconditioning needs. Furthermore, having part of the Reserve Fleet located in the Great Lakes could force the Navy to reconsider its recent decision to cancel its last Master Ship Repair contract with a Great Lakes shipyard. These contracts are required in order for major military vessel repair work to be undertaken. For these reasons and for reasons of regional equity, the Great Lakes deserve to be considered as a redeployment anchorage for part of the National Defense Reserve Fleet.

## CONCLUSION

The potential benefits from a military vessel contract, accruing directly to the shipbuilder as well as to subcontractors, related industries and to local/regional economies, make it worthwhile for Great Lakes shipbuilders to pursue such work. However, Great Lakes region shipyards historically have been responsible for only a small percentage of military vessel construction,

based on annual prime contract value and it is unlikely the future will see any major changes.

Great Lakes shipyards, though, have been vital in the construction of certain vessel types not only during wartime but also during peacetime. The total number of military vessels built in the Great Lakes is around 15,500. The majority of these craft are in the patrol/gunboat, amphibious/landing craft, utility craft and mine warfare categories. The three shipyards on the Great Lakes that have had recent Navy, Army and Coast Guard vessel contracts for new construction, conversion and repair currently employ more than 1,700 persons. The total value of current prime contracts is over $500 million. More than 500 million dollars in new work is potentially available during the latter half of the 1980s. The secondary benefits derived from this amount through region subcontracts and the multiplier effect will assure a wide geographic employment and monetary benefit attributable to military vessel work on the Great Lakes.

The most promising area of new Navy vessel construction for Great Lakes builders involves mine warfare forces, particularly the mine countermeasures ship program and minesweeper hunter program which has recently passed through the design competition phase. Another good prospect involves the Navy's plans to expand significantly its rapid deployment sealift capacity both through new construction and conversion. Redeployment of part of the National Defense Reserve Fleet to the Great Lakes from saltwater anchorages would help to preserve superstructure integrity as well as provide opportunities for maintenance and refitting work for region shipyards. Other military vessels operating in the Lakes, e.g. destroyers on "good will" cruises and Coast Guard and Corps of Engineers craft present further repair possibilities, scheduled or otherwise.

Great Lakes members of Congress have a role to play in assisting region shipyards in their quest for more military and Coast Guard vessel contracts. Their most important contribution can be made through the military project appropriation process and through Armed Services Committee deliberation and through contact with federal agencies having appropriate jurisdiction. The Great Lakes Congressional delegation has only four members out of 29 on the Senate Appropriations Committee but three Senators are on the Defense Appropriations Subcommittee out of 17 total. On the other hand, the region House delegation has 21 members on the Appropriations Committee (more than a third of the membership). The House Defense Appropriations Subcommittee has four members out of 11. Other important committees of both Houses of Congress are the Armed Services Committees and their respective Sea Power subcommittees. The new chairman of the House Armed Services Committee is Representative Les Aspin of Wisconsin. For Coast Guard vessel construction programs, the Senate Merchant Marine Subcommittee (Commerce Committee) and House Coast Guard and Navigation Subcommittee (Merchant Marine and Fisheries Committee) are the appropriate jurisdictional committees. Even though key defense committee assignments are few (except for House Armed Services), communication with committee members has been one widely used avenue of influence by the Great Lakes Congressional Delegation. Those members of Congress whose districts or states benefit significantly from military or Coast Guard vessel contracts should make the effort to familiarize themselves with the details of procurement programs and local supplier/shipyard potential and then coordinate action with fellow region Congressmen. There is little doubt that military ship-

building contracts at particular Great Lakes yards provide positive spinoffs for entire states and the whole region.

A recent example of how this process should work concerns a planned Army request for proposal for logistical support ships. The Army was intending to open the bid to NATO countries as well as U.S. shipyards. U.S. law forbids Navy contracts to non-U.S. shipyards but Congress has not establshed a policy for Army or Coast Guard vessels. The Great Lakes Commission, based in Ann Arbor, Michigan, was informed of this proposed Army contract action and communicated its objection to the Secretary of the Army, key Congressional committee chairmen and the Great Lakes region Congressional Delegation. The Commission wrote that the proposed action appeared contrary to long-standing Congressional intent and that Great Lakes shipyards could submit bids but that foreign competition could substantially reduce the chance of a successful region bid. After a short but intensive period of Congressional inquiries of the Army, the Army decided to drop the controversial bid procedure. Since the early 1984 action, a Great Lakes Senator has indicated that he may propose legislation to prohibit this possibility in the future.

Congress has in recent years considered legislation that would revive maritime construction subsidy programs which have received no funding under the Reagan Administration. Critics of the withdrawal of construction subsidies point out that Navy-related work cannot sustain all the shipyards of the Active Shipbuilding Base. Some predictions indicate that without new commercial work, as many as nine shipyards could go under. Much of the new commercial work has migrated to foreign shipyards where overall construction costs, particularly for labor, can be less than half for comparable U.S. ship construction. Proposals to permit U.S. shipping companies to build or repair in foreign shipyards contingent on "buyouts" of operating subsidies could exacerbate the downturn in U.S. shipbuilding unless certain conditions are attached to a buy-out program. Another legislative proposal would establish a Maritime Development Bank intended to provide the capital for some prospective U.S. commercial ship construction. In 1984, a nine-member commission chaired by the Secretary of the Navy was created by Congress to study defense-related aspects of the merchant marine. With these activities and others, it is apparent that Congress remains interested in maritime/shipbuilding affairs and understands its importance to the U.S. economy. Unfortunately, most Great Lakes shipyards are not in a good position to take advantage of construction subsidy initiatives because of either current military work, yard capability requirements, the legal exclusion of subsidies for vessels built for the intercoastal trade or Seaway constraints which hinder competing for new large ocean vessels.

The U.S. Great Lakes shipyards need more work. Military vessel construction, compared with traditional commercial work, is the one area that offers substantial near-term hope. Defense expenditures have for years been moving to Sun Belt states to the detriment of the Midwest. The region's Congressional Delegation should actively begin to rectify this imbalance in federal revenue flow to the area. In addition to the matter of equitable distribution of federal tax monies, the national security issue of preserving shipbuilding capacity is threatened by the substantial lack of naval vessel orders in the Great Lakes region. Is it possible that as the region goes, so goes the country?

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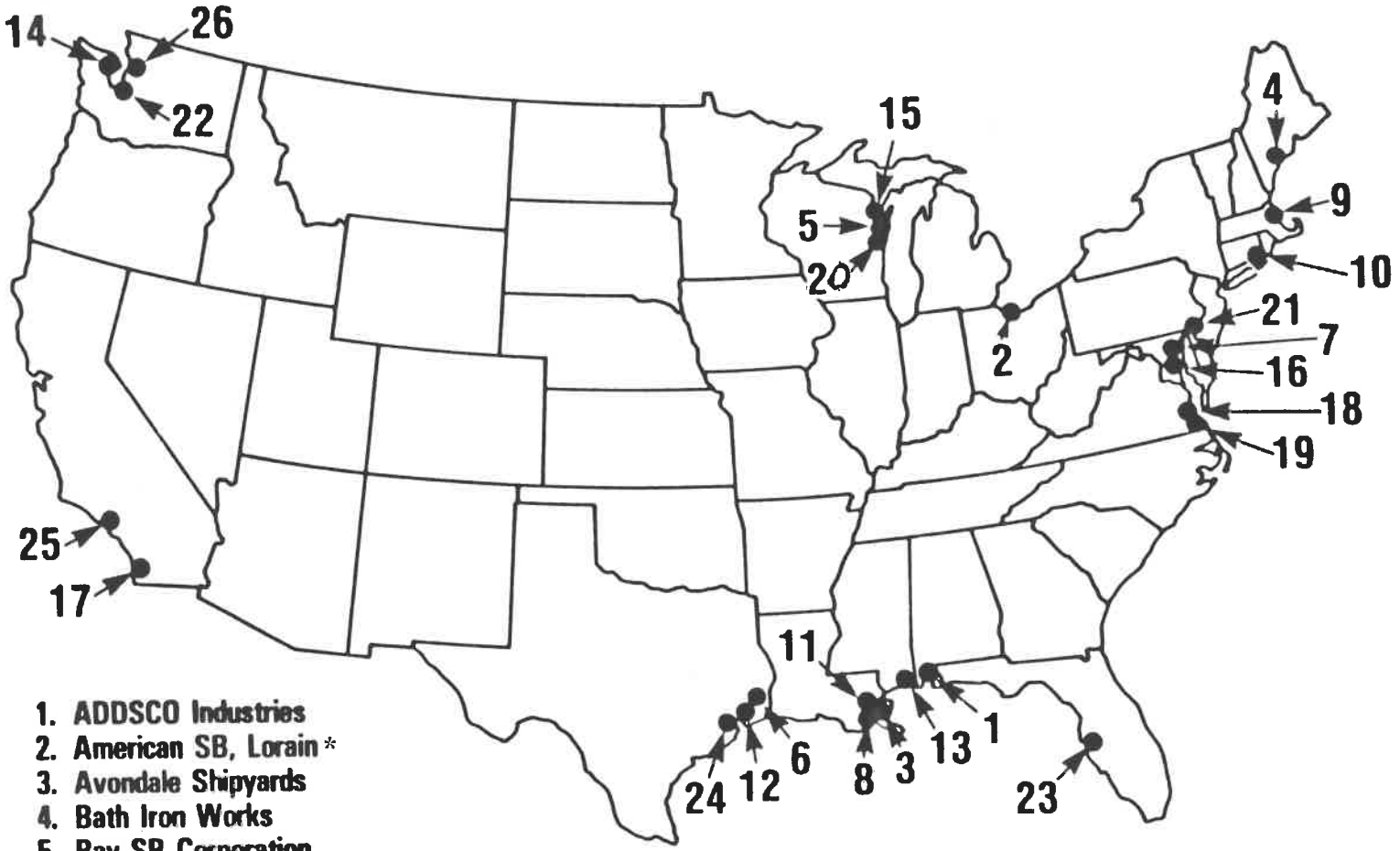
# ACTIVE U.S. SHIPBUILDING BASE




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

* Closed late 1983

October 1, 1983

APPENDIX A

# 3 CURRENT NAVY Shipbuilding Contracts, Self Propelled Only

| SHIPYARD NAVY NUMBER | | CONTRACT PRICE $ | APPROXIMATE DELIVERY DATE (EST) |
|---|---|---|---|
| **Avondale Shipyards** | | | |
| ★T-AO-187 | Henry J. Kaiser | 123,900,000 | 2/86 |
| T-AO-188 | unnamed | 117,000,000 | 6/86 |
| T-AO-189 | unnamed | 116,000,000 | 11/86 |
| T-AO-190 | unnamed | 116,000,000 | 3/87 |
| LSD-45 | unnamed | 166,000,000 | — |
| **Bath Iron Works** | | | |
| FFG-47 | Nicholas | 65,130,000 | /84 |
| FFG-49 | Robt. G. Bradley | 65,130,000 | /84 |
| FFG-50 | Taylor | 82,300,000 | /84 |
| FFG-53 | Hawes | 123,500,000 | /85 |
| ★FFG-55 | Elrod | 123,500,000 | /86 |
| FFG-56,58 | unnamed (2) | 169,800,000 | /85,6 |
| FFG-59 | unnamed | 89,300,000 | /86 |
| CG-51 | unnamed | 305,200,000 | /87 |
| CG-XX | unnamed | 252,800,000 | — |
| **Bell Halter** | | | |
| LCAC-1-6 | unnamed (6) | 170,000,000 | 85,6 |
| LCAC-7-12 | unnamed (6) | 131,600,000[1] | — |
| PBM X | | 425,000[2] | |
| MSH X | | 1,000,000[3] | — |
| **Boeing Marine** | | | |
| Jetfoils | (4) | 150,000,000[7] | — |
| **Robert E. Derector** | | | |
| WMEC-905 | Spencer | 37,700,000[4] | /84 |
| WMEC-906 | Seneca | 37,700,000[4] | /84 |
| WMEC-907 | Escanaba | 37,700,000[4] | /85 |
| WMEC-908 | Tahoma | 37,700,000[4] | /85 |
| WMEC-909-13 | unnamed (5) | 150,800,000[4] | 85-87 |
| **GD Electric Boat Division** | | | |
| SSN-708 | Minneapolis/St. Paul | 70,121,000 | /84 |
| SSN-709 | Hyman G. Rickover | 140,242,000 | /84 |
| SSN-710 | Augusta | 140,242,000 | /85 |
| SSN-719,20 | unnamed (2) | 132,650,000 | /85 |
| SSN-724 | unnamed | 70,121,000 | /87 |
| SSN-725 | unnamed | 70,121,000 | /88 |
| SSN-751,2 | unnamed | 560,200,000 | /88 |
| SSN-753 | unnamed | 649,000,000 | |
| SSBN-730 | Henry M. Jackson | 354,500,000 | /84 |
| SSBN-731 | Alabama | 349,500,000 | /85 |
| SSBN-732 | Alaska | 349,500,000 | /86 |
| ★SSBN-733 | Nevada | 401,000,000 | /86 |
| SSBN-734 | unnamed | 523,700,000 | /88 |
| SSBN-735 | unnamed | 531,600,000 | /89 |
| SSBN-736 | unnamed | 870,000,000 | — |
| SSBN-737 | unnamed | 62,000,000[1] | — |
| **Ingalls Shipbuilding** | | | |
| CG-48 | Yorktown | 298,000,000 | 7/84 |
| CG-49 | Vincennes | 333,500,000 | 85 |
| CG-50 | unnamed | 333,500,000 | 86 |
| CG-52, 53 | unnamed (2) | 664,100,000 | /86,7 |
| CG-54-6 | unnamed (3) | 926,100,000 | /87 |
| CG-57,58 | unnamed(2) | 325,500,000 | — |
| LHD-1 | unnamed | 140,900,000[1] | — |
| **Jeffboat** | | | |
| Tugs— | unnamed (5) | | |
| **Lockheed Marine** | | | |
| LSD-41 | Whidbey Island | 338,600,000 | 11/84 |
| LSD-42 | Germantown | 304,000,000 | /85 |
| LSD-43 | unnamed | 271,477,228 | /87 |
| LSD-44 | unnamed | 37,200,000[1] | — |

| SHIPYARD NAVY NUMBER | | CONTRACT PRICE $ | APPROXIMATE DELIVERY DATE (EST) |
|---|---|---|---|
| **Marine Power & Equipment** | | | |
| LCM | unnamed (8) | 3,660,000 | |
| **Marinette Marine** | | | |
| MCM-2 | unnamed | 46,000,000 | 9/86 |
| MCM- | unnamed | 42,000,000 | 86 |
| TWR | unnamed (8) | 19,200,000 | — |
| MSH | unnamed | 1,000,000[3] | — |
| Workboats | (28) | 7,000,000 | — |
| **National Steel & Shipbuilding** | | | |
| T-ARC-7 | Zeus | 107,000,000 | 1/84 |
| **Newport News Shipbuilding** | | | |
| CVN-71 | Theodore Roosevelt | 1,200,000,000 | /86 |
| CVN-72 | Washington | 1,550,000,000 | 12/89 |
| CVN-73 | Lincoln | 1,550,000,000 | 12/91 |
| SSN-716 | Salt Lake City | 120,272,000 | /84 |
| SSN-717 | Olympia | 240,544,000 | 7/84 |
| SSN-718 | Honolulu | 240,544,000 | /84 |
| SSN-721-3 | unnamed (3) | 675,000,000 | /86,6,7 |
| SSN-750 | Newport News | — | /87 |
| SSN-754 | unnamed | 319,000,000 | — |
| **Peterson Builders** | | | |
| ARS-50 | Safeguard | 54,000,000 | /84 |
| ARS-51 | Grasp | 70,000,000 | /85 |
| ARS-52 | Salvor | 70,000,000 | /85 |
| ARS-53 | Grapple | 33,900,000 | /85 |
| MCM-1 | Avenger | 99,000,000 | /85 |
| MCM- 5 | unnamed (2) | 74,700,000 | — |
| YP-676-82 | unnamed (7) | 36,357,752 | /84-86 |
| **Swiftships** | | | |
| Patrol boats | (9) | — [6] | /84-6 |
| Patrol boats | (3) | — [8] | — |
| **Tacoma Boatbuilding** | | | |
| T-AGOS-2 | Contender | 13,822,000 | /84 |
| T-AGOS-3 | Vindicator | 13,822,000 | /84 |
| T-AGOS-4 | Triumph | 12,240,000 | /84 |
| T-AGOS-5 | Assurance | 12,240,000 | /84 |
| T-AGOS-6 | Persistent | 12,240,000 | /85 |
| T-AGOS-7 | Indomitable | 12,240,000 | /85 |
| T-AGOS-8 | Prevail | 12,240,000 | /85 |
| T-AGOS-9-12 | unnamed (4) | 48,956,000 | /85,6 |
| WMEC-903 | Harriet Lane | 32,500,000[4] | /84 |
| WMEC-904 | Northland | 32,500,000[4] | /84 |
| Missile ships | unnamed (2) | 143,000,000[5] | — |
| **Todd Pacific, San Pedro** | | | |
| FFG-43 | Thach | 71,600,000 | 4/84 |
| FFG-46 | Rentz | 66,323,000 | 8/84 |
| FFG-51 | Gary | 92,000,000 | /85 |
| FFG-54 | Ford | 92,000,000 | /85 |
| FFG-57 | Reuben James | 88,000,000 | /86 |
| FFG-60 | unnamed | 89,900,000 | /87 |
| FFG-XX | unnamed | 100,000,000 | — |
| **Todd Pacific, Seattle** | | | |
| F-FFG-44 | Darwin (for R.A.N.) | 68,515,500 | /84 |
| FFG-48 | Vandegrift | 68,515,500 | /84 |
| FFG-52 | Carr | 92,000,000 | /85 |
| **Uniflite** | | | |
| PBM | unnamed | 425,000[2] | — |
| Hydro survey launches | (3) | 601,000 | /84 |
| LPCL | unnamed (27) | 2,038,000 | 84 |
| **Watercraft America** | | | |
| Landing craft (LCAV) | (X) | 8,500,000 | — |

USN Vessel classifications:
**Warships:** CVN 026Aircraft Carrier (Nucl. Prop.). CG 026Guided Missile Cruiser. DD = Destroyer; DDG = Guided Missile Destroyer; FFG = Guided Missile Frigate. SSN = Submarine (Nucl. Prop.); SSBN = Ballistic Missile Submarine (Nucl. Prop.). LSD = Dock Landing Ship. MCM = Mine Countermeasure Ship. LCAC = Landing Craft, Air Cushion. **Auxiliary Ships:** AD = Destroyer Tender. AGOS = Ocean Surveillance Ship. AK = Cargo Ship; AO = Oiler; ARC = Cable Repair Ship. ARS = Salvage Ship. **Service Craft:** YP = Patrol Craft. YTB = Harbor Tug. **U.S. Coast Guard:** WMEC = Medium Endurance Cutter.
**Notes:** T = Assigned to MSC;
F = Being constructed for a foreign gvt.;
X = Added to existing classifications to indicate new class;
N = As last letter of ship symbol denotes nuclear propulsion.

[1] Long lead procurement
[2] Phase I design contr.
[3] Phase II design contr.
[4] For U.S.C.G.
[5] For gvt. of Thailand
[6] For gvt. of Egypt
[7] For gvt. of Indonesia
[8] For West Indies

# 4 MOBILE OFFSHORE DRILLING RIGS Building or on Order in U.S. Yards

| BUILDER | OWNER | TYPE | NO. | WATER DEPTH, FT | DRILLING DEPTH, FT |
|---|---|---|---|---|---|
| Marathon, Brownsville, Tx | Global Marine | J 111C | 1 | 300 | — |
| Marathon, Vicksburg, Miss. | Rowan Drilling | J 150 88C | 1 | 328 | — |
| | Rowan Drilling | J 111C | 2 | 300 | 30,000 |
| | TOTAL | | 4 | | |

# 5 NAVY REPAIR, OVERHAUL & CONVERSION CONTRACTS AWARDED

| BUILDER | OWNER | TYPE OF CONSTRUCTION | VALUE ($) |
|---|---|---|---|
| Arcwell | USN | Conv. & repair **USS Kitty Hawk (CV-63)** | 1,502,007 |
| Atlantic Dry Dock | MSC | Convert **USS Furman (T-AK-280)** to cableship | 5,000,000 |
| | MSC | Convert Ro/Ro **American Eagle** | 2,400,000 |
| | USN | Overhaul **USS Perry (FFG-7)** | 4,100,000 |
| Avondale | MSC | Convert 3 SL-7s to T-AKRs | 136,200,000 |
| Bath Iron Works | USN | Overhaul frigate **USS Capodanno (FF-1093)** | 14,700,000 |
| BIW, Portland yd | USN | Overhaul **USS Conolly (DD-979), USS O'Bannon (DD-987), USS Deyo (DD-989)** | 67,000,000 |
| Bay Shipbuilding | MarAd | Convert **ex President Harrison** to TAC-1 | 13,800,000 |
| Bender Shipyard | *MSC | Reconditioning **USNS Hudson** | 4,200,000 |
| Bethlehem, Sparrows Point | USN | Convert **Estelle Maersk, Emma Maersk, Evelyn Maersk** to T-AKX | 375,000,000 |
| Bethlehem, Beaumont | MSC | Convert **Eleio Maersk, Emilie Maersk** to T-AKX | 250,000,000 |
| Boston Shipyard | *USN | Overhaul **USS Truckee (T-AO-147)** | 1,256,925 |
| Braswell Shpyds | USN | Overhaul **USS Sirius** (supply ship) | 10,700,000 |
| Coastal Drydock | USN | Overhaul **USS McCandless (FF-1084), USS Pharris (FF-1094), USS Beary (FF-1085)** | 40,800,000 |
| | USN | Overhaul **USS Stump (DD-978), USS Nicholson (DD-982), USS Moosburgger (DD-980)** | 60,000,000 |
| Dillingham, Honolulu | USN | Overhaul **USS Reclaimer (ARS-42)** | 3,700,000 |
| FMC Corp | USN | Modernize 167 amphibious assault vehicles | 166,700,000 |
| General Dynamics | USN | Overhaul **USS Fulton (AS 11)** | 12,537,760 |
| General Ship, Boston | USN | Maintenance **USS Valdez (FF-1096), USS Miller (FF-1091)** | 46,472,696 |
| | USN | Overhaul **USS Jesse L. Brown (FF-1089)** | 8,800,000 |
| Hoboken Shipyards | USN | Overhaul **USS Kalamazoo (AOR-6)** | 14,300,000 |
| Ingalls Shipbuilding | USN | Modernize battleship **Iowa (BB-61)** | 177,000,000 |
| | USN | Overhaul three destroyers | 67,000,000 |
| Metro Machine | USN | Repair **USS Nashville (LPD-13)** | 10,263,174 |
| NASSCO | MSC | Convert 3 SL-7s to T-AKRs | 135,500,000 |
| | MSC | Convert **John B. Waterman, Thomas Heyward, Charles Carroll** to T-AKX ships | 261,000,000 |
| | USN | Overhaul **USS Hepburn (FF-1055), USS Cook (FF-1083)** | 31,000,000 |
| | USN | Overhaul **USS Cayuga (LST-1186)** | 13,000,000 |
| | MSC | Convert tkrs. **Worth, Rose City** to T-AH | 336,200,000 |
| | USN | Overhaul **USS Merrill (DD-976)** | — |
| Newport News Shipbuilding | USN | Overhaul **USS Daniel Boone (SSBN-629)** | 12,800,000 |
| | USN | Overhaul **USS Francis Scott Key (SSBN-657)** | — |
| | USN | Overhaul **USS Tecumseh (SSBN-628)** Planning | — |
| | USN | Overhaul **USS Will Rogers (SSBN-659)** Planning | — |
| | USN | Overhaul, refuel **George Washington Carver (SSBN-656)** | — |
| | USN | Comprehensive overhaul of **USS Nimitz (CVN-68)** | 140,000,000 |
| | USN | Overhaul, refuel **USS Benjamin Franklin (SSBN-640)** | 17,063,000 |
| | USN | Overhaul **USS Eisenhower (CVN-69)**[1] | 10,900,000 |
| Norfolk Naval Shipyard | USN | Overhaul **USS Coral Sea (CV-43)** | 150,000,000 |
| Norshipco Norfolk | USN | Overhaul **USS Newport (LST-1179)** | 6,000,000 |
| Northwest Marine | MSC | Overhaul **USNS Observation Island** | 9,899,356 |
| Pennsylvania Shipbuilding | MSC | Convert 2 SL-7s to T-AKRs | 99,500,000 |
| Philadelphia Navy Yard | USN | SLEP overhaul **USS Forrestal (CV-59), USS Independence (CV-62)** | — |
| San Diego Iron & Steel | USN | Overhaul **USS Fanning (FF-1076)** | 6,939,414 |
| Seward Marine Service | USN/USCG | Vessel hull cleaning | 39,400,000 |
| Southwest Marine | USCG | Overhaul icebreaker **Glacier** | 41,001,000 |
| | USN | Overhaul **USS Dubuque (LPD-8)** | 10,000,000 |
| | USN | Maintenance of AOE-1,2,3,4, | 107,000,000 |
| | *USN | Drydock **USS Denver (LPD-9)** | 1,196,000 |
| | *USN | Repair **USS Kansas City (AOR-3)** | 20,852,111 |
| Thunderbolt Marine | USN | Repair **LDU-1650, LCU-1663** | 1,046,035 |
| Todd, Pacific | USN | Overhaul **USS Niagara Falls (AFS-3)** | 25,000,000 |
| | USN | Repair **USS Hector (AR-7)** | 2,044,626 |
| Triple A South | USN | Overhaul **USS Ajax (AR-6)** | 4,900,000 |
| | USN | Overhaul **USS Dixon (AS-37)** | 10,284,918 |
| | USN | Overhaul **USS Shasta (AE-33)** | 10,500,000 |
| U.S.C.G. Yard, Curtis Bay, Md | USCG | Major Maintenance, 16 WMECs | — |

**Types:** J = Jackup, SM = Semisubmersible, S = Submersible, D = Drill Ship, B = Barge

1 JANUARY 1984

RESERVE FLEET SUMMARY

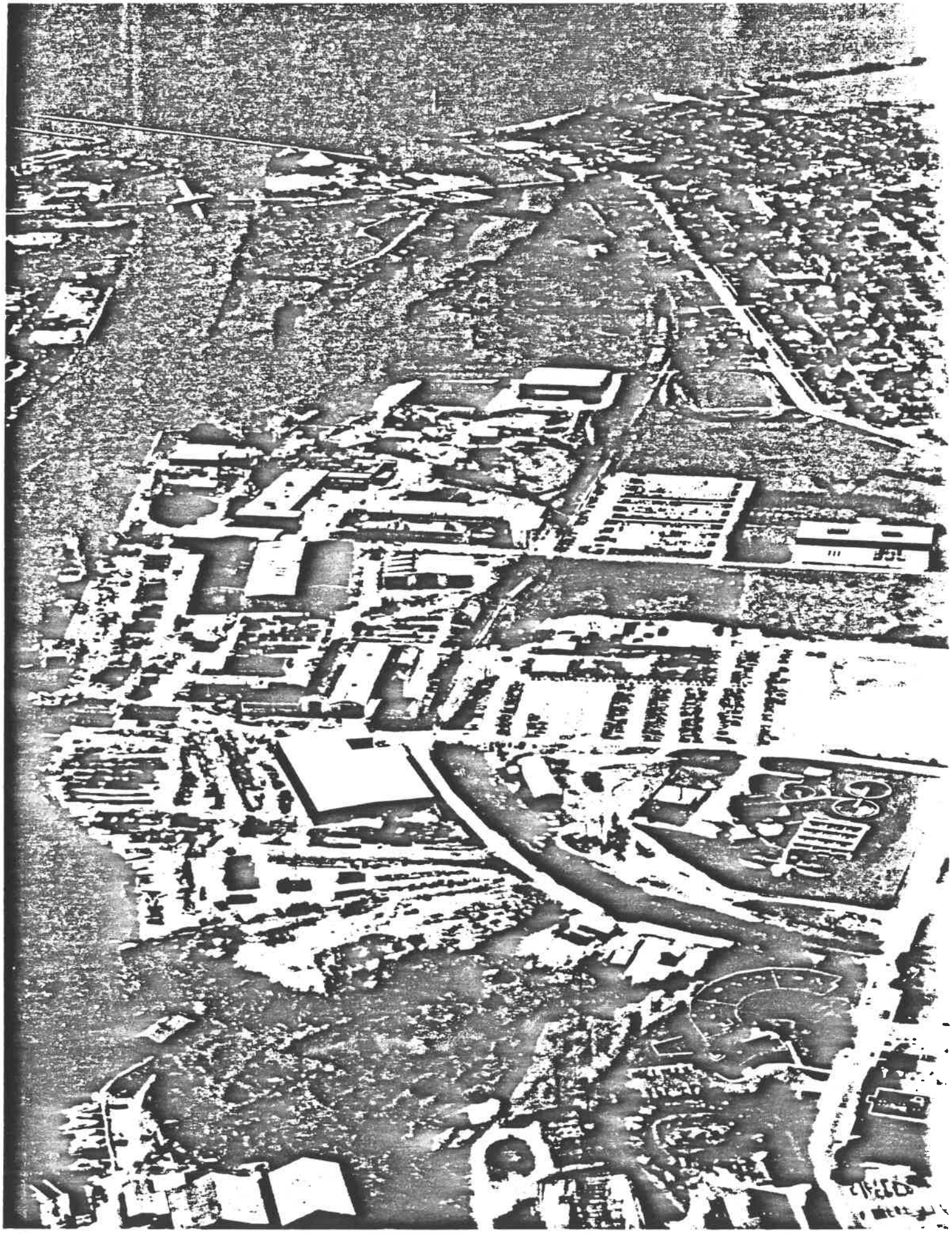
| | | TOTAL | JAS | MOB | BEAU | SUI |
|---|---|---|---|---|---|---|
| 1 | TRANSPORTS & PASSENGER CARGO | | | | | |
| | AP -P251 | 1 | 1 | | | |
| | AP -P2 | 7 | 2 | | | 5 |
| | AP -P2E | 6 | 4 | | | 2 |
| | | 14 | 7 | | | 7 |
| 2 | MILITARY AUXILIARIES | | | | | |
| | AE | 1 | 1 | | | |
| | AF -C2 | 2 | 2 | | | |
| | AG | 1 | | | | 1 |
| | AG -C41A | 1 | 1 | | | |
| | AGM -C4SA | 1 | 1 | | | |
| | AGR -ZEC5 | 1 | 1 | | | |
| | AH -C4B2 | 1 | 1 | | | |
| | AK -C2 | 1 | | | | 1 |
| | AK -C4 | 1 | 1 | | | |
| | AK -EC2 | 2 | 2 | | | |
| | AKC -CIME | 1 | 1 | | | |
| | LKA -C2 | 5 | 5 | | | |
| | LKA -C2A3 | 2 | 2 | | | |
| | LKA -C2F | 1 | 1 | | | |
| | LKA -C41A | 1 | | | | 1 |
| | LPA -V#5 | 12 | 12 | | | |
| | LST | 6 | | | | 6 |
| | | 40 | 31 | | | 9 |
| 3 | TANKERS | | | | | |
| | AO | 3 | | | 1 | 2 |
| | AO -EXT2 | 1 | | | 1 | |
| | AO -ST2E | 1 | | | | 1 |
| | AO -T2A | 1 | | | | 1 |
| | AO -T2E | 5 | 3 | | 2 | |
| | AO -T3S2 | 1 | | | | 1 |
| | AO -T3S2 | 3 | 2 | | | 1 |
| | AO -XT2E | 1 | | | 1 | |
| | IX -LG91 | 1 | 1 | | | |
| | | 17 | 6 | | 5 | 6 |
| 4 | DRY CARGO | | | | | |
| | AK | 1 | | | | 1 |
| | AK -C333 | 4 | 3 | | 1 | |
| | AK -C338 | 4 | 4 | | | |
| | AK -C346 | 2 | 2 | | | |
| | AK -C41A | 1 | 1 | | | |
| | AK -C41H | 2 | 2 | | | |
| | AK -C41P | 2 | 1 | | 1 | |
| | AK -C41Q | 2 | | | | 2 |
| | AK -C41T | 2 | | | 2 | |
| | AK -C41U | 2 | | | 1 | 1 |
| | AK -C457 | 11 | 5 | | 3 | 3 |
| | AK -C458 | 5 | 5 | | | |
| | AK -C464 | 3 | 1 | | | 2 |
| | AK -C573 | 3 | 3 | | | |
| | AK -C6QC | 2 | | | | 2 |
| | AK -V#2 | 107 | 38 | | 18 | 51 |
| | AK -V#3 | 18 | 8 | | 6 | 4 |
| | AK -XST2 | 7 | 5 | | 2 | |
| | AKC -N3M | 1 | 1 | | | |
| | AKR | 1 | 1 | | | |
| | AKR -C576 | 2 | 2 | | | |
| | | 182 | 82 | | 34 | 66 |
| | TOTAL SHIPS | 253 | 126 | | 39 | 88 |

CLASSIFICATIONS AS USED IN THIS PUBLICATION

ARE ASSIGNED ACCORDING TO SHIP'S PRINCIPAL USE AS AN AUXILIARY

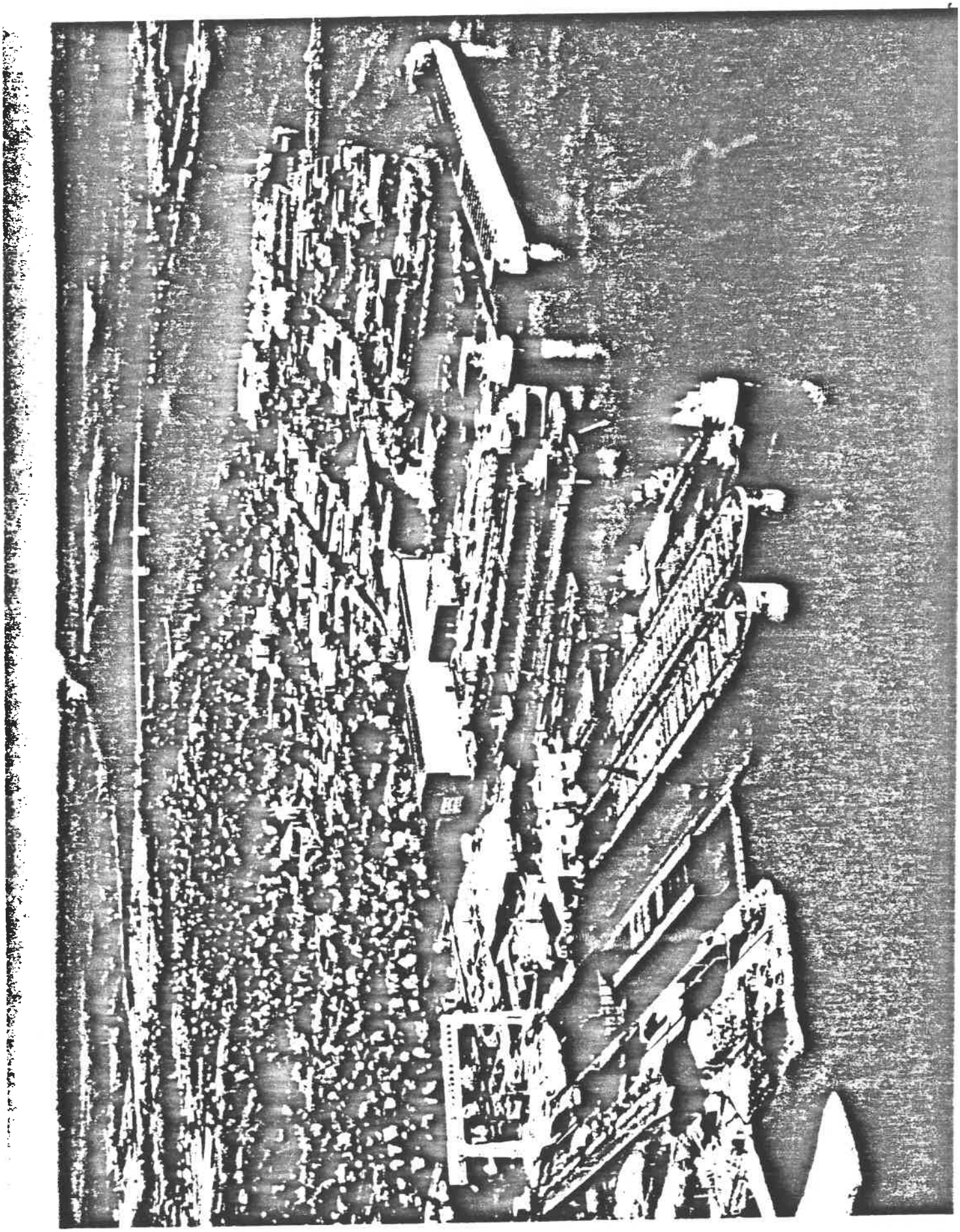
| | |
|---|---|
| AF | Refrigerated Cargo |
| AG | Miscellaneous |
| AGM | Missile Range Instrumentation |
| AGOR | Oceanographic Research |
| AGS | Surveying |
| AH | Hospital Transport |
| AK | Dry Cargo |
| AKD | Bulk Cargo (Ore, Grain, Phosphate, etc.) |
| AKR | Vehicle Cargo |
| AKS | General Stores (Fitted with bins) |
| AKV | Aircraft Cargo |
| AO | Tanker |
| AOG | Gasoline Tanker |
| AP | Passenger, Comb. Pass/Cargo, Transport |
| AR | Repair |
| ARC | Cable Repairing |
| ARG | Engine Repair, Internal Combustion |
| ARV | Aircraft Repair |
| ARVH | Aircraft Repair (Helicopter) |
| ATF | Fleet Ocean Tug |
| AW | Distilling |
| IX | Miscellaneous (Special Products: Wine, Orange Juice, Liquified Petroleum Gas, Chemicals, etc. |
| LSD | Dock Landing |
| LST | Tank Landing |

With the exception of the ARC class, the letter "C" following a classification meaning coastal, indicates the ship has limited cruising radius and speed and/or small cargo deadweight.



1979 Aerial view of Marinette Marine yard showing T-ATF's and Artubar.

BAY SHIPBUILDING, INC.
STURGEON BAY, WIS.



PETERSON BUILDERS, INC.

STURGEON BAY, WIS.

*"Quality Production on Schedule At A Profit Which We Share"*

PBI

SHIPBUILDERS
STEEL — ALUMINUM — WOOD
FIBERGLASS