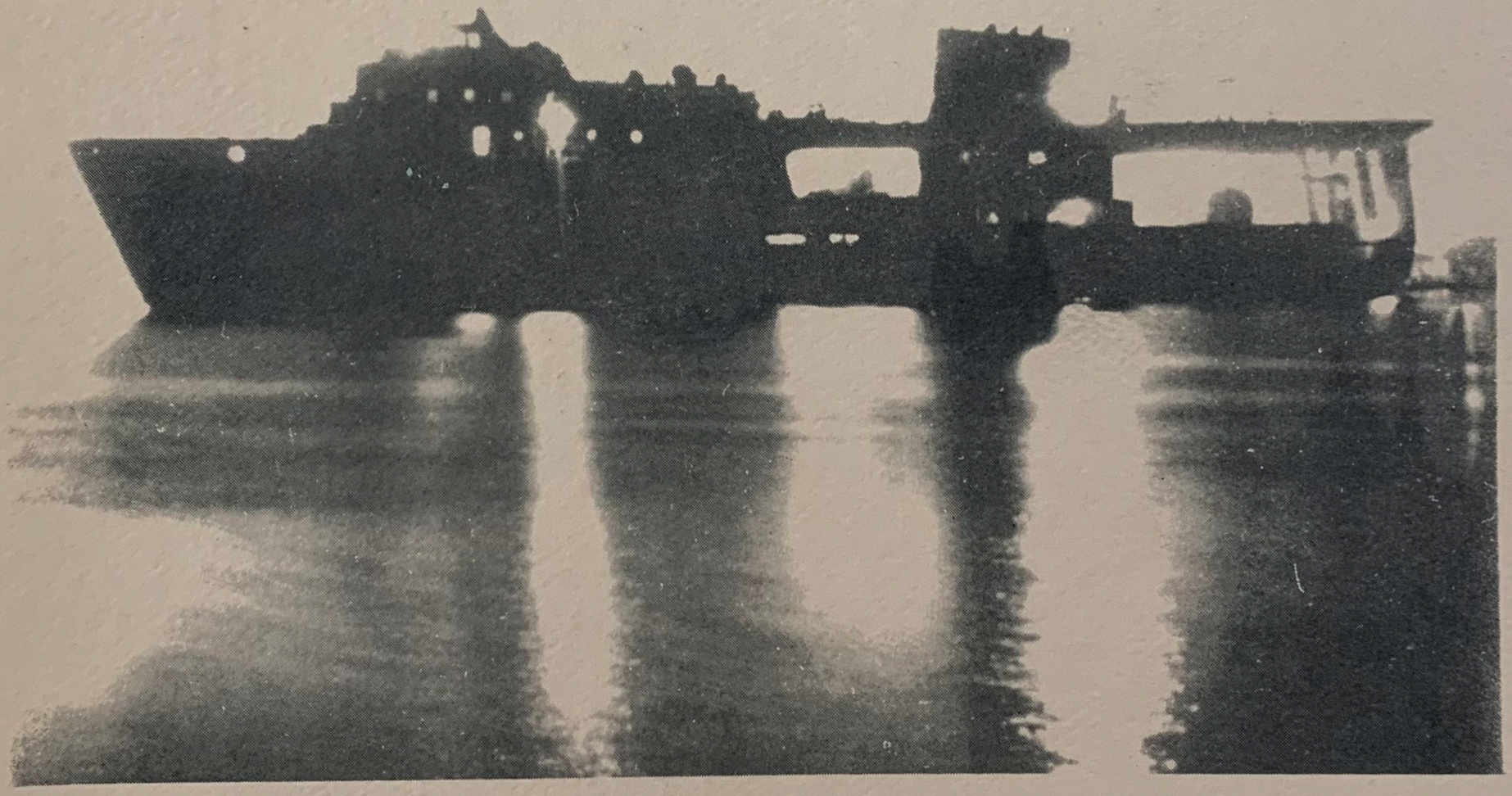
HISTORY

OF SHELL OFFSHORE SEISMIC OPERATIONS

IN THE UNITED STATES



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Shell Oil Company

December 1986

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CHAPTER 5
1983 to 1985: Shell's Modern Seismic Vessel, Shell America

In the early 1980's, Shell management became aware that its seismic vessels built in the mid 1960's were getting old *(Phaedra* and *Niobe).* The company also gained some new ideas about the next generation of geophysical vessels while using the *GECO Beta,* a Norwegian ship under contract for several years.

As a result, Shell planned and built one of the largest, most-advanced seismic ships anywhere in the world, the Shell America. She was launched in 1983.

The new vessel is the flagship of the Shell fleet, using the latest technology and advancing the science of seismology still further. The company continues to use leased vessels.

This chapter is about how the ship was built and how it operates.

Planning and Building of Shell America

In February 1981, a number of people throughout the company met in committees to determine what kind of vessel would meet geophysical needs for the next ten years or more. A design proposal was developed and submitted in June 1981 by staff from Shell Offshore, Inc., Westhollow and Bellaire Research Centers, Head Office Field Engineering, and Head Office Geophysics.

As plans were developed, concepts changed. Originally, a smaller vessel was envisioned, but the planners realized that the ship needed to be larger and fast enough to move quickly from the Gulf of Mexico to the Bering Sea off Alaska or the North Atlantic and from one regional survey area to another. Greater size was needed to carry more and larger airgun arrays and compressors.

The resulting ship is 300 feet long. Table 2 lists her specifications, including speed, crew accommodations, and ship equipment. (Seismic equipment is discussed later in this chapter.)

In 1983 Shell contracted with Marinette Marine of Marinette, Wisconsin, to build the ship--as yet unnamed.

Meanwhile, the company conducted a contest to select a name. Employees submitted 150 names, most from mythology in keeping with the names of earlier vessels such as the *Phaedra.* However, the judges liked *Shell America,* proposed by Lee Meitzler, a mate whose father also had been a Shell seaman. They liked a name that showed both Shell ownership and a patriotic theme.

To get ready for the launching, Shell worked closely with the U.S. Coast Guard to meet its regulations. Most of the crew members were transferred from other Shell ships and upgraded their licenses as necessary for running a larger ship.

Table 2

SPECIFICATIONS FOR SHELL AMERICA

Built by Marinette Marine, Marinette, Wisconsin Launched June 18, 1983
Delivered and accepted in Houston on November 20, 1983
Cost, $31 million (plus $14 million for seismic equipment)

300 feet long
59 feet across beam
28-foot molded depth
19-foot design draft

3414 gross tonnage
5340 long tons, full load displacement

16 knots cruising speed
7200 shaft horsepower

Crew and Crew Accommodations

2 complete crews, each working 14 days on and 14 days off
22-person marine crew (engineers, mates, and able-bodied seamen)
23-person seismic crew (processors, navigators, and shooters)
28 staterooms capable of housing 53 persons (each with private bath, telephone, radio, TV hookup, and thermostat)
Game-TV room
Reading room
Galley, from which 4 hot meals and snacks are served each day

Propulsion System

3 EMD 20-645E7B diesels, generating alternating current, which is converted to direct current by SCR equipment and fed to:
4 General Electric motors (1800 hp each, 2 per shaft), which drive Bird-Johnson controllable-pitch (CP) wheels through Philadelphia Gear reduction gears.
800 hp Bird-Johnson bowthruster, which, in combnation with 13-foot CP wheels aft, increases docking maneuverability.

Navigation System

Furuno FD-120 Automatic Direction Finder
Navidyne ESZ-4000 Sat/Nav (satellite navigation system)
Navidyne ESZ-7000 LORAN-C
Sperry CAS II collision avoidance system (24-mile range)
Furuno FE-881 depth sounder
2 Sperry SRD-301 Doppler speed logs
2 Sperry MK-29 gyrocompasses
2 Sperry radars (one X-band, one S-band)
2 Harris RF-230M SSB's
2 Sailor RT 144AC VHF's
Raytheon Rayfax 300 MK II weather facsimile

Steering System by Sperry

Machinery Monitoring System by Harbor Marine

In-port Equipment

Caterpillar D-398B-TA diesel, which drives:
General Electric 600 kw generator,
Caterpillar 3304T emergency diesel, which drives:
General Electric 90 kw generator.
HBL anchor windlass
3 Nautilus deck cranes

Emergency Equipment

General alarm system by Hose-McCann
2 lifeboats (74-person)
4 inflatable rafts (25-person)
Harding water-jet-propelled utility boat, which is readied for launch whenever a helicopter lands on the heliport.
Firefighting gear including CO_2 pumps

Just 18 months after the contract was signed and 13 months after the first steel was cut, Marinette Marine finished the ship--two months ahead of schedule. *Shell America* was christened at Marinette, Wisconsin on June 15, 1983, by Mrs. Peggy Flowers, wife of Mr. B. S. Flowers, President of Shell Offshore Inc. The first voyage was across the Great Lakes through the St. Lawrence Seaway and down the Atlantic coast to the Gulf of Mexico. She arrived in Houston in November and was outfitted with seismic instruments. Test runs were completed in April 1984. See Figures 51 and 52.

Shell America (Figure 53) worked in the Gulf of Mexico, preparing for upcoming Federal lease sales, until May 1985 when she left for Alaska's Bering Sea where still more lease sales were planned.

Shell America's Seismic Capabilities and Equipment

Some new and proprietary concepts are involved in the 10-ton orange floats which hold the airguns and in the airgun arrangement. These produce more seismic energy for deeper subsurface penetration and better reflection data are acquired. Westhollow Research Center did considerable work on the new system, including testing several model floats in a test tank, building prototypes to scale, and testing the prototypes in the Gulf of Mexico.

The ship can carry up to eight floats and deploy them quickly with a semi-computerized launching system suspended on an overhead track.

The recording and shooting systems have been improved to include three-dimensional recording capability. Recorded data can be processed onboard instantaneously by a Sperry Univac computer. The computer is compatible with others at Shell's Information Center in Houston and data not processed at sea can be sent to the center by satellite or by air (on magnetic tape) from the ship's heliport.

To ensure that ship noise causes minimal interference during data-gathering, the instrument room is acoustically and electronically isolated. Ship drive shafts have been meticulously balanced. Major equipment such as compressors and engines are shock mounted to reduce transfer of sound and vibration.

The better computer integrated navigational equipment onboard improves seismic operations. The computerized system coordinates ship course and speed by gyro compasses and Doppler Sonar and is updated with satellite data fixes, LORAN-C, RAYDIST, SYLEDIS and other radio systems. Video screens display the integrated navigation data to the navigators, the instrument room personnel, and the bridge personnel. This makes it easier for the boat to get on line and stay on line. The tail buoy radar system and cable compass readings keep accurate fixes on the cable position. Acoustic-type devices properly locate the airgun arrays.

Other elements of ship design aid seismic work. The diesel-electric propulsion system is the largest ever installed on a seismic vessel, which means that the ship can go where needed faster. The variable-pitch propellers provide greater maneuverability, and the "U-tube" stabilization system gives the smoothest ride possible. When the ship is operating at reduced speeds during data acquisition, the captain can divert current from the propulsion engines to drive the airgun compressors.

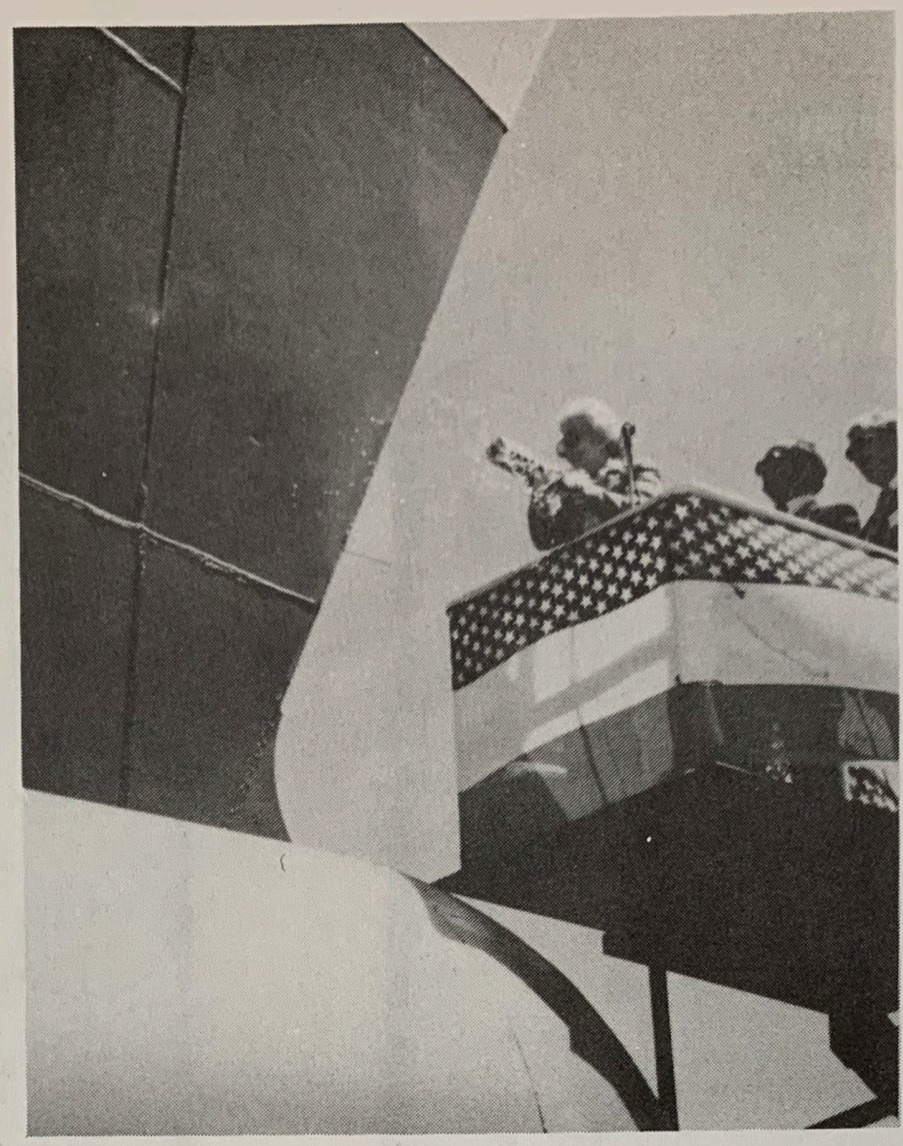

Figure 51: Mrs. B. S. Flowers christening the *Shell America.*

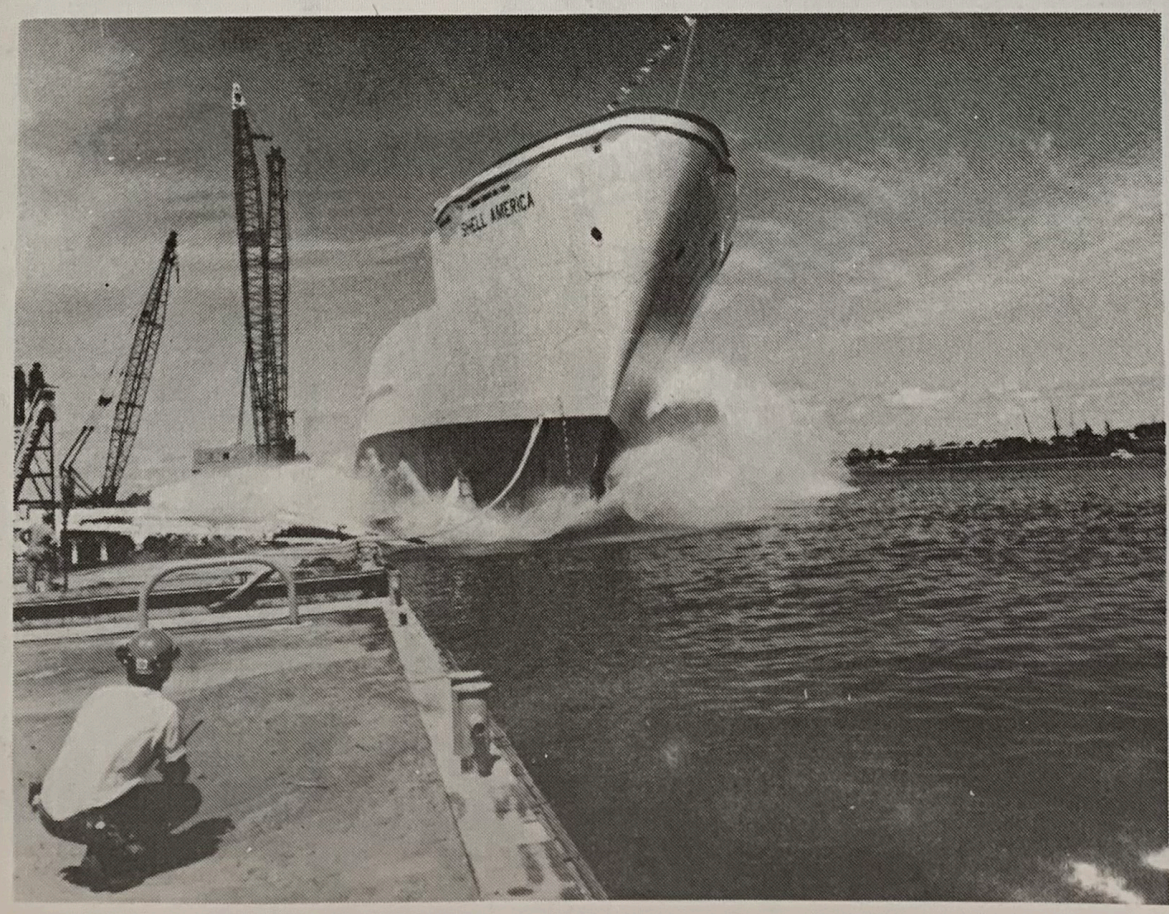

Figure 52: Launching the *Shell America.*

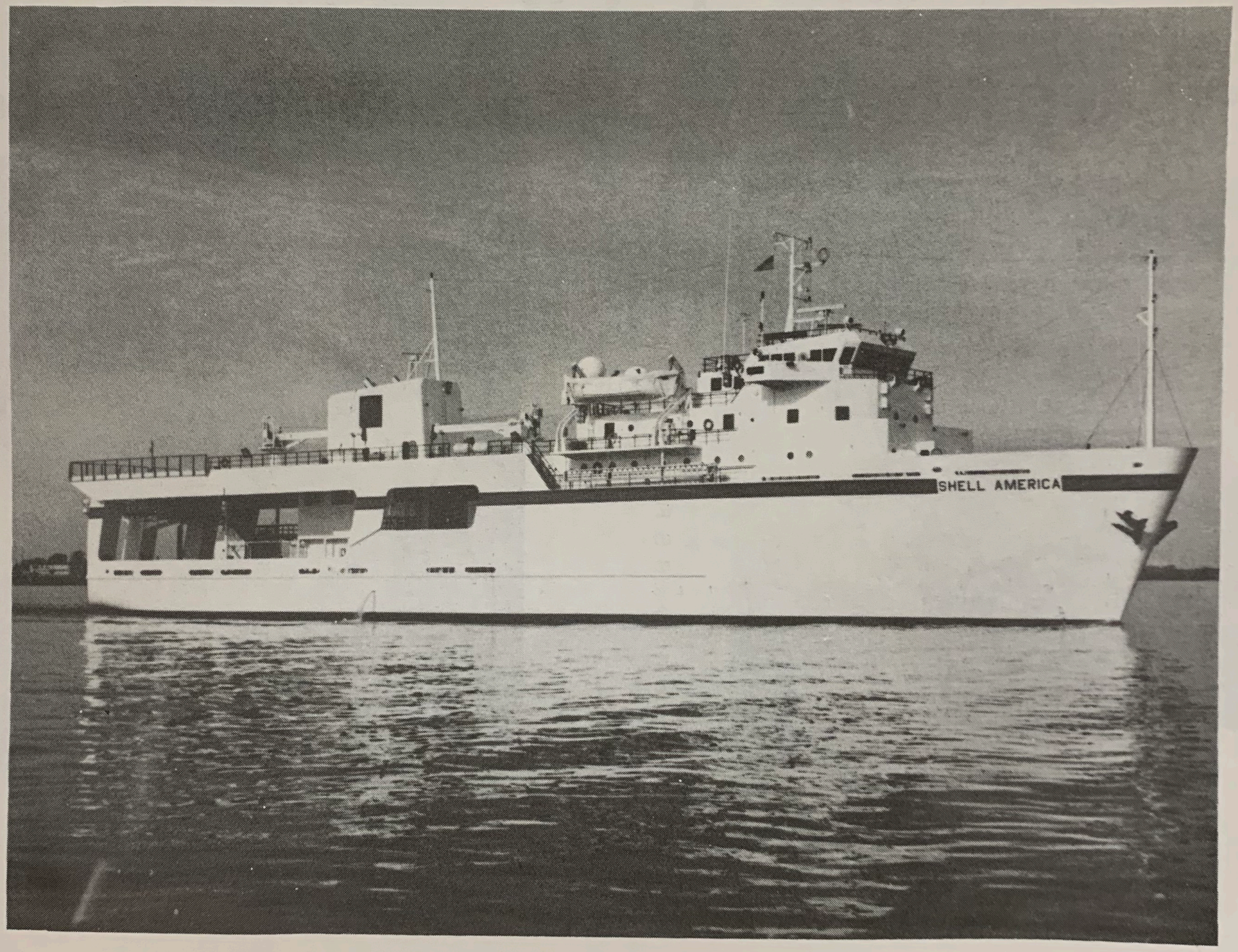

Figure 53: The *Shell America*.