

# Research Facilities Available for Your Use





# Introduction

In recognition of the breadth and complexity of the research challenges posed by environmental issues, the U.S. Environmental Protection Agency (EPA) is exercising its position of leadership by advancing a new, more collaborative business model for conducting environmental research. With its valuable and highly specialized research facilities located in laboratories and research centers across the country, EPA aims to foster research partnerships with other federal agencies, states, private sector companies, utilities, nonprofit organizations, and academic institutions interested in addressing environmental issues. By sharing its skills, knowledge, and research facilities and equipment, EPA will serve as a catalyst for progress in efforts to identify, understand, and solve current and future environmental problems. This brochure highlights a few of EPA's unique facilities where opportunities for productive research alliances exist. Information about additional avenues for collaboration can be found at [www.epa.gov/facilities\\_network/](http://www.epa.gov/facilities_network/).





# Drinking Water Research Facilities

Cincinnati, Ohio

**T**wo unique drinking-water pilot plants are on site at EPA's Cincinnati research facilities. These large-scale (6.4 L/min) pilot plants can be used to study contaminants in drinking water. Water is trucked from nearby rivers, reservoirs, and ground water sources and stored in the plant's 5,000 gal. raw water storage tank. Contaminants, chemicals, or microbes may be added to the raw water, as needed. Because the tanks are made primarily of stainless steel and glass, they can be used to study contaminants at very low concentrations. The tanks have been configured to employ coagulation, clarification, filtration, direct filtration, biological filtration, and softening. They can operate in series (softening following coagulation) or in parallel (comparative coagulants, comparative filter media, comparative disinfectants); and such disinfectant oxidants as chlorine, ozone, chloramine, and chlorine dioxide can be introduced at several locations. Clear wells can be dedicated to filters or pooled to provide large volumes (up to 600 gal.) for sampling and concentration. These facilities have been used for the study of disinfection by-products, both organic (including trihalomethanes and haloacetic acids) and inorganic (bromate) and for studies for the control of pesticides, bacteria, viruses, *Giardia* cysts, and *Cryptosporidium* oocysts.



## R.V. *Lake Explorer* Duluth, Minnesota

**T**he **Research Vessel *Lake Explorer*** provides state-of-the-art research capabilities to monitor and assess the health of the Great Lakes and determine the effects of pollution and natural and human-caused disturbances. The vessel is an integral part of EPA's research operations in Duluth and is operated by a three-person crew and can accommodate a scientific staff of seven.

This 82-ft-long, 18-ft-wide vessel is powered by twin 900-hp diesel engines, two five-blade propellers, and twin 50-kW generators. With a maximum cruising speed of 18 knots and an range

of 925 nautical miles, the ship has an economic cruising speed of 12.5 knots.

The *Lake Explorer's* research capabilities include: Global Positioning System navigation; deck crane and stern A-frame with hydrographic tow winch to collect samples; suite of electronic sensors for water quality and biological profiling; sonar equipment to characterize lake bottoms; other sampling and collection gear; and an on-deck laboratory. An Optical Plankton Counter is used to measure the real-time distribution and nature of small animal and plant communities as it is towed behind the vessel and oscillated up and down through the water.







Chapel Hill, North Carolina

## Human Studies Facility

**T**he Human Studies Facility, located on the campus of the University of North Carolina at Chapel Hill, offers scientists the ability to study the health effects of airborne pollutants using **state-of-the-art exposure chambers**. The chambers can deliver most gaseous pollutants at precise concentrations and atmospheric conditions, and their instrumentation permits the measurement of pollutant-induced changes in lung function and heart-rate variability. The facility contains five Rochester-style chambers, four audiometric isolation rooms, and four *in vitro* exposure systems. Existing pollutant-delivery capabilities include ozone, sulfur dioxide, nitrogen dioxide, and volatile organic compounds.

## Human Studies Facilities

## Multipollutant Control Research Facility

Research Triangle Park, North Carolina

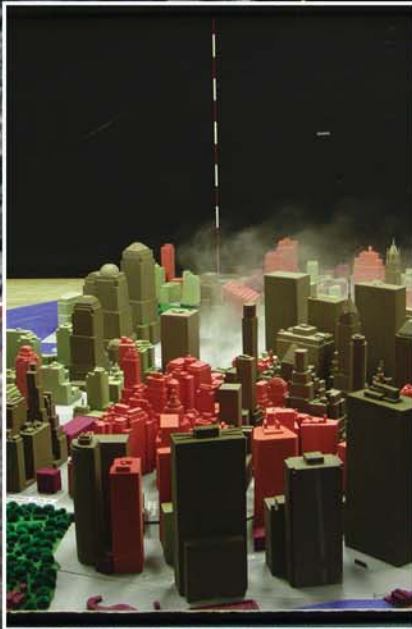
**T**he recently constructed multipollutant control research facility (MPCRF) supports development of new flue gas cleaning technologies for stationary sources of air pollution closely simulating full-scale emission sources. The combustor is able to fire pulverized coal, distillate oil, and/or natural gas at 4 million Btu/hr, yielding flue gas flow at 300°F (150°C), entering into the MPCRF's wet and dry flue gas cleaning systems. This research aims to develop technologies that can simultaneously control NO<sub>x</sub>, SO<sub>x</sub>, particulate matter, and/or mercury. This is important research for multipollutant-control programs.





Research Triangle Park, North Carolina

## Meteorological Wind Tunnel



**E**PA's campus in Research Triangle Park houses a state-of-the-art meteorological wind tunnel for air pollution dispersion studies in both urban and rural settings. A detailed characterization of pollutant concentrations and turbulent air-flow patterns around scaled models in this controlled laboratory environment provide a better understanding of atmospheric physics and serves as a critical basis for the development of computer-based atmospheric models for predicting impacts from emissions. In the wind tunnel, both scale models of simple building geometries and models of actual cities help scientists understand the flow in and around buildings and urban street canyons, where scientists can observe complex vertical and horizontal motions such as channeling, re-circulation, and vertical venting. EPA researchers used this facility to evaluate the transport and dispersion of airborne pollutants released by the collapse of the World Trade Center buildings. Pictures of the 1:600 scale model of lower Manhattan in the wind tunnel can be viewed at [http://www.epa.gov/asmdnerl/wtc\\_amd.html](http://www.epa.gov/asmdnerl/wtc_amd.html)

## Meteorological Wind Tunnel

## Test & Evaluation

## Test and Evaluation Facility

Cincinnati, Ohio

**T**he Test and Evaluation (T&E) Facility is a multi-purpose, high-bay research facility. Research here involves a wide range of testing and evaluation of pilot and bench-scale water, wastewater, and hazardous waste treatment technologies. The facility includes on-site chemistry laboratories and a machine shop. Additionally, the T&E facility is a RCRA permitted treatment, storage, and disposal facility that holds an Ohio EPA treatability exclusion which permits treatability studies using quantities of all categories of hazardous waste.





Gulf Breeze, Florida

## Coral Research Facility



The Coral Research Facility offers scientists the unique capability of assessing multiple stressor effects on coral and their algal symbionts in a controlled laboratory environment. Scientists here have cultured over 10 species of reef building corals and 28 *Symbiodinium* cultures representing the major clades in the world's corals. Coral culturing allows for the maintenance of genetically identical coral clones and symbiont species for repeated experiments over time. The coral facility includes two environmental testing systems that provide controlled exposures of coral to the combined effects of temperature and ultraviolet radiation (UV). Research instrumentation includes spectroradiometers to precisely measure UV test doses and pulse amplitude modulation fluorometry to quantify inhibition of photosynthetic efficiency. Researchers can adapt laboratory test systems to evaluate dose-response relationships for other stressors including contaminants and nutrients.

Coral Research

## The Environmental Photographic Interpretation Center

Reston, Virginia and Las Vegas, Nevada

A repository of **unique and irreplaceable remote sensing data** has been developed over the past 30 years. This archive, located in Las Vegas and used by EPIC staff in Las Vegas and Reston, contains more than 5,500 rolls and 75,000 cut-frames of aerial photography; more than 4,250 reports; and more than 4,000 CD-ROMs of digital data from various sensors including Landsat Thematic Mapper, IKONOS, AVIRIS, Hyperion, and Hymap. Some of the archive's aerial photographs date from the early 1900s, and new geospatial data are continuously being added. The archive's materials have been inventoried and bar-coded and are managed by specialized library software.

Environmental Photographic Interpretation  
Research & Development  
US Environmental Protection Agency

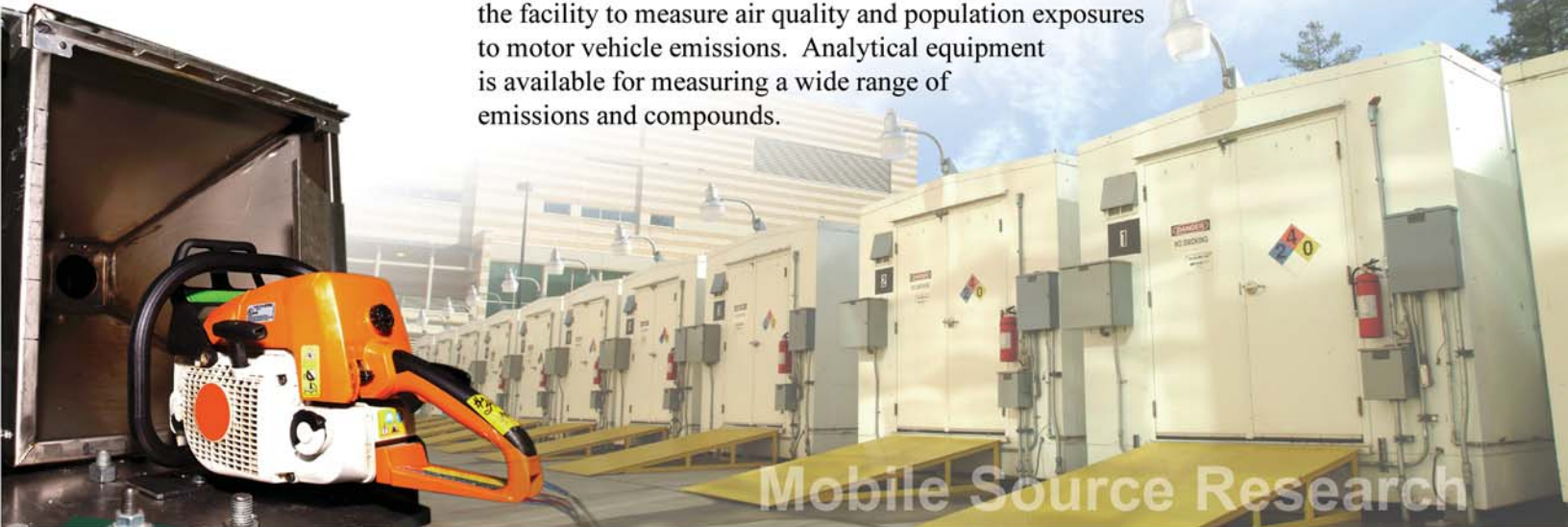




# Mobile Source Research Facility

Research  
Triangle Park,  
North Carolina

**A** number of unique, state-of-the-art resources for the characterization and source profiling of motor-vehicle emissions and off-road-engine exhaust are available. Motor-vehicle-emissions research can be conducted by a chamber capable of maintaining temperatures in the range of -20°F to 100°F. Also available is a suite of small-engine dynamometers to conduct emissions research on small hand-held engines (string trimmers, leaf blowers, chainsaws), lawn mowers, and outboard motors. There are 10 new above-ground gasoline storage tanks which provide the capability to test vehicles using a wide assortment of fuels (e.g., summer- and winter-grade gasolines, oxyfuels, reformulated gasolines, and custom fuel blends) and fuel additives. The facility also operates a portable chassis dynamometer and portable analytical lab capable of conducting emissions research at remote sites under ambient conditions. Mobile ambient monitoring platforms are maintained at the facility to measure air quality and population exposures to motor vehicle emissions. Analytical equipment is available for measuring a wide range of emissions and compounds.



## Environmental Chambers

Athens, Georgia

**T**wo walk-in controlled environmental chambers are available at EPA's research laboratory in Athens. Researchers can use these controlled systems to examine the effects of climatic and human perturbations on soil and aquatic processes. Each chamber has a computer control system that regulates temperature, humidity, CO<sub>2</sub> content, photoperiod, and spectral irradiance. The chambers have doors that provide easy access to the 3.5 m<sup>2</sup> internal study area and are equipped with microprocessor controllers, sensing devices, and lamp canopies.

In addition to these walk-in chambers, the laboratory operates a 45-ft mobile laboratory designed to conduct on-site sampling and field analyses. The mobile laboratory has gas-cylinder storage and gas-line hookups, as well as a fully functional 5-ft fume hood capable of handling most instrumentation and most experiments that can be done in conventional laboratory settings. The mobile laboratory has a full-size explosion-proof refrigerator and freezer for sample preservation and storage, a deionized water system, a fresh water system, and hot water.

Environmental Chambers







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EPA 600/F-04/040 June 2004 www.epa.gov/facilities\_network/



For additional information about these facilities and to learn more about options for forming collaborative networks with EPA researchers, contact:

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