

Why GAO Did This Study

In April 2010, an explosion onboard the *Deepwater Horizon* drilling rig in the Gulf of Mexico led to a release of approximately 206 million gallons of oil. When an oil spill occurs, responders have several options for managing the environmental impacts, including using chemical dispersants to break the oil into smaller droplets, which can promote biodegradation and help prevent oil from coming on shore. GAO was asked to review (1) what is known about the use of chemical dispersants and their effects, and any knowledge gaps or limitations; (2) the extent to which federal agencies and other entities have taken steps to enhance knowledge on dispersant use and its effects; and (3) challenges, if any, that researchers and federal agencies face in their attempts to enhance knowledge. GAO collaborated with the National Academy of Sciences to identify and recruit experts on dispersant use and conducted interviews with these experts, agency officials, and other specialists, and reviewed key documents and reports.

What GAO Recommends

GAO recommends, among other things, that the Interagency Coordinating Committee on Oil Pollution Research periodically provide updated information on key dispersant research by nonfederal sources. Also, the Interagency Committee should ensure that subsurface and Arctic applications are among the future priority research areas. The Departments of the Interior, Commerce, and Homeland Security, and the EPA generally concurred with the recommendations made to them.

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OIL DISPERSANTS

Additional Research Needed, Particularly on Subsurface and Arctic Applications

What GAO Found

According to experts, agency officials, and specialists, much is known about the use of chemical dispersants on the surface of the water, but gaps remain in several research areas. For example, experts generally agreed that there is a basic understanding of the processes that influence where and how oil travels through the water, but that more research was needed to quantify the actual rate at which dispersants biodegrade. In addition, all the experts GAO spoke with said that little is known about the application and effects of dispersants applied subsurface, noting that specific environmental conditions, such as higher pressures, may influence dispersants' effectiveness. Knowledge about the use and effectiveness of dispersants in the Arctic is also limited, with less research conducted on dispersant use there than in temperate or tropical climates. For example, one expert noted that more research is needed on biodegradation rates for oil in the Arctic because the cold temperature may slow the process down.

Federal agencies have funded over \$15.5 million of dispersant-related research since fiscal year 2000, with more than half of the total funding occurring since the *Deepwater Horizon* incident. Most of these 106 projects were funded by the Department of the Interior's Bureau of Safety and Environmental Enforcement (BSEE), the National Science Foundation (NSF), and the Environmental Protection Agency (EPA). Over 40 percent of the research projects were focused at least in part on testing dispersant effectiveness. For example, BSEE funded 28 projects on the efficacy of dispersants on different types of oil and under different ocean conditions. In contrast, relatively few projects were focused on applying dispersants subsurface or in the Arctic. Specifically, NSF funded three projects looking at the use and effects of subsurface dispersant application, and BSEE and EPA funded the eight projects related to the use of chemical dispersants in Arctic or cold water environments.

Researchers face resource, scientific, and communication challenges related to dispersant research. Agency officials, experts, and specialists identified inconsistent and limited levels of funding as a challenge to developing research on the use and effects of chemical dispersants. For example, because support for dispersant research fluctuates, with temporary increases following a major spill, it is difficult for federal agencies to fund longer term studies, such as those needed to understand chronic toxicological effects of dispersants. In addition, researchers face scientific challenges with respect to dispersants, including being able to conduct research that replicates realistic oil spill conditions. Conducting research in the open ocean faces several logistical barriers, and laboratory experiments are unable to fully approximate the scale and complexity of ocean conditions. Lastly, agency officials, experts, and specialists told GAO that it can be a challenge to communicate and track research. Although some organizations have attempted to compile lists of dispersant-related research, currently there is no mechanism that tracks dispersant research across all sources and highlights past and ongoing research projects. For example, the Interagency Coordinating Committee on Oil Pollution Research—a multi-agency committee chaired by the Coast Guard—maintains a list of federally sponsored oil spill related research, but does not track or cross-reference related research that has been funded solely by industry or nongovernmental sources.