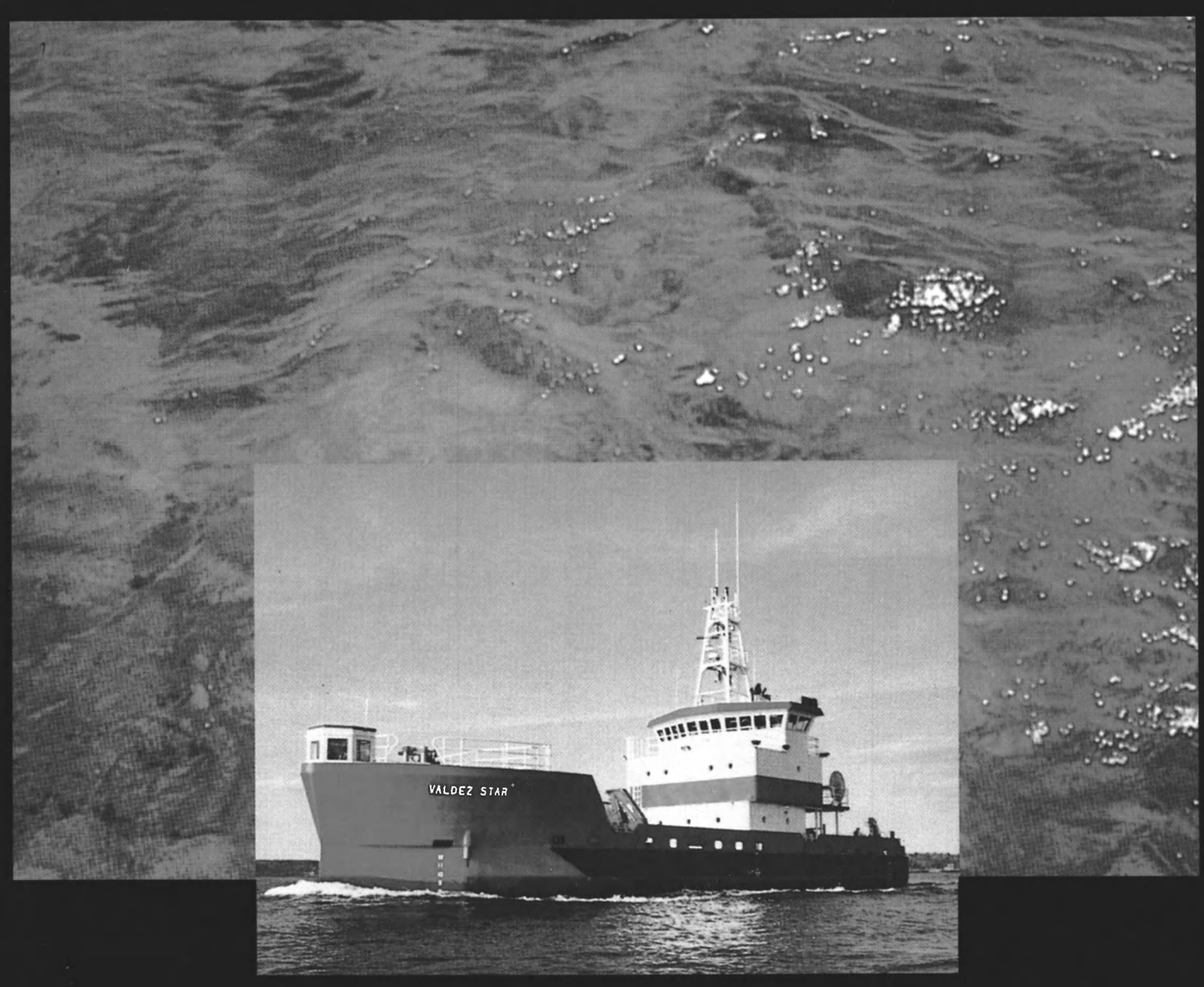
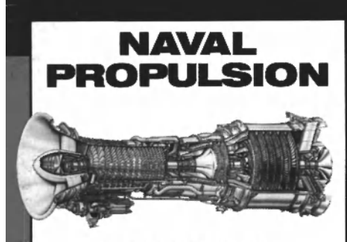
MARITIME REPORTER
AND
ENGINEERING NEWS

Marine Safety & Environmental Technology

A Focus on new hull designs, navigation equipment and the latest developments conforming to environmental safety standards and regulations . . .

. . . SEE INSIDE





NAVAL TECHNOLOGY and SHIPBUILDING

Special Pull-Out Supplement

SEPT 1991

They're all powered by

EMD GM or DETROIT DIESEL or Allison GT

STEWART & STEVENSON COUNTRY

Diesels or turbines from the world's largest distributor of diesel engines

ENGINEERED POWER STEWART & STEVENSON

1400 Destrehan • P.O. Box 1776 • Harvey, LA 70059-0008 • Tel: 504/347-4326 • Fax: 504/348-8970
8631 East Freeway • Houston, TX 77029 • Tel: 713/671-6100 • Fax: 713/671-6197

Circle 225 on Reader Service Card

ON THE COVER

This month's issue focuses on the immense impact of the Oil Pollution Act of 1990 and other recent marine environmental legislation. Adm. **Arthur E. (Gene) Henn**, the newly appointed Chief, Office of Marine Safety, Security and Environmental Protection, U.S. Coast Guard, heads the list of authors who examine the implications of this ground-breaking legislation. The cover features the oil skimmer Valdez Star, built by Goudy & Stevens Shipyard, East Boothbay, Maine. Inset, lower left, shows General Electric's LM2500 marine gas turbine, a popular choice for naval propulsion. Cover Design: **Alex Brown**/Artwork Production.

INSIDE

$1.2 Million Contract Won By Bender For Work On Pioneer Commander

Bender Shipbuilding & Repair Co., Inc., Mobile, Ala., was awarded a $1.2 million contract for work on the S/S Pioneer Commander, a 530-foot cargo ship which has been in a MarAd Active Reserve Status in New Orleans, La.

MARITIME REPORTER and Engineering News

Editorial and Executive Offices
118 East 25th Street, New York, NY 10010
(212) 477-6700 • ITT Telex: 424768 MARINTI
Telefax: (212) 254-6271

Publishers:	CHARLES P. O'MALLEY
	JOHN E. O'MALLEY
	JOHN C. O'MALLEY
Editorial Director:	CHARLES P. O'MALLEY
Editor:	JOHN R. SNYDER
Senior Editor:	THOMAS H. PHILLIPS
Production Editor:	ALAN SCOTT
Editorial Consultant-Marine Industry:	JAMES R. McCAUL
Production Manager:	MAY LOUIE
Circulation Manager:	DALE L. BARNETT
Regional Sales Manager:	LUCIA ANNUNZIATA
Regional Sales Manager:	DANIEL A. ARNOLD

Advertising Circulation and Sales Offices
118 East 25th Street, New York, NY 10010
Telephone (212) 477-6700

REPRESENTATIVES

U.S. Gulf States — **MR. JAMES N. McCLINTOCK**
Wheelhouse One Building
634 Village Lane North, Suite 205
Mandeville, LA 70448
Telephone: (504) 626-7990
Telefax: (504) 624-5163

Scandinavia — **MR. STEPHAN R. G. ORN**
AB Stephan R. G. Orn
Box 184, S-271 24 Ystad, Sweden
Telephone 0411-184 00
Telefax: 411 10531

United Kingdom — **MR. MICHAEL J. DAMSELL**
Euromedia, Ltd.
Tern House, Upper West St.
Reigate, Surrey RH2 9HX, England
Telephone: 07372 242558
Telefax: 0737 223235
Telex: 932699 KENPUB G.

Italy — **MR. VITTORIO F. NEGRONE**
Ediconsult Internazionale
Piazza Fontane Marose, 3-16123 Genova, Italy
Telephone: (010) 583520
Telefax: (010) 566578
Telex: 211197 EDINT I

MARITIME REPORTER AND ENGINEERING NEWS

ISSN-0025-3448

No. 9 Volume 53

118 EAST 25th STREET
NEW YORK, N.Y. 10010
(212) 477-6700
Telex: MARINTI 424768
Telefax: (212) 254-6271

ESTABLISHED 1939

Maritime Reporter/Engineering News is published monthly by Maritime Activity Reports, Inc. Mailed at Second Class Postage Rates at Waterbury, CT 06701 and additional mailing offices.

Postmaster send notification (Form 3579) regarding undeliverable magazines to Maritime Reporter/Engineering News, 118 East 25th Street, New York, NY 10010.

Publishers are not responsible for the safekeeping or return of editorial material.

Member BPA
Business Publications Audit of Circulation, Inc.

After much searching, we finally found a boat owner who's not using CAPRINUS® Oil.

And that wasn't easy. Because the fact is, you can find CAPRINUS U Oil just about anywhere you find hard-working inland marine boats.

CAPRINUS is Shell's top-of-the-line, premium-quality marine oil specially formulated for extended service in medium-speed diesel engines.

Our single grade, CAPRINUS U Oil 40, is a high-dispersant, zinc-free* oil which provides excellent protection and keeps engines running clean.

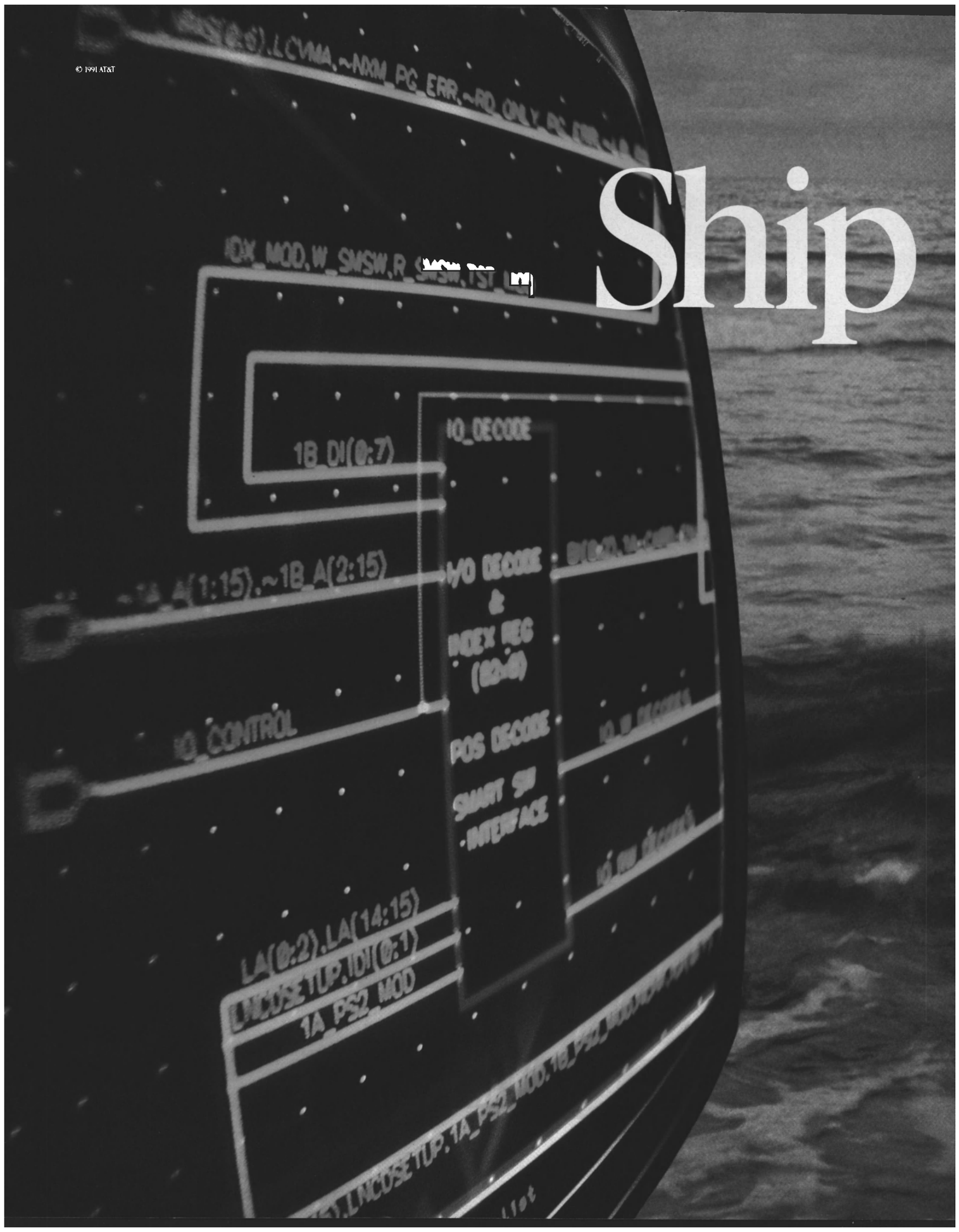
CAPRINUS U 20W-40 Multigrade lowers operating costs by reducing oil and fuel consumption versus single grade oils. It also delivers excellent engine protection, which reduces maintenance costs in the long run.

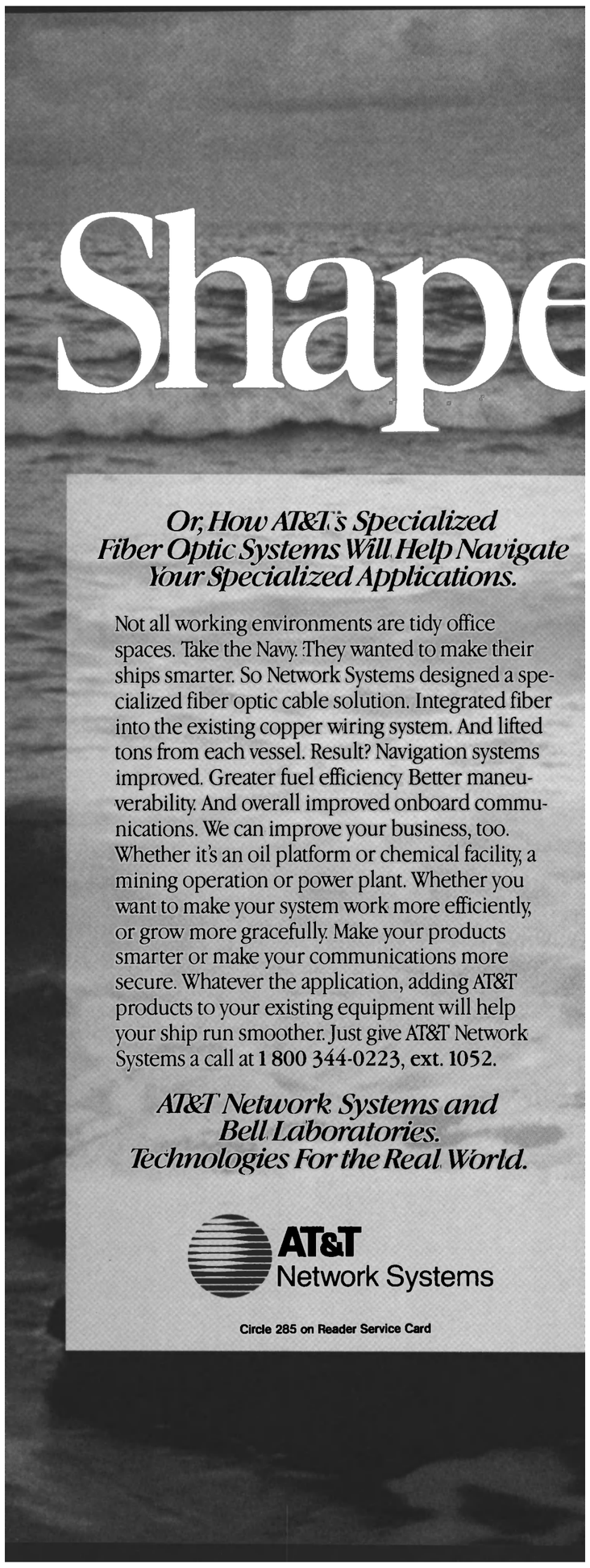
We're so confident of the quality of CAPRINUS Oil, we back it with a written warranty. If it does not perform as promised, we'll pay to repair any engine damage caused by oil failure. Some restrictions apply. For further details or a copy of the warranty, contact your local Shell jobber or call 1-800-231-6950.

*Zinc level less than 10 ppm

CAPRINUS® Oil

Circle 305 on Reader Service Card


© 1991 AT&T
Ship


Shape
Or, How AT&T's Specialized Fiber Optic Systems Will Help Navigate Your Specialized Applications.
Not all working environments are tidy office spaces. Take the Navy. They wanted to make their ships smarter. So Network Systems designed a specialized fiber optic cable solution. Integrated fiber into the existing copper wiring system. And lifted tons from each vessel. Result? Navigation systems improved. Greater fuel efficiency Better maneuverability. And overall improved onboard communications. We can improve your business, too. Whether it's an oil platform or chemical facility, a mining operation or power plant. Whether you want to make your system work more efficiently, or grow more gracefully. Make your products smarter or make your communications more secure. Whatever the application, adding AT&T products to your existing equipment will help your ship run smoother. Just give AT&T Network Systems a call at 1 800 344-0223, ext. 1052.
AT&T Network Systems and Bell Laboratories. Technologies For the Real World.
AT&T
Network Systems
Circle 285 on Reader Service Card

$4.3 Billion Offshore Investment Planned By Malaysia

Over the next five years, more than M$12 billion (about $4.3 billion) will be pumped into the offshore sector in the Malaysian states of Sarawak and Sabah to tap over 760 million barrels of oil reserves and boost gas production.

The capital expenditure program will bring numerous new fields on stream, increase recovery in existing producing areas, and enhance the gas transportation system.

Shell, which has a major presence in the area, expects its share of the investment to total M$8.1 billion (about $2.9 billion) from 1991-96.

Most of the money will be spent in Sarawak, which will provide the 11 tons of cubic feet of additional feedstock gas for the expansion of Malaysian LNG production at Bintulu.

There will also be extensive development work in the oil sector, however, with production in the area expected to rise from 284,000 barrels per day this year to 338,000 barrels per day in 1995.

Shell's upstream operations during the five-year period will bring on stream the 144 million barrel Kinabalu field in block SB-1, discovered in 1989 and appraised last year.

The steep rise in engineering costs is an important issue facing Shell in its development plans.

Shell's upstream manager in the area said the cost of bringing a small structure on steam has doubled in the last year to around M$10 million (about $3.6 million).

Strategic Sealift—All Ahead Full? Or All Stop?

The Shipbuilders Council of America is receiving mixed signals from the Navy and the Department of Defense (DoD) as to the speed with which the sealift program will move to contract award.

On the Navy side, a notice appeared on July 9 in the "Commerce Business Daily" (CBD) announcing a survey by the Naval Sea Systems Command (NAVSEA) of "potential U.S. sources for the design and construction of strategic sealift ships." According to the CBD announcement, the Navy "anticipates a two-phased design/construction approach with multiple contracts for the detail design/construction of the ship(s)."

The Navy is contemplating construction of a 950-foot ship and a 700-foot ship, each with a 105.5-foot or Panamax beam. The initial design contract will be restricted to U.S. shipbuilders capable of constructing the ships. The ships must be built in U.S. shipyards. In addition, domestic manufacture of propulsion and auxiliary systems has been mandated by the Congress. Interested shipbuilders have 30 days from the date of the CBD announcement to respond.

The Shipbuilders Council understands that on July 11, the Navy briefed Secretary of Defense **Dick Cheney** on its plans for sealift execution. The plans include, among other options, using the 950-foot ship mentioned in the CBD notice for Prepositioning and Reduced Operating Status (ROS) missions. The 700-foot ship option would have commercial viability—perhaps as a car carrier—and would be chartered by the government to commercial operators with the understanding that it would be made available in time of national need.

Meanwhile, there are indications that the DoD, rather than moving rapidly forward with implementation of this vital program, may subject it to the long, drawn out procedures of the full Defense Acquisition Board process. Already, there has been talk that DoD bureaucrats want to take control of the program through the assignment of an Acquisition Category 1 (D) classification, which could require full DoD review at every laborious step. This process, which is suitable for B-2s and nuclear submarines, is bureaucratic overkill for sealift and will further delay contract awards.

These sealift ships are simple and should be built to commercial standards as cheaply as possible. There is no new technology involved in their construction; similar ships are under construction around the globe.

Bazan-MAN B&W Engines Power Oceanographic Research Ship 'Hesperides'

Four generating sets, two of them driven by 1,400-kw 14V 20/27 Bazan-MAN B&W engines (in the picture) and two by 7L 20/27 engines, are the prime movers for the diesel-electric propulsion plant of ocean research ship Hesperides.

Four Bazan-MAN B&W engines with a total output of 4,200 kw are the prime movers of the diesel-electric propulsion power plant installed aboard the oceanographic research ship Hesperides. The vessel, which will take part in the scientific investigation projects scheduled for southern continent's coming summer season in the Antarctic, was constructed by the Cartagena Factory of the Empresa Nacional Bazan. The engines were built in the engine factory of E.N. Bazan, also located in Cartagena.

The operating conditions of oceanographic research vessels require a propulsion plant that performs well at low speed, the possibility of fine turning of propulsion power, low noise and rapid response. The special requirements were decisive factors in the choice of diesel-electric propulsion and, concretely, these Bazan-MAN B&W engines, as prime movers for the propulsion plant.

The Hesperides is driven by two direct-current 1,400-kw engines at 184/220 rpm each, mounted in tandem and directly coupled to the shafting.

Four three-phase alternate-current diesel generators supply the power required by the main engines and all the auxiliary services installed onboard.

The new vessel, delivered in May, will be operated by the Spanish Navy at the service of the Higher Council of Scientific Investigation, and has been defined as "the new flagship of Spanish scientific research."

With a length between perpendiculars of about 255 feet, her hull is reinforced for ice navigation. Aside from the most advanced navigational and dynamic positioning facilities available, this ship is also equipped with a complete oceanographic research laboratory.

The generator sets, made up of the four Bazan-MAN B&W engines described above, are adequately designed to provide the ship's propulsion power and to supply the electrical installations for all her auxiliary services.

For further information on Bazan-MAN B&W engines,

Circle 55 on Reader Service Card

MMS Awarded Contract By Coscol Marine

Marine Management Systems (MMS) has been awarded a contract to implement their Spare Parts Inventory Management (SPIM) and Planned Maintenance (PMS) systems for Coscol Marine, the ship operating subsidiary of The Coastal Corporation, according to an announcement by MMS vice president **Don Logan.**

Under the contract, MMS is in the process of installing the systems at Coscol's Houston, Texas, operations office, as well as onboard the tanker Coastal New York. MMS is scheduled to implement an additional SPIM/PMS system onboard the Coastal Eagle Point. Both shipboard systems will interface via satellite communications with Coscol's office system. Further, the shipboard systems will utilize MMS' latest bar code technology to facilitate inventory control and update.

Ongoing support for the project will be handled by MMS technical staff in Stamford, Conn.

MMS has been providing computerized vessel management systems for over 20 years, and currently supports more than 400 active systems worldwide, operating at over 200 shipboard and shoreside locations.

For more information and free literature on MMS,

Circle 18 on Reader Service Card

Navy Solicits Offers For Initial Design Of New Sealift Vessels

Details about the kind of new military cargo vessel it wants for an enhanced sealift fleet were revealed by the Navy recently when it solicited offers for the initial design of two types of sealift ships.

The two designs being pursued, the Naval Sea Systems Command said, are a ship to lift vehicles and supplies from the U.S. to a war zone, and a so-called prepositioned ship, or depot vessel, stored with equipment and anchored in selected areas of the world.

To be built to commercial standards and specifications, the ships will have a maximum sustained speed of 24 knots, a range of 12,000 nautical miles, and lengths of 700 feet to 950 feet will be examined. In addition, they will be roll-on/roll-off ships that maximize the number of tanks, helicopters and other vehicles that can be carried. Cranes will also be installed.

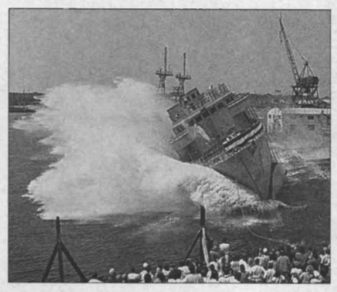
A Navy press statement said the action marks the initial efforts for the acquisition of strategic sealift ships necessary to logistically support overseas operations like Desert Shield/Desert Storm.

The solicitation, according to a Navy official, is only for the preliminary design of a new sealift vessel, a Navy official said. A Pentagon mobility requirements study due in November will provide a clearer picture of what the Navy wants in terms of numbers and types of sealift ships and aircraft, along with the mix of new and used vessels that will be required. Right now, the Navy is looking at a range of 22 to 45 additional vessels, he said.

The Navy is seeking initial designs now, the official explained, because it wants to be in a position to exercise Congressional intent as soon as possible, and so that it can implement the requirements study quickly.

The Navy, in the solicitation, is seeking comment on the possible major conversion of existing ships and wants information on the potential commercial charter viability of the initial designs. However, the Navy said, these enhancements must not detract from the military mission of the ships.

Peterson Builders Launches MCM-11 At Yard In Sturgeon Bay, Wisconsin



The MCM-11 Gladiator shown during launching ceremonies at the yard of Peterson Builders in Sturgeon Bay, Wis.

Peterson Builders, Inc., recently christened and launched the 224-foot wooden MCM-11 Gladiator, Mine Countermeasure Ship, at its yard in Sturgeon Bay, Wis.

The Gladiator is the eighth MCM launched at PBI in a series of 11 MCM ships contracted with the U.S. Navy. Peterson Builders is one of the few remaining shipyards with the expertise, facilities and knowledge to construct large wooden ships today. PBI is entering its fifth decade of minecraft ship construction and has built minecraft for 13 different navies around the world.

The mine countermeasure ships accommodate a crew of 81, and are the Navy's largest wooden hulled ship. A wide variety of special skills, equipment and materials are utilized in laminating the ship's major structure from large timbers of Douglas fir, white oak and Alaskan cedar.

For free literature on the facilities and capabilities of Peterson Builders,

Circle 57 on Reader Service Card

THERE'S ONE STAR YOU SHOULD NEVER NAVIGATE WITHOUT.

While the north star has been made obsolete by technology, the Texaco Star has gone in the opposite direction.

Today, the Texaco Star has come to represent a global product and service network connected by state-of-the-art computer technology.

Even if you're in Houston while your cruise line is docking in Rotterdam, or if you're in London while your tankers are motoring through the Panama Canal, Texaco will be right there with you.

In fact, timely, efficient service—with our top quality Marine Fuels and Lubricants as well as with your paperwork—is where the Texaco Star really shines.

And isn't it good to know that even in these high-tech times, there's still a star that can guide you?

For complete information and to place your order, contact:

Texaco Inc.
Fuel and Marine Marketing Dept.
2000 Westchester Avenue
White Plains, NY 10650

Phone: (914) 253-4000
Cable: TEXMAROIL
HARRISON NEW YORK STATE
Telex: New York 791144

Texaco Ltd.
Fuel and Marine Marketing Dept.
1 Knightsbridge Green
London SW7 1RU

Phone: 071-584-5000
Cable: TEXMAROIL LONDON SW1
Telex. London 8956681
Ask for the 'Bunker Desk.'

TEXACO
WORLDWIDE
MARINE FUELS • LUBRICANTS

Circle 227 on Reader Service Card

Ecomarine USA Offers Environmental Services

The ECO-110, a new series of multi-mission environmental vessels commissioned by Ecomarine USA, recently went into service in Miami. Pictured here is an earlier model, the ECO-100, at work in Italy.

The first two of a new series of multi-mission environmental vessels commissioned by Ecomarine USA were recently floated off the assembly line at Bollinger Machine Shop and Shipyard in Lockport, La. After completing sea trials in the Gulf of Mexico, these state-of-the-art craft, known as the ECO-110, were based in Miami, Fla., where they were put to work picking up marine debris, monitoring and mapping water pollution, and cleaning up oil slicks and other chemical spills.

Founded in November 1990 and headquartered in New York City, Ecomarine USA provides the most advanced technology and services for oil spill response, marine pollution control, and marine monitoring and mapping. The company leases fleets of environmental vessels to government agencies, businesses and other groups concerned with keeping the nation's waterways clean.

Ecomarine USA's strategy is to form partnerships with regional companies knowledgeable about the local maritime market. The first such joint venture, Ecomarine Florida, was announced earlier this month by Ecomarine USA and Florida Clean Harbors, Inc., a holding company founded by **Donald T. Quinn**, president of Oceanic Steamship Co. With headquarters in Miami, Ecomarine Florida plans to eventually expand its services to include Naples, Tampa/St. Petersburg, Jacksonville and Orlando.

A key feature of Ecomarine USA's services is that potential users—such as oil-spill cooperatives or local municipalities with sewage overflow problems—do not actually buy the boats, but charter them along with the services of a trained crew. And they can potentially share these costs with other users.

Unlike most oil-spill cleanup equipment, Ecomarine USA's multi-mission vessels are designed to be continually at work, ready to be rushed to the scene of an emergency. As a private contractor, Ecomarine USA is wholly accountable for the maintenance and performance of its equipment.

Ecomarine USA has also commissioned a 65-foot flagship vessel known as the ECO-800. Work on the first ECO-800 is currently under way at Trinity Marine Group's Aluminum Boats division in Crown Point, La., and is expected to be completed later this year. The boat was designed by Boat Craft of Jacksonville, Fla.

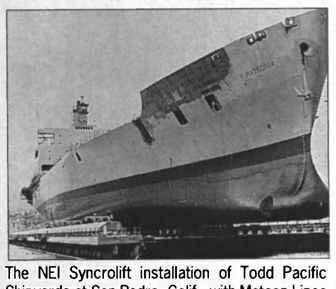
Both the ECO-800 and ECO-110 will be equipped with mechanical "jaws" designed to extract debris from the water with a powerful suction mechanism capable of consuming vast volumes of oil and debris. Under ideal conditions, the mechanism can recover up to 40 tons of oil an hour on the ECO-110 and up to 100 tons on the ECO-800.

"Earlier versions of these rugged vessels have proven themselves to be a cost-effective and utterly practical solution to cleaning up waterways," says **William S. Doyle**, a managing director of Ecomarine USA.

Ecomarine USA is a joint venture of OMI Corp., a major shipping company based in New York; Ecoventures Inc., a holding company headed by **Maxwell A. Rabb**, the former U.S. Ambassador to Italy; and Ecolmare SpA. of Sorrento, Italy, one the world's leading providers of technologically advanced marine-ecology services for government and industry.

For complete details,
Circle 41 on Reader Service Card

Atlas Converts Syncrolift To A 'Weightbridge'



The NEI Syncrolift installation of Todd Pacific Shipyards at San Pedro, Calif., with Matson Lines 22,500-dwt Matsonia overhanging the ship-lift.

NEI Syncrolift, Miami, Fla., a world leaders in ship-lift technology, has now transformed the range of operational uses for its unique system by introducing the Atlas Load Monitoring System.

Atlas (Advanced Technology for Load-monitoring on Articulated Syncrolifts) analyzes the load taken by each hoist, and is an innovation developed to enhance the control system fitted to most of the 191 Syncrolifts in operation around the world.

As part of Syncrolift's control and monitoring system, the hoist loads are measured with remarkable accuracy. Atlas then analyzes and totals these to give the exact all-up weight of the vessel on the Syncrolift. The individual hoist loads represent the specific weight/unit length associated with each hoist and, when taken together, these figures provide a load distribution profile for the vessel.

Atlas also analyzes the load distribution profile to determine the location of the vessel's LCG which enables longitudinal trim to be accurately predicted at launch. Changes in LCG are monitored, recorded, and checked to predict changes of trim at launching. The Tons per Meter immersion at various drafts is also shown. In addition, Atlas monitors differential loads between the port and starboard hoists, to measure, record and analyze differential transverse loads on docking.

In a shipyard, use of Atlas means that: (a) Vessel loads can be accurately checked for variations between docking and undocking; (b) High load concentrations can be more easily predicted to prevent hull damage during docking; (c) Damaged vessels can be recovered while the system accurately interprets how best to accommodate them; and (d) The platform can be used as a manipulator for ship conversion or modification projects.

For more information and free literature from NEI Syncrolift,

Circle 56 on Reader Service Card.

MacGregor-Navire Equipment Specified For Chiquita Reefer Series

Six 635,000-cubic-foot reefer ships ordered by Chiquita Brands from Danyard group in Denmark are specified with insulated weatherdeck and 'tweendeck hatch covers designed by MacGregor-Navire.

The 13,000-dwt, 24-knot series—among the world's largest and fastest reefers—will be deployed in the U.S. owner's Great White Fleet after deliveries during 1991-93. Pallet-friendly refrigerated capacity is arranged in four holds which can also accept 70 by 43-foot containers; some 95- by 43-foot containers can be stowed on deck.

The MacGregor-Navire shipsets are based on the following hydraulically operated hatch covers arranged to offer clear openings 13.70 meters by 10.50 meters (about 45 feet by 34.4 feet) in all the holds: Insulated hatch covers of the high-stowing folding Rack-Back type for the weather deck; Insulated hatch covers of the Link-Link type for No. 4 'tweendeck of Nos. 2, 3 and 4 holds; and Non-insulated hatch covers of the Link-Link type for Nos. 2, 3 and 5 'tweendecks of Nos. 2, 3 and 4 holds and for the two 'tweendecks of No. 1 hold.

The weatherdeck sets are operated by hydraulic cylinders fitted at the sides of the covers, and the 'tweendeck covers by internally integrated cylinders. Two MacGregor-Navire hydraulic pump sets will be installed to supply power for operating the covers.

For further information and free literature from MacGregor-Navire,

Circle 103 on Reader Service Card

Damen Delivers First Of Two Twin-Screw Multipurpose Tugs To Abu Dhabi Petroleum Ports

The superstructure of the Caterpillar-powered Hamour is placed well forward to create a large work deck aft and sufficient space for the towing/anchor handling winch.

Damen Shipyards of Gorinchem, the Netherlands, recently delivered the first of two almost identical multipurpose tugs to Abu Dhabi Petroleum Ports Operating Company (ADPPOC).

The 147.6-foot-long by 42.6-foot-beam tug, named Hamour, recently successfully completed its sea trials. The vessel, of all welded steel construction, is suitable for the following tasks: berthing, anchor handling, firefighting, salvage, dive support, and hose flushing.

The complete design of the vessel, including the lines plan, construction and engine room arrangement, was done by Damen Shipyards based on specifications received from ADPPOC.

The Hamour is powered by two eight-cylinder Caterpillar 3608 TA engines with a maximum total output of 6,658 bhp at 1,000 rpm. The engines drive Lips controllable-pitch propellers via Reintjes reduction gears. The propellers run in Van der Giessen steerable nozzles. The steering gear is by means of four Sperry hydraulic cylinders and two hydraulic pumps. For optimal maneuvering, the tug is fitted with a Caterpillar diesel-driven, Pleuger bow thruster.

The tug, classed as a "Firefighting I" vessel, is equipped with Kvaerner Eureka fire pumps and monitors. Nautical/navigation and communication equipment includes Furuno echo sounder, radar and radio direction finder, and Sperry gyrocompass and autopilot.

The Hamour has accommodations for 17 persons. All floors, paneling and insulation are in accordance with SOLAS requirements.

For free literature detailing the facilities and capabilities of Damen Shipyards,

Circle 39 on Reader Service Card

MarAd Receives Title XI Application To Refinance 2 ITBs

The Maritime Administration (Mar Ad) has received an application from the General Electric Credit Corp. of Georgia, C/O General Electric Capital Corp., Stamford, Conn., for a Title XI guarantee to aid in refinancing, at a reduced interest rate, a portion of the existing Title XI obligation issued in connection with financing of two integrated tug/barge units (ITBs).

The ITB Julius Hammer was delivered on March 18, 1981, and the ITB Frances Hammer on September 16, 1981. Both were built at Avondale Shipyards, Inc., New Orleans, La.

If approved, the 15-year guarantee would cover the following portion of the outstanding Title XI guarantee: $15,797,257 for the Julius Hammer and $17,605,425 for the Frances Hammer.

Lokring Offers Free Literature On Low-Pressure Fittings

Lokring Corporation of Foster City, Calif., is offering free literature detailing its Lokring Class 200 fittings for low-pressure nonferrous pipe. The patented Lokring design employs a metal-to-metal seal and the company reports it is a cost-effective way to join thin-wall pipe onboard ship without brazing or welding.

Lokring claims it is the only mechanically attached fitting line with products approved by the U.S. Navy for use in flammable systems in fire-hazardous spaces.

The brochure also describes the portable, one-man installation tooling and power supply options. The fittings are NAVSEA and ABS approved and accepted by the U.S. Coast Guard.

For a free copy of the brochure,

Circle 4 on Reader Service Card

Five Trinity Industries Subsidiaries Team To Build LPG Barges

In what may be a record in shipbuilding teamwork, five subsidiaries of Trinity Industries, Inc., are cooperating in the construction of two 260-foot liquid propane gas (LPG) barges for Harvey Gulf, Inc., Harvey, La.

The barges will be constructed, erected, and painted at Gretna Machine and Iron Works, Inc., Harvey, with components manufactured on site along with elements from the following Trinity companies: Equitable Shipyards, New Orleans, La., sandblasting and preconstruction primer; Equitable Shipyards, Madisonville, La., automated panel line fabrication; Trinity-Beaumont, Beaumont, Texas, tank placement assistance; and Beaird Industries, Shreveport, La., manufactured LPG tanks.

Each barge will be fitted with two 213-foot-long independent Beaird LPG tanks with inside diameters of 16 feet 9 inches, and a working pressure of 266 psig (pounds per square inch gauge). Each barge can carry 15,000 barrels of LPG. The tanks will be shipped by rail from Shreveport to Beaumont because they are too large to negotiate some tight turns in the Louisiana railway system.

John Dane III, president of the Trinity Marine Group which includes 10 shipyards (Beaird is part of another Trinity segment), said the team effort is a good example of Trinity's efforts to hold down company and customer costs by reducing redundancy or duplication within its plants.

Both barges are expected to be delivered in the third quarter of 1992.

For free literature on the facilities and capabilities of Trinity Marine Group,

Circle 36 on Reader Service Card

L&C Associates Installs Dehumidification System Aboard USNS Mississinewa

L&C Associates of North Hampton, N.H., specialists in marine dehumidification systems, have recently completed the design and installation of a dehumidification system aboard the USNS Mississinewa in Norfolk, Va. The Mississinewa and four other Neosho Class Oilers are being placed in the Reserve Fleet as Avondale Shipyards continues the scheduled construction of 18 Kaiser Class Oilers.

Dehumidification is essential aboard the vessels of the Ready Reserve Fleet because maintaining relative humidity at or below 35 percent will inhibit moisture-induced corrosion. Dehumidification systems designed by L&C Associates utilize disiccant dehumidifiers and a spray applied moisture barrier to maintain the integrity of the dehumidified spaces. This combination of dehumidification and sealing will maintain the ship's present condition for the duration of the layup.

L&C's dehumidification system circulates dehumidified air to both the forward and aft deckhouses, machine space, pump rooms, cargo control areas, storerooms, ship service areas, and all refrigerated storage space.

After completing the installation of the dehumidification system, L&C technicians created a vapor barrier to prevent moisture from entering the dehumidified spaces through vents, skylights or hatches. All openings leading to the dehumidified spaces were sealed with PSS, a spray applied vinyl plastic. PSS is as effective as sheet metal blanks in keeping moist air from entering the dehumidified space. But since PSS can be installed more quickly and removed without any special tools, PSS greatly minimizes the cost of installation and subsequent reactivation.

L&C Associates is the leading provider of dehumidification and sealing systems to marine clients and has provided dehumidification systems for more than 120 clients for both military and commercial applications.

For further information and free literature from L&C Associates,

Circle 32 on Reader Service Card

The Oil Pollution Act of 1990

PRIMARY TASK OF REGULATORY ACTION FALLS TO THE COAST GUARD

By Rear Admiral Arthur E. Henn

Recent major oil spills have galvanized the 101st Congress into unanimously passing a major piece of legislation which had been under development for the previous 15 years. This legislation is the Oil Pollution Act of 1990 (OPA 90) (Public Law 101-380). Although OPA 90 will require regulatory action by several Federal agencies, its primary tasks fall to the Coast Guard. The Act's impact on both the regulated industry and on the regulating agency is going to be substantial.

The Act has numerous provisions which will profoundly change the way oil is transported in the U.S. trade. However, by far the most notable among notable provisions is the increase in liability for companies that handle, store and transport oil. Under certain circumstances, such as violation of law or gross negligence, the shipper's liability is unlimited. We have been advised that this provision can and probably will cause some shippers to abandon the U. S. trade.

In addition to increasing liability, the Act establishes the use of a Federal trust fund for financing cleanup operations; imposes response planning and execution responsibilities on government entities, as well as owners and operators of vessels and shoreside facilities; and mandates new prevention measures involving vessel construction and operation. As complex as these federal requirements are, there is the potential for even greater complications. OPA 90 does not preclude individual states from prescribing their own regulations in certain areas. In fact, various states have already enacted legislation similar to OPA 90. Because of the potential for a patchwork of nonstandard requirements among the coastal states, some of them have cooperated to form a task force to coordinate their regulatory requirements not only among themselves but with the Federal government.

For the last 25 years the Coast Guard has been actively involved with many environmental issues regarding tanker safety and pollution prevention. Since OPA 90 enactment, the USCG has intensified action on these issues by initiating a vigorous effort to comply with the requirements in OPA 90. The Coast Guard is developing approximately 80 regulatory projects, studies and reports covering pollution prevention, response, compensation, and liability.

Rear Adm. Arthur Eugene (Gene) Henn
Chief Office of Mairne Safety & Environmental Protection, U.S.Coast Guard

The Coast Guard has made several organizational and operational changes to be responsive to the Act. Two special staff elements have been established to facilitate OPA 90 implementation. A National Pollution Funds Center (NPFC) was established to develop and administer those parts of OPA 90 dealing with vessel financial responsibility and the Oil Spill Liability Trust Fund. A flag officer has been assigned as Commander. The NPFC moved from USCG Headquarters to permanent quarters in Arlington, in July 1991. A separate headquarters unit, the OPA 90 Staff, consisting of project managers, counsels, and editors, is writing regulations and overseeing and coordinating the multiple studies and reports. The Act is broadly focused and changes have also been made in the Federal oil spill response mechanism and system.

The USCG has the primary responsibility for Federal oil spill response in the coastal zone. It provides predesignated Federal on Scene Commanders and continually maintains manned facilities which can be used for command, control, and surveillance of oil spills. In addition, the Coast Guard now maintains two National Strike teams, one at Hamilton Air Force Base, San Francisco, Calif., and a second in Mobile, Ala. The strike teams are designed to airlift highly skilled pollution response experts and specialized oil cleanup equipment to the spill site to assist and advise Federal on-Scene Coordinators. To augment our ability to respond quickly to a spill, a third strike team is being established at Fort Dix.

With three response teams, we need a single control center to insure that they are uniformly trained and equipped. The control center will also coordinate activity among the teams. This control center is called the National Strike Force Coordination Center (NSFCC). It is being established in Elizabeth City, N.C. Both will begin operation this summer.

Not every area in the nation will have immediate access to one of the strike teams, so the USCG is also improving its ability to respond to spills by establishing District Response Groups (DRG). These will be located in the 10 Coast Guard Districts. The District Response Groups will be able to marshal all USCG resources (personnel, vessels, aircraft, etc.) within one district. The DRG will be a quick reaction, pollution response team to provide a first line of defense against spills until a major contractor can arrive on the scene. This effort may require revising USCG District Standard Operating Procedures to achieve a more coordinated USCG response and provide better access to USCG assets/resources during spill incidents.

While it is critical to have trained teams able and ready to respond immediately to a spill, it is just as essential to have response equipment stockpiled in strategic locations where it is most likely to be needed. Accordingly, the Coast Guard has identified 19 sites where equipment will be stored. The equipment includes containment booms, vessel-of-opportunity skimming systems, portable barges to hold collected oil, and associated pumps and ancillary equipment.

To make effective use of these new response capabilities requires extensive planning before a spill actually occurs. Major areas of contingency planning include prevention, cleanup, compensation, and restoration. Under OPA 90, oil spill contingency and response planning has shifted from a voluntary or limited responsibility to a major regulatory requirement for owners/operators of mobile and stationary oil-related facilities. The USCG and EPA have been cochairing monthly meetings of the National Response Team (NRT) to draft a revised National Contingency Plan by the Fall of 1991. The NRT primarily assists member agencies, coordinates their preparedness planning and response to prevent any duplication, and facilitates support of all emergency response actions.

One of the major tasks facing the Coast Guard is to write regulations necessary to implement all of the provisions of OPA. There are several extremely important regulatory projects which are high priority for rapid completion. To prevent the likelihood of an oil spill, OPA 90 requires that new tankers and tankers undergoing major modifications be fitted with double hulls versus single hulls. Right now single hull vessels constitute a majority of the ships in service. Existing tankers must be retrofitted according to a schedule that began in July 1990, and all tankers must be in compliance by 2015. However, the law does not specify the design criteria that will constitute a double hull. Details such as this will be covered by rulemaking.

ment OPA 90 requirements for double hull construction on tank vessels began in August 1990. Because the public was unable to wait for completion of the rulemaking process, the USCG issued Navigation and Vessel Inspection Circular No. 2-90 on September 21, 1990, to provide industry with interim guidance on double hull standards until final regulations can be issued. A Notice of Proposed Rulemaking was published in the Federal Register on December 5, 1990. The final rulemaking will define the protective spaces that will constitute a double hull.

The Coast Guard is also working to publish final rules by August 1992 concerning response plans for both vessels and facilities. This is an important rulemaking because operators may not continue in business if they have not submitted plans to the Coast Guard for approval within six months after the rules are published.

These and more than forty other rulemakings are going to be published in the Federal Register. Many of the more important rules will be the subject of either public hearings or workshops. At the public hearings interested parties may express their views on the proposed rules. At workshops the Coast Guard will be exploring possible solutions to specific problems in a give-and-take format. All rulemakings will be available for written comment. The number of people who will want to comment on these regulations is expected to be substantial. In order to facilitate the comment process and to generally keep interested parties informed, the OPA 90 staff is developing a mailing list. When proposed rules are published in the Federal Register, they will also be sent to people on the mailing list. Anyone interested in being added to the list can write to **Bruce Novak**, U.S. Coast Guard Headquarters, room B110, 2100 Second St., SW, Washington, DC 20593-0001.

While we have been busy domestically, no effort to curb pollution can be effective without international cooperation. In fact, with so much of the tanker fleet under foreign flag, it is essential that the Coast Guard act aggressively to include the world community in the pollution prevention effort.

The USCG is working with the International Maritime Organization (IMO) to implement additional measures to minimize pollution of the oceans and rivers of the world. IMO is the arm of the United Nations which establishes rules for vessel operation and construction worldwide.

In July 1991, the IMO Marine Environment Protection Committee (MEPC) met in London and discussed alternative tank vessel designs to double hulls. The MEPC decided to study this issue which will primarily focus on the mid-deck design. A planning meeting was recently held in London to discuss the study. The United States was a major contributor to the planning process. The study is scheduled to be completed by the end of 1991.

The National Academy of Sciences (NAS) conducted a study designed to evaluate alternative tank vessel designs and operational requirements that may provide protection equal to, or greater than, double hulls. The NAS report, titled, *Tanker Spills: Prevention by Design*, was published in February 1991, and is currently being reviewed. The NAS report and the input from IMO described above will have a significant impact on the Coast Guard's evaluation of measures which may be developed as potential equivalents to double hulls.

In addition to tanker design, the Coast Guard is studying the need for safer port operations. The Office of Navigation and Waterways Services at USCG Headquarters evaluated systems and port requirements in the Port Needs Study. The study, which will be provided to members of Congress in August 1991, focused on major ports in the United States to determine the need for Vessel Traffic Service (VTS) systems.

One of the concepts which appears repeatedly in OPA 90 is the need for cooperation among interested parties. The act requires cooperation among government agencies and establishes committees that involve local citizen's groups in planning and response activities. One of these cooperative requirements is for an interagency Coordinating Committee which will bring the Research and Development (R&D) resources of all the Federal agencies together. The Committee, comprising 13 government agencies, is chaired by the USCG. The initial efforts of the Committee have been to complete an implementation plan. A draft of the implementation plan is completed. Title VII authorizes funding of approximately $27 million for regional grant programs, demonstration projects, and R&D projects. The goal is to enhance the state-of the-art in spill prevention, spill response management, spill response, fate and effects of oil, restoration, and rehabilitation.

To date, the USCG has committed a considerable amount of its resources, both financial and physical, to implement the requirements of OPA 90. For the future, we can expect permanent changes in the way oil industry operates and is regulated; ocean and rivers should experience environmentally beneficial impacts; creation of new technologies will help prevent and respond to oil spills.

Editor's Note: Rear Admiral Henn was recently named Chief, Officer of Marine Safety, Security and Environmental Protection at Coast Guard Headquarters in Washington, D.C. Prior to this assignment, Admiral Henn was Commander of the Maintenance and Logistics Command, Atlantic.

OPA Spawns New Opportunities To Develop Systems And Equipment For Oil Spill Control

By Theodore A. Ulrich, Partner Cadwalader, Wickersham & Taft

The Oil Pollution Act of 1990 has spawned much debate over double-hull construction and the liability of "responsible parties"; however, a large portion of the act deals with the containment and prevention of spills, primarily as a result of new equipment and manning requirements and improvements, as well as contingency planning. Thus, an opportunity exists for marine suppliers and manufacturers to provide assistance to vessel owners and operators in meeting these provisions and in developing further enhanced pollution containment and cleanup equipment.

Unfortunately, as a result of the act's preservation of the authority of the various states to enact their own statutes, additional requirements—some of which may be inconsistent—will undoubtedly be enacted by various state legislatures. broad-based contingency plan with multiple regional response centers in Texas with stored oil spill fighting equipment and an audit staff for policing private company contingency plans, which would be in addition to the Federal review.

Drug Testing Of Crew Members

As a result of press coverage, we are all aware of the act's enhanced provisions dealing with alcohol and drug abuse, criminal records, and DWI convictions. Many of these provisions—issuance and periodic renewal of licenses and documents, accident or casualty investigation—all under its current chemical drug testing program, which requires, among other tests, the random testing of certain crew members. Although the drug testing program started some time ago, there may be an opportunity for additional contractors to be employed by the owner/operators with respect to this testing program. The drug testing program is set forth in 46 CFR Part 16 whereas the procedures of collection and testing are contained in 49 CFR Part 40.

Manning Standards

As a result of criticism of the manning and work load level on major spills, several provisions were included in the act as to manning standards, crew size, and training. These were combined with a mandated study to evaluate navigation equipment, electronic position-reporting and identification systems, and inspection standards (Sections 4106, 4111 and 4114 of the act). At least one computer simulator course for training has been established at CAORF at the U.S. Merchant Marine Academy regarding oil spill response and cleanup. Other training courses by simulator, videotape or other means may be needed to bridge the gap for currently licensed officers and crew as well as the establishment of such training courses for students at the U.S. Merchant Marine Academy and state maritime schools.

Mandatory Equipment

The act has also made several specific provisions for mandatory equipment, although some vessels may already be so equipped. It provides for overfill and tank level or pressure monitoring devices on all vessels, foreign or domestic, to be installed within one year (Section 4110). It also requires that all vessels subject to the Vessel Bridge-to-Bridge Radio Telephone Act (33 USC 1203), including foreign vessels, have the capability to receive navigational safety information from the U.S. Coast Guard and others, which is apparently not now the case (Section 4118). Regulations to implement this requirement have not yet been issued; however, certain retrofitting of even existing equipment may be required in order to comply.

Oil Spill Contingency Planning

The Oil Pollution Act of 1990 established multiple layers of contingency planning and supervision of removal or cleanup operations. While it can be argued that the act does little to clear-up the confusion and inefficiency of such removal and cleanup operations, it is these provisions which may most affect marine suppliers and equipment manufacturers. Each of the levels of contingency planning—Federal, Area/Regional, State (coordinating with others, and as a result of the preservation of authority to the states) and owner/operator--is collecting equipment for utilization in any future spill. Their response may be exacerbated by the public criticism over the "late and inadequate" response to the Valdez oil spill. However, given the series of spills within a short period of time several months later on, as well as the potentially vast amounts of equipment which may be needed for a large spill, such stockpiling may not be unreasonable.

The act provides for the establishment of a National Contingency Plan for the effective and immediate removal of any discharge into navigable waters or an adjoining shore, the exclusive economic zone or affecting natural resources. If a substantial threat (size or character) to the public health and welfare (including natural resources) exists, then the President, through such National Contingency Plan, must direct all Federal, State or private Unit. The potential for area concerns and national concerns to be divergent is readily apparent.

In addition to the above plans, each tanker vessel trading to the U.S. must also have its own approved contingency plan for removal, "to the maximum extent practicable," of a worst case discharge or threat thereof. This plan must be consistent with the National Contingency Plan and the Area Contingency Plan (and any state plan) and demonstrate training as well as the availability of personnel and equipment to accomplish the plan. While pending approval of a submitted plan, an owner may trade up to two years if he certifies that he has a commercial contract which will achieve the same result as his plan. The phrase "maximum extent practicable" allows for the consideration of technological limitations as well as the practical or technical limits of a particular owner/operator's response capability. However this also allows for considerable upgrading and development of suitable equipment by the manufacturers. The extent to which there will be equipment development is difficult to predict at this time.

Onboard Removal Equipment Required

Within two years after enactment, the act provides for the additional requirement that vessels carrying oil or hazardous substances in bulk must carry onboard "appropriate removal equipment that employs the best technology economically feasible and that is compatible with the safe operation of the vessel" (Section 4202). It is not known what precisely will be required. However, booms or dispersants may be acceptable. The vessel owner/operators and equipment suppliers will need to work with the administration to reasonably define this equipment as well as provide for proper training to make it effective.

Further the above provision provides for the establishment after two years of "periodic inspections of containment booms, skimmers, vessels and other major equipment" used in oil spill removal (Section 4202). Whether this will result in the establishment of "servicing" type facilities, akin to those for life rafts, cannot be determined at this time.

As a result of the Oil Pollution Act of 1990, there are thus substantial opportunities for the marine industry's equipment and services manufacturers and suppliers to provide the additional equipment, as well as to improve upon that currently available, to help clean up oil spills.

ONE FROM 3.MAJ: Jan Michalewsky (left) of the Chinese-Polish Joint Stock Co., Shanghai, China, shaking hands with **Sanjin Kajba**, director, 3. Maj Shipbuilding Industry, Rijeka, Yugoslavia, at a recent ceremony for the delivery of the multipurpose vessel M/S Szymanowski. Seated is **Wang Chu Bin** of the Chinese-Polish Joint Stock Co. The 22,000-ton Szymanowski has an overall length of 557 feet, breadth of 45 feet and design draft of 30 feet. The Polish-flag ship will be powered by a 3.Maj-built Sulzer 5RTA 62 diesel, rated at 12,739 hp at 109 rpm.

Dean Burch

Dean Burch, director general of the International Telecommunications Satellite Organization (INTELSAT) since 1987, recently passed away at his home in Potomac, Md., after a long illness.

Among Mr. Burch's accomplishments are his liberalization of INTELSAT policies to speed the establishment of separate satellite systems in furtherance of U.S. policy goals, and arranged the organization to compete better with fiber-optic cable and to face an international market.

Rauma Launches 1,400-Berth Liner For Sally Line

Finnish builder Rauma Yards Oy recently christened and launched a 1,400-berth cruise liner at its Rauma yard for Sally Line.

Christened the Sally Albatross by Ms. **Auli Rahkamo**, wife of Helsinki city manager **Kari Rahkamo**, construction has moved at a quick pace due to the yard's advanced building techniques and the fact that the main engines, propulsion system and other equipment was utilized from the previous Sally Albatross. Delivery is scheduled for February 1992.

The Sally Albatross will have an overall length of 525 feet, breadth of 82 feet, draft of 18 feet and speed of 21 knots. The steel hull will be specially strengthened for ice navigation and she will comply with the regulations and classification of Det norske Veritas.

The cruise liner will have a total of 55 passenger cabins, most with a sea view and some with their own balcony, public areas covering 5,400 square meters, including four restaurants, a conference section seating 450, a night club accommodating 600, a casino, saunas and a hospital.

For free literature detailing the shipbuilding facilities of Rauma Shipyards,

Circle 98 on Reader Service Card

Free Literature Offered On Environmentally Safe All-Purpose Cleaner

Six years ago, the Electric Boat Division of General Dynamics Corporation set, as one of its goals, reduction in the use of toxic chemicals.

After receiving a sample of Simple Green, a nontoxic, nonflammable and nonabrasive cleaner, and conducting several test applications, GD began using the product for some parts cleaning and for cleaning of interior ship hull areas.

The manufacturers of Simple Green, Sunshine Makers Inc., Huntington Harbor, Calif., claim that protective clothing and additional ventilation are unnecessary when using it as a cleaning and degreasing agent.

Simple Green, according to its makers, is a nontoxic, biodegradable, phosphate-free liquid all-purpose cleaner, containing a blend of synthetic high-grade penetrants. Surfactants are added to saponify oils and grease for through rinsing and prevention of redeposition of contaminants. Simple Green is water-based, contains no petroleum and is nonflammable.

A free literature package on Simple Green with technical data and safety information as well as product usage is available from Sunshine Makers. For a copy,

Circle 91 on Reader Service Card

Saint John Shipbuilding Delivers HMCS Halifax

The first new combatant in 20 years recently joined the Canadian Navy as the Department of National Defense took delivery of the HMCS Halifax. The Halifax is also the first warship in history to use a distributed computer architecture.

Saint John Shipbuilding Ltd. in St. John, New Brunswick, built the 4,750-ton Canadian Patrol Frigate. Paramax Electronics Inc. of Montreal performed the system integration. Paramax is a subsidiary of Unisys.

A revolutionary feature of the ship is the use of a distributed computer network to control sensors, weapons, communications, navigation and machinery. Thirty computers are spread throughout the ship. If the ship takes battle damage, the network automatically reconfigures itself to avoid damaged components. Thus, one unlucky hit will not destroy the ship's electronics.

The ship carries a helicopter hangar and will initially support Sea King antisubmarine helicopters. Eventually they will be replaced by EH-101 helicopters.

The propulsion plant uses a pair of General Electric LM 2500 gas turbines, backed up by a Pielstick diesel. All are cross-connected to the reduction gears.

For free literature on the facilities and capabilities of Saint John Shipbuilding,

Circle 38 on Reader Service Card

Hyundai Wins Contract To Build Eight 85,000-Dwt Tankers For Venezuela

The Venezuelan state-run oil company PDVSA has awarded a $496 million contract to build eight 85,000-dwt tankers to Hyundai Heavy Industries, South Korea. This is part of an overall renovation of the company's fleet, which will cost an estimated $1.3 billion.

Mitsubishi Corp. will provide financing of the deal, which is to be fulfilled by mid-1994.

MHI To Build High-Speed Catamaran Hydrofoil With Diesel Engines

Mitsubishi Heavy Industries, Ltd. (MHI) has received an informal order for what is described as the world's first super high-speed catamaran hydrofoil powered by high-speed diesel engines. This informal order was made by a Japanese company which will be established jointly by local governments and the private sector soon.

This is Japan's first domestically developed super high-speed catamaran hydrofoil and marks MHI's first super high-speed passenger ship. The ship will be delivered in March 1993.

The hydrofoil craft, called the Mitsubishi Super Shuttel 400, is one of the largest in the world with a capacity of 350 passengers. The 350-ton catamaran type ship, with an overall length of about 111.5 feet and a breadth of 36 feet, has a maximum speed of 40 knots per hour. An aluminum alloy is used for the hull to reduce the weight of the ship.

This craft will provide high-speed transportation between Japan's mainland and the Okinoshima Island in the Japan Sea, replacing a 350-passenger, 25-knot ship currently in service.

The catamaran allows a wider hydrofoil, which provides greater lift force, and makes the use of diesel engines possible. Compared with gas turbine hydrofoils, according to MHI, diesel engines offer a considerably lower construction, maintenance and operational costs.

The Mitsubishi Super Shuttle 400 is equipped with four high-speed diesel engines. The lightweight, high-power "S16R-MTK" engine, with a power output of 2,850 hp, was developed by MHI. Two engines, installed in each hull of the catamaran, drive waterjets. The catamaran also has high stability in bad weather conditions.

For free literature detailing the facilities and capabilities of MHI,

Circle 50 on Reader Service Card

American Commercial Asks Title XI For 8 Tank Barges And 50 Hopper Barges

The Maritime Administration has received an application from American Commercial Lines, Inc., Jeffersonville, Inc., for a Title XI guarantee to aid in financing the construction of eight tank barges and 50 hopper barges

The vessels will operate on the inland river systems and on the Mississippi River and its tributaries and the Gulf Intracoastal Canal. The proposed builder is Jeffboat Division of American Commercial Marine Service Co. of Jeffersonville.

If approved, the guarantee, which would have a term of up to 25 years, would cover a maximum $11.3 million of the estimated actual cost of $15.3 million..

Contracts To Operate Two Research Vessels Awarded By U.S. Navy

The U.S. Navy recently announced that it has chosen two oceanographic institutions to operate its next two oceanographic research ships.

The Scripps Institution of Oceanography, La Jolla, Calif., will operate one ship, called AGOR-24, for the University of California system.

Woods Hole Oceanographic Institution, Woods Hole, Mass., will operate the other, AGOR-25.

The two vessels are scheduled for full operation in late 1994 and late 1997, respectively.

AGOR-23, the first ship of a similar design, was awarded to the University of Washington in Seattle in November 1987. AGOR-24 and 25 are the second and third research ships procured under a plan to replace the aging and technologically

Marine Preservation Group Commits $270 Million To Fight Oil Spills

The Marine Preservation Association, an oil industry trade group, announced that it has committed $270 million for the purchase of equipment to fight oil spills.

The funds will cover operating and capital expenditures of the group, a nonprofit corporation based in Washington, D.C.

The $270 million includes equipment and 16 offshore response vessels for five regional catastrophic oil spill response centers near New York, Miami, Lake Charles, La., Port Hueneme, Calif., Seattle and other staging areas.

Each regional center is designed to respond to a catastrophic spill of about 200,000 barrels. Regions will support each other to respond to larger spills.

ASRY To Add Two New Docks En Route From US East Coast

Arab Shipbuilding and Repair Yard Co. (ASRY) recently announced an acceleration of its expansion plan by seeking a Panamax floating dock which would be commissioned well ahead of the new graving dock which had been delayed by hostilities in the Gulf.

Now ASRY has acquired not one, but two Panamax floating docks which will shortly begin their voyage from the U.S. East Coast to Bahrain in the Arabian Gulf. Arrangements to bring the new docks into service will be expedited and they are expected to be ready to receive the first vessels early in the new year, substantially improving the yard's capacity which is now based on one 500,000-dwt graving dock. This new investment will amount to about $55 million.

Hans Frisk, who joined ASRY as general manager and chief executive for Karlskrona of Sweden late last year, is pleased with the added capacity in the yard and is looking forward to further developing ASRY to handle more and more of the large repair specifications for aging vessels which have already become a staple of the yard's work load

For further information on facilities and capabilities of ASRY,

Circle 34 on Reader Service Card.

Sigma Coatings
The Complete Choice

BELOW THE WATERLINE

The build up of marine life on a ship's hull can greatly reduce its operational efficiency. As a result of extensive research, Sigma now produces a comprehensive range of antifouling paint systems designed to prevent fouling, thereby minimising roughness and improving the hydrodynamic efficiency of the hull through the water.

The Sigmaplane line has four premium self-polishing antifoulings, each suited to particular operational characteristics. The Sigma Pilot line is a contact leaching longlife antifouling system, while the Classic line offers traditional antifouling formulations providing ship owners with economical fouling prevention.

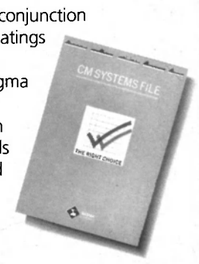
All three lines have an 'Ecol' version which complies with the latest environmental regulations.

ABOVE THE WATERLINE

Boottops, topsides, superstructures and decks not only have to look good but must also withstand the rigours of impact, abrasion, weather and extremes of temperature.

Sigma Coatings has perfected a range of paints to meet all these requirements. Based on Sigma CM Coating, a chemically modified, high-build recoatable epoxy, the Sigma CM system provides excellent durability with unlimited overcoating intervals.

When used in conjunction with specialised coatings such as Sigma EP Multiguard and Sigma EP Glassflake, this remarkable system ensures that vessels look their best and perform to the highest possible standards.



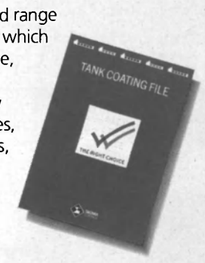
TANKS AND HOLDS

Each year the chemical industry continues to develop more and more products which may need to be shipped in bulk or as parcels in chemical/product carriers.

Sigma Coatings is continually monitoring new products to ensure that it can offer the most suitable tankcoating system for every eventuality.

The 5 Sigma tankcoating systems, developed from an in-depth knowledge of owners' requirements, are designed to provide the perfect solution to every problem, from the transport of dry bulk foodstuffs and mild chemicals, to the constant shipment of highly aggressive chemical cargoes in a variety of sequences.

This specialised range of products, all of which are isocyanate-free, includes phenolic epoxies, optimally crosslinked epoxies, high-build epoxies, solvent-free epoxies and inorganic zinc silicates.



Comprehensive files on the Sigma Coatings specially developed for each area of a vessel are now available.

SIGMA COATINGS

Sigma Coatings
8979 Market Street, Houston, TX77029
Tel: (713) 672 1175 Fax: (713) 672 1418

THE RIGHT CHOICE

Circle 253 on Reader Service Card

Homeport Marine Converts Supply Vessel, Launches King Crab Boat

Homeport Marine Services, Inc. of Moss Point, Miss., recently completed the conversion of the 212-foot supply boat Veesea Sapphire to a standby/rescue boat with supply capabilities, and launched a 160-foot crab boat.

The Veesea Sapphire was delivered to Seacor Marine of Morgan City, La. This conversion work represents Seacor's intention to mobilize 10 of its vessels operating in the U.S. Gulf of Mexico and coastwide trade to the North Sea. The boats will serve under contract with Conoco UK.

Seacor president **Glen Fornell** characterized the conversion work as extensive. The vessels will comply with the latest rules applying to boats engaged in North Sea "safety" service and will be capable of meeting the regulations for 250 survivor-class boats. A two-tiered extension was fitted to the deck aft of the pilothouse to accommodate survivors with bunks, treatment facilities and seating. The vessels are designed with port and starboard rescue zones to facilitate recovery from the sea. Bridge wings were extended for visibility and joystick controls installed to improve maneuverability. Where necessary to provide protection from weather, the bows have been raised and the pilothouse lifted. Each vessel has been equipped with two British-made 15-man Fast Rescue Craft (FRCs) cradled in rapid launching davits. There were also extensive modifications to the pilothouse and the crew quarters

Seacor Marine's M/V Veesea Sapphire after being converted to a standby/rescue boat with supply capabilities by Homeport Marine Services, Moss Point, Miss.

In an effort to support Conoco as a leader in safety, Seacor's conversion design and vessel modifications are intended to insure seaworthiness under the harsh conditions prevailing in the North Sea, particularly during the winter, and are also intended to provide a safe and comfortable environment for survivors. These vessels meet the requirements of ABS, USCG, and the British Department of Trade and Industry.

Conversion work on two additional boats for Seacor is scheduled to begin and, in addition to this conversion work, Homeport currently has a 152-foot vessel under construction scheduled for delivery in late 1991.

The 160-foot-long by 38-foot-beam all-steel king crab boat recently launched by Homeport Marine will participate in the North Pacific and Alaska crab fisheries.

The vessel is powered by two Caterpillar 3508 diesel engines rated at 905 hp each with Twin Disc 540 reduction gears. Electrical power is furnished by three 350-kw CAT 3406TA generators. The vessel, being built in accordance with ABS loadline requirements, has quarters for 27 crewmen.

Homeport Marine is a local and privately owned company located on a 17-acre site next to the Escatawpa River in Moss Point.

For free literature giving complete details on the facilities and capabilities of Homeport Marine,

Circle 51 on Reader Service Card

Aqua-Chem Offers Brochure On Shipboard Overhaul And Repair

Aqua-Chem, with over 30 years of proven experience, is the only major U.S. desalination plant manufacturer providing shipboard overhaul and repair.

Aqua-Chem provides service from two new marine overhaul/repair centers—one located in San Diego, Calif., and the other in Norfolk, Va. Or, representatives will travel anywhere in the world to supervise repairs or prepare recommendations for your overhaul/repair work.

For more information and free literature on the full range of services provided by Aqua-Chem,

Circle 29 on Reader Service Card

Reasons for repair at Astilleros?

We stick to Repairs
At Astilleros we're proud of a growing inflow of conversions.
But repair is -and will always be- our main daily concern.

Four yards to choose
Cadiz, Astano-Ferrol, Santander and Bilbao.
Nine dry docks or floating docks, and capacities up to 400,000 dwt.

Strategic locations
Covering your lanes on the Atlantic, the Bay of Biscay or the Mediterranean.

Non-stop work
Our industrial flexibility allows us to comply with your tightest schedules, working 24 hours a day.

ASTILLEROS ESPAÑOLES

For further information
Padilla, 17
28006 Madrid, Spain

Tel. (341) 435 78 40
Telex 27648 ASTIL-E
Fax (341) 576 29 56

Circle 202 on Reader Service Card

The Shipbuilders of Spain

Three profit makers for your marine business

Flexibility is the key to profitability in the marine business today.

The Wärtsilä Vasa engine range offers you just that - from initial engine room design to everyday operation. And allows you to operate on any fuel - from MDO to the lowest-grade heavy fuels, and even natural gas.

Already the hundreds of Wärtsilä Vasa 22, 32 and 46s installed worldwide are saving their owners time, space and money. To find out more about how Wärtsilä Vasa engines can do the same for you, give us a call.

WÄRTSILÄ DIESEL

Circle 331 on Reader Service Card

Wärtsilä Diesel Oy
P.O.Box 244, SF-65101 Vaasa, Finland
Telephone +358-61-242 111, Telex 74250 wva sf, Telecopier + 358-61-171 906
(For the Wärtsilä Vasa 22 and 32 engines)

Wärtsilä Diesel Oy
Stalarminkatu 45, SF-20810 Turku, Finland
Telephone +358-21-643 111, Telex 62640 wdt sf, Telecopier +358-21-643 169
(For the Wärtsilä Vasa 46 engines)

Wartsila Diesel Inc., Route 5, P.O. Box 116 B, Chestertown, Maryland 21620, Telephone +1-301-778 9100, Telex 810-9516386 wartsila marr, Telecopier +1-301-778 9107

Textron Marine Awarded Army LACV Overhaul Pact With $8 Million Potential

Built by Textron Marine Systems, LACV-30s accommodate a wide variety of payloads and can be disassembled for transport by truck, rail, aircraft or ship.

A multiyear contract has been awarded to Textron Marine Systems (TMS), New Orleans, La., by the U.S. Army Troop Support Command (TROSCOM), St. Louis, Mo., to repair and overhaul the Army's fleet of LACV-30 hovercraft stationed at Fort Story, Virginia. The contract with options has a potential value of over $8 million.

The work will primarily be performed at Ft. Story by Textron Marine Systems Virginia Beach Operations where spare parts are manufactured and other overhaul operations conducted. The company is headquartered in New Orleans, La.

Built by TMS, the 76-foot-ton LACV-30s move rapidly across water, land, snow, ice, marshes and low brush, through 8-foot surf and over 4-foot obstacles.

One of North America's largest designers and builders of air cushion vehicles, TMS, Division of Textron Inc., offers a complete support system for their products, such as the LACV-30s and the U.S. Navy's Landing Craft, Air Cushion (LCAC), which includes maintenance, technical assistance, training of operators, repairs and spares, and detailed operation and maintenance manuals.

For free literature on Textron Marine Systems,

Circle 6 on Reader Service Card

Aker Omega Awarded Offshore China Project

Aker Omega, Inc., Houston, Texas, a division of Aker Engineering a.s. of Oslo, has been awarded the next phase of development by Amoco Orient Petroleum Company and Nanhai East Oil Corporation, a subsidiary of the China National Offshore Oil Corporation, as the project management and general engineering contractor of the Liuhua 11-1 Field Development. The field is located 120 miles offshore the People's Republic of China in approximately 1,000 feet of water. The field will be developed to produce heavy crude oil with very little associated gas.

MarAd Awards Contract Worth $1.1 Million To AK Engineering

The Maritime Administration (MarAd) recently awarded a $1,147,095 contract to AK Engineering, Chelsea, Mass., for the drydocking of and repairs to the Navy's aviation support vessel T-AVB Wright. The contractor has arranged to lease a drydock owned by the Massachusetts Water Resources Authority located at the Fore River Shipyard, Quincy, Mass.

The work will include painting the ship's hull, cleaning its tanks, and other repairs required by the American Bureau of Shipping and the U.S. Coast Guard.

MarAd maintains a select group of cargo ships known as the Ready Reserve Force (RRF) to meet surge sealift needs in the early stages of military contingency operations. It also maintains certain Navy-owned vessels, including the Wright, for the Navy in RRF-like status.

During Operations Desert Shield and Desert Storm, MarAd activated 78 of its 96 RRF vessels plus two Navy-owned ships, including the Wright, to support coalition operations.

The shipyard work on the Wright is expected to be completed within 21 days. American Overseas Marine, Quincy, Mass., manages the vessel for MarAd, and administers the contract on the agency's behalf.

With its self-stripping system, the VLCC Bloom Lake also features short loading periods and manpower savings.

Hitachi Zosen Delivers HZ-MAN B&W-Powered VLCC

The Ariake Works of Japanese shipbuilder Hitachi Zosen recently delivered the VLCC Bloom Lake to her owner, Golden Harvest Corporation. The vessel is a sister ship of the Sawako delivered earlier.

The 1,076-foot-long by 187-foot-breadth Bloom Lake is the first standard-type tanker with 280,000 dwt newly developed by Hitachi Zosen. It is designed to carry 2 million barrels of cargo oil and cruise with minimal resistance and high fuel efficiency.

Propulsion for the tanker is provided by an HZ-MAN B&W 6S80MC-type diesel engine with a maximum continuous output of 22,900 hp x 67.3 rpm, producing a speed of 14 knots. It uses a derated, low-speed, long-stroke, static-pressure supercharged engine, which makes significant fuel savings possible during operation. The main engine can be operated from the steering room through a microcomputer-equipped remote control system. Advanced automatic monitoring equipment is installed to permit automated cruising even when the engine room is unattended.

The vessel, which has a new, simplified hull structure that eliminates the center girder, is equipped with the Super Stream Duct, a nozzle developed by Hitachi Zosen, in front of the propeller and is fitted with a large bulbous bow below the waterline for better propulsion efficiency..

The Bloom Lake has a complement of 32 persons.

For free literature detailing the facilities and capabilities of Hitachi Zosen,

Circle 43 on Reader Service Card

Committee To Address Impact Of California Bunker Tax

A committee was recently formed to address the impact of the new California bunker fuel tax.

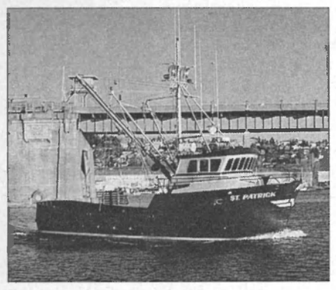
Called the Committee for Tax Exempt Bunkers, it will provide a forum for shipowners and bunker purchasers to air their views on the new tax, which affects all bunker deliveries in California. The Committee for Tax Exempt Bunkers will work closely with the Independent Refiners Association.

The law, which became effective July 15 of this year, will have a significant impact on several sectors of the marine community and ironically it has been the viewpoint of many observers that the new tax will result in a net loss of revenue to the state due to the detrimental effects on so many local industries.

The new tax will pose a financial hardship on suppliers and providers of ancillary services such as barge and trucking companies, ships' agents and related services. The law also might cause a rise in global bunker prices as production and sale of bunkers in California, the world's third largest bunker supply area, declines and increased demand in alternative supply areas forces levels up.

For further information on the new committee, contact: Committee for Tax Exempt Bunkers, C/O Trans-Tec Services, Inc., 580 California Street, Suite 2020, San Francisco, Calif. 94104; or fax: (415) 421-6690.

Fred Wahl Delivers Two Fishing Vessels To U.S. Owners



The Cummins-powered St. Patrick, delivered to a Seattle owner by Fred Wahl Marine Construction, was built to a Jensen Maritime Consultants, Inc. design.

Fred Wahl Marine Construction, Reedsport, Ore., has delivered two 58-foot combination fishing vessels to U.S. owners. Both vessels were built at the yard's former site in Depoe Bay, Ore.

The first boat, the St. Patrick, was delivered earlier this year to **Mark Anderson** of Seattle. She worked in the Sand Point, Alaska trawl fishery before returning to Seattle to prepare for the Southeast Alaskan salmon seine fishery this summer.

The second vessel, the Tradition, was delivered to **Doug Hoedel** of Kodiak, Alaska. She will seine for Kodiak salmon and spend the remainder of the year crabbing and longlining.

Each vessel has an overall length of 57 feet 9 inches, molded breadth of 19 feet, gross tonnage of 64 and fish hold capacity of 1,600 cubic feet.

The propulsion plant aboard each vessel consists of a Cummins KT-19 M, rated at 425 bhp at 1,800 rpm, a Twin Disc MG-516 reduction gear, with a reduction ratio of 4.5:1, Aquamet 19 shafting and 56-inch diameter four-blade bronze propeller. Generator sets consist of one 43-kw John Deere and one 12-kw Isuzu aboard the St. Patrick and two 55-kw Cummins and one 12-kw Isuzu aboard the Tradition.

Fishing equipment includes a Marco seine block and crab block aboard the Tradition and a Kolstrand seine block aboard the St. Patrick. Both are fitted with Pullmaster boom winches.

For free literature detailing Fred Wahl Marine Construction,

Circle 8 on Reader Service Card

U.S. Shipyards Receive Navy, USCG Repair, Maintenance Contracts

A number of small-, medium-, and large-sized yards around the country were recently awarded U.S. Navy, Coast Guard and Government ship repair and vessel maintenance contracts.

In the New England states, Providence, R.I.-based Promet Marine Services Corporation received a $116,557 contract for the technical availability on the Oliver Hazard Perry Class frigate USS Samuel B. Roberts (FFG-58).

In mid-America, National Maintenance & Repair, Inc., Hartford, Ill., will perform drydocking and repairs on the Coast Guard cutter USCG Obion (WLR-65503) under a $256,917 contract.

In the mid-Atlantic states, M&W Marine Services, Inc., Newport News, Va., received a $117,752 contract for vessel repairs. Also in Newport News, Davis Boat Works, received two separate contracts totaling $527,318 for vessel repairs to two LCMs.

Norfolk, Va.-based NORSHIPCO is repairing the USS Exploit (MSO-440) under a $1,146,182 contract.

Wilmington Shipyard, Inc., of Wilmington, N.C., received a $247,900 vessel repair contract for the landing craft LCM-8505.

Detyens Shipyards, Inc., in Mount Pleasant, S.C., is performing repairs on the U.S. Army vessel BD-6661 under a $180,159 contract. A separate contract worth $584,221 was awarded to Detyens for the drydocking and repairs of the USCGC Dauntless (WMEC-624).

In Florida, Sun State Marine Inc. in Green Cove Springs, received a $166,925 contract for drydock and repairs to the Coast Guard Primrose. The company is also performing work on the Coast Guard cutters Drummond, Key Largo and Metompkin under a $205,780 contract.

The Bellinger Division of Jacksonville Shipyards Inc. is performing a regular overhaul of the YOGN-113 under a $818,067 contract.

One of the Navy's hydrofoil missileship combatants, the USS Aries (PHM-5), is undergoing work at Runyan Machine & Boiler Works, Pensacola, Fla. The contract is worth $1,012,043.

On the West Coast, the San Pedro Division of Southwest Marine, Inc., in Terminal Island, Calif., received a $2,887,908 contract for miscellaneous hull, mechanical and electrical repairs and ship alterations on the frigate USS George Philip (FFG-12). The yard also received a $5,493,785 contract for similar type work aboard the amphibious transport dock USS Ogden (LPD).

Also located on Terminal Island, Al Larson Boat Shop was awarded a $1,521,859 contract for miscellaneous hull, mechanical and electrical repairs and ship alterations on the frigate USS Jarrett (FFG-33).

Pacific Ship Repair & Fabrication of San Diego received two separate contracts for work on aircraft carriers totaling $2,059,052. The USS Independence (CV-62) will undergo a restricted availability at the yard, while the USS Ranger (CV-61) is scheduled for a selected restricted availability. Continental Maritime has also received a $2,684,113 contract for similar work on the Ranger. Up the coast in San Francisco, Service Engineering Co. is performing a restricted availability on the ammunition ship USS Mauna Kea (AE-22) under a $118,504 contract. Continental Maritime of San Diego was awarded a $2,378,348 contract for the selected restricted availability of the destroyer USS Harry W. Hill.

NOAA Installs System To Measure Tides, Current In Tampa Bay, Fla.

Scientists with the National Oceanic and Atmospheric Administration (NOAA) recently installed the last in a series of instruments in Tampa Bay, Fla., that will provide integrated information on tides, currents and winds in the area.

The automated devices, the first of their kind anywhere in the country, are part of the NOAA's physical oceanographic real-time system, known as PORTS.

The instruments will combine current, water level and wind data and send the information by voice over the telephone or by computer modem for use by pilots, tug and towboat captains, environmental managers and recreational boaters.

According to the NOAA, the information can be especially important to pilots bringing ships into or out of the harbor. Knowing, for example, that water depths will be greater than normal can allow vessels to be loaded with more cargo.

In addition, according to Dr. **Hank Frey**, the project's director and chief of NOAA's Estuarine and Ocean Physics branch, the system can assist in search-and-rescue efforts and help predict the movement of oil spills.

"We estimate that PORTS will bring economic benefits of over $2 million annually to Tampa Bay," Dr. **Frey** said. He added the system would improve safety by reducing the uncertainties of traditional tide and current predictions, which can't take weather effects into account."

Real-time water level and wind data will be available at the Port of St. Petersburg, Port Manatee, Old Port Tampa and the Port of Tampa. Old Port Tampa will also have real-time current data. Real-time current and wind data will be available at the Sunshine Skyway Bridge.

The information will be collected centrally on a computer at the Coast Guard base at St. Petersburg, stored, and then disseminated.

NOAA's National Weather Service will also transmit the information over NOAA Weather Radio.

PORTS will undergo two months of testing before information will become generally available.

Boats & Barges

Winninghoff Completes Two New Deliveries—Fire/Rescue Boat And Aluminum Research Vessel

The research vessel R/V Caleta.

Fire/rescue boat Response FR-7.9.

Winninghoff Boats, Inc., Rowley, Mass., recently announced the delivery of a 26.5-foot fire/rescue boat, and a 25.5-foot aluminum research vessel.

The fire/rescue boat, Response FR-7.9, was delivered to the Hogansburg, N.Y., Fire Department to be operated on and around the Akwesasne Indian Reservation on the St. Lawrence Seaway. The boat's 40 mph top speed and remarkable maneuverability result from a Hamilton Jet 211 drive powered by a 330-hp Volvo gasoline engine. Outfitting features include a side dive door, tow post, enlarged foredeck with integral storage, bow ladder, and the following fire system: American Godiva GP-1600 fire pump with one 2.5-inch discharge aft, two 1.5-inch discharges and an Akron Apollo monitor forward.

Such specialized outfitting and operating characteristics yield a fire/rescue response capability that was designed entirely around fire department requirements. Like the other Response-Winninghoff fire/rescue boats, this one exhibits user oriented design and construction focused specifically on fire/rescue performance.

Rutgers University Institute of Marine and Coastal Sciences recently dedicated their new Winninghoff-built aluminum research vessel, the R/V Caleta, at their Tuckerton, N.J. Research Lab. The 25.5-foot by 11-foot boat will be used for coastal and estuarine studies off the coast of New Jersey, the Hudson River and Delaware Bay.

The R/V Caleta is powered by a Volvo AD 41A/DP, a 200-hp diesel driving a duo-prop outdrive. The I/O permits operation in as little as 18 inches of water. With a normal operating load, she has a top speed of 24+ knots.

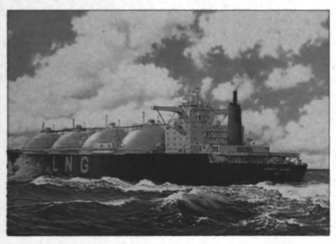
For free literature on the facilities and capabilities of Winninghoff Boats,

Circle 45 on Reader Service Card

Bender Awarded $4.5 Million Pact For T-AGS-40 Repair

Bender Shipbuilding & Repair Co., Inc., was recently awarded the drydocking, overhaul and repair of extensive engine room fire damage on the survey vessel USNS Tanner (T-AGS-40). The base contract amount is $4.5 million with a potential contract value of $5.65 million. The work is scheduled to take 120 days.

HHI Wins Order Worth $250 Million For LNG Carrier



Artist's conception of the 125,000-cubic-meter-capacity Moss type LNG carrier that will be built by Hyundai Heavy Industries.

South Korean builder Hyundai Heavy Industries, Co., Ltd., (HHI) recently signed a contract with A&P Shipping S.A., Panama, worth a reported $250 million to build the first Korean LNG ship.

This is the first of two Moss-type 125,000-cubic-meter-capacity LNG carriers awarded to Hyundai Shipyard. When delivered in March 1994, the ship will be operated by Hyundai Merchant Marine Co., Ltd. (HMM) to transport 1 million tons of Indonesian LNG per year over a period of 20 years, from 1994 to 2013.

The second ship, scheduled for delivery in March 1995, will be operated by Yukong Line Ltd. to carry 1 million tons of Malaysian LNG.

This is the first LNG carrier construction contract won by HHI and represents a major breakthrough for the company into a Japanese-dominated market.

To date, Korea has imported all its LNG—currently 2.5 million tons per year—via foreign-flag vessels on a CIF basis. The HHI deal follows a recent agreement by the Korean Government to extend its deal with Indonesia and Malaysian to double the country's import of LNG starting in 1994.

Since the 1970s, HHI has been working closely with companies such as Kvaerner Moss Technology of Norway and GAZ Transport and Techni GAZ of France in developing suitable large LNG tank designs.

HHI has already delivered a number of LPG/ethylene carriers since it first entered the LPG carrier market in 1986.

The Moss design 125,000 cubic-meter-capacity LNG ship will have an overall length of 899 feet, beam of 155 feet, depth of 87 feet and design draft of 36 feet. She will be fitted with four independent spherical tanks of nearly 131 feet in diameter.

The propulsion plant will consist of a steam turbine and two sets of Mitsubishi gas/oil dual burning marine boilers. The main turbine will be remotely controlled from the wheelhouse and centralized administration control center.

For free literature detailing the shipbuilding services of HHI,

Circle 7 on Reader Service Card

Exxon Strikes Tanker Charter Deal

Exxon Company International is near finalizing a deal to charter at least five tankers, all except one of which will be double-skinned and double-hulled.

According to reports, Exxon has struck a charter deal with Sanko Steamship of Japan and Neptune Orient Line of Singapore for three new Aframax-size tankers built at a cost of about $60 million apiece.

The charter plan calls for the construction of two 95,000-dwt tankers to be ordered against a charter guarantee by Sanko Steamship from Japanese shipbuilders Hitachi Zosen and Namura Shipbuilding Co., Ltd. Delivery of the vessels is expected to be in the fall of 1993.

Exxon is expected to take five-year charters on the ships, with an option for two years.

NOL is expected to order a similar size tanker for delivery in 1993 with similar charter period and rate conditions for Exxon. Another tanker will be built under the construction contract, if Exxon chooses to exercise an option.

Furthermore, another new similar size double-hull tanker owned by D'Alessia and an 86,803-dwt Yugoslav-flag single-hull tanker owned by Yugotankers will be chartered by Exxon.

According to an Exxon spokesman, the vessels would probably be used for the Atlantic Basin.

Industry And The Environment

Doing The Right Thing

BY
JEFFERY A. SMITH
VICE PRESIDENT —
PUBLIC AFFAIRS
THE AMERICAN
WATERWAYS
OPERATORS

The barge and towing industry's vessels have been serving the citizens of the United States since the 1600s. As America has grown, so has the barge industry, and as America's consciousness about the environment has grown, so has the sense of responsibility this industry feels for the environment. The coastal waterways and inland river systems are some of America's greatest treasures, and this industry is totally dependent on these precious resources for its livelihood. Common sense dictates that we protect and enhance the marine environment on which our future relies.

The oil spill in Prince William Sound in 1989 struck a fundamental chord in the American people. One can argue that the interest and goals of the environmental community have been embraced by the American people. The national imperative is to achieve clean air and clean water, and protect against further environmental degradation. Across the nation, the barge and towing industry is responding responsibly to that imperative.

Americans consume 17 billion barrels of oil a day. The barge and towing industry transports nearly 30 percent of America's petroleum and petroleum products - in over 4,000 tank barges. There are inherent risks in that transportation. But according to U.S. Coast Guard statistics, waterborne commerce is the safest and most regulated form of transportation and results in fewer accidental spills or collisions than any other form of transportation. This excellent record is directly attributable to tough operational safeguards imposed by the companies themselves, as well as strict federally mandated inspection standards.

The enactment of the Oil Pollution Act (OPA) of 1990, which combines for the first time in a comprehensive regime liability, cleanup, safety, hull configurations, penalties and other preventive measures, pushes the nation forward in the right direction of spill prevention and cleanup. The industry was involved in that process all along, guiding decision-makers to regulate and legislate sensibly and safely.

In response to OPA '90, the Towing Safety Advisory Committee formed a Subcommittee on OPA Implementation to assure a focused mechanism for providing the Coast Guard with data, information and advice on the wide range of regulatory projects the Agency is directed to pursue by OPA '90. Thus industry continues its contribution to the regulatory processes which will affect all marine transporters.

However, it is important to note that our environmental awareness predates the Valdez spill. We recognized that marine safety and environmental protection go hand in hand in 1986 when AWO established a Task Force on Vapor Emissions to intercept unguided state actions which didn't appropriately balance the two. This work resulted in safe, sensible symmetry among the provisions of the re-authorized Clean Air Act in 1991, state regulations establishing emission limitations and standards, and Coast Guard Marine Safety rules governing vapor emissions recovery.

These are all quantifiable accomplishments, but the real first step in change is a strong commitment. The tug and barge industry adopted a guiding set of environmental principles in December 1990. These principles solidify and articulate AWO member companies' commitment to policies and practices which will maximize marine safety and environmental protection. The principles emphasize prevention, planning, responsibility, safety, training, cooperation, and environmental stewardship.

However, the industry recognizes that intentions alone are not enough. A stated commitment must be followed by action to be effective. In 1989, AWO formed a Study Group on Marine Safety Issues, and as a result of the report of that group, the AWO Board of Directors last year formed several Working Groups to further assess industry operations. These working groups were charged with reviewing the way industry does business in a broad range of areas. One working group is involved in an in-depth examination of the critical issues of licensing, manning, training, watchstanding, pilotage and other issues. Another is looking carefully at the issues of vessel construction, maintenance, and operations. Still another is examining new technology in areas of navigation and communications equipment to determine their potential to enhance marine safety on towing vessels. Another working group is examining the pollution prevention benefits of overfill devices, tank/level pressure monitoring devices, periodic gauging, and examining the thickness of tank vessel hulls.

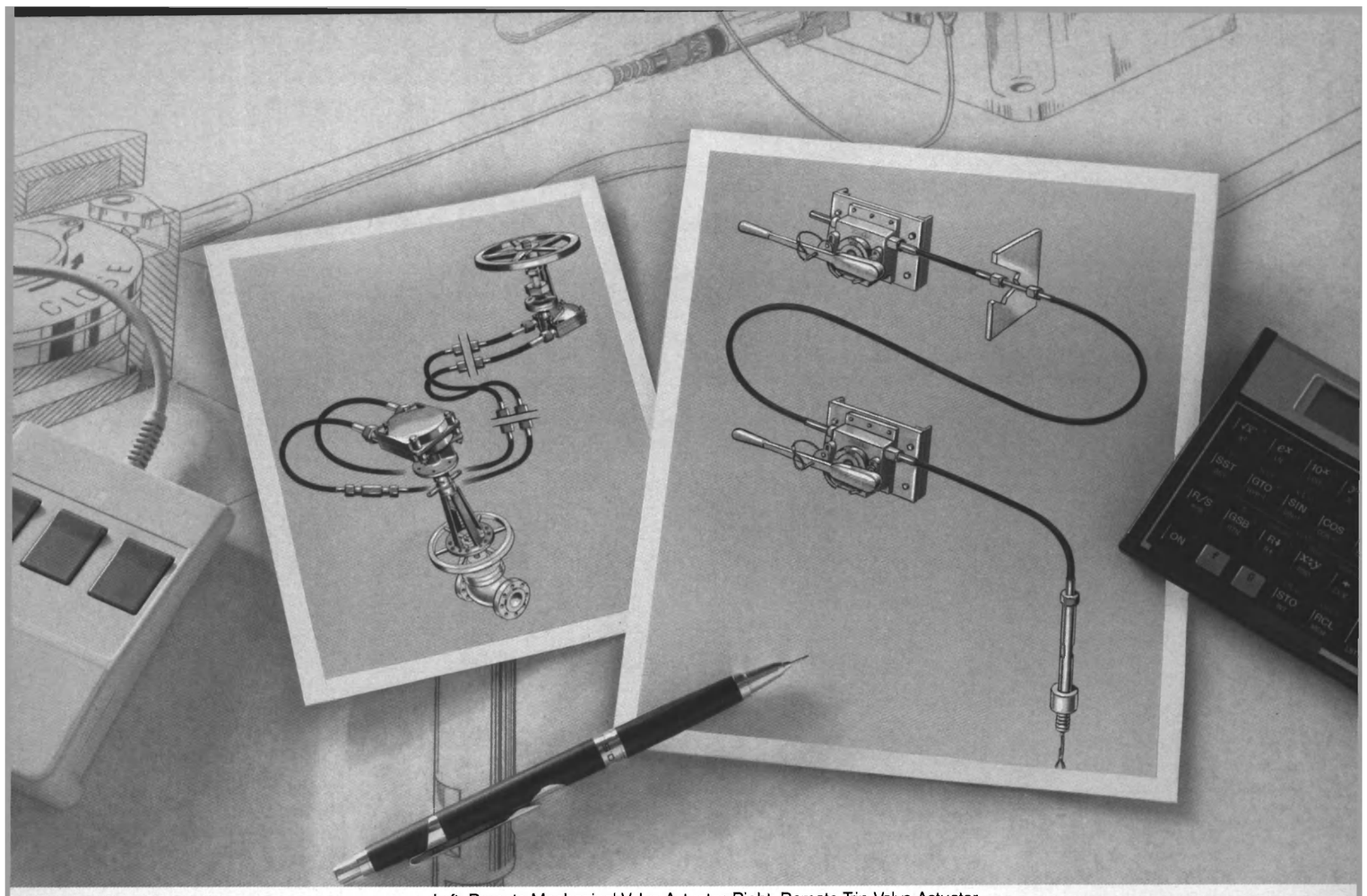
The findings of these working groups will be a central topic of discussion at the upcoming AWO Board of Directors Fall Convention, September 12 and 13, as the industry turns its attention to this all-important examination of its own operations.

Over the last few years, the barge industry has strongly supported ratification and start-up of Annex V of the International Convention for the prevention of Pollution from Ships to put a stop to the destructive practice of dumping garbage and plastics generated by vessels at sea. On March 1, 1991, the Coast Guard published a final rule on requirements for waste disposal which requires vessels to display a placard containing detailed information on the proper discharge of waste materials. AWO responded to this need by creating a *Protect Your Waterways* placard which not only meets the requirements of the no dumping rule, but strongly asserts the industry's commitment to protecting the waterways on which their businesses rely. To date, thousands of these placards have been distributed to industry vessels. The AWO placards state that "Clean Water Is Everyone's Responsibility" — a message towing vessels carry every day.

On the midcontinent rivers, officials of the U.S. Fish and Wildlife Service, EPA and state environmental agencies have been traveling aboard industry vessels periodically for two years, at the industry's invitation. This program has resulted in enhanced mutual understanding of both towing operations and environmental protection. With the assistance of the towing industry, the EPA has produced and distributed a videotape for the use of vessel personnel on how to avoid and mini-

"The Coastal Waterways and Inland River Systems are some of Americas greatest Treasures "

Jeffery A. Smith



Left: Remote Mechanical Valve Actuator. Right: Remote Trip Valve Actuator.

RMVA, and now RTVA Teleflex designs solutions for Remote Valve Operation

Engineering solutions aren't born. They're carefully designed. Consider RMVA, the Remote Mechanical Valve Actuator System from Teleflex, Inc. Naval Technologies Division.

The RMVA System serves as the industry standard for quality and performance in remote valve operation, and has been installed on virtually every ship class in the U.S. Navy.

Teleflex engineers solve problems using first-hand knowledge gained through years of experience on Naval vessels.

Teleflex has now found the solution to the problems long associated with Trip Valve Operators: the Remote Trip Valve Actuator System, or RTVA.

The RTVA System is designed first for survivability, as it eliminates shock-induced valve closures associated with the current cable/pulley systems.

The RTVA System is cost effective. It is completely sealed, permanently lubricated and corrosion resistant.

It's maintenance-free operation saves valuable manpower—allowing the ships' force to work on more critical tasks.

Design simplicity assures ease of installation with minimal labor requirements. Installation may be accomplished during overhaul, repair, or new construction.

Specify Teleflex for remote valve operators.

Call or write today for your free RMVA or RTVA Design brochure.

Teleflex®
naval technologies division

Quality, Reliability, Survivability, . . . by design.

771 First Avenue • King of Prussia, PA 19406-1401 • (215) 265-0556 • Telex: 902-528 • Fax: (215) 265-5359

Approved for all U.S. Naval Surface Ships. ABS approved.

For RMVA Brochure, circle 319 on Reader Service Card. For RTVA Brochure, circle 320 on Reader Service Card.

mize the environmental impact of their operations, and still operate safely. Handouts are being distributed to vessels passing through locks at particularly sensitive times for the environment — informing vessel masters of the need for special caution at selected times — and asking for input from industry concerning fish and wildlife activity in these areas of operation. This unique cooperative effort continues in 1991.

But industry commitment to the environment goes beyond stated principles, self-evaluation and cooperative exchanges of ideas. In addition to industry-wide initiatives, individual companies across the nation are demonstrating their dedication to preservation of the environment in many ways.

For example, for the last three years, through the combined efforts and resources of local towing companies, concerned citizens, representatives of the U.S. Fish and Wildlife Service and the Corps of Engineers, a project has been developed to protect the Port Aransas Refuge in Texas which is home to endangered whooping cranes. The worldwide count of these birds is under 150, and they rely exclusively on the Aransas Refuge where they return each year to spend the winter and raise their young. Industry companies provide labor, barges, cranes and boats necessary to off-load and place cement bags along various shoreline areas of the refuge where the banks are determined to be most severely threatened by erosion. In 1991, scores of volunteers worked side by side to place 11,000 bags of concrete along a 1,000 foot portion of the shoreline to form a barrier preventing contamination of fresh water into the Refuge and reducing erosion of the banks of the whooping crane nesting areas.

But it isn't only money and manpower that will make a difference, it's individual companies' commitment to high standards of environmentally responsible work practices. Through company newsletters, poster campaigns, environmental education programs and corporate policy, companies are enforcing this standard of care throughout their operations. Many companies now require biodegradable materials for cleaning, both in their facilities and onboard their vessels, and are eliminating or substituting other products that are environmentally harmful. Industry companies across the nation are developing recycling programs and are reinforcing the concept of environmental awareness in all their employees. Most have their own corporate environmental policies.

In many companies, the push toward environmental sensitivity has resulted in voluntary modifications and changes in equipment as well, including installation of sump pumps to minimize accumulation of bilge water, providing chemical holding tanks with secondary containment, and installation of monitoring systems on vessels for greater fuel efficiency. Companies have installed water/oil separators to permit concentration of waste oil products which must be controlled, provided spill rails on tank barges, vapor flares to control volatiles brought ashore, and floating roofs on tanks that contain volatile products. Some companies that work with refrigeration units have installed freon receivers to accept the freon which would otherwise be dumped into the atmosphere. Other companies have developed voluntary maintenance programs designed to reduce vessel stack emissions.

This dedication has also come in the form of operational changes. Reduction of speed in narrow channels to reduce bank and bottom erosion, refraining from using single-skin tank barges in environmentally sensitive areas, additional inspections by supervisory personnel, and use of waterblasting instead of sandblasting when preparing towboat hulls for painting are just some of the many voluntary measures individual companies have adopted to protect and enhance the environment.

U.S. Coast Guard casualty data makes clear that personnel competence is statistically by far the most critical factor in accident avoidance. Many industry companies have long required training requirements above and beyond what the law requires. Increased personnel training, development of crew orientation programs, oil-spill response plans, hazardous waste handling programs and increased personnel aboard vessels when conducting potentially hazardous actions are steps companies have taken on their own to ensure safe, environmentally sensitive practices.

Across the board, barge and towing industry companies continue to refine their operations to eliminate the threat of environmental harm that could be caused by industry activity.

In this decade, there has emerged a wider consciousness of the need to harmonize a healthy industry with the public good, and this industry is demonstrating its desire and commitment to maintain and improve environmental conditions. The realization that more care today will result in reduced cost tomorrow, combined with the need to keep the public trust that its environment is being cared for, has led to change for this industry. We are committed to keep working to improve our performance and to safeguard our precious marine environment. This industry is changing, working harder to do better.

American Waterways Operators Environmental Principles

The waterborne transportation industry plays an integral role in the commerce of the United States. Companies must develop a reputation for strong environmental stewardship in order to be commercially successful. AWO member companies are dedicated to continually improving operations in an effort to eliminate environmental incidents and to reduce environmental hazards to an absolute minimum. This commitment to continuously improve the compatibility of your operations with the environment is evidenced by the following fundamental principles:

- Make environmental protection a priority in business planning.
- Maintain active and effective environmental policies and programs designed to protect the environment.
- Conduct our business, and operate and maintain our vessels and facilities in a manner that protects the environment, as well as the safety of employees and the public.
- Develop and implement company programs that address education, training, and communication of environmental policies and procedures. Emphasis will be placed on the importance of strict compliance with federal, state and local laws and regulations regarding marine safety and the environment.
- Maintain and update emergency response plans that will allow companies to respond swiftly to environmental incidents and minimize environmental damage.
- Actively participate with government and other interested parties in creating responsible laws, regulations and programs which safeguard the environment.
- Seek out, or respond to, proposed environmental matters or concerns from either the public or private sectors.
- Strive to reduce vessel-generated waste and emissions by improving operating procedures.
- Work in partnership with manufacturers, shippers and vendors to enhance safe transportation of products and the management of cargo residues and cleaning wastes associated with the transporation of cargoes.

Repair Contracts Awarded By Navy To U.S. Shipyards

The U.S. Navy and Coast Guard recently awarded several repair and maintenance contracts to shipyards around the country.

On the East Coast, East Boston, Mass.-based Boston Graving Dock Corporation received $377,968 for the regular overhaul of the non-self-propelled covered lighter YFN-1251.

In Providence, R.I., Promet Marine Services Corporation performed regular overhauls of the patrol craft YP-696 and YP-698 under a $279,334 contract.

Down the coast, New York Shipyard Corporation, Brooklyn, N.Y., received a $5.1 million contract for the drydocking selected restricted fixed-price availability of the frigate USS Clifton Sprague (FFG-16).

In the mid-Atlantic states, Earl Industries, Inc., Portsmouth, Va., was awarded a $147,000 contract for the restricted availability of the submarine tender USS L.Y. Spear (AS-36). Earl Industries was also awarded a separate contract worth $363,700 for the technical availability of the amphibious assault ship USS Saipan (LHA-2).

The neighboring yards of Quality Boats Co. and Olympic Marine Service, Inc., received contracts for restricted availabilities of landing craft (LCMs). Quality Boats received a $111,111 contract, while Olympic Marine Service received a $106,040 contract. Quality Boats also received a $157,512 contract for repairs on the aircraft carrier USS John F. Kennedy (CV-67).

Also in Portsmouth, Associated Naval Architects were awarded separate contracts worth $759,560 for work on the non-self-propelled berthing and messing barge YRBM-28 and non-self-propelled covered lighter YFN-1159, as well as $341,859 in contracts for repairs to LCM-8604 and work on the utility landing craft LCU-1650 and LCU-1663.

In Norfolk, Dolphin Ship Repair Corp. received $308,415 for voyage repairs on the store ship USNS Rigel (T-AF-58).

The oiler USNS Mississinewa (T-AO-144) was deactivated by Norfolk Shipbuilding & Drydock Corp. (NORSHIPCO) at its Norfolk, Va., yard under a $1.5 million contract.

Chesapeake, Va.-based Port Allen Marine, Inc. received separate contracts worth $384,727 for vessels repairs.

Also in Chesapeake, Creasy Electronics received $144,839 for ship repair on the tank landing ship USS Manitowoc (LST-1180).

In Newport News, Va., Davis Boat Works, Inc. performed vessel repairs under a $179,131 contract.

Delta Marine, Inc., Wilmington, N.C., received a $101,400 contract for vessel repairs, while Wilmington Shipyards, Inc., also of Wilmington, received a $222,300 contract for similar work.

Detyens Shipyards, Inc., in Mt. Pleasant, S.C., received $138,398 for a restricted availability of the destroyer USS Mahan (DDG-42).

In Charleston, S.C., Braswell Services Group performed regular overhauls on the non-self-propelled covered lighter YFNB-42 and non-self-propelled floating crane YD-245 under a $2.7 million contract.

Metal Trades, Inc., in Hollywood, S.C., performed a restricted availability on the large harbor tug YTB-803 under a $552,723 contract.

In Jacksonville, Fla., Jacksonville Shipyards, Inc. received a $1.6 million contract from the Supervisor of Shipbuilding, Conversion & Repair, for work on the cruiser USS Philippine Sea (CG-58).

Out West, Southwest Marine, Inc.'s San Pedro Division received a $2.9 million contract for miscellaneous hull, mechanical and electrical repairs and ship alterations on the frigate USS George Philip (FFG-12). A second separate contract, valued at $5.5 million was awarded to the San Pedro Division for similar work on the amphibious transport dock USS Ogden (LPD-5).

In National City, Calif., Bay City Marine received a $349,990 contract for the restricted availability of the frigate USS Bagley (FF-1069).

In the Pacific, Marisco Ltd., Ewa Beach, Hawaii, performed drydocking and repairs on the U.S. Coast Guard cutter Washington (WPB-1331) under a $124,435 contract.


NAVAL
TECHNOLO
& SHIPBUILDING
U.S. Navy's New SWATH
The McDermott-Built USNS Victorious


GY
a special supplement to
MARITIME REPORTER
AND
ENGINEERING NEWS
SEPTEMBER 1991

Group Therapy

For Ships At Sea.

Our OEM experience makes the difference when supporting steam systems.

It takes special skills to maintain today's steam propulsion and ships service power generation equipment. When your ship is powered by GE steam turbines, there's one way to make sure the systems work at peak performance. Have them serviced by the GE Steam Team who designed and manufactured the original equipment. They can maintain it best, because they not only know every component and every assembly, but also how each functions within a complex engine room environment.

When you call the Steam Team for your next overhaul, you get: Engine room know-how from GE Marine Services. Prompt delivery of stocked OEM parts from Argo International. Factory expertise from GE Navy & Small Steam Turbine. And long range parts and service planning through GE Marine & Defense Facilities Sales.

Our mission is your mission. You can count on our team to assist you with preventive maintenance, system upgrades, life extension programs, systematic parts planning or emergency repairs . . . any time, anywhere. We focus on the fleet.

For more information contact your local GE Sales or Service office or call

1-800-626-2004

Circle 220 on Reader Service Card

GE Steam Team

Overview Of U.S. Navy Ship Repair & Modernization:

$13.4 Billion Earmarked For Repair Over Next 3 Fiscal Years

By James R. McCaul, President
IMA Associates, Inc.

Maintenance and repair of U.S. Navy ships provides a major business base for more than 50 shipyards in this country. With only a few exceptions, Navy ship repair is the most important source of business to these firms and their network of subcontractors.

Over the next three fiscal years, FY 1991-1993, it is estimated that the total expenditure for Navy ship maintenance and modernization will be $13.48 billion.

Number Of Repair-Capable Yards Remains Stable

Exhibit 1 shows the trend in the number of yards capable of performing Navy ship construction and repair over the past nine years. As shown, the number of construction capable yards has fallen from 37 to 20 over this period—a decrease of 46 percent. In contrast, the number of yards with full repair capability has dropped from 49 to 44—a decrease of only 10 percent. There has been almost no decrease in the number of yards capable of performing limited repairs.

Ship Maintenance Expenditures Triple

Exhibit 2 shows the level of expenditures for active fleet ship maintenance and modernization over the period FYs 1975-1993. As indicated, expenditures have tripled over this period. They peaked in 1985 at just under $6.2 billion. This was also the high year in terms of expenditures per ship. Since then, expenditures have fallen—particularly those related to ship modernization.

However, as shown in Exhibit 2, estimates for FY 1993 indicate a rise in the amount of expenditure per ship—almost $10.1 million per ship—the third highest level since 1975. This is due, for the most part, because estimates for FY 1993 also indicate a substantial increase in the level of expenditures per ship for maintenance, almost $8.6 million per vessel.

Although spending is expected to remain at lower levels for ship modernization over the next few years, expenditures for ship maintenance, conversely, are projected to rise steadily from FY 1991 to 1993. Estimates for maintenance expenditures show $3.4 billion will be spent in FY 1991, $3.8 billion in FY 1992 and almost $4.0 billion in FY 1993.

Naval Technology Cover: For details on the Navy's new SWATH USNS Victorious, see story on page 52.

The cableship USNS Zeus in drydock on the BethPride dock at what was then the Bethlehem Steel Sparrows Point, Md., shipyard (Now known as BethShip Sparrows Point).

Number Of Maintenance Availabilities

Exhibit 3 shows the number of overhauls and short term maintenance availabilities scheduled for active fleet ships over the past eight years and planned for the next three years. The number of overhauls has fallen dramatically during this period—reflecting the change in maintenance strategy which emphasizes frequent short duration availabilities in place of periodic lengthy overhauls.

(continued on next page)

Exhibit 3
Trend in Number of Maintenance Availabilities

Fiscal Year	Overhauls	Selected Restricted Availabilities	Phased Maintenance Availabilities	Total
1983	59	72	8	139
1984	53	88	10	151
1985	55	106	17	178
1986	33	99	31	163
1987	39	108	54	201
1988	22	87	64	173
1989	23	98	69	190
1990	19	100	55	174
1991(plnd.)	13	66	52	131
1992(plnd.)	9	81	64	154
1993(plnd.)	17	72	52	141

Source: IMA report number 7117.

Exhibit 4 Expenditures for Maintenance and Modernization of Naval Reserve, MSC and RRF Ships (in millions of $)

Fiscal Year	Naval Reserve Ships	MSC Ships[1]	RRF Ships[2]
1983	100.3	240.2	n.a.
1984	97.4	179.0	n.a.
1985	123.6	319.1	n.a.
1986	127.9	164.4	n.a.
1987	148.3	221.7	n.a.
1988	157.3	205.7	75.0
1989	170.1	173.2	75.0
1990	151.8	162.7	85.0
1991(est.)	199.2	173.5	172.0
1992(plnd.)	141.9	200.7	117.0
1993(plnd.)	136.0	215.2	121.0

Notes: 1. MSC expenditure include maintenance and repair of nucleus fleet ships. Data may not be totally comparable year to year. 2. RRF expenditures included in Navy budget prior to 1989.
Source: IMA report number 7117.

Other Navy Ship Maintenance

The Navy has been spending between $100 million to $200 million annually on maintenance and modernization of naval reserve ships. The Military Sealift Command (MSC) has recently been spending about $175 million to $200 million annually on ship maintenance and repair of nucleus fleet ships. The Maritime Administration (MarAd) had budgeted about $170 million in FY 1991 to maintain the Ready Reserve Fleet (RRF). Funding trends are shown in Exhibit 4.

Over the next three fiscal years, a total of about $477 million is estimated or planned to be spent on the maintenance and modernization of naval reserve ships. During this same period, plans call for a total expenditure of $589.4 million on MSC ship maintenance and modernization and an additional $410 million for RRF ship programs.

$12.2 Billion For Electronics, Support & Other Equipment Over Next 3 Years

The Navy has been spending between $3.3 billion and $4.3 billion annually for ship support equipment, electronics and other equipment for replacement and ship modernization. Over the next three years, the Navy plans to spend $12.2 billion for such equipment. A 12-year trend in spending is shown in Exhibit 5.

The largest percentage of replacement and modernization expenditures has been for communications and electronics equipment. Expenditures in this area represent about 50 percent of the total—and are projected to increase 54 percent from 1990 to 1993.

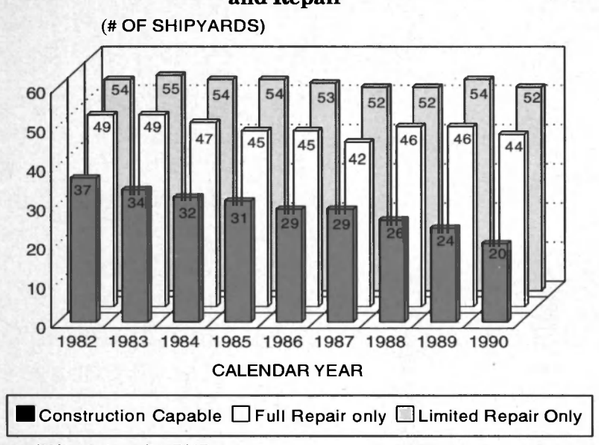
IMA has prepared an in-depth assessment of future Navy ship repair. The 200+ page report gives details for scheduled Navy repairs over the next several years. Information includes the ship name, homeport, expected start and finish dates and type of availability. Also provided is the MSC ship maintenance plan for over the next 12 months. Historical data are provided showing work contracted to each shipyard over the past eight years. The report, Maintenance, Repair and Modernization of U.S. Navy Ships (Report No. 7117), is available for $575. To order, contact IMA Associates, Inc., 600 New Hampshire Avenue, NW, Suite 140, Washington, D.C. 20037; telephone: (202) 333-8501; or fax: (202) 333-8504.

Exhibit 2
Trend in Navy Ship Maintenance & Modernization Expenditure

Fiscal Year	Maintenance	Modernization	Total Dollars	Total Ships	Main./ Ship	Modern./ Ship	Total Maint. & Mod./Ship
	(in millions of $)					(in 000's of $)	
1975	$1140.5	$434.5	$1575.0	496	$2299	$ 876	$3175
1976	1490.5	569.8	2060.3	484	3080	1177	4257
1977	1903.4	669.2	2572.6	477	3990	1403	5393
1978	2563.5	545.2	3108.7	468	5478	1165	6643
1979	2508.9	772.3	3281.2	473	5304	1633	6937
1980	2642.5	763.1	3405.6	479	5517	1593	7110
1981	3195.0	952.7	4147.7	491	6507	1940	8447
1982	3632.3	932.8	4565.1	513	7081	1818	8899
1983	4201.2	896.6	5097.8	513	8189	1748	9937
1984	4214.7	2086.5	5301.2	523	8059	2077	10136
1985	4779.6	1397.7	6177.3	542	8818	2579	11397
1986	4179.7	1398.6	5578.3	555	7531	2520	10051
1987	4244.4	1344.7	5589.1	568	7473	2367	9840
1988	3551.1	959.4	4501.5	565	6285	1698	7983
1989	3454.7	1017.0	4471.7	566	6104	1797	790
1990	3654.0	1054.6	4708.6	545	6705	1935	8640
1991(est.)	3417.7	647.3	4065.0	528	6473	1226	7699
1992(est.)	3761.9	975.3	4737.2	477	7886	2045	9931
1993(est.)	3575.7	697.2	4672.9	464	8568	1503	1007

Note: Modernization costs from 1990 onward may not be completely comparable with early year figures.
Source: IMA report number 7117.

Exhibit 1 Shipyards Capable of Navy Construction and Repair



Source: IMA report number 7117.

Exhibit 5 Trend in Expenditures for Replacement and Modernization Equipment (in millions of $)

Fiscal Year	Ships Support Equipment	Commu. Electron. Equipment	Ordnance Support Equipment	Sales and Repair Parts	Out-fitting Spares	Total
1982	687	1,155	827	1/	2/	2,669
1983	534	1,413	695	1/	2/	2,642
1984	666	1,527	920	198	2/	3,311
1985	744	1,583	1,06	255	2/	3,643
1986	817	1,832	1,153	233	2/	4,035
1987	957	1,830	1,190	282	2/	4,259
1988	730	1,519	789	258	2/	3,296
1989	621	1,400	1,052	203	325	3,601
1990	696	1,467	696	223	186	3,268
1991	741	1,772	482	244	274	3,513
1992	777	2,444	550	296	219	4,286
1993	852	2,265	763	293	275	4,448

Notes 1. Expenditures for spares and repair parts were not separately identified prior to FY 1984.
2. Expenditures for outfitting spares were not separately identified prior to FY 1989

Source: IMA report number 7117, Maintenance, Repair and Modernization of U.S. Navy Ships, April 1991.

California-Based Ship Repairers Awarded U.S. Navy Contracts

A number of ship repairers located in or around San Diego, Calif., were recently awarded Navy ship repair, overhaul and deactivation contracts by the Supervisor of Shipbuilding, Conversion and Repair, San Diego. Additionally, a major repairer located in San Francisco was awarded a voyage repair contract by the Maritime Administration for a Navy aviation support vessel.

Southwest Marine, Inc. San Francisco, Calif., was awarded a $3,241,145 contract for voyage repairs to the T-AVB Curtiss. The work, which includes drydocking and extensive boiler repairs, was scheduled to be completed in 49 days.

San Diego-based Campbell Industries, Inc. recently received a trio of contracts totaling almost three quarters of a million dollars for the deactivation of three Navy Charles F. Adams Class (DDG-2) destroyers. The three 437-foot, 4,500-ton-displacement ships feature four boilers, two geared turbines and two shafts. The Navy's newest class of destroyer, the Arleigh Burke Class (DDG-51) features four LM2500 marine gas turbines from GE.

The first contract, worth $247,429, was for the deactivation of the USS Lynde McCormick (DDG-8). The second, valued at $248,996, was for the deactivation of the USS Robison (DDG-12), while the third, worth $248,995 was for deactivation of the USS Buchanan (DDG-14).

Al Larson Boat Shop, also located in Southern California on Terminal Island, received a contract for the regular overhaul of the self-propelled fuel lighter barge YO-203. The contract was valued at $702,057.

The conventional powered aircraft carrier USS Ranger (CV-61), which is powered by eight boilers, four geared steam turbines and four shafts, is undergoing a selected restricted availability at Continental Maritime of San Diego under a $3,324,427 contract.

Pacific Ship Repair & Fabrication, Inc. was also awarded a $3,228,180 contract for a selected restricted availability on the Kitty Hawk Class Ranger.

Boland Marine Receives $431,793 Contract For Container Barge Repair

Boland Marine & Manufacturing Company, Inc., New Orleans, La., recently received a $431,793 contract for repairs to the 38,400-dwt, 1972-built container barge S.S. Cape Mendocino. The contract was awarded by the U.S. Department of Transportation, Maritime Administration.

Thomas Marine Delivers Waterways Tender To Hempstead, N.Y.

The 38-foot welded aluminum waterways tender CW 12, built by Thomas Marine, Inc., for the Town of Hempstead, Dept. of Conservation and Waterways, Freeport, N.Y.

Thomas Marine, Inc., Patchogue, N.Y., recently delivered a 38-foot waterways tender to the Town of Hempstead, Department of Conservation and Waterways, Freeport, N.Y.

Powered by a single 160-hp Detroit Diesel engine, the 12-ton waterways tender, called the CW 12, has a beam of 12 feet 6 inches and a draft of almost 4 feet. The rest of her propulsion plant consists of a three-blade Michigan propeller, Aquamet 22 shafting and Twin Disc reduction gear. Auxiliary power is provided by a Koehler generator set.

Other equipment on board includes Morse engine controls, Wagner hydraulic steering controls, Hale and Rule pumps.

Navigation and communication equipment includes a Whelan Siren, P/A system, ICOM VHF radio, a Ritchie compass and Raytheon autopilot and radar.

Established in 1961, Thomas Marine designs and builds welded aluminum service craft, with stock designs from 22 to 52 feet. The firm offers design, engineering, complete machine and fabricating facilities, with hauling, aluminum welding and repowering services.

For free literature detailing the boatbuilding capabilities of Thomas Marine,

Circle 9 on Reader Service Card

Management Picked For New Sulzer Diesel U.S.

Peter Sulzer, chairman of New Sulzer Diesel Ltd. and the New Sulzer Diesel Group, headquartered in Winterthur, Switzerland, has announced the management team selected to head New Sulzer Diesel U.S. Inc., the wholly owned subsidiary charged with conducting operations from the U.S. for the New Sulzer Diesel Group.

The president and chief executive officer of New Sulzer Diesel U.S. Inc. **is Robert G. Walsh Jr.**, a graduate of Webb Institute, with graduate degrees from MIT and NYU and more than 20 years' experience in the maritime industry, including oversight of commercial and government ship acquisition and operations in the U.S. and overseas. Most recently he was Executive Assistant to the Deputy Commander at the Military Sealift Command in Washington, D.C.

Ernst P. Jung, who has been with Sulzer for over 40 years, has been promoted from general manager to vice president, technical services for New Sulzer Diesel U.S. Inc. He has also been named to a seat on the board of directors.

Mr. **Sulzer** also announced that Adm. **James S. Gracey** (Ret.), former Commandant of the U.S. Coast Guard, has agreed to serve as adviser to the New Sulzer Diesel Group. Admiral **Gracey** sits on several boards of directors and is a consultant, with offices in Washington, D.C., and Arlington, Va.

New Sulzer Diesel is a world leader in design, manufacture, support and R&D of high-quality heavy-duty diesel engines for maritime propulsion and auxiliary, and electric power generation. New Sulzer Diesel engines propel more than one third of the world's oceangoing fleet. The 14,000 engines in service are fully supported through the New Sulzer Diesel worldwide, after-sales organization.

Gladding-Hearn Begins Construction Of Two Aluminum Pilot Boats

Gladding-Hearn Shipbuilding, Somerset, Mass., has begun construction of two new aluminum pilot boats for the Virginia Pilots Association and S.C.-based Charleston Branch Pilots.

Designed by C. Raymond Hunt Associates of Boston, the pilot boats will function as harbor dispatch vessels, as well as transporting the pilots to ships, said shipyard officials.

The 51-foot Hampton, which offers complete liveaboard accommodations for two, will replace an ashore waypoint used to dispatch the Virginia pilots to ships on the port of Hampton Roads in addition to shuttling pilots across the harbor to avoid highway traffic on the Hampton Roads Bridge/Tunnel, said **George Duclos**, Gladding-Hearn president.

The other pilot boat, a 39-footer, will also serve as a standby boarding boat for pilots who would normally travel by car from downtown Charleston to Wando Terminal in Mt. Pleasant.

The Hampton, the Virginia pilots, fourth Gladding-Hearn launch, is powered by twin Detroit Diesel 8V-92NA engines rated for 350 hp at 2,100 rpm reaching speeds of 22 knots, while the smaller, single-screw pilot boat powered by the same engine has a top speed of 20 knots. This is the Charleston pilots, fifth pilot boat built by the yard since 1960.

The Hampton has a beam of 17 feet, depth of 8 feet and draft of 5 feet. The as-yet-unnamed pilot boat has a beam of 14 feet, depth of 6 feet 6 inches and draft of 4 feet 6 inches. Both boats will be delivered in the third quarter of this year.

For free literature detailing the boatbuilding capabilities of Gladding-Hearn,

Circle 2 on Reader Service Card

Village Marine Wins U.S. Navy, Chinese Orders For Desalination Plants

Village Marine Tec., Gardena, Calif., recently received separate orders to deliver water-making plants to the People's Republic of China and the U.S. Navy.

The Chinese order is for a reverse osmosis water-making plant for an oil drilling platform off the coast of China. The watermaker is expected to produce 4,000 gallons of freshwater a day for the platform crew. Village Marine Tec. personnel are currently in China to start up the plant and train local technicians in its operation.

The U.S. Navy order is for the delivery of eight large desalination plants to make extremely pure water for use in the boilers of ships.

Each plant, which will produce 86,000 gallons per day, will deliver water from a relatively small unit—inside a container about the size and shape of a railroad boxcar. The plants will be readily portable.

The Navy will use the plants to convert industrial grade water to "boiler-quality" feed water for ships.

For free literature detailing the line of watermaker plants available from Village Marine Tec.,

Circle 92 on Reader Service Card

Ambrose Joins Brandtship USA

Brandtship USA, Inc., Fort Lauderdale, Fla., shipbrokers and ship managers, recently announced that **Samuel L. Ambrose** has joined the company.

Mr. **Ambrose** will be in charge of the operation of the two LPG tankers on charter to Fertilizers of Trinidad and Tobago, Limited, and will act as owner's representative for the three Knud I. Larsen, Copenhagen Mark VI containerships on time charter to Sea-Land Service, Inc. in their Central American service.

Before joining Brandtship USA, Inc., Mr. **Ambrose** was president of Wisco USA, Inc., Miami for the last six years prior to which he was marine superintendent of West Indies Shipping Corporation, Port-of-Spain, Trinidad.

Bath Iron Promotes John C. Mason To VP

John C. Mason, who has directed the development of the new Aegis Guided Missile Destroyer program at Bath Iron Works (BIW), has been promoted to vice president, following the commissioning of the first ship of the class into the U.S. fleet.

Mr. **Mason** began his career at BIW in 1977 as a project engineer. He was involved in research projects dealing with the Maritime Administration before becoming manager of marketing for Navy new construction in 1981. He was promoted to director of program management of the Aegis destroyer program in 1985.

BIW has contracts to build eight additional destroyers and will bid on others later this year.

For free literature detailing the facilities and capabilities of Bath Iron Works,

Circle 22 on Reader Service Card

Treatment/Purification System For Heavy Fuels, Lube Oils From Acomarin

When the Ultrasaff (Ultrasonic Automatic Fine Filter) was first introduced, it was originally intended only for fine filtering processes of marine heavy fuels and lube oils. Following pilot testing with different heavy fuels, however, it was discovered that with enough high ultrasonic cavitation intensity, the fuel changed towards a homogenous, stable and well-emulsified end product.

According to Finnish manufacturer Acomarin Oy, the engine room applications of Ultrasaff for fine filtering, homogenizing of wax and asphaltines into the fuel and the emulsification of water into the filtered liquid are almost unlimited. This occurs assuming the cavitation threshold is reached.

Another marine application for Ultrasaff is diesel fuel treatment for the daily service tank of a drilling rig. Ultrasaff can be used as a biocide, killing unwanted bacteria in the tank and tubing which could potentially cause fuel equipment problems.

Other similar applications include the treatment of large quantities of hydraulic oils and lube oils.

With the use of Ultrasaff, reports Acomarin, there is the potential for saving on fuel costs because of less sludge, less filter maintenance because there are no moving parts, better lubricating oil condition due to improved fuel combustion, and less nitrous oxide exhaust emissions.

Besides producing Ultrasaff systems in Naantali, Finland, Acomarin Oy plans to production in Tampa, Fla., by Acomarin International Inc. The sales and after-sales service networks are under development.

For free literature detailing the Ultasaff,

Circle 104 on Reader Service Card

Bird-Johnson Appoints Ed Mullen Manager, Program Management

Bird-Johnson Company, Walpole, Mass., has appointed Edwin R. Mullen as manager, program management.

Formerly manager, marine sales, Mr. Mullen has been with Bird-Johnson for 12 years, 10 of those as a program manager. In his new position, he will be responsible for all management aspects of Bird-Johnson's government and major commercial contracts, reporting to Peter Gwyn, the company's president and chief operating officer.

Bird-Johnson Company is a leading designer and manufacturer of naval and commercial marine controllable pitch and fixed pitch propeller systems and provides castings and precision machined products.

Merger Plan Proposed For General Ship

A former owner of General Ship Corporation, an East Boston ship repairer, is proposing to merge the yard with a local metal fabricator.

The former owner, venture capitalist **Arnold L. Mende**, is proposing a merger of General Ship and P.X. Engineering Inc. The two firms are adjacent on South Boston waterfront land owned by Boston's Economic Development and Industrialization Commission (EDIC).

Mr. **Mende** is proposing to continue Navy repair work at the yard and possibly commercial, while fabricating metal tubes at the facility that would be used for the underwater portion of the third Boston Harbor tunnel. Mr. **Mende** also wants to renovate an EDIC-owned, 1,200-foot drydock for the tunnel tube project.

The time schedule for the tunnel project is putting pressure on the proposed merger.

Private investors have already pledged $25 million to Mr. **Mende** for the project, while EDIC has approved $5.5 million in bonds for the project.

The Massachusetts Port Authority is offering limited loan guarantees to Mr. **Mende**.

Avondale Industries Names Mortimer VP And Manager, Shipyards Division

Edmund C. Mortimer has been appointed a corporate vice president and manager, Shipyards Division at Avondale Industries Incorporated.

In his new capacity, Mr. **Mortimer** will be in charge of all shipyard operations as well as the procurement of new government work for the yard.

Mr. **Mortimer** retired after serving 30 years in the U.S. Navy, during which time he was heavily involved in the acquisition of a variety of ships.

IPH Marine Offers Free Literature On Automation Systems For Shipbuilding

IPH Marine Automation, a division of the Danish company IPH, designs, manufactures, and carries out on-site installation of automation systems for the shipbuilding and offshore industries.

Due to the development of the revolutionary IPH Marine Automation System, MAS, IHP Marine Automation is now one of the leading ship automation suppliers to national and international owners and yards. All MAS components are type-approved by all major international classification societies.

The new diesel electrical TESO-ferry Schulpengat, built on Verolme Heusden Shipyard B.V. and to be put into service between Den Helder and Texel, is equipped with a fully integrated MAS ship automation system.

For further information on automation systems for the shipbuilding and offshore industries from IPH Marine Automation,

Circle 30 on Reader Service Card

Bill To Ban Drilling Off Florida Coast Meets Opposition

A bill that would permanently extend and expand a one-year-old, 10-year moratorium on oil and gas drilling off the coast of Florida encountered opposition from the Bush Administration in a recent hearing of the Senate Energy Committee.

According to David O'Neal, Interior Department Assistant Secretary for Land and Minerals Management, said the bill was unnecessary. He said the provision in the bill requiring the U.S. to buy back 221 leases for oil and gas drilling off the coast of Florida would cost $750 million to $1.5 billion.

The bill, which was offered by Republican Senator Bob Graham of Florida, would also ban leasing and development in a 100-mile buffer zone off the entire Florida coast.

Modern Naval Propulsion Systems: Powering The World's Future Navies

Although the diesel engine still dominants as the main propulsion and generating plant in the commercial sector, the marine gas turbine has quickly become the preferred choice for the large modern naval combatant. First incorporated as the main propulsion power on a major warship by the Soviets in its Kashin Class destroyers, marine gas turbines offer quiet operation, excellent compactness, power-to-weight ratios and service reliability. Today they are featured on international naval ships ranging from 200-ton hydrofoil missileships to 50,000-ton naval support ships.

Marine gas turbines are typically offered in a number of propulsion arrangements with such acronyms as CODOG (Combined Diesel or Gas Turbine), CODAG (Combined Diesel and Gas Turbine), COGAG (Combined Gas Turbine and Gas Turbine) and COGOG (Combined Gas Turbine or Gas Turbine), using either one or multiple engines depending upon the cruising speed desired.

The French Navy's Georges Leygues Class destroyers are powered by two SEMT-Pielstick 16-cylinder PA6V280 diesels of 10,400 bhp and two Rolls-Royce Olympus TM3B gas turbines of 52,000 bhp in a CODOG system.

The latest classes of U.S. Navy combatants consisting of frigates, cruisers and destroyers—about 140 ships—all feature GE Marine & Industrial's LM2500 marine gas turbine as main propulsion. The Navy has even selected LM2500s for its new fast combat supply ship class. The first of the class, the 754-foot Supply (AOE-6), under construction at San Diego's NASSCO, will make her debut next year with four GE units.

This year the U.S. Navy's newest Aegis guided missile destroyer, the USS Barry (DDG-52), was christened at Ingalls Shipbuilding Inc., a division of Litton. The 504-foot Barry, like her recently delivered sister, the USS Arleigh Burke, is powered by four GE LM2500 marine gas turbine engines.

The gas turbine generator sets aboard the destroyers Barry and Arleigh Burke both use the Allison 501-K34 engines from Allison Gas Turbine, Military Industrial Engines, Indianapolis, Ind., to produce 2,500 kilowatts of shipboard electrical power.

Diesels

Diesels engines are still very popular for main propulsion and power generation applications in smaller naval vessels. The recently delivered 58-foot Nadon, an all-aluminum planing catamaran for the Royal Canadian Mounted Police, for example, is powered by a pair of MAN B&W 10-cylinder D2840 LXE diesels. Rated at 820 hp at 2,300 rpm each, the high-speed engines drive Arneson ASD-12 surface-piercing propellers through ZF BW-165 reverse reduction gearing.

In minehunter applications, Paxman Diesels Ltd. supplied low magnetic signature marine diesel engines for the Royal Navy's Sandown Class single-role minehunters, built by the U.K.'s Vosper Thornycroft, while Italy's Isotta Fraschini supplied compact ID 36 diesel engines for the U.S. Navy's newest minehunter, the GRP-hulled USS Osprey (MHC-51).

The GRP-hulled Sandown vessels are each powered by two six-cylinder Paxman Valenta 6RP200E propulsion engines, which have a continuous rating of 500 kwb (670 bhp) at 1,200 rpm.

MTU of North America supplied its 16V396TB94 diesel engines, rated at 3,433 bhp at 2,100 rpm, for the repowering of the SES-200, the Navy's only operational surface effect ship. The waterborne, air supported craft with catamaran-style rigid sidehulls was refurbished and converted by Textron Marine Systems, New Orleans, La. The modification calls for converting the ship's propulsion system from conventional propellers to twin KaMeWa 71S62/6-SII waterjets, and removal of existing gearboxes for replacement with two ZF BW755 gearboxes. The conversion and modification will allow the 162-foot SES-200 to achieve speeds in excess of 40 knots in calm water.

Sold by Morrison Knudsen, Power Systems Division, eight Electro-Motive Division (EMD) 2,000-kw high-shock 16-645E5N diesel engines have been supplied for use as back-up support to the nuclear power plants on two U.S. Navy aircraft carriers. EMD high shock gensets have been installed in all six of the Navy's nuclear-powered aircraft carriers.

The Fairbanks Morse Engine Division of Coltec Industries (formerly Colt Industries) has supplied the main propulsion engines and ship service engine generators for U.S. Navy LSD-41 Class ships and main propulsion engines for U.S. Navy TAO-187 Class fleet oilers.

FOR MORE INFORMATION ON NAVAL PROPULSION SYSTEMS

Technical data, product literature and brochures are available free of charge on any of the naval propulsion systems and equipment included in this article. To receive copies of free literature, circle the appropriate Reader Service number on the postpaid card bound into the back of this issue. See the table below for the appropriate Reader Service number for each manufacturer.

Manufacturer	*Reader Service#*	*Manufacturer*	*Reader Service#*
Allison Gas Turbines	61	KaMeWa	76
Arneson	62	Kato	77
Bergen Diesel	63	Krupp MaK	78
Bird-Johnson	64	MAN B&W Diesel	79
Caterpillar	65	MTU	80
Cincinnati Gear	66	North American Marine Jet	81
Coltec-Fairbanks Morse	67	Omnithruster	82
Cummins	68	Paxman Valenta	83
Deutz MWM	69	Riva Calzoni	84
Electro-Motive Division	70	Rolla Propellers	85
GE Marine & Industrial	71	Rolls-Royce	86
GE Naval & Drive Turbine Systems	72	SEMT-Pielstick	87
Hamilton Marine	73	Sulzer-Escher Wyss	88
Hedemora Diesel	74	Westinghouse Marine	89
Isotta Fraschini	75	ZF	90

Fairbanks Morse's 10-cylinder PC 4.2 Colt-Pielstick is currently the largest U.S.-manufactured medium-speed diesel engine capable of burning DFM or heavy fuels up to 3,500 sec Redwood at 100 degrees F.

Norway's Bergen Diesel has also been very active in the U.S., supplying about 50 engines to the Navy. Bergen medium-speed diesels will power the new icebreaker/research vessel for Edison Chouest.

Serving a power range of 880 to 9,900 kw, Krupp MaK Diesel supplied the U.S. Navy oceanographic survey ships T-AGS-39 and T-AGS-40 with three Krupp MaK 6 M 332 diesel engines each as the 2,700-kw ship's services electrical plant.

The twin-hulled SWATH USNS Victorious (T-AGOS-19), which at present is on acceptance trials for the Navy, is powered by a diesel-electric propulsion system, consisting of four Caterpillar 3512 diesels with Kato generators driving two General Electric propulsion motors rated at 1,600 shp. The vessel's speed is estimated to be 10 knots.

The latest engine design from Sweden's Hedemora Diesel AB is the twin-turbocharged 18-cylinder VB 210 series, which the company has supplied as the main engines for the new Type 471 submarine for the Royal Australian Navy. The new submarines will each be equipped with three Hedemora VB 210 18-cylinder diesel generator sets with a combined output of more than 4 mw electrical power.

Steam Turbines & Gearing

This year, the Westinghouse Marine Division, Sunnyvale, Calif., has been awarded a $90.8 million contract by the Naval Sea Systems Command to supply two main propulsion units, with options for up to an additional seven systems for the Navy's new Seawolf Class attack submarine. The first shipset of the third generation high power density submarine propulsion units will delivered in June 1993.

The newest Wasp Class amphibious assault ship, the 844-foot, 40,500-ton USS Essex (LHD-2), has a power plant which uses two Westinghouse steam turbines and reduction gearing, developing a combined 70,000 shp, with two Combustion Engineering boilers, to drive the ship at speeds of more than 20 knots. Stewart & Stevenson supplied the generators for the ship.

GE's Naval & Drive Turbine Systems Department provides geared steam turbines or advanced hardened and ground gears or turbine generator sets for such U.S. Navy combatant programs as: the SSN-688 Los Angeles and SSBN-726 Ohio submarine classes; the CVN-68 Nimitz aircraft carrier; DDG-51 Arleigh Burke destroyer; and LHD-1 Wasp amphibious assault ship.

The most recent development from the Cincinnati Gear Company, which supplies gearing rated 2,500 hp and up, is the incorporation of SSS/TOSI reversing unit on a 50,000-hp gearbox in the AOE-6 program.

Propellers

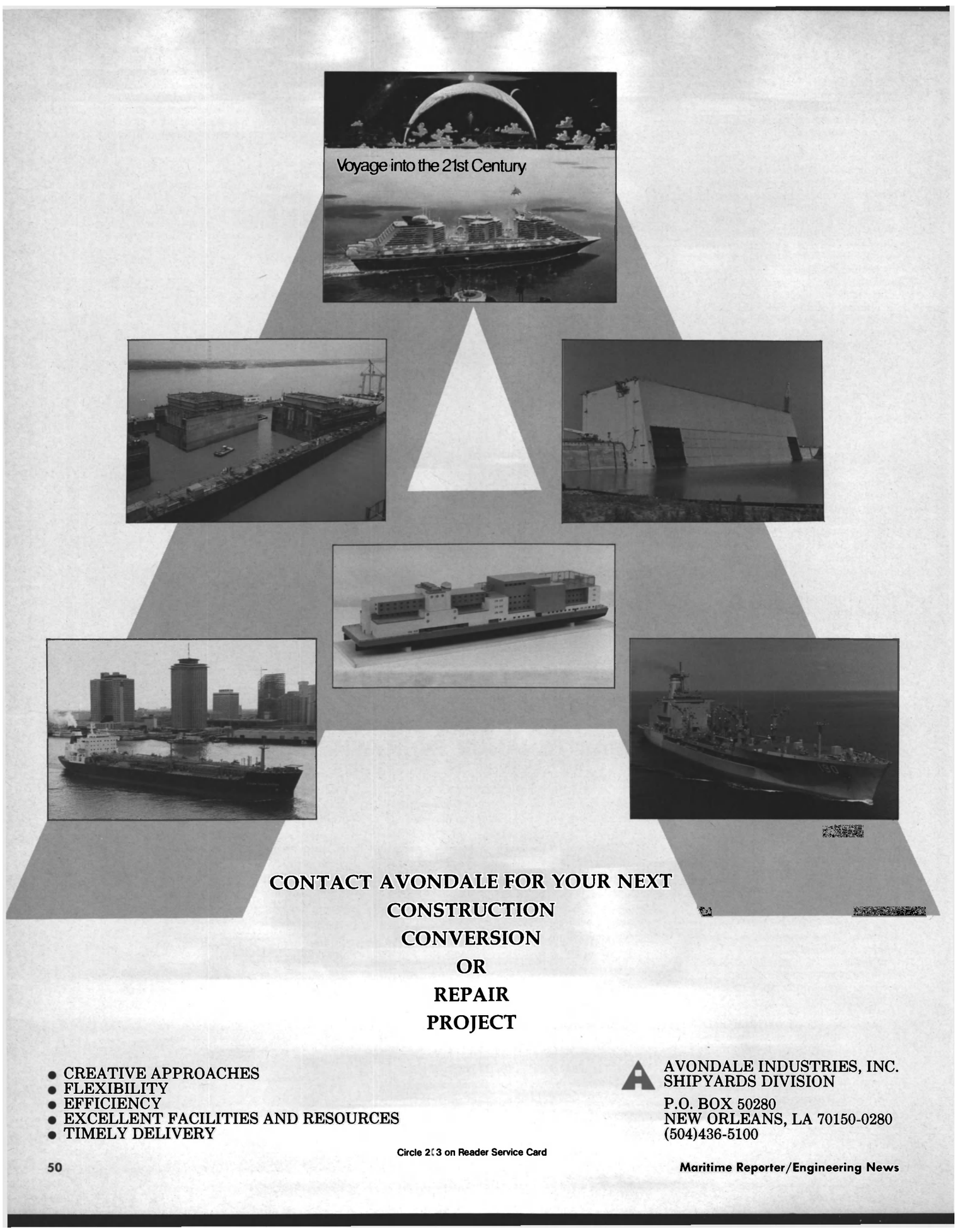
The Bird-Johnson Company, which has supplied all of the controllable pitch (CP) propeller systems for the diesel-powered Avenger Class Mine Countermeasure (MCM) Ships, has also been popular choice with gas turbine-powered ships. Since gas turbines cannot be reversed, ships must be fitted with either a reversing gearbox or controllable-pitch propellers. The USS Barry is the latest Bird-Johnson installation to go to sea.

Sulzer-Escher Wyss five-bladed CP and reverse pitch propellers are featured on the FRG's Bremen Class frigates, as well as on a number of Canadian, Indonesian, Saudi Arabian and South Korean naval ships.

Waterjet Propulsion

Waterjet propulsion tends to be specified for high speed craft where their efficiency increases. This type of propulsion has been adopted for new patrol boats. Powerful waterjets, for example, are being fitted aboard patrols being built for the Finnish Navy. Swedish manufacturer KaMeWa and Riva Calzoni are two of the main builders of high power waterjet units. Riva Calzoni offers waterjet units with a power range of as high as 25,000 kw.

In the lower power range, North American Marine Jet of Benton, Ark., recently supplied dual Nomera 14s, rated at 275 hp at 2,800 rpm, for a refit of a Navy 32-foot riverine patrol boat. North American Marine Jet, which in recent years has



CONTACT AVONDALE FOR YOUR NEXT
CONSTRUCTION
CONVERSION
OR
REPAIR
PROJECT

- CREATIVE APPROACHES
- FLEXIBILITY
- EFFICIENCY
- EXCELLENT FACILITIES AND RESOURCES
- TIMELY DELIVERY

AVONDALE INDUSTRIES, INC.
SHIPYARDS DIVISION

P.O. BOX 50280
NEW ORLEANS, LA 70150-0280
(504)436-5100

Circle 213 on Reader Service Card

increased its emphasis on the commercial workboat sector, is currently bidding on supplying waterjet propulsion for eight Riverine Assault Craft that will be built by SeaArk. The RACs will each be powered by dual 300-hp Cummins diesels. If all the options are exercised under the contract, as many as 50 RACs will be built for use by the Army.

New Zealand's Hamilton Jet recently supplied a pair of Hamilton model 361 waterjets for each of three Indian Coast Guard offshore patrol boats. The flush-mounted waterjets are directly driven by twin Deutz MWM TD 232 V12 diesels, producing 403 hp each at 2,300 rpm. The GRP-hulled 51-foot boats achieve a maxium speed of 24 knots.

Three McDermott-built U.S. Navy Torpedo Test Craft are equipped with Omnithruster hydrojet maneuvering and propulsion systems. The YTTs, -9, -10 and -11, utilize 350-hp Omnithruster Mark II hydrojet Model JT 700TDs, which offer the craft precise handling, position keeping and automatic heading.

Surface Piercing Propeller

One of the latest developments in the high speed boat market is the surface piercing propeller. This concept was designed for planing vessels, where only the bottom blades of the propeller do useful work at high speed.

Rolla SP Propellers of Switzerland has over 28 years' experience in the field of surface piercing technology. In recent years the number of high-speed craft propelled by surface piercing propellers has increased substantially. There are now several thousand vessels operating with these type of propellers, including sophisticated high performance naval vessels and long distance record breakers. **Philip Rolla** of Rolla SP Propellers has developed a propeller for 35 to 50 knot applications needing vertical lift at the transom.

Another concept developed is the Arneson surface drive, which has the propeller mounted on a shaft which incorporates a universal joint. The propeller end of the shaft is supported by two hydraulic rams, one vertical and one horizontal, the horizontal ram allowing the shaft to be turned in this plane to give steering using the propeller thrust, and the vertical rams allows the height of the propeller in relation to the water surface to be adjusted.

This Arneson drive concept offers benefits for vessels like landing craft which may have to beach or for craft which have to operate at widely varying draft levels.

Sembawang Completes TBT-Free Paint System On BP Shipping Tanker

Sembawang Shipyard Ltd. of Singapore recently completed application of an environmentally friendly self-polishing anti-fouling paint system on BP Shipping's BP Achiever. This is reportedly the first such application in the Far East.

Called International Intersmooth BG Series and developed by the U.K.'s International Paint (Courtaulds Coatings), the TBT-free (tin-free) self-polishing coating is among the first of its type to be developed.

The 127,575-dwt tanker is among the first complete applications of this co-polymenr anti-fouling.

Geoff Sheperd, superintendent engineer for Associated Steamships Pte. Ltd., who was supervising the vessel's repairs in Sembawang, said that the use of this environmentally friendly application demonstrates BP's continual commitment toward environmental protection.

The BP Achiever also underwent surveys on her boiler, propellers and tailshaft during her stay in Sembawang.

For free literature detailing the ship repair capabilities of Sembawang Shipyard,

Circle 99 on Reader Service Card

AWO Names Whalen VP, Legislative Affairs

Curtis E. Whalen has been appointed vice president-legislative affairs for the American Waterways Operators (AWO), the national trade association for the inland and coastal barge and towing industry.

Mr. **Whalen** comes to AWO with 15 years of lobbying experience for major U.S. corporations.

Tanker Industry Close-Up:

Reward Quality Tonnage, Take Realistic Approach To Regulation

By Seigo Suzuki*, Chairman
INTERTANKO

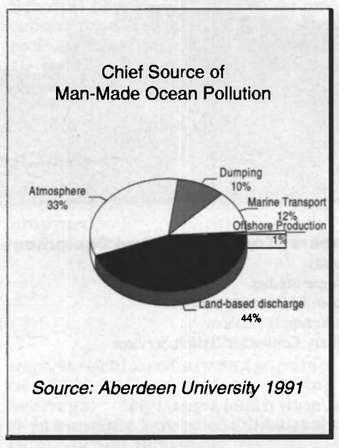
The world tanker fleet carries some 1.5 billion tons of oil annually, providing a reliable, indispensable and cost-effective service. However, serious problems have emerged, ranging from ill-conceived legislation to the biggest question of all—how is the aging world tanker fleet to be replaced? A solution to this problem must be found.

Independent tanker owners, who control about 65 percent or 190 million dwt of the world fleet, have spent billions of dollars complying with new international rules fitting new shipboard systems which improve safety and environmental levels. However, governments have failed to play their role by providing adequate shore reception facilities for cargo residues.

Furthermore, the Oil Pollution Act of 1990 (OPA) rejects international liability and compensation agreements for oil pollution damage. Instead, it opens the door to unlimited liability, which is uninsurable. Unlimited liability is also counterproductive, as it may deter high quality carriers and attract irresponsible carriers. In particular, OPA rejects shared liability on pollution damage. Cargo interests have no direct compensation sharing responsibilities under OPA. Consequently, OPA provides no incentive to select quality tonnage.

OPA, in requiring double skins on new tankers, ignores important safety concerns . . . and the fact that other design options may be more effective overall in reducing oil outflow.

Shipping activity accounts for only 12 percent of all marine pollution, while land discharges contribute 44 percent. But ships are the soft targets for regulators. Most maritime safety experts agree that the human factor is more significant than the design issue. Oil discharges from maritime activities dropped from 1.47 million tons in 1981 to 0.57 million tons in 1989, of which the tanker share dropped from 1.12 million tons to 0.27 million tons—a 75 percent drop. In 1989, the tanker fleet delivered over 1.4 billion tons of oil. This seems to indicate that the tanker industry is making rapid progress in its efforts.



Source: Aberdeen University 1991

However, despite the progress made by the shipping industry, pollution of the seas must be further reduced. Pollution from coastal development is now considered as by far the most serious threat to the long-term health of the world's oceans. The point is reinforced by new statistics which reveal that ship-generated pollution is in sharp decline. In the period from 1971-80, there were 810 spills, with an average size of 3,372 barrels, while from 1981-90, there were 422 spills, with an average size of 2,555 barrels.

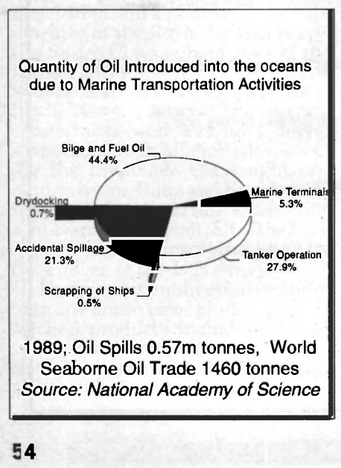
INTERTANKO (International Association of Independent Tanker Owners), whose 300 members control 1,800 tankers aggregating 170 million dwt, regards this as an impressive reduction—especially given the fact that the average 1990 ship is 40 percent larger than its 1970 counterpart.

Today, the tanker industry is taking new steps to introduce tougher standards of operation. However, if further significant improvements are to be made, governments, cargo interests and charterers must also play their part.

The oil industry must be induced to pay a premium for quality tonnage. If charterers pay a premium for quality, they also pay a premium for a better marine environment and, not least, the aging tanker fleet would be renewed on a sound financial basis.

Governments can contribute to this renewal process by resisting pressure to overregulate the industry. What regulators decide at the conference table must remain within the bounds of enforcement capability worldwide. Overregulation detracts from existing standards and, once again, would push quality tonnage into an unfavorable market position. This, in turn, would delay much needed fleet renewal.

*Editor's Note: This article was excerpted from a recent open letter by Mr. Suzuki to the International Maritime Organization and the oil industry.



1989; Oil Spills 0.57m tonnes, World Seaborne Oil Trade 1460 tonnes
Source: National Academy of Science

WATERCOM Promotes Virginia R. Lewis To Director Of Operations

WATERCOM recently announced the promotion of **Virginia R. Lewis** to director of operations.

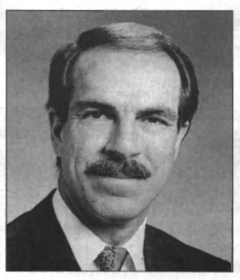
Ms. **Lewis** oversees the Operations Control Center (OCC), WATERCOM's central computer system. In this capacity, she is


Virginia R. Lewis

responsible for monitoring 55 computerized shore stations which operate 24 hours a day along 4,000 miles of inland waterways. Additionally, she is in charge of WATERCOM's Operator Assisted Services, which provide customers with collect and credit card calling assistance and message delivery. She also supervises the operations of WFN Marine Radio, which serves the Louisville, Ky., and Madison and Jeffersonville, Ind., areas.

WATERCOM is a leader in the field of communications for vessels navigating more than 4,000 miles of American inland waterways.

Bird-Johnson Names Andrew Barrs Manager, Seattle Operation


Andrew F. Barrs

Bird-Johnson Company, Walpole, Mass., has appointed **Andrew F. Barrs** to the position of general manager for their Seattle, Wash., operation.

Formerly Bird-Johnson's director, quality and program management, he has been with the company since 1974. He will be responsible for the operations of the facility, reporting to **Peter Gwyn**, president and chief operating officer.

Bird-Johnson's Seattle operations sells and services commercial and recreational controllable-pitch and fixed-pitch propellers, propeller shafting, and various propeller system accessories.

Bird-Johnson Company is a world leader in the design and application of naval and commercial marine controllable-pitch and fixed-pitch propeller systems and provides castings and precision-machined products to other capital goods industries.

TOTE Adds Third Ship To U.S.-Flag Fleet

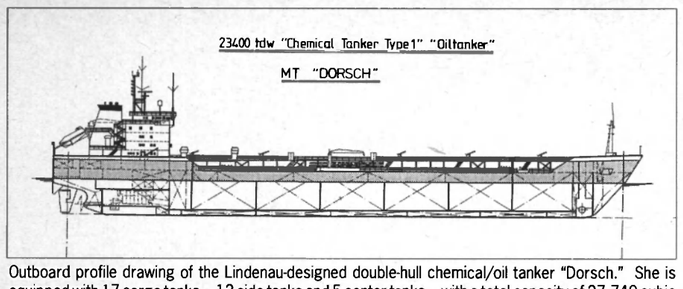
With an eye on the long-term interests of the Alaska shipping trade, Totem Ocean Trailer Express (TOTE), Inc., has purchased a third vessel to add to its U.S.-flag fleet.

TOTE, which currently operates two Roll-On/Roll-Off trailerships between Tacoma, Wash., and Anchorage, Alaska, purchased the 700-foot S/S Puerto Rico from Puerto Rico's government-owned shipping company, Puerto Rico Marine Management, Inc. TOTE plans to lengthen the vessel by 90 feet at a yet undetermined U.S. shipyard. The total investment in the vessel, including purchase and conversion is expected to be $50 million, according to , company vice president of operations.

According to **Robert B. McMillen**, TOTE president and chief executive officer, the additional ship would provide backup capability to assure a steady shipping schedule for its customers and would also be available to handle the anticipated increase in Alaska trade into the next century.

To be renamed the Northern Lights, the ship is currently at Jacksonville Shipyards, Inc., Jacksonville, Fla., where she will undergo work to bring her up to U.S. Coast Guard and ABS classification standards. Mr. **McMillan** said the ship would be available for charter by the end of this year.

TOTE is a privately owned Alaska corporation which began operations in 1975. It is headquartered in Seattle and is a subsidiary of Totem Resources Corporation, which also owns Foss Maritime Company and Interocean Management Corporation.



Outboard profile drawing of the Lindenau-designed double-hull chemical/oil tanker "Dorsch." She is equipped with 17 cargo tanks—12 side tanks and 5 center tanks—with a total capacity of 27,740 cubic meters.

Lindenau Shipyard Launches Largest Double-Hull German-Flag Oil Tanker

Lindenau GmbH Schiffswerft & Maschinenfabrik, Kiel-Friedrichsort, Germany, recently launched and christened its 15th double-hull tanker since 1976.

Christened the "Dorsch" by Mrs. **Inge-Maj Denisoff**, the 23,000-dwt tanker is the sister ship of the M/T Conger, delivered by the yard to shipping company Carl Buttner of Bremen in the first quarter of this year. The Conger is reportedly the largest double-hull oil tanker sailing under the German flag.

The aim of this new type of tanker developed by Lindenau is to transport oil and chemicals as environmentally safe and economically as possible.

The Dorsch, like the Conger, has a double side shell which, according to Lindenau, offers a three-fold higher collision resistance than a comparable single shell tanker. She has been classed by Germanischer Lloyd, +100 A4 E3 "Chemical tanker Type 1" "Oil Tanker" COLL 5 (center cargo tanks) COLL 2 (Wing Cargo Tanks) +MC E3 AUT INERT.

Built for worldwide trade of chemical and crude oil products, her overall length is 557 feet, with a molded breadth of 81 feet, summerfreeboard draft of 34 feet gross tonnage of 12,299 and deadweight of 23,400 tons.

Main propulsion is provided by a MAN B&W 6L 58/64 diesel, rated at 9,977 hp at 400 rpm, with Renke-Tacke reduction gearing and a four-blade variable pitch propeller plant.

Navigation equipment includes a Krupp Atlas Elektronik 5600 radar and 8600 ARPA and an Anschutz Standard 14 gyrocompass and autopilot.

The Dorsch is expected to be delivered in the first quarter of 1992.

For free literature detailing the shipbuilding capabilities of Lindenau Shipyard,

Circle 95 on Reader Service Card

Aker Omega Plans Joint Industry Project With 8 Oil Companies

Aker Omega, Inc. of Houston, Texas, is planning to start a Joint Industry Project (JIP) on October 1, 1991, with eight major oil company participants. The project is aimed specifically at investigating an alternative concept for producing oil in the 3,000-6,000-foot water depths in the Gulf of Mexico but has potential applications in much shallower waters and around the world.

The concept to be studied will be a particular type of free-standing buoyant riser system which Aker Omega refers to as a Subsea Completed Buoyant Riser (SCBR) system. Spread wells similar to that used with the Shell Auger TLP are located at the mudline with shutoff valves in simple trees, and from them dual tubings encased in rigid riser sections extend to a "crown" location approximately 400 feet below the water surface. Upward from the "crown" the dual tubing is extended by flexible risers sections which first droop downward and then rise to the interior of the lower hull of the FPV. From that position the flexibles rise to the deck where they are attached to manifolds. This concept could provide an economic and reliable means of developing future deepwater fields, possibly more economic than TLP and TLWP concepts now being considered.

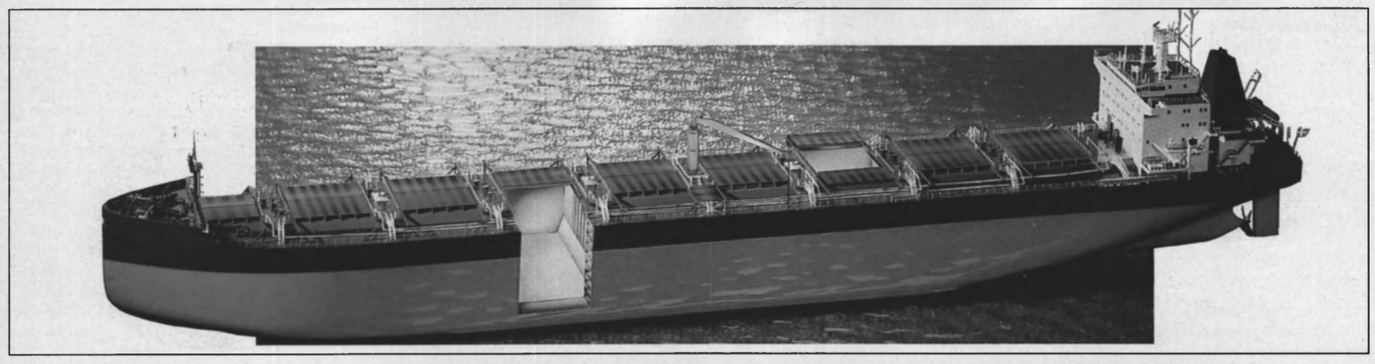
The Joint Industry Project is planned in three phases. Phase 1, which will start October 1, 1991, is scheduled to complete in mid-February of 1992. Phase 2, now planned for the summer of 1992, will be a model test which will be subcontracted to Marintek in Trondheim. Phase 3 will be a detailed design phase, and it is now scheduled for 1993.

For additional information,

Circle 35 on Reader Service Card.

—THE PANAMAX CARRIER—

New Generation Of Vessels From Burmeister & Wain Shipyard



BCT85 Designed To Meet U.S. Oil Pollution Act Of 1990 Can Be Delivered As Either Product Carrier Or OBO Carrier

SHIPOWNERS who want an effective carrier with the highest possible flexibility, will find the answer in the new generation of Panamax vessels from Burmeister & Wain Shipyard (B&W). This latest Panamax-beam ship design from B&W takes the concept of fully double-skinned construction yet a stage further.

The new design, the BCT85, incorporates 2-meter spacing between shells and can be delivered as either a product carrier or an OBO carrier.

In both versions, the vessel is more effective than conventional Panamax-sized carriers, and due to higher cargo capacity and lower operating costs, the BCT85 has a higher earning potential.

The new 80,500-dwt class is designed with double hulls, as required by the U.S. Oil Pollution Act 90, and conforms with U.S. Coast Guard Regulations relating to new, oil-carrying vessels entering U.S. waters.

The wheelhouse is equipped with all the electronic communications, navigation and weather-reporting facilities of a modern navigation bridge. Maneuvering of the vessel is divided in practical main functions and grouped in the work stations:

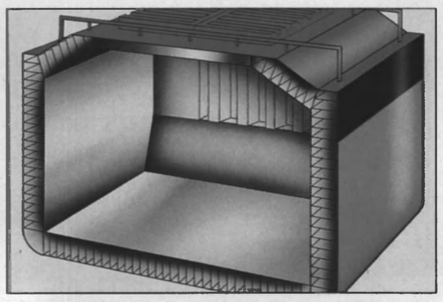
- Route Planning Station
- Navigation Work Station
- Traffic Surveillance and Maneuvering Station
- Instrument and Alarm Panel

Maneuvering consoles are placed on each bridge wing.

The purpose of the double hull is to increase safety. But the double hull also has an important function as ballast tanks, as well as an effective insulating effect, thus reducing the costs of heating cargoes such as crude oil.

Another advantage of the double hull is that all structural reinforcement is located between the hulls. Therefore, the sides of the tanks or the holds are smooth and entirely free of sharp edges. This ensures easy and effective maintenance — and high cargo flexibility, due to the easy-to-clean tanks.

Burmeister & Wain Shipyard has been building double hull vessels since 1984. This experience ensures the highest possible utilization of the double-hull concept.



All structural reinforcement is located between the hulls. Therefore, the sides of the tanks or the holds are smooth and entirely free of sharp edges.

Deep-well pumps for handling of liquid cargoes are placed in the bulkheads between the cargo holds.

The vessel is designed and constructed as a single-screw OBO carrier or product carrier to the rules of Detnorsko Veritos, or other classification societies to an equivalent notation.

The OBO version will, in a combination trade, Atlantic and the PT-version in product trade, A.G.-Japan, show an improved earning power.

The hull derives from the shipyard's successful Panamax carriers which have proved in practice to be among the most fuel-efficient of their type. The fuel consumption at CSR is as low as 30 tons/dny.

The BCT85 is built to minimize the crew costs, without compromising the safety of the vessel, or the standard of the accommodation facilities.

Propulsion is provided by one MAN B&W crosshead diesel engine, type 5S60 MC or equivalent, direct reversible, single-acting, two-stroke, constant pressure turbo-charged, delivering 10,900 bhp at 95 rev/min.

Auxiliary machinery consists of two MAN B&W diesel engines, type 5L23/30 or equivalent, each directly coupled to an alternator, 640-kw, 720-rpm, 3 by 440-VAC, 60-Hz; two MAN B&W diesel engines, type 6L, 28/32 or equivalent, 1,500-kw at 775-rpm, one directly coupled to an alternator, 1,200-kw, 3 by 440 VAC, 60-Hz; both engines with power take-off for hydraulic power-pack gear box; and one emergency generator at approximately 150-kw, 3 by 440-VAC, 60-Hz.

Other than an exceptionally bluff bow developed for the latest design, the hull form derives largely from the preceding classes of Panamax carriers.

In the face of increasingly tough competition from Far Eastern yards, Burmeister & Wain is one of the few European shipbuilders to have maintained a presence in the Panamax sector. For nearly 20 years, B&W has been turning out economical classes of Panamax carriers from its Refshaleoen yard in Copenhagen, Denmark.

For more details, contact:
Burmeister & Wain Shipyard A/S, P.O. Box 2122, DK-1015, Copenhagen K., fax 45 3157 11 19.

Marco Christens Third Freezer Longliner For Alaska Frontier

The Frontier Explorer, shown undergoing sea trials in Puget Sound following completion by her designers and builders, is based on Marco's successful MarcoMatic automatic longline system and a vessel with the proven ability to meet the needs of North Pacific longlining.

Marco Shipyard has continued its leadership in the development of the automated North Pacific longliner with the delivery of the Frontier Explorer to Alaska Frontier Company. It is the third such vessel for AFCO built by Marco, and comes just two years after the first was christened.

Marco introduced the freezer longliner concept to the Alaska fisheries with the conversion of an offshore supply vessel into the very successful Deep Pacific. Her experience formed the basis for the current design.

The Frontier Explorer is 135 feet 4 inches long, with a beam of 30 feet 10 inches and a depth of 14 feet 11 inches. She will carry approximately 590,000 pounds of headed-and-gutted fish in her 14,800-cubic-foot refrigerated hold.

The new vessel is powered by a Caterpillar 3512 diesel, rated at 1,175 hp at 1,600 rpm, driving a three-blade Berg controllable-pitch propeller through a Reintjes 4.94:1 reduction gear. Auxiliary power is provided by two CAT 3406T diesels coupled to 250-kw generators.

For free literature on the facilities and capabilities of Marco Shipyard,

Circle 24 on Reader Service Card

Vulkan Group Signs Contract To Build Two Chiquita Reefers

German shipbuilders Bremer Vulkan AG and Schichau Seebeckwerft AG of the Vulkan Group recently signed a contract with United Brands/Chiquita, represented by the Great White Fleet Ltd., for the construction of two refrigerated cargo vessels.

The order for the reefers is a repeat of a 565,000 cubic foot capacity design. Bremer Vulkan has delivered four of these ships to date.

The new ships are scheduled for delivery at the end of 1992 and the early part of 1993 and will join the Chiquita fleet.

The ships will be built by Schichau Seebeckwerft.

Financing for the ships was arranged by a German bank consortium.

Leevac Shipyards Converts Two Vessels

On April 3, 1991, Leevac Shipyards, Inc., Jennings, La., signed a contract with the OMI Ship Management, Inc. as ship managers for U.S. Department of Transportation, Maritime Administration (MarAd) for the conversion of two 180-foot offshore supply vessels to torpedo retrieving vessels. The contract price for the two vessels was $2,291,000 with a total of 84 calendar days to complete the project.

Leevac completed and redelivered the vessels on July 3, 1991.

The two supply boats (Nola Pelham built in 1981 and Crystal Pelham built in 1982) were sold by MarAd from the Reserve Fleet in Orange, Texas, to the U.S. Navy.

Now named Hugo and Hunter, the two vessels will operate out of Roosevelt Roads, Puerto Rico. Each vessel replaces vessels that were destroyed in Hurricane Hugo in 1989. The vessels will be assigned by the Navy to the Atlantic Fleet Weapon Training Facility and operated by General Electric.

For free literature detailing the facilities and capabilities of Leevac Shipyards,

Circle 33 on Reader Service Card

Progress Report On Development Of Europe's E-3 Tanker Design

The U.S. Congress adopted the Oil Pollution Act of 1990 in August of last year, which includes technical requirements of full double hulls in tankers to reduce accidental oil pollution risks. The International Maritime Organization is now working to develop international regulations. In principal, various alternatives backed by other countries are being studied in addition to the American proposals. It is likely that new MARPOL 73/78 amendments will be in force in 1993 or 1994.

Owners Opposed To Double Hulls

Many shipowners are opposed to mandatory double hulls for oil tankers, and favor instead the approval of equally effective alternatives to deal with oil spills. However, even before approval of OPA 90 (since early 1990, nearly all contracts for large tankers have been placed for double-hull designs or have an option to convert to one). Many of these options are being exercised. According to the latest figures, orders for 87 double-hulled tankers, including 10 on option, have been placed worldwide by shipowners to date.

This might be due to the fact that double hulls will be the only new tanker type allowed in U.S. waters after 1994, pending adoption of new IMO regulations and possible related amendments to OPA 90.

New Double-Hull Tanker Designs

Due to this commercial pressure, and with great technological effort, shipyards are redesigning their standard tankers to include double hulls. The first new double hull designs appeared in the market in 1990, and by now few single skin ships are being commercialized by yards, including IMO III type chemical tankers.

For example, Astilleros Espanoles S.A. (AESA) has redesigned, or is redesigning, all its standard tankers to comply with OPA 90 requirements; chemical tankers from 8,000 dwt to 46,000 dwt, shuttle tankers of 125,000 dwt and Suezmax tankers of 145,000 dwt.

New From Europe, The E-3 Tanker

The renewed interest in reducing accidental oil pollution from tankers, coupled with the age of the existing tanker fleet, has created a concern among European shipping and shipbuilding interests regarding the Far East domination in this market segment and made desirable a European reentry in this market. Meetings have been held between five leading European shipyards since the fall of 1990. As a result of these meetings, the five yards—AESA of Spain, Bremer Vulkan and Howaldtswerke Deutsche Werft, both of Germany, Fincantieri SpA of Italy and GEC-Alsthom Chantiers de l'Atlantique of France—have decided to develop a new generation of supertankers that would reflect the new market character around the year 2000. The three basic aspects of the project are:

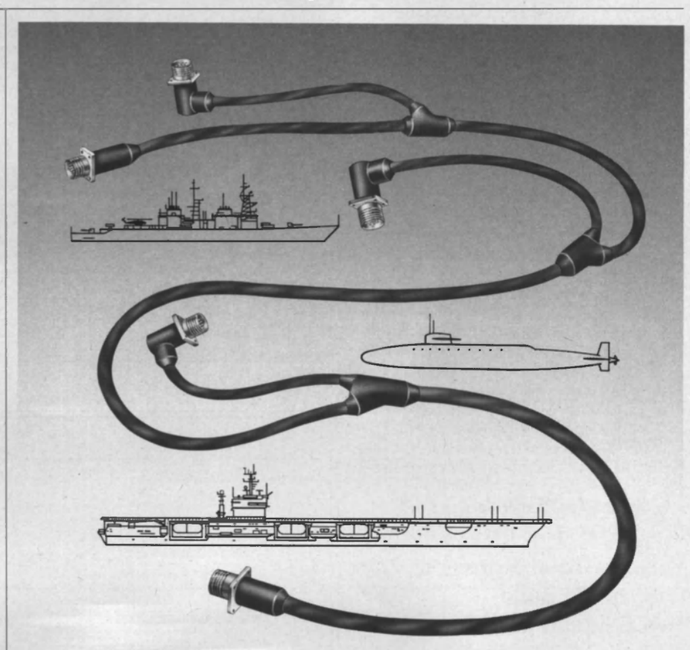
Ecological—providing far greater protection against accidental pollution of the seas than previous designs;

Economical—providing competitive running costs in comparison with other alternative designs in the market; and

European—featuring European industrial products; being technologically advanced and suitable for competitive production.

In the E-3 Project technical work, the prevention of accidental pollution has given the same importance, in terms of time and resources, as other traditional aspects of the project, such as naval architecture, structures or machinery and equipment. The basic principle is to reduce accidental pollution by all means available, with an objective of "zero pollution."

The E-3 concept is based on the analysis of the chain of events needed to go from a vessel sailing without



problems, to a harmful pollution of the marine environment. The chain of events begins with an incident or hazardous situation which results in an accident involving the cargo tanks. Cargo oil escapes from the tanks and the vessel, causing an uncontrollable spill and resulting in oil pollution.

Therefore, when fighting against accidental pollution, there is the chance of intervention at each link of this fateful chain. Severing any one of the links is sufficient to avert pollution. Most groups working on this problem, including owners, the Congress and IMO, have concentrated on the central links of the chain on protection of cargo tanks by means of a double hull, and the containment of cargo on board by the action of hydrostatic pressure, vacuum and overflow to other intact tanks.

The E-3 Project goes even further and tackles the problem along its entire range. Means are being analyzed to:

- Improve navigation systems to prevent hazardous situations;
- Improve safety systems to prevent hazardous situations degenerating into accidents;
- Protect cargo tanks against internal and external damage in the event of explosions, collisions and groundings;
- Adopt measures and systems to keep the cargo within the vessel in the event of the tanks rupturing;
- Have equipment on board for cargo containment operations and cleanup in the event of a spill.

According to research by the E-3 Project, 80 percent of accidental spills into the sea are caused by human error. Therefore, the E-3 tanker will feature what it calls "fail-safe" characteristics in her design that will contribute to control the consequences of such errors.

The E-3 Project is developing an open design whose leading features can be incorporated in tankers of any size designed to meet the specific requirements of each customer. However, initial work has centered around a VLCC size vessel of two million barrels capacity, with a deadweight tonnage of 280,000 tons and equipped with special collision avoidance systems. The service speed takes into account current trends towards relatively fast ships, and may be adjusted up or down, according to customer specifications. The specific technical details of the E-3 Project are still confidential and will not be published until later this year.

Editor's Note: This article is excerpted from a recent speech by **Rafael G. Fraile**, the head technical manager at Spanish shipbuilder Astilleros Espanoles S.A. and the lead manager of the team of five European shipyards working on the technical and marketing matters of the "E-3 Tanker Project," a new double-hull, two- million-barrel-capacity VLCC design.

Conrad Industries Delivers Drydock, Three Deck Barges

The steel floating drydock Terminales, built by Conrad Industries, Inc., Morgan City, La., for foreign owner Terminales Maracaibo, C.A. of Maracaibo, Venezuela.

The Morgan City, La., shipyard of Conrad Industries, Inc., recently delivered a floating drydock and three deck barges to separate domestic and international owners.

The steel floating drydock, with a length of 120 feet overall and a width of 52 feet, was delivered to Terminales Maracaibo, C.A., of Maracaibo, Venezuela.

Two of the deck barges were delivered to Cashman Brothers Marine Contracting Co., Inc., Quincy, Mass. The oceangoing deck barges are ABS classed and have an overall length of 220 feet and breadth of 54 feet, with deck, side and bottom plating of 1/2-inch steel.

A smaller deck barge, with an overall length of 120 feet and 45-foot beam, was delivered to Moter S.A. of Fort-de-France, Martinique, French West Indies. She is Bureau Veritas classed.

For free literature detailing the vessel construction capabilities of Conrad Industries,

Circle 3 on Reader Service Card

Tin-Free Self-Polishing Antifouling Introduced By Hempel's Marine Paints

Hempel's Marine Paints A/S has announced the introduction of their second generation of tin-free self-polishing antifoulings: Hempel's Nautic Tin-Free 7190.

The product is based on extensive research carried out at Hempel's research centers in Copenhagen and Barcelona, and is the result of a total commitment by Hempel's to the development of environmental-friendly antifoulings—a culmination of carefully planned and targeted research programs started in 1976.

According to the Hempel Group's technical director, **Niels Conradsen**, Hempel has invested heavily in antifouling research and the new product, which will be followed by further developments based on even more advanced technology within the next few years.

Hempel's Nautic Tin-Free 7190 is based on extensive practical testing of similar compositions which have provided satisfactory performance under various conditions for periods approaching four years.

According to Hempel's worldwide marketing manager, **Svend Johnsen**, Hempel will continue to market antifoulings according to the "tailor-making" philosophy, which means that the new product will be specified according to the vessel's operating conditions. We are confident that the new product will be able to provide drydocking intervals up to five years, Mr. **Johnsen** said, but until we have sufficient practical results to prove that we shall only specify it up to 48 months.

Provided that the existing primer and antifouling system is sound, the new antifouling can be applied directly on top of tin containing self-polishing antifoulings, ablative antifoulings and the Classic types.

For further information and free literature on Hempel's Nautic Tin-Free 7190,

Circle 42 on Reader Service Card

Westmont Industries Delivers Third Navy Barge Crane

Westmont Industries, Santa Fe Springs, Calif., recently delivered the third of a series of five 100-long ton barge cranes, YD-248, to the U.S. Navy.

The floating cranes, engineered fabricated, assembled, tested and delivered by Westmont, are to be used at various naval activities, with four cranes to be located on the East Coast and the other on the West Coast. The single-deck barge has a reinforced cargo deck area, boom rest, crew spaces, auxiliary and diesel engine generator, shoe power back-up, capstans and other accessories.

The fully revolving diesel-powered crane has a luffing boom and three independent hook hoists. The main hoist has a rated main hoist capacity of 100 long tons at an 80-foot radius, an auxiliary hoist capacity of 38,000 pounds and a whip hoist capacity of 10,000 pounds.

For free literature detailing the capabilities of Westmont Industries,

Circle 93 on Reader Service Card

Viking Fender Appointed Goodyear 'Ship-Side' Marine Fender Distributor

Viking Fender Company of Sea Bright, N.J., was recently appointed by Goodyear Tire & Rubber Company as a distributor of "Ship-Side" Marine Fendering.

Viking will distribute both molded and extruded rubber in rectangular, D-Shape, and wing-type fenders for tugs, barges, workboats, ferries and similar hard-working vessels.

Viking Fender manufactures laminated marine fendering.

The 1991 edition of Viking Fender Company's catalogue is now available. For a free copy,

Circle 21 on Reader Service Card

New Asmar Floating Dock To Become Operational In October

The new 1,200-ton-lifting-capacity floating dock, which Asmar Shipbuilding and Docking Company of Chile is building as part of its modernization program for its Talcahuano shipyard will be launched this month and become operational in October.

Developed by Asmar itself, the new dock has been specifically designed to carry out the repair of fishing vessels and other types of smaller vessels.

The dock, which is about 262.4 feet long by 59 feet wide, is of box type with lateral rectangular walls. The lifting time for a 1,200-ton vessel will be one hour 15 minutes.

For free literature on the facilities and capabilities of Asmar Shipbuilding and Docking Company,

Circle 54 on Reader Service Card

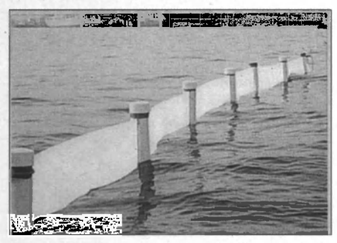
Argo Marine Opens New Spare Parts Procurement Office In Largs, Scotland

Argo Marine recently announced the opening of a new spare parts procurement office in Largs, Scotland.

The new office will be managed by **Alistair McGowan**, formerly purchasing manager of Kvaerner-Kincaid Shipyards.

Mr. **McGowan's** primary responsibility will be to source European marine spares for Argo Marine's locations at New York, N.Y., Virginia Beach, Va., New Orleans, La., and San Francisco, Calif.

Oil Containment Systems Use High-Performance Spectra Fibers From Allied Signal



Spectra fabrics can play a significant role in helping to contain mammoth oil spills, such as the one in the Persian Gulf.

Environmental cleanup and pollution control are on nearly everyone's list of critical problems. In light of the enormous spill in the Persian Gulf, immediate action is required.

Spectra fabrics are part of the solution. A Spectra fabric is today being used in the first workable oil containment system employing high-performance fibers. The system, called Oscar Boom for spill control, is produced by Oscar International, of Winston-Salem, N.C. (Oscar is an acronym for Offshore Surface Cleanup and Recovery.) It uses a vertical floating containment fence employing a specially treated woven Spectra fabric supported by patented flotation spars. The fabric is treated so that water can flow through but oil and other floating pollution cannot.

Here, Spectra's great strength-to-weight ratio, low specific gravity and chemical resistance are key to its superiority. Spectra's strength and low specific gravity allow it to stand upright in the water, while other fabrics previously used in this application were weaker and tended to drape, said **Paul Weber**, president of Integrated Textile Systems, Inc., Monroe, N.C.

"It is the perfect material for the application," said **James Neal**, president of Oscar International, who invented the Oscar Boom. "Its great strength allows it to take all the strains involved in the recovery process. And Spectra's inert quality resists oil, saltwater, salt water, saline, ultraviolet rays and acids."

The Spectra fabrics create an additional environmental advantage," Mr. **Weber** stated. "The fabric-and-oil combination doesn't have to be buried, as with previous containment systems. It can be incinerated or burned as a fuel when it is no longer needed."

"The Oscar System using Spectra is being commercialized in the first half of 1991," said Mr. **Weber**. "Integrated Textile Systems is working with a major U.S. oil company and a European government to develop this technology."

For free literature detailing Spectra fibers,

Circle 59 on Reader Service Card

Premiere Introduces New Cost-Cutting Welding Module

Premiere, Inc., Broussard, La., recently unveiled a new unitized welding module that replaces up to seven individual welding units. The module, designed to reduce costs while improving efficiency, is the first of its kind manufactured specifically for the oil industry.

In the process of looking for a more dependable and efficient method of providing the customer with the required welding equipment, Premiere developed the unitized welding module. At its heart are two diesel-engine-driven generators. Each is capable of powering seven welding machines. Premiere recommends using a maximum of six welding machines and one generator while retaining the seventh welding machine as a standby. The second generator provides 100 percent backup electrical power.

Lee Matherne, president of Premiere, explained that "With this module, only one unit is required, rather than seven boxed welders. It can be operational less than 15 minutes after it is on board."

For more information and free literature on the new cost-cutting welding module from Premiere,

Circle 100 on Reader Service Card

Viking Introduces New 35-Person Davit Launched Life Raft

A new davit launched life raft is now available for emergency evacuation of passengers from large ships. The system was developed with ultimate concern for passenger safety and comfort by Viking Life Saving Equipment, a Danish manufacturer of lifesaving products for the marine industry.

The raft accommodates 35 people. Its large-capacity significantly reduces the need for a greater number of smaller rafts and davits. Equipped with an emergency pack and all other equipment required by SOLAS, it also meets IMO regulations for lifesaving equipment. It has also passed severe wind tunnel and sea trial wind force tests.

A great advantage of the davit launched raft is that it allows boarding on deck, after which the raft is lowered to the water and released from the ship. The dangers of jumping from deck to the raft or entering from the water are eliminated.

For further information from Viking Life Saving Equipment,

Circle 58 on Reader Service Card

Centerline Power Offers Brochure On Products And Services

Centerline Power, Inc. of Longmont, Colo., has successfully completed pilot production of the first Sulzer RND fuel injection nozzles manufactured in the U.S. The run includes large nozzles for 90-cm bore engines.

This achievement marks the culmination of over nine months of intensive design, engineering and research effort by Centerline. Regular production of nozzles for two-stroke engines began in July and includes Sulzer RTA needle and guides and circulating valves.

Centerline, established in 1986, specializes in the manufacture and repair of fuel system components for two- and four-stroke marine diesels.

For complete details on Centerline products and services,

Circle 20 on Reader Service Card

Oil Spill Control Video Offered By Breg-Oil Sponge International

A video presentation has been produced by Breg-Oil Sponge International, Inc. describing the company numerous sorbent products. The video shows various sorbent applications and explains how the sorbents work, as well as showing the latest technology for controlling spills.

The company manufactures sorbents for most every need. Oil spills on water—toxic liquids and aggressive chemicals—nonaggressive chemicals and common industrial fluids.

For more information,

Circle 16 on Reader Service Card

Didier Keller Named President Of IMODCO

IMODCO Inc. recently announced the appointment of **Didier Keller** as president of the company to replace **Robert C. Byrd** who resigned to pursue other interests in the offshore oil and gas industry as a private consultant.

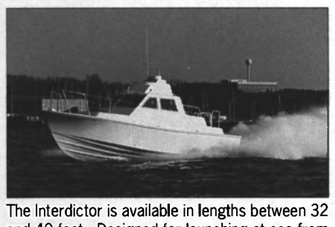
Mr. **Keller**, formerly executive vice president of IMODCO Inc., also served with IMODCO Inc.'s sister company SBM Inc., and has over 15 years of experience in the single-point mooring industry, holding positions of increasing responsibility in project management, operations, engineering and marketing.

IMODCO Inc. is a member of the IHC/Caland Group of international marine technology oriented companies, whose business is to serve the offshore oil industry and the dredging/mining industry.

For free literature on the products and services offered by IMODCO Inc.,

Circle 27 on Reader Service Card

HMVG Delivers New Interdictor Patrol Boats To Taiwan Customs



The Interdictor is available in lengths between 32 and 40 feet. Designed for launching at sea from a larger ship, the boats cruise at 30 knots with a maximum speed in excess of 35 knots. Beam is 11 feet 8 inches and draft is only 23 inches.

The Hood Military Vessel Group (HMVG) of Hood Enterprises, Inc. has completed delivery on a three-million-dollar contract for eight custom, deep-V hull patrol boats to the Taiwan Customs Service. Used to patrol and combat smuggling in the Formosa Strait between Taiwan and the Republic of China, the patrol boats are one of nine "Interdictor" designs available from HMVG.

HMVG markets military and municipal patrol boats to governments, port authorities and agencies worldwide.

The HMVG Interdictor is able to self-right, restart and run all systems after a 360-degree rollover. The 40-foot offshore Interdictor designed for the Taiwan Customs Service carries a crew of six in a watertight, fully air-conditioned pilothouse with reinforced Lexan windows.

Developed by boat designer **Ted Hood**, the Interdictor hull and superstructure construction consists of fiber reinforced plastic with unidirectional S- and E-glass, Kevlar, aircraft grade balsa core and vinylester resin to achieve maximum strength with minimum weight. The deep-V planing hull provides excellent handling in heavy seas.

The boats are powered by twin Cummins 300 engines and Arneson drives and feature dual lever engine controls and trolling valves for low-speed maneuverability.

For more information on boats marketed by Hood Military Vessel Group,

Circle 44 on Reader Service Card

NASSCO Names Grothen Director Of Repair

National Steel and Shipbuilding Company (NASSCO) has announced that **Richard Grothen** has been named director of repair.

Mr. **Grothen** will have overall responsibility for the repair and conversion of U.S. Navy and commercial ships at NASSCO. He will also direct maintenance operations for the shipyard.

He joined NASSCO in 1981 as manager of support services and later served as director of new construction outfitting.

Circle 310 on Reader Service Card ➔

Soviet Icebreaker Traverses North Pole, Arctic Ocean During 21-Day Expedition

The Soviet nuclear-powered icebreaker Sovetskiy Soyuz recently arrived at the Bering Sea Port of Providenya in the Soviet Far East, completing what is called the first-ever crossing of the North Pole and Arctic Ocean by a surface vessel.

The vessel carried 54 Americans among its 90 passengers, according to Stamford-based Salen Lindblad Cruising and Quark Expeditions.

On July 26, the icebreaker sailed from Murmansk in the western Soviet Union and reached the North Pole on the morning of August 5, according to Salen Lindblad. Passengers paid up to $25,000 each to join the 21-day expedition, which is also the first to carry so many Westerners and paying passengers aboard a member of the Soviet Arctic fleet.

The Sovetskiy Soyuz's 75,000-shp drives her through pack ice 5 feet thick at speeds up to 10 knots

The nuclear-powered vessel has a cruising speed of 18.8 knots when not cutting through the ice. She weighs 21,000 tons, is 500 feet long and has 2-inch-thick steel at bow.

The Cummins-powered Miss Ellis Island, built by Blount Marine, is certified to carry 775 passengers on excursion trips between the island and New York City's Battery Park.

Cummins-Powered Passenger Vessel 'Miss Ellis Island' Delivered To Circle Line By Blount Marine

Blount Marine Corporation, Warren, R.I., recently delivered the passenger vessel Miss Ellis Island to Circle Line Statue of Liberty Ferry, Inc. The vessel was designed by naval architect **Robert A. Simons**, and is certified to carry 775 passengers on excursion trips to Ellis Island.

The Immigration Center on the island has recently been refurbished. Ellis Island itself has been made part of the National Park System.

The vessel contains several unusual features due to its dockage and route. One of these features is the watertight bumper pipe with a solidly welded insert plate. The bumper is built for protection from the heavy surge at the Battery pier in lower Manhattan. Also unusual is the oil-lubricated shaft bearing, made by the Golten Group of Norway, which lubricates and protects the shafts. The design also features a profile with rounded stern and capped pilothouse in keeping with the look of the famous Circle Line fleet.

The Miss Ellis Island brings the total of Blount-built vessels in the Circle Line Statue of Liberty Ferry fleet to five.

For free literature on the facilities and capabilities of Blount Marine,

Circle 11 on Reader Service Card

MISS ELLIS ISLAND
List of Suppliers

Main engines	Cummins
Generators	Cummins
Engine Controls	Mathers
Wire	L.F. Gaubert
Signal system	Hose-McCann
Decking	Products Research
Electronics	Furuno-Icom
Bearing	Golten Group
Bow thruster	Schottel
Deck/manholes	L.S. Baird
Propellers.	Bird-Johnson
Ventilation.	Aerovent

Correction

An article in the April issue recently omitted the fact that Raytheon Marine Company manufactures advanced high seas commercial radar in the U.S. Raytheon has produced commercial marine radar for over 40 years. The firm currently manufactures radar, including its Pathfinder/ST, at its Hudson, N.H., facility.

Centofanti Purchases Schroder Bellows Product Line Of Parker-Hannifin

Centofanti Marine Service, Inc., West Elizabeth, Pa., recently announced completion of the purchase of the Schrader Bellows Marine Controls product line of Parker-Hannifin Corporation, Akron, Ohio. Included in the sale are all existing inventory, tooling, test fixtures, engineering documentation and trade names Gear-Mate II, Mariner Mark IV System and Commandair Valves.

Schrader Bellows has been a leader in the manufacturing of gear and engine control systems with both fully pneumatic and electric over pneumatic systems. These systems are compatible with either hydraulic or air-flex clutches.

Gabe Centofanti, president, said the name will change to Centofanti Marine Systems, Inc. due to legal requirements, but that and the address is all that will change. We remain dedicated to the quality product and designs as well as first class service to our distributors and customers, he added.

For further information on Centofanti Marine Systems,

Circle 49 on Reader Service Card

Shell Offshore Teams With Houston Marine For Stability Training

Shell Offshore Inc. (SOI) has commissioned Houston Marine Training Services to develop a 10-day stability training program. SOI will use the completed package to train selected drilling foremen and marine personnel assigned to the company's tension leg platform.

Forty percent of the training will be oriented toward tension leg platforms, and the remainder to standard surface drilling units.

The course will be submitted for Coast Guard approval so that attendees can meet the training requirements for licenses as ballast control operator, barge supervisor, and offshore installation manager.

Corps Of Engineers Says Missouri River Season Will Not Be Extended

The U.S. Army Corps of Engineers in Omaha, Neb., has announced that the 1991 commercial navigation season on the Missouri River will not be extended beyond November 1 because storage in the reservoirs has not recovered sufficiently.

Col. **Donald E. Hazen**, Corps of Engineers Missouri River Division engineer, said, "While the Missouri River basin has received much improved snowmelt and rainfall runoff in May and June, storage is inadequate to trigger an extension to November 15."

The opening of the 1991 navigation season was delayed one week in April, and the season length will be shortened by advancing the closing date from December 1 to November 1. In addition, minimum service flows are limiting barges to 7-1/2-foot drafts rather than 8-1/2-foot drafts throughout the five-week shortened season.

Ronald Swart Joins Willard Marine, Inc.

Ronald L. Swart has joined Willard Marine, Inc. of Anaheim, Calif., as manager, R.I.B. Division. Mr. **Swart** has over 10 years' experience in the R.I.B. and inflatable boat business, and over 20 years in the marine industry. He has been active in the Southern California Marine Association, recently serving as chairman of the 1991 Los Angeles Boat Show Committee. One of the first orders of business for Mr. **Swart** will be to set up a national sales representative program to market Willard's Sea Force R.I.B. line.

In business for over 30 years, Willard Marine is a designer and builder of fiberglass Rigid Inflatable Boats (R.I.B.) and other boats from 18 to over 60 feet in size, principally for commercial and military markets.

Meyer Werft Delivers Fifth In Series Of Six Gas Tankers To AKP 'Sovcomflot' In Moscow

The cargo tanks on the Saulkrasti are designed for maximum pressure of 5.4 bar and 30 percent vacuum, and for a lowest transport temperature of -48 degrees C. The gas plant enables the ship to cool down, warm up or maintain all cargoes at any requested working temperature. With a total pump capacity of 1,500 cubic meters an hour, time of discharge is about 10 hours.

Meyer Werft of Papenburg, Germany, recently delivered the fifth ship of a series of six LPG/Ammonia/VCM carriers to AKP "Sovcomflot," Moscow. Some days before delivery, the 16,250-dwt tanker was named Saulkrasti, from a place in the Gulf of Riga.

The yard had already delivered one gas tanker in January this year, and in autumn the last unit of the series of six vessels will be handed over. Upon completion of the series, the yard will have built a total of 45 liquefied gas tankers.

Like all the other ships of the series, the 518-foot-long by 69.8-foot-wide Saulkrasti is owned by "Sovcomflot" and will be operated on their behalf by Acomarit (UK) Ltd., Glasgow.

The vessel is propelled by one MAN B&W two-stroke main engine, type 6L50MCE, developing 5,820 kw (7,920 hp) at 141 rpm; the propeller speed is 141 rpm. The main engine is capable of burning heavy fuel oil up to IF 380 (3,500 sec. Redwood I).

Electrical power is supplied by three MAN-B&W generating sets with A. van Kaick generators.

Unattended operation of the machinery space is possible in compliance with the regulations.

For free literature on the facilities and capabilities of Meyer Werft,

Circle 25 on Reader Service Card

NKK Breaks Into LNG Carrier Market

The recent award of a 19,000-cubic-meter-capacity LNG carrier to Japan's Nippon Kokan K.K. (NKK) marked a significant breakthrough for the company into this highly technological construction market.

Ordered by a Japanese company, the LNG carrier will feature a new NKK membrane design and will be used to supply medium-sized cities in Japan. Construction is expected to start later this year with delivery scheduled for the latter half of 1993.

NKK has had recent success, posting orders for seven ships during 1990-91.

Ohmec International Introduces New Diesel Fuel Monitor

Ohmec International Corp., manufacturers of Ohmec onboard contaminant monitors for aircraft, has recently introduced the "Water Witch."

The Water Witch is a solid-state, portable instrument designed to detect water in marine diesel fuel. An audible alarm alerts the operator whenever the 28-inch-long sensing rod comes in contact with water, thereby reducing possible costly water damage to engines and fuel systems.

The Water Witch is a hand-held instrument powered by a 9-volt transistor battery that, when inserted into diesel fuel, sounds an audible alarm if water contact is made. A storage tank unit is also available.

For further information and free literature on the Water Witch from Ohmec Intenational,

Circle 19 on Reader Service Card

Oceaneering To Work On Three Platforms Offshore California

Oceaneering International, Inc., Houston, Texas, has been awarded a contract to provide diving, atmospheric diving system (ADS), and remotely operated vehicle (ROV) services on Exxon's Harmony, Heritage, and Hondo platforms offshore California. The work will be performed by Oceaneering's Santa Barbara office.

Work is scheduled to begin this month on the Harmony and Heritage platforms, with the first phase of operations involving structural modifications in water depths up to 960 feet seawater.

Work on the Hondo platform includes installation of clamps and risers and preparations for the pipeline tie-ins, which Oceaneering will perform in the spring of 1992. A team of over 50 divers, welders, ROV personnel, and ADS operators will be mobilized for the project, which is scheduled for completion by summer 1992.

New Japanese Report Warns Shipyards Not To Expand Capacity

A new report recently published by a Japanese research institute states that adequate worldwide shipyard capacity exists to handle the projected orders for VLCCs during the 1990s. The report can be seen as a warning to yards which have plans to expand their present capacity by upgrading present facilities or building new ones.

The report, "Changes in the World's Shipbuilding Facilities for Large Size Vessels," published by the Japan Maritime Research Institute, says that 27 likely VLCC building facilities which exist at present are sufficient to handle the demand for 350 VLCCs during the 1990s.

JMRI maintains that it is in the best interests of Japan, South Korea, and Western Europe to closely coordinate the supply and demand conditions which exist at present in order to maintain profitable shipbuilding prices.

Miba Marine Bearings, Used Throughout World, Extend Engine Service Life

Miba Gleitlager AG of Austria produces engine bearings—components, which have a considerable influence on the performance, operational reliability and service life of an engine.

Throughout the world, more than 60 engine manufacturers trust Miba bearings. Miba's quality is the result of permanent development activities, as well as pioneering measuring techniques and is reflected in the number of Miba licenses granted.

The bearings are proving themselves in series production of four-stroke engines of all sizes from the most demanding con rod bearings of small diesel engines up to large ship engines in heavy oil applications.

For further information and free literature on Miba bearings,

Circle 12 on Reader Service Card

Infinitive Offers Free Literature On Diesel Engine Parts

Infinitive, Inc., a producer of diesel engine components, plans to manufacture and distribute Detroit Diesel 53, 71 and 92 Series cylinder kits with 100 percent U.S. content. Pistons, liners and piston pins will be produced at Infinitive's Germantown, Wis., facility and packaged with U.S.-made piston rings in an effort to supply the Detroit Diesel aftermarket with a cost competitive cylinder kit.

Infinitive anticipates having this program fully implemented by the December 1991. This program is part of a long-range objective for Infinitive to establish its position as a quality OEM alternative.

For free literature detailing Infinitive's aftermarket Detroit Diesel cylinder kits,

Circle 94 on Reader Service Card

Single-Hull VLCC Price Will Reach $128 Million By Year 2005

Study Released By Ocean Shipping Consultants - U.K.

Prices for very large crude carriers (VLCCs) with single hulls (SH) will reach $128 million by 2005, predicts Great Britain's Ocean Shipping Consultants (OSC) in a recently-released study. The report, which builds on OSC's 1989 study, continues to maintain that ordering levels will drop over the 1991-1993 timeframe, and prices will follow suit. However, although orders definitely fell during the last quarter of 1990 through the first quarter of 1991, tanker prices have remained relatively steady.

OSC's price predictions tend to be on the conservative side. Furthermore, international prices for tankers with double hulls (DH) will be significantly higher. After accounting for these factors as well as figuring in inflationary increases, it is safe to say that the era of cheap ships is definitely drawing to a close.

The following table shows prices for recent tanker orders in three categories: VLCCs (250,000-280,000 dwt), Suezmax tankers (130,000-150,000 dwt), and product tankers of shuttle-ship size (80,000-100,000 dwt):

Recent Prices For New-Construction Oil Tankers

Dwt/Hull	No./Type	Customer	Yard	Date	Del.	Price
280,000 dwt SH w/DH option	3 VLCCs	Saudi Aramco	Mitsubishi, Japan	4/91	1993/94	$107.9m ea.[1] (Y15b ea.)
280,000 dwt SH w/DH option	3 VLCCs	Saudi Aramco	NKK, Japan	4/91	1993/94	$107.9m ea.[1] (Y15b ea.)
280,000 dwt DH	1 VLCC	Amoco, U.S.	Mitsubishi, Japan	3/91	1993	$100m +
280,000 dwt DH	1 VLCC	Onassis, Greece	Sumitomo, Japan	2/91	1993	$125m[2]
Unknown dwt, SH w/DH option	2 VLCCs	Worldwide Shipping, Hong Kong	Hyundai, Korea	5/91	1993/94	$90m ea., SH $108m ea. w/DH option
148,800 dwt 132,000 dwt Both DH	2 tankers	Mitsui-Chevron Japan-U.S.	IHI, Ishibras, Japan, Brazil	4/91	1993	$162.5m for both $81.25 ea. (estimate)[3]
95,000 dwt SH	2 tankers, shuttle ship size	Leif Hoegh, Norway	Mitsui, Japan	6/91	93	$122.3m for both (Y17b), $61m ea.
86,000 dwt DH	8 product tankers	Petroleos de Venezuela	Hyundai, Korea	Unofficial 7/91	Unknown	$65m ea. (Japanese bid: $71.5m)

[1] Saudi Aramco ship price originally quoted at $115 million (y16 billion) per ship.

[2] Price for the Onassis ship, first ordered in July 1990, was changed to reflect the double hull option, thereby increasing the original price of y13.5 billion.

[3] The price was not revealed. However, Brazil's government bank BNDES approved a $130 million loan to have the ships built. Presuming it was an 80 percent loan, the contract price for the two ships would be $162.5 million.

Liebherr Reports Brisk Demand For Deck Cranes

The vessel Erikson Crystal, showing high-speed Liebherr cranes of type CBW 5/19 Litronic, capable of working under offshore conditions.

Liebherr's leading position for deck cranes on reefer vessels continues to be confirmed by the rising number of orders placed with the manufacturer during recent months.

Among the orders presently being fabricated by Liebherr-Werk in Nenzing, Austria, and other Liebherr factories and by licensees are a total of 18 deck cranes to be delivered to Danyard A/S in Frederishavn, Denmark, and to be installed on six reefer vessels for Chiquita United Brands of Cincinnati.

Each ship will be equipped with Liebherr's new low height, slim line CBW Litronic® container handling crane. The two single cranes on each vessel have 36 tons capacity at 20 meters radius, the twin crane comes with 2 x 20 tons, also at 20 meters outreach.

This order comes directly in line with an order for 32 reefer cargo-handling cranes for eight newbuildings under construction at four Norwegian shipyards (Kleven, Aukra, Langsten) for a Danish/Finnish group of owners (Lauritzen, Erikson, Holming). In this case, each vessel will have two CBW 8/20 Litronic and two CBW 36(20)/21/22.5) Litronic (the latter means 36 tons to 21 meters radius and 20 tons to 22.5 meters).

Still under delivery is a contract for 48 high-speed CBW 5/19 Litronic cranes, capable of working under offshore conditions, for 12 vessels. Electronic control of motions and fairleaders allow work in Union Purchase mode.

For free literature on cranes from Liebherr,

Circle 26 on Reader Service Card

Hamilton Waterjets Power Fast Ferry

Narvik Mek. Industri A/S (NAMEK), located in Narvik in northern Norway, recently delivered the Inpesca 10, a 90-passenger, 53-foot fast ferry powered by Hamilton waterjets.

The innovatively designed boat is propelled by a Hamilton waterjet propulsion system, consisting of Hamilton 362 waterjets coupled to Volvo TAMD 122D engines, each rated at 444 hp. The waterjets propel the 16-ton vessel up to 31 knots in lightship conditions. With its load of 90 passengers, an extra 6 tons, a cruising speed of 24 knots is maintained.

The hull form incorporates deep pontoon chines on each side of the center section. This configuration gives high lift and significantly reduces wave generation giving a low friction hull which is easily driven by the low drag Hamilton system. The net result is a high-speed vessel, still capable of planing even at low speeds, with relatively small engines.

The high-speed ferry is destined for operation in Nicaragua.

For free literature detailing Hamilton waterjets,

Circle 1 on Reader Service Card

New Software Group Responds To Industry Call

A new organization of professional software developers, International Marine Software Associates (IMSA), has been established in response to a need for enhanced marine design and construction software products.

For additional information about IMSA or IMSA member products, contact Ms. **Jill L. Aaron**, c/o HydroComp, Inc. at (603) 659-2660.

SPECIAL
TRIPLE BONUS
FOR ADVERTISERS!

MARITIME

E

NOVEM

TRIPLI
IS

EXTRA BONU
AT THESE TH

10th S.N.A.M.E.
MARITIME
SOCIETY OF NAVAL ARCHITECTS AND MAR
IN NEW YORK

INTERNATIONAL
IN NEW ORLEA

MARIC
IN GERMANY

WITH **ONE** ADVERTISEMENT...AT **ONE** COST...YOU **CAN BE** THERE, SELLING AT THREE OF THE MARINE INDUSTRY'S

BEST EVENTS.

PLUS...ONLY MARITIME REPORTE**R** BACKS YOUR ADVERTISING WITH THE SALES POWER OF THE **WORLD'S LARGEST TOTAL MARINE INDUSTRY CIRCULATION.**

WITH FEATURES COVERING BOTH THE DEEP DRAFT AND SHALLOW DRAFT SECTORS OF THE MARKET...AND THE THREE-SHOW EXTRA DISTRIBUTION...THIS NOVEMBER ISSUE WILL BE THE BEST READ IN YEARS...AND THE MOST PRODUCTIVE FO**R** ADVERTISERS.

RESERVE ADVERTISING SPACE NOW...
TAKE ADVANTAGE OF THE TREMENDOUS READER INTE
GENERATE. RESERVE YOUR AD SPACE TODAY! CALL

Upcoming Events

Marine Spill Response Corporation. For registration information, con-

Petroleum Tankship Operations course in Houston, Texas

tanker fleet will be among the topics discussed. Contact **Harold D.**

Magnavox Installs New Differential GPS System In Scandinavia

Ships maneuvering through the narrow twisting channels leading into Stockholm and Helsinki can now navigate with greater accuracy and confidence, thanks to an innovative new differential GPS system which has recently been installed by Magnavox.

The system was developed by Magnavox under contract with the Swedish Maritime Administration and the Finnish Board of Navigation.

The differential navigation system uses land-based reference stations to monitor the signals broadcast from the satellites in the Global Positioning System (GPS). Each reference station computes corrections for the satellite ranges. These correction factors are then transmitted to ships, vehicles or aircraft fitted with GPS receivers, thereby providing a substantial improvement in position-fixing accuracy.

The systems in Sweden and Finland are the first operational systems to use marine radio beacons to transmit the differential GPS correction factors.

Several large passenger ferries are already using the system with excellent results. The differential GPS data is being integrated with the ships' radars and enhanced electronic chart systems, providing highly accurate navigation through channels that are at times no more than twice the width of the ship, even during restricted visibility.

For further information and free literature from Magnavox,

Circle 10 on Reader Service Card

Bender To Lengthen, Overhaul Research Vessel

Bender Shipbuilding & Repair Co., Inc., Mobile, Ala., recently received a contract worth $4 million to lengthen, overhaul and reactivate the research vessel Western Strait.

The Western Strait will be renamed Ka'Imikai-O-Kanaloa and will be operated by the University of Hawaii for the Hawaii Undersea Research Laboratory Program in Honolulu, Hawaii.

Under the contract, Bender will extend her present length of 185 feet to 222 feet by adding a midbody. Other work under the contract will include the addition of quarters, laboratories, scientific equipment and submarine handling gear with various auxiliary equipment, storage and public spaces to support a total of 36 personnel.

Bridon To Provide Aircraft Carrier Purchase Cables To U.S. Navy

The U.S. Navy has awarded a million dollar contract to Bridon American Corp for 220,000 feet of high-strength purchase cables for aircraft carriers, according to an announcement by **William B.R. Hobbs**, Bridon president.

The steel cables will be part of the aircraft arresting gear used to stop high-speed jet aircraft landing on carrier decks. Purchase cables are attached to the cross deck pendants that engage a hook on the underside of the landing aircraft.

For more information and free literature,

Circle 101 on Reader Service Card

Electric Boat Names Roger E. Tetrault General Manager

Roger E. Tetrault was appointed corporate vice president and general manager of General Dynamics' Electric Boat, effective August 1.

Mr. **Tetreault** comes to Electric Boat from Babcock and Wilcox, where he spent 20 years in various positions of the Nuclear Fuel Division, including division vice president and general manager. In 1990, he was named vice president and group executive of the company's Government Group.

EPORTER'S

G

BER '91

SHOW
UE

DISTRIBUTION
EE BIG SHOWS

NTERNATIONAL
XPOSITION

E ENGINEERS ANNUAL SYMPOSIUM & SHOW
VEMBER 13-16)

JS

ORK BOAT SHOW

(DECEMBER 5-7)

JS

HEM '91

ECEMBER 3-5)

THE S.N.A.ME. ANNUAL MEETING AND SHOW, BEING HELD IN NEW YORK (SOCIETY OF NAVAL ARCHITECTS

AND MARINE ENGINEERS) HAS ALWAYS BEEN A PREMIER EVENT...FOR DECADES, ONE OF THE WORLD'S MOST IMPORTANT INDUSTRY MEETINGS.

THE INTERNATIONAL WORK BOAT SHOW FEATURE ARTICLE...WITH EXTRA DISTRIBUTION AT THIS IMPORTANT NEW ORLEANS SHOW...ADDS THE SHALLOW DRAFT DIMENSION TO THIS BIG NOVEMBER ISSUE.

ONLY MARITIME REPORTER WILL GIVE YOUR ADVERTISING **MAXIMUM** EXPOSURE IN NOVEMBER...FOR **MAXIMUM** SALES RESULTS FOR YOU.

EST THAT THIS NOVEMBER SPECIAL ISSUE WILL
2-477-6700. Advertising Closing Date: October 1.

ONLY MARITIME REPORTER GIVES YOUR ADVERTISING THESE POWERFUL SALES-BUILDING ADVANTAGES

- **WORLD'S LARGEST** TOTAL MARINE INDUSTRY CIRCULATION
- **U.S. CIRCULATION** THOUSANDS LARGER THAN ANY OTHER MARINE MAGAZINE
- **THOUSANDS** MORE BUYING INFLUENCE READERS
- **THOUSANDS** MORE U.S. NAVY BUYERS
- **"NAVAL TECHNOLOGY & SHIPBUILDING"** SIX SPECIAL PULL-OUT MAGAZINE SUPPLEMENTS
- **100% REQUESTED CIRCULATION** . . . in writing . . . by each individual reader
- **100% ADDRESSED TO INDIVIDUAL PEOPLE** . . . by name and title
- **BEST READ AND MOST WANTED**—MR is asked for, requested, by thousands more marine industry readers than any other marine magazine in the world.
- **UNEQUALLED PASS-ALONG READERSHIP** . . . 5.5 readers per copy . . . over 140,000 monthly readership.
- **MOST SALES LEADS FOR ADVERTISERS**— more than any other marine magazine

MARITIME REPORTER AND ENGINEERING NEWS

MARITIME REPORTER/Engineering News
118 East 25th Street, New York, NY 10010
(212) 477-6700
FAX (212) 254-6271

THE ADVERTISING LEADER in 1989, a larger number of advertisers placed more pages of advertising in Maritime Reporter than in the No. 2 magazine.

In the first half of 1990, Maritime Reporter carried **60% more paid advertising pages** than in the No. 2 marine magazine.

MOST SALES LEADS FOR ADVERTISERS

Advertisers report MARITIME REPORTER produces more sales leads than any other marine magazine in the entire world . . . two times to five times more sales leads than the next nearest marine publication.

Magnavox Installs New Differential GPS System In Scandinavia

Ships maneuvering through the narrow twisting channels leading into Stockholm and Helsinki can now navigate with greater accuracy and confidence, thanks to an innovative new differential GPS system which has recently been installed by Magnavox.

The system was developed by Magnavox under contract with the Swedish Maritime Administration and the Finnish Board of Navigation.

The differential navigation system uses land-based reference stations to monitor the signals broadcast from the satellites in the Global Positioning System (GPS). Each reference station computes corrections for the satellite ranges. These correction factors are then transmitted to ships, vehicles or aircraft fitted with GPS receivers, thereby providing a substantial improvement in position-fixing accuracy.

The systems in Sweden and Finland are the first operational systems to use marine radio beacons to transmit the differential GPS correction factors.

Several large passenger ferries are already using the system with excellent results. The differential GPS data is being integrated with the ships' radars and enhanced electronic chart systems, providing highly accurate navigation through channels that are at times no more than twice the width of the ship, even during restricted visibility.

For further information and free literature from Magnavox,

Circle 10 on Reader Service Card

Bender To Lengthen, Overhaul Research Vessel

Bender Shipbuilding & Repair Co., Inc., Mobile, Ala., recently received a contract worth $4 million to lengthen, overhaul and reactivate the research vessel Western Strait.

The Western Strait will be renamed Ka'Imikai-O-Kanaloa and will be operated by the University of Hawaii for the Hawaii Undersea Research Laboratory Program in Honolulu, Hawaii.

Under the contract, Bender will extend her present length of 185 feet to 222 feet by adding a midbody. Other work under the contract will include the addition of quarters, laboratories, scientific equipment and submarine handling gear with various auxiliary equipment, storage and public spaces to support a total of 36 personnel.

Bridon To Provide Aircraft Carrier Purchase Cables To U.S. Navy

The U.S. Navy has awarded a million dollar contract to Bridon American Corp for 220,000 feet of high-strength purchase cables for aircraft carriers, according to an announcement by **William B.R. Hobbs**, Bridon president.

The steel cables will be part of the aircraft arresting gear used to stop high-speed jet aircraft landing on carrier decks. Purchase cables are attached to the cross deck pendants that engage a hook on the underside of the landing aircraft.

For more information and free literature,

Circle 101 on Reader Service Card

Electric Boat Names Roger E. Tetrault General Manager

Roger E. Tetrault was appointed corporate vice president and general manager of General Dynamics' Electric Boat, effective August 1.

Mr. **Tetreault** comes to Electric Boat from Babcock and Wilcox, where he spent 20 years in various positions of the Nuclear Fuel Division, including division vice president and general manager. In 1990, he was named vice president and group executive of the company's Government Group.

Upcoming Events

Transshipment Conference in Quebec City, Quebec, Canada, September 10-12. Run by Mariport Group Ltd., the event is on cargo shipment and handling concepts for the 1990s. Held at the Loews le Concorde Hotel Grande Allee. Phone: (416) 333-8171; fax: (416) 333-1162.

American Waterways Operators (AWO) Fall Convention in Washington, D.C., September 12-13. Will offer a forum to members to be brought up to date on pertinent issues confronting the tug and barge industry and the association. To be held at the Washington Court on Capitol Hill. Contact **Lori Swenningson** for further information at (703) 841-9300.

The Oil Pollution Act of 1990: An Assessment One Year Later in Oslo, Norway, September 17-18. Conference will provide a forum for both government and industry executives to conduct a comprehensive examination of OPA's impact both at the national and local level in the U.S. One of the guest speakers will be Vice Adm. **John Costello**, USCG (Ret.), who is president of the Marine Spill Response Corporation. For registration information, contact: Conference Coordinator, Marine Marketing International, c/o Kotorfellesskap a/s, Hjalmar Brantingsvei 8, 0581 Oslo 5, Norway.

National Waterways Conference (NWC) Annual Meeting & Exhibition in Houston, Texas, September 18-20. On the agenda will be such issues as addressing navigation infrastructure, higher waterways user taxes and environmental challenges facing the inland waterways industry. Event will take place at the Doubletree Hotel. For further information contact NWC at 1130 Seventeenth Street, Washington, D.C. 20036; telephone: (202) 296-4415; fax: (202) 835-3861.

Baltic & International Maritime Council (BIMCO) in Venice, Italy, September 20-24. The conference program of this general meeting will feature sessions on quality assurance and life extension of ships, Europe after 1992, and dialogue between owners and charterers. Held at the Hotel Excelsior, 161 Bagsvaerdvej, DK-2880 Bagsvaerd, Denmark, Phone: (+45) 444-44500.

Petroleum Tankship Operations Course in Houston, Texas, September 30-October 3. Course for shoreside personnel taught by **Arthur McKenzie**, New York Trade Center Institute. Phone: (212) 466-4044.

Admiral of the Ocean Seas (AOTOS) in New York, N.Y., October 11. Annual awards dinner for AOTOS. This year award presentations will be made to **Warren Leback**, U.S. Maritime Administrator, and **Charles I. Hiltzheimer**, president and chief executive officer of Puerto Rico Marine Management Inc. Held at the New York Hilton. Phone: **Barbara Spector Yeninas**, AOTOS coordinator (201) 226-6260; or United Seamen's Service (212) 775-1262.

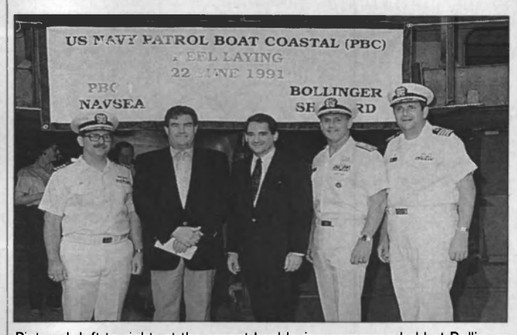
West Coast Tanker Operations Symposium in La Jolla, Calif., October 11-12. Sponsored by the Los Angeles Metropolitan Section of The Society of Naval Architects and Marine Engineers. Will be held at the Sheraton Grande, Torrey Pines Resort. The symposium will discuss technical issues relating to tanker operations on the U.S. West Coast. Operating experience and the impact of new legislation on the tanker fleet will be among the topics discussed. Contact **Harold D. Ramsden**, MCA Engineers, Inc., at (714) 662-0500.

65th Annual Convention of Propeller Club of the U.S. in Brownsville, Texas, October 14-18. Panel sessions will cover Gulf of Mexico fisheries, Shipping Act review, foreign trade market assessment, pollution issues, and lessons of the Persian Gulf War. Held at Fort Brown Hotel & Resort. Contact Propeller Club of the U.S., 3927 Old Lee Highway, #101A, Fairfax, Va. 22030; phone: (703) 691-2777.

(continued on page 75)

"Hey, how come these U.S. Treasury Bills I bought have a picture of the late Japanese Emperor Hirohito on them?"

Keel Laid For New Navy Patrol Boat At Bollinger Shipyard



Pictured, left to right, at the recent keel laying ceremony held at Bollinger Machine Shop & Shipyard, are: Capt. **Rich Havel**, Project Manager, PMS 300, U.S. Navy; **Boysie Bollinger**, chairman and CEO of Bollinger; Congressman **Billy Tauzin**, Third Congressional District of Louisiana; Adm. **George Worthington**, Commander, Naval Special Warfare Command; and Capt. **John Donahue**, Supervisor of Shipbuilding, Conversion and Repair, U.S. Navy.

A keel laying ceremony was recently held at Bollinger Machine Shop & Shipyard, Inc., Lockport, La., for the new class of U.S. Navy coastal patrol boats (PBC). The PBC is 170 feet in length and will be used by the Special Operations Force (SOF) for coastal interdiction and special warfare.

The basic contract for eight boats was competitively procured and awarded to Bollinger in August of last year.

A contract modification to exercise an option for the construction of five more PBCs was awarded for $48,729,397 in July 1991. Work will be performed at the Lockport, La., yard and is expected to be completed March 1, 1994.

For free literature detailing the boatbuilding capabilities of Bollinger Machine Shop,

Circle 102 on Reader Service Card

New Sulzer Diesel Expects To Report Good Profit In '91

New Sulzer Diesel Ltd., Winterthur, Switzerland, formed when Sulzer spun off its diesel engine business into a new company in July 1989, reported that last year the diesel business broke even for the first time in a decade as orders rose 28 percent over 1989, and orders so far this year are well above budget.

A resurgence in the shipbuilding industry has benefited New Sulzer Diesel. The last three years have seen a very healthy newbuilding market around the world.

Peter G. Sulzer, New Sulzer's chairman, said most of the new orders have come from Japanese shipbuilders. The company itself does relatively little manufacturing, but has 25 licensees around the world who do, with the largest concentration in Japan and South Korea.

New Sulzer's principal shareholders now are the Italian shipyard Fincantierei, along with two German shipbuilders, Bremer Vulkan and Deutsche Maschinen- und Schiffbau. Sulzer Brothers also retains a small interest.

Robert G. Walsh Jr. was recently appointed president of the new company's U.S. subsidiary, New York-based New Sulzer Diesel US Inc. Mr. **Walsh** most recently served as executive assistant to **Wallace T. Sansone**, deputy commander of the U.S. Military Sealift Command.

For free literature detailing New Sulzer Diesel,

Circle 106 on Reader Service Card

Upcoming Events

(continued from page 73)

Fish Expo '91 in Seattle, Wash., October 17-20. Exhibition and seminars, at the Seattle Center. Features one of the largest exhibitions in the world on the commercial fishing industry. For further details call (207) 772-3005.

Seatrade Exposhiip Riomar 91 in Rio de Janeiro, Brazil, October 21-25. Conference and exhibition organized by Seatrade. Held at Centero de Canvencoes do Hotel Nacional. Contact **Michael Kazakoff**, phone: (609) 452-9414 or fax: (609) 452-9374.

Fleet Maintenance in the 21st Century in Virginia Beach, Va., October 22-23. Joint symposium sponsored by the Commander in Chief, Atlantic Fleet and American Society of Naval Engineers, at the Pavilion Convention Center. Technical papers regarding fleet maintenance management, engineering, logistics and training within aviation, surface and submarine fields will be presented. Contact **Lewis J. Friedrichsen**, M. Rosenblatt & Son, Inc., 5700 Thurston Avenue, Suite 204, Virginia Beach, Va. 23455; phone: (804) 460-4449; or fax: (804) 464-2801.

Europort '91 in Amsterdam, The Netherlands, November 12-16. Exhibition will focus on shipping and shipbuilding, port and dock equipment, communication and navigation equipment, etc. Will be held in the RAI Exhibition and Conference Center. For further information, contact RAI Exhibitions in Amsterdam at +31 20 549 1212.

SNAME Annual Meeting & 11th International Maritime Exposition in New York City, November 13-15. Marine industry trade show sponsored by The Society of Naval Architects and Marine Engineers. Technical papers will be presented on industry issues. Exhibits will include ship design, propulsion machinery, navigation and communications equipment,etc. Will be held at the New York Hilton. For further information, contact SNAME at 601 Pavonia Avenue, Jersey City, N.J. 07036; or phone: (201) 798-4800.

The Work Boat Show in New Orleans, La., December 5-7. Annual exhibition focusing on offshore supply boats, inland tugs, barges, commercial fishing boats and excursion/passenger vessels will be held at the Louisiana Superdome. For information, contact National Fisherman Expositions, 5 Milk Street, P.O. Box 7437, Portland, Maine 04112-7437; phone: (207) 772-3005; or fax: (207) 772-5059.

AAPA 1992 Annual Meeting in Anchorage, Alaska, September 21-25, 1992. Annual meeting of the American Association of Port Authorities. An attendance of 800 is anticipated for this event. For further information, call (703) 684-7300.

TANKER REGULATIONS

Implications for the Market

International shipping safety and antipollution regulations look set to undergo a major upheaval in the 1990s according to a new report. The introduction of the 1990 US Oil Pollution Act by the **Bush** Administration in August 1990 threatens to shatter the international alliance that has been built up over the course of the last three decades.

The guidelines on which most international legislation is now based are provided by conventions held by the International Maritime Organization (IMO). The study, by tracing the history of the international community's response to the dual problems of maritime safety and pollution, concludes that adoption of the IMO's two major policy weapons—SOLAS (concerned with marine pollution) and KV (concerned with safety of life)—by maritime nations increased significantly during the 1980s.

The report has found that allegiance to international legislation is high. More than 95% of the world tanker fleet, for instance, is registered under a flag state that has adopted KV. While in practice such affiliation is somewhat lower, it nonetheless shows that the trading opportunities for substandard ships are limited. Despite these successes, however, the maritime environment has continued to be blighted by major oil spills resulting in disillusionment in certain quarters with the achievements of the IMO.

In the meantime the 1990 US Oil Pollution Act, already termed the most radical response yet by a single nation to the problem of marine pollution, threatens to have devastating impact on both tanker costs and operating practices. With research by Drewry suggesting that the fitting of a double hull will add an extra 20-25% to the cost of a newbuilding, the scale of the legislation is likely to be harshly felt. Supplementing this is the prospect of unlimited damage liability for the owners of vessels deemed responsible for oil spills. This has already forced some "majors" to suspend operations to the United States. While most P&I Clubs—for the moment at least—offer coverage of up to $1 billion, owner/operators are having to pay a price for it. The renewal of P&I cover in February 1991 left some companies facing a three-fold increase in premiums. In short, this could represent the beginning of a two-tier market, in which oil trades to the USA are distinct from the oil trades to the rest of the world.

The effects of this single piece of legislation, however, threaten to have a far wider effect on the world of shipping. It seems likely that, as a result, the international regulations to which tanker owners must adhere may be subject to wholesale change. Reports suggest a growing lobby to be in favor of large-scale amendments in IMO legislation following the decision by the world's leading importer of crude to introduce its own answers to the problem of marine pollution, Although details are at present vague, recent meetings have seen a number of radical topics discussed, including the mandatory introduction of double-hulled tankers. The cohesion of the international community under the banner of the IMO is undoubtedly threatened by the emergence of unilateralism on a grander scale and the study seeks to assess the likely future moves by regulators—which in some cases may be significant.

For further information, contact Drewry Shipping Consultants Ltd., 11 Heron Quay, London E14 4JF.

FIVE YEAR OUTLOOK FOR THE U.S. MARINE INDUSTRY

An Assessment of Ship Construction and Major Modification Prospects Available to Shipbuilders, Equipment Manufacturers and Other Suppliers

Report No. 7119 - $575.00 per copy
September 1991

Want a totally objective forecast of where the U.S. marine industry is headed over the next five years?

A new, 200+ page report by IMA provides a detailed forecast of building and major modification activity in all major segments of the U.S. marine business.

The report documents the size and composition of 30 individual market segments, analyzes underlying market drivers, forecasts construction and modification activity over the next five years, identifies regulatory and legislative actions likely to affect future suppliers.

30 MARKET SEGMENTS ARE ASSESSED

Commercial Ships
- Cruise ships
- Jones Act container ships
- Alaska crude carriers
- Product tankers
- Chemical & specialty tankers
- Great Lakes self-unloaders
- Seagoing barges
-

Navy Ships
- Sealift ships
- Combatants
- Amphibious ships
- Support ships
- Research & survey ships
- Icebreakers

Offshore Sector
- Rigs and drill ships
- Production platforms
- Support vessels

Small Vessels
- Ferries
- Dinner and excursion boats
- River gambling boats
- Harbor and coastal tugboats
- Small naval craft
- Coast Guard cutters
- Fishing boats
- Megayachts
- Dredges

Inland Waterways
- Towboats
- River barges

Specialty Fabrications
- Prison and accomodation barges
- Floating production & power platforms
- Sunken tube tunnel sections

* * * * * * * * * * * * * * * * * * *

Under one cover is a totally objective, in-depth assessment of the buisness outlook for the entire U.S. marine sector - providing the type of information needed for formulating long term market positioning strategy in a rapidly changing industry.

The report is available for **$575.00** per copy. To order, please contact **IMA Associates, Inc. - 600 New Hampshire Ave., NW - Suite 140 - Washington, DC 20037 - Telephone 202-333-8501 - Fax 202-333-8504**. Telephone or fax orders will be accepted

Circle 253 on Reader Service Card

JBF Offers New Wave Of Multipurpose Oil Recovery Vessels

JBF Scientific Company, Inc. of Southwest Harbor, Maine, is introducing three new models to its current line of successful oil spill recovery vessels. This new generation of fast response, multi-use oil and debris recovery boats are available in 25-, 30-, and 42-foot lengths. The vessels consist of a catamaran-hull with twin engines and onboard collected oil storage tanks, and have response speeds in excess of 20 knots.

Advantages of the new design include incorporation of a proven oil-spill recovery concept, multi-use workboat, fast response, shallow draft, and competitive pricing through extensive use of computer enhanced design and construction.

For more information and free literature from JFB Scientific,

Circle 46 on Reader Service Card

Ferrostaal Takes Over All Services Of Affiliate MAN GHH Floating Docks

Ferrostaal AG, Essen, Germany, announced that it has taken over all the activities of its affiliate company MAN GHH in the field of the engineering and marketing of floating docks.

With a background of over 30 years' worldwide experience in the field of shipbuilding and marine engineering, Ferrostaal, with its specialized FN Division, offers the same range of professional technical and commercial services to existing customers of GHH Floating Docks as they have received in the past, and will offer these services to new customers.

For further information and free literature from Ferrostaal AG,

Circle 52 on Reader Service Card

RCI Delivers Oil-Spill Containment Boats To U.S. Navy

River City Industries, Inc. (RCI) of Moss Point, Miss., recently delivered two 33-foot pontoon platform workboats to the U.S. Naval Facilities Engineering Command, Port Hueneme, Calif. The boats are designed to deploy oil containment booms in the event of an oil spill. The catamaran pontoons are fabricated of fiberglass and are fitted with all-aluminum decks.

RCI currently is performing a contract for the U.S. Navy for the construction of 30 each fiberglass trimaran towed targets. RCI has already delivered 40 such craft under two previous contracts.

For additional information regarding the products and services of RCI,

Circle 53 on Reader Service Card

French Named VP, New Construction Production At National Steel

National Steel and Shipbuilding Company (NASSCO) has announced that **Spencer L. French** has been named vice president, new construction production.

Mr. **French** will have overall responsibility for the construction of new ships at NASSCO. He will direct line operations for the steel and outfitting trades, planning and scheduling for U.S. Navy and commercial ship construction, and ship management and testing.

Mr. **French** has over 22 years of experience in shipyard operations, engineering, program management and support functions. Prior to joining NASSCO as a vice president in 1987, he was a vice president with General Ship Corporation in Boston, Mass.

U.S. Offshore Firm Seeks MarAd Approval To Sell Bulk Barge

Gulf Fleet Supply Vessels, Inc., Houston, Texas, has received approval from the Maritime Administration to sell to J.P. Knight (Offshore) the 5,061-dwt barge Hercules Del Golfo, a British corporation.

Built in 1982, the vessel will be registered in St. Vincent and the Grenadines.

Halter International's Spill Response Answer: Multipurpose Combo-60

In 1990, the Congressional Office of Technology Assessment released a report on the current equipment available for cleanup operations including skimmers, chemical dispersants, burning and bioremediation. The OTA report, "Coping with an Oiled Sea: An Analysis of Oil Spill Response Technologies," provided builders with the challenge to design a vessel that would exceed modern technology.

"We cannot always prevent an oil spill from happening," said **Harold P. Halter**, president of Halter International, Inc., "but we can control it once it has occurred."

As founder of Halter Marine Inc. until its sale to Trinity Industries in 1983, Mr. **Halter** was one of the premier boatbuilders during the oil boom.

Now Mr. **Halter** has teamed with **John R. Glas**, a senior officer and investment banker, and formed New Orleans-based Halter International. The firm just introduced the first of a series of multipurpose emergency response vessels, the Halter Combo-60. She is equipped with a computer-based system for rapid deployment and a training program for vessel operators. The RREDI Corp., a Halter International subsidiary, manages an oil spill training program for personnel who will operate

The Halter International Combo-60 is ballasted down as crew put out the Halter International Sea Sled for improved recovery effectiveness.

the Combo vessels. The training is offered as part of a comprehensive service contract. Other vessels in the series will vary in size and may be modified to meet specific customer requirements.

According to Halter International, each vessel in the Combo Series employs six different pumping modes of operation, which enables each vessel the capacity of adapting to the type and consistency of spill material and existing sea conditions. In following the flow of oil in the vessel, the Combo sucks oil through a unique collection device, called the Halter Sea Sled, at hovering flow rates of 4 knots and skimming flow rates of 4 knots. The oil moves across flexible bellows, which affords continuous sled contact with oil in seas up to 6 feet, and through the bow, and into the separation chamber, where a modified floating weir is located. The separated oil is heated as it is drawn by a Lawrence centrifugal screw pump during light spills. The oil is then pumped into and temporarily stored in 20,000 gallon polyurethane-coated nylon "bladders," or into nearby barges or ships. The company reports that for heavier spills, oil greater than 1-1/2 feet thick, two Nomera 20, North American Marine jet pumps operate simultaneously with the Lawrence pump producing a recovery capacity up to 20,000 barrels per hour. In its maximum pumping mode, Halter International claims the Combo-60 is capable of recovering up to 32,000 barrels per hour by utilizing all four of its jet pumps.

The jet pumps are driven by four Caterpillar 3208TA diesel engines, rated at 425 hp at 2,800 rpm.

With the Combo's multipurpose capability, much of the vessel's time will be dedicated to activities other than oil recovery. In addition to collecting oil, Halter International reports the Combo-60's function include fighting fires, aerating chemical spills, patching damaged vessels, backwashing shorelines, clearing debris from waterways, draining flooded areas, servicing land-based fire engines, and dredging shallow water areas.

For free literature detailing the Combo-60 from Halter International,

Circle 96 on Reader Service Card

FOR MORE INFORMATION
ON
EQUIPMENT AND SERVICES ADVERTISED IN THIS ISSUE

CIRCLE THE APPROPRIATE NUMBER ON READER SERVICE CARD OPPOSITE

ADVERTISER	EQUIPMENT /SERVICE	CIRCLE NO.
A & J MANUFACTURING	ELECTRONIC ENCLOSURES	266
AT & T, FIBER OPTIC	CABLES	285
ACOMARIN	FILTER RING SYSTEMS	317
AEROQUIP	INDUSTRIAL CONNECTORS	237
ALDEN ELECTRONICS	DISTRESS TRANSMITTERS	296
ANSCHUTZ & CO	NAUTO CONTROL	222
AQUA-CHEM	EVAPORATORS REPAIR	315
ASEA BROWN BOVERI	TURBOCHARGERS	255
ASTILLEROS ESPANDES	SHIPBUILDING/REPAIR	202
AVONDALE SHIPYARD	SHIPBUILDING/REPAIR	203
BMT INTERNATIONAL	BOAT DESIGN/FLEET SIMULATION	213
BOSTROM SHIPPING	SHIP MANAGEMENT	230
CALTAX MARINE	DIESEL ENGINES	304
CARRIER TRANSICOLD	AIRCONDITIONING	250
CATERPILLAR	DIESEL ENGINES	209
CENTRICO	OIL PURIFICATION SYSTEMS	287
CLA-VAL	VALVES	219
COFFIN TURBO	SHIPBOARD MECHANICAL SEALS	268
COLTEC	ENGINES	274
CURACO DRYDOCK	DRYDOCK	308
DATREX	PHOTOLUMINESCENT PICTOGRAMS/SYMBOLS	212
DEL GAVIO	MARINE HYDRAULICS	226
DERBYSHIRE	EDUCTORS/STRAINERS/VALVES/FITTINGS	255
DIVERSIFIED MARINE BROKERAGE	BROKERS	240
DIVERSIFIED MARINE BROKERAGE	BROKERS	317
DIVERSIFIED MARINE BROKERAGE	BROKERS	327
L. C. DOANE	LIGHTING EQUIPMENT	242
ECOMARINE	POLLUTION CONTROL	201
ENVIROVAC	MARINE SANITATION DEVICES	206
ESGARD	BALLAST/TANK COATINGS	314
FANA	ARMORSHIELD SHRINK WRAP	277
FERNSTRUM	GRIDCOOLERS	218
GAYLORD	GALLEY EXHAUST HOODS	207
GE, NAVAL	STEAM TURBINES	220
GIRO ENGINEERING	FUEL INJECTION PIPE SYSTEMS PROTECTION	271
GLOBAL MARITIME	SHIP REPAIR	270
GOLTENS	DIESEL ENGINES REPAIR	208
BF GOODRICH	BEARINGS	267
HALTER INTERNATIONAL	SHIPBUILDING	263
HEMPEL COATINGS	HEMUCRYL WATER-BORNE PAINTS	330
HITATCHI ZOSEN	SHIPBUILDING	295
HOUSTON MARINE	FIREFIGHTING CLASS	274
IDB—AERONAUTICAL	COMMUNICATION SYSTEMS	205
IMA	MARKETING INFORMATION	293
JEAMAR WINCHES	WINCHES	217
JIM'S PUMP REPAIR	PUMP REPAIR	223
KIENE DIESEL	DIESEL ACCESSORIES	335
KINETICS	ADVANCED MARINE VEHICLES COURSE	298
KVAEVNER INCINERATION	INCINERATORS	272
LEISTRITZ	SCREW PUMP	204
LITTON SPECIALITY DEVICES	SATELLITE EPIRBS	235
LOEFFLER	BELLS/DECKS DRAINS/VALVES	216
LOKRING	PIPE FITTINGS	301
McELROY	DECK EQUIPMENT	228
MTU	MARINE FINANCING	279
MACKAY	EB NERA SATURN C	292
MARCO SEATTLE	FILTERBELT SYSTEM	233
MARINE ELECTRIC	MONITORING SYSTEM	249
NAVAL ELECTRONICS	NAVIGATION/COMMUNICATION SYSTEMS	326
NORCONSULT	SHIP REPAIR	311
NATIONAL RAILWAY EQUIPMENT	REMANUFACTURED GM EMD ENGINES	289
OMNITHRUSTER	MODULAR THRUSTER SYSTEM	257
OVAKO STEEL	SHAFT COUPLINGS	211
PMS PRODUCTS	METAL PROTECTANT	256
PACIFIC RIM DIESEL	DIESEL ENGINES	262
PECK & HALE	TWISTLOCK STACKERS	297
PARKWAY IMPERIAL	IMMERSION SUITS	214
PETTIBONE TIFFIN	CRANES	300
REVERE AEROSPACE	CABLE ASSEMBLIES	247
ROBERTSON MARINE	CONTROL SYSTEMS	344
ROLLA SP PROPELLERS	PROPELLERS	254
ROWE BUMPERS	FENDERINGS	234
S.E.M.T. PIELSTICK	DIESEL ENGINES	252
SAAB MARINE	LEVEL GAUGING SYSTEM	303
SCHAT WATERCRAFT	SAFETY EQUIPMENT	221
SCHOTTEL-WERFT	PROPULSION SYSTEMS	302
SEAWARD	MARINE FENDERS	251
SERODINO	REFUSE SKIMMERS	276
SHELL OIL	MARINE OIL	305
SHIP'S AID INTERNATIONAL	MARINE SERVICES	288
SIGMA COATINGS	MARINE COATINGS	253
SOUNDCOAT	NOISE CONTROL PRODUCTS	229
STANDARD REFRIGERATION	SERVICE CONDENSERS	215
STEWART & STEVENSON	PROPULSION EQUIPMENT	225
SUMMER EQUIPMENT	HYDRAULIC STEERING SYSTEM	244
TELEFLEX	RMVA VALVES	319
	RTVA VALVES	320
TEXACO	MARINE OILS	227
TEXTRON MARINE	BOATBUILDING	316
THOMAS MARINE	BOATBUILDING	261
ULSTEIN INTERNATIONAL	PROPLLERS/THRUSTERS	241
ULTRA POLY	DOCK FENDERS	346
VESTA A/S	VESTA INCINERATION TECHNOLOGY	310
WALPORT WUSA	MARINE VIDEOS	245
WARTSILA	DIESEL ENGINES	331
WESTECH GEAR	HEAVE COMPENSATION SYSTEMS	299
G.J. WORTELBOER	ANCHOR/CHAINS	313
ZSI	CUSHION & CLAMPING	312

The listing above is an editorial service provided for the convenience of our readers.

BUYERS DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER/Engineering News. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR/EN assumes no responsibility for errors. **If you are interested in having your company listed in this Buyers Directory Section, contact John C. O'Malley at (212) 477-6700.**

ABRASIVES
Barton Mines Corp., 1658 Cole Blvd., Golden, CO 89401
Chesapeake Specialty Products, 5055 Northpoint Blvd., Baltimore, MD 21219
Stan-Blast Abrasives, P.O. Box 968, 3300 River Road, Hawey, LA 70059

AIR CONDITIONING AND REFRIGERATION—Repair & Installation
Adrick Marine Corp., 320 Cantor Ave., Linden NJ 07036
Bailey Group, 2323 Randolph Ave., Avenel, NJ 07001
Carrier Transicold, P.O. Box 4805, Syracuse, NY 13221
Stal Refrigeration AB, Butangsgatan 16, S-601 87 Norrkoping, SWEDEN
York Int'l, P.O. Box 1592-083G, York, PA 17405

BALLAST
Chesapeake Specialty Products, 5055 Northpoint Blvd., Baltimore, MD 21219
Genstar Stone Products, Executive Plaza IV, Hunt Valley, MD 21031
Mineral Research & Recovery Inc., 4565 S. Palo Verde, Ste 203, Tucson AZ 85714
Queen City Iron & Steel, P.O. Box 7205, Charlotte, NC 28241-7205

BARGE BUILDING
Conrad Industries, P.O. Box 790, Morgan City LA 70381
Maxon, South Boundary Street, P.O. Box 69, Tell City, IN 47586

BARGE—Leasing
McDonough Marine Service, 2300 Surekote Road, New Orleans, LA 70117
Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

BASKET STRAINERS
Beaird Industries, P.O. Box 31115, Shreveport, LA 71130

BEARING—Rubber, Metallic, Non-Metallic
B.F. Goodrich, Engineered Polymer Products, 150 Division Dr., Wilmington, NC 28401
B.F. Goodrich, Marine Products Group, 6061 B.F. Goodrich Boulevard, Jacksonville, FL 32226
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Thomson Gordon Ltd., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6
Waukesha Bearings, P.O. Box 1616, Waukesha WI 53187

BOILER—Manufacturers
Aalborg Ciserv (Miami) Inc., 1539 SW 21st Ae., Ft. Lauderdale, FL 33312

BROKERS
Captain Astad Company, Inc., P.O. Box 350486, Ft Lauderdale, FL 33335, 2900 Energy Centre, 1100 Poydras Street, New Orleans, LA 70163-2900
Diversified Marine Brokerage, 1201 Northern Blvd., Manhasset, NY 11030
Jack Faulkner, 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960

BUNKERING
Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

CARGO ACCESSORIES
Morgan Crane Company, Inc., 1300 Normandy Place, Santa Ana, CA 92705

CHAIN
Baldt, Inc., 6 M. Butler St., Chester, PA 19013
Crandall Dry Dock Engineers Inc./Marit Chain, 21 Pottery Lane, Dedham MA 02026
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020
G.J. Wortelboer Jr. B.V., Postbus 5003, 3008 AA Rotterdam, NETHERLANDS

CHOCKING COMPOUNDS
ITW Philadelphia Resins, 130 Commerce Drive, Montgomeryville, PA 18936

CLAMPING—Pipe, Tubes, Hose
ZSI, 32497 Schoolcraft Road, Livonia, MI 48150

COMPACTORS
International Compactor, Inc., P.O. Box 5918, Hilton Head, SC 29938
A/S Vesta, Skudehavsvej 27, DK-2100 Copenhagen, DENMARK; Sales Agents: American United Marine Corp., 5 Broadway, Rt 1, Saugus, MA 01906, USA

COMPUTERIZED INFORMATION SYSTEMS
TIMSCO, P. O. Box 91360, Mobile AL 36691
Coastdesign, Inc., Unit 201, 12837 76th Avenue, Surrey, BC CANADA V3W 2V3

CONDENSERS/SEPARATORS
Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130
Standard Refrigeration Co., 2050 N. Ruby, Melrose Park, IL 60160
Wright Austin Co., 3250 Franklin St., Detroit MI 48207

CONTROL SYSTEM—Monitoring
Henschel, Inc., 9 Hoyt Drive, Newburyport MA 01950
IMO Industries, Gems Sensors Division, One Cowles Rd., Plainville CT 06062
Lyngso-Valmet Marine A/S, P.O. Box 130, N-3430 Spikkestad, NORWAY
MMC International, 60 Inip Dr, Inwood NY 11696
Marine Electric RPD, Inc., 50 Carol St., P.O. Box 1135, Clifton, NJ 07014-1135
Norcontrol A/S, P.O. Box 1024, N-3191 Horten, NORWAY
Robertson Marine Systems, 3000 Kingman St., Suite 207, Metairie, LA 70006
Robertson-Shipmate, 400 Oser Avenue, Hauppage, NY 11788
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406

CRANE—HOIST—DERRICK—WHIRLEYS
The Crosby Group, Inc., P.O. Box 3128, Tulsa OK 74101
Del Gavio Marine Hydraulics Inc., 619 Industrial Rd., Carlstadt, NJ 07072
Liebherr-Werk Nenzing GES.mbh, P.O. Box 10, A-6710 Nenzing, AUSTRIA
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
Morgan Crane Company, Inc., 1300 Normandy Place, Santa Ana, CA 92705
J.D. Neuhaus Hebezeugue GmbH, D-5810 Witten, GERMANY
Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883
Reco Crane Co., 5734 Jefferson Highway, New Orleans LA 70181
Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

DECK MACHINERY—Cargo Handling Equipment
All Set Marine Lashing AB, P.O. Box 14112, S-161 14 Bromma, SWEDEN
Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013
New England Trawler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Markey Machinery Co., Inc., P.O. Box 24788, Seattle, WA 98124-0788
Morgan Crane Company, Inc., 1300 Normandy Place, Santa Ana, CA 92705
McElroy Machine & Mfg. Co., Inc., P.O. Box 4454, Biloxi MS 39535 4454
Seattle Crane & Equipment Co., Inc., 4403 20th Street East, Fife, WA 98424
Willem Pot b.v., P. O. Box 29102, 3001 GC Rotterdam, The Netherlands

DECKS
Boatlife, 205 Sweet Hollow Road, Old Bethpage, NY 11804

DIESEL ACCESSORIES
Coltec Industries Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Diesel America Inc., 5217 River Rd., New Orleans LA 70123
Gearhardt's Inc., P.O. Box 10161, Jefferson, LA 70181
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360
Giro-Engineering Ltd., 370 Brook Lane, Sarisbury Hampshire, ENGLAND S03 6ZA
Kiene Diesel Accessories, 325 S. Fairbanks St., P.O. Box 386, Addison IL 60101
Pow-R-Quik, 5518 Mitchelldale, Houston, TX 77092

DIESEL ENGINE—Spare Parts & Repair
Aalborg Ciserv (Miami) Inc., 1539 SW 21st Avenue, Ft. Lauderdale, FL 33312
Caltrax Marine Diesel B.V., Frankijkweg 11, 4455 TR Nieuwdorp (Vlissingen Oost), THE NETHERLANDS
Caterpillar, Inc., Engine Div., P.O. Box 610, Mossville, IL 61552-0610
Coltec Industries, Parts & Service Div., 701 Lawton Ave., Beloit, WI 53511
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
Global Maritime Services, 247 SW 33 Court, Ft. . Lauderdale, FL 33315
Golten Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231
Hatch & Kirk, 5111 Leary Avenue NW, Seattle, WA 98107
KHD Canada, Inc., 4420 Garand, Ville St-Laurent, Quebec, CANADA H4R 2A3
Kim Hotstart Mfg Co., E 5724 Broadway Ave, P.O. Box 42, Spokane WA 99210
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1, GERMANY
MAN B&W Diesel, 17 State Street, New York, NY 10004
MTU of North America, 10450 Corporate Drive, Houston, TX 77478
Markisches Werk GmbH, P.O. Box 1442, D-5884 Halver 1, GERMANY
Pacific Rim Diesel, 3842 W. Marginal Way SW, Seattle, WA 98106
Paxman Diesels, P.O. Box 8, Paxman Works, Colchester, Essex, CO1 2HW, ENGLAND; Paxman Diesels USA, (A Div. of Ruston Gas Turbines, Inc.), 15950 Park Row, Houston, TX 77084
S.E.M.T. Pielstick, 2 Quai de Seine, Saint Denis, Paris, FRANCE 93203
Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166

DIVING & SALVAGE
H.J. Merrihue, P.O. Box 23123, New Orleans LA 70183
Muldoon Marine Services, Inc., P.O. Box 3221, Terminal Island, CA 90731
Sea-Side Diving, 28612 Harper Ave., St. Clair Shores, MI 48081

DRY DOCKS-Design
Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381
Marine Design Services, P.O. Box 928, Bonita CA 92002
MAN GHH Sterkrade, P.O. B. 110240, D 4200 Oberhausen 11, GERMANY

ELECTRICAL EQUIPMENT
L. F. Gaubert & Co., Inc., P. O. Box 50500, New Orleans LA 70150
MMC International, 60 Inip Dr, Inwood NY 11696
P.J. Plishner Marine/Radio Research Instrument Co., 584 N. Main St., Waterbury, CT 06704-3506
SPD Technologies, 13500 Roosevelt Blvd., Philadelphia PA 19116
Universal Marine Electric Co., Inc., P.O. Box 266-923, Houston, TX 77027-6923

ELECTRONIC DISPLAY
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolboton, NORWAY

ELECTRONIC ENCLOSURES
A&J Manufacturing, 14131 Franklin Ave., Tustin CA 92680

ELECTRONIC INFORMATION SUPPORT
Inventory Locator Service, 3965 Mendenhall Rd. South, Suite 10, Memphis, TN 83115

ENGINE TEST EQUIPMENT
General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360
Instruments, Computers, & Controls, Inc., 6942 Haven Creek Dr., Katy, TX 77449

EPIRBS
ACR Electronics, Inc., 5757 Ravenswood Rd., P.O. Box 5247, Ft. Lauderdale FL 33310-5247
Alden Electronics, 40 Washington St., Westborough, MA 01581
Litton Special Devices, 750 W. Sprout Road, Springfield, PA 19064
Koden International, 77 Accord Park Drive, Norwell, MA 02061

EQUIPMENT-Marine
Byrne, Rice & Turner, Inc., 1172 Camp St., New Orleans, LA 70130
Gladsky Marine, Garwies Point Rd., Glen Cove, NY 11542
Maritme Power Corp., 200 Henderson Street, Jersey City, NJ 07302
Ovako Steel Inc., P.O. Box 745, Avon, CT 06001

EVAPORATORS
Alfa-Laval, Desalt A/S, Stamholmen 93, DK-2650 Hvidore, Copenhagen, DENMARK
Aqua-Chem, Water Technologies Div., P.O. Box 421, Milwaukee, WI 53201
Beaird Industries Inc., P.O. Box 31115, Shreveport, LA 71130

FANS-VENTILATORS-BLOWERS
Carling Turbine Blower Co., 10 Nebraska St., P.O. Box 88, Worcester, MA 01613
Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA 94402

FASTENERS
Jamestown Distributors, 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02635
Non-Ferrous Bolt & Mfg. Co., 4085 Nevso Dr., Suite C, Las Vegas, NV 98103

FENDERING SYSTEMS/BUOYS-Dock & Vessel
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston, TX 77020
Rowe Bumpers, Conveyors & Caster Corp., 3501 Detroit Ave., Cleveland, OH 44113
Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook, VA 22624
Solidur Plastics Co., 200 Industrial Dr., Delmont, PA 15626
Standard Refrigeration Co., 2050 N. Ruby, Melrose Park, IL 60160
Ultra Poly Inc., 2926 South Steele, Tacoma, WA 98409
Viking Fender Co., 50 Church Street, Sea Bright, NJ 07760

FIBER OPTIC SYSTEMS
AT & T, Cables System/Fiber Optic Div., 111 Madison Avenue, Morristown, NJ 07962

FUEL ADDITIVES, CONDITIONING
U.S. Borax/Industrial Chemicals, 3075 Wilshire Boulevard, Los Angeles, CA 90010

GALLEY EQUIPMENT
Cospolich Refrigerator Co., 949 Industry Rd., Kenner LA 70062
Gaylord Industries, 10900 S W Avery St, P.O. Box 1149, Tualatin, OR 97062
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi MS 39535-4454

GANGWAYS, LADDERS
Coast Marine & Industrial Supply Inc., 398 Jefferson St., San Francisco, CA 94133
Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32966
Westmont Industries, 10805 Painter Ave., Santa Fe Springs, CA 90670
Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

HEAT EXCHANGERS
Alfa-Laval, Desalt A/S, Stamholmen 93, DK-2650 Hvidovre, Copenhagen, DENMARK
Alfa-Laval Separation Inc., 2115 Linwood Avenue, Fort Lee, NJ 07024
Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130

HORNS/WHISTLES
Kahlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241

HOSE
HBD Industries, Inc., 1801 S. Railroad Street, Salsbury, NC 28145-0948

HYDRAULICS
Aeroquip Corporation, 3000 Strayer, P.O. Box 631, Maumee, OH 43537-0631
Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken NJ 07030
Del Gavio Marine Hydraulics Inc., 619 Industrial Rd., Carlstadt, NJ 07072

INCINERATORS
Teamtec A/S, P.O. Box 100, N 4912 Gjeving, NORWAY
A/S Vesta, 27 Skudehavnsvej, DK-2100 Copenhagen DENMARK. US Agent: American United Marine, 5 Broadway, Rte 1, Saugus, MA 01906

INSULATION
Soundcoat Company, 1 Burt Drive, Deer Park, NY 11729

JOINER—Watertight Door—Paneling—Ceiling System—Decking
Cupples Products, 2650 S. Hanley Rd., St. Louis, MO 63144
GEC-Marconi Electronic Systems Corp., 550 S. Fulton Ave., Mt. Vernon, NJ 10550
IMAC AB, Berga Alle 1, S-252 55 Helsingborg, SWEDEN
U.S. Rep: Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031
Walz & Krenzer Inc., 1390 Mt. Read Blvd., Rochester NY 14606

KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

LEGAL SERVICES
John Jozwick, c/o Bryan, Schiffrin & McMonagle, First & Cedar Bldg., Ste 350, 2701 First Ave., Seattle, WA 98121

LIFEBOATS/RAFTS
Zodiac of North America, P.O. Box 400, Stevensville, MD 21666
Willard Marine Co., Inc., 1250 N. Grove St., Anaheim, CA 92806

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
ACR Electronics, Inc., 5757 Ravenswood Rd., P.O. Box 5247, Ft. Lauderdale, FL 33310-5247
Archway Marine Lighting, 4501 Swan Ave., St. Louis, MO 63110
Carlisle & Finch, 4562 W. Mitchell Ave., Cincinnati OH 45232
The L.C. Doane Co., P.O. Box 975, Essex, CT 06426
Nautilus Equipment Ltd., P.O. Box 66, Station M, Halifax, Nova Scotia B3J 2L4, CANADA
Phoenix Products, 6161 N 64th St., Milwaukee WI 53218

LINE BLINDS
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474

LOGISTICS
VI. Logistics Consultants, Inc., 3420 Bienville Blvd., Ocean Springs MS 39564
QED, 4646 N. Witchduck Road, Virginia Beach, VA 23455

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
Del Gavio, 619 Industrial Rd., Carlstadt, NJ 07072
Global Maritime Services, 247 SW 33 Court, Ft. Lauderdale, FL 33315
Golten Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231

MACHINING—On Site Repair
Global Maritime Services, 247 SW 33 Court, Ft. Lauderdale, FL 33315

MARINE ACCOMMODATIONS
Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980

MARINE FURNITURE
Wilson & Hayes, 1601 Eastlake Avenue, East, Seattle, WA 98102

METAL PRODUCTS
Williams & Co., Inc., 901 Pennsylvania Avenue, Pittsburgh, PA 15233-1495
Jamestown Metal Marine Sales, Inc., 4710 N.W. Second Ave., Boca Raton,FL 33431

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356
Artec Offshore Corp., 578 Enterprise St., Escondido, CA 92025
B.C. Research, 3650 Wesbrook Mall, Vancouver, B.C. CANADA V6S 2L2
CDI Marine Co., 9487 Regency Square Blvd., Suite 500, Jacksonville, FL 32225
CT Marine, 18 Church Street, Georgetown, CT 06829
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, MA 02026
Crane Consultants, 15301 First Ave S., Seattle WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
Arthur D. Darden, 3200 Ridgelake Dr., Suite 403, Metairie LA 70002
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, 2611 Jefferson-Davis Hwy, Ste. 3000, Arlington, VA 22202
Diversified Technologies, 812 Live Oak Dr., Chesapeake VA 23320
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
GHM Inc. (Industrial Measurement Consultants), P.O. Box 1836, Newport News, VA 23601
Gibbs & Cox, Inc., 50 West 23rd Street, New York, NY 10010
The Glosten Associates Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
Morris Guralnick Associates, Inc., 130 Sutter Street, Suite 400, San Francisco, CA 94104
C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110
Hydrocomp, Inc., 45 James Farm-Lee, P.O. Box 865, Durham, NH 03824
JJH Inc., No. 4 Executive Campus, Culbert Blvd. & Route 70, P.O. Box 5031, Cherry Hill, NJ 08034
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
James S. Krogen, 1515 NW 7th St., Suite 124, Miami FL 33125
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
John V. McCollum, Inc., 1199 Long Point Road, Mt. Pleasant, SC 29464
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
John J. McMullen Associates, Inc., 1 World Trade Center, Suite 3000, New York, NY 10048
MacPherson Maritime Services, 141 Jefferson Ave., Westfield NJ 07090
Fendall Marbury, 9 Neal Street, Annapolis MD 21401
Marine Design & Operations, Inc., 226 Chestnut St., Roselle Park, NJ 07204
Marine Management Systems Inc., 102 Hamilton Ave., Stamford CT 06902
Marine Power Associates, 1010 Turquois St., Ste 217, San Diego, CA 92109
Maritech, Seacliff, Bay Road, Newmarket, NH 03857
Maritime Design, Inc., 3020 Hartley Rd., Jacksonville, FL 32257

R.J. Mellusi & Co., 71 Hudson St, New York, NY 10013
Nautical Designs, Inc., 2101 S Andrews Ave, Suite 202, Ft Lauderdale FL 33316
Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean Oil International Engineering Corp., 3019 Mercedes Blvd, New Orleans LA 70114
Olsen Marine Surveyors Co., P.O. Box 283, Port Jefferson, NY 11777
Omega Marine Engineering Systems, Inc., 11757 Katy Freeway, Ste 1100, Houston TX 77079
QED Systems Inc., 4646 Witchduck Rd., Virginia Beach, VA 23455
Donald J. Quigley, Inc., P.O. Box 515 Richboro, PA 18954
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112
Sea School, 10812 Gandy Boulevard, St. Petersburg, FL 33702
Seaworthy Systems Inc., P.O. Box 965, Essex, CT 06426; 17 Battery PL, New York, NY 10004; P.O. Box 205, Solomons MD 20688; 2 Skyline Pl., 5203 Leesburg Pike, Suite 700, Falls Church VA 22041; 1305 Franklin St., Suite 210, Oakland, CA 94612.
Seaworthy Electrical Systems, 17 Battery Pl. N.Y. N.Y. 10004
George G. Sharp, Inc., 100 Church St., New York, NY 10007
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
Systems Engineering Associates (SEACOR), 200 East Park Dr., Suite 600, Mt Laurel NJ 08054
TIMSCO, P. O. Box 91360, Mobile AL 36691

NAVIGATION & COMMUNICATIONS EQUIPMENT
Anschutz & Company, P.O. Box 3748, Teaneck, NJ 07666
AT&T, High Seas Dept., 412 Kemble Ave., Room C380, Morristown, NJ 07960
Comsat Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Henschel, Inc., 9 Hoyt Drive, Newburyport MA 01950
Hose McCann, 9 Smith Street, Englewood, NJ 07631
IDB Aero-Nautical Communications, 15245 Shady Grove Road, Rockville, MD 20850
Kelvin Hughes Ltd., New North Rd., Hainault, Ilford, Essex 1G6 2UR ENGLAND
Kenwood USA Corp., Marine Products Div., 2201 E. Dominquez St., Long Beach, CA 90810
Mackay Communications, 441 US Highway #1, P.O. Box 331, Elizabeth NJ 07207
Marine Electric RPD, Inc., 50 Carol St., P.O. Box 1135, Clifton, NJ 07014-1135
Mobile Telesystems, Inc., 300 Professional Drive, Gaithersburg, MD 20879
Naval Electronics, 5417 Jetview Circle, Tampa FL 33634
Norwegian Telecom, P.O. Box 6701, Oslo 1, NORWAY
Novatech, 820 Cormorant St., Victoria, BC V8W 1R1, CANADA
Robertson Marine Systems, 3000 Kingman Street, Suite, 207, Metairie, LA 70006
SPD Technologies, 13500 Roosevelt Blvd., Philadelphia, PA 19116
Simrad, 19210 33rd Avenue West, Lynwood, WA 98036
Singapore Telecom, Orchard Point Post Office, P.O. Box 38, SINGAPORE 9123
Sperry Marine Inc., 1070 Seminole Trail, Charlottesville VA 22901
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Summer Equipment Ltd., 24 West 4th Ave., Vancouver V5Y 1G3, CANADA
Trimble Navigation, 585 North Mary Avenue, P.O. Box 3642, Sunnyvale, CA 94086
Waterway Communications System, Inc. 453 E. Park Pl., Jeffersonville, IN 47130

NOZZLES
Nautican Enterprises Ltd., 407 Mountain Highway, North Vancouver, B.C. V7J 2L1

OIL—Marine—Additives
Exxon Company International, 200 Park Ave., Bldg 222, Room A279, Florham Park, NJ 07932, P.O. Box 4706, Houston, TX 77210-4706
Mobil Oil Corporation, 3225 Gallows Road, Fairfax, VA 22037-0001
Shell Oil, P.O. Box 2463, Houston, TX 77252
Texaco, International, 2000 Westchester Avenue, White Plains NY 10650

OIL/WATER SEPARATORS
Alfa-Laval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974-0556
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale NJ 07647
FAST Systems, Inc., 3240 N. Broadway, St. Louis, MO 63147
MMC International, 60 Inip Dr, Inwood NY 11696

PAINT—COATING—CORROSION CONTROL
Ameron, 201 N. Berry St., Brea, CA 92622
Enviro Coatings, Inc., 4560 Belt Line Rd., Suite 300, Dallas, TX 75244
Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
GlobalTech, 9801 Westheimer St., Ste. 202, Houston, TX 77042
Jamestown Distributors, 28 Narragansett Ave., P.O. Box 348, Jamestown, RI 02635
Hempel Coatings, Foot of Curie Avenue, Wallington, NJ 07057
Melvin Pierce Marine Coating, Inc., P.O. Box 93, Semmes, AL 36575
Microphor, Inc., Marine Division, 452 E. Hill Rd., P.O. Box 1460, Willits, CA 95490
Sigma Coatings, 8979 Market St., Houston, TX 77029, 330 Rover Road, Harvey, LA 70059, 1100 Adams St., Hoboken, NJ 07030
Unitor Ships Service, Unitor Marine Chemicals Division, 3 High St., Rickmansworth, Herts, WD3 1SW UNITED KINGDOM

PIPE FITTINGS/CONNECTING SYSTEMS
Aeroquip Corporation, 3000 Strayer, P.O. Box 631, Maumee, OH 43537-0631
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
Stanley G. Flagg Co., 1020 W. High St., Stowe, PA 19464
Thaxton, Inc., 25 Leonburg Rd., Mars, PA 16406-8401

PORT SERVICES
Port of Iberia, P.O. Box 897, New Iberia LA 70561
Port of Portland, 5555 N. Channel Ave., Portland, OR 97217

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
Avondale Industries, Harvey Quick Repair, P.O. Box 116, Harvey, LA 70058
American Air Filter, P.O. Box 35690, Louisville, KY 40432
ASEA Brown Boveri, 1460 Livingston Ave., North Brunswick NJ 08902
ASEA Brown Boveri (Stromberg), P.O. Box 185, 00381 Helsinki, FINLAND
Argo International, 140 Franklin Street, New York, NY 10013
Aquamaster-Rauma Ltd., Box 220, SF-26101, Rauma, FINLAND
Bergen Diesel A/S, P.O. Box 924, N-5002, Bergen, NORWAY
Bird Johnson Company, 110 Norfolk St., Walpole, MA 02081
CWF Hamilton & Co., Ltd., P.O. Box 709, Christchurch, NEW ZEALAND
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
Coltec Industries (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
Electro-Motive Division of GM, 9301 W 55th St., LaGrange, IL 60525
Fincantieri, Diesel Engines Divisio—GMT, Bagnoli della Rosandra 334, Trieste, ITALY
GE Marine & Industrial, 1 Neumann Way N-158, Cincinnati OH 45215
GE Naval & Drive Turbine Systems, 166 Boulder Dr., Fitchburg MA 01420
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Krupp MaK, 7555 Danbro Crescent, Mississauga, Ontario, CANADA L5N 6P9
Mapeco Products Inc., P.O. Box 6, 725 Glen Cove Ave., Glen Head NY 11545
Marine Gears, Inc., P.O. Box 689, Greenville MS 38707
Marine Systems Inc., 2032 Atlantic Ave., Chesapeake VA 23324
Markisches Werk, P.O. Box 1442, D-5884 Halver GERMANY
MAN B&W Diesel, 17 State St., New York, NY 10004
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Holeby, DENMARK
MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15. DK-9900 Frederikshavn DENMARK
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1 GERMANY
MKW Power Systems, 301 S. Church St., Rocky Mount, NC 27801
MTK Magnetek Inc., 11150 Santa Monica Blvd., Los Angeles CA 90025
New Sulzer Diesel, Ltd., CH-8401, Winterthur, SWITZERLAND
Northwest Marine Services Corp., 6452 So. 144th St., Tukwila WA 98168
Nylands Marine Service A/S, P.O. Box 130, N-4818 Faervik, NORWAY
Omnithruster Inc., 9515 Sorensen Ave., P.O. Box 2144, Santa Fe Springs, CA 90670
Ovako Steel Couplings AB Sweden, S-813 00 Hofors SWEDEN
Propulsion Systems, 1441 N Northlake Way, Seattle WA 98103
Rolla SP Propellers SA, Via Silva 5, P.O. Box 251, 6828 Balerna SWITZERLAND
Rolla SP Propellers USA, 4030 Mustang Road, Melbourne, FL 32934, USA
Karl Senner Inc., 25 W Third, Kenner LA 70062
Schottel-Werft, D-5401 Spay, GERMANY
Stewart & Stevenson, 1400 Destrehan, P.O. Box 8, Harvey LA 70059-0008
Sulzer/Escher Wyss, Ravensburg GERMANY
Textron Lycoming, 550 Main St., Stratford, CT 06497
Ulstein International, A/S, N-6065 Ulsteinvik, NORWAY
J. M. Voith GmbH, Marine Division, Postfach 1940, D-7920, Heidenheim/Brenz, GERMANY U.S. Rep: Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021
Oy Wartsila Ab, Vasa and Abo Divisions, P.O. Box 244, SF65100 Vasa, FINLAND
Oy Wartsila, Stork Division, P.O. Box 244, SF 65100 Vasa, FINLAND
WesTech Gear Corp., 2600 E. Imperial Highway, Lynwood, CA 90262
ZF of North America, Marine Sales, 500 Barclay Blvd, Lincolnshire IL 60069

PROTECTIVE WRAPS
FANA (Film Applicators of North America), 1260 E Woodland Ave., Springfield PA 19064

PUMP—Repair—Drives
Coffin Turbo Pump, Inc., 326 S. Dean Street, Englewood, NJ 07631
Del Gavio, 619 Industrial Rd., Carldstadt, NJ 07072
Golten Marine Company Inc., 160 Van Brunt Street, Brooklyn, NY 11231
Houser Marine, Lario Division, 1713 S McKenzie St., Foley AL 36535
Jim's Pump Repair, 48-55 36th St., Long Island City NY 11101
Leistritz Corporation, 165 Chestnut Street, Allendale, NJ 97401
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Vita Motivator, 99 W Hawthorne Ave., Suite 622, Valley Stream NY 11580
Wilden Pump & Engineering Co., 22069 Van Burren St., P.O. Box 845, Colton, CA 92324

REMOTE VALVE OPERATORS
S. S. White Technologies, Inc., 151 Old New Brusnwick Rd, Piscataway, NJ 08854
Teleflex, Inc., 771 First Ave., King of Prussia, PA 19406

ROPE—Manila—Nylon—Hawsers—Fibers
Allied Signal Inc., Fibers Division, 1411 Broadway, New York, NY 10018
Columbian Rope Corp., P.O. Box 270, Guntown, MS 38849
Dupont, Montgomery 403, 1011 Centre Road, Wilmington, DE 19805

SANITATION DEVICE—Pollution Control
Jered Brown Brothers, 56 South Squirrel Rd., Auburn Hills, MI 48326
Byrne, Rice & Turner, Inc., 1172 Camp Street, New Orleans, LA 70130
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
FAST Systems, Inc., 3240 N. Broadway, St. Louis MO 63147
Microphor, Inc., 452 E. Hill Rd., P.O. Box 1460, Willits, CA 95490
Novatech, 820 Cormorant St., Victoria BC V8W 1R1, CANADA
Red Fox Environmental Services, Inc., P.O. Box 53809, Lafayette, LA 70505-3809
Research Products/Blankenship (Incinolet), 2639 Andjon, Dallas, TX 75220

SCALE MODELS
Sturgeon Bay Model Shop, 187 N Ninth Ave., Sturgeon Bay WI 54235

SCUTTLES/MANHOLES
L.S. Baier & Assoc., 7527 NE 33rd Dr., Portland OR 97211

SHIPBUILDING EQUIPMENT
MAN—GHH, Sterkrade Werfsrabe 112 D-4100 Duisburg 18, GERMANY
MAN—GHH, P.O. Box 110240, D-4200 Oberhausen 11, GERMANY
NEI Syncrolift, Inc., 8970 S W 87th Ct., Miami FL 33176
Offshore Industries, Inc., 144 Railroad Ave., Suite 206, Edmonds WA 98020

SHIPBUILDING—Repairs, Maintenance, Drydocking
Astilleros Espanoles S.A., Padilla 17, 28006 Madrid, SPAIN
Atlantic Marine, Inc., 8500 Heckscher Dr., Jacksonville, FL 32226
Avondale Industries Inc., P.O. Box 50280, New Orleans LA 70150
Bender Shipbuilding & Repair, P.O. Box 42, Mobile AL 36601
Bethlehem Steel, Martin Tower, Bethlehem PA 18106
Bethlehem Steel, Baltimore Marine Div., Sparrows Point Yard, Sparrows Point MD 21219
Blount Marine, Box 368, Warren RI 02885
Bollinger Lockport & Larose, P.O. Box 250, Lockport, LA 70374-0250
Chris-Marine AB, P.O. Box 9025, S-2000 39, Malmo, SWEDEN
Conrad Industries, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381
Curacao Drydock (USA), Inc., P.O. Box 3012, Curacao, Netherlands Antilles
Equitable Shipyards Inc., Trinity Marine Group, Box 29266, New Orleans LA 70189
Fincantieri SpA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
Freeport Shipbuilding, P.O. Box 417, Freeport, FL 32439
Galveston Shipbuilding, 6800 Port Industrial Boulevard, P.O. Box 2660, Galveston, TX 77553
Gulf Craft, Inc., 3904 Highway 182, Patterson, LA 70392
Halter International, 7412 Lakeshore Drive, New Orleans, LA 70124
Hitachi Zosen, Hitachi Shipbuilding & Engineering Co., 1-1-1 Hitotsubashi, Chiyoda-ku Tokyo 100, JAPAN
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530
In-Place Machining Co., 1929 N. Buffum Street, Milwaukee, WI 53212-3793
Jacksonville, Shipyards, 750 E. Bay St., Jacksonville, FL 32202
Jeffboat, Inc., P.O. Box 610, Jeffersonville IN 47130
Kvaerner Fjellstrand, N-5632 Omastrand, NORWAY
Lindenau Werft, Postfach 9060, D-2300 Kiel-Friedrichsort, GERMANY
Lisnave, Apartado 2138, 1103 Lisbon, Codex PORTUGAL
MAN GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, GERMANY
MIL Davie, Inc., P.O. Box 130, Levis, Quebec, CANADA
Marco, Inc., 2300 W Commodore Way, Seattle, WA 98199
T. Mariotti, Calata Chiappella, 16126 Genoa (Port) ITALY
Munson Manufacturing, 150 Dayton, Edmonds WA 98020
Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607
New York Shipyard Corp., One Beard St., Brooklyn NY 11231
Norconsult Engineering Co., Inc., P.O. Box 529, 5785 Plantation Rd., Theodore, AL 36582
Protecno, Ltd., Rua Eugenio Castro, 13A-r/c, 2800 Almada, PORTUGAL, U.S. Rep: Walter Thorsen, Inc., 79 Oweno Rd., P.O. Box 755, Mahwah, NJ 07430-0755
Quality Shipyards, Inc. (Zapata), 3201 Earhart Dr., P.O. Box 1817, Houma, LA 70361
Thomas Marine, 37 Bransford Street, Patchogue, NY 11772
SeaArk, P.O. Box 210, Monticello AR 71655
Service Marine Industries, P.O. Box 3606, Morgan City LA 70381
Skipperliner Shipyards, 621 Park Plaza Dr, Dept 21, LaCrosse WI 54601
Steiner Shipyard, Inc., P.O. Box 742, Bayou la Batre, AL 36509
Swath Ocean, 979 G Street, Chula Vista, CA 92011
3 Maj Associates Shipbuilding Industry, P. O. Box 117, 51001 Rijeka YUGOSLAVIA
Textron Marine Systems, 6600 Plaza Drive, New Orleans, LA 70127-2584
Trinity Marine Group, Box 3029, Gulfport, MS 39505-3029
Union Dry Dock & Repair, P.O. Box M1539, Hoboken, NJ 07030
Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201
Zodiac of North America Inc., Thompson Creek Rd., P.O. Box 400, Stevensville, MD 21666

SIMULATOR TRAINING
Houston Marine Training Services, 1600 20th Street, Kenner, LA 70062
Marine Safety International, Marine Air Terminal, LaGuardia Airport, NY 11371

SILENCERS
Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130

SMOKE CURTAINS
HMS Marine Hardware, 333 W. Merrick Road, Valley Stream, NY 11580

STABILIZERS
Naiad Stabilizers, Van Dusen & Meyer Inc., P.O. Box 558, Shelton, CT 06484

STAINLESS PLATE
Eastern Stainless Division, Cyclops Corporation, P.O. Box 1975, Baltimore MD 21203

STUFFING BOXES
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

SURVIVAL EQUIPMENT
Schat Watercraft, P.O. Box 465, Ft of Industrial Rd., Farmingdale NY 07727
Stearns Manufacturing, P.O. Box 1498, St. Cloud MN 56302
Viking Life Saving Equipment, 1625 N Miami Ave., Miami FL 33136

TANK CLEANING
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530

TANK LEVELING INDICATORS
IMO Industries, Gems Sensors Division, One Cowles Rd, Plainville CT 06062
MMC International, 60 Inip Dr, Inwood NY 11696
Saab Marine Electronics AB, P.O. Box 13045, S-402 51 Goteborg SWEDEN

TESTING
Barbee Valves, 205 W. 35th St., Suite A, National City, CA 92050
Wyle Laboratories, 7800 Govern's Dr., SW, Huntsville, AL 35807

TOOLS
Derbyshire Machine & Tool, Belfield Ave. & Wister St., Philadelphia, PA 19144-1788
Ingersoll-Rand, Professional Tool Group, Allen & Martinsville Rd., Liberty Corner, NJ 07938
LSP Industries, P.O. Box 5303, 2511-20th Street, Rockford, IL 61125
San Diego Marine Hardware, 1660 Logan Avenue, San Diego, CA 92113

TORSIONAL VIBRATION SPECIALISTS
T.W. Spaetgens, 156 W. 8th Ave., Vancouver, BC, CANADA, V5Y 1N2

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
Jack Faulkner, 2419 Caddy Lane, Flossmoor IL 60422

TURBOCHARGERS
Cooper Industries, Energy Services Group, North Sandusky St., Mt. Vernon, OH 43050

VALVES AND FITTINGS
Aeroquip Corporation, 3000 Strayer, P.O. Box 631, Maumee OH 43537-0631
American Vulkan Corporation, P.O. Drawer 673, 2525 Dundee Rd., Winter Haven, FL 33882-0673
Circle Seal Controls, Brunswick Corporation, P.O. Box 3666, 1111 N. Brookhurst St., Anaheim, CA 92803
Cla-Val Co., P.O. Box 1325, Newport Beach, CA 92663
Cunico Corp., 214 N Hawaiian Ave., P.O. Box 306, Wilmington CA 90748
Dolsey Ltd., 863 West 44th Street, Norfolk, VA 23508
Elliot Manufacturing, P.O. Box 773, Binghamton, NY 13902
Loeffler Machine, US #1 & Robbins Ave., Penndel PA 19047
MMC International, 60 Inip Dr, Inwood NY 11696
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474
Stanley G. Flagg Co., 1020 West High St., Stowe, PA 19464
Zidell Explorations, Inc., 3121 SW Moody Ave., Portland OR 97201

VIBRATION ANALYSIS
DLI Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110
T. W. Spaetgens, 156 W 8th Ave., Vancouver BC CANADA V5Y 1N2
Vibranalysis Engineering Corp., 4380 S. Wayside, Suite 100, Houston TX 77087

VIDEO—Training
Walport Wusa, 840 Bond St., Elizabeth, NJ 07201

WASTEWATER TREATMENT
EES Corporation/Omnipure, An Eltech Systems Company, 12850 Bournewood Dr., Sugarland TX 77478

WATER PURIFIERS
Alfa-Laval, Desalt A/S, Stamholmen 93, DK-2650 Hvidovre, Copenhagen, DENMARK
Alfa-Laval Separation Inc., 955 Mearns Rd., Warminster, PA 18974
Beaird Industries Inc., P.O. Box 31115, Shreveport LA 71130
Everpure, Inc., 660 N. Blackhawk Dr., Westmont, IL 60559
Exstar International, 6502 Windmill Way, Wilmington, NC 28405
Matrix Desalination, Inc., 3295 SW 11th Avenue, Fort Lauderdale, FL 33315
Sea Recovery Corp., P.O. Box 2560, Gardena, CA 90247-0560

WEATHER CHART RECORDERS
Alden Electronics, 40 Washington St., Westborough, MA 01581

WELDING
American Durweld Sales, P.O. Box 850, Scituate MA 02066
Welding Consultants USA, 10399 Paradise Blvd. #101, St. Petersburg, FL 33706

WINCHES AND FAIRLEADS
Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013
Jeamar Winches Ltd., 53 Maple Ave., Richmond Hill, Ontario L4C 6P3, CANADA
MMC International, 60 Inip Dr, Inwood NY 11696
Markey Machinery Co., 79 South Horton St., Seattle, WA 98134
Nordic Machine Manufacturing, 4700 Ballard Ave., NW, Seattle, WA 98107
Smith Berger Marine Inc., 516 S. Chicago St., Seattle, WA 98108
Thern, Inc., 5712 Industrial Park Rd., Winona, MN 55987

WINDOWS-Windshield Wipers
GEC-Marconi Electronic Systems Corp., 550 S. Fulton Ave., Mt. Vernon, NY 10550
Marketec, Inc., P.O. Box 999, Pisgah Forest NC 28768

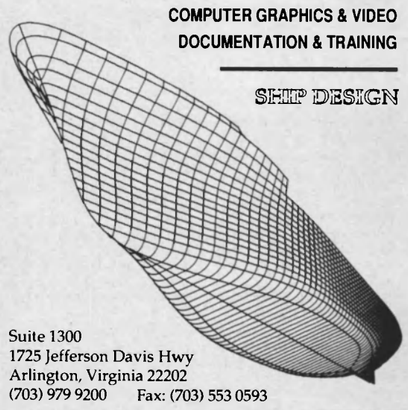
WIRE AND CABLE
Seacoast Electric Company, Station Plaza, Rye NY 10580

PROFESSIONAL

advanced marine
ENTERPRISES, INCORPORATED

NAVAL ARCHITECTURE & MARINE ENGINEERING
PROGRAM & PRODUCTION MANAGEMENT
COMPUTER GRAPHICS & VIDEO
DOCUMENTATION & TRAINING

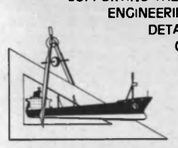
SHIP DESIGN



Suite 1300
1725 Jefferson Davis Hwy
Arlington, Virginia 22202
(703) 979 9200 Fax: (703) 553 0593

COI MARINE COMPANY
PROFESSIONAL • EXPERIENCED • RESPONSIVE

SUPPORTING THE MARINE INDUSTRY WITH:
ENGINEERING SERVICES
DETAILED DESIGN
COMPUTER AIDED DESIGN
TECHNICAL PUBLICATIONS
LOGISTICS



JACKSONVILLE (904) 724-9700 · PHILADELPHIA (609) 228-1853 · NEWPORT NEWS (804) 245-0516 · PORTSMOUTH (804) 397-8000 · BREMERTON (206) 479-8828

DLI ENGINEERING CORPORATION
MARINE
VIBRATION ANALYSIS
NOISE CONTROL
253 Winslow Way West, Bainbridge Island, WA 98110
(206) 842-7656

Measurement, recording and analysis of mechanical, structural and electrical phenomena.

AutoSHIP - The Industry Standard

PC Based software for the marine industry. Fully integrated system from hull design to hydrostatics, stability analysis, plate expansion, NC cutting and construction. Over 450 installations in 32 countries.

Coastdesign Inc.
12837 - 76th Avenue, Suite 201
Surrey, B.C. Canada V3W 2V3
Tel: (604) 599-1278 Fax: (604) 599-1287

Coastdesign

Dt DIVERSIFIED *technologies*
NAVAL ARCHITECTURE
MARINE ENGINEERING
SALVAGE ENGINEERING

812 Live Oak Drive
Chesapeake, VA 23320
(804) 420-9532

675 S. Washington Street
Alexandria, VA 22314
(703) 739-8844

DOLSEY LTD.
863 WEST 44TH STREET • NORFOLK, VIRGINIA 23508

Distributor of:
Mil-Spec Bronze Cupro Nickel
Valves Fittings Pipe
Flanges Solder

Watts: 1-800-825-8379 VA: 804-423-3037
Fax: 804-423-5568 FL: 904-249-1245

Arctec Offshore Corporation

- *SHIP AND BOAT HYDRODYNAMIC MODEL TESTING*
- *OCEAN ENGINEERING MODEL TESTS*
- *SHIP AND OFFSHORE PLATFORM INSTRUMENTATION AND TRIALS*
- *COASTAL ENGINEERING*
- *ARCTIC ENGINEERING*

578 ENTERPRISE ST. ESCONDIDO, CALIFORNIA 92025
(619) 746-5511 FAX (619) 746-3035

CRANDALL
DRY DOCK ENGINEERS, INC.
Railway and Floating Dry Docks
Waterfront Structures • Consulting
Design • Inspection
Dry Dock Hardware and Equipment
21 Pottery Lane Dedham, MA. 02026
Tel. (617) 329-3240 Telex: 924406

---

crane consultants Inc.
15301 1st Ave. So. Seattle, Washington 98148
(206) 246-7962 FAX (206) 246-1010
Crane hoist, materials handling specialists

ENCON Management Incorporated
Marine Structures • Engineering Analysis • Marine Survey
Project Management • Loss Prevention • Naval Architecture
P.O. Box 7760 • Beaumont, Texas 77726
(409) 842-9181

CAPTAIN ASTAD COMPANY INC.
SHIPBROKERS & MARINE CONSULTANTS
SALE & PURCHASE—ANY TYPE VESSELS
NEW CONSTRUCTION—CONVERSIONS
OWNERS REPRESENTATIVE

P.O. Box 350486
Fort Lauderdale, Florida 33335
Phone: 305/462-2048
Fax: 305/462-2153

2900 Energy Centre, 1100 Poydras Street
New Orleans, LA 70163-2900
Phone: 504/585-7317
Fax: 504/585-7301 TLX: 161733 9 (IDC)

C. R. CUSHING & CO., INC.
NAVAL ARCHITECTS, MARINE ENGINEERS
& TRANSPORTATION CONSULTANTS
18 Vesey Street
NEW YORK, N.Y. 10007
TEL (212) 964-1180 CABLE CUSHINGCO
TX: 752481

BARGES - TUGS - TOWING
CHARTERS AND SALES
(708) 798-2419
FAX (708) 798-1077

Jack Faulkner
Tug & Barge Sales

PROCUREMENT AGENTS
ON INLAND
AND OCEAN TOWING

2419 Caddy Lane Flossmoor, Illinois 60422
TOWING ANYWHERE THERE IS WATER

Ocean Engineering Centre
SHIP-MODEL TESTING

- Resistance Tests • Flow Visualization
- Wake Surveys
- Towed Directional Stability Evaluations
- Seakeeping

For Information Contact:

B.C. Research
Ocean Engineering Centre
3650 Wesbrook Mall,
Vancouver, Canada V6S 2L2
Telephone (604) 224-4331
Telex 04-507748

ARTHUR D. DARDEN
INCORPORATED
NAVAL ARCHITECTS & MARINE ENGINEERS
3200 RIDGELAKE DRIVE, SUITE 403
METAIRIE, LOUISIANA 70002 (504) 832-3952

GHM INDUSTRIAL MEASUREMENT CONSULTANTS
- Industrial Photogrammetry
- Theodolite Systems
- CAD Applications

P.O. Box 1836, Newport News, VA 23601 (804) 591-9244

CT MARINE
NAVAL ARCHITECTS • MARINE ENGINEERS

- VAPOR RECOVERY
- TUGS
- TOWBOATS
- BARGES

18 Church Street, Georgetown, CT 06829
Telephone: 203-544-8110
FAX: 203-544-8210

DESIGN ASSOCIATES, INC.
M. KAWASAKI
14360 Chef Menteur Highway
New Orleans, Louisiana 70129
Naval Architects
Marine Management
Marine Engineers
Transportation Consultants
Phone: (504) 254-2012 TWX 810-951-5317

GIBBS & COX INC
NAVAL ARCHITECTS & MARINE ENGINEERS
50 West 23rd Street • New York, NY 10010
(212) 366-3900

CHILDS ENGINEERING CORPORATION
WATERFRONT ENGINEERING • DIVING INSPECTION
BOX 333 MEDFIELD, MA 02052 (508)359-8845

DESIGNERS
& PLANNERS

TOTAL PROJECT SUPPORT

DESIGN
PRODUCTION
SERVICE LIFE

As a member of the BMT Group of companies, we can now combine our 38 years of expertise with access to one of the most advanced and comprehensive maritime research programs in the world.

Implementing cost-effective project support through state of the art technologies. . . .

Member of the BMT Group of Companies

DESIGNERS & PLANNERS, INC.
2611 Jefferson Davis Highway
Suite 3000
Arlington, VA 22202
Phone: (703) 418-3800

Seattle, Washington
Phone: 206-624-7850
Fax: 206-682-9117

THE GLOSTEN ASSOCIATES, inc.
CONSULTING ENGINEERS SERVING THE MARINE COMMUNITY

MORRIS GURALNICK ASSOCIATES, INC.
NAVAL ARCHITECTS MARINE ENGINEERS
130 Sutter Street, Suite 400
San Francisco, CA 94104
(415) 362-1242

CLASSIFIED AND EMPLOYMENT ADVERTISING

Technical Manager - Two positions available. Complete technical management of vessels in association with the commercial department of the principals. Implement and use computerized maintenance, inventory control, and purchasing onboard vessels (including directing the activity of Systems Analysts and Software Engineers in software design and equipment requirements). Liaise with various governmental, classification and insurance agencies and assure vessel compliance with agencies' standards. Provide crew for vessels. Manually or using bending moment and stability programs, prepare plans for proper loading of ship cargo. Undertake ship inspections, surveys, feasibility studies, repair and regular maintenance scheduling, and drydock supervision for vessels. Implement budget requirements and running costs of the vessels' principals. Assist vessels' crews with troubleshooting. Requires: Bachelor's degree in Marine Engineering, plus two years experience in the job offered or two year as a Chief Engineer on board a commercial ship. Also requires: one third international travel; working knowledge of Lotus 1-2-3 and Turbo Pascal; working knowledge of diesel ship engines. No smoking in the office. 40 hours/week; Mon.-Fri., 9:00 a.m. - 6:00 p.m.: $35,000/year. Send resume only to: Job Service of Florida, 701 S.W. 27th Avenue, Room 15, Miami, Florida 33135. Refer to Job No. FL0467076.

Mid-sized tug and barge marine transportation company seeks a Port Captain to oversee daily operations of offshore units.

Ideal candidate would have experience as Master aboard ocean tug/barge unit, as well as rescue and/or salvage experience.

Position would require extensive travel.

Send detail resume with reference and copy of license to:
Box 901
Maritime Reporter
118 East 25th Street
New York, NY 10010

ENGINEERS-MARINE/PORT

American Management Systems is providing exper Port Engineers who maintain selected U.S. Navy ships under phased maintenance prgm in So. Calif. Successful applicant will have BS Degree, U.S. Citizenship Prior Port Eng exp & USCG Lic. Competitive sal/bnfts pkg. Resume to: Port Eng, AMERICAN MANAGEMENT SYSTEMS, 1455 Frazee Road, #315, SO CA 92108

Universal Personnel Service Company, a division of Wink Inc. Companies of New Orleans, LA, is currently seeking qualified candidates for positions in the marine industry for the MS Gulf Coast.

Facility Engineer
Plant Manager
General Manager
Human Resources Manager
Purchasing Manager
ILS Manager

Please call or send resume to:
Universal Personnel Service Company
2710 Beach Blvd. Suite 6D
Biloxi, MS 39531 EOE MF
(601)388-3065 (601)388-3160 Fax

SHIPYARD ESTIMATOR

Experienced individual with background in large vessel repair and overhaul. New construction/steel fabrication experience a plus. Degree or apprenticeship preferred, but will consider other experience.

We are a growing and dynamic young company with many pluses. Gulf Coast location. Send resume with salary history to: **Box 903, Maritime Reporter, 118 E. 25th Street, New York, NY 10010**

WINCHES

For Sale, 4 double head gypsy winches approx. 20,000 lb pull, items are in perfect working order and like new condition. Motors are 30, 480V. Removed from government installation. Reasonably priced. Call Mid Maine Contractors (207)268-4554.

FOR SALE

NEW 7" RADIUS PANAMA CHOCKS
(MEET PANAMA REGULATIONS)

14" x 10" CLEAR OPENING. With extended legs for welding to deck. 14" wide on base - length 28" - height 27 1/4". IMMEDIATE DELIVERY FROM STOCK.

ALL DOORS - FACTORY NEW IMMEDIATE DELIVERY

ABS 6 DOG WATERTIGHT DOORS

30"x54" - RH & LH - Special $650 (in stock now)
26"x66" - RH & LH - Price on request
26"x60" - RH & LH - Price on request
30"x60" - RH & LH - Price on request

4 DOG LIGHTWEIGHT-STANDARD DOOR
3/16" Panel-1/4" Frame-Suitable for Tugs, Barges, Workboats, Fishing Vessels, Inland Bays & Rivers.

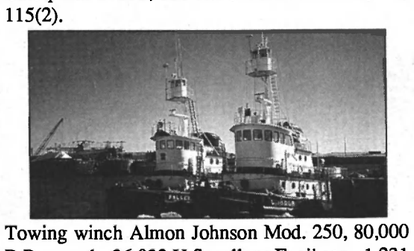
22"x60" - RH & LH - $447
24"x60" - RH & LH - $483
24"x54" - RH & LH - $495
26"x54" - RH & LH - $475
30"x60" - RH & LH - $568

Call Harold Chait
MARITIME POWER CORPORATION
200 HENDERSON ST.
JERSEY CITY, NJ 07302
PHONE:(201)433-0870 FAX:(201)433-9287

For Sale

Two Sister ocean-going tug boats Hawser type Twin screw diesel motors, steel hull, ABS+ A1 "Towing Service" + AMS located at Guerrero Negro, Baja California, Mexico.

L.O.A. 109'4-1/2" Breadth 28'6". Design draught 13'2-5/8". 297.3 G.T. 89.18 Nett registered tons, 11 crew accommodation, built in Japan 1966. Propulsion Plant, 2 General Motors Mod. 16-278-A, 1800 B.H.P. 800 R.P.M. each main generators KATO/ Caterpillar D-353, 330 H.P./453 K.V.A. 440/220/ 115(2).



Towing winch Almon Johnson Mod. 250, 80,000 B.P. pounds, 36,032 U.S. gallons F. oil cap., 1,231 U.S. gallons lube oil cap., 13,970 U.S. gallons fresh water, reduction gear falk 1sft reversible (2), propellers 3 blade solid bronze. Equipped with radar, gyro compass, echo sounder, radios SSB/VHF, meet SOLAS & U.S. Coast Guard standards.

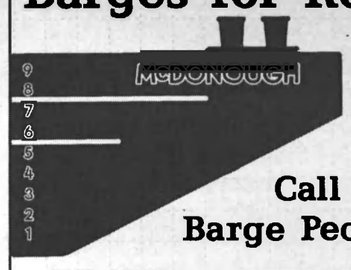
For further details please contact: Capt. David F. Middleton Phone: (619) 239-7339, Telefax: (619) 239-1831, San Diego, CA U.S.A. or Ing. Joaquin Ardura, Phone: (52-685)7-00-21, Telefax: (52-685)7-04-77 Guerrero Negro, B.C.S., Mexico

OCEAN ABS BARGES FOR CHARTER
located San Francisco Bay, CA

Derrick barge Cynthia 150x50x12 Clide 24 4 anchors 4 drum winch 2 drum winch 2 hyd. winches gen. comp. etc.
FLAT BARGE 200x45x15

GLANVILLE, 2657 Darius Way , San Leandro, CA 94577, (415) 483-1066

Barges for Rent



Call the Barge People.

INLAND AND OFFSHORE
DECK BARGES 110'X30' to 250'X72'
ALSO CRANE, HOPPER, TANK, AND SPECIALTY BARGES

New Orleans (504) 949-7586
2300 Surekote Rd.
New Orleans, LA 70117

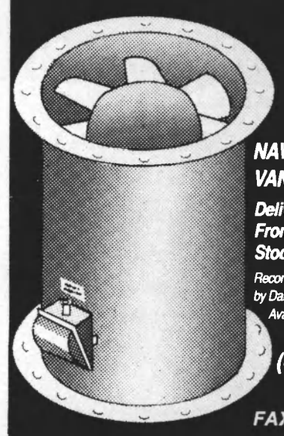
Parkersburg (304) 485-4494

St. Louis **Houston**

McDONOUGH MARINE SERVICE
The Barge People

JON M. LISS ASSOCIATES, INC.

411 BOREL AVENUE, SUITE 505 • SAN MATEO, CALIFORNIA 94402



NAVY STANDARD VANEAXIAL FANS
Delivery From Stock
Reconditioning and Rewinding by Dahl Beck Electric. Available with Warranty.
(415) 573-9191
FAX (415) 572-8458

NAVAL & MARINE HIGH PRESSURE GAUGE GLASSES
TUBULAR AND FLAT
MODELINE NO. 501 RED
EEP "CA" PLAIN or EEP "RB" REFLEX
Liquid Level 5000P.S.I. at 100°F
Dial Gauges | Flow Indicators
for 5 tea n-Mica Protected
Up to 1500 pounds.
OTHER EEP/PRODUCTS
PHONE 908-938-5641 FAX NUMBER 908-938-9463
EUGENE ERNST PRODUCTS CO.
P.O. BOX 427 or SOUTH MAIN STREET
EARMINGDALE, NEW JERSEY 07727-0427 U.S.A.
SEND FOR CATALOG 79-B

CONRAD
Industries, Inc.

BUILDERS • BARGES • DRYDOCKS
DRYDOCKING — SHIPYARD

P.O. BOX 790 MORGAN CITY, LA 70381

QUICK REPAIRS—2 SHIFTS
FOUR DRYDOCKS 2,400 TON
SPECIALISTS IN BARGE AND
DRYDOCK CONSTRUCTION
..... SINCE 1948 .....
PH. 504-384-3060 FAX 504-385-4090

Decca 752 Autopilot, console mount. New/in factory crate $5000.00 RF 230/231 new $2500.00 ea. Furuno FE881 MKII new $1800.00 Decca 914/916 many displays and antenna/TR units. Large stock of new Decca spares. Also Harris, Motorola — List on request. Baytex Marine 713-334-0561