THE DEEPWATER HORIZON OIL SPILL: ECOGENOMICS AND BIODEGRADATION OF THE DEEP-SEA PLUME

Terry C. Hazen*
Lawrence Berkeley National Laboratory
MS 70a-3317, One Cyclotron Rd
Berkeley, CA 94720
Voice: 510-486-6223
Fax: 510-486-7152
tchazen@lbl.gov

The explosion on April 20, 2010 at the BP-leased Deepwater Horizon drilling rig in the Gulf of Mexico off the coast of Louisiana resulted in oil and gas rising to the surface and the oil coming ashore in many parts of the Gulf. It also resulted in an immense oil plume 4,000 ft deep. Despite spanning more than 600 feet in the water column and extending more than 10 miles from the wellhead, the dispersed oil plume was gone within weeks after the wellhead was capped – degraded and diluted to undetectable levels. Ecogenomics enabled discovery of new and unclassified species of oil-eating bacteria that apparently lives in the deep Gulf where oil seeps are common. Using 16s microarrays, functional gene arrays, clone libraries, lipid analysis and a variety of hydrocarbon and micronutrient analyses we were able to characterize the oil degraders. The most dominant bacteria that were represented in the oil plume were uncultivated representatives of Colwellia and Oceanospirillum. In addition, we performed laboratory microcosm experiments using uncontaminated water collected from the Gulf. This data suggests that a great potential for intrinsic bioremediation of oil plumes exists in the deep-sea and other environs in the Gulf of Mexico.

###