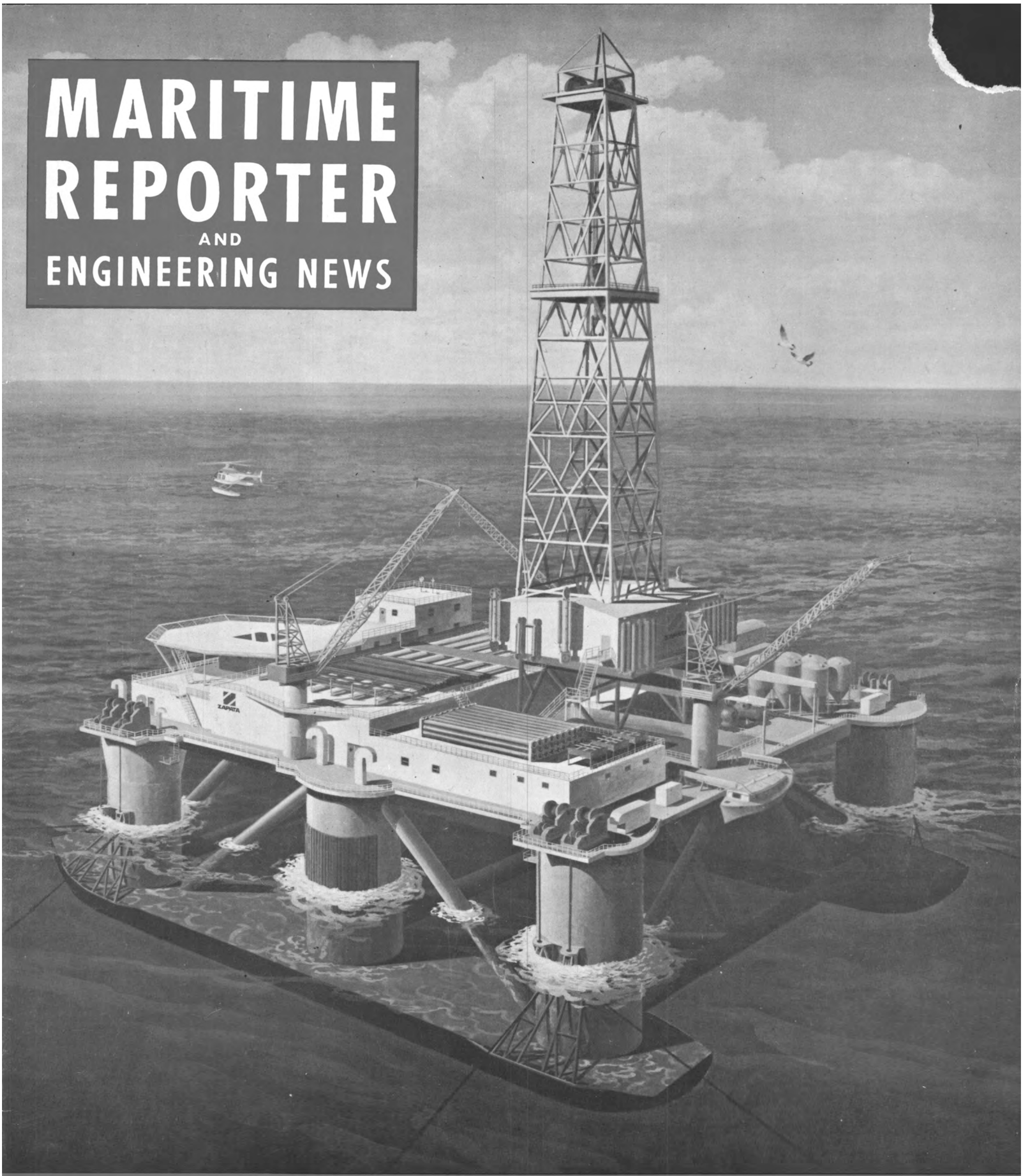
MARITIME REPORTER
AND
ENGINEERING NEWS



Avondale Receives $50-Million Zapata Award To Construct Three Semisubmersible Rigs

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General Dynamics Awarded Four Additional LNG Tankers At Total Cost Of $380 Million

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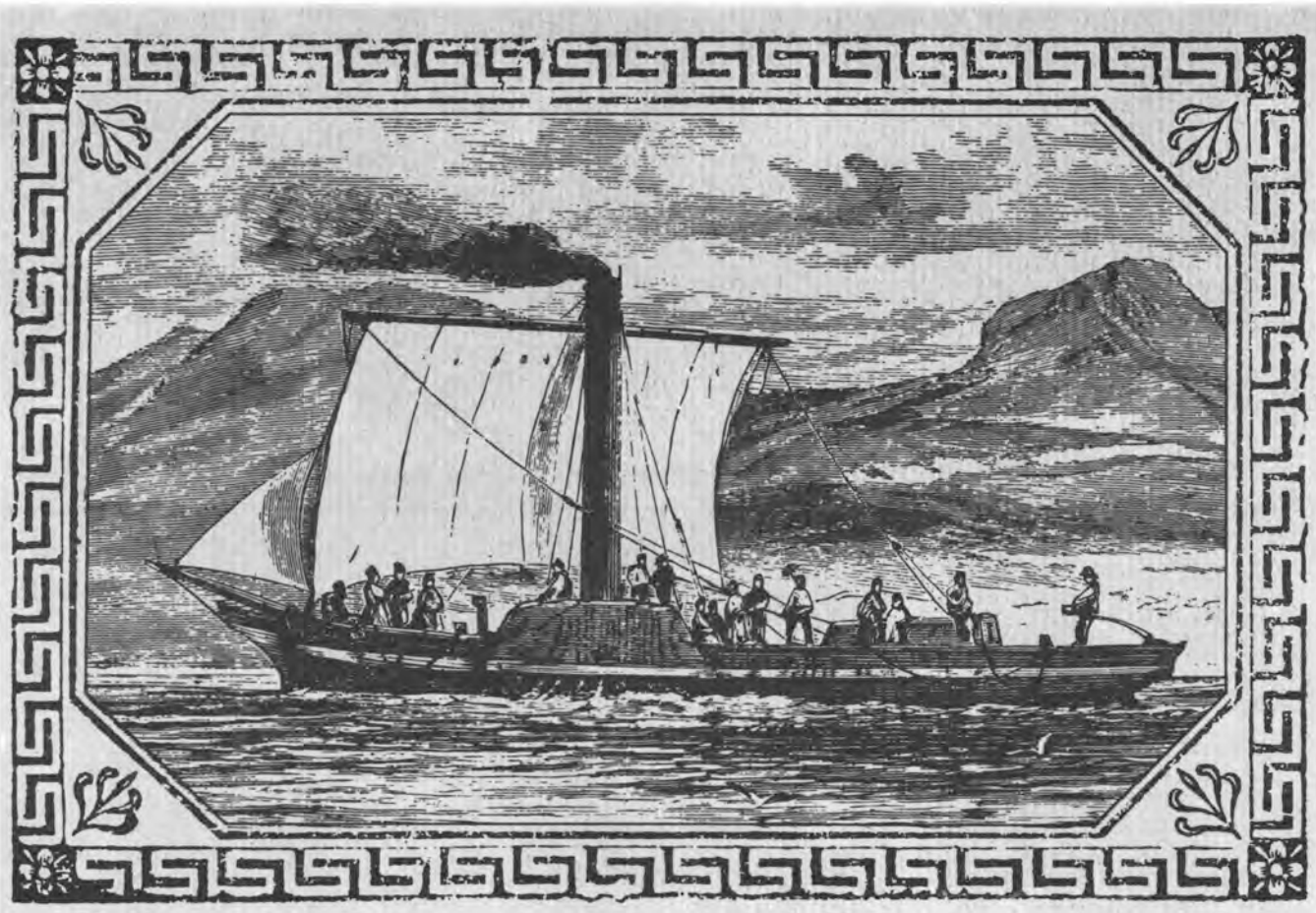
DECEMBER 1, 1973



FIRST ON THE FIRTH OF FORTH. The *Comet* was built by *Henry Bell* at Port Glasgow in 1811 and placed in service on the River Clyde in 1812. It was the first steamship to run commercially in Europe.

The *Comet* was a public passenger steamer and, at first, this Scottish Steam Packet plied between Glasgow and Greenock on the peaceful Clyde.

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But the *Comet* showed that steam was in Europe to stay.

Ships have come a long way since the *Comet*, whose engines probably used a single lubricant. Today's complex engines call for a diversity of precise, high-quality lubricants.

To meet this need, Gulf offers a number of superior marine diesel dual-purpose lubricating oils.

Gulf Veritas V9 is a non detergent lubricating oil used primarily in the crankcase systems of slow speed, crosshead diesel engines. It is manufactured from the highest quality solvent processed base oils and contains rust, oxidation and foam inhibitors for additional metal protection and long crankcase oil life.

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Cunard Steamship Tankers To Be Built By Davie Quebec Yard

The Export Development Corporation (EDC) has announced a loan of up to $30.4 million to cover 80 percent of the sale price of two tankers to be built in Quebec for Cunard Steamship Co. Ltd. of England.

The corporation said the two 39,000-ton product carrying tankers will be built by Davie Shipbuilding Ltd. at its yards in Lauzon, Quebec, Canada, for delivery in March and May 1975.

The sale is being financed on terms which require a down payment of 20 percent by Cunard with the balance payable in 16 semiannual installments after delivery. The EDC loan is for the 80 percent to be paid later.

The actual purchase price will be about $35 million.

Conoco To Open First U.S. Ethylene Tanker Terminal In La.

The nation's first tanker terminal for ethylene will be opened on the Gulf Coast next April by Conoco Chemicals, it was announced by **Robert W. Gerwig,** vice president of Continental Oil Company and general manager of chemicals operations.

Ethylene landed at the terminal will be processed at the company's nearby Lake Charles, La. manufacturing complex. Engineering and construction of the terminal and associated facilities are now under way.

IHC Holland Brochure Describes New HDK Marine Diesel Engine

A brochure is available from IHC Holland describing its newly developed HDK marine diesel engine. The HDK is a two-stroke crosshead design which affords efficient separation of crankcase and combustion section, making the unit ideally suited for operation on heavy fuels.

HDK engines are available with outputs ranging from 1,455 to 9,700 hp. The number of cylinders can vary from 3 to 10 on in-line units, and from 10 to 20 on engines of the V-type. The maximum operating speed is 375 rpm. Total output of HDK engines sold since their introduction in 1972 is more than 75,000 hp.

For a copy of the brochure, write to **R.B. Ziegler,** IHC Holland, Box 507, Mystic, Conn. 06355.

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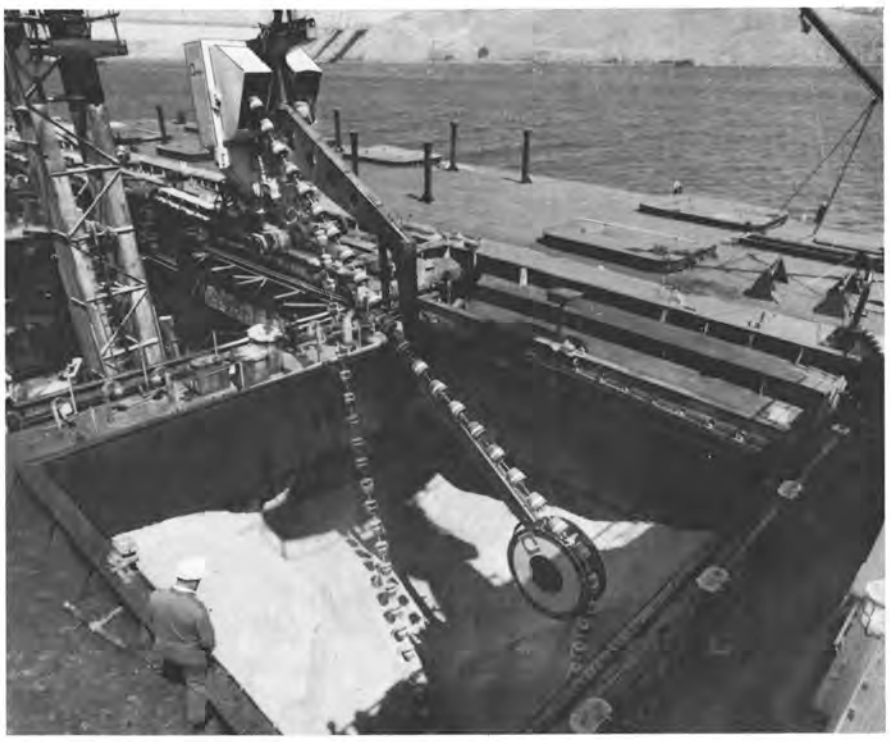

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Simmonds To Provide LNG Transfer Systems For Ships At Quincy

Simmonds Precision Products, Inc., 150 White Plains Road, Tarrytown, N.Y. 10591, has announced that it has received an initial contract to provide the LNG (liquefied natural gas) custody transfer systems on three oceangoing tankers.

The tankers, designed to carry LNG from Algeria to the United States, will be built for the Burmah Oil Company by General Dynamics at Quincy, Mass.

Geoffrey R. Simmonds, president, said the systems will include equipment to accurately measure the amount of LNG contained at cryogenic temperatures (–260 degrees Fahrenheit) in five spherical tanks aboard each of the three ships. A typical custody transfer system includes a network of sensors for the measurement of LNG tank levels, density, pressure and temperature. These signals are converted electronically into highly accurate tank quantity data which is displayed on an electronic control room console.

In addition to the initial contract, General Dynamics holds an option on Simmonds Precision custody transfer systems for additional LNG tankers. The dollar values of the contract and the options were not disclosed.

It is estimated that more than 100 LNG tankers will be required by 1985 to import LNG to the United States, Japan and Western Europe. In addition to these shipboard installations, dockside LNG measurement systems will be required to monitor the loading and unloading of the tankers.

The company will immediately expand its technical and marketing manpower in support of future activities in the rapidly growing LNG market, Mr. **Simmonds** said.

Simmonds Precision, a leader in aerospace fuel gaging systems, provided cryogenic gaging systems for the Apollo and Skylab programs. Similar systems are now in development for the Space Shuttle.

Halter Marine Delivers Two Motor Vessels To Euro-Pirates Int'l

Halter Marine Fabricators of Moss Point, Miss. has delivered the motor vessels Red Beard and Black Beard. The two vessels were built by Halter Marine for Euro-Pirates International, Inc. of New Orleans, La. They are in a series of vessels being built for **Charlie Slater,** better known as Champagne Charlie, a New Orleans hotel owner (French Quarter Inn).

The 176-foot by 38-foot by 14-foot vessels are both certified by the American Bureau of Shipping for A-1 and Full Ocean, and also by the U.S. Coast Guard.

Upon delivery, Red Beard and Black Beard are scheduled to service the offshore oil and mineral industry off the coast of Brazil.

TBI Names Macaulay Naval Architect And Production Manager

William C. Sandifer, president of TBI Products, Inc., 36 Cutler Street, Stonington, Conn., has announced the appointment of **James R. Macaulay** as production manager, naval architect and marine engineer. He will be responsible for the efficient and economical operation of the manufacture of work tugs and yachts, as well as the associated design work.

Mr. **Macaulay** comes to TBI Products with five years of experience in naval architecture and marine engineering with General Dynamics Corporation's Electric Boat Division. His most recent position was project engineer for the Trident submarine design.

Mr. **Macaulay** holds a degree in naval architecture and marine engineering from the University of Michigan. He is a native of Waterbury, Conn.

TBI Products, Inc. has, for the past four years, been involved in the production of work tugs, open launches and yachts. Recently they have expanded their production line to produce a workboat suitable for environmental protection in the form of a pollution boom towboat for containment of oil spills. They are presently working on a design for hull-cleaning equipment.

Zapata Awards Avondale $50-Million Contract For Semisubmersibles—Additional Tug/Supply Vessels And Other Units To Be Built

ON THE COVER: Three new U.S.-flag semisubmersible offshore drilling rigs like this artist's conception will be built for Zapata Off-Shore Company by Avondale Shipyards, Inc. in New Orleans. Construction on the advanced design, SS-2000 Class units will begin soon, with deliveries commencing in spring 1975.

Zapata Corporation, Houston, Texas, has announced that a contract has been signed with Avondale Shipyards, Inc., a subsidiary of Ogden Corporation, for construction of three new semisubmersible offshore drilling rigs.

In addition, Zapata has an option to build a fourth rig. The total cost of the three rigs is approximately $50 million. Zapata's full cost of the three rigs is estimated to be approximately $70 million.

The new rigs, to be called the SS-2000 Series, are part of an overall Zapata program calling for approximately $124 million in capital commitments during the company's fiscal 1974. Other key elements of the program related to the offshore petroleum industry include construction of eight new tug/supply vessels for Zapata's marine service operations, at a total cost of more than $17 million. Some of these vessels will be U.S.-flag for operation in the expanded search for hydrocarbons in American coastal waters.

Zapata said that construction of the first of the SS-2000 rigs will start at Avondale's yard in New Orleans, La., soon, with deliveries expected to commence in spring 1975 and to be completed by mid-1976. The addition of this semisubmersible class brings to five the number of rigs now being built for Zapata (two are scheduled for delivery in 1974) at a total capital investment of approximately $115 million. The company currently has 14 rigs in operation, including three jackup units gained in October, when Zapata acquired Crestwave Offshore Services, Inc.

Zapata Off-Shore Company, a subsidiary, will own and operate the SS-2000 units, which will be capable of working in all but the most severe environments. The rigs will be initially outfitted for drilling in 1,000 feet of water, with a design capability for drilling in water of 2,000 feet. Drilling equipment will be capable of drilling to depths of more than 25,000 feet.

The SS-2000 units are of twin catamaran lower hull configuration, with six stabilizing columns. They will have an overall length of 260 feet, with maximum beam of 200 feet and depth to drilling deck of 80 feet. Variable deck load capacity will be 2,000 tons. Featuring the latest equipment, the rigs will have motion compensators and automatic pipe racking gear. Displacement of the vessels will be approximately 16,750 long tons at drilling draft of 45 feet. They will have quarters for 90 men. Rig design conforms to both U.S. Coast Guard and American Bureau of Shipping classification standards.

William H. Flynn, Zapata chairman and chief executive officer, said that proceeds from the July 5 sale of its former international bulk shipping division had enabled Zapata to substantially restructure its financial resources and to accelerate expansion of its existing businesses.

Mr. **Flynn** said that in addition to broadening the scope of its present operations, Zapata is pursuing efforts to become actively involved in U.S.-flag bulk shipping in a "significant way." He remarked that the company has been studying such alternatives since 1971, when it formed a New York-based subsidiary, Zapata Bulk Transport, Inc., for that purpose.

Other major expenditures which Zapata has announced since July 5 include the repayment of approximately $100 million in senior bank debt and intercompany debt due the former shipping division, and the purchase of 25 percent of Zapata's outstanding common stock for about $33 million in a September tender offer.

Two key acquisitions have been completed in the past four months. Zapata entered the tuna fishing business with the purchase of seven existing tuna clippers for a total consideration of $19 million, and plans to add five more vessels in 1974 at an aggregate cost of $16 million. Zapata expanded its offshore drilling fleet in October with the $20-million acquisition of Crestwave Offshore Services, Inc., a New Orleans-based company with three jackup rigs.

In addition to offshore drilling and marine services, activities of Zapata Corporation (NYSE) include petroleum exploration, copper and coal mining, menhaden and tuna fishing, and building and general construction.

Ogden's Avondale Shipyards, a leading American shipbuilder, is also a major producer of offshore rigs and fixed platforms. With the delivery of the three new rigs for Zapata, Avondale will have constructed a total of 10 since 1972.

D.W. Challinor Appointed Manager Yarrows Shipyard

D.W. (Don) Challinor has been appointed manager at the Yarrows Limited shipyard at Victoria, British Columbia, Canada, to succeed **William Maddock** who has retired.

Mr. **Challinor** has wide experience in the shipping and shipbuilding industries in Australia, England and Canada and joined Burrard Dry Dock Company in North Vancouver in 1966, where he became chief engineer for the Burrard and Yarrows shipyards.

Mr. **Challinor** is a member of the B.C. Association of Professional Engineers, the Royal Institution of Naval Architects, and the Institute of Marine Engineers.

Mr. **Maddock**, who joined Yarrows in 1950, had been shipyard manager for 17 years before his retirement on October 31.

Free Enterprise Award To James P. McAllister

James P. McAllister

James P. McAllister, president and chief executive officer of McAllister Brothers, Inc., has been presented with the annual "Free Enterprise Award" from the Insurance Federation of New York at its 59th annual meeting and luncheon held on November 8, 1973.

Mr. **McAllister** is the third generation of his family to direct the activities of this 109-year-old towing company, which operates a fleet of 50 tugs on the waters of New York, Philadelphia, Norfolk, Puerto Rico, the Great Lakes and St. Lawrence River. He has long been active in New York and national maritime and defense activities, and had previously been named "Man of the Year" by the Maritime Association of the Port of New York and the Foreign Commerce Club of New York.

The award, presented for "outstanding achievements over the years in defense of free enterprise," has been given in the recent past to **Gilbert W. Fitzhugh,** chairman of Metropolitan Life, **Nathan W. Wentworth,** chairman of The Continental Corporation, and **John C. Emery,** president of Emery Airfreight.

Ralph C. Gross, president of the New York Chamber of Commerce and Industry, was the speaker at this year's luncheon at the Americana Hotel, which annually attracts a statewide audience of insurance, banking and other industry executives.

Motorships, Inc. Names Udo Reif President

The appointment of **Udo Reif** as president of Motorships, Inc. has been announced by **Nils O. Seim,** who retires to the position of chairman of the board.

Mr. **Reif** was previously executive vice president of Motorships. He is also president of Motorships of Puerto Rico, Inc., and president of Univenture Shipping Corporation of Monrovia, Liberia.

Motorships is a ship agency firm, founded 15 years ago, specializing in handling automobile ships. Its wholly owned subsidiary, Gulf Motorships, Inc., has offices in New Orleans and Baton Rouge, La., and Houston and Galveston, Texas, handling general cargoships, tankers and automobile carriers.

Motorships of Puerto Rico handles cruise ships, general cargoships and automobile ships.

MacGregor Company Formed In Singapore

A new company, MacGregor South East Asia (Pte.) Ltd. has been formed in Singapore to meet the needs of the area's rapidly expanding shipbuilding and shipping potential.

Established as a joint venture between International MacGregor and the Singapore company of R. Jumabhoy & Sons (Pte.) Ltd., the new company holds the exclusive right to design, sell, manufacture, install and service MacGregor hatch covers and other equipment to the shipping and shipbuilding industries of Singapore, Malaysia, Indonesia, Thailand and Bangladesh.

In the past three years, R. Jumabhoy & Sons Ltd. has operated the Singapore MacGregor After Sales Station which services MacGregor-equipped ships, and is also an MCS engine-cleaning-system sales and stock depot. R. Jumabhoy & Sons Ltd. and its associates have expanded and now represent several major shipping lines calling at Singapore, Malaysia and Indonesia. Its managing director **A.R. Jumabhoy**, B.Sc., a well-known figure in Southeast Asian maritime circles, is also chairman and managing director of the new MacGregor company whose technical staff includes two senior engineers, **S.D. Iyer**, A. Weld.I., D.F.M. and **P.Lazarus**, L.M.E., A.M.I.E.

Through MacGregor South East Asia, the Singapore shipyards, such as Jurong, Keppel and Sembawang will be able to benefit from the MacGregor Organisation's experience and expertise in hatch covers, ro/ro ramps and decks, hull doors and side ports. Presently engaged in producing cargoships including Freedom vessels, these shipbuilders will soon be joined in Singapore by the new Hitachi-Robin-Zosen and Mitsubishi (Singapore) yards.

Having considerable repair experience, the Singapore yards are also skilled in conversion work, a field where MacGregor know-how extends from simple side port installations to complete ro/ro conversions.

There is a large shipbuilding complex under construction at Pasir Gudang on the Malaysian Coast opposite Singapore, while the Indonesian and Thailand Governments both have ambitious plans for their own repair and building centers.

The ASEAN (Assoc. of S.E. Asian Nations) fleets are rapidly enlarging with the addition of new and second-hand general cargo tonnage. It is for such vessels and for regional shipping lines that MacGregor South East Asia can provide equipment and know-how, including the retrofit of modern hatch covers. Lines of ASEAN include Neptune Orient (Singapore), Malaysian International Shipping Corp., and the National Lines of Indonesia and Thailand.

Sun Ship Names William E. Jarrett General Auditor

William E. Jarrett

Sun Shipbuilding & Dry Dock Co. has appointed **William E. Jarrett** to the post of general auditor.

In his new post Mr. **Jarrett** will retain his existing audit functions and take on the general audit responsibilities of the company and special assignments. He will report to **G.C. Liacouras**, vice president for finance.

Mr. **Jarrett** joined Sun Ship in April 1957 as an accountant in the general accounting department. He was named an internal auditor in November 1964, a job he held until he was appointed manager of the shipyard's internal audit department in January 1967.

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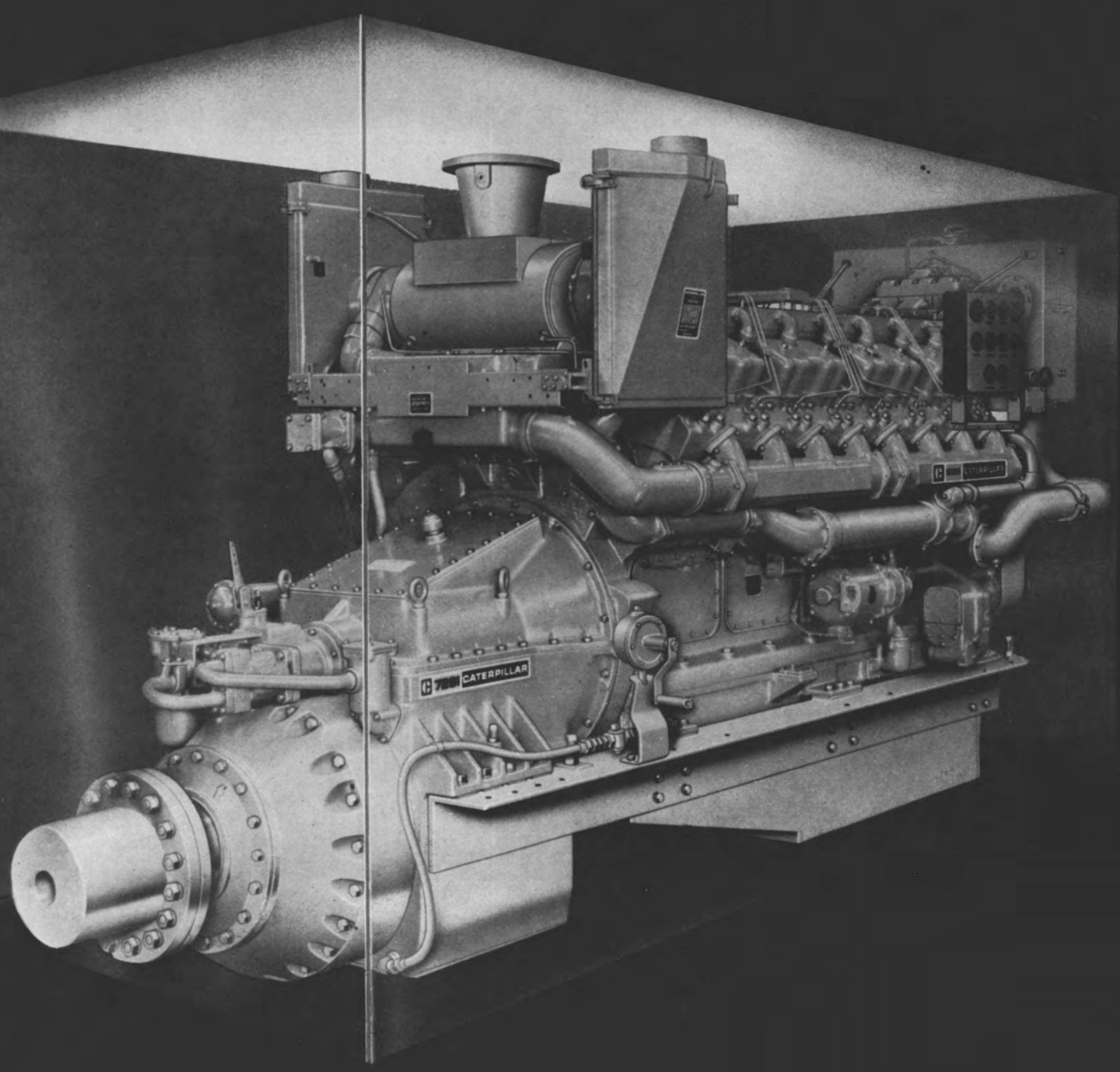

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Model	Cyl.	Disp. (cu. in.)	RPM (Cont.)	SHP (Cont.)	BHP (Cont.)	Marine Gear	Ratios Fwd.	Ratios Rev.
D399	V-16	3928	1225	1091	1125	Cat 7261	2.89:1 to 4.22:1	3.18:1 to 3.84:1
D398	V-12	2946	1225	825	850	Cat 7251	2.95:1 to 4.34:1	3.24:1 to 3.95:1
						Cat 7261	2.89:1 to 3.50:1	3.18:1 to 3.84:1
D379	V-8	1964	1225	548	565	Cat 7241	2.00:1 to 5.88:1	2.00:1 to 5.88:1
						Cat 7251	2.95:1 to 5.11:1	3.24:1 to 5.11:1
D353	I-6	1473	1225	412	425	MG 521	2.19:1 to 4.09:1	2.19:1 to 4.09:1

CATERPILLAR

ZAPEX Groups Drilling Two Wildcat Wells Offshore U.K./Ghana

Zapata Exploration Company (ZAPEX) announced that it has begun drilling operations on two offshore exploratory wells. An exploratory test will be drilled offshore Ghana, and a well will be spudded on prospective gas acreage in the southern United Kingdom North Sea.

The Ghana well is the first of two wells ZAPEX must drill there under a farm-out agreement to gain a working interest in four blocks covering approximately 1.3 million gross acres. It will be drilled on Block 4, located about 20 miles offshore Ghana in the South Atlantic Ocean.

ZAPEX is operator and has 25 percent interest in a seven-company exploration group which has licenses including Block 43/11 in the U.K. North Sea. The group has contracted for Zapata Off-Shore Company's jackup rig Chapparal to drill one well there. The block covers approximately 59,900 gross acres, and is located approximately 100 miles southeast of Newcastle and 120 miles north of Bacton, England.

Formed in 1972, Zapata Exploration Company has offices in Houston, Texas, and London, England, and conducts offshore petroleum exploration around the world. Its current active interests cover 6.9 million gross acres in waters of six countries. ZAPEX is a publicly held subsidiary of Zapata Corporation.

Babcock & Wilcox Elects Louis Favret Corporate Vice Pres.

Louis M. Favret

Louis M. Favret has been elected a corporate vice president of The Babcock & Wilcox Company.

Mr. **Favret,** who has been vice president, Nuclear Divisions since October 16, 1973, has direct responsibility for the company's Nuclear Power Generation Division and Nuclear Equipment Division. He reports to **Walter M. Vannoy,** group vice president, Power Generation Group.

Mr. **Favret** joined B&W in 1951 in the Power Engineering Group. Before October 16, he was a division vice president and general manager of the Nuclear Equipment Division.

Mr. **Favret** earned B.S. and M.S. degrees in mechanical engineering at Ohio State University, and is a member of the school's visiting committee. He is also a member of the Atomic Industrial Forum.

Dravo Corp. Elects Slease And Mertz To Counsel Posts

Dravo Corporation, Pittsburgh-based engineering, construction and manufacturing company, has announced the election of **Clyde H. Slease** as general counsel and **Robert E. Mertz** as corporate secretary and associate general counsel.

The action follows the retirement on November 1 of **John S. Mason,** secretary and general counsel, after 35 years of service.

Mr. **Slease,** who joined Dravo in 1948, served most recently as counsel and assistant to the president. He will continue in the latter position.

Mr. **Slease** holds a B.S. degree from Haverford College and a J.D. degree from the University of Pittsburgh. He is a member of the Allegheny County and Pennsylvania bar associations and Phi Delta Phi legal fraternity.

Mr. **Mertz** has been on Dravo's legal staff as counsel since 1969. He holds an A.B. degree from Lehigh University, a J.D. degree from Harvard University, and is a member of the Allegheny County, Pennsylvania, and American bar associations.

General Dynamics Awarded Four Additional LNG Tankers—Total Cost $380 Million

Workmen are nearing completion of the concrete slab floor on Building Basin Twelve at General Dynamics, Quincy Shipbuilding Division. The Basin will be the site of the first liquefied natural gas tanker to be constructed in the United States.

General Dynamics Corporation has announced that it has received firm orders totaling $380 million to build four additional liquefied natural gas tankers at its Quincy (Mass.) Shipbuilding Division.

It is the largest single commercial order ever received by a U.S. shipyard.

The new four ships to be built at Quincy will be identical to the three 125,000-cubic-meter ships already in Quincy's backlog. They raise Quincy's current commercial backlog to $650,000,000.

Buyers of the four LNG tankers will be Cherokee I Shipping Corp., Cherokee II Shipping Corp., Cherokee III Shipping Corp. and Cherokee IV Shipping Corp. The ships will be chartered to subsidiaries of Energy Transportation Corp., a recently formed U.S.-flag vessel operation which will also operate the three other LNG tankers being built at Quincy.

The new vessels will be used to transport liquefied natural gas under a contract between Burmah Oil Limited and the Indonesian state-owned oil and gas company Pertamina. The pact covers gas sold by Pertamina to buyers in Japan.

All four LNG tankers will carry American registry and American crews.

The U.S. Maritime Administration will issue mortgage guarantees for the four tankers under Title XI of the Merchant Marine Act. However, the tankers will not require construction subsidies.

David S. Lewis, chairman and chief executive officer of General Dynamics, said the first of the additional four LNG tankers will be delivered in December 1976, and the last in July 1978.

"These orders for seven indentical ships at fair prices settle once and for all the long-term future of Quincy and confirm our decision of a year ago to keep the yard open to meet the increasing requirements of the growing worldwide market for LNG tankers," Mr. **Lewis** said.

General Dynamics reported on November 8 its earnings for the first nine months of 1973 were the highest of the past six years.

Nine-month earnings were $2.62 per common share, or $27,530,000 on sales of $1,209,846,000. The earnings for the nine months were approximately 52 percent greater than in the same period last year, when earnings were $1.71 per common share, or $18,150,000 on sales of $1,151,435,000.

Third quarter earnings were $1.06 per common share, or $11,080,000 on sales of $382,986,000. This compares with earnings of 63 cents per common share, or $6,714,000 on sales of $382,288,000 for the third quarter of 1972.

Mr. **Lewis** said strong performances in both the commercial and Government areas of business were responsible for the earnings increase.

Telecommunications, building materials and resources earnings were particularly significant, he said.

Earnings of Stromberg-Carlson Corporation, a leading producer of telephones and telecommunications equipment, increased substantially in the nine months over the same period last year, Mr. **Lewis** said. This increase was due to increased sales and earnings of its CROSS-REED electronic and electromechanical switching equipment and telephone instruments. The backlog for telephone equipment is now at an all-time high.

The substantial earnings increase by Marblehead Lime Co., the nation's leading lime producer, reflected the increased production by the steel industry, Marblehead's major customer.

Material Service Corp., the Midwest's leading supplier of building materials, also made sizeable earnings increases due primarily to increased construction activity in the Chicago area.

Interest costs decreased sharply during 1973 because of continuing reductions in borrowings under the corporation's line of credit. Mr. **Lewis** said.

He pointed out that the company had recently received contracts totaling about $880 million for seven 688-class attack submarines and four liquefied natural gas tankers which strengthened the company's position as one of the nation's largest shipbuilders.

"We believe that these orders will insure profitable operations at the Electric Boat and Quincy Shipbuilding Divisions for the rest of this decade," he said.

These orders brought the total funded backlog to $2.6 billion, the highest level in the company's history, Mr. **Lewis** said.

Total funded and unfunded backlog is now $3.2 billion, or approximately 35 percent greater than at the end of 1972, he said.

General Dynamics is a leader in aircraft and aerospace, electronics, nuclear submarines, telecommunications, tactical missiles, building materials, lime, coal and asbestos, in addition to design and construction of large surface ships.

MarAd Revised Publications Catalog Now Available

The Maritime Administration's Eastern Region Technical Library has prepared a revised catalog of publications. The catalog also lists Maritime Administration Government Printing Office publications which can be purchased at the Library, together with prices.

Many booklets, brochures and copies of Maritime Administration press releases and speeches may be obtained from the Library free of charge.

The 49-page catalog is free upon request to Technical Library, Maritime Administration, Room 3752, 26 Federal Plaza, New York, N.Y. 10007.

Hanissian Joins Sanko As Operations Manager

Sanko Steamship (U.S.A.) Corp. announced that **John Hanissian** will be joining the firm as its operations manager. Mr. **Hanissian** was formerly associated with Texas Transport & Terminal as assistant sales manager.

Ichiro Onozuka Named President Of Hitachi Zosen Affiliate

Ichiro Onozuka

Ichiro Onozuka, executive vice president of Hitachi Zosen, was appointed president of Toyo Ocean Development & Engineering Co., Ltd., one of Hitachi Zosen's affiliated companies. This assignment was made as part of the company's reorganization and personnel changes to broaden the business activities of Toyo Ocean Development & Engineering Co., Ltd.

The Toyo Ocean Development & Engineering Co., Ltd. was established by Hitachi Zosen on April 1, 1971, with a capital investment of about $25 million. The company was set up to sell and rent plants, machinery and installations for ocean development. Other business operations include planning, design, installation and operation of ocean recreation facilities, as well as research and development in ocean development technology.

The Toyo Ocean Development & Engineering Co., Ltd. also carries out ocean exploration projects and provides information services for ocean development and related fields.

PSEG Of New Jersey To Buy Nuclear Plants From Offshore Power

Offshore Power Systems, Jacksonville, Fla., has announced that Public Service Electric and Gas Company (PSEG) of New Jersey, exercising its option, has agreed to purchase two additional floating nuclear plants for operation in 1985 and 1986 at a site still to be determined.

This brings the total number of floating nuclear plants under contract to Public Service to four. The original two, which had been contracted for in September 1972, will be sited 2.8 miles off Little Egg Harbor, N.J., in 1979 and 1980. Each unit is an 1150-megawatt plant, representing a total of 4600 megawatts of new power generation for the densely populated New Jersey area.

In making the announcement, **J.R. Stadelman,** vice president, Offshore Power Systems, stated that the purchase by PSEG is a "positive step toward alleviating the energy crisis in New Jersey, as well as a timely one in view of the foreign fuel import situation. Power generation from each 1150-megawatt floating nuclear plant will reduce the need for oil by one million barrels per month, releasing the scarce fuel oil for other needed purposes, as well as improving the nation's balance of payments."

Offshore Power Systems, a Westinghouse-Tenneco enterprise, has a backlog of eight units under commitment, representing a total of approximately $3 billion in sales.

In addition to the four units under contract to Public Service, Offshore Power Systems received in July a letter of intent for two floating nuclear plants from Middle South Utilities, Inc., to be sited in south Louisiana, with operation scheduled for 1982 and 1984.

In October, the Jacksonville Electric Authority signed a letter of intent for two units to be delivered for operation somewhere off the northeast Florida Coast in 1982 and 1984.

Earlier this year, Offshore Power Systems applied to the Atomic Energy Commission for licensing of eight essentially identical floating nuclear plants that will be produced on an assembly-line basis at its manufacturing facility on Blount Island in Jacksonville. On June 8, the AEC accepted the application from Offshore Power Systems for official review. Approval is expected some time early in 1975, the same year in which the manufacturing facility will be completed.

Three Major Offshore Firms Develop New Gravity Base Platform

A new series of deepwater structural designs for offshore platforms, especially applicable to the North Sea, has been developed by a joint venture consisting of Brown & Root, George Wimpey and Company and Christiani and Nielsen, Ltd.

The gravity base and platform design calls for structures supported on a concrete-bearing mat without use of deep piling. The concrete base unit and steel tower are placed and united at sea or a composite structure is constructed in a dockyard and subsequently towed to site and installed in one unit.

The designs are a result of 12 months' extensive research and development, taking advantage of the combined research facilities of the three partners.

The joint venture unites companies with vast international experience in the engineering and construction of traditional offshore steel platforms and major onshore and marine concrete projects. The team was formed when it became apparent that concrete based platforms might offer a siutable alternative in areas of the North Sea where environmental and sea bottom soil conditions would allow their use.

Specific designs will be developed for individual operators' needs based on the "hybrid" concept—structural steel towers founded on concrete base units, with modular packaged superstructures. Two basic variations are possible: (1) separate construction of base and tower units for assembly at sea, and (2) assembly of tower and base unit together for transport to site in upright position.

The first approach offers advantages in speed of construction with simultaneous fabrication of the main elements.

The second alternative concentrates onshore assembly work at one main site, with possibly longer construction time, but offers advantages of speed and simplicity in offshore placement.

Model tests of transport and installation techniques are now nearing completion at the Norwegian Technical University Hydraulics Laboratory in Trondheim, Norway. Additional tests will begin shortly at Wimpey Central Laboratory. A preliminary "quality assurance" is expected shortly from Det norske Veritas, who is reviewing the general design. Aspects of the design have been checked with Lloyd's Register of Shipping for compliance with D.T.I. regulations. Foundation studies for a range of possible sites have been performed by the Norwegian Geotechnical Institute at Oslo and by the Soils Division of Wimpey Laboratories, Ltd.

Designs have been under construction at the Highlands Fabricators' base at Nigg Bay, Scotland, but components or even complete structures could feasibly be built at other locations available to the joint venture companies.

The group expects to be able to offer proposals for construction to interested clients within three months.

Glacier-Herbert Sterngear To Be Built In U.S. By Bethlehem

Bethlehem Steel Corporation and Glacier Metal Company, Ltd., have agreed to cooperate on a ship-by-ship basis for the design and manufacture of the British company's Glacier-Herbert withdrawable sterngear.

Bethlehem Steel's shipbuilding department will make the Glacier-Herbert sterngear. It will be marketed in the United States by Glacier Metal, which will do the design work. Bethlehem's shipbuilding department will provide full marketing support in the endeavor.

Bethlehem Steel, second largest steel company in the United States, builds and repairs ships in its own yards and also operates its own fleet of vessels.

The Glacier Metal Company (member of the Associated Engineering Group) is acknowleged as a world leader in bearings for the marine industry.

Zapata Bulk Transport Relocated In New York

Zapata Bulk Transport, Inc. announced that it has moved its offices and is now located on the 18th floor of 245 Park Avenue, New York, N.Y.

Seatrain Lays Keel For T.T. Stuyvesant 225,000-Dwt Tanker

New York City Economic Development Administrator **Ken Patton** was joined by U.S. Assistant Secretary of Commerce **William W. Blunt Jr.** at the Brooklyn Navy Yard for the recent keel-laying of the T.T. Stuyvesant, the third ship to be constructed at the yard since the City of New York acquired the facility from the Federal Government in 1969. The T.T. Stuyvesant is being constructed by the Seatrain Shipbuilding Corporation.

Located on the borders of three underemployed communities, the Brooklyn Navy Yard, which has been converted into an industrial park, now has 28 tenant companies with an aggregate workforce of 4,659 people.

Assistant Secretary of Commerce **Blunt** noted that the Federal Government has provided $150 million in direct loans, working capital and other subsidies to stimulate shipbuilding activity in the Brooklyn Navy Yard. In addition, the Federal Economic Development Administration has contributed almost $1 million in public works grants and $500,000 in technical assistance monies to the yard.

The 225,000-dwt T.T. Stuyvesant will have a length of 1,094 feet and a cargo capacity of 9,489,328 cubic feet. The new tanker's 50,000 horsepower turbine engine will give the ship a cruising range of 15,200 nautical miles.

The Brooklyn Navy Yard is administered by CLICK (Commerce, Labor and Industry Corporation of Kings), a local, nonprofit economic development corporation. Associate Commissioner **Abraham Goodman** is the New York City government's liaison with CLICK.

ACT/PACE Names Hugh Roberts To Head Marketing & Sales


Hugh Roberts

Hugh Roberts, who has been in charge of special projects at Associated Container Transportation/PACE Line for three years, has been named manager of inward marketing and sales, according to an announcement by **Harold Lloyd,** inward freight manager.

Mr. **Roberts,** who joined ACT in 1970 following a career in steamshipping, trucking and warehousing, will be in charge of developing markets for all imports into the United States from Australia and New Zealand. In this regard, he will be working closely with PACE sales teams in Australasia.

Mr. **Roberts,** as special projects manager at ACT, has helped develop the inland depot system and designed imported meat document handling materials.

He was previously vice president and general manager of H.D. Warehouses Inc. in Kearny, N.J. and also worked for Denver-Chicago and Yellow Freight System Trucking, and U.S. Lines.

Mr. **Roberts** is a graduate of San Bernadino Valley (Calif.) College and a veteran of the U.S. Air Force.

Peck & Hale Names R.D. Schultz President

Robert D. Schultz of Sayville, N.Y., has been named president of Peck & Hale, Inc., West Sayville, N.Y., manufacturers of cargo securing systems and lashings with worldwide distribution. **Kenneth L. Peck** is now chairman of the board.

Mr. **Schultz** came to Peck & Hale, Inc. in 1962 as chief engineer and assistant to the president. He is a graduate of Cleveland State University in civil engineering, and holds an M.B.A. degree from C.W. Post. Before joining Peck & Hale, Mr. **Schultz** was a design engineer with the Bureau of Ships for six years.

National Steel And Shipbuilding Launches Second OBO For Aries Marine Shipping

Principals on the launch platform include, left to right: **John M. Murphy,** NASSCO vice president; the Honorable **Robert J. Blackwell,** Assistant Secretary of Commerce for Maritime Affairs; **Mrs. Lloyd E. Bensen,** sponsor of the S/S Ultrasea; **Mrs. Joseph A. Ament,** matron of honor; **Lloyd E. Bensen,** executive vice president, American Ultramar Limited, and **John V. Banks,** NASSCO president.

The S/S Ultrasea, 80,500-dwt San Clemente Class oil/bulk/ore carrier (OBO), was launched at National Steel and Shipbuilding Company (NASSCO) of San Diego, Calif., October 20, 1973. Ceremonies, open to the general public, commenced at 8 a.m. with a band concert by the U.S. Marine Corps Recruit Depot Band.

Mrs. Lloyd E. Bensen, wife of the executive vice president of American Ultramar Limited, served as the ship's sponsor. Her sister, **Mrs. Joseph A. Ament,** assisted as matron of honor.

Others participating in the colorful ceremonies included the Honorable **Robert J. Blackwell,** Assistant Secretary of Commerce for Maritime Affairs; **Arnold Lorbeer,** president, American Ultramar Limited; **Leo V. Berger,** president, Aries Marine Shipping Company; the Right Rev. Msgr. **I.B. Eagen,** pastor, Mission San Diego de Alcala; **John V. Banks,** president, NASSCO, and **John M. Murphy,** vice president, sales, NASSCO.

Ultrasea is the second of two NASSCO-designed OBOs for Aries Marine Shipping Company. Her keel was laid February 17, 1973, and delivery is scheduled for March 29, 1974. Her sister ship Ultramar was delivered to the customer on August 8, 1973.

The contract for these ships was the first awarded under the 1970 Merchant Marine Act that provided Government assistance for bulk carriers and encouraged shipyards to design and market high-performance ships.

Economic studies sponsored by the Maritime Administration pointed to the OBO-type vessel as being best suited to recapture the U.S. bulk trade now largely carried in foreign-flag ships. The versatility of the OBO in being able to transport different products, liquid or bulk, between ports, permits high utilization and low-cost transportation.

The 80,500-dwt Ultrasea is of the maximum size that can transit the Panama Canal. She is 892 feet 6 inches in length overall, has a beam of 105 feet 9 inches, and a depth of 62 feet 6 inches. The propulsion is single-screw steam-turbine and has a sustained full-load speed of 16.5 knots.

Immediately following the launch of Ultrasea, the keel was laid for NASSCO Hull 391, the second of three NASSCO-designed San Clemente Class 90,000-dwt tankers for Aeron Marine Shipping Company. **Bertram Ault,** vice president, finance. American Ultramar Limited, officiated at the keel-laying.

To date, the S/S Ultrasea, and her sister ship S/S Ultramar (delivered August 8, 1973), are the largest merchant ships ever built on the West Coast.

Approximately 2,000 spectators were present to view the colorful ceremonies.

Wisconsin Barge Line Issues 20-Year Bonds For Barge Purchase

C.L. Shaughnessy, vice president and treasurer of CLC of America, Inc., has announced completion of an $8,575,000 issue of 20-year bonds by its subsidiary, Wisconsin Barge Line, Inc.

Proceeds will be used by the inland water carrier to buy 50 barges and two towboats. The serial and sinking fund bonds, guaranteed by the Maritime Administration, will have final maturity on April 30, 1993.

Karageorgis Opens New York Office —100 Vessels In Fleet

Michail A. Karageorgis, S.A. of Piraeus, Greece, announces the opening of their New York office, Michail A. Karageorgis of New York, Inc., located at 1301 Avenue of the Americas, New York, N.Y. 10019.

The Karageorgis fleet, which will consist of about 100 vessels of both dry cargo and tankers, will be handled from this office for the Western Hemisphere business.

Robert T. Jones has been named managing director, **Willy E. Gorrissen** has been named director, **Richard J. Reese** has become director of Dry Cargo Division, and **Peter M. DeMeo** has become director of operations.

Further announcements of additional personnel will be made at a later date.

Promotions Announced At Galveston Wharves

Promotions at the Galveston Wharves (Port of Galveston) were recently announced by **Harry H. Levy Jr.,** chairman of the board of trustees, and **C.S. Devoy,** executive director.

Effective immediately, these changes follow the promotion of Mr. **Devoy** at the last board meeting from general manager and port director to executive director.

Messrs. **Levy** and **Devoy** also announced the appointment of **Paul Haney** as manager of public relations.

Promotions were made as follows: **O.L. Selig** to deputy port director, administration and finance; **D.J. Collier** to deputy port director, operations and sales; **C.E. Poe** to director of engineering; **G.R. Jones** to director of industrial development and tenant relations; **Robert A.Nesbitt** to director of communications; **Robert Ross** to assistant manager, operations department; **Marion J. Sunseri** to cargo controller, and **Ron Surovik** to assistant port engineer.

Mr. **Devoy** recently started his 11th year as chief executive officer of the Port and was recently named president of the American Association of Port Authorities.

Mr. **Selig** is a Wharves career employee with 19 years of service, and Mr. **Collier** has been with the Port for 18 years at Elevator B, and in sales and operations.

Mr. **Poe** has been port engineer for the past two and a half years.

Mr. **Jones** has 12 years of service and was auditor and assistant to the general manager.

Mr. **Nesbitt** is a veteran of 20 years of service in sales and public relations.

Mr. **Ross** has five and a half years of service, and Mr. **Sunseri** has been with the Galveston Port organization for six years in the operations department.

Mr. **Surovik** has been in the engineering department two years.

Mr. **Haney** is a former newspaperman who was assistant city editor of The Washington Evening Star and later, for 11 years, public affairs officer for NASA, becoming known as "the voice of the astronauts." He is a native of Akron, Ohio.

J.C. St. Amant To Head New Mobile Office For George G. Sharp, Inc.

George G. Sharp, Inc. of New York and Washington has announced the opening of a new office in Mobile, Ala., to perform marine design, engineering, inspection and drafting services for ships, conversions, off-shore structures, and supporting equipment. **Robert P. Giblon,** president of George G. Sharp, Inc., has appointed **Joseph C. St. Amant** the Gulf Coast manager and head of the Mobile office. Mr. **St. Amant** was formerly in charge of Sharp's inspection office at Pascagoula, Miss.

Mr. **St. Amant,** who is a native of New Orleans, La., is a veteran in the field of shipbuilding and offshore petroleum activities. He has more than 35 years' experience, including service with Todd Shipyards Corporation, U.S. Transportation Corps, Texaco, and private naval architectural firms. Mr. **St. Amant** has studied steam and diesel engineering at Tulane University, ship design at Delgado College, safety engineering at the California Safety Institute, and presently holds a chief engineer's license for both steam and diesel machinery. He is a member of The Society of Naval Architects and Marine Engineers, American Welding Society and The Propeller Club International.

The new office of George G. Sharp, Inc. is located at 2603 Halls Mill Road, Mobile, Ala. 36606.

Nielsen Shipping Names Alfredo Duarte Executive Vice Pres.

The appointment of **Alfredo C. Duarte** as executive vice president of K. Nielsen Shipping and Trading Co., Inc. was announced by the Miami, Fla.-based firm which acts as general freight agent for Norwegian Caribbean Lines and Commodore Mia-Mex Line. Mr. **Duarte** was formerly the chief executive officer of Seaway Lines, Inc.

Frank Cuccias Forms Engineering/Design Firm In Ocean Springs

F.P. (Frank) **Cuccias** has announced the formation of a new engineering design and consulting firm known as Southern Engineering Associates. This firm offers a unique span of services from naval architecture and marine engineering to facility planning, estimating, production planning and manufacturing engineering.

Based in Ocean Springs, Miss., the newly organized firm is presently engaged in consulting projects in support of offshore activities, Naval and commercial shipbuilding and structural assemblies.

Mr. **Cuccias** is an alumnus of the U.S. Naval Academy, and a graduate engineer of M.I.T. His previous positions include a group vice presidency of Varo Inc. and a director of Litton Industries.

Stella Maritime Elects Gales Executive VP

Michael A. Gales has been elected executive vice president and director of Stella Maritime Video, Inc., Englewood Cliffs, N.J., it has been announced by **Kenneth Mogull,** president.

Mr. **Gales** initially joined the company in July as a consultant. Stella Maritime Video, Inc. is one of the world's leading creators of on-board videocassette entertainment systems, providing first-run full-length color feature motion pictures to the maritime community.

Prior to joining the company, he was vice president-marketing of The Vidtronics Co. Inc., a division of Technicolor Corporation of America. From 1972 to July 1973, he was president of Medipix Corp.

A 1963 graduate of Oklahoma University, Mr. **Gales** served as a first lieutenant in the United States Army, seeing action in Bien Hoa, South Vietnam.

Britain Holds Lead In LNG And LPG Ships

The British shipping industry now has a world lead in the relatively new and fast-expanding gas tanker business.

And by 1976, according to the present new order position, Britain will have moved further ahead with a fleet of over one million tons (deadweight) of liquefied natural gas and liquefied petroleum gas carriers in service.

Figures in the Chamber of Shipping and the British Shipping Federation's publication "UK Shipping News," show that the world gas tanker fleet at present comprises 374 ships totaling just over 2.3 million deadweight tons, of which British owners have a 22 percent tonnage stake or almost 500,000 dwt.

There are a further 75 gas ships of nearly three million dwt on order worldwide, of which British shipping's share is 14 vessels totaling 578,000 dwt, or some 20 percent. This new building program—and the ships are largely in the 36,000 to 65,000-ton categories—represents for U.K. owners an estimated massive $957 million investment.

Most of these ships are LNGs which are extremely expensive to build, costing something between $59.8 million and $78.9 million, which is roughly equivalent to the cost of the QE2 or twice as much as a supertanker of a quarter of a million tons.

"One of the reasons for the very high cost is that the cargo has to be kept in special insulated tanks, in a liquid form, at a temperature of minus 161 centigrade (–258F.). This is because the carriage of gas in its natural form is impracticable: requiring 600 times the volume of the liquid form," says UK Shipping News.

"Among overseas countries, Japan, Norway, the United States, Liberia, Denmark, France and Federal Germany are well to the fore in gas tanker operation and they all have new ships on order. Present indications are that in three years' time Japan will occupy second place to Britain in the size of its fleet with Norway third and the United States fourth.

"A revealing indication of the full extent of British shipping's participation in gas tankers is that between 1970 and 1976 its fleet will have increased ten times as against a fourfold rise in the world gas tanker fleet," UK Shipping News adds.

Union Mechling Corporation Elects F.A. Mechling President —Dudley Coles Executive VP


F.A. Mechling


Dudley Coles

Union Mechling Corporation, a subsidiary of Dravo Corporation and one of the largest carriers on the inland waterway system, has announced the election of **F.A. Mechling** as president. **Dudley Coles** was elected to succeed Mr. **Mechling** as executive vice president.

The two men will take over their new posts on January 1, 1974, upon the retirement of **Charles E. Walker** as president. Mr. **Walker** will have served 41 years with Dravo, Union Mechling and a predecessor company, Union Barge Line Corporation.

Before formation of Union Mechling last June through a merger of Union Barge Line and A.L. Mechling Barge Lines Inc., Mr. **Mechling** served as executive vice president and treasurer of Mechling Barge Lines.

Mr. **Coles** joined Dravo in 1946 and transferred to its subsidiary, Union Barge Line, in 1962. He served 10 years as vice president-sales and, upon formation of Union Mechling Corporation, was elected vice president-marketing.

A native of Rock Falls, Ill., Mr. **Mechling** is a past chairman of the board of The American Waterways Operators, a member of the advisory committee and a past chairman of the board of Water Resources Congress, a member of the water carrier panel and board of the Transportation Association of America, a member of the executive committee of the National Waterways Conference and the advisory committee of the Northwestern University Transportation Center, and chairman of the board of The National River Academy.

Born in Chestnut Hill, Pa., Mr. **Coles** is a graduate of Lehigh University. He is a member of the Traffic Club of Pittsburgh, The Propeller Club of the United States, the Traffic and Transportation Association of Pittsburgh, and the National Defense Transportation Association.

Hampton Roads Section Hears Paper By Richard Vassallo On Marine Air-Conditioning

The Hampton Roads Section of The Society of Naval Architects and Marine Engineers held their first local meeting of the 1973-74 season at the Little Creek Amphib Base Officers Club on October 18, 1973.

Chairman **C.E. Peacock Jr.** opened the meeting with the introduction of the new Section officers, and following dinner presented **Richard C. Vassallo,** the principal speaker of the evening.

Mr. **Vassallo,** who is chief engineer for Bailey Refrigeration, outlined the current trends in the field of marine air-conditioning systems and dealt with the basic refrigeration cycle. His paper emphasized the chilled water piping system, its use and advantages. Mr. **Vassallo** also predicted a very bright future for the screw compressor within the marine air-conditioning field.

Principals of the meeting, shown left to right: **Robert C. Strasser,** vice chairman of the Section; **Richard C. Vassallo,** speaker; **Charles E. Peacock Jr.,** chairman, and **Eugene E. Jaeger,** papers committee, Hampton Roads Section.

The 100 members and guests showed renewed interest in Mr. **Vassallo's** subject matter and also the discussions furnished by **John W. Markert** and **John Nicholls.**

The remainder of the 1973-74 schedule is as follows:

December 11, 1973—Fort Monroe Officers Club, Hampton, Va., "Operating Experience with High Power Marine Gears," by **T.W. Steele** of General Electric Company.

February 7, 1974—Commodore Country Club, Kempsville, Va., "LNG Containment Systems," by **J. Pauthier** and **M. Kotcharian** of Technigaz Company.

April 16, 1974—Mariners Museum, Newport News, Va., "A Voyage on a Four Masted Schooner, Doris Hamlin, 1936," by **Robert H. Burgess** of Mariners Museum.

Portside profile of the Mobil 2, dressed for her christening, in New York Harbor.


Arthur E. Fischer, manager Mobil's U.S. fleet (on left) and **A.R. Seligman,** president, Southern Shipbuilding (far right), watch as **Mrs. Fischer** breaks the bottle naming the Mobil 2. Shown in the background are Mr. **Fischer's** son-in-law, **Howard Frankel,** and grandsons **Alan** and **David Frankel.**

Latest Addition To Mobil's Tug Fleet

The Mobil 2

The tug Mobil 2, the newest addition to Mobil Oil Corporation's fleet of tugs, towboats and barges, was christened on November 1 by **Mrs. A.E. Fischer,** whose husband is manager of Mobil's U.S. fleet. The ceremonies were held at Battery Park Seawall in New York Harbor.

The Mobil 2 was built by Southern Shipbuilding Corporation of Slidell, La. It was designed by Southern Shipbuilding and the technical staff of Mobil Shipping and Transportation Company.

Henry J. Luck Jr., general manager of marine transportation at Mobil, said that Mobil 2 would operate in coastwise service between Paulsboro, N.J., and northeast terminals, and in New York Harbor.

The Mobil 2 has an overall length of 108 feet, a molded beam of 30 feet and a draft of 13 feet. The all-welded tugboat is transversely framed and single decked. The hull form incorporates a slight tunnel stern. The American Bureau of Shipping classification for the tug is Maltese Cross A-1 for coastwise towing service.

This latest addition to the Mobil fleet is a twin-screw vessel powered by a pair of General Motors Model 12-645 E2 diesel engines. Each engine develops 1,500 bhp at 900 rpm. The engines drive four-bladed stainless-steel Coolidge propellers through a Lufkin, Model RS-2524, reverse-reduction gear and Fawick slip clutches. The propeller shafting was provided by the St. Louis Ship Division of Pott Industries. The stern tubes and the strut bearings are fitted with Johnson demountable stave-type bearing surfaces.

The electric power for the tug is provided by two Detroit Diesel engines driving Delco 75-kw generators.

The entire power plant is automated. The Smith Meeker Engineering Company developed and supplied the automation system which provides for start, stop and complete monitoring of the main engines, start-up of the diesel-generator sets with automatic starting and switching of the units in case of power failure, and monitoring of other vital machinery functions. The system also includes the steering-gear supervisory circuits.

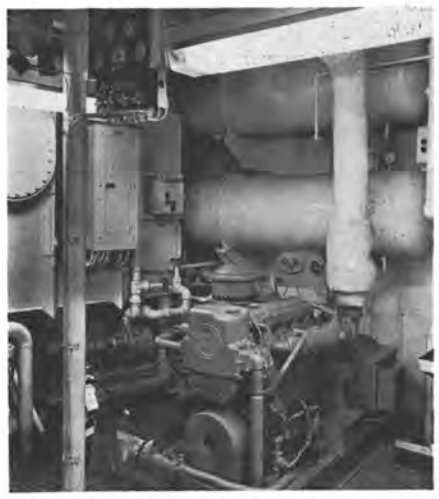
Power Products supplied the main switchboard. A Hose McCann telephone system is fitted throughout the vessel, including staterooms.

The Mobil 2 is fitted with a Carrier Corporation heating and air-conditioning system. Capacity of the system is 13 tons.

A Sperry hydraulic-ram type steering gear actuates the twin rudders. Rockwell supplied the 500-gpm foam fire-fighting system.

The pilothouse is fully outfitted for the services intended. It is equipped with a Sperry Mark 37 gyrocompass and autopilot. The radar is a Decca RM 426. The radio equipment includes one Benmar SSB radiotelephone and one Intech VHF radiotelephone, plus two monitoring receivers for distress, ship-to-shore and bridge-to-bridge communication.


View of engineer's control room shows automation/monitoringpanel;main switchboard.

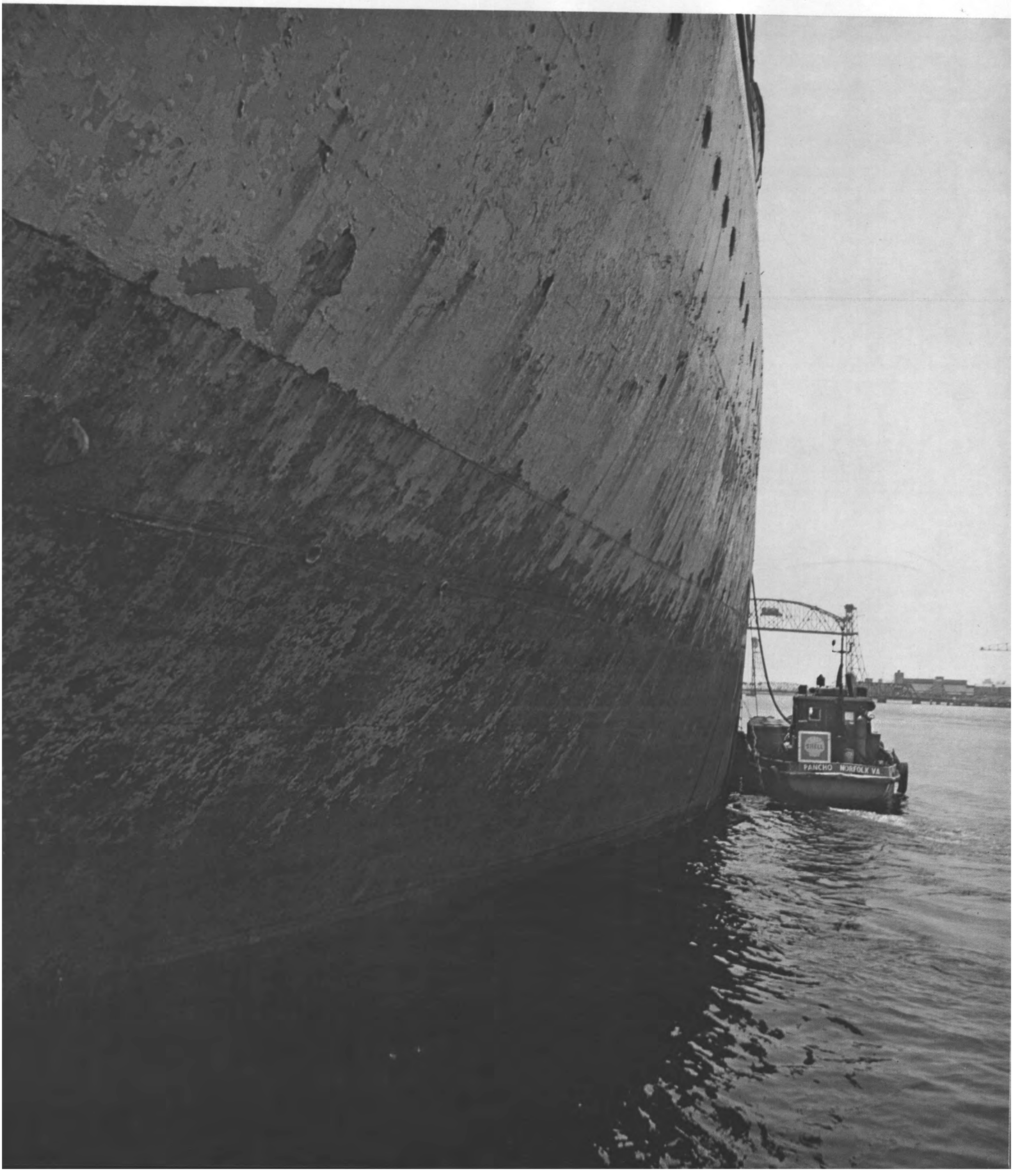

Detroit Diesels drive the Delco generators for electric power.


View of the GM-EMD port main engine, looking aft.


Pilothouse, showing steering station and control console.


Engine room, looking forward over Lufkin gears.

Now you can take on 4,000 gals./hr.



# of Shell lubricants at Hampton Roads.

—or 4,800 gals./hr. at Portland, Maine, or 4,400 gals./hr. at New York City. Altogether, Shell offers speedy, cost-saving bulk lube delivery at 13 major ports on the East, West and Gulf Coasts.

Motorships are saving time and costs with bulk oil delivery service offered by Shell's Agent, Marine Oil Services, Inc., Anders Williams Company, Norfolk, Virginia.

This firm uses two tank boats—one holds 13,500 gallons, the other 19,500 gallons, to service ships in Hampton Roads. Each boat is divided into two compartments and can deliver up to 4,000 gallons of Shell Lubricants per hour to ships' tanks.

Advantages to ship owners

With this speedy tank-to-tank delivery system, there is less chance of product contamination, and only minimum assistance is needed from ship crews. In addition, there is no interference with cargo operations. Delivery is faster and less hazardous than with drums. Still, both of the tank boats frequently carry drums on deck, in addition to full tanks below, to fill smaller orders.

Use of Shell MELINA® Oil increasing

Demand for multi-purpose MELINA Oil is increasing for both slow speed crosshead-type diesels—including Sulzer, MAN, B & W, Gotaverken, Fiat, Stork—and medium and high speed trunk piston engines. MELINA Oil protects engine parts against wear and corrosion, and resists oxidation over a long service life. MELINA also satisfies the requirements of other shipboard equipment such as gear transmissions, variable pitch propellers, steering gear, turbochargers and air compressors.

E. J. Wheeler, Manager of Marine Oil Services, Inc., opens an outlet valve so that ALEXIA Oil can be pumped at 55 gals./minute into a waiting tank boat. Four insulated 10,000 gallon storage tanks hold Shell lubricants at a constant 120°F., permitting fast flow in any season.

Shell Representative, John Barnett, discusses some of the advantages of MELINA Oil with Chief Engineer, Demetrios Kalisporis. MELINA Oil neutralizes acids that straight mineral oils cannot.

◀ Marine Oil Services' tank boat, Pancho, pumps Shell MELINA Oil into the Greek tanker, Captain Xilas. Pancho's pumps can deliver 4,000 gals./hr. from her 19,500-gallon tanks. This fast, clean delivery speeds ship turnaround time.

Marine Oil Services also offers TALPA® Oil, a specially refined straight mineral oil, for engines not requiring additive type lubricants. And Shell ALEXIA® Oil is in demand for engines with separate cylinder lubrication because of its anti-wear and acid-neutralizing properties.

Start saving with the speed and economy of bulk delivery of Shell lubricants at Seattle, Portland, Oregon; San Francisco, Oakland, Los Angeles, Houston, Galveston, Texas City, New Orleans, Hampton Roads, Philadelphia, New York and Portland, Maine. For prompt information call 800-231-6990. In Texas call 713-220-2188.

Shell Commercial Marketing,
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Shell Products Perform

SHELL

Cryogenic Structures Subsidiary Of Baltek Expanding Facilities

A new 96,000-square-foot manufacturing facility in Central Valley, N.Y., is under construction by Baltek (NASDAQ-BTEK) Corporation's subsidiary, Cryogenic Structures Corporation, for the fabrication of balsa wood insulation panels for liquefied natural gas tankers, it was announced by **Jacques Kohn,** president. Also under way is an addition to the Baltek plant in Northvale, N.J., which will provide a 70-percent increase in manufacturing capacity for the company's major product, Contourkore®. Both projects will be completed early in 1974.

Cryogenic Structures Corporation has a $22,500,000 contract for delivery of insulation panels for three LNG tankers to be constructed by Newport News Shipbuilding Company (a Tenneco company) for El Paso Natural Gas Company. Shipment will be from natural gas wells in Algeria. The first insulation panels are to be delivered by Baltek beginning next year. Baltek is also currently bidding on insulation contracts for several additional LNG tankers in Europe, the United States and Japan.

"The balsa wood insulation panels to be fabricated at Central Valley," Mr. **Kohn** said, " are for the huge tankers which transport liquefied natural gas at –260 degrees Fahrenheit from abroad to storage and regasification in the United States for utilization as badly needed fuel for home and industry. The new Cryogenic Structures plant is probably the first facility in the Northeast to be devoted to manufactured products which can provide a big assist in our present energy crisis.

"The expansion of the Northvale facility for Contourkore has been necessary," Mr. **Kohn** continued, "because of the rapid expansion of the market for this product. Revenues for Contourkore gained 50 percent in 1972, and another 35 percent increase is expected for 1973. Contourkore is end-grain balsa, used as the core of a fiberglass laminate, widely used in the construction of pleasure and commercial boats, chemical tanks, concrete forming, materials handling equipment and water and sewage plant components."

Sun Ship Appoints Jon H. Matthews

Jon H. Matthews

Sun Shipbuilding & Dry Dock Company, Chester, Pa., has appointed **Jon H. Matthews** as chief, machinery technical.

In his new assignment, Mr. **Matthews** will be responsible for directing all activities of the machinery technical department relating to new construction, conversion and repair. His department is responsible for marine engineering, shipboard testing and mechanical equipment specification. Mr. **Matthews** reports to **Eugene Schorsch,** director of the Manufacturing Engineering Division of the company.

Mr. **Matthews** joined Sun Ship in July 1967 in the hull technical department. He most recently served as project engineer for the shipyard-built deep ocean mining ship Hughes Glomar Explorer.

A native of Philadelphia, Mr. **Matthews** graduated from Drexel Institute of Technology in 1965 with a B.S. degree in mechanical engineering. In 1970, Mr. **Matthews** was awarded his M.S. degree in mechanical engineering from the University of Pennsylvania.

Mr. **Matthews** is a member of The Society of Naval Architects and Marine Engineers and The American Society of Mechanical Engineers.

Raytheon Introduces Doppler Speed Log

A versatile new sonar navigation product for commercial marine use has been introduced by Raytheon Company. Called the Fairway Doppler Speed Log, it provides precise speed logging to 1,000-foot depths—400 feet deeper than the 600-foot depth that has previously limited bottom-tracking instruments.

The Fairway Doppler Speed Log gives accuracy of one-half of one percent of the speed range of 40 knots and provides a distance readout with resolution of one-tenth of a nautical mile. Depth indication and selectable depth alarm are offered as built-in optional extras.

The system is all solid state and utilizes the latest in digital processing technology to provide accurate maintenance-free operation. The bridge control unit features an easy-to-read digital display that can be cabinet mounted, attached to a bulkhead or hung from the overhead. Analog and digital repeater displays can be positioned throughout the ship as desired.

Speed and depth-data inputs can also be furnished to true-motion radars, collision-avoidance displays and electronic navigators. The product utilizers dual narrow beams from a transducer array that is mounted easily in a gate valve or sea chest.

Additional information and literature on the Fairway Digital Doppler Sonar Speed Log can be obtained from the marketing manager, Raytheon Maritime Systems, Portsmouth, R.I. 02871.

Port of Long Beach Handbook Available

A totally revised harbor handbook for the Port of Long Beach, Calif., has been published and is now available. The new handbook, which details every berth and facility in the port, may be obtained by writing to the Port of Long Beach, Public Relations Division, P.O. Box 570, Long Beach, Calif. 90801.

Propeller Club Holds Essay Contest For High School Students

Free trips on American ships to the Mediterranean, South Africa, Europe, the Orient, the Caribbean and South America; coastal cruises on Atlantic, Gulf and Pacific Coasts; and Mississippi and Ohio River trips are offered to high school students throughout the United States as national prizes in the 39th Annual Harold Harding Memorial Essay Contest of The Propeller Club of the United States and its member local Propeller Club Ports.

Jasper S. Baker, national president, in announcing this year's contest, stated: " This contest has been held successfully for 38 years to broaden the education of teenage students in maritime matters of vital importance to our country, and to acquaint our younger generation with the necessity for a strong American merchant marine and marine industry for our economic prosperity and national security."

The theme of the 1973-1974 contest is "Our American Merchant Marine—To Assure Our Economic and Energy Needs." The contest closes March 1, 1974. National prize winners will be announced on National Maritime Day, May 22, 1974. Last year, 15 high school students won national prizes. For full details, inquiry should be made to local Propeller Clubs or to The Propeller Club of the United States, 17 Battery Place, New York, N.Y. 10004. The Propeller Club is a nonprofit educational maritime society whose 85 clubs and 13,000 members are devoted to the promotion, furtherance and support of the American merchant marine and its allied and associated industries.

Dromgool Associates Formed In New York

The formation of the maritime agency firm of Dromgool Associates Inc. with offices at 67 Broad Street, New York, N.Y., has been announced by **Thomas A. Dromgool.** The firm will deal in agency, stevedoring, port utilization and ship repair activities, he reported.

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MARINE ENGINEERING/LOG

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DIESEL GENERATOR SETS

1

350 KW DIESEL GENERATOR SET

350 KW—120/240 volts DC—600 RPM—compound wound G.E. generator with switchgear. ENGINE: Ingersoll-Rand—heavy-duty type S—505 HP—10½x12—reconditioned to ABS.

2

250 KW DIESEL GENERATOR SET

ENGINE: Enterprise 12 x 15 DSG-6 — 6 cyl. — 450 RPM crank No. 50J. GENERATOR: Westinghouse 250 KW—120/240 DC—1040 amps—450 RPM. Typical serial No. 3S-10P-913. Complete with switch gear.

3

EMERGENCY GENERATOR
SUPERIOR 75KW 120/240 VOLT D.C. DIESEL GENERATOR SET

With switchgear. ENGINE: Radiator cooled Superior GBD-8—6 cylinder—1200 RPM GENERATOR: Electric Machinery Co.—120/240 volts DC—316 amps—1200 RPM—stab. shunt.

4

UNUSED
10 KW SUPERIOR DIESEL GENERATOR SET

GENERATOR: Delco 10 KW—120 VDC—83.3 amps—1200 RPM. ENGINE: Superior diesel—2 cyl.—4½x5¾—15 HP—heat exchanger cooled.

5

500 KW—
120/240 VOLT DC
DIESEL GENERATOR SET
EQUAL TO NEW

GENERATOR: Allis Chalmers—Compound wound. Has Class "A" insulation. Output 500 KW—120/240 volts DC—2080 amperes—720 RPM—drip-proof—self-cooling. Ambient 50°C—temperature rise 40°C. ENGINE: Model GM 8-278—2-cycle—Vee type—8½"x10½"—air starting—720 RPM. Complete with switchgear. Condition very good. Still aboard naval vessel. Has Ross shell & tube type lube oil & raw coolers—temp. control valve—shock mounts.

6

300 KW
DIESEL
GENERATOR
SET

ENGINE: G.M. 6-278—6-cylinder—2 cycle—8¾"x10½"—750 RPM—with oil and water Ross Shell and Tube Heat Exchangers, instrument panel, pyrometer, etc. Vibro Isolators.
GENERATOR: G.E. 300 KW—120/240 volts DC—1250 amps—shunt wound—continuous overload rating 375 KW—2 hours—55° Weight of unit approximately 26,000 pounds. Complete with shock mounts. Unit 13' 2" long, 64" wide, 8' high.

TURBO GENERATOR SETS

7

400 KW WESTINGHOUSE TURBO GEN SETS FOR BETH. SPARROWS PT. HULLS 400 TO 4500; QUINCY HULLS 1600

400 KW (500 KVA)—80% PF—1200 RPM—450/3/60. TURBINE: 585 lbs—840°TT—28½" vacuum—9018 RPM—serial 10A4462-3 & 10A4462-4. GEAR: 9018/1200 RPM. A.C. GENERATOR: 500 KVA—400 KW—450 volts—641 amps—80%PF—3 phase 60 cycle—1200 RPM—CR 40°—excitation amps 41—excitation voltage 120. Instruction book 5442. Switchgear available.

8

UNUSED 300 KW—240 VOLT DC
WESTINGHOUSE LOW-PRESSURE
TURBO-GENERATOR SET

GENERATOR: 300 KW—240 VDC—1250 amps—1200 RPM. GEAR: 5286/1200—frame 6x15—serial 10A-2612-4. TURBINE: Frame C-325—225 PSI—397° TF—5286 RPM—Serial 10-A-2611-4. Wt. 16,700 lbs.—complete in original factory crate.

9

LOW-PRESSURE
UNUSED 300 KW G.E.
120/240 VOLT DC
TURBO-GENERATOR SET

GENERATOR: 300 KW—120/240 VDC—1250 amps—1200 RPM. REDUCTION GEAR: 8.344:1—10012/1200 RPM—type S-182. TURBINE: DOR418N—449 H.P.—10012 RPM—working pressure 180/220 PSIG.

10

WESTINGHOUSE
440/3/60
200 KW UNIT

GENERATOR: Westinghouse 200 KW—250 KVA—450/3/60—1200 RPM—80% PF—with 40 KW—120 VDC on same shaft. GEAR: 9989/1200 RPM—double helical. TURBINE: Westinghouse—540 PSI—superheat 322°F. Test 930 PSI 800°TT. Also operate 615 PSI—850°TT.

11

1250 KW G.E.
10-STAGE
TURBO GENERATOR
SET

TURBINE: 525—615 PSI—850°TT—7938 RPM—10-stage—type FSN. GEAR: Single helix—7938/3600. GENERATOR: 1250 KW—450/3/60/3600—.80 PF—type ATB with surface air cooler. Overload 25%—2 hours—1563 KW.

12

6 EQUAL-TO-NEW
LATE TYPE 500 KW
SHIPS SERVICE TURBO
GENERATORS

1962—DeLaval. Very little use. Completely preserved with rotors and diaphragms crated separately. TURBINE: DeLaval—585 PSI—840°TT—6-stage—6391 RPM—class CD—Also suitable 440 lbs.—740°TT—25" vac. GEAR: 6391/1200 RPM. GENERATOR: Allis-Chalmers—450/3/60. Totally enclosed, with static exciter and voltage regulator system. Weight 17,665 lbs. Complete with latest dead front switch gear. Also available are the condensers, circulating and condenser pumps. All very up-to-date, compact construction. Turbines will easily handle 600 KW if up-grading is desired.

13

AP2 VICTORY
WORTHINGTON-
MOORE
CROCKER-WHEELER
300 KW UNIT

TURBINE: 440 PSI—740°TT—28½" vacuum—type S4—5-stage—6097 RPM—serial 7547 & 7548. GEAR: 6097/1200. GENERATOR: 300 KW—120/240 volts DC—1250 amps—compound wound—973643—999759. Armature flange 8½"; B.C. 7"—12 holes. ALSO NEW ARMATURES IN STOCK & 300 KW SHUNT ARMATURES.

14

UNUSED C-4
CROCKER-WHEELER
500 KW
GENERATOR ENDS ONLY
120/240 VOLTS D.C.—1200 R.P.M.

FORMERLY USED WITH WORTHINGTON-MOORE TURBINES & GEARS

Upgraded by U.S. Navy—rewound in glass. Generator Frame and Armature—Marine 500 KW type 3-1200—dripproof enclosure—base mount. Modified from Crocker-Wheeler generator frame 152HD—240/120 volts DC—2083/521 amps—1200 RPM. Ambient temperatures 50°C. APPLICATION: For C-4-SA1; C4-SA-3; T-AP-134 vessels, using Worthington-Moore Turbine—Form S-6 and generator Form 14 x 10. No pedestal bearing.

15

WESTINGHOUSE 400 KW TURBO-GEN
835 LBS — 840°TT

Newport News Hulls 480—541 Esso ships. TURBINE: Westinghouse 835 lbs/840°TT—9018 RPM—6-stage—instruction book 1430-C1—serial 5A-7090-7 & 8. GEAR: 9018/1200 RPM. GENERATOR: Westinghouse 400 KW—440/3/60/1200 RPM—rewound field—instruction book 5442. EXCITER: 5.5 KW.

16

TWO 538 KW
WESTINGHOUSE
T-2 AUX. GENERATORS
(COMPLETE)

TURBINE: 538 KW @ 5010 RPM—438 PSIG—750°TT—28½" vacuum. GEAR: 5010/1200 RPM. A.C. GENERATOR: 400 KW 450/3/60/1200—0.8 PF. DC EXCITER: 32.5 KW—120 volts (variable voltage)—shunt—4-pole—DC excitation 5 KW. ALWAYS WELL MAINTAINED BY MAJOR OIL CO.

TURBINES & ROTORS

MAIN PROPULSION

17

BETH. CLASS—13,600 H.P.

Sparrows Point & Quincy 1600 hulls. H.P. turbine casing only. Excellent blading & labyrinth packing.

18

H.P. & L.P. COUPLINGS

1 Set—for Beth Class 13,600 HP 4400 hulls and Quincy 1600 hulls.

19

G.E. 6690 HP @ 7062 RPM
HIGH PRESSURE 8-STAGE
TURBINE

835 lbs—840°TT—#83341—originally built for Esso Christobol—Newport News.

T-2 TURBINES & ROTORS

20

COMPLETE WESTINGHOUSE T-2
MAIN TURBINE—UNSHROUDED
6600 HP—435 PSI—750°F
28" VACUUM—3720 RPM

Instruction book IB-8345—type D—serial No. 5A-2124-6—unshrouded. Unit complete with all packing, stationary blading, linkage, governors, diaphragms, nozzles, etc. WILL SELL ROTOR SEPARATELY OR COMPLETE TURBINE CASING & ROTOR. Always well maintained by major oil company.

21

2 COMPLETE T-2
G.E. TURBINES

#61818 and #61834—large Lynn—all stages magnafluxed.

ROTOR WILL INTERCHANGE WITH ELLIOTT MAIN TURBINE
Will Sell Rotors Separately

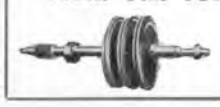
22

T2-SE-A1
MAIN PROPULSION
ROTOR — G.E.

Large Schenectady — serial 77418 — reconditioned Bethlehem Steel 1970—all stages magnafluxed.

23

T-2 TANKER
UNUSED—4 UNITS AVAILABLE
AUX. G.E. TURBO GEN. ROTORS



DORV — 325M — 5645 RPM — for 525 KW G.E.

VICTORY SHIP TURBINES & ROTORS

24

8500 H.P.
8-STAGE
TURBINES FOR
LARGE
VICTORY SHIPS

L.P. – 3509 RPM
H.P. – 6159 RPM

LP Serial #77943—HP Serial #77942—Interchanges Ingalls C-3—Class 442 & Sun C-4 vessels—U.S. Navy Victory "Liberty".

LP Serial #72272—HP Serial #72271—Interchanges Ingalls C-3—10 boxes of spares.

LP Serial #62042—HP Serial #62043—GEI 16263—Ridgeway Victory.

WRITE OR PHONE FOR DETAILED INFORMATION AND PRICES

TON METALS CO.

MORE ST. • BALTIMORE, MD. 21202

) 539-1900 Marine Dept.: (301) 355-5050

25 VICTORY SHIP AP2 H.P. & L.P. TURBINES
NEW — UNUSED — 6000 H.P. SETS

G.E.—H.P. & L.P.—with throttle valve
Westinghouse—L.P.—with throttle valve
Allis-Chalmers—H.P & L.P.—with throttle valve

26 6000 H.P. G.E. — NORTH CAROLINA C-2

H.P.—8-stage—serial 78040
L.P.—7-stage—serial 78043
G.E.I. 16262

27

19 STAGE
WESTINGHOUSE
H.P. ROTOR FOR
AP2 VICTORY

Reconditioned — balanced—with ABS. Serial 4A-2079—type B — 19 stage reaction blades. Excellent — just out of shop. 13" Flange diameter with 14 bolts.

28

G.E. 8500 H.P.
REDUCTON GEAR
FOR LARGE AP3
VICTORY & C3

MD-48A—8500 HP—6159/3509/763/85 RPM.

29 ALSO 6000 H.P. VICTORY
AP2 REDUCTION GEAR

Westinghouse 4A-1640.

PUMPS

CARGO STRIPPING PUMPS

30

BRONZE T2 TANKER
STRIPPING PUMPS

14x14x12—700 GPM at 100 lbs. Same pump available in steel for fuel oil transfer, etc.

31

WORTHINGTON
16"x14"x18"
VERTICAL DUPLEX
STRIPPING PUMP

1400 GPM @ 110 PSI—suction lift 11.5 ft.—steam back pressure 15 lbs. Suction 14"—discharge 10"—steam 2½"—exhaust 4". Overall width 6'8"—overall height 9'1½"—depth 3'9½"—wt. approx. 10,000 lbs.

32

UNUSED DELAVAL
IMO ROTARY PUMP

175 GPM—35 PSIG—10 HP—120 volts DC—1750 RPM—serial E-8619—frame 324 VY—76 amps—mfg. by Electro Dynamics. With magnetic control. Excellent condition.

33 NEW TURBINE DRIVEN FIRE
AND GENERAL SERVICE PUMP

Allis-Chalmers 6 x 5 pump, type SKH—1200 GPM—125 PSI—3500 RPM. Coppos turbine type TF-22-2½ — 3500 RPM. 273#—50° superheat.

34

DAYTON-DAWD
2-STAGE
FIRE
AND
BILGE
PUMP

Vertical 2-stage type TDV-10—20 HP—20 GPM @ 184'—3" discharge—4" suction—1775 RPM—Maumee Sun. Motor: 120 volts DC—20 HP—1775 RPM.

BOILER FEED PUMPS

Suitable for Navy and Merchant Vessels

35

COFFIN
TYPE
CG-4A
FEED PUMP

2 Available—very little use. Maximum 325 GPM—1760' head or 750 lbs Steam inlet 575 lbs.—540°TT—exhaust 20 lbs.—speed 760 RPM.

36 UNUSED DD445 CLASS WORTHINGTON
TURBINE-DRIVEN FEED PUMP

Worthington — drawing SL5043—425 GPM—1675' total dynamic head—5000 RPM 3-stage—double suction. Flanged 4½" inlet—4" outlet. Powered by Sturtevant steam turbine—282 HP—590 PSI. For Fletcher DD-445 Class Destroyers.

37

BUFFALO
SIZE 4
FEED PUMPS

Terry Turbine—BM—273 HP—550 RPM—exhaust 15 lbs—590 PSI—superheat 0°—425 GPM Buffalo Pump—discharge pressure 750 lbs—5"x4"—built for USN DD destroyers. DD 445 Class Fletcher.

38

WORTHINGTON
3-STAGE UNUSED
BOILER
FEED PUMP

PUMP: 5" Worthington—460 GPM @ 750 PSI—5000 RPM—305 HP—steam flow 8052/hr—26.4 lbs HP hr. TURBINE: Sturtevant C-22—type 21—575# dry saturated steam—15 lb. back pressure—259°F water temperature—15 lbs/inch suction pressure.

39 INGERSOLL-RAND BRONZE CARGO PUMP

10GT—4500 GPM at 125 lbs.—2-stage—size 14x12.

40

C-25
CARGO PUMP TURBINE
SPARE GEARS

One set of gears available for Westinghouse C-25 Cargo Pump Turbine.

MISCELLANEOUS

DOUBLE REDUCTION GEARS for Diesel Drive

41

3200 HP
DOUBLE INPUT
SINGLE OUTPUT
DIESEL
REDUCTION GEARS
20 DEGREE OFFSET

Farrell-Birmingham — 3200 SHP. REDUCTION GEAR: 1.81:1—handles two 1600 HP diesels @ 720 RPM. With hydraulic couplings & Fawick clutch. Port and starboard. Gear output 400 RPM. Suitable for dredge pumps. Non-reversing. OK for 38D8-⅛ engine.

42 2:67:1 RATIO
DOUBLE IN-LINE GEARS

Farrell-Birmingham 3200 HP non-reversing—from seaplane tenders. Ratio 1.867:1. Complete with hydraulic couplings, etc. Will handle two 38D8-⅛ FM diesels. Has Fawick clutch.

43 2100 HP DOUBLE INPUT
SINGLE OUTPUT GEARS—3:435:1 RATIO

Farrell-Birmingham — heavy duty — originally built for 2 heavy-duty direct-reversing engines—300 RPM—1050 HP each. Ratio 3.435:1.

44 SINGLE ENGINE REDUCTION GEAR

Farrell-Birmingham — non-reversing—1600 HP at 2.4909:1. With hydraulic couplings.

45 ANCHOR WINDLASS

Hyde 2-11/16" — 12x14 — 100 PSI — steam — 54,100 lbs.

46

SHARPLESS
LUBE & DIESEL
OIL PURIFIERS

Type M-34-W22-UM—15,000 RPM. BOWL MOTOR: 2 HP—230 volts DC—8.5 amps—3450 RPM—250 to 300 GPH. Originally built for C-1-A diesel vessels.

47

UNUSED
1135 SQ. FT.
C.H. WHEELER
CONDENSER

20" Ex. inlet—⅝" CU-NI tubes—with or without air ejector.

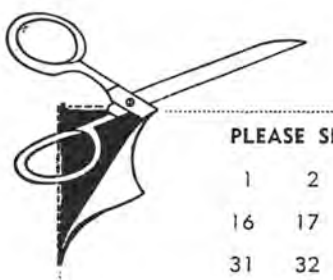
48

UNUSED 70 HP
McKIERNAN-TERRY
WINDLASSES

Chain and two 10640 lb anchor & 30 fathoms chain @ 30 FPM. 70 HP—230 volts—shunt DC motors—233 amps—550 RPM—55°C rise. Wildcat centers 47½". Base 9'5" wide x 11' long. Weight 36,000 lbs.

INQUIRE FOR ALL OTHER ITEMS

Forced draft blowers, reduction gear parts, bilge and ballast pumps, main circulators, general service pumps, F.O. transfer pumps, lube oil service, standby feed pumps, condensate pumps, aux. circulating pumps, feed water heaters, wash water pumps, etc.



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NAME..... COMPANY.....

ADDRESS..... POSITION..... PHONE.....

CITY..... ZONE..... STATE.....

Unitor Exhibition Held In New York

"A Day With Unitor," an exhibition arranged by Unitor Ships Service, Inc., New York, was held at the Belmont Plaza Hotel in New York City on October 23 through October 25.

Shipowners and ship agents in New York were invited to the exhibition, which was very successful.

Unitor Ships Service is a worldwide supply system for maintenance and safety on board.

Unitor Ships Service, A/S, Oslo, Norway, was established in 1936 as a service organization with an aim to ensure smooth and effortless supplies of welding gases in standard cylinders to the merchant fleets.

The Unitor supply depot system was established because of difficulties frequently encountered by vessels wishing to have their cylinders refilled with gases in foreign ports. Such refillings often proved impossible, due to lack of sufficient time, local regulations, inadequate refilling facilities, etc.

The effectiveness of the Unitor system rests upon the use of a standard approved type of cylinder for acetylene and oxygen, which are approved for use on-board ships by main classification societies such as Lloyd's Register of Shipping, England; SBG, Germany; Commission Centrale de Securite, France, and Det norske Veritas, Norway, assuring maximum safety.

The Unitor supply system is worldwide and comprises liaison offices in Piraeus and Yokohama, subsidiary companies in London, Liverpool, Bergen, Kristiansand, Goteborg, Hamburg, Rotterdam, Antwerp, LeHavre, Marseilles, Port de Bouc, Lisbon, Singapore, Montreal, New York, Philadelphia, Houston, and Wilmington, Calif., and agents in more than 180 ports all over the world.

Shown during the exhibition, left to right, are **Egil Ruud,** president, Unitor Ships Service, Inc., New York; **Erling Foss,** sales manager, Unitor Ships Service, A/S, Oslo, Norway, and **Knud G. Johanessen,** Moller Steamship Co., Inc., New York.

Each Unitor office and depot has available acetylene and oxygen in standard cylinders of 40 liters capacity. The majority of the agents are also stocking electrodes, welding rods and main spare parts for the Unitor equipment.

All Unitor branches effect deliveries of fluorcarbon refrigerants, air tools and safety and fire-fighting equipment.

Unitor Ships Service in Oslo and London have performed pioneer work in arranging training courses in welding for ships' officers and crew, and can offer ships' officers and crew welding training courses on-board, run by a Unitor instructor during the vessel's voyage.

The number of Unitor Ships Service's customers is rapidly growing and now lists more than 1,000 shipowners in several of the world's major shipping nations. Approximately 6,000 ships divided into two major groups, respectively 40 percent Scandinavian and 60 percent under other flags, are using the Unitor system.

GOLTEN OPEN HOUSE: All hands came forward recently to offer congratulations and help celebrate open house festivities at Wilmington, Calif.'s newest factory addition, the 10,000-square-foot concrete block-steel building of Golten Marine Co., Inc., 330 Broad Avenue. The marine diesel specialists site now encompasses a total of 24,000 square feet of office space, general ship and voyage repair shop, and spare parts bonded warehouse. Worldwide, Golten Marine are noted for their patented process of in-place engine main journal and crankpin grinding machines. Taking part in the official "turn-key" ceremony are, left to right: **Jens Bakken,** general manager (retired), Golten Marine N.Y.; **Jacob Verspoor,** general manager, Rotterdam, Holland plant; **Sigurd Golten,** president, Golten Marine Co., Brooklyn, N.Y.; **Joseph Johnson,** vice president and general manager, Wilmington, Calif. plant and headquarters for their Pacific Coast Division; **Knut Golten,** general manager, Atlantic Diesel, Oslo, Norway, and **Norman Golten,** Golten Marine Co., Brooklyn, N.Y.

Jet Barge No. 3, owned and operated by J. Ray McDermott & Co., Inc., New Orleans, La.

PIPE DREAM

The pipe-burying barge you see above is now doing yeoman service in the North Sea.

It is unusual, unflappable, and unparalleled.

Seventy-two men can live on it in air-conditioned comfort. It has a helicopter platform. And it contains a multitude of equipment and machinery, the most newsworthy of which is a sled of high pressure jets which trench out underneath the pipe previously laid: as they traverse the ocean floor, they are powerful enough to even break rock structures.

Jet Barge No. 3 is the last word of its kind. It is classified by the American Bureau of Shipping †A-1, for unrestricted ocean service. We like to think that one of the reasons it is such an outstanding vessel is that Todd Houston built it.

Talk to TODD

TODD SHIPYARDS CORPORATION: New York • Brooklyn • New Orleans • Galveston • Houston • Los Angeles • San Francisco • Alameda • Seattle
Executive offices: One State Street Plaza, New York, N.Y. 10004. (212) 344-6900. Cable: "Robin" New York.

Tetra-Tech Purchases Oceanographic Eng'r'g And Hydro Products

Dillingham Corporation (NYSE) and Tetra-Tech, Inc. have reached an agreement whereby Tetra-Tech will purchase Oceanographic Engineering Company and its Hydro Products Division for over $2 million. It is expected the sale will be completed this year, following normal legal and accounting procedures.

Oceanographic Engineering, a division of Dillingham, is headquartered in San Diego, Calif. It produces a line of high-quality underwater instruments and systems, and will report sales of more than $4,000,000 this year.

Tetra-Tech, founded in 1966, is a Pasadena-based privately owned company engaged in marine and water quality control research and engineering, as well as offshore oil exploration. **Nicholas D. Boratynski,** president of Tetra-Tech, said that Oceanographic Engineering's present executives, headed by president **George Hatchett,** will continue to manage the company.

"It is a natural fit for Tetra-Tech," Mr. **Boratynski** commented. "Our company has been in the engineering and research end of marine technology since its founding, while Oceanographic Engineering and Hydro Products have been products-oriented in the same field. We have become very familiar with their products in the normal course of our operations."

Dillingham Corporation is a Honolulu-based diversified corporation with activities in four categories—maritime, property development, construction, and resources. Its 1972 revenues amounted to $533 million. Recently, Dillingham reported net earnings for the first nine months of 1973 of $8,582,000, or 62 cents per share of common stock, compared with $5,767,000, or 41 cents per share, in the first nine months of 1972.

Lowell S. Dillingham, chairman and chief executive officer of Dillingham Corporation, said Oceanographic Engineering is a high-technology company that blended more naturally with Tetra-Tech's activities than with Dillingham's major operations.

Annual Conference On Marine Coatings Set For March 21-22

Robert M. Ives Jr. (Exxon Chemical Co., USA), chairman of the marine finishes manufacturers committee of the National Paint and Coatings Association, Inc. Washington, D.C., has announced that the Fourteenth Annual Marine Coatings Conference will be held at the Cascades Meeting Center in Williamsburg, Va., on March 21 and 22, 1974.

This conference is sponsored annually by NPCA to provide an opportunity for shipbuilders, ship operators, naval architects, and representatives of Government agencies to discuss new developments in marine coatings, new application techniques, and other matters of mutual interest with the manufacturers of marine coatings and their raw material suppliers.

The program for the 1974 conference will include technical papers by individual speakers, panel sessions, and a prominent speaker at the banquet on the evening of March 21. Three half-day sessions are planned. The first will be devoted to the heavy duty marine industry, the second will cover inland waterways, the offshore industry and the small boat industry, and the third session will feature speakers on economics, raw materials and safety. In addition, arrangements have been initiated for a tour of an industrial facility in the Hampton Roads area. A tour of Williamsburg for the ladies is also planned.

Finn Olander, executive vice president and general manager, Hempel's Marine Paints, Inc., is program chairman for the 1974 conference. He is assisted by **Al Verbyla,** president, Seaguard Corporation, and **Ernest Skiles,** marine manager, Carboline Company. Staff liaison at NPCA is conducted by Capt. **John M. Montgomery,** USN (ret.).

Appleton Machine Picks Marine Div.'s Baudhuin For Board of Directors

Jule J. Baudhuin

Jule J. Baudhuin, vice president and general manager of the Marine Division of Appleton Machine Company, has been elected to the board of directors of the 90-year-old manufacturing concern, it was announced by **V.K. Lamberg**, president.

Mr. **Baudhuin** has directed the activities of the Marine Division since its inception, and has over 20 years' experience in that field.

Mr. **Baudhuin** received his B.S. degree in chemical engineering from Michigan Technological University in 1950. He is presently a member of The Society of Naval Architects and Marine Engineers, the Society of Automotive Engineers and Marine Technology Society.

The Marine Division of Appleton Machine Company markets a complete line of marine deck auxiliary equipment, such as mooring winches, capstans, cranes, fairleads and related products.

Colt-Pielstick Order Duplicated For Second Integrated Tug-Barge

A second pair of diesel engines has been ordered from Colt Industries Power Systems Division of Beloit, Wis., to power a new twin-screw tug-barge to be built in Galveston, Texas. This is a duplicate of an order received last year for engines for a similar tug-barge unit. The two 14-cylinder engines will be Colt-Pielstick, Model PC-2, and will be shipped early next year.

The integrated tug and barge, called a CATUG, will be built for Port Everglades Towing, Inc., of Fort Lauderdale, Fla., by Kelso Marine, Inc., of Galveston. The tug and barge fit and lock together forming a rigid connection between the stern of the barge and the twin hulls of the catamaran tug.

E.L. Fay Jr., vice president-product marketing for the Power Systems Division, pointed out that this is a new approach toward an economical method of providing transportation of bulk cargoes. He added that the reversing marine engines are rated at 7,000 horsepower each and will turn twin four-blade propellers. The division will also furnish the gears, engine auxiliaries and the monitoring and control systems.

Reduced manning schedules have resulted in increased dependence on monitoring and control of the propulsion system. Colt Power Systems' engineers design the remote systems that allow the operator to continuously observe operation of the machinery from the bridge and engine room consoles. Remote control from these stations along with the necessary monitoring meet the requirements for today's vessels.

The Colt-Pielstick "V"-type engine is a four-cycle medium-speed unit with a bore of 15.75 inches and a stroke of 18.1 inches. The PC-2, rated at 500 horsepower per cylinder, can operate on all diesel fuels and with minor engine and system adjustments, on heavy fuels to 3500 SSU.

Both tug and barge units are designed for a complement of 14 men and will operate under the American flag for transportation of petroleum and chemical products in the U.S. coastal trade. The cargo tanks for both vessels have a capacity of 325,000 barrels. The combined tug and barge units will have an overall length of 629 feet, a 35-foot operating draft and a designed speed of 14.75 knots. J.B. Hargrave Naval Architects, Inc. of West Palm Beach, Fla., are the designers for the equipment.

Collins Shareholders Approve Merger Into Rockwell International

The merger of Collins Radio Company into Rockwell International was approved by Collins shareholders at a special shareholders meeting held in Cedar Rapids, Iowa.

Speaking to shareholders and guests at the meeting, **W.F. Rockwell Jr.,** chairman of the board of Collins and also chairman and chief executive officer of Rockwell International, said that Collins will assume a major role within the corporate structure of Rockwell.

"The Collins Radio Company name is a valuable asset," Mr. **Rockwell** states, "and it will be retained."

There are a few areas where minor changes should be made to augment effectiveness and efficiency, but Mr. **Rockwell** assured his audience that basically Collins will operate as it has in the past.

"Its company operations have been oriented to global marketing strategies," he noted, "and those strategies will continue."

"We're going to continue to rely on all the key executives of Collins who have chartered the upward course of the company," he said.

Robert C. Wilson, president and chief executive officer of Collins, said that the future for Collins and its employees is bright. He stated that in many respects the merger of Collins into Rockwell "is the end of one phase in the development of Collins and the beginning of another, which promises to be even more successful and dynamic than the first."

Collins Radio Company is a multinational, high-technology avionics and telecommunications company. In addition to its domestic facilities, Collins has manufacturing facilities in Canada, Mexico, England, France, West Germany, Italy, Australia and Japan, and service facilities all over the world.

Odense Delivers 285,000-Dwt Tanker —Eighth In A Series For A.P. Moller Group

Pictured during the naming ceremony, left to right: **Mrs. Maersk Mc-Kinney Moller,** wife of the chairman of the A.P. Moller Group; **Mrs. Else Clausen,** sponsor; **Maersk Mc-Kinney Moller; Einar Clausen,** the ship's chief engineer, and **Hans Christensen,** captain of the Robert Maersk. The two Clausen children are shown in the foreground.

The last in a series of eight 285,000-ton VLCCs, built by Odense Steel Shipyard Ltd. for the A.P. Moller Group, has been completed and named the Robert Maersk during ceremonies at the Lindo Yard, which is situated on Odense Fjord, Denmark.

The naming ceremony was performed by **Mrs. Else Clausen,** the young wife of the ship's chief engineer, **Einar Clausen.**

The ship was constructed in Lindo's huge building dock, capable of turning out 650,000 tonners.

Already taking shape in the building dock is the first of two 285,000 tonners for the Livanos Group for delivery early in 1974.

The Lindo Yard will then start building seven 330,000 tonners for the A.P. Moller Group and six 310,000 tonners for Shell Tankers (UK) Limited.

Load Monitor Measures Hull Stresses & Motion

Since 1972 Det norske Veritas and an affiliate of the Royal Norwegian Council for Scientific and Industrial Research have been conducting full-scale experiments with computer measurement of wave-induced motions and stresses on ships' hulls and cargo.

Experience aboard the cargo vessels M/S Taimyr and M/S Toyama has provided information for the production of a Hull Load Monitor which is being built by the Norwegian electronics manufacturer Statronic A/S of Kilsund, Norway. Ten ships will soon be instrumented and at sea, providing input and experience to this program.

Great expectations are held for the navigational assistance rendered by this relatively inexpensive micro-computer application. While never replacing the master's feel, these monitors will aid greatly in providing data heretofore unobtainable regarding the ship's speed and safety during various phases of the voyage and thus will assist in maximizing the economical use of the vessel.

Statronic hopes to display this equipment at the forthcoming SOCCO conference to be held in New York in January. For additional information write to **D. Thomas St. John,** Statronic A/S, 110 Cameron Mews, Alexandria, Va. 22314.

South Jersey Port Corp. Names Joseph Balzano Deputy Exec. Director

Joseph A. Balzano, a veteran of 23 years in the field of marine operations, has been named deputy executive director, operations and facilities of the South Jersey Port Corporation, headquartered in Camden.

Robert L. Pettegrew, executive director of the state port agency, announced the elevation of Mr. **Balzano,** who had served as general manager of operations.

The port corporation facilities include the three-berth Beckett Street Terminal on 66 acres at the foot of Beckett Street, and the Broadway Terminal which has six berths, and is developing a major industrial complex in the former New York Shipbuilding Corporation's 175-acre North yard. The property was acquired by the South Jersey Port Corporation in late 1970.

Total cargo tonnage through both terminals is expected to reach the million-ton mark before the end of the year, Mr. **Pettegrew** noted.

Mr. **Balzano,** a graduate of Camden High School and the Academy of Advanced Traffic, was general superintendent for the port corporation's predecessor, the South Jersey Port Commission which constructed and operated the Camden Marine Terminal, now designated Beckett Street Terminal.

Where Hard Thought Becomes Hardware

Call it what you will—togetherness, teamwork, or just plain efficiency—the close relationship between design and construction, made possible by our new concept of production drawings, should rank high when selecting a shipbuilder. Design skills without production expertise, and vice versa, are of no value. NASSCO offers you both. . . . . Our engineers have produced an impressive variety of designs including OBO's and tankers, while our skilled workers working in almost perfect weather build superior ships.

NASSCO

NATIONAL STEEL and SHIPBUILDING COMPANY San Diego, California (714) 232-4011

Owned by Kaiser Industries Corporation and Morrison-Knudsen Company Incorporated

Richard H. Beuthel Named APL Seattle General Manager & VP

American President Lines has announced the appointment of **Richard H. Beuthel** as general manager in Seattle, Wash., for the American Mail Line Division of APL. Previously vice president-marketing for AML, Mr. **Beuthel** has also been named a vice president of APL.

The appointment follows the recent merger of the Seattle-based American Mail Line into American President Lines.

As general manager, Mr. **Beuthel** will coordinate the administration of the division's operations and activities in the Pacific Northwest. He will report directly to the president of APL. Major functional responsibilities will continue to remain with the respective headquarters in San Francisco, Calif. The position of general manager is designed to provide top management representation in AML's area of operations, and to insure its functions are effectively coordinated with San Francisco headquarters.

In addition to the Seattle-area facilities, Mr. **Beuthel** will oversee divisional operations and activities in Portland, Ore., and in APL's Vancouver, British Columbia subsidiary, Trans-Pacific Steamship Agencies, Ltd.

Mr. **Beuthel's** assignment also includes an active participation in the continuing longer range planning for overall company operations.

With American Mail Line since 1967, Mr. **Beuthel** served in the U.S. Navy for three and a half years. He received a B.A. degree from Miami University in Oxford, Ohio. He attended the Graduate Institute of International Studies in Geneva, Switzerland for one year on a Rotary Fellowship, and received an M.B.A. degree (1959) from Harvard, where he studies foreign trade and transportation.

Conch L.N.G. Formed As New Partnership By Three Companies

Conch L.N.G. has recently been formed as a partnership under the Uniform Partnership Act of New Jersey by fully owned subsidiary companies of the Royal Dutch/Shell Group, Continental Oil Company and U.S.Y. & T. Industries, Inc. of Chicago. The firm holds all the U.S. rights to the Conch self-supporting tank design for LNG tankers. It has already licensed one U.S. shipyard, Avondale Shipyards, Inc., to construct LNG tankers to its design and is actively seeking opportunities to promote the construction of LNG tankers to its design in other U.S. shipyards.

Conch L.N.G. has recently opened its office at West Park Drive, Mt. Laurel Industrial Park, Moorestown, N.J. 08057. Officers at the Moorestown office are **Hugh Morgan,** commercial vice president and deputy chief executive, and **Carl L. Ritter**, technical vice president.

Western Gear Gets Pipe Tensioning Order For European Barges

New generation pipe tensioners and related auxiliary equipment valued at nearly $4 million have been ordered from Western Gear Corporation, Lynwood, Calif., for installation aboard two advanced-concept pipelaying barges under construction in Germany and Holland.

The patented Pipemaster pipe tensioning systems were ordered by Societe Entrepose-G.T.M. (EPTM) of Paris, for their derrick lay barge, EPTM 1601, and by I.H.C. Gusto N.V., of Schiedam, Holland, for the Viking Consortium.

Each of the tensioners being manufactured by Western Gear's Heavy Machinery Division at Everett, Wash., is of the proprietary track-type, developing more than 200,000 pounds of pulling force. The machinery will be installed aboard the new barges for operation in tandem.

Delivery scheduled later this year will bring to 35 the number of Pipemaster pipe tensioners ordered from Western Gear since the development of deepwater lay techniques in recent years.

THE BIG ONES ARE COMING

from Bethlehem-Beaumont

Dwarfing everything for miles around are the two massive semi-submersible drilling rigs shown under construction at pierside in our Beaumont, Texas, yard. On the right is the newly commissioned Zephyr I, being built for the joint-venture partners, A. P. Møller/Dearborn-Storm Corporation. It is capable of drilling to 25,000 ft in the North Sea. A sister semi, the Zephyr II, is also on order at Beaumont.

On the left is the Pacesetter I, being built for the Western Company of North America. Shown ready to receive its upper platform, this rig will be capable of working in water depths to 600 ft and beyond.

Nearly ready for launching from the ways at the left is the starboard lower hull of the Zapata SS-3000, being built for Zapata Marine Drilling, Inc. The completed port hull lies waiting at the pier above. Based on Bethlehem's BethDrill rig design, this huge semi will support a variable load of 6,250 short tons, and will be able to drill safely and economically in 1,000 ft waters.

Other big semis and jack-up rigs are also on order or under construction here at Beaumont.

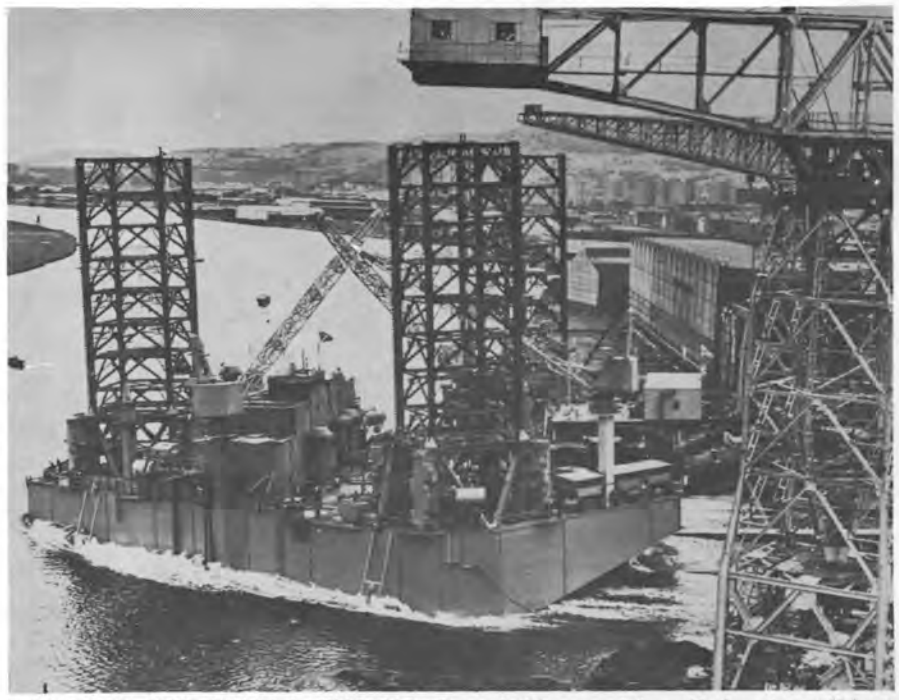
In addition to its design and construction work for the offshore industry, Beaumont handles conversions, as well as repair and service work on all types of vessels. As with all Bethlehem repair yards, Beaumont's emergency, 'round the clock services are only a cable away.

BETHLEHEM STEEL

Shipbuilding

Dry Docks in Baltimore, New York, Boston, Los Angeles and San Francisco Harbors, and at Beaumont, Texas.

Building Ways at Sparrows Point, Md.; Beaumont, Texas; San Francisco, Calif.; and Singapore.



MARATHON-CLYDEBANK LAUNCHNG: Penrod 64, a mobile self-elevating offshore drilling platform owned by Penrod Drilling Company of Dallas, Texas, is shown here as it was launched recently at the Clydebank, Scotland, yard of Marathon Shipbuilding Company (U.K.) Limited. The rig has hull dimensions of 230 by 200 by 26 feet. Designed for a drilling depth of 30,000 feet, Penrod 64 has quarters for 78 personnel. The rig is scheduled for operations in the North Sea. Marathon Shipbuilding is a subsidiary of Houston-based Marathon Manufacturing Co.

International Maritime Problems Discussed At SNAME California Sections Annual Joint Meeting

Shown above at the joint meeting of the California Sections, left to right: **John Banks,** president, National Steel & Shipbuilding Co.; **Paul Bukunt,** General Electric Co.; **Charles Wilson,** Babcock & Wilcox Co.; **Larry French,** director of engineering, National Steel & Shipbuilding Co.; **Mrs. French, Mrs. Banks,** and **Mrs. Bukunt.**

The 17th annual joint meeting of the California Sections of The Society of Naval Architects and Marine Engineers was held October 12-14 at the Del Monte Hyatt House in Monterey, Calif.

One hundred and sixty members and guests participated in both the social activities and presentation of the following papers: "Engineering, Planning and Production Aspects of a Major Container Ship Conversion," by **Hans K. Schaefer,** engineering manager, Todd Shipyards Corporation, Seattle Division; "A Study on Production Control of the Cross Type Conversion," by **Y. Nagata,** Mitsubishi Heavy Industries, Ltd., Kobe, Japan; and "Conversion of Seamaster Cargoliners to Full Container Ships," by **Hugh F. Munroe,** director, vessel construction, American President Lines.

Written discussion of the Seamaster conversion covered all aspects of both the design and fabrication problems involved in this rapid response to changing freight patterns.

Written discussions were made by Mr. **Bannister** of J.J. Henry Co., Inc.; Mr. **Shaffner,** of Todd Shipyards, Los Angeles; Mr. **Chatterton** of Todd Shipyards, Los Angeles, and Mr. **Guralnick,** naval architect.

Oral discussions were by Mr. **Kossa,** naval architect; Mr. **Haskell,** Matson Navigation; Mr. **Stewart,** Bethlehem Shipbuilding; Mr. **Nichols,** Rohr; Mr. **Marriner,** naval architect, and Mr. **Van Riper,** American Bureau of Shipping.

The oral discussion indicated a profound difference of opinion as to the responsibility for minor cracking noted in service.

Mr. **Nagata's** discussion of the world's largest and most sophisticated conversion operation received written discussion from Mr. **Summers** and Mr. **Stewart** of Bethlehem Shipbuilding, San Francisco. Written, as well as subsequent oral discussion, developed that lifts of up to 4,000 tons were possible. Their extremely intricate planning required up to 12 months lead time and a ratio of one to three of productive labor vs. supervision. The typical United States ratio is one to six minimum.

The meeting concluded with a dinner-dance at Rancho Canada.

Copies of the papers are available from **James L. Moss,** Marcona Corporation, 1 Maritime Plaza, San Francisco, Calif. 94111, telephone (415) 981-5560.

Pictured above at the Del Monte Hyatt House in Monterey are, left to right: author **Hans Schaefer,** Todd Shipyards, Seattle; **Mrs. Schaefer,** and author **Y. Nagata,** Mitsubishi Heavy Industries, Ltd., Japan.

Attending the meeting, left to right: **James Moss,** papers chairman/moderator, Marcona Corp.; author **Y. Nagata; Mrs. Phoebe Stewart,** and **H.P. Stewart,** discusser, Bethlehem Shipyard Corp., San Francisco.

New United States Ice Engineering Laboratories And Ice Towing Basin Under Construction

ARCTEC, Incorporated, a privately owned consulting engineering firm specializing in cold regions technology, has announced that construction of its new office and ice engineering laboratories located in the Oakland Ridge Industrial Park, Columbia, Md., is proceeding on schedule. Upon completion, these laboratories will provide the latest techniques and technology to industry and Government for engineering and economic studies concerned with natural resource recovery, environmental protection, and transportation systems analyses in Arctic regions and other cold regions where ice-covered waters exist at some time each year. ARCTEC feels its new laboratories will make major contributions toward relief of the energy crisis, since the greatest regions of untapped energy sources in the world today are the Arctic areas. The hostile environment of these areas required that thorough engineering studies be completed prior to committing major programs. The modeling techniques developed by ARCTEC allow this to be done without high cost, high risk, and long-time periods required for full-size prototype development programs.

ARCTEC's new laboratories will include three major facilities—an ice model towing basin, a hydraulics laboratory, and a general-purpose refrigerated flume. The design of the new ice model basin will be based upon ARCTEC's three years of experience in operating its present ice model basin, the only model towing facility in North America in which models of marine vehicles, offshore structures, port facilities, and pollution control devices can be tested in a properly scaled ice environment. The new towing basin will substantially extend and refine the capabilities of the present basin. The hydraulics laboratory will provide the capability of modeling ice-related problems in rivers, canals, harbors and coastal areas. The refrigerated flume will be used for various studies of water and water-ice flows in open channels and rivers. ARCTEC's patented liquid nitrogen refrigeration system and a new synthetic material will be used to simulate ice cover in these facilities.

The ice model towing basin will have wet dimensions of 100 by 12 by 5 feet, length, width and water depth, respectively, allowing testing of the largest ships currently envisioned for use in ice-covered waters at reasonable scale factors. For example, a 245,000-deadweight bulk carrier having a length of 1,000 feet, beam of 175 feet, and draft of 70 feet could be tested in the new basin at a typical scale factor of 50, resulting in a model length, beam and draft of 20, 3.5, 1.4 feet, respectively. The basin is capable of model tests with models up to 28 feet in length.

The refrigerated, circulating water flume will be 100 feet long and 4 feet wide. The flume will be used for studying the hydraulics of ice-covered water flows, the formation of ice covers over a flowing system, and other problems associated with the interaction of ice cover and flowing water.

The hydraulic model laboratory will provide 2,360 square feet of floor space designed to support a hydraulic model. The hydraulic model will make use of a synthetic material to simulate ice cover, since saline ice produced by quick freezing of brine solutions does not satisfactorily model all of the physical properties of full-scale ice required for proper scaling in hydraulic models. ARCTEC has recently developed a synthetic material which properly scales not only the flexural strength, but in addition, properly scales the elastic modulus, the compressive strength, and the shear strength of full-scale ice. ARCTEC can, therefore, provide hydraulic models with ice cover in which full hydromechanical similitude can be realized at reasonable scales. The locations of the hydraulic model laboratory, and the building itself, have been selected to allow future expansion of the hydraulic model laboratory to four times its present size.

For the past three years, ARCTEC has been engaged in numerous research, consulting and engineering design projects in the field of cold regions technology both inside and outside the laboratory. Inside the laboratory, ARCTEC has tested various systems designed for use in cold regions which include conventional icebreaking ships, Arctic offshore structures, ice cutters for special purpose marine vehicles, ice melting systems for Arctic drilling rigs, and pneumatic ship pitching systems for Arctic drillships and cargoships.

Outside the laboratory, ARCTEC maintains a staff of design and field testing specialists who have conducted engineering and economic studies related to extending the winter navigation season on the Great Lakes and St. Lawrence Seaway, and the transportation of natural resources from Alaska and the Canadian Queen Elizabeth Islands. Field tests have been conducted on many of the systems designed by ARCTEC and tested in the laboratories, allowing correlation of theoretical analysis and model tests with full-scale data.

The range of service in the broad field of ice engineering offered by ARCTEC will be greatly enhanced upon the completion of these new laboratories. The laboratories will be capable of making unique contributions toward the solution of ice-engineering problems associated with such areas as the Alaskan waters, the Great Lakes, the St. Lawrence Seaway, and the Upper Mississippi River. Typical of the type of determinations which can be made in these laboratories are: resistance of ships in ice, ice forces on structures, formation of ice cover on rivers, ship operation in ice at terminals and harbors, ice jam formation and prevention, ice supression and anti-icing techniques, maneuvering characteristics of ships in ice, forces on ice retention booms, forces while operating in ice pressure ridges, surface ice adhesion characteristics of oil spills and cleanup in ice-covered waters, the effect of surface coatings, growth of frazil ice in waterways, action of ice retention and control structures, and evaluation of ice formation and deicing methods for river locks and gates.

Plans call for ARCTEC personnel to occupy the new office-laboratory building in early 1974.

Bethlehem Sparrows Point Delivers 120,000-Dwt Tanker To Overseas Shipholding

The 120,000-dwt tanker S/S Overseas Juneau, being built for a subsidiary of Overseas Shipholding Group, Inc. (OSG), was recently christened at Bethlehem Steel's Sparrows Point shipyard in Baltimore by **Mrs. Robert J. Blackwell,** wife of the Assistant Secretary of Commerce for Maritime Affairs.

Named after the capital of Alaska, the 883-foot-long vessel features the latest safety, navigational, communications and antipollution equipment available. The ship has a cruising range of 15,000 miles, with a nominal sea speed of 16 knots developed from 26,000-hp steam turbines. She is the second vessel of this class to be built by Bethlehem Steel and the first for delivery to Overseas Shipholding.

Mrs. Blackwell smashed the traditional bottle of champagne on the vessel's bow as it lay alongside an outfitting pier. Her sister, **Miss Judith Ryan,** served as maid of honor for the ceremony. The ship, which was floated out of the new 1,200-foot-long building basin at Sparrows Point, was delivered last month, immediately entering service under a long-term charter.

One of the largest vessels ever built in the United States, the Overseas Juneau will be the 13th U.S.-flag tanker for OSG, which already owns one of the largest bulk fleets of any publicly-held U.S. company, as well as the largest independent U.S. tanker fleet.

OSG's operating fleet will consist of 40 tankers and dry bulk carriers aggregating 2.2 million deadweight tons. This figure will rise to more than 5.5 million tons by 1978, when the 23 additional vessels currently on order have been delivered.

Mrs. Robert J. Blackwell, wife of the Assistant Secretary of Commerce for Maritime Affairs, grasps a bottle of champagne just prior to christening the 120,000-dwt tanker S/S Overseas Juneau at Bethlehem's Sparrows Point shipyard. With **Mrs. Blackwell** are, from left to right: **Ran Hettena,** senior vice president and director of Overseas Shipholding Group, Inc.; **William H. Collins,** general manager of the yard; Mr. **Blackwell,** and **Walter F. Williams,** vice president, shipbuilding, Bethlehem Steel.

Among the major features of the new vessel, which has a liquid cargo capacity of nearly 950,000 barrels, are: For safer maneuvering, there is a Bethlehem centralized pilothouse engine control which maximizes speed of transmission of orders to the engine room. Wide-range boiler burners and automatic combustion control equipment enable the boilers to be operated from standby to full speed without altering the number of burners in use. Cargo valves are hydraulically operated with remote or local control to suit their location and service. Optimum navigational guidance uses large-screen radar systems with two separate frequencies for the advantage of maximum storm penetration and clarity of resolution in harbor areas. A satellite navigation system receives and decodes satellite signals and combines them with data from external velocity sensors to provide accurate worldwide all-weather position information. For maximum antipollution protection, there is a 2,400-gallon-a-day capacity on-board sewage treatment system, and an oily-water separating system with a capacity of 7,700 barrels to remove oil from tank washings. The system is designed so that only clean water will pass overboard from the ship.

All officer and crew quarters are air-conditioned.

In addition to the Overseas Juneau, the yard has under construction, or on order, five 265,000-dwt tankers, two 120,000-dwt tankers and one containership.

Following the christening, **William H. Collins,** general manager of the yard, was the host at a luncheon in honor of the sponsor.

NavShips Requests Bids For 23 MK-3 Patrol Boats

In connection with the construction of twenty-three 65-foot patrol boats, designated the MK-3, the following, among others, will be issued IFB N00024-74B-0528 by the Naval Ship Systems Command: Barbour Boat Works, Inc., Marinette Marine Corp.; J.M. Martinac Shipbuilding Corp.; General Ship & Engine Works, Inc.; Peterson Builders, Inc.; Harbor Boat Building Co.; Swiftships, Inc.; Weaver Shipyards, and Defoe Shipbuilding Co.

Seakeeping Symposium Held At Webb Institute

Participants pictured at the two-day Webb symposium, **back row** (left to right), **Owen Oakley Jr.,** University of California, author; **Nils Salvesen,** NSRDC, co-chairman; **R. Wermter,** NSRDC, chairman; **T. Francis Ogilvie,** University of Michigan, author; **D. Hoffman,** Webb Institute of Naval Architecture, author; **Vincent J. Cardone,** City University of New York, author, and **J.F. Dalzell,** Davidson Laboratory, author. **Middle row** (left to right), **Robert F. Beck,** University of Michigan, author; **Willard J. Pierson Jr.,** City University of New York, guest of honor; **W.E. Cummins,** NSRDC, author and chairman, Panel H-7; **Manley St. Denis,** University of Hawaii, guest of honor, and **B.V. Korvin-Kroukovsky** (retired), chairman. **Front row** (left to right), **Martin A. Abkowitz,** M.I.T., author; **R.B. Zubaly,** Webb Institute, co-chairman; **E.V. Lewis,** Webb Institute, author; **F. Sellers,** MPR Associates, co-chairman; **J.R. Paulling,** University of California, author, and **Michel K. Ochi,** NSRDC, author.

A crowd of 125 people gathered in the Henry Auditorium at Webb Institute of Naval Architecture for the day-and-a-half Seakeeping Symposium on October 18-19, organized by Panel H-7 (Seakeeping Characteristics) of the Technical and Research Program of The Society of Naval Architects and Marine Engineers to commemorate the 20th anniversary of the St. Denis/Pierson paper "On the Motions of Ships in Confused Seas," (Transactions, SNAME, 1953). Of the participants, approximately 50 were from industry, 25 from universities, and the balance from Government agencies or research laboratories.

At the symposium banquet on the first evening, the honored guests, Dr. **Willard J. Pierson Jr.** of the City University of New York, and Dr. **Manley St. Denis** of the University of Hawaii, gave their own presentations in the fields of oceanography and seakeeping, respectively. They were introduced by Rear Adm. **Albert G. Mumma,** USN (ret.), former president of The Society of Naval Architects and Marine Engineers, who was master of ceremonies. The finale was the presentation by **Phillip Eisenberg,** president of the Society, of Certificates of Appreciation with a citation which read "To Manley St. Denis and Willard J. Pierson Jr., who changed our thinking about the ship, the sea and the ship upon the sea." The text was written by the late **Wilbur Marks** (member), who had been one of the principal organizers of the symposium.

The technical meetings were divided into three sessions dedicated to waves, transfer functions and ship responses. Dr. **W.E. Cummins** of the Naval Ship Research and Development Center gave an introductory keynote address. The program was as follows:

Wave Session: chairman, Prof. **B.V. Korvin-Kroukovsky** (retired); co-chairman, **F. Sellars,** MPR Associates. "Ocean Wave Prediction: Two Decades of Progress and Future Prospects," by **Vincent J. Cardone,** City University of New York; "Directional Wave Spectra Measurement and Analysis Systems," by **Owen H. Oakley Jr.,** University of California; "Application of Wave Inputs to Seakeeping," by **Dan Hoffman,** Webb Institute of Naval Architecture, and **Wilbur Marks** (deceased).

The guests of honor at the symposium were Dr. **W.J. Pierson** and Dr. **M. St. Denis** (right).

Transfer Function Session: chairman, **R. Wermter,** NSRDC; co-chairman, Dr. **N. Salvesen,** NSRDC. "Transfer Functions for Predicting Ship Motions: A Review of the Theory," by **T. Francis Ogilvie** and **Robert F. Beck,** University of Michigan; "Numerical Simulation of Large-Amplitude Ship Motions in Astern Seas," by **J.R. Paulling** and **Paul D. Wood,** University of California; "Pathologies of the Transfer Functions," by **W.E. Cummins,** NSRDC.

Application Session: chairman, Dr. **P. Kaplan,** Oceanics, Inc.; co-chairmen, Prof. **R.B. Zubaly** and **R. van Hooff,** Webb Institute. "The 'Input-Output' Approach to Seakeeping Problems—Review and Prospects," by **J.F. Dalzell,** Davidson Laboratory; "Review of Recent Progress in Theoretical Prediction of Ship Responses to Random Seas," by **Michel K. Ochi,** NSRDC; "Long-Term Applications of St. Denis/Pierson Technique to Ship Design," by **E.V. Lewis,** Webb Institute; Seakeeping Criteria and Specification," by **J.B. Hadler,** NSRDC, and **T.H. Sarchin,** Naval Ship Engineering Center; "Applications of the Spectral Technique to Design and Operation," by **Martin A. Abkowitz,** Massachusetts Institute of Technology.

Symposium Banquet: "Forecasting and Observing Waves, Winds and Weather at Sea," by **Willard J. Pierson Jr.,** City University of New York; "Looking Backward and Ahead at Seakeeping Research," by **Manley St. Denis,** University of Hawaii.

The proceedings of the symposium, including summaries of the lively discussions prepared by the co-chairmen, were available for distribution to all participants and for sale to others in the near future.

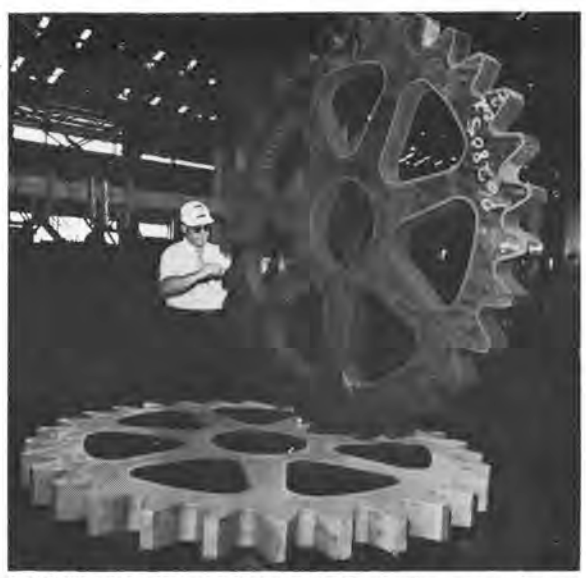
The chairman of the steering committee for the symposium was Dr. **Dan Hoffman,** assisted by Dr. **W.E. Cummins, J.F. Dalzell, W. Marks** (deceased), and **R. Wermter.** The committee wishes to thank the authors, chairmen, co-chairmen and all participants for their wholehearted cooperation in the affair.

Nat'l Bulk Affiliate Orders Four 446,500-Dwt Tankers From IHI Kure Shipyard

IHI (Ishikawajima-Harima Heavy Industries Co., Ltd.), Japan, recently concluded a contract to build four 446,500-dwt tankers with Meridian Transportation Company (Liberia), an affiliate of National Bulk Carriers Inc. (NBC) of the United States. The contract was signed in Tokyo by Dr. **Hisashi Shinto,** president of IHI, and **E.L. Hann,** vice president, Far East operations of NBC. The total contract price amounts to approximately 80,000 million yen.

The four tankers will be built at the IHI Kure Shipyard and completions are respectively scheduled for September 1976, January 1977, May 1977, and September 1977. Each tanker will have the following approximate measurements: overall length of 1,183 feet, molded breadth of 223 feet, molded depth of 104 feet, and draft of 82 feet. They will be equipped with a 45,000-shp IHI turbine developing a service speed of 15.9 knots.

Since 1964, National Bulk has placed orders with IHI for 27 ships totaling 5,635,000 dwt. This includes the four tankers ordered above, and eight 264,000-dwt tankers and three 326,000-dwt tankers.



SPECIAL SHAPES FROM ARMCO: Spoke gears for an offshore jackup drilling platform get a final check from an Armco Steel metallurgist before shipment. The 87-inch-diameter gears were cut from 5-inch-thick tailored alloy steel, designed for the application and produced at Armco's Houston Works. Cutting was numerically controlled and provided extremely close tolerances from a battery of natural gas torches. The gears and similarly torch-cut gear racks will be part of a platform used to locate and develop new offshore oil and gas reserves.

JOINT MEETING IN NEW YORK: The Society of Marine Port Engineers New York, N.Y., Inc., and The Institute of Marine Engineers, Eastern U.S.A. Branch held a joint meeting at the Downtown Athletic Club, New York City, on October 24, 1973. At the technical session, preceded by a dinner, **Thomas J. Young,** United States Lines, Inc., sponsored a paper titled "LNG Carriers-Operations," by **Arthur G. Berndt,** manager, Ship Group "E", Exxon International, Inc., Tanker Department. Pictured at the meeting are: (seated, left to right), Mr. **Young,** sponsor; Mr. **Berndt,** speaker; **Joseph Thelgie,** Marine Transport Lines, first vice president; **Robert E. Yohe,** American Bureau of Shipping, secretary, Institute of Marine Engineers; (standing, left to right), **Robert H. Imlah,** Ampower, treasurer, Institute of Marine Engineers; **Edward English,** Atlantic Repair Co., chairman, program committee; **John Antonetz,** Texaco Inc., chairman, papers committee; **William P. Towner,** American Bureau of Shipping, second vice president; **Thomas Jones Jr.,** American Export Lines, chaplain, and **H.H. Hunt,** marine surveyor, secretary-treasurer.

Three Firms To Join In Irish Consortium Serving Coastal Drilling

Three firms are forming a new consortium in Dublin for the purpose of servicing Ireland's offshore oil and gas industry. Fitzwilton, the Peninsular and Oriental Steam Navigation Company, and Irish Shipping will participate in the venture, with each firm holding equal shares in the consortium.

The group decision was made after each of the companies had made separate feasibility studies of the services sector to Ireland's offshore oil industry. The companies are now making a more detailed study to define areas where their combined skills may be put to use.

Fitzwilton is one of Ireland's most important industrial conglomerates. The Peninsular and Oriental Steam Navigation Company is a London-based shipping firm. Irish Shipping is a deepsea shipping line owned by the Irish Government.

In a separate development, representatives of Marathon Oil Company of the United States have met with the Irish Government to discuss the possibility of exploiting a natural gas discovery located in the Celtic Sea, approximately 30 miles off the coast of Cork. Marathon has indicated that by North Sea standards the gas find is relatively small, although they have not disclosed publicly the extent of the find. A company spokesman has said that studies are now under way "to determine the magnitude of investment required to develop the field." Marathon's final decision will be made after the company's studies have been completed and their discussions with the Irish Government have been concluded.

Ireland's Minister for Industry and Commerce, **Justin Keating,** has undertaken a special departmental study encompassing the entire field of Ireland's offshore gas and oil exploration and development. Important considerations to be answered by the study include the extent of possible Government participation in exploration, and the desirability of establishing a state energy corporation.

Edo Western Corp. Named To Represent Graseby Instruments

Edo Western Corporation is now acting as exclusive representative in both North and South America for a full line of high-pressure underwater cable glands. These highly reliable long-life underwater penetrators are a product of Graseby Instruments Ltd., Surrey, England.

Graseby's molded polyethylene high-pressure underwater cable glands with molded polyethylene pressure seals are capable of withstanding up to 1,000 pounds pressure, are extremely durable, and provide unsurpassed dependability. They are normally supplied with 60 feet of polyethylene-sheathed conductor and with cable terminations to comply with user requirements. They are furnished in aluminum bronze or phosphor bronze housings, but special housings manufactured from other metals, such as stainless steel and aluminum, are available on special order. Grouping of glands on a single housing can be employed to provide additional connections and unlimited versatility.

World's Largest LNG To Be Built In France

According to reports from France, Louis Dreyfus S.A. of Paris, has ordered a liquefied natural gas carrier (LNG) from Chantiers de France, Dunkirk. It is said this will be the largest such vessel in the world. The ship, about 130,000 cubic meters, will be built by the use of the "Gaz Transport" method of construction, and is scheduled for delivery by the end of 1977. When completed, the LNG carrier wil be time-chartered to the European consortium "Segape," the Societe d'Achat de Gaz Algerien Pour l'Europe, for a minimum period of 20 years.

Zapata Naess Shipping Co. Ltd. Names Muscatelli And Nilssen

Capt. A. Muscatelli

Ralph A. Nilssen

N.B. Madsen, president of Zapata Naess Shipping Company Limited (soon to be renamed Anglo Nordic Shipping Limited) recently announced the appointment of Capt. **A. Muscatelli** as vice president, ship operations, and **Ralph A. Nilssen** as vice president, new construction.

Captain **Muscatelli,** now stationed in Glasgow, has been associated with the Naess Group for over 18 years, both at sea and in several capacities of operational management. In his new assignment, he will be in charge of operating a fleet of more than 3 million dwt of tankers, combination, bulk and chemical vessels.

Mr. **Nilssen** assumes responsibility for the company's new construction program, which includes the recently announced order for three 402,000-dwt ULCCs to be built at the Mitsubishi Heavy Industries' Koyagi shipyard.

JBF Scientific Corp. Receives $1,400,000 Navy Contract For 18 Oil Recovery Skimmers

The DIP skimmers have the ability to harvest any floating material, including debris and sorbents, without changing the skimmer configuration.

The U.S. Navy has contracted with JBF Scientific Corporation, Burlington, Mass., for 18 Dynamic Inclined Plane (DIP) oil skimmers to be used on river, harbor, and coastal oil spills. JBF will deliver six DIP 3001 oil skimmer boats and 12 DIP 1002 oil recovery systems on this contract. The 3001 is a twin-screw diesel-hydraulic boat, 25 feet long, that recovers oil, sorbents and debris in waves several feet high. A similar unit has been in operation in the Puget Sound Naval Shipyard for the last 15 months and has proved to be highly effective on many spills.

Dynamic Inclined Plane (DIP) skimmers are based upon the concept of collecting the oil under the surface of the water, thus greatly reducing the effect of waves. As the skimmer moves through the water, or the water moves past the skimmer, the oil is forced to follow the surface of a moving inclined plane to a collection well underneath the skimmer. Buoyant forces cause the oil to surface in the well, forcing water out the bottom. As the oil collects, it is pumped off to storage tanks. Separation occurs automatically, and virtually no water is collected.

The DIP 1002 oil recovery system consists of a DIP 1001 oil skimmer, two sections of containment boom, a tank for storing recovered oil, and an air compressor. All of the components are mounted on a trailer along with a jib crane to launch the skimmer into the water. This system will be used in harbors, around piers, in congested areas between nested ships and as a recovery link in a containment boom.

DIP 3001 and 1002 systems will be delivered to naval facilities all over the United States. The total contract price for the 18 units is $1,416,015.

The DIP concept was developed by JBF Scientific Corporation, and a demonstration model was built for the U.S. Environmental Protection Agency in 1971. Production equipment is now in use by the U.S. Navy, the Commonwealth of Massachusetts and the Canadian government.

For further information contact **Edward E. Johanson,** JBF Scientific Corporation, 2 Ray Avenue, Burlington, Mass. 01803; telephone (617) 273-0270.

C.M.R.-Marseillaise, France Expands Plant Facilities

Model of new C.M.R. facility to house plate and machine shops.

C.M.R. (Compagnie Marseillaise de Reparations) one of the leading ship repair facilities in the Port of Marseilles recently announced the addition of new plant facilities to be erected on a site adjacent to drydocks #8 and #9, the largest docks presently in operation at the yard.

The new plant is expected to be completed in the spring of 1974 and will house complete plate and machine shops, as well as two 50-ton overhead cranes, enabling the yard to better facilitate repairs on all types of vessels up to 200,000 dwt.

Twin Disc, Incorporated Introduces New Heavy Duty Power-Shift Transmission

Twin Disc, Incorporated, Racine, Wis., has expanded its line of Power-Shift Transmissions with the addition of the new 2800 Series.

The 2800 Series is designed specifically for heavy duty applications such as swing control, winches or other applications requiring small size, high capacity and a 2:1 or 1:1 ratio. The 2800 Series measures only 14¾ inches from flange to flange, and has a rating of up to 580 hp at 2,400 rpm.

This Twin Disc Power-Shift Transmission Series can be used with any Twin Disc 10,000 or 11,500 Series Three-Stage Hydraulic Torque Converter, a Twin Disc Type 4-2000 Series Single-Stage Hydraulic Torque Converter, or a Twin Disc Type 4-2000 Series Omega Drive. The Omega Drive is a system that combines an oil-actuated clutch and a hydraulic torque converter in one package to provide an infinitely variable speed to the converter output shaft, while, at the same time, permitting an infinite modulation of power to one or more other engine-driven converter-mounted power take-offs. The clutch is designed to modulate—or slip—so that the degree of clutch engagement can be varied and held continuously if desired from 100 percent to lockup, without developing excessive heat.

Complete information can be obtained from Twin Disc, Incorporated, Racine, Wis. 53403.

Pacific Lighting Unit Files For LNG Vessel Financing

Pacific Alaska LNG Co., a subsidiary of Pacific Lighting Corp. (NYSE), Los Angeles, Calif., has filed an application with the U.S. Department of Commerce for guarantees of loan and mortgage financing for two liquefied natural gas (LNG) carrier vessels.

The application is for $236 million, which is 87.5 percent of the estimated $270 million cost of the vessels in-service, including interest during construction. Filed with the Maritime Administration, the application falls under provisions of Title XI of the Merchant Marine Act of 1936, as amended.

The vessels will be used by the company to transport the LNG equivalent of between 400 and 500 million cubic feet per day of natural gas from south Alaska's Cook Inlet to southern California.

According to **Paul A. Miller,** chairman of the board of Pacific Lighting, terms to acquire the gas supplies from south Alaska are still being negotiated with producers.

"An application for the entire Alaska LNG project will be filed later with the Federal Power Commission," Mr. **Miller** said.

"Pacific Alaska LNG Co. will also be filing supplementary information with the Maritime Administration as soon as contracts for the vessels have been signed," he added.

Mr. **Miller** explained that the specially-designed carriers will bring the LNG to a proposed docking, unloading and regasification facility within Los Angeles Harbor.

"Once the fuel has been restored to its natural gaseous state, it will be put into the lines of Southern California Gas Co., our gas distribution subsidiary," Mr. **Miller** said.

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A NEW LIFE FROM HUD: The 36-year-old pilgrim ship Gunung Djati, 16,393 tons (shown above), arrived at Hongkong United Dockyards Ltd. with steam propulsion, and recently left the yard propelled by medium-speed diesels. The fast re-engining job was done with M.A.N. medium-speed diesel engines driving two propellers through Lohmann and Stolterfoht reduction gears. Strict production control and planning were necessary for the three distinct stages—the old engines had to be removed, extensive steelwork involving about 390 tons had to be done, and finally, the new engines with all associated auxiliary machinery, piping and electrical work had to be installed. No stage could be started until the previous one was completed. HUD's modern planning techniques permitted extensive general repairs to the 36-year-old vessel during the re-engining.

Halter-Built Carrier Begins Service In Nigeria For O.I.L.

Oil Conveyor, a personnel carrier built by Halter Marine for O.I.L., is shown operating in Bonny, Nigeria, for Ocean Inchcape (Nigeria) Ltd.

The vessel is one of seven to service O.I.L.'s two marine contracts for Shell B.P. Petroleum Company of Nigeria. The first mooring contract began early this year for inshore work at Bonny. Three 55-foot mooring tugs are already in operation.

The second contract, now under way, is for the offshore work. In addition to Oil Conveyor, three mooring tugs under construction at Richard Dunston's Hessle yard will be employed.

Oil Conveyor is capable of carrying 39 passengers and light stores at a speed of 23 knots. She operates between Bonny Marine Terminal and the offshore loading station, where export tankers of up to 300,000 tons can load at two Shell/B.P., single buoy moorings (SBMs).

Commenting on the start of the offshore operations at Bonny, Capt. **John H. Newton,** O.I.L.'s marine contracts manager said: "The SBMs which O.I.L. will be handling are two of the seven currently off the Nigerian coast. O.I.L will also be providing pilotage and loading services for the export tankers. All our vessels, both for offshore and inshore work, are manned extensively by Nigerian crews. They are all excellent seamen and play a crucial role in our operations."

O.I.L. was set up in 1971 by Ocean Transport & Trading, and Inchcape & Co. to service the offshore industry.

Nuclear Propulsion Projects Studied At MarAd Seminar And SNAME Meeting

Attending the New York Metropolitan Section meeting at the USMMA were, from left to right: **Arnold M. Stein,** M. Rosenblatt & Son; **Robert Fulton,** Modular Systems, Inc., secretary-treasurer of the New York Metropolitan Section; Capt. **W.M. Maclean,** Department of Engineering, USMMA, chairman, papers committee; **James C. Schaff,** Global Marine, Inc., author; **Donald B. Carpenter,** Delaval Turbine, Inc., section chairman; **Thomas J. Sartor Jr.,** Farrell Lines, Inc., vice chairman, and **Patricia McGovern,** George G. Sharp, Inc., chairman, meetings committee.

The U.S. Merchant Marine Academy, under the aegis of the Maritime Administration held a seminar on the subject, "The State of the Art in Commercial Applications of Nuclear Propulsion," on Wednesday, October 17, 1973. The seminar was held at the Academy, at Kings Point, N.Y., during the afternoon and was followed by an evening meeting, also at the Academy, of the New York Metropolitan Section of The Society of Naval Architects and Marine Engineers, where a paper by **Morris Lebovits** and **J.C. Schaff** of Global Marine, Inc. was presented on the feasibility of a "Nuclear Powered Icebreaking Supply/Support Ship for Arctic Exploration." Both the seminar and the SNAME meeting were held in Bowditch Hall.

During the afternoon, a panel of experts presented the current thinking on commercial applications of nuclear propulsion and conducted discussions on its pertinent aspects. The program was presented as follows: (1) A "Welcome" was given by Rear Adm. **Arthur B. Engel,** Superintendent of the U.S. Merchant Marine Academy. (2) "An Update on Technology for Commercial Nuclear Propulsion" was presented in two parts—(a) Primary Systems, by **James Lemmon,** Babcock & Wilcox Co., and (b) Secondary Systems, by **Howard Spears,** General Electric Co. (3) "Economics of Nuclear Propelled Ships" was presented by **George Geyer,** Babcock & Wilcox Co. (4) "The Impact of Nuclear Power on Ship Design" was given by **Ken Shauer,** George G. Sharp, Inc. (5) "Prospects of a Nuclear Fleet" was presented by Dr. **Zelman Levine,** Chief, Office of Maritime Technology, U.S. Maritime Administration. (6) "Personnel Training" was presented by Capt. **M.J. Gross,** Department of Engineering, U.S. Merchant Marine Academy. (7) "Acceptance and Port Entry for Nuclear Ships" was presented by **Robert Schmidt,** Babcock & Wilcox Co. (8) "Licensing and Regulation" was given by **Parks Honeywell,** Eastern area manager, N.U.S. Corp., Rockville, Md. (9) "Summary" was presented by Capt. **W.M. Maclean,** Department of Engineering, U.S. Merchant Marine Academy.

Following the afternoon's seminar sessions, there was a short tour of the Academy facilities for those visiting for the first time and those wishing to update their familiarity with the school.

Present at the afternoon seminar at the U.S. Merchant Marine Academy were, from left to right: **Charles W. Wilson,** manager, marine sales, Babcock & Wilcox, New York; **R.E. Whitam,** manager, marine commercial, B&W Barberton; **R.E. Schmidt,** Government marketing, B&W Lynchburg, and **C. W. Connell,** project engineer, B&W Barberton.

A social hour at the Officers' Club, starting at 5:00 p.m., completed the afternoon. It served as a transition to dinner at 6:30 p.m. and The Society of Naval Architects and Marine Engineers meeting, which began at 8:00 p.m. In all, a full day was devoted to nuclear propulsion.

The paper presented at the evening's SNAME meeting pointed out that preliminary surveys of the Arctic offshore hydrocarbon potential, combined with production indications from onshore wells, present a very exciting prospect for exploration and development of much needed fields of petroleum reserves. The Arctic offshore environment, with its seasonal periodic encroachment of ice, allows only short open-water intervals during which drilling ships and workboats can normally operate. Design and development of new dual-purpose icebreaking ships for drilling and for supply/support of ice operations, are needed to expand the drilling season before exploration can proceed to fully develop the expected reserves.

The paper went on to describe the design and configuration of supply ships (workboats) required to support an ice-qualified drilling ship in exploratory development of potential hydrocarbon reserves in Arctic regions. The paper presented results of a study, conducted for the Maritime Administration by Global Marine, Babcock & Wilcox, and General Electric, that investigated the technical and economic feasibility of nuclear propulsion power for ships supporting an Arctic offshore drilling vessel. The economic and operational advantages of nuclear power are developed, along with technical aspects of installing a 30,000-kw (40,000-hp) nuclear generating plant in the workboat. The developed workboat is 418 feet long overall, displaces 13,417 long tons full load, and is structurally qualified as a Canadian Arctic Class 6 icebreaker.

Paul C. Dahan Appointed Vice President Mobil Shipping —Arthur M. Lissenden Retires

Paul C. Dahan

Arthur M. Lissenden

Paul C. Dahan has been appointed vice president of Mobil Shipping and Transportation Company. He succeeds **Arthur M. Lissenden,** who retired from Mobil Oil Corporation November 30, after almost 40 years of service.

Mr. **Dahan** received a B.S. degree in naval architcture and marine engineering from the University of Michigan. He joined Mobil as a project engineer in 1963. His most recent position was manager of project development and design.

He is a member of The Society of Naval Architects and Marine Engineers and serves on several industry committees, including the American Bureau of Shipping's committee on naval architecture. He holds several patents relating to naval applications.

Mr. **Lissenden** received a degree from Webb Institute of Naval Architecture and Marine Engineering in 1930. He joined Mobil in 1934. He was named manager of the technical division in the marine transportation department in 1957 and, later, vice president and director of Mobil Shipping and Transportation Company.

He is a licensed professional engineer in the State of New York and a council member and vice president of The Society of Naval Architects and Marine Engineers. He is also a member of the technical committee of the American Bureau of Shipping, American Petroleum Institute, and The Propeller Club.

Largest Single Towboat Order Received By St. Louis Ship —Six 5,600-HP Vessels

St. Louis Ship, Division of Pott Industries Inc., has been awarded its largest single towboat order, totaling approximately $10,000,000 from American Electric Power Service Corporation of New York. The contract calls for construction and delivery of six 5,600-hp river towboats. The vessels are scheduled to enter the coal transportation service upon completion.

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Pacific Resources' Bid For Subsidy To Build Four Vessels Supersedes Earlier Application

A construction subsidy application to cover four vessels has been filed with the Maritime Administration by Pacific Resources Inc. on behalf of its new subsidiary, Hawaiian International Shipping Company. The vessels will be either combination ore/bulk/oil (OBO) carriers of 80,000-dwt each, or four tankers of 89,000-dwt each.

The application is intended to supersede an earlier construction differential subsidy bid by Pacific Resources, which covered only three ore/bulk/oil carriers estimated to cost $34.6 million per vessel. In that earlier application, Pacific Resources had filed under its own name, rather than on behalf of Hawaiian International.

According to the new application, total cost of the four 80,000-dwt tankers is estimated at approximately $130 million. The ships would contract to operate from crude oil sources in the Arabian Gulf and Indonesia to refineries in Hawaii and on the Pacific Coast of the United States.

J.R.D. Systems, Inc. Names John J. Hendrix President

John J. Hendrix

Thomas J. Barry

At a recent board of directors meeting, J.R.D. Systems, Inc., Staten Island, N.Y., elected **John J. Hendrix** as president, **A.C. Hendrix** as vice president, and named **Thomas J. Barry** as special consultant for fire protection projects.

J.R.D. Systems has developed and patented a modular Inert Gas System for Fire Protection of industrial and marine installations which will be marketed in the near future. In addition to developing new products for marine and industrial demands, J.R.D. Systems, Inc. provides design and technical survey services such as supervision of construction or marketing capability reports for new products for all types of marine and industrial engineering projects.

Mr. **Hendrix** holds a bachelor's degree in marine engineering from the Marine Engineering College of Amsterdam, Holland. Before joining J.R.D. Systems, Inc., he was employed with Seatrain Shipbuilding Corp. as marine engineer and chief of hull machinery. His last position was acting chief plant engineer and dockmaster. He is a member of The Society of Naval Architects and Marine Engineers, member of the Institute of Marine Engineers (London), member of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, and member of the American Society of Naval Engineers.

Mr. **Barry** attended City College of New York and majored in electrical engineering at New York University. He has had extensive experience in fire-fighting, fire protection and prevention, and is fully acquainted with the world-famous New York City Fire Code.

For additional information on J.R.D. services, write to P.O. Box 'R', 550 Manor Road, Staten Island, N.Y. 10314.

Bull & Roberts Introduces Test Kit Of Different Type For Boiler Feed Water

A patented and radically different type of test kit for the determination of dissolved oxygen in boiler feed water is being introduced to the marine field by Bull & Roberts, Inc.

This new system, which is designed to speed the tests and give more accurate readings with far less material and equipment, will replace the most commonly used Winkler Test introduced by Bull & Roberts in the late 1930s.

Deaerators on most modern vessels produce feed water at or below 7 ppb (parts per billion) dissolved oxygen when operating at normal steaming rates. Whereas the Winkler Test will indicate "O Oxygen" when the content is below 18 ppb, the new B&R Test Kit has standards of 0 and 5 ppb with graduations to 40 ppb to determine whether or not the deaerator is operating within specifications.

Since any reading above 10 ppb spells potential trouble, and the approximate analysis time is only one minute, this test has real advantages to the engineer. In contrast to the Winkler Test which has a five-step procedure employing five different reagents, the B&R Test requires only one disposable ampoule, a sample purge bottle and a simple comparator containing eight color standards ranging from 0 to 40 ppb dissolved oxygen.

In other dissolved oxygen tests, a measured volume of sample in an open container is, of course, in direct contact with the air. If the surface of the sample is stirred or agitated in any way, the test results will be invalid. In the B&R ampoule-type test, the sample never comes in direct contact with the atmosphere. The tip of the ampoule is immersed in the flowing sample stream well below the surface of the water. When the test is run, the tip is broken off in the snapper fitting and the vacuum inside the ampoule sucks in the proper amount of sample.

The initial kit setup consists of a sample purge bottle with special fittings, a comparator and a box of 30 ampoules. Thereafter, only additional cigarette-size ampoules containing a carefully measured quantity of color-forming reagent, sealed under vacuum, are needed. All materials or replacement parts are available directly from Bull & Roberts or from any of their distributors in major ports throughout the world.

Bull & Roberts, Inc. is located at 785 Central Avenue, Murray Hill, N.J. 07974.

"THE CAPTAIN MISSED THE SMELL OF SALT WATER, HERE IN THE DESERT."

GROUND BREAKING: M.K. Products, Inc., a leading manufacturer of automatic and semiautomatic welding equipment, is expanding its operation to a new 73,000-square-foot plant in the Irvine Industrial Complex in Irvine, Calif., with a completion date scheduled for late January or early February 1974. Pictured above, from left, at the ground-breaking ceremony are **Paul Miller,** vice president sales; **Mike Kensrue,** chairman of the board; **Joe Page,** president, and **Don Martin,** senior vice president. M.K. Products manufactures the Cobramatic and Cobrapak semiautomatic Mig welding systems, Doodle Bug Automatic Dual Head Stiffener Welder, Sidewinder Automatic Vertical Fillet Welder and other semiautomatic and automatic welding equipment. All products are marketed through welding supply distributors in the United States, Canada and overseas.

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3) Complete terms and conditions of sale, descriptions of vessels and bid proposal forms will be available from the Office of the Director, Administrative Services Division, Administration Building, P.O. Box 1949, Bridge Plaza, Camden, New Jersey 08101 on or after November 30, 1973.

4) Any one or more of the named ferryboats may be withdrawn from sale at any time until final award.

5) The named ferryboats may be inspected at the Chester, Pennsylvania terminus of the Chester-Bridgeport Ferry, foot of Flower Street, Chester, Pennsylvania by appointment with the General Manager (telephone 215-874-7105) between the hours of 9:00 A.M. and 4:00 P.M. on weekdays beginning November 26, 1973 through December 28, 1973.

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539-1900 (301) 355-5050

RECONDITIONED

LESLIE PUMP GOVERNOR VALVE

For U.S. Naval Vessels—type CT-HNS-3. For merchant vessels—type CTHS. Size 2". Typical serial 241-423. For immediate delivery.

$495

THE BOSTON METALS COMPANY

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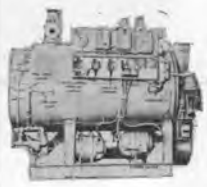
SELF-CONTAINED—ALL CONTROLS CYCLOTHERM STEAM BOILERS

MODEL MC-90
OUTPUT
2600 LBS/HOUR



Design pressure 100 PSI—2-Pass—1 burner (pressure atomizing)—burner capacity 26 gal./hr. Electric ignition. Equipped with fuel pump — 1½ HP (Feed pump 10 GPM @ 300 ft. head — 3 HP — 440/3/60) Blower 5 HP—440/3/60 — pressure 20" water — 3400 RPM. TUBES: 22 at 2½" x 0.110 wall and 22 at 2" x 0.095 wall. Furnace 16" OD x ⅜" thick. Head ½" thick. Steel plate 5/16". **$1395**

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NEW WATERTIGHT DOORS

6-Dog right and left hand hinged steel doors—with frames. Built and tested to A.B.S. specifications.

SIZE	NET WT.
26"x48"	250 lbs.
26"x60"	300 lbs.
26"x66"	320 lbs.
30"x60"	330 lbs.

EACH DOOR

IMMEDIATE DELIVERY

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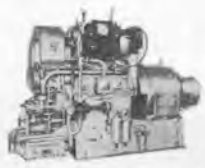

G.M. 3-268A 100 KW A.C. Diesel GENERATOR SET

Like new, ENGINE: G.M. 3-268A—3 cylinder—6½"x7" bore & stroke. GENERATOR: Century — 100 KW—440 volts—3-phase—60 cycle.

AIR STARTING $2450 **ELECTRIC STARTING $2775**

THE BOSTON METALS COMPANY

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NEW 7" RADIUS PANAMA CHOCKS

(MEET PANAMA REGULATIONS)

With extended legs for welding to deck. IMMEDIATE DELIVERY FROM STOCK.

THE BOSTON METALS COMPANY

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UNUSED 2" BRONZE STRAINERS (DUPLEX)

Flanged—mfg by Derbyshire Machine & Tool Co. Flange has 6 holes 9/16".

$299.00

THE BOSTON METALS COMPANY

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1000 GPM—125 LB

BRONZE FAIRBANKS-MORSE FIRE & GENERAL SERVICE PUMP

PUMP: Mfg by Fairbanks-Morse.. Horizontally split case — 1000 GPM—281' head — 3545 RPM. Suction pressure flooded—6" suction—5" discharge. Steelflex coupling. MOTOR: Fairbanks-Morse—440/3/60—squirrel cage—3600 RPM—class A insulation. Type KZK—continuous duty—dripproof—ambient temp. 50°C. Complete with Cutler-Hammer controller (reduced voltage magnetic starter). DIMENSIONS: 5' 5" OAL—23" OAW—2' 11" OAH. UNIT HAS HAD VERY LITTLE USE.

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100,000 lb. Almon Johnson Series 232 Constant Tension Mooring Winches

5 Available. In very good condition. Series 232 mooring & anchoring winches—automatic self-tensioning. Wide range from 100,000 lb line pull at 10 FPM to 26,000 lbs at 400 FPM. Gypsy line pull 12,000 lbs at 125 FPM. Drum declutchable through spiral jaw clutch for free spooling. Driven by 50 HP—230 VDC motors—Westinghouse CK—575 RPM—½ hour—75°C rise—stab. shunt—181 amps—max. RPM 1900. Cutler-Hammer brake—18"—type NM. Complete with magnetic control panel, resistor banks & remote control pedestal—mounted master switch. **Can spool up to 2000' 1¼" wire.**

THE BOSTON METALS COMPANY

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ALLIS-CHALMERS 1200 KW D.C. GENERATORS

SUITABLE FOR DIESEL ELECTRIC TUGS AND VESSELS OR OIL FIELD DIRECT DRIVE D.C. GENERATORS

1200 KW—525 Volts D.C.—750 RPM—2290 amps—totally enclosed—self-ventilated with surface air coolers. Frame: split type. 2-Bearings: split sleeve, spherical seat, self-aligning. Separately excited from a 120 volt source. Continuous duty. Very good condition.

THE BOSTON METALS COMPANY

313 E. Baltimore St. Baltimore, Md. 21202
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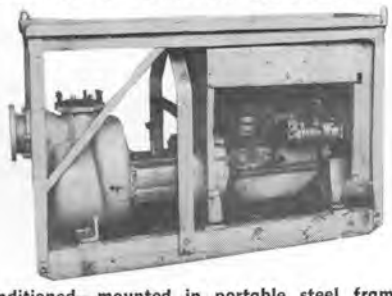
PORTABLE 6" CARVER SALVAGE PUMPS



Reconditioned—mounted in portable steel frame. 1750 RPM—1100 GPM @ 100' head; 1500 GPM @ 70' head; 1800 GPM @ 50' head; 2100 GPM @ 20' head. Leroi gas engine—model D-201P3—4 x 4—1750 RPM—hand crank——wt. 600 lbs.

$995

THE BOSTON METALS COMPANY

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539-1900 (301) 355-5050

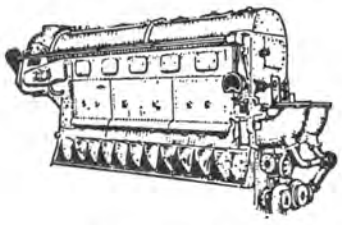
SHIPBOARD EQUIPMENT

From

ZIDELL EXPLORATIONS INC.

Contact: Ralph E. Ingram
3121 S.W. Moody Ave., Portland, Ore. 97201
Telex: 36-0503 • Cable "ZIDELL"
PHONE: A/C 503 • 228-8691

MARINE DIESEL ENGINES

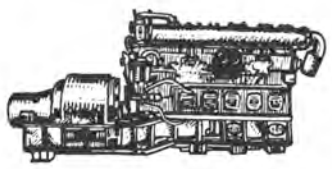


MATCHED PAIR . . . FAIRBANKS-MORSE Model 38D8-⅛ — 1 Port; 1 Starboard. Used condition, 1800 HP, 800 RPM, 2 cycle, 8½″ bore, 10″ stroke, Air Start.. Complete with Westinghouse Reduction Gears, 2.216:1 ratio —with Hydraulic Coupling.

MARINE DIESEL GENERATORS

4—COOPER - BESSEMER, Marine . . . Model FSN 6, 6 cylinders, 375 HP, 900 RPM with General Electric generators, 250 KW 440/3/60.

2—SUPERIOR Diesel Engines . . . Model GBD8 Marine, 150 HP, 1200 RPM, 8 cylinder, with Delco Generators, 100 KW, 120/240 DC.



4—GENERAL MOTORS, Model 3-268A, marine, 150 BHP, 1200 RPM, 3 cylinders, with 100 KW Generators, 450/3/60.

3—GENERAL MOTORS, Model 3-268A, Marine, 150 HP, 1200 RPM, 3 cylinders, with Allis-Chalmers Generators, 100 KW, 120/240 DC.

Many other units in stock

TURBINE GENERATORS—AC and DC Voltage

A.C.

2—1500 KW, GENERAL ELECTRIC Turbines: Type FN4-FN30, Steam 525 PSIG. 8145 RPM, with G.E. Generators, 1500 KW, 450/3/60.

4—1250 KW, GENERAL ELECTRIC Turbines: Type FSN, 525 PSI, 7938 RPM. Generators: 1250 KW, 450/3/60, 3600 RPM, Type ABT2.

4—600 KW, GENERAL ELECTRIC Turbines: Type FN3-FN20, Steam 525/565 PSIG, 10033 RPM, with G.E. Generators, 600 KW, 450/3/60.

8—750 KW, GENERAL ELECTRIC Turbines: Type FN3-FN24, 525 PSI, 10,033 RPM. Generators: 750 KW, 450/3/60, 1200 RPM, Type ATI.

2—500 KW, GENERAL ELECTRIC Turbines: Type FN3-FN20, steam 375/425 PSI, 6 Stage, 9987 RPM. Generators: 500 KW, 450/3/60, 1200 RPM, Type ATI.

D.C.

1—WORTHINGTON, 225 PSI, 397°F, 6510 RPM, with Westinghouse Generator, 150 KW, 120 DC, 1250 Amperes.

1—GENERAL ELECTRIC, with G.E. Generator, 350 KW, 440/3/60.

1—GENERAL ELECTRIC, 525 PSI, with G.E. Generator, 250 KW, 440/3/60.

4—ALLIS-CHALMERS, 440 PSI, 740°F, with Allis-Chalmers Generators 300 KW, 240/240 DC.

ALLIS-CHALMERS, 440 PSI, 740°F, 300 KW, 120/240/DC.

6—WESTINGHOUSE, 200 PSI, with Westinghouse Generators, 60 KW, 120 D.C.

JOSHUA HENDY, 300 PSI, 550°F, with Westinghouse Generator, 300 KW, 120/240 DC.

WORTHINGTON, Form S4, 440 PSI, 740°F to a Westinghouse Generator, 250 KW, 440/3/60, and to a 90 KW, 120 DC.

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FAST REPLIES ON YOUR INQUIRIES!

A partial listing of our stock from EX-NAVY and MARITIME VESSELS

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Rebuilt and Guaranteed

AXIAL FLOW FANS

LaDel, Sturtevant, etc.

In 440 AC, in 115 DC, and in 230 DC, and in sizes 1 HP through 20 HP. Completely reconditioned.

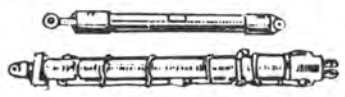
EXAMPLE LISTING:

Size A¼	Size A3	Size A8
Size A½	Size A4	Size A10
Size A1	Size A5	Size A12
Size A2	Size A6	Size A16

Electro-Mechanical STEERING GEAR

1—SPERRY No. 2, 5 HP, 230 Volts DC, complete with Steering Winch, Controller Panel, Ballast Resistor, Electro-Mechanical Steering Stand—with Steering Wheel (with Pull-out Knob).

HYDRAULIC CYLINDERS



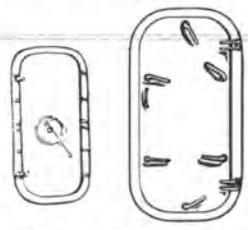
Bore	Overall Stroke	Rod Diameter	Retracted Length	Action
10″	12″	3.75″	45½″	double
10″	26″	3.75″	58½″	double
2″	8″	1½″	20″	double
2.5″	15″	1.12″	25½″	double
3″	8″	1.37″	15½″	double
6″	8″	4″	144″	double

CARGO HOISTER BLOCKS

5 ton rated, steel, as removed from surplus ships. Manufactured by: Young, Draper, etc., 12″ & 14″ sizes.

$44.50 ea. **$49.50 each with pull test certificates**

STEEL WATERTIGHT DOORS

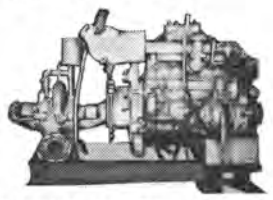


Used, Good Condition, Trimmed Frames.

Many sizes available, priced reasonable. Some Typical Prices shown below. Please Inquire for other sizes.

26″x48″-4 Dogs—**$60.00 ea.**
26″x57″-6 Dogs—**$80.00 ea.**
26″x60″-4 Dogs, 6 Dogs—**$86.00 ea.**
26″x66″-6 Dogs, 8 Dogs—**$100.00 ea.**
26″x66″-Q.A. Type—**$175.00 ea.**

FIRE PUMPS



2—BUDA, Model 6-LD-468, Diesel Engines, 6 cylinders, 100 BHP, Marine, Gardner-Denver, centrifugal Pumps, Bronze, horizontally split case, 1000 GPM, 280′ head, 6″ suction and 5″ discharge.

AIR COMPRESSORS

1—GARDNER-DENVER, 150 CFM, 125 PSI, Class WB, Size 7x5¾x5, with Diehl Motors, 45 HP, 230 Volts DC, 870 RPM, 167 Amperes.

3—INGERSOLL - RAND, Size 5x5x4x4, 50 CFM, 150 PSI, with G.E. Motor, 20 HP, 440/3/60.

2—WESTINGHOUSE AIR BRAKE Steam, Size 11x11x12, approximately 60 CFM at 100 PSI.

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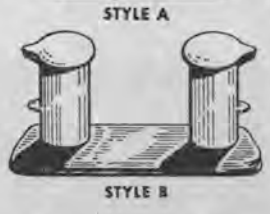
2—WORTHINGTON, 20 CFH, 3000 PSI, 4 stage, 585 RPM, with Worthington Steam Turbine, 47 HP, 5502 RPM.

DOUBLE BITS

STYLE A



STYLE B

Used, clean, good, suitable for reuse. Predominantly 12″ and 14″ sizes, 2 styles, Many other sizes in stock, ranging from 6″ to 18″.

Specify quantity, size and style required for fast quotation.

FAIRLEADS

Designed and Manufactured by ZIDELL EXPLORATIONS INC.

To Give You These Features: One size fairlead with universal type sheave to accommodate wire rope sizes 1″ up to and including 2″. Self Aligning, Swivel Type Head. Dependable and Ruggedly built to perform consistently year after year with minimum maintenance.

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From

ZIDELL EXPLORATIONS INC.

Contact: Ralph E. Ingram
3121 S.W. Moody Ave., Portland, Ore. 97201
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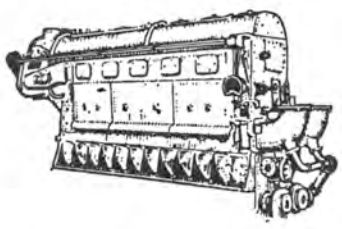

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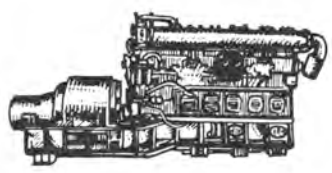

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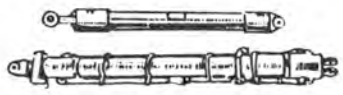

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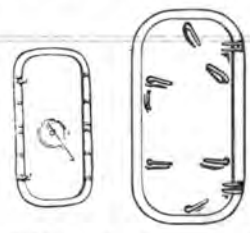

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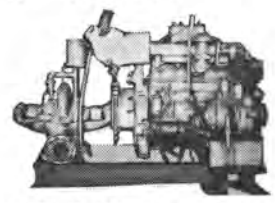

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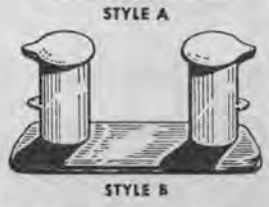

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Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

ANCHORS AND ANCHOR CHAINS
Lockstad Co., Inc., 179 West 5th Street, Bayonne, N.J. 07002

AUTOMATIC DRAFTING SYSTEMS
Gerber Scientific Instruments Co., P.O. Box 305, Hartford, Conn. 06101

BEARINGS
BJ Marine Bearings, a Borg-Warner Industry, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

BOILERS
Babcock & Wilcox Co., 161 E. 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095

BOW THRUSTERS
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171

BUNKERING SERVICE
Gulf Oil Trading Co., 1290 Ave. of the Americas, N.Y., N.Y. 10019
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
The West Indies Oil Co., Ltd., St. John's Antigua, W. I.

CARGO HANDLING EQUIPMENT
MacGregor International Organization, 49 Gray's Inn Road, London W.C.1., England

CLUTCHES, GEARS & BRAKES
Wichita Clutch Co., Inc., Wichita Falls, Texas 76307

COATINGS—Protective
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144
International Paint Co., Inc., 21 West Street, New York, N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Philadelphia Resins Corp., 20 Commerce Dr., Montgomery, Pa. 18936

CONTAINERS—CONTAINER HANDLING SYSTEMS
Ameron Corrosion Control Div., Brea, Calif. 92621
Lighter Aboard Ship, Inc., 225 Baronne St., New Orleans, La. 70112
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
RPC Division, Midland-Ross Corp., P.O. Box 490, Roxboro, N.C. 27573

CONTAINER LASHINGS & COMPONENTS
American Engineered Products, P.O. Box 74 Nichol Ave., McKees Rock, Pa. 15136

CONTROL SYSTEMS
Frederick Cowan & Co., Inc., 120 Terminal Drive, Plainview, L.I. New York 11803
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
Henschel Corporation, 14 Cedar St., Amesbury, Mass. 01913
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.
WABCO Fluid Power Division, 1953 Mercer Road, Lexington, Kentucky 40505

CORROSION CONTROL
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144

CRANES—HOISTS—DERRICKS—WHIRLEYS
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Houston Systems Mfg. Co., P.O. Box 14551, Houston, Texas 77021
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501

CRANE LOAD INDICATORS
W.C. Dillon & Co., 14620 Keswick St., Van Nuys, Calif. 91407

DECK COVERS (METAL)
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

DECK MACHINERY
Appleton Machine Co., P.O. Box 2265, Iron Mountain, Mich. 49801.
ASEA Marine, Rep. in U.S.A. by Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134
A G. Weser, Seebeckwerft, 2850 Bremerhaven 1, Germany

DIESEL ENGINES
Bruce GM Diesel, Inc., 180 Route #17 S. at Interstate 80, Lodi, N.J. 07644
Caterpillar Tractor Co., Industrial Div., 100 N.E. Adams St., Peoria, Ill. 61602
Colt Industries Inc., Power Systems Div., Beloit, Wisc. 53511
De Laval Turbine Inc., Engine & Compressor Div., 550 85th Ave., Oakland, Calif. 94621
Electro-Motive Division General Motors, La Grange, Illinois 60525
M.A.N. Maschinenfabrik Augsburg-Nurnberg AG, Werk Augsburg, West Germany.
H.O. Penn Machinery Co., Inc., 1561 Stewart Ave., Westbury, N.Y. 11590
Waukesha Motor Co., 1000 W. St. Paul Ave., Waukesha, Wis. 53186

DIESEL ENGINE MUFFLERS
Marine Products & Engrg. Co., 20 Vesey St., New York, N.Y. 10007

DOCK BUILDERS
GHH Sterkrade Ferrostaal Overseas Corp., 17 Battery Place, New York, N.Y. 10004

DOORS—Watertight—Bulkhead
Overbeke-Kain Co., 20905 Aurora Rd., Cleveland, Ohio 44146
Walz & Krenzer, Inc., 20 Vesey St., New York, N.Y. 10007

ELECTRICAL EQUIPMENT
AMP Special Industries, P.O. Box 1776, Paoli, Pa. 19301
Arnessen Electric Co., Inc., 335 Bond St., Brooklyn, N.Y.
Brown and Ross of New Jersey Incorporated, 370 Paterson Plank Road, Carlstadt, N.J. 07072
Galbraith-Pilot Marine Corp., 166 National Rd., Edison, N.J. 08817
Harvard Murlin Div., P.O. Box 302, Quakertown, Pa. 18951
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Oceanic Electrical Mfg. Co., Inc., 159 Perry Street, N.Y. 10014

EVAPORATORS
Bethlehem Steel Corp., Shipbuilding, 25 B'way, N.Y., N.Y. 10004
Riley-Beaird, Inc., Maxim Evaporator Profit Center, P.O. Box 1115, Shreveport, Louisiana 71130

FAIRLEADS
Appleton Machine Co., P.O. Box 2265, Iron Mountain, Mich. 49801.

FENDERING SYSTEMS—Dock & Vessel
BJ Marine Products, subsidiary of Borg-Warner, P.O. Box 2709, Terminal Annex, Los Angeles, Calif. 90054
Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004

FITTINGS & HARDWARE
AMP Special Industries, P.O. Box 1776, Paoli, Pa. 19301
Robvon Backing Ring Co., 675 Garden St., Elizabeth, N.J. 07207

GAS ALARM SYSTEMS
Lisnave, P.O. Box 2138, Lisboa 3, Portugal
Riken Keiki Fine Instrument Co., Ltd., 2-7-6 Azusawa Itobashi-ku, Tokyo, Japan

HATCH COVERS
MacGregor-Comarain, Inc., 135 Dermody St., Cranford, Md. 07016

HEATERS & COOLERS
Way-Wolff Associates, Inc., 45-10 Vernon Blvd., Long Island City, N.Y. 11101

HULL INSPECTION SYSTEMS
Hydro Products (A Dillingham Co.), P.O. Box 2528, San Diego, Calif. 92112

INSULATION—Marine
Bailey Carpenter & Insulation Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

LIGHTS—Emergency, Search & Navigation
Snelson Oilfield Lighting Co., P.O. Box 1284, Fort Worth, Texas 76101

LNG SHIP DESIGN AND LICENSING
PDM/GAZ Transport, 919 Third Ave., New York, N.Y. 10022

LNG TANKAGE
Gazocean U.S.A. Inc., 125 High St., Boston, Mass. 02110
LGA—Liquid Gas Anlagen Union GmbH, c/o Ferrostaal Overseas Corp., 17 Battery Place, New York, N.Y. 10004
Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa. 15225

LININGS
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144

MARINE BLOCKS & RIGGING
Crosby Group, Box 3128, Tulsa, Okla. 74101

MARINE DRIVES—GEARS
Hoffert-Lowe, Inc., 108 Ridge Road, North Arlington, N.J. 07032
Philadelphia Gear Corp., Schuylkill Expressway, King of Prussia, Pa. 19406

MARINE EQUIPMENT
Comet Marine Supply Corp., 157 Perry St., New York, N.Y. 10014
Homelite Corporation, 70 Riverdale Ave., Port Chester, N.Y. 10573
ITT Henze Service, P.O. Box 1745, Mobile, Ala. 36610
Kearfott Marine Products, 780 South 3rd Ave., Mt. Vernon, N.Y. 10550
Nicolai Joffe Corp., P.O. Box 2445, 445 Littlefield Ave., So. San Francisco, Calif. 94080
Merrin Electric, 162 Chambers St., New York, N.Y. 10007
Stow Mfg. Co., 225 Sheer St., Binghamton, N.Y. 13902
Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wis. 53186

MARINE FURNITURE
Bailey Joiner Co., 115 King Street, Brooklyn, N.Y. 11231

MARINE INSURANCE
Adams & Porter, 1819 St. James Place, Houston, Texas 77027
Midland Insurance Co., One State St. Plaza, New York, N.Y. 10004
R.B. Jones Corp., 301 West 11th St., Kansas City, Mo. 64105
UK P&I Club (Bermuda): Thos. R. Miller & Son, Mercury House, Front St., Hamilton, Bermuda (P.O. Box 665)

MARINE PROPULSION
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Ark. 72204
Murray & Tregurtha, Inc., 2 Hancock St., Quincy, Mass. 02171
Port Electric Turbine Div., 155-157 Perry St., New York, N.Y. 10014
Stal-Laval, Inc., 400 Executive Blvd., Elmsford, N.Y. 10523
Turbo Power & Marine Systems, Subsidiary of United Aircraft Corp., 1690 New Britain Ave., Farmington, Conn. 06032

MARINE SURVEYORS
McClain Marine Service, 2 Hazel Place, Hazlet, N.J. 07730
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Fla. 33316

MARITIME FINANCING—Leasing
General Electric Credit Corp., 4 Corporate Drive, White Plains, N.Y. 10604
Qualpeco Services, Inc., 750 Third Ave., New York, N.Y. 10017
Rhode Island Hospital Trust National Bank, 15 Westminster Street, Providence, R.I. 02903

NAVAL ARCHITECTS AND MARINE ENGINEERS
American Standards Testing Bureau, Inc., 40 Water Street, New York, N.Y. 10004
J. L. Bludworth, 4030 Wynne St., Houston, Texas
Breit Engrg. Inc., 441 Gravier St., New Orleans, La. 70130
James G. Bronson Associates, 166 Altamont Ave., Tarrytown, N.Y. 10591
Childs Engineering Corp., Box 333, Medfield, Mass. 02052
Coast Engineering Co., 711 W. 21st St., Norfolk, Va. 23517
Crandall Dry Dock Engrs., Inc., 238 Main St., Cambridge, Mass. 02142
Francis B. Crocco, Inc., Box 1411, San Juan, Puerto Rico
C.R. Cushing & Co., Inc., One World Trade Center, New York, N.Y. 10048
Arthur D. Darden, Inc., 1040 International Trade Mart, New Orleans, La. 70130
Design Associates, Inc., 3308 Tulane Ave., New Orleans, La. 70119
Designers & Planners, Inc., 114 Fifth Ave., New York, N.Y. 10011
M. Mack Earle, 103 Mellor Ave., Baltimore, Md. 21228
Parker C. Emerson & Associates, 17935 Cardinal Drive, Lake Oswego, Oregon 97034
Christopher J. Foster, 14 Vanderventer Ave., Port Washington, N.Y. 11050
Friede and Goldman, Inc., 225 Baronne St., New Orleans, La. 70112
Gibbs & Cox, Inc., 40 Rector Street, New York, N.Y. 10006
John W. Gilbert Associates, Inc., 58 Commercial Wharf, Boston, Mass. 02110
Morris Guralnick, Associates, Inc., 583 Market St., San Francisco, Calif. 94105
J. J. Henry Co., Inc., 90 West St., New York, 10006
Hydranautics, 6338 Lindmar Dr., P.O. Box 1068, Goleta, Calif. 93017
C.T. Ilariucci & Associates, Tourism Pier #3, San Juan, P.R. 00902
Jantzen Engineering Co., 15 Charles Plaza, Baltimore, Md. 21201
James S. Krogen, 2500 S. Dixie Hwy., Miami, Fla. 33133
Littleton Research and Engrg. Corp., 95 Russell St., Littleton, Mass. 01460
Robert H. Macy, P.O. Box 758, Pascagoula, Miss. 39567
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 1180 Ave. of Americas, N.Y., N.Y. 10036
Marine Design Associates, P.O. Box 2674, Palm Beach, Florida
Rudolph F. Matzer & Associates, Inc., 13891 Atlantic Blvd., Jacksonville, Fla. 32225
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metritape, Inc., 77 Commonwealth Ave., West Concord, Mass. 01742
Robert Moore Corp., 350 Main St., Port Washington, N.Y. 11050
Nickum & Spaulding Associates, Inc., 71 Columbia St., Seattle, Wash. 98104
Ocean-Oil International Engrg. Corp., P.O. Box 6173, New Orleans, La. 70114
Pearlson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 8-D So. New River Drive East, Ft. Lauderdale, Fla. 33301
Potter & McArthur, Inc., 253 Northern Ave., Boston, Mass.
M. Rosenblatt & Son, Inc., 350 Broadway, New York, N.Y. 10013 and 657 Mission St., San Francisco, Calif.
George G. Sharp, Inc., 100 Church St., New York, N.Y. 10007
T. W. Spaetgens, 156 West 8th Ave., Vancouver 10, Canada
R. A. Stearn, Inc., 100 Iowa St., Sturgeon Bay, Wisc. 54235
Richard R. Taubler, 50 Court St., Brooklyn, N.Y. 11201
H. M. Tiedemann & Co., Inc., 74 Trinity Pl., New York, N.Y. 10006
Trident Studio, Box 670, Spring House, Pa. 19477
Whitman, Requardt & Associates, 1304 St. Paul St., Baltimore, Md. 21202
Yankee Shipwrights, P.O. Box 35251, Minneapolis, Minn. 55435

NAVIGATION & COMMUNICATIONS EQUIPMENT
American Hydromath Co., 55 Brixton Rd., Garden City, N.Y. 11530
Communication Associates, Inc., 200 McKay Road, Huntington Station, N.Y. 11746
Edo Corporation, 13-10 111th Street, College Point, N.Y. 11356
Edo Western Corporation, 2645 South 2nd West, Salt Lake City, Utah 84115
Electro-Nav, Inc., 501 Fifth Ave., New York, N.Y. 10017
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
ITT Decca Marine, Inc., 386 Park Ave. South, New York, N.Y. 10016

ITT Mackay Marine, 2912 Wake Forest Road, Raleigh, N.C. 27611
Lorain Electronics Corp., 2307 Leavitt Road, Lorain, Ohio 44052
Magnavox Navigation Systems, 2829 Maricopa St., Torrance, Cal. 90503
Raytheon Co., Submarine Signal Div., P.O. Box 360, Portsmouth, R.I. 02871
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.
Standard Communications Corp., 639 N. Marine Ave., Wilmington, Calif. 90744
Teledyne Hastings Raydist, P.O. Box 1275, Hampton, Va. 23361
Tracor, Inc., 6500 Tracor Lane, Austin, Texas 78721
The Waterways Co., 3512 Metairie Hts. Rd., New Orleans, La. 70002

OILS—Marine—Additives
Exxon Company, U.S.A., P.O. Box 2180, Houston, Texas 77001
Exxon International Company, 1251 Avenue of the Americas, New York, N.Y. 10020
Gulf Oil Trading Co., 1290 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002

PAINT—Marine—Protective Coatings
Ameron Corrosion Control Div., Brea, Calif. 92621
Carboline Co., 350 Hanley Industrial Court, St. Louis, Mo. 63144
International Paint Co., 21 West St., New York, N.Y. 10006
Patterson-Sargent, P.O. Box 494, New Brunswick, N. J.
Transocean Marine Paint Association, P.O. Box 456, Delftseplain 37, Rotterdam, Holland

PETROLEUM SUPPLIES
Independent Petroleum Supply Co., 1345 Ave. of Americas, New York, N.Y. 10019
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
The West Indies Oil Co., Ltd., St. John's, Antigua, W. I.

PIPE—Cargo Oil
Kubota, Ltd., 22, Funade-cho 2-chome, Naniwa-Ku, Osaka, Japan

PLASTICS—Marine Applications
Ameron Corrosion Control Div., Brea, Calif. 92621
Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231
Philadelphia Resins Co., 20 Commerce Dr., Montgomeryville, Pa. 18936

PORTS
Port of Galveston, P.O. Box 328, Galveston, Texas
Jacksonville Port Authority, 2701 Tallyrand Ave., Jacksonville, Fla.

PROPELLERS: NEW AND RECONDITIONED
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Coolidge Propellers, 1601 Fairview Ave. East, Seattle, Wash. 98102
Escher Wyss Gmbh, P.O. Box 798, Ravensburg, Germany
Federal Propellers, 1501 Buchanan Ave. S.W., Grand Rapids, Mich. 49502

PUMPS
Colt Industries, Inc., Fairbanks Morse Pump & Electric Div., 3601 Kansas Ave., Kansas City, Kansas 66110
Delaval Turbine Inc., IMO Pump Division, P.O. Box 321, Trenton, N.J. 08602
Houttuin-Pompen N. V. Sophialaan 4, Utrecht, Holland
Jacuzzi Bros., Inc., 11511 New Benton Highway, Little Rock, Arkansas 72204

REFRIGERATION—Refrigerant Valves
Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

REGENERATORS—Fuel Savings
Harrison Radiator Division, General Motors Corp., 200 Upper Mt. Road, Lockport, New York 14094

ROPE—Manila—Nylon—Hawsers—Wire
American Mfg. Co., Inc., Noble & West Sts., Brooklyn, N.Y. 11222
Atlantic Cordage & Supply Corp., 60 Grant Ave., Carteret, N.J. 07008
Du Pont Co., Room 31H1, Wilmington, Delaware 19898
Jackson Rope Corp., 9th & Oley, Reading, Pa. 19604
Wall Rope Works, Inc., Beverly, N. J. 08010

RUDDER ANGLE INDICATORS
Galbraith-Pilot Marine Corp., 600 Fourth Ave., Brooklyn, N.Y. 11215
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Hose McCann Telephone Co., Inc., 524 W. 23rd St., N.Y. 10011
Sperry Marine Systems Div., Charlottesville, Va., 22901, Division of Sperry Rand Corp.

SANDBLASTING EQUIPMENT
Pauli & Griffin Co., 826 Folsom St., San Francisco, Calif. 94107

SCAFFOLD BOARDS
Howmet Corporaton, Southern Extrusions Division, P.O. Box 40, Magnolia, Arkansas 71753

SEWAGE DISPOSAL
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Jered Industries, Inc., 1300 S. Coolidge Rd., Birmingham, Mich. 48008
Koehler-Dayton, Inc., P.O. Box 309, New Britain, Conn. 06050

SHAFT REVOLUTION INDICATOR EQUIP.
Henschel Corp., 14 Cedar St., Amesbury, Mass. 01913
Ultra Products, Inc., 805 Central Ave., New Orleans, La. 70121

SHIPBOARD VENTILATION
Coppus Engineering Corp., P.O. Box 457, Worcester, Mass. 01613
TANK S.A.P.P. Inc., 330 Madison Avenue, New York, N.Y. 10017 and 1020 Springfield Avenue, Mountainside, N.J. 07092

SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
National Metal & Steel Corp., 1251 New Dock St., Terminal Island, Cal. 90731
Zidell Explorations, Inc., 3121 S. W. Moody St., Portland, Ore. 97201

SHIP BROKERS
Agemar, P.O. Box 1465, Maracaibo, Venezuela
Hughes Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
Mowbray's Tug and Barge Sales Corp., 21 West St., N.Y., N.Y. 10006
Oaksmith Boat Sales, Inc., Fisherman's Terminal, Seattle, Wash. 98119

SHIPBUILDING STEEL
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., 25 Broadway, New York, N.Y. 10004
Huntington Alloy Products, Div. International Nickel Co., Inc., Huntington, W. Va. 25720
International Nickel Co., 1 New York Plaza, New York, N.Y. 10004
United States Steel Corp., P.O. Box 86, Pittsburgh, Pa. 15230

SHIPBUILDING—Repairs, Maintenance, Drydocking
Albina Engine & Machine Works, 2100 N. Albina Ave., Portland, Oregon 97208
Astilleros Espanoles, S.A. Zurbano, 70, Madrid 10, Spain
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans La. 70150
Beliard, Crighton & Cie, P.O. Box 2074, Route des Docks, 59, Dunkirk, France
Beliard Murdoch S. A., Kattendijkdok Westkaai 21, Antwerp, Belgium
Bell Aerospace Company, Div. of Textron, P.O. Box 1, Buffalo, N.Y. 14240
Bethlehem Steel Corp., Shipbuilding, 25 Broadway, N.Y., N.Y. 10004
Bludworth Shipyard, Inc., Box 5426, Cypress St., Brady Island, Houston, Texas 77012
Carrington Slipways Pty. Ltd., Tomago, N.S.W. 2322, Australia
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock, Inc., P.O. Box 153, Willemstad, Curacao, N.A.
Dillingham Shipyard, Pier 41, P.O. Box 3288, Honolulu, Hawaii 96801
Dravo Corporation, Neville Island, Pittsburgh 25, Pa.
Empresa Nacional Bazon, 65 Castellana, Madrid 1, Spain
Equipment Systems, Inc., A Microdot Co., P.O. Box 95, Port Deposit, Md. 21904
Equitable Equipment Co., Inc., P.O. Box 8001, New Orleans, La. 70122
General Dynamics, Electric Boat Division, 99M Eastern Point Road, Groton, Conn. 06340
General Dynamics, Quincy Division, Quincy, Mass. 02169
Halter Marine Services, Inc., Route 6, Box 287H, New Orleans, La. 70126
Havre de Grace, Havre de Grace, Md.
Hillman Barge & Construction Co., Grant Bldg., Pittsburgh 19, Pa.
Hongkong United Dockyards Ltd., Kowloon Docks, Hong Kong
Jeffboat, Inc., Jeffersonville, Ind. 47130
Kawasaki Dockyard Co., 8 Kaigan-dori, Ikuta-ku, Kobe, Japan
Kelso Marine, Inc., P.O. Box 268, Galveston, Texas 77550
Keppel Shipyard (Private) Ltd., P.O. Box 2169, Singapore
Kockums Mekaniska Verkstads AB, Malmo 1, Sweden
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
Marathon Manufacturing Company
Marathon LeTourneau Offshore Company, 1700 Marathon Building, 600 Jefferson, Houston, Texas 77002
Marathon LeTourneau Gulf Marine Division, P.O. Box 3189, Brownsville, Texas 78520
Marathon LeTourneau Marine Division, LeTourneau Rural Station, Vicksburg, Mississippi 39180
Marathon LeTourneau Offshore Pte., Ltd., P.O. Box 83, Taman Jurong Post Office, Singapore 22, Singapore
Marathon Shipbuilding Company, P.O. Box 870, Vicksburg, Miss. 39180
Marathon Shipbuilding Company (U.K.) Ltd., Clydebank Bunbartonshire, G81-1YB, Scotland
Marine & Rail Equipment Division/FMC Corp., 4700 N.W. Front Ave., Portland, Oregon 97208
Matton Shipyard Co., Inc., P.O. Box 428, Cohoes, New York 12047
Mercantile Marine Engineering & Graving Docks Co., N.V., Antwerp, Belgium
Mitsui Shipbuilding & Engrg. Co. Ltd., 6-4, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan
Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
National Steel & Shipbuilding Corp., San Diego, Calif. 92112
Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Newport Ship Yard, Inc., 379 Thames St., Newport, R.I. 02840.
Northwest Marine Iron Works., P.O. Box 3109, Swan Island, Portland, Oregon 97208
Odense Steel Shipyard Ltd., P.O. Box 176, DK-5100 Odense, Denmark
Paceco, Div. Fruehauf Corp., 2350 Blanding Ave., Alameda, Calif. 94501
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, Fla. 33156
Perth Amboy Dry Dock Co., Perth Amboy, N.J. 08862
St. Louis Shipbuilding—Federal Barge, Inc., 611 East Marceau, St. Louis, Mo. 63111
Sasebo Heavy Industries Co., Ltd., New Ohtemachi Bldg., Chiyoda-ku, Tokyo, Japan
Savannah Machine & Shipyard Co., P.O. Box 787, Savannah, Ga. 31402
Sembawang Shipyard (Pte) Ltd., P.O. Box 3, Sembawang, P.O. Singapore, 27
Service Machine & Shipbuilding Corp., Box 1578, Morgan City, La. 70380
Slocum Iron Works, Inc., P.O. Box 2506, 1752 Telegraph Road, Mobile, Ala. 36601
Sumitomo Shipbuilding & Machy. Co., Ltd. 2-1 Ohtemachi 2-chome, Chiyoda-ku, Tokyo, Japan
Todd Shipyards Corp., 1 State St. Plaza, New York, N.Y. 10004
Tracor/Mas, Inc., P.O. Box 13107, Port Everglades, Fla. 33316
Vancouver Shipyards Co., Ltd., 50 Pemberton Ave., North Vancouver, B. C., Canada

SHIP MODEL BASIN
Hydronautics, Incorporated, Laurel, Maryland 20810

SHIP STABILIZERS
Jered Industries, Inc., 1300 S. Coolidge Rd., Birmingham, Mich. 48008
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
Sperry Marine Systems Div., Charlottesville, Va. 22901, Division of Sperry Rand Corp.

STEAM GENERATING EQUIPMENT
Babcock & Wilcox Co., 161 East 42nd Street, New York, N.Y. 10017
Combustion Engineering, Inc., Windsor, Connecticut 06095

STEERING SYSTEMS
Wm. E. Hough Co., 1125 P N.W. 45th St.. Seattle, Wash. 98107

SWITCHBOARDS
Hose McCann Telephone Co., Inc., 524 West 23 St., N.Y., N.Y. 10011

TOWING—Vessel Chartering, Lighterage, Salvage, etc.
Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
Henry Gillen's Sons Lighterage, West End Ave., Oyster Bay, N.Y. 11771
James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
McDonough Marine Service, P.O. Box 26206, New Orleans, La.
Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 5335, New York, N.Y. 10048
Puerto Rico Lighterage Co., P.O. Box 1072, San Juan, P.R. 00902
State Boat Corporation, 3701 Kirby Drive, Houston, Texas 77006
Suderman & Young Towing Co., 329 World Trade Center, Houston, Texas 77002
Turecamo Coastal and Harbor Towing Corp., 1752 Shore Parkway, Brooklyn, N.Y. 11214

VALVES AND FITTINGS—Hydraulic—Safety Flanges
Dover Corp. / Norris Division, P.O. Box 1739, Tulsa, Okla. 74101.
Fabri-Valve Co., 2100 N. Albina Ave., Portland, Oregon 97208
Hubeva Marine Plastics-Lining, 435 Hamilton Ave., Brooklyn, N.Y. 11231
Marine Moisture Control Co., 449 Sheridan Blvd., Inwood, N.Y. 11696
Mechanical Marine Co., 900 Fairmount Ave., Elizabeth, N.J. 07027

WIRE ROPE
Armco Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Bethlehem, Pa. 18016

ZINC
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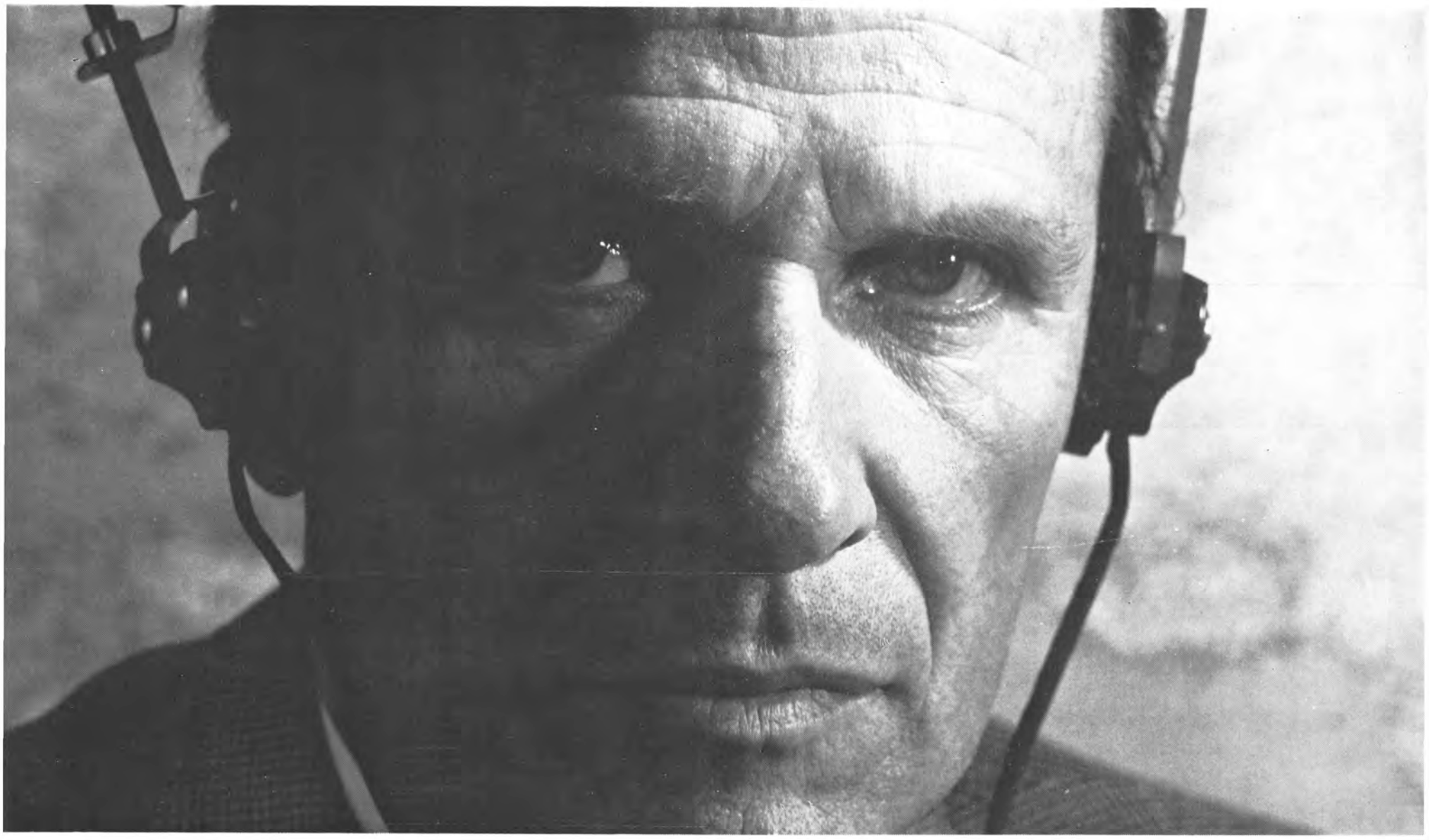

680 experts work for the Diesel service departments of the Augsburg and Hamburg Works of M.A.N. alone. Added to these there are service stations with M.A.N.-trained staff in 34 major ports.
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