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## It's No Crude Joke: This Oil Field Grows Even as It's Tapped

Odd Reservoir Off Louisiana  
Frods Petroleum Experts  
To Seek a Deeper Meaning

By CHRISTOPHER COOPER

Staff Reporter of THE WALL STREET JOURNAL  
HOUSTON — Something mysterious is  
going on at Eugene Island 330.

Production at the oil field, deep in the Gulf of Mexico off the coast of Louisiana, was supposed to have declined years ago. And for a while, it behaved like any normal field: Following its 1973 discovery, Eugene Island 330's output peaked at about 15,000 barrels a day. By 1989, production had slowed to about 4,000 barrels a day.

Then suddenly — some say almost inexplicably — Eugene Island's fortunes reversed. The field, operated by PennzEnergy Co., is now producing 13,000 barrels a day, and probable reserves have rocketed to more than 400 million barrels from 60 million. Stranger still, scientists studying the field say the crude coming out of the pipe is of a geological age quite different from the oil that gushed 10 years ago.

### Fill 'er Up

All of which has led some scientists to a radical theory: Eugene Island is rapidly refilling itself, perhaps from some continuous source miles below the Earth's surface. That, they say, raises the tantalizing possibility that oil may not be the limited resource it is assumed to be.

"I kind of blew me away," says Jean Whelan, a geochemist and senior researcher from the Woods Hole Oceanographic Institution in Massachusetts. Connected to Woods Hole since 1973, Dr. Whelan says she considered herself a traditional thinker until she encountered the phenomenon in the Gulf of Mexico. Now, she says, "I believe there is a huge system of oil just migrating" deep underground.

Conventional wisdom says the world's supply of oil is finite, and that it was deposited in horizontal reservoirs near the surface in a process that took millions of years. Since the economies of entire countries ride on the fundamental notion that oil reserves are exhaustible, any contrary evidence "would change the way people see the game, turn the world view upside down," says Daniel Yergin, a petroleum futurist and industry consultant in Cambridge, Mass. "Oil and renewable resource are not words that often appear in the same sentence."

### Mideast Mystery

Doomsayers to the contrary, the world contains far more recoverable oil than was believed even 20 years ago. Between 1976 and 1996, estimated global oil reserves grew 72%, to 1.04 trillion barrels. Much of that growth came in the past 10 years, with the introduction of computers to the oil patch, which made drilling for oil more predictable.

Still, most geologists are hard-pressed to explain why the world's greatest oil pool, the Middle East, has more than doubled its reserves in the past 20 years, despite half a century of intense exploitation and relatively few new discoveries. It would take a pretty big pile of dead dinosaurs and prehistoric plants to account for the estimated 660 billion barrels of oil in the region, notes Norman Hyne, a professor at the University of Tulsa in Oklahoma. "Off-the-wall theories often turn out to be right," he says.

Even some of the most staid U.S. oil companies find the Eugene Island discoveries intriguing. "These reservoirs are refilling with oil," acknowledges David Sibley, a Chevron Corp. geologist who has monitored the work at Eugene Island. Mr. Sibley cautions, however, that much research remains to be done on the source of that oil. "At this point, it's not black and white. It's gray," he says.

Although the world has been drilling for oil for generations, little is known about the nature of the resource or the underground activities that led to its creation. And because even conservative estimates say known oil reserves will last 40 years or more, most big oil companies haven't concerned themselves much with hunting for deep sources like the reservoirs scientists believe may exist under Eugene Island.

Economics never hindered the theorists, however. One, Thomas Gold, a respected astronomer and professor emeritus at Cornell University in Ithaca, N.Y., has held for years that oil is actually a renewable, primordial syrup continually manufactured by the Earth under ultrahot conditions and tremendous pressures. As this substance migrates toward the surface, it is attacked by bacteria, making it appear to have an organic origin dating back to the dinosaurs, he says.

While many scientists discount Prof. Gold's theory as unproved, "it made a believer out of me," says Robert Hefner, chairman of Seven Seas Petroleum Inc., a Houston firm that specializes in ultradeep drilling and has worked with the professor on his experiments. Seven Seas continues to use "conventional" methods in seeking reserves, though the halls of the company often ring with dissent. "My boss and I yell at each other all the time about these theories," says Russ Cunningham, a geologist and exploration manager for Seven Seas who isn't sold on Prof. Gold's ideas.

Knowing that clever theories don't fill

the gas tank, Roger Anderson, an oceanographer and executive director of Columbia University's Energy Research Center in New York, proposed studying the behavior of oil in a reservoir in hopes of finding a new way to help companies vacuum up what their drilling was leaving behind.

He focused on Eugene Island, a kidney-shaped subsurface mountain that slopes steeply into the Gulf depths. About 80 miles off the Louisiana coast, the underwater landscape surrounding Eugene Island is otherworldly, cut with deep fissures and faults that spontaneously belch gas and oil. In 1985, as he stood on the deck of a shrimp boat towing an oil-sniffing contraption through the area, Dr. Anderson pondered Eugene Island's strange history. "Migrating oil and anomalous production. I sort of linked the two ideas together," he says.

Five years later, the U.S. Department of Energy ponied up \$10 million to investigate the Eugene Island geologic formation, and especially the oddly behaving field at its crest. A consortium of companies leasing chunks of the formation, including such giants as Chevron, Exxon Corp. and Texaco Corp., matched the federal grant.

The Eugene Island researchers began their investigation about the same time that 3-D seismic technology was introduced to the oil business, allowing geologists to see promising reservoirs as a cavern in the ground rather than as a line on a piece of paper.

Taking the technology one step further, Dr. Anderson used a powerful computer to stack 3-D images of Eugene Island on top of one another. That resulted in a 4-D image, showing not only the reservoir in three spatial dimensions, but showing also the movement of its contents over time as PennzEnergy siphoned out oil.

What Dr. Anderson noticed as he played his time-lapse model was how much oil PennzEnergy had missed over the years. The remaining crude, surrounded by water and wobbling like giant globs of Jell-O in the computer model, gave PennzEnergy new targets as it reworked Eugene Island.

What captivated scientists, though, was a deep fault in the bottom corner of the computer scan that was gushing oil like a garden hose. "We could see the stream," Dr. Anderson says. "It wasn't even debated that it was happening."

Woods Hole's Dr. Whelan, invited by Dr. Anderson to join the Eugene Island investigation, postulated that superheated methane gas — a compound that is able to absorb vast amounts of oil — was carrying crude from a deep source below. The age of the crude pushed through the stream, and its hotter temperature helped support that theory. The scientists decided to drill into the fault.

As prospectors, the scientists were fairly lucky. As researchers they weren't. The first well they drilled hit natural gas, a

pocket so pressurized "that it scared us," Dr. Anderson says; that well is still producing. The second stab, however, collapsed the fault. "Some oil flowed. I have 15 gallons of it in my closet," Dr. Anderson says. But it wasn't successful enough to advance Dr. Whelan's theory.

A third well was drilled at a spot on an adjacent lease, where the fault disappeared from seismic view. The researchers missed the stream but hit a fair-size reservoir, one that is still producing.

It was here, in 1995, that the scientists ran out of grant money and PennzEnergy lost interest in continuing. "I'm not discounting the possibility that there is oil moving into these reservoirs," says William Van Wie, a PennzEnergy senior vice president. "I question only the rate."

Dr. Whelan hasn't lost interest, however, and is seeking to investigate further the mysterious vents and seeps. While industry geologists have generally assumed such eruptions are merely cracks in a shallow oil reservoir, they aren't sure. Noting that many of the seeps are occurring in deep water, rather than in the relative shallows of the continental shelf, Dr. Whelan wonders if they may link a deeper source.

This summer, a tiny submarine chartered by a Louisiana State University researcher will attempt to install a series of measuring devices on vents near the Eugene Island property. Dr. Whelan hopes this will give her some idea of how quickly Eugene Island is refilling. "We need to know if we're talking years or if we're talking hundreds of thousands of years," she says.

## Oilfield Pipe Maker DST Aims to Service Entire Globe

By JONATHAN FRIEDLAND

Staff Reporter of THE WALL STREET JOURNAL

MEXICO CITY—Paolo Rocca wants to do for oil companies what Coca-Cola Co. has done for soft-drink consumers: put the product in their hands at all times in all places.

He wants to make the seamless steel pipes that oil companies need for drilling and oil transport available around the clock, everywhere on the planet, whether in the stormy fields of the North Sea or the badlands along the Persian Gulf.

In the past three years, the Italian-Argentine entrepreneur has worked to knit the operations of three of the world's leading makers of seamless pipe, all controlled by his family holding company, Buenos Aires-based **Organizacion Techint SA**. The idea is to beat a consortium of Japanese companies and the **Mannesmann AG-Vallourec** combination in Europe to become the favored pipe supplier to private oil companies such as Exxon Corp. and state-owned producers such as **Petroleos Mexicanos SA**, or Pemex.



Paolo Rocca

Mr. Rocca has pursued his goal in some adverse circumstances. The collapse of oil prices last year was responsible for thinning the number of exploration rigs in operation around the globe from about 2,200 at the end of 1997 to 1,300 by April of this year. That, in turn, badly hurt sales and prices of seamless pipe. Those pressures and recent oil-company mergers have driven **Nippon Steel Co.**, **Sumitomo Metals Co.** and **Kawasaki Steel Co.** of Japan to end a long-standing rivalry. Last month, they said they were considering forming a joint venture for their seamless-pipe operations that would include pinching off some capacity.

"This is no longer just a manufacturing business," said Mr. Rocca, 46 years old. "It is a service business with a high premium on good logistics and good information systems. Over the next three or four years, we want to have a logistics system equal to that of Boeing or the U.S. Army."

Wall Street analysts mostly like what Techint is doing with its three main pipe-manufacturing units. These are collectively known as **Grupo DST**, of which Mr. Rocca is chairman. The three units—**Tubos de Acero de Mexico SA**, or **Tamsa**, **Siderca SA** of Argentina and **Dalmine SpA**

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## Oilfield Pipe Maker Aims for Globe

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of Italy—experienced a big drop in their share prices last year as world oil prices stumbled.

Jaime Nicholson, an analyst at Warburg Dillon Read in New York, said DST should now benefit from a jump in spending by oil companies. The jump has been triggered by a price rebound that has been under way since March, when several big oil-producing countries reduced output.

DST "has a leading market position, a broad product mix and very good geographical coverage," Ms. Nicholson said. "They also recognize that service is increasingly important in this industry."

With a 25% share of the global market, DST is already the biggest international maker of seamless pipe for the energy industry. And with 20 distribution points world-wide and a marketing alliance with **NKK Co.** of Japan, it has formidable international reach.

Mr. Rocca says he would like to build more relationships like the one Tamsa has

developed with Pemex. For the past four years, Tamsa has provided just-in-time delivery of pipe to the state-owned oil company, allowing Pemex to hold zero inventory. Pemex officials say this has allowed the company to cut costs substantially. It has also allowed Tamsa to fine-tune its own output, minimizing waste and maximizing capacity.

That kind of fine-tuning is critical given the highly cyclical nature of the pipe industry. Daniel Altman, an analyst at Bear Stearns Cos. in New York, expects that as a result of the drop in oil prices last year, Tamsa's 1999 sales will fall by 26% to \$456 million, then rebound to \$557 million in 2000. Earnings are expected to be equally volatile. Mr. Altman believes earnings per American depositary receipt listed on the New York Stock Exchange will drop to 35 cents this year from \$2.12 last year, before climbing to \$1.35 in 2000. "We are expecting a robust recovery in oil-rig utilization in 2000 and 2001," said Mr. Altman. "And that's not yet reflected in Tamsa's stock price."