

# Attachment C

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**Subject:** "Pie Chart" Doc  
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**Attachments:** Oil Budget description 7 29 v 7.doc

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The Oil Budget document has just started clearance by the White House. It is positioned as a public information document and contains general description of the oil fate. If there are changes I will route the final version. Obviously not for release until after clearance.

Mark

## Deepwater Horizon/BP Oil Budget Calculator: Where did the oil go?

The National Incident Command has assembled the best scientific minds in the government and independent scientific community to produce an estimate of just how much oil has been skimmed, burned, contained, evaporated and dispersed. They have developed a tool, called the Oil Budget Calculator to determine where the oil has gone. The numbers are based on best estimates of how much oil was released and how this oil is moving and degrading.

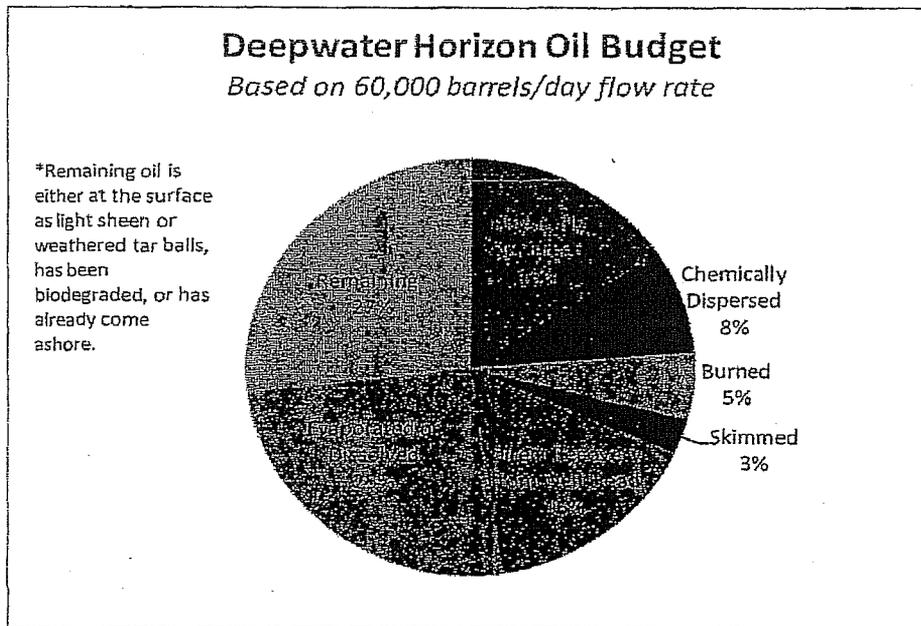


Figure 1: Oil Budget Calculator- Shows what has happened to the oil.

### Explanation of Findings

The Flow Rate Technical Group (FRTG), assembled by the National Incident Command, estimates that as of July 15, between 3-5 million barrels of oil had been released from the Deepwater Horizon/BP wellhead.

As shown in the pie chart (Figure 1), aggressive response efforts have been successful in recovering a significant portion of the spilled oil. 16 percent of the oil was captured directly from the wellhead by the riser pipe insertion tube and top hat systems. In addition, burning and skimming operations collected approximately 11 percent of the oil.

It is estimated that 25 percent of the oil volume quickly evaporated or dissolved into the water column. The volatile components of oil evaporate, while the components that are not volatile dissolve into the water column or form residues such as tar balls. The evaporation rate estimate is based on scientific research and observations conducted during the Deepwater Horizon incident. A different evaporation rate is used for fresh and weathered oil to provide the most accurate number.

16 percent of the oil has dispersed physically into the water column, and 8 percent of the oil was dispersed by the application of nearly 50,000 barrels of chemical dispersants. Physical dispersion occurs as a result of the oil coming out of the broken riser pipe at high speed into the water column, which caused some of it to spray off in small droplets (less than 100 microns – the diameter of a human hair).

Some portion of the dispersed oil that is in droplets smaller than 100 microns remained below the surface. Previous analyses have shown evidence of a diffuse cloud of dispersed oil between 3300 and 4300 feet. (citation: Federal Joint Analysis Group Report 1 and 2, <http://ecowatch.ncddc.noaa.gov/JAG/reports.html>).

We know that naturally occurring bacteria have consumed and biodegraded a significant amount of the oil. Bacteria that break down the dispersed and weathered surface oil are naturally abundant in the Gulf of Mexico in large part because of the warm water there, the favorable nutrient and oxygen levels, and the fact that oil enters the Gulf of Mexico through natural seeps regularly. While there is more analysis to be done to quantify the exact rate of biodegradation in the Gulf, early indications are that the light crude oil from this well is biodegrading quickly.

After accounting for operations, dispersion and evaporation, 27 percent remains. This oil is either at the surface as light sheen or weathered tar balls, has been biodegraded, or has already come ashore on beaches.

In summary, burning, skimming and direct recovery from the wellhead have removed roughly one quarter of the oil. Around a quarter of the total has been naturally evaporated and just less than one quarter dispersed into Gulf waters. The remaining amount, just over one quarter is on the surface, in tar balls, on the shore, already removed from the shore or has been biodegraded.

NOAA continues to track the movement of the remaining oil. It will issue daily surface oil trajectories for as long as necessary and continue subsurface sampling to monitor the concentration and distribution of oil there. NOAA responders are working with the Unified Command to develop monitoring strategies for tar balls and near shore submerged oil.

Even though the threat to shorelines has decreased since the capping of the BP wellhead, federal scientists remain extremely concerned about the impact to the Gulf ecosystem. Fully understanding the impacts of this spill on wildlife, habitats, and natural resources in the Gulf region will take time and continued monitoring and research.

**Note on degree of confidence in calculations:** The Oil Budget calculations are based on direct measurements where possible and the best available scientific estimates where measurements were not possible. The numbers for direct recovery and burns were measured directly and reported in daily operational reports. The rest of the numbers were based on previous scientific analyses, best available information and a broad range of scientific expertise. These numbers will continue to be refined based on additional information and further analysis.

## **Attachments**

**Appendix A:** Deepwater Horizon Gulf Incident Budget Tool Report from July 28, 2010, contains detailed explanation of calculation methods. The tool was created by the US Geological Survey in collaboration with US Coast Guard, NOAA, and NIST.

**Appendix B: Acknowledgements**

**Deepwater Horizon/BP Oil Budget Calculator:  
Where did the oil go?  
Appendix B: Acknowledgements**

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**Credits**

The following scientists were involved in developing the Oil Budget Calculator tool:

David Mack (USGS) – Lead application developer  
Jeff Allen (USGS) – Interface designer  
Bill Lehr (NOAA) – Lead mass balance and oil budget scientist  
LCDR Lance Lindgren and CDR Peter Hoffman (USCG) – Application requirements  
Steve Hale, Kent Morgan, Kevin Laurent, and Jerry McFaul (USGS) – Technical advisors  
Sky Bristol and Tim Kern (USGS) – Project vision and management  
Kevin Gallagher and Martha Garcia (USGS) – Executive sponsors

The Following Scientists created and reviewed the calculation methods used in the oil budget calculator:

Federal Scientists

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