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World Trade Center dust analysis offers good news for New Yorkers

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The rubble has been cleared from the World Trade Center site, but questions still loom about the long-term health effects on people who survived the terrorist attacks. A new set of dust samples taken from around Manhattan in the days following Sept. 11, 2001, offer some much-needed good news.

A team of researchers tested debris from the collapsed towers for toxic organic chemicals and found that the potential risk of exposure from inhaling such compounds was lower than expected. The findings are scheduled to appear in the Feb. 1 print edition of *Environmental Science & Technology*, a peer-reviewed journal of the American Chemical Society, the world's largest scientific society. The article was initially published Dec. 18 on the journal's Web site.

The scientists were looking specifically for persistent organic pollutants—highly toxic compounds that pose a special problem because they endure in the environment and can be toxic to humans and wildlife. They found no evidence of high levels of two particular POPs: pesticides and polychlorinated biphenyls, which were used in hundreds of industrial and commercial applications until their production was banned in 1977.

The team did, however, estimate that the dust covering lower Manhattan contained between 100-1000 tons of polycyclic aromatic hydrocarbons—a group of compounds containing some that are classified by the U.S. Environmental Protection Agency as probable human carcinogens. But, while the amount of PAHs was high, the dust particles to which the chemicals stuck were large enough to stay out of a person's lungs, according to Paul Liroy, Ph.D., associate director of the Environmental and Occupational Health Sciences Institute in Piscataway, N.J., and an author of the study.

"The fact that the particles were primarily above 10 micrometers in diameter would mean that the deposition was in the upper airways of the respiratory system and readily cleared rather than fine particles, which would deposit deeper in the lung," Liroy says. "That means, in terms of potential lifetime exposures, we were probably going to be lucky in that these may not be exposures of significant health risk."

Immediately after the attacks, the majority of people focused their attention on asbestos, Liroy says. But he and his colleagues felt the only way to understand the situation was to determine everything people could possibly have been exposed to. In contrast to what we normally do every day in environmental sciences, this was a catastrophic event," Liroy says. "We had no clue what was in there and what sizes and ranges, so our goal was to do a full characterization of the entire aerosol."

Lioy and others were invited to Ground Zero to help assess the impact on public after the attacks. They took samples from 13 locations around the World Trade site from Sept. 12-17. In an earlier paper, published in *Environmental Health Perspectives*, the group performed a more general analysis on the samples and reported that the dust had a high level of glass fibers and a high pH. "Most of the responses were probably due to the very long fibers which we reported in our first paper and the high pH of the cement dust that was released in the first few days," Lioy

Phase II of the experiment, which is reported in the current paper, was led by Jo Offenberg, Ph.D., of Rutgers University. The team focused mainly on the persistent organic pollutants and their potential for long-term health risks. They also looked if there was some uniformity in the way the PAHs were spread around Manhattan

Three of the samples constituted a north-south transect down Church Street, on the east side of the epicenter. The concentrations of PAHs in these samples increased toward the south, which is in keeping with the wind direction immediately after the disaster: The wind blew to the east/northeast during the first 12-18 hours, carrying debris, dust and smoke to the East River and beyond. Then the winds shifted to south, carrying the dust over Battery Park and south to New Jersey.

The research group plans to use this information along with samples taken indoors to study potential health risks regarding the cleaning of people's houses and apartments. "Although it's a big number — 100-1000 tons of PAHs — it's not the only health concern," Offenberg says. "Simply having three inches of concrete dust in one's room is a very unique experience, in terms of cleaning up. You don't just get out vacuum cleaner and run it."

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