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Research Highlights . . .

Chemical warfare agents detectable on soils, plants

Military commanders and national leaders need to know if chemical warfare agents are present before sending troops into hostile territory. Researchers at DOE's [Idaho National Engineering and Environmental Laboratory](#) can now detect part-per-million levels of chemical warfare agents directly on soil or plant surfaces within 5 to 10 minutes using a new ion-trap secondary ion mass spectrometer. Samples as small as 3 to 4 milligrams—about 40 grains of salt—are identified by the ions that the instrument sputters off the sample surfaces. Each chemical present is identified by a detectable spectrum as unique as a fingerprint.

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Oboe: Music to Livermore ears

In 1992, testing of nuclear weapons by exploding them beneath the Nevada Test Site stopped. Today instead, science-based Stockpile Stewardship assures weapon safety and reliability. An array of high-tech experiments yields data for supercomputer programs that simulate weapon aging and operation. Now, far beneath the Nevada desert, subcritical experiments replace the "big-bang" explosions of decades past. In "subcrits," a coin-sized plutonium disc is shocked by high explosive, while sensitive instruments measure particles ejected from the surface. Subcrits began July 2, 1997. DOE's [Lawrence Livermore National Laboratory](#) is readying Oboe 8, which will be the 14th NNSA subcritical experiment overall and the 10th for Livermore.

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Real-time beryllium detection

Beryllium's high strength and light weight make it an ideal metal for many industrial applications. Breathing fine particulate beryllium, however, can be a health hazard to workers who grind, mill or otherwise machine the metal. In some individuals beryllium triggers an autoimmune response that can result in Chronic Beryllium Disease, a debilitating, incurable and sometimes fatal disease. A beryllium detection technique, a quick colorimetric analysis from DOE's [Los Alamos National Laboratory](#), involves wiping the surfaces of the lab with a chemically prepared pad and then adding a solution. If the pad turns blue, beryllium is present; if it remains orange, the surface is free of contamination.

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Where in the water is that float from San Diego?

Jim Bishop of DOE's [Lawrence Berkeley National Laboratory](#), co-director of the [DOE Center for Research on Ocean Carbon Sequestration](#), was chief scientist on a recent voyage of the Scripps Institution of Oceanography's research vessel [New Horizon](#) out of San Diego, developing what Bishop calls "a forensic science to detect biological activity in the deep sea." A device for optically measuring particulate inorganic carbon was among the instruments tested and calibrated, along with a SOLO float that tested a new way to measure carbon sedimentation. An intermittent GPS caused the SOLO to spend most of ten days hiding, but it faithfully transmitted satellite data that aided a midnight recovery off wind-whipped Point Conception.

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