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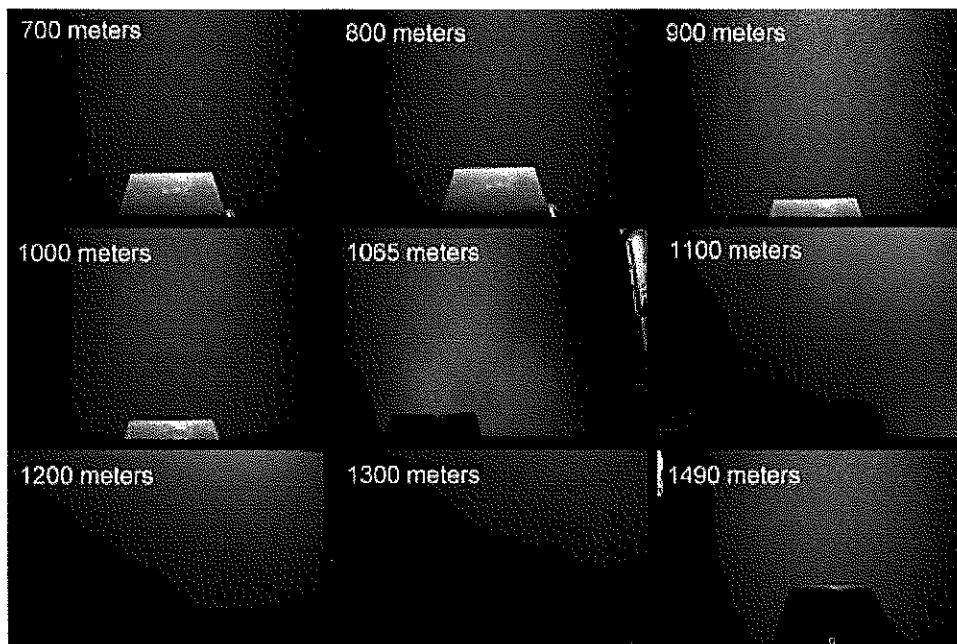
THE WALL STREET JOURNAL

WSJ.com

ENVIRONMENT & SCIENCE | AUGUST 20, 2010

Oil Plume From Spill Persists, Data Show

By ROBERT LEE HOTZ



R. Camilli, Woods Hole Oceanographic Institution/Science

Still images taken June 1 by a remote-operated camera descending through the Gulf of Mexico just southwest of the well site showed what scientists called a "highly turbid" layer of emulsified oil between 1,065 meters and 1,300 meters deep.

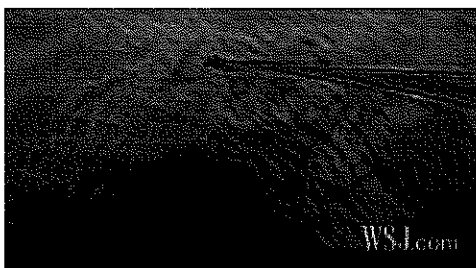
Oil from the Deepwater Horizon spill formed an underwater plume of hydrocarbons the size of Manhattan, scientists said Thursday, raising fears of a lingering cloud of trace chemicals in the Gulf with an unknown long-term impact.

The new findings from the Woods Hole Oceanographic Institution add to evidence from

other research groups this week that the offshore spill—the largest in history—is confounding scientists' assumptions about how the Gulf waters are interacting with the mass of oil.

The new data, based on measurements taken in June when oil was still gushing from BP PLC's Macondo well, also challenge government estimates that the vast majority of the 4.9 million barrels of spilled oil is already gone from the Gulf or being rapidly broken down by bacteria, several marine experts said. The Woods Hole scientists reported their preliminary findings Thursday online in the journal *Science*.

Instead, some of that oil may persist deep under water—at levels thousands of times higher than those caused by the natural oil seeps that dot the Gulf sea floor—where it can elude conventional detection and cleanup efforts, scientists said.



Stefanie Ilgenfritz has details of a just-released-survey indicating the oil that spilled from the Deepwater Horizon produced drifting plume of hydrocarbons the size of Manhattan.

Up to 79% of the spilled oil may still be in the Gulf, researchers at the Georgia Sea Grant program and the University of Georgia said earlier this week. Oil is already settling into the sea floor in a prime spawning ground for fish called DeSoto Canyon east of the damaged well, according to University of South Florida scientists.

"I think the imprint of the BP release, the discharge, will be detectable in the Gulf of Mexico for the rest of my life," oceanographer Ian MacDonald from Florida State University told a congressional hearing on the spill Thursday.

The Woods Hole researchers saw little evidence in June, two months after a wellhead explosion triggered the spill, that oil-eating microbes had reduced the cloud of chemicals. "It looks like the oil is degrading relatively slowly," said Woods Hole chemist Ben Van Mooy.

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Contrary to previous predictions by other researchers, however, the Woods Hole group found no evidence of "dead zones," in which bacteria feasting on oil can use up so much oxygen in the process that no fish or marine life can survive. They speculated that earlier oxygen readings might have been wrong because measuring devices can give artificially low readings when coated

by oil.

Renewed concerns over leftover oil in the Gulf of Mexico could deal a further blow to the region's battered fishing industry, which is eager to return to normal after big stretches of state and federal waters were reopened in recent weeks. The five Gulf Coast states had \$10.54 billion in combined seafood sales and employed more than 200,000 people in 2008, according to government data.

But demand for Gulf seafood has shrunk amid images of oil-slicked waters. That is despite heightened monitoring by the U.S. Food and Drug Administration, which says seafood from the parts of the Gulf open to fishing pose no health risks.

So far, the chemicals in the deep plume aren't concentrated in these depths at levels high enough to be directly toxic to most marine life, several ocean experts who study the Gulf said.

No one knows yet how long oil plumes will last or what their long-term impact will be. But experts are concerned that if the trace chemicals linger long enough, they could damage fish eggs and larvae, as well as the plankton on which many fish feed.

Researchers suggest the plume may last for a year or more, but it isn't yet known whether it has dissipated since the Woods Hole researchers measured it, at the end of June.

"These hydrocarbons may well show up somewhere else, running undetected below the surface," said Richard Camilli from the Massachusetts-based Woods Hole group, who was chief scientist on the June research.

For 10 days in June, Dr. Camilli and his colleagues aboard a U.S. National Science Foundation research vessel explored the plume—22 miles long and more than a mile wide—as it snaked along 3,000 feet below the surface of the Gulf.

Writing in the journal *Science*, the scientists confirmed that oil from the well had been caught below the surface of the Gulf in pools of microscopic oil drops and petroleum-based trace chemicals, which were degrading more slowly than many had



C. McIntyre, Woods Hole Oceanographic Institution

The scientists made 57,000 measurements, mainly using sensors aboard a remote-controlled robot deployed from the ship.

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expected. The plume resembled a mist of trace chemicals largely invisible to the eye, rather than a river of oil.

In normal circumstances, crude oil floats to the surface, where it can be skimmed, burned off or evaporated. Floating on the waves, it can be churned into smaller drops readily digested by bacteria.

But oil from the ruptured well, broken down by sprays of chemical dispersants and held at depth by water pressure, has formed microscopic droplets not buoyant enough to break through the transition layer that separates warm surface currents from the cold bottom water, several experts said.

In their analysis, the Woods Hole researchers said they found high concentrations of benzene, toluene, xylene and other so-called BTEX petroleum compounds that could be traced to the leaking well. They calculated that the plume contained between 5% and 6% of the signature BTEX petroleum hydrocarbons released during the spill.

"This is the first number that anybody has been able to put on how much of the stuff from the well is ending up in the plume," said University of Georgia oceanographer Samantha Joye, who is studying the Gulf spill but wasn't involved in the project.

At the National Oceanic and Atmospheric Administration, a senior agency official said the new data would become part of the federal damage assessment used to help determine any penalties and fines that may be levied against BP and its contractors for damages from the spill.

BP officials referred requests for comment on the new research to NOAA and the federal joint command overseeing the spill cleanup.

Since the well was capped on July 15, there has been virtually no dispersant use—only 200 gallons total applied on July 19, according to the Environmental Protection Agency.

The question of how much oil is left in the Gulf, and where it has gone, is a contentious political issue in Washington.

On Aug. 4, White House environmental policy czar Carol Browner and Jane Lubchenco, administrator of the NOAA, released a study that indicated that nearly 75% of the 4.9 million barrels spilled from BP's well in the Gulf had been dispersed, evaporated, or collected in cleanup operations.

That report has since drawn criticism. Rep. Ed Markey (D., Mass.), chairman of a House Energy and Commerce subcommittee, used Thursday's hearing to criticize the Obama administration for "giving many people a false sense of confidence," and chided the administration for releasing the report.

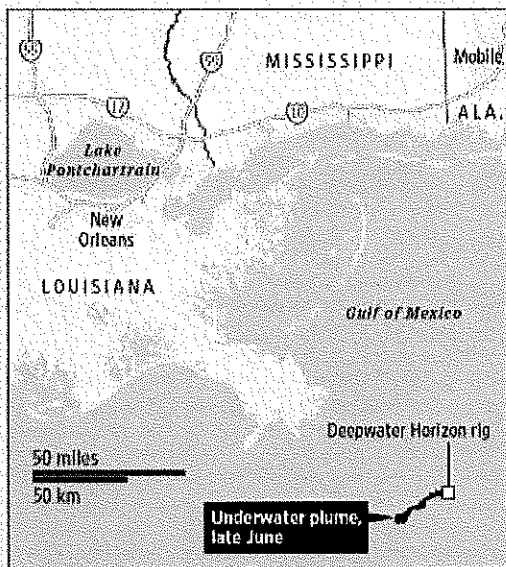
"We remain confident in our estimates," Ms. Lubchenco of NOAA said Thursday.

—Mike Esterl,
Siobhan Hughes
and Stephen
Power contributed
to this article.

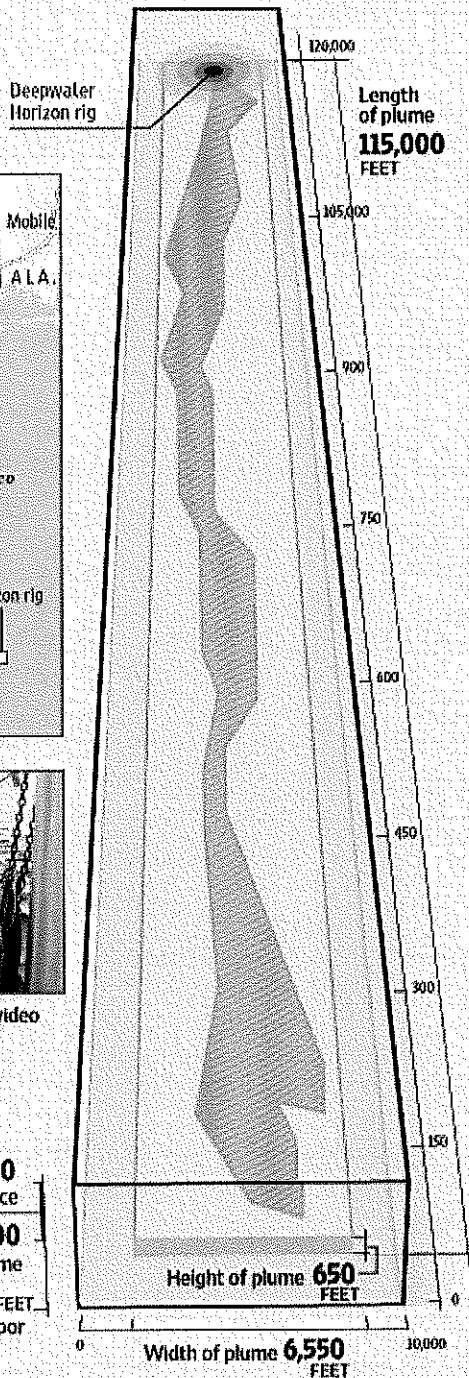
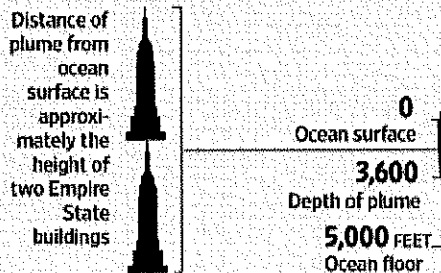
Write to Robert Lee Hotz at

Deep Contamination

Scientists on Thursday presented precise measurements of an underwater oil plume that formed after the Deepwater Horizon well blowout.



The Sentry submarine took chemical samples and video footage of the plume from June 19 to 28.



Source: Science Journal. Photo: Woods Hole Oceanographic Institution

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