

The Dawn of Offshore Drilling



220FT. SUBMERSIBLE DRILL BARGE

Honoring the *Mr. Charlie* Drilling Rig
An Historic Mechanical Engineering Landmark

Ceremony to be held March 17, 2012
at 111 First Street in Morgan City, Louisiana

Floating a Novel Idea

In the early 1950s, exploration and production activity along the U.S. Gulf Coast had yet to grow into its name as the Offshore Oil & Gas Industry. How could it? Drilling engineers and equipment and vessel designers were still trying to figure out how to drill in open water at depths greater than 15 to 20 feet. The accepted

technique for drilling in the coastal wetlands included the installation of a caisson structure at the drill site and then pumping out the water to establish a semi-dry rig floor. However these sites were not really transportable, taking weeks and sometimes months to bring into operation, and thus not an ideal solution for the wildcat nature of Gulf Coast exploration drilling.



Mr. Charlie at its final, permanent mooring in Morgan City, LA, 2011.

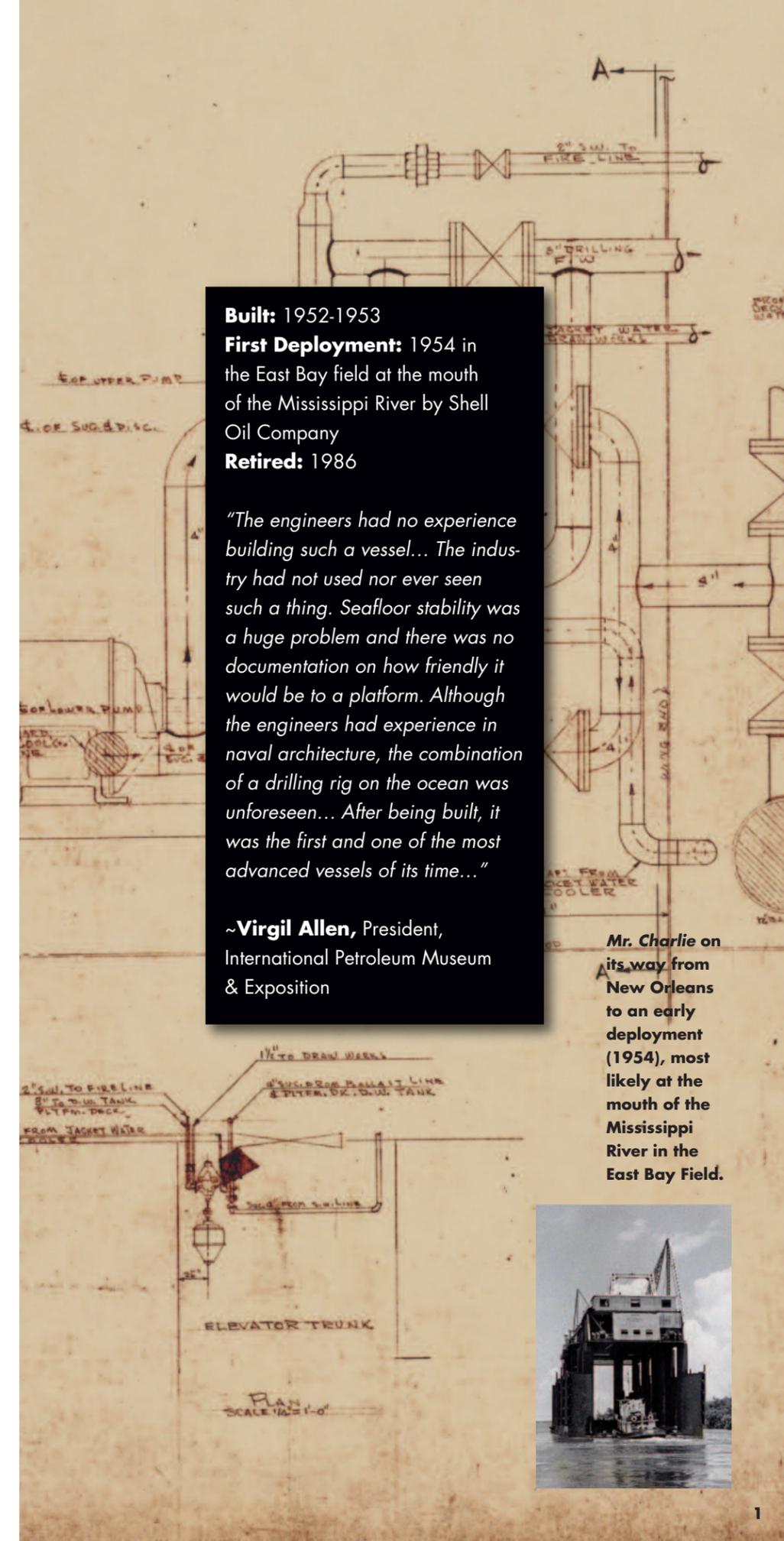
The Seed of a Dream

A young U.S. Navy engineer working at Kerr-McGee had an idea that a self-sufficient drilling rig could be installed on a transportable barge and floated to any location in water depths up to 40 feet. This daring concept could potentially open a whole new coastal zone to exploration, but Alden J. "Doc" Laborde's boss at Kerr-McGee thought that the notion of a submersible, refloatable, movable drilling rig needed proving out. So Kerr-McGee passed on the idea, as did all the major players in the oil and gas industry of that era.

So Doc Laborde did what came naturally to Gulf Coast oilmen. He went wildcatting for an investment and development partner, and eventually found sponsorship in Charles Murphy, the owner of a small independent oil company out of El Dorado, Arkansas. Murphy recognized the opportunity and not only invested the first \$500,000, but helped Doc put together a consortium of investors to raise the additional \$2 million needed to build the dream. Doc named the rig "Mr. Charlie" in honor of his benefactor.

Construction on *Mr. Charlie* began in early 1952 at the Alexander Shipyards in New Orleans and was completed in late 1953. Its trial deployment was in 1954 on the East Bay Field at the mouth of the Mississippi River for Shell Oil Company. The deal's terms were simple. If *Mr. Charlie* could do what Doc promised, Shell would hire the rig to explore the entire field. It did and the rest is history.

The plans for Mr. Charlie shown here are the ODECO original hand-drafted engineering plans for the historical rig and its equipment, dated August 1953.



Built: 1952-1953

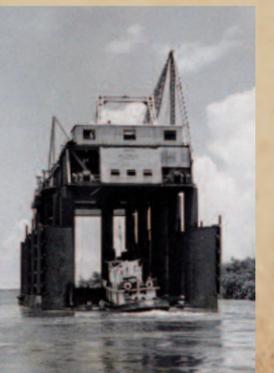
First Deployment: 1954 in the East Bay field at the mouth of the Mississippi River by Shell Oil Company

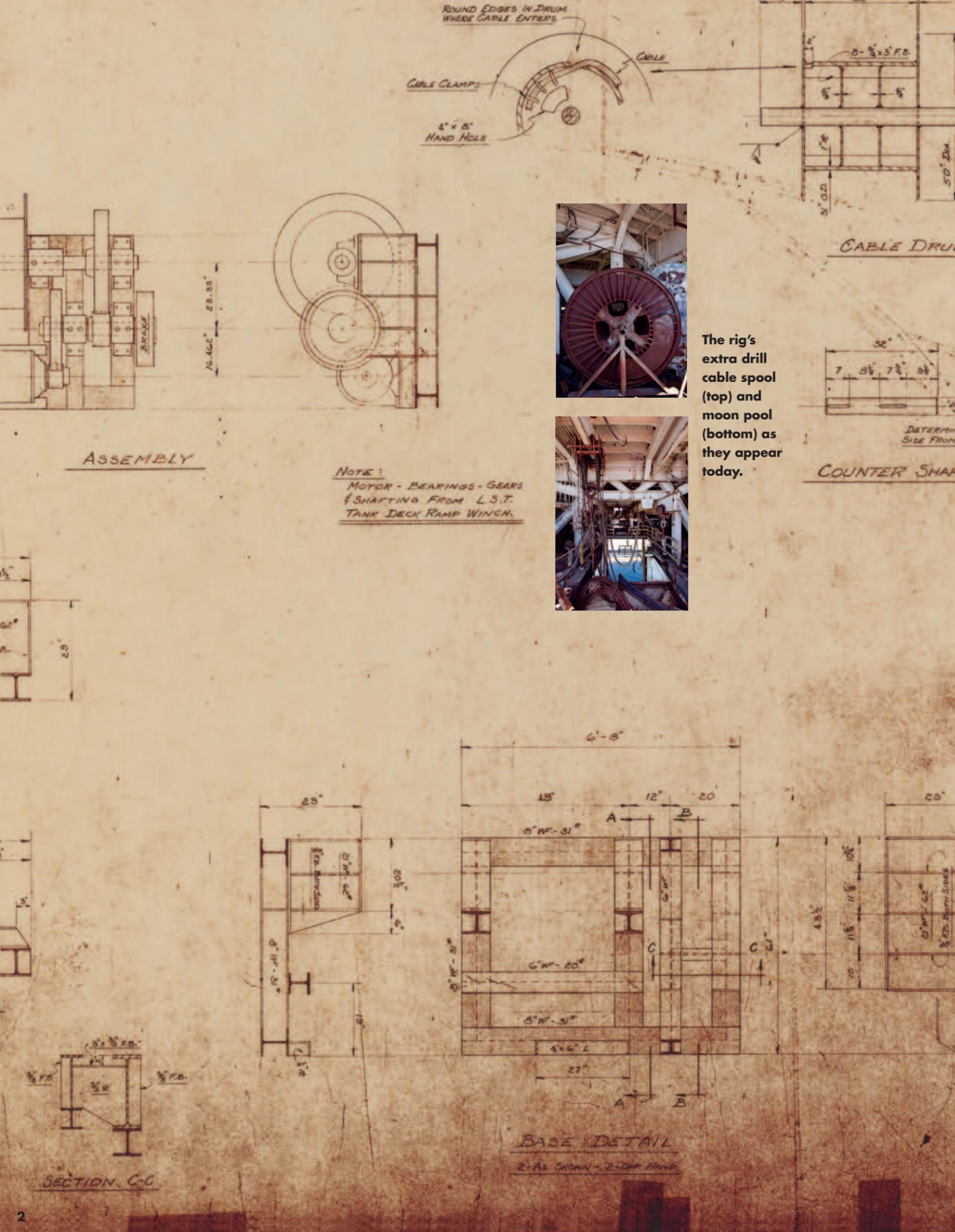
Retired: 1986

"The engineers had no experience building such a vessel... The industry had not used nor ever seen such a thing. Seafloor stability was a huge problem and there was no documentation on how friendly it would be to a platform. Although the engineers had experience in naval architecture, the combination of a drilling rig on the ocean was unforeseen... After being built, it was the first and one of the most advanced vessels of its time..."

~Virgil Allen, President, International Petroleum Museum & Exposition

Mr. Charlie on its way from New Orleans to an early deployment (1954), most likely at the mouth of the Mississippi River in the East Bay Field.





The rig's extra drill cable spool (top) and moon pool (bottom) as they appear today.



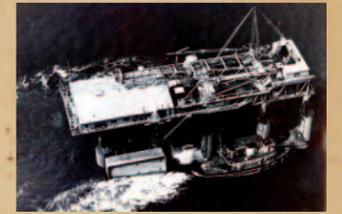
Achieving History

Mr. Charlie went on to drill hundreds of wells – more than a cumulative 2.3 million feet – up and down the Gulf Coast for Shell Oil as well as many other oil companies past and present. And Doc went on to found the Ocean Drilling and Exploration Company (ODECO), design and construct the world's first purpose-built semisubmersible rig, the *Ocean Driller* in 1964, and continued to achieve some of the industry's most notable "firsts" in the 1970s with the *Ocean Viking* (Phillips Petroleum) and *Ocean Victory* (Occidental Petroleum) semisubmersibles.

By the mid-1980s, offshore drilling activity had moved well past the 40-foot depth, leaving Mr. Charlie high and dry – effectively unemployed. But a preservation effort, led by Morgan City area oilmen and people who actually worked on or around Mr. Charlie, saved the rig from the scrap heap. Due to the diligence of the non-profit International Petroleum Museum & Exposition, Mr. Charlie, along with other industry artifacts, now serves as an industry resource and working training facility.

A Technological Touchstone

Mr. Charlie opened the gateway for the development of numerous mechanical engineering designs and technologies for offshore drilling and transportation. Its breakthrough design and construction pushed the limits of the industry into the subsea realm to face new challenges and even greater technological innovation. Its construction was so revolutionary and durable, of all the rigs and offshore vessels built in the Alexander Shipyards prior to 1966, Mr. Charlie is the only vessel that hasn't yet been scrapped.



Once Mr. Charlie was towed to the drill site, the pontoons were lowered and then the barge, pontoons and structural legs were flooded with seawater until negative buoyancy was achieved. Once the flat-bottomed hull settled on the seafloor, "making hole" began.



Two views of the rig's moon pool as it appears today.

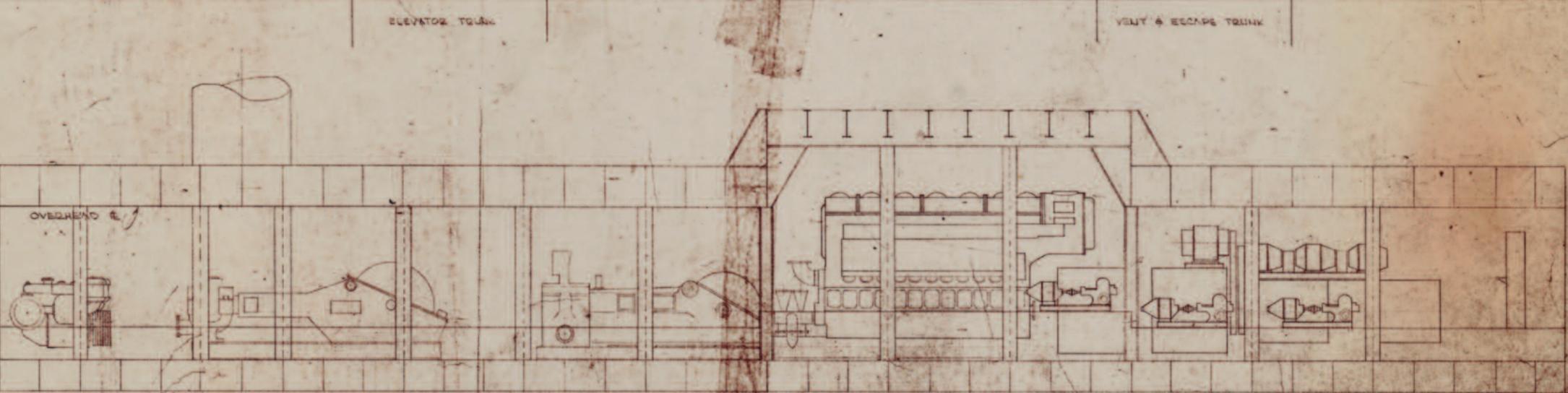
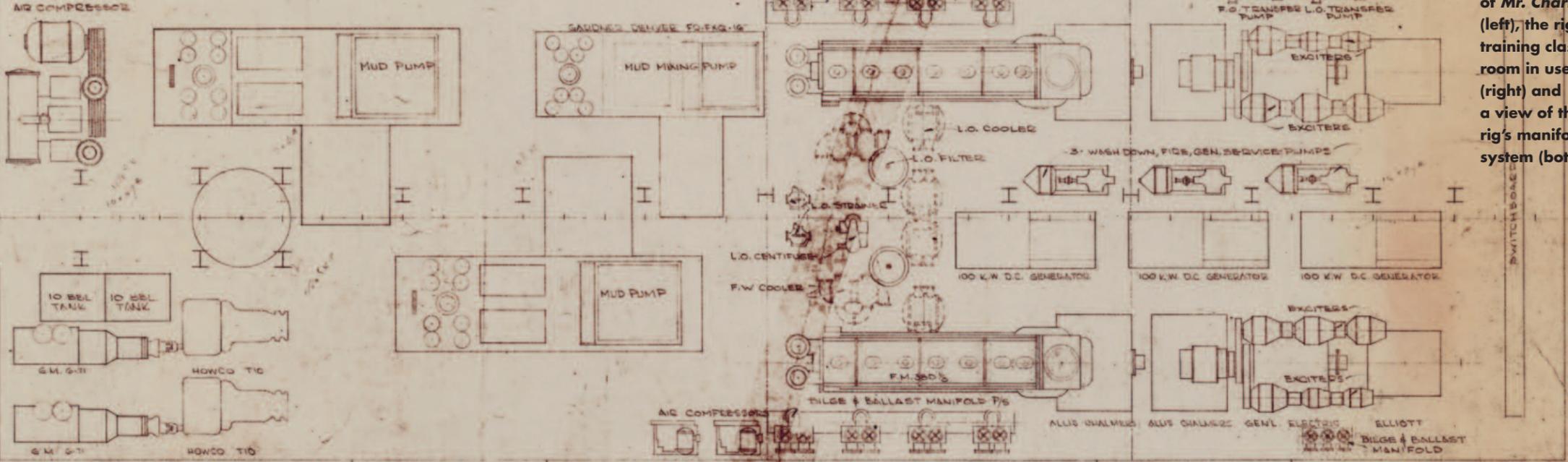
ODECO			
220' SUBMERSIBLE DRILL BARGE			
ALEXANDER SHIPYARD INC. NEW ORLEANS, LA.			
ANCHOR WINCH			
DATE: 1/20/67	ALT.	JOB NO P-2657	
DATE: 1/20/67	ISSUE DATE: 1/20/67	DWG NO / 29	
APPROVED:	ISSUE DATE: 1/20/67	DWG NO / 29	



Drilling rig equipment and machinery as it appears today on Mr. Charlie. From left to right: a pulley assembly, an array of valves and the blowout preventer controls.



The updated, working galley of Mr. Charlie (left), the rig's training classroom in use (right) and a view of the rig's manifold system (bottom).



From top to bottom: the drill derrick, the substructure of the rig floor and the heliport.



Drilling rig equipment and machinery as it appears today on Mr. Charlie. From left to right, the substructure

of the rig floor, a view of various fluid controls, the crane-hoist assembly and drilling mud system.



-ODECO-		
220' SUBMERSIBLE DRILL BARGE		
ALEXANDER SHIPYARD INC. NEW ORLEANS, LA.		
MACHINERY ARRANGEMENT		
SCALE: 1" = 1' FOOT	ALT.	JOB No 35036
DATE: AUG. 12, 1953	ISSUE DATE	DWG. No 3
DWG. BY: J. J. BROWNE	APP'D.	

The Meaning of the Landmark



Top: The current entrance to the Mr. Charlie rig museum.

Bottom: Mr. Charlie actively deployed with its pontoons submersed on the East Bay Field for Shell Oil (c. 1955).

The primary reason *Mr. Charlie* was selected as an ASME/ landmark* is the significance that offshore drilling has had on the evolution of the energy industry and its impact on today's society, not to mention the economic stability of the entire Gulf Coast region and other areas of offshore E&P activity around the world. Its extensive documented history and easy accessibility to the landmark and training facility by offshore workers, as well as the general public, also positions the world's first submersible drilling rig as a particularly inspiring engineering landmark.

About the Mr. Charlie Rig Museum

Mr. Charlie is moored in Morgan City, Louisiana, as a tribute to the pioneers of the offshore oil and gas industry. Today, the once transportable rig serves as a permanent monument to the industry's culture of initiative, perseverance, creativity and hard work – a living reminder of the positive contributions, technological innovations and advancements, and the worldwide influence of the Petroleum and Mechanical Engineering disciplines. The owners of the *Mr. Charlie* Rig Museum and the International Petroleum Museum and Exposition work to educate the general public on the significance of the oil and gas industry and its impact on local, state, national and global economies.

Through the museum's effort, the complexities and issues of the industry and life in the offshore oilfield become real. The story is told from the participants' perspectives, detailing and demonstrating the hardships and heroism, the problems and solutions, the challenges and achievements. Through the efforts of the International Petroleum Museum and Exposition, *Mr. Charlie* provides us with an accurate depiction of the history of the offshore oil business.

For more information on the history of *Mr. Charlie* and the offshore oil industry, please visit www.rigmuseum.com.

Birth of a Generation

Mr. Charlie is a transportable and self-sufficient Submersible Drilling Rig. With room to store drinking water, food and the necessary supplies, it provided quarters for 45 with an operational capacity of 58 crewmembers. At the time of its construction, it was one of the world's largest steel marine structures deployed by the offshore oil and gas industry.

Today, dwarfed by its 6th Generation semi-submersible and jackup drilling rig counterparts, *Mr. Charlie* seems small for the important role it played. The barge is approximately 220 feet long, 85 feet wide and 14 feet deep. Beneath the living quarters, pontoons extend its width to 136 feet and a four-foot skirt extends below its flat-bottom keel on both the port and starboard sides. The floor of the platform is 60 feet above the barge supported by legs that connect the two. These massive legs served as the conduit for such critical functions as electric, water and air lines, elevator access and other services needed to fully operate an independent facility.

All told, *Mr. Charlie* carried enough fuel and supplies to drill an offshore well, generate electricity, dispose waste, provide the necessary systems for "ship-to-shore" communications, as well as provide an offshore home to its crew. Last, but certainly not least, *Mr. Charlie* was fully equipped with an emergency firefighting system, blowout preventers and medical supplies.

Never before had such comprehensive capability and function been made available to the Gulf Coast's exploration and production industry in one purpose-built vessel.

* Coincidentally, as a tribute to *Mr. Charlie's* revolutionary (for its time) construction, the rig also received the Extraordinary Welding Achievement award as a "Historic Welded Structure" from the American Welding Society in 1995.

Original Owner: Ocean Drilling & Exploration Company (ODECO)
Cumulative Depth Drilled: 2.3 million+ feet
Water Depth: 40 feet
Length of Career: 32 years active deployment, 25 years moored as a training facility and rig museum
First Contract: Shell Oil Company
Designer: Alden "Doc" J. Laborde
Business Partner: John Hayward
Financier: Charles Murphy, Jr.
Construction: Alexander Shipyard, New Orleans



Vessel Specifications

Barge:
 Hull Length:220'
 Beam (with pontoons):134'
 Draft:14' with 1-6' fins

Slot:
 Length:38'
 Width:26'
 Center of Rotary:13' from back of slot

Platform Deck:
 Height of Deck above Bottom:63'

Quarters:
 Capacity:45 men

Heliport:
 Length:80'
 Width:60'
 Capacity:S-58

Operating Depth:
 Maximum (normal):0-40'
 Hurricane Season:0-32'
 Minimum:0-14'

Principal Equipment

Mast:
 Lee C. Moore jackknife - 140'
 Static Hook Load capacity – 760,000 lbs
 (1,035,000 GNC)

Drawworks:
 Continental Emsco EDES drive by two
 1,500 hp motors with Imagco 7838 dynamic
 brake and 1 3/8-inch drill line

Rotary:
 37 1/2 inches driven by 1,375 hp GE elec-
 tric motor

Traveling Equipment

Block:Brewster 500T
 Hook:Web Wilson 500T
 Crown:Lee C. Moore 7 sheave
 Swivel:Gardner Denver 550T
 Mud Pumps: Two Continental Emsco FB-
 1600 driven by 1,800 hp GE electric motor
 Mud Mix Pumps: Four Mission 6x8 cen-
 trifugal pumps
 Shale Shaker:Brandt dual high speed
 Desander:Pioneer S-3-12
 Desilter:Pioneer T-24-4E
 Degasser:Swaco
 Kelly Spinner:International A6
 Drill Pipe:10,000 5-inch OD, Grade E
 5,000 5-inch OD, Grade G
 Drill Collars:21 7 3/4-inch OD

Blowout Preventer (BOP):
 - One 13 5/8-inch, 5,000 psi WP single
 preventer
 - One 13 5/8-inch 5,000 psi WP double
 preventer
 - One 13 5/8-inch 5,000 psi Hydril

BOP Control System:
 Payne 160 gal accumulator with electric and
 air motor drives, one six-station control on
 drill floor and one four-station control at
 forward end of working deck

Diverter System:Two 6-inch lines

Choke Manifold:
 - 10,000 psi WP equipped for H₂S protec-
 tion with Swaco remote choke

Rig Power:
 - Two Fairbanks-Morse Model 38D 8-1/8
 opposed piston diesel engines each rated
 2,200 hp at 720 rpm, each driving one
 1,650 kw AC generator SCR control system
 - One 500 kw AC Auxiliary generator driven
 by a Cummins diesel engine

Storage Capacities

Bulk Mud:2,920 cubic feet
 Diesel Fuel:1,200 barrels
 Build Cement:3,150 cubic feet
 Potable Water:1,000 barrels
 Liquid Mud:974 barrels
 Drill Water:2,500 barrels
 Sack Material:3,000 sacks

In Acknowledgement

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 made these promotional materials possible:

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 - Adam Richmond, Colorado School of
 Mines
 - Kyle Richter, Texas A&M

- *The International Petroleum Museum
 & Exposition (a non-profit organization
 created by the men who worked on or
 around Mr. Charlie).*
 P.O. Box 1988, Morgan City, LA 70381
 985-384-3744 - phone
 985-384-3047 - fax

- *Pensar, LLC, Houston, TX*

The History and Heritage Program of ASME

Since the invention of the wheel, mechanical
 innovation has critically influenced the de-
 velopment of civilization and industry as
 well as public welfare, safety and comfort.
 Through its History and Heritage program,
 the American Society of Mechanical Engi-
 neers (ASME) encourages public under-
 standing of mechanical engineering, fosters
 the preservation of this heritage and helps
 engineers become more involved in all as-
 pects of history.

In 1971 ASME formed a History and Her-
 itage Committee composed of mechanical
 engineers and historians of technology. This
 Committee is charged with examining,
 recording and acknowledging mechanical
 engineering achievements of particular sig-
 nificance. For further information, please
 visit <http://www.asme.org>

Landmark Designations

There are many aspects of ASME's History
 and Heritage activities, one of which is the
 landmarks program. Since the History and
 Heritage Program began, 249 artifacts have
 been designated throughout the world as his-
 toric mechanical engineering landmarks,
 heritage collections or heritage sites. Each
 represents a progressive step in the evolution
 of mechanical engineering and its signifi-
 cance to society in general.

The Landmarks Program illuminates our
 technological heritage and encourages the
 preservation of historically important works.
 It provides an annotated roster for engineers,
 students, educators, historians and travelers.
 It also provides reminders of where we have
 been and where we are going along the di-
 vergent paths of discovery.

ASME helps the global engineering
 community develop solutions to real world
 challenges. ASME, founded in 1880, is a
 not-for-profit professional organization that
 enables collaboration, knowledge sharing
 and skill development across all engineering
 disciplines, while promoting the vital role of
 the engineer in society. ASME codes and
 standards, publications, conferences, contin-
 uing education and professional develop-
 ment programs provide a foundation for
 advancing technical knowledge and a safer
 world.

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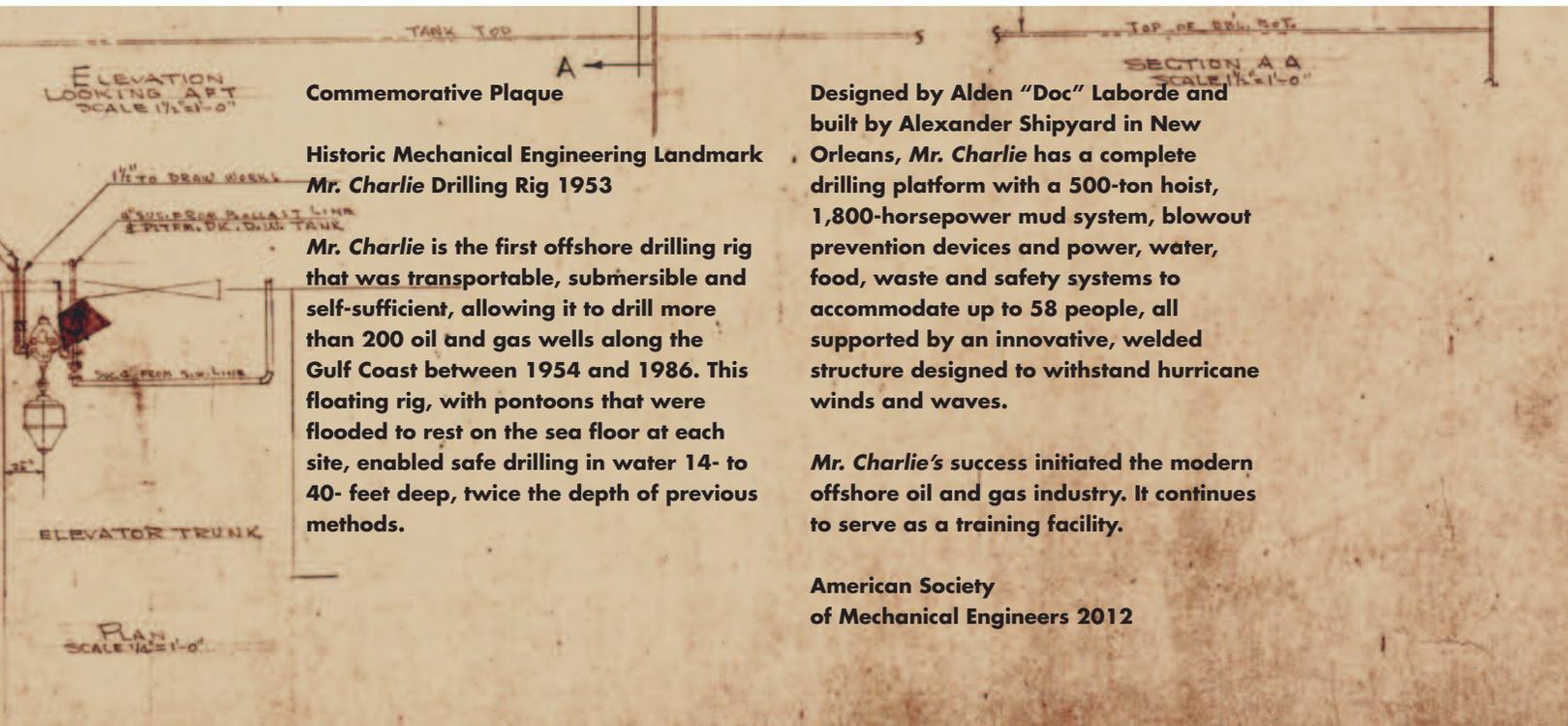
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Commemorative Plaque

Historic Mechanical Engineering Landmark *Mr. Charlie* Drilling Rig 1953

Mr. Charlie is the first offshore drilling rig that was transportable, submersible and self-sufficient, allowing it to drill more than 200 oil and gas wells along the Gulf Coast between 1954 and 1986. This floating rig, with pontoons that were flooded to rest on the sea floor at each site, enabled safe drilling in water 14- to 40- feet deep, twice the depth of previous methods.

Designed by Alden "Doc" Laborde and built by Alexander Shipyard in New Orleans, *Mr. Charlie* has a complete drilling platform with a 500-ton hoist, 1,800-horsepower mud system, blowout prevention devices and power, water, food, waste and safety systems to accommodate up to 58 people, all supported by an innovative, welded structure designed to withstand hurricane winds and waves.

Mr. Charlie's success initiated the modern offshore oil and gas industry. It continues to serve as a training facility.

American Society
of Mechanical Engineers 2012



INTERNATIONAL PETROLEUM
TECHNOLOGY INSTITUTE

BOOK # 250