

Dispersants: A Big Unknown

May 6, 2010

Over the past couple of days, I have gotten several questions about dispersants that are being used to combat the ever-growing oil slick in the Gulf: What do dispersants do? Are they effective? Are they toxic? What happens to the oil?

I will be the first to admit that I cannot come close to answering all of these questions, but based on the research I have done (primarily two National Academy of Sciences reports: [Using Oil Spill Dispersants on the Sea \(1989\)](#) and [Oil Spill Dispersants: Efficacy and Effects \(2005\)](#)), here are my impressions:

One of the take-home messages regarding dispersants is that, according to the 2005 report, they *“do not actually reduce the total amount of oil entering the environment...the objective of dispersant use is to enhance the amount of oil that physically mixes into the water column, reducing the potential that a surface slick will contaminate shoreline habitats or come into contact with birds, marine mammals, or other organisms that exist on the water surface or shoreline. Conversely, by promoting dispersion of oil into the water column, dispersants increase the potential exposure of water-column and benthic biota to spilled oil.”* (p. 2, emphasis added)

So, dispersants might be reducing the visible sheen on the surface of the ocean, but might be increasing the threat to aquatic life under the surface and on the ocean floor. Given the fact that the most commonly used dispersant, Corexit 9500, can be toxic to crustaceans at relatively low concentrations—and this toxicity might increase since the Gulf is so warm—we should be concerned about what impact the combined oil and dispersants will have on our bottom-dwelling critters, as well as larval fish. (See [“Acute Aquatic Toxicity of Three Corexit Products: An Overview,”](#) by Anita George-Ares and James R. Clark, Exxon Biomedical Sciences, Inc.)

A question that I have is why we don't know more about the effects of the dispersants on the water column, and wildlife. According to the 2005 NAS report, few studies have been conducted since 1989 to validate the assumption that chemical dispersants dramatically reduce the impact to seabirds and aquatic mammals. While dispersants have been used in spills in the Gulf of Mexico, the effectiveness of the dispersants “was evaluated primarily by visual observation, and not all operations included confirmation by measurement of dispersed oil in the water column. Therefore, the reliability of effectiveness estimates is unknown.” (p. 71) Further, the study suggests that if you use dispersants, it is difficult to know how the below-surface plume will behave, as they state that “unlike surface slicks, that are affected primarily by surface winds, the nature and trajectory of subsurface dispersed oil plumes are more susceptible to currents.” (p. 48) Therefore the underwater plumes might be going in different direction from the surface slicks!

While I have not come to a conclusion as to whether dispersants should or should not be used (I don't think the answer is that simple), it is obvious we do not know enough about these dispersants, and at the very least, the effects of dispersants and oil in the water column and on the ocean floor must be thoroughly studied. This is why I suggest that independent scientists, university scientists, and agencies, such as NOAA and EPA, begin studying these dispersed oils in the Gulf to ensure that we are not making an ill-fated tradeoff. Just because we can't see an oil sheen on the surface, does not mean the oil has gone away.

Further Reading

There has been a bit of coverage regarding dispersants over the past couple of days, I would suggest taking a look at what the [Lower Mississippi Riverkeeper](#), and [NRDC](#) have been posting on the issue. Also check out recent articles in the [New York Times](#) and [Grist](#).

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