

Berkeley's ALS used to study WTC ground zero air

A collaboration that includes researchers from the DOE national laboratories at Berkeley and Livermore and the University of California at Davis has been using the powerful X-ray beams at Berkeley Lab's Advanced Light Source (ALS) study the quality of the air quality near "ground zero," the site where the World Trade Center was brought down by terrorists last September 11. In samples of particulate matter collected continuously from early October to mid-December, the collaborative team has found unprecedented high concentrations of very fine particles less than a quarter-millionth of a meter in size, plus abnormally persistent high levels of coarse particles presumably produced by fires that continued to burn underground.



Among many other pollutants, the level of very fine sulfur in the World Trade Center air was higher than in the Kuwaiti oil fields during the fires ignited during the Gulf War of 1991.

Thomas Cahill, UC Davis professor emeritus of physics and atmospheric sciences, led the DELTA collaboration (Detection and Evaluation of Long-range Transport of Aerosols) which used ALS beamline 10.3.1 for X-ray fluorescence studies of samples at very high resolution. When illuminated by X-rays in the right energy range, atomic elements will re-emit X-rays at characteristic energies. ALS light allowed the DELTA collaboration

to determine the exact composition of their samples for elements from sodium to uranium in a single 30-second exposure.

"The ALS is from my point of view an ideal machine for our work, with a virtually perfect energy range—not more energy than we need and not less," says Cahill. "The extraordinary brightness of the X-rays combined with the ability to focus the beam to a micron in diameter means we can pour lots of X-rays into a small area quickly, then rapidly move to the next region."

Berkeley Lab's ALS is a synchrotron storage ring designed to accelerate electrons to energies of nearly 2 billion electron volts (GeV) and extract from them the world's brightest beams of soft (low-energy) X-rays and ultraviolet light through use of bending, wiggler, or undulator magnetic devices.

Submitted by DOE's Berkeley Lab

NREL ENGINEER GOES THE DISTANCE

Light that allows a student to read at night at home in his small hut in rural Chile, lean water, a vaccine refrigerator at a health clinic. These are Larry Flowers' rewards.



Larry Flowers

Flowers, a Team Leader at the National Renewable Energy Laboratory, helped form the Lab's Village Power Group in 1994 to bring electricity from renewables to rural areas of the world.

"We need to find a way to bring sustainable solutions to the 2 billion people in the world that do not have electricity," Flowers said.

The Village Power Group is dedicated to matching renewable energy technologies with rural energy needs in the international market. The essential activities include developing applications, testing systems, initiating pilot projects and conducting outreach, training and information activities.

Flowers has worked in a variety of areas centers during his 21 years at NREL— industrial applications, solar thermal and buildings research. But it was his work with the Village Power Group that took him out of the laboratory and into the field.

"I think a person really needs to be out in the field so that you understand the needs and resources of those you are trying to help find solutions," Flower said.

Flowers' attention isn't just overseas. In 1999, he was tapped to lead the Wind Powering America program, a commitment to dramatically increase the use of wind energy in the United States.

For Flowers, his work is just not about providing energy to rural areas or encouraging local governments to purchase wind energy through the Wind Powering America program, it's about thinking outside of the box.

"My advice to others is to use the strength of your calling card, which for me is the Lab, but to let your ideas and resourcefulness not be confined by that calling card."

Submitted by DOE's National Renewable Energy Laboratory