*Updated: This version is corrected to clarify that the plume modeling team's estimate is a lower bound estimate, as Dr. McNutt accurately reported in her press announcement on May 27, 2010.*

# Flow Rate Group Provides Preliminary Best Estimate Of Oil Flowing from BP Oil Well

USGS Director Dr. Marcia McNutt today announced that the National Incident Command's Flow Rate Technical Group (FRTG) has developed an independent, preliminary estimate of the amount of oil flowing from BP's leaking oil well.

In making the announcement, Dr. McNutt, who is the chair of the FRTG, established by Admiral Thad Allen, the National Incident Commander, emphasized that since day one, the Administration's deployments of resources and tactics in response to the BP oil spill have been based on a worst-case, catastrophic scenario, and have not been constrained by flow rate estimates.

~~Based on three separate methodologies, outlined below, the independent analysis of the Flow Rate Technical Group has determined that the overall best initial estimate for the lower and upper boundaries of~~All three methodologies considered by the FRTG are consistent with flow rates of oil in the range~~is~~ from~~in the range of~~ 12,000 to 19,000 barrels per day. Higher flow rates are consistent with the data considered by one of the teams.

The FRTG used three separate methodologies to calculate their initial estimate, which they deemed the most scientifically-sound approach, because measurement of the flow of oil is extremely challenging, given the environment, unique nature of the flow, limited visibility, and lack of human access to BP's leaking oil well.

**Mass Balance Team**

The first approach led by the Mass Balance Team analyzed how much oil is on the surface of the Gulf of Mexico. The Mass Balance team developed a range of values using USGS and NOAA analysis of data that was collected from NASA's Airborne Visible InfraRed Imaging Spectrometer (AVIRIS), an advanced imaging tool. USGS has previously used the AVIRIS tool to discover water on the moon. This is the first time it has been used to measure the volume of an oil spill.

Based on observations on May 17th, and accounting for thin oil not sensed by the AVIRIS sensor, the FRTG estimated that between 130,000 and 270,000 barrels of oil are on the surface of the Gulf of Mexico. It is important to note that the FRTG also estimated that a similar volume of oil to the amount AVIRIS found on the surface has already been burned, skimmed or dispersed by responders or has evaporated naturally as of May 17th.

Given the amount of oil observed and the adjusted calculations for the amount of oil that has been burned, skimmed, dispersed, or evaporated the initial estimate from the Mass Balance Team is in the range of 12,000 to 19,000 barrels of oil per day.

This methodology carried several challenges, including the fact that the AVIRIS plane can only fly over a portion of the spill in a day, meaning that an assumption must be made that the area imaged is representative of the entire spill region.

**Plume Modeling Team**

The second approach led by the Plume Modeling Team used video observations of the oil/gas mixture escaping from the kinks in the riser and at the end of the riser pipe alongside advanced image analysis to estimate fluid velocity and flow volume. Based on advanced image analysis and video observations the Plume Modeling Team has provided an initial lower bound estimate of 12,000 to 25,000 barrels of oil per day. They continue to work to provide an upper bound.

This team faced several methodological challenges, including having a limited window of data in time to choose from, getting good lighting and unobstructed views of the end of the riser, and estimating how much of that flow is oil, gas, hydrates, and wate

**Riser Insertion Tube Tool Estimate**

Both estimates from the Mass Balance Team and the lume Modeling Team were reality-checked with a basic calculation of the lower limit o ossible oil that is spilling. The lower limit was calculated based on the amount of oil collected by t Riser Insertion Tube Tool (RITT), plus the estimate of how much oil is escapin RITT, a how much oil is leaking from the kink in the riser.

On May 25, 2010, at approximatel 17:3 CDT, he RITT logged oil collection at a rate of 8,000 barrels of oil per day, as measur by a m ter wh e calibration was verified by a third-party. Based on observations of the rise the eam e ated that at least 10% of the flow was not being captured by the riser at the time oil llection was logged, increasing the estimate of total flow to 8,800 barrels of oil per ay. Fa ring the flow from the kink in the riser, the RITTI Team calculated that the lo r bound es mate of the total oil flow is at least 11,000 barrels of oil per day, depending on whe r the flo through the kink is primarily gas or oil. The lower bound estimate calculated by the ITT eam is more than twice the amount of the earlier flux estimate of 5,000 barrels of oil per day and is independent of any calculations or model assumptions made by either team above.



**On-going Calculations**

The preliminary estimates provided by the FRTG are based on new methodologies being employed to understand a highly dynamic and complex situation. As the FRTG collects more data and improves their scientific modeling in the coming days and weeks ahead, they will continue to refine and update their range of oil flow rate estimates, as appropriate.

The FRTG is working diligently to ensure all estimates are peer reviewed by independent experts and academics as expeditiously as possible. They will also establish a website to ensure this information is available and reported to the public in a timely fashion.

**Response**

Below are the resources surged to date to mitigate the impacts of the spill:

- Approximately 1,300 vessels are responding on site, including skimmers, tugs, barges, and recovery vessels to assist in containment and cleanup efforts—in addition to dozens of aircraft, remotely operated vehicles, and multiple mobile offshore drilling units.
- More than 1.85 million feet of containment boom and 1.25 million feet of sorbent boom have been deployed to contain the spill—and approximately 300,000 feet of containment boom and 1 million feet of sorbent boom are available.
- Approximately 11 million gallons of an oil-water mix have been recovered.
- Approximately 840,000 gallons of total dispersant have been deployed—700,000 on the surface and 140,000 subsea. More than 380,000 gallons are available.
- 17 staging areas are in place and ready to protect sensitive shorelines, including: Dauphin Island, Ala., Orange Beach, Ala., Theodore, Ala., Panama City, Fla., Pensacola, Fla., Port St. Joe, Fla., St. Marks, Fla., Amelia, La., Cocodrie, La., Grand Isle, La., Shell Beach, La., Slidell, La., St. Mary, La.; Venice, La., Biloxi, Miss., Pascagoula, Miss., and Pass Christian, Miss.

**Background**

The Flow Rate Technical Group is comprised of federal scientists, independent experts, and representatives from universities around the country. It includes representatives from USGS, NOAA, DOE, Coast Guard, MMS, the national labs, National Institute of Standards and Technology, UC Berkeley, University of Washington, University of Texas, Purdue University, and several other academic institutions. BP is not involved in the FRTG except to supply raw data for the scientists and experts to analyze.

FRTG Members from the Federal Government appointed to date include:

Marcia McNutt, Director, USGS; William Rees, Jr., Los Alamos National Lab, Department of Energy; Darren Mollot, Department of Energy; Franklin Shaffer, Department of Energy; Victor Labson, USGS; Bill Lehr, National Oceanic and Atmospheric Administration; Austin Gould, US Coast Guard; Richard Brannon, US Coast Guard; Don Maclay, Minerals Management Service (MMS); Gerald Crawford, MMS; David Absher, MMS; and Bill Courtwright, MMS.

FRTG Members from academia and independent organizations appointed to date include:

Omar Savas, Professor of Mechanical Engineering, University of California Berkeley
James Riley, Professor of Mechanical Engineering, University of Washington
Juan Lasheras, Prof. of Engineering and Applied Sciences, University of California San Diego
Poojitha Yapa, Professor of Civil and Environmental Engineering, Clarkson University
Paul Boomer, Senior Lecturer, Petroleum and Geosystems, University of Texas at Austin
Steve Wereley, Associate Professor of Mechnical Engineering, Purdue University
Peter Cornillon, Professor of Oceanography, University of Rhode Island
Ira Leifer, Assoc. Researcher, Marine Science Institute, University of California Santa Barbara

Alberto Aliseda, Assistant Professor of Mechanical Engineering, University of Washington
Pedro Espina, National Institute of Standards and Technology.

For more information, visit www.deepwaterhorizonresponse.gov.

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