



*“Benefits of the study will be national and local in scope.”*

# Urban Dispersion Program New York City

## Purpose and sponsors of this study

The New York City Urban Dispersion Program is a four-year (2004-2007) research project whose major objective is to study how air flows in an urban environment. The objective will be accomplished by:

1. Improving the permanent network of wind stations in and around New York City (NYC) to estimate better where contaminants may travel and enhancing the city’s emergency response capabilities,
2. Conducting field studies in NYC to advance knowledge about the movement of contaminants in and around NYC and into and within building interiors,
3. Improving and validating computer models that simulate the atmospheric movement of contaminants in urban areas using data collected from the field studies, and,
4. Transferring the improved capabilities to NYC emergency agencies.

The program is primarily sponsored by the U.S. Department of Homeland Security with additional support from the Defense Threat Reduction Agency of the U.S. Department of Defense and by the U.S. Department of Energy.

## Function of the field study

Field studies in NYC are an essential component of the Urban Dispersion Program. They provide data for improving and validating atmospheric models to simulate the dispersal of contaminants in and around cities, into building interiors, and into the surrounding regions. These models are used by emergency management, law enforcement, and intelligence personnel to plan for, train for and respond to potential terrorist attacks and accidents involving toxic industrial chemicals. The NYC field studies will build on the knowledge gained from comprehensive field studies conducted in the smaller cities of Salt Lake City (2000) and Oklahoma City (2003). Information about the previous two studies is available at the following web sites: <http://urban.llnl.gov>, <http://ju2003.pnl.gov>.

In an urban dispersion field study, numerous portable wind-sampling instruments are placed in and around the study area to measure wind patterns. A safe-inert tracer gas is released into the air, and the sampling instruments measure the movement of the tracer throughout the study area. While urban field studies generally last from two-to-four weeks, only five-to-ten days of actual tracer gas releases take place during the study period.

## When and where the initial study will occur

Under the New York City Urban Dispersion Program, three field studies are planned, a preliminary study scheduled for March 2005, and two extensive studies tentatively planned for August of 2005 and spring of 2006.



*Instruments that measure winds and temperatures in the city and above building tops.*



*“...major objective is to enhance the city’s emergency capabilities...”*

The first Urban Dispersion Program field study will be conducted within approximately one-half mile of Madison Square Garden (W. 33rd Street and 8th Avenue in midtown Manhattan) with safe, inert perfluorocarbon tracers (PFTs) released outdoors in the vicinity of the Garden. Two days of tracer studies are planned to be accomplished during the two-week period from March 7 through March 21, 2005. The two-week period is intended to allow for at least two days of settled weather before releasing the tracers.

Six PFTs will be released at five locations (two PFTs at one location) near Madison Square Garden. They will be measured by 21 portable, battery-powered samplers attached to light poles extending out to 400 meters from the Garden and by 10 samplers located on top of surrounding buildings. Tracer samples will also be collected using personal samplers that will be carried by 12 individuals located in and around the Garden area and Penn Station.

Winds will be measured with 17 temporary weather stations at 14 locations in the study area. At the end of each study day, the tracer samples will be collected and taken to a laboratory for analysis. All of the portable wind stations will continuously record data, which will be periodically retrieved during the two-week study period.

## Are perfluorocarbon tracer gases safe?

Yes. All three field studies in New York City will use low concentrations of perfluorocarbon tracer gases. PFTs are colorless, odorless, biologically inert, non-toxic and non-combustible gases. Government and private organizations in the United States and Europe have safely and successfully used tracer gases for many years in both indoor and outdoor studies. PFT compounds can be inhaled and ingested with no concern and are safe for human exposure at high concentrations. For example, in the article “The (Liquid) Breath of Life” (Science, Vol. 245, pp. 1043-1045, Sept. 8, 1989), a perfluorocarbon fluid in the lungs of a premature infant can facilitate normal breathing in the immature lung membranes. The article also mentions the use of perfluorocarbons as artificial blood substitutes (p. 1045) as does the article “Different Paths to a Human Blood Substitute” (NY Times, p. D5, July 8, 1992).

## Why pick NYC for this study?

New York City is an ideal site for the field studies because of its large urban setting, which adds to the understanding of urban dispersion gained from the previous studies in smaller cities. NYC representatives have provided vital support and assistance to program sponsors and coordinators by identifying community groups and New York City agencies for briefings on the Urban Dispersion Program.

Benefits of the study will be national and local in scope. Ultimately, the nation benefits from the improvement of its emergency response capability and from the testing and refining of outdoor and indoor atmospheric dispersion models that can be applied to most cities.

Locally, New York City will have access to an unparalleled site-specific data set useful for improving local emergency response as well as testing atmospheric dispersion models. Precise information on local winds and other meteorological quantities (such as temperature and precipitation) may also greatly assist in local weather forecasting and in emergency response planning by the fire department and other city or state agencies.

Research scientists in the Urban Dispersion Program come from the U.S. Department of Energy’s national laboratories, research laboratories operated by the Department of Homeland Security, the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, the Department of Defense, and various universities.

### For more information

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