

Update on AVIRIS Data Collection and Analysis

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Thank you Madam Deputy Secretary,

My report is an update on the USGS' and collaborators' application of the NASA Airborne Visible/Infrared Imaging Spectrometer, the AVIRIS, to mapping and characterizing oil available to be cleaned up from the sea-surface and shore. The AVIRIS is uniquely suited to this application as it has the ability to map the volume of oil present on the surface and its chemistry.

This project has two phases, the first phase focused on establishing an average daily discharge rate of spilled oil using a mass-balance approach as part of the Flow Rate Technical Group. NASA deployed the AVIRIS on the Gulf in May for this effort. The resulting discharge rate has been released as a peer-reviewed USGS Open File Report and will be incorporated in the final report of the Flow Rate Technical Group. The second phase, and the topic of this report, is focused on mapping the amount of available oil for recovery as part of the oil budget activity, and assessing the oil chemistry and weathering state to understand impacts on oiled coastal systems and natural and economic resources in the Gulf.

The phase-2 oil budget activity is accounting of the total amount of discharge entering and leaving the Gulf. The volume of surface oil is measured by the AVIRIS and added to the contained, skimmed, burned, and estimated oil lost through natural and chemical dispersion, and evaporation and dissolution to provide an insight into the oil present on the surface and in the subsurface. This insight gained is critical to understanding the chemical evolution of the oil prior to landfall, its degradation and transformation, and the potential for transfer of heavy metal and organic contaminants to the seawater.

This second phase has two deployments of the AVIRIS, a low-altitude, high-resolution survey, and a high-altitude, broad-area survey. The low-altitude survey was conducted from July 3rd through the 12th and the results are being processed and interpreted currently. Concurrent ship-borne and coastal spectral calibration, and sampling of the oil for chemical characterization was conducted and the samples are now being analyzed in the USGS Denver laboratories. The AVIRIS surveyed both impacted and potentially impacted coastal areas and examined in detail a 200 square kilometer area at sea around the spill site. The detailed area was flown morning and afternoon of July 9 and on July 12 to aid in understanding the changes in sea-surface oil over time.

The USGS is analyzing the chemical composition of spill-related samples. The suite includes two samples of relatively pure, fresh oil provided by BP, samples of the

dispersant, Corexit, and samples of oil and seawater collected by the USGS from the ocean surface, and oil-affected beaches and marshes. The oil and water samples are being analyzed for oil- and dispersant-related compounds in support of the oil budget estimations and the AVIRIS mapping of weathered oil.

Field work for the characterization of oil contamination in the southern Louisiana marshes was performed around the areas of Grand Isle, Barataria Bay and the end of the Mississippi delta in two of the major wetland ecosystem types, those dominated by *Spartina alterniflora* and *Phragmites australis*. Oil, water, sediment and vegetation samples and reflectance measurements of non-impacted and impacted marsh plants have been made for the analysis of the AVIRIS data. Preliminary pre-impact maps of vegetation composition and extent and preliminary post-impact maps of oiled marsh have been created. Studies are continuing to quantify and characterize the nature of oil impacts on the marshes.

The high-altitude survey deployment is scheduled to start about August 4. The mission is to cover a broad area of the Gulf mapping sea-surface oil, and to find the full extent of potentially oiled coastline. It is anticipated that contemporaneous sampling will be conducted along shore, and if warranted, at sea.

The USGS effort has been greatly assisted by NASA and its Jet Propulsion Laboratory, The US Coast Guard, several units of NOAA, and the area and incident commands.

Madam Deputy Secretary, this concludes my report. I would be happy to answer any questions you may have.

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