In this Newsletter, we seek to:

- inform the public about the research that is being carried out by scientists at National Institute of Environmental Health Sciences (NIEHS) Centers to investigate the environmental and health consequences of the World Trade Center (WTC) disaster, and;
- provide information arising from this research that is useful in understanding and coping with the environmental impacts that followed the WTC disaster on September 11, 2001.

The Centers involved in these research studies have included:

NIEHS Children’s Centers at Columbia University and Mt. Sinai School of Medicine (MSSM), and; the NIEHS Environmental Health Centers at Columbia University, New York University (NYU) School of Medicine (along with collaborators at the University of Rochester), University of Medicine & Dentistry of New Jersey (UMDNJ at Rutgers), Johns Hopkins University, and the University of North Carolina (UNC, and its collaborator Hunter College). This Newsletter provides a concise summary of these NIEHS Centers’ latest efforts at evaluating the environmental and health impacts of the pollution that emanated from the WTC disaster fires.

Translating our NIEHS Environmental Health Research Center scientists’ knowledge and expertise into greater community knowledge and awareness has always been the goal of our NYU-NIEHS Community Outreach and Education Program (COEP). Our COEP has made a concerted effort to keep in touch with the community through our newsletters, community forums, and a WTC web site.

Please use this newsletter as an informational resource. It provides a brief summary of the ongoing NIEHS-funded research into the continuing environmental health concerns about the WTC disaster. In addition, there is a glossary of environmental health terms and acronyms, a list of useful Internet websites, and other related information.

ONGOING STUDIES OF WTC DISASTER CONTAMINATION EFFECTS

WTC Air Pollution Exposure Studies

Following the collapse of the WTC buildings, dust spread throughout lower Manhattan. The NYU-NIEHS Center is evaluating the community exposures to dust and particle air pollution resulting from the World Trade Center disaster.

Drs. Lung Chi Chen and George Thurston and their NYU team of investigators have analyzed dust “fallout” samples collected near Ground Zero (and from apartment buildings nearby in lower Manhattan), as well as daily air pollution samples near Ground Zero beginning days after 9/11. NYU has been evaluating
these samples for their composition and toxicity. Ambient air samples were collected at the NYU Downtown Hospital on Beekman Street in lower Manhattan, and at Hunter College in midtown for comparison.

While it has been found that most of the WTC dust particles were large and, thus, were unlikely to penetrate past the throat into the lung, the larger dust particles were found to be more alkaline and, therefore, were very irritating to the nose and throat. This is consistent with the symptoms and complaints of “WTC cough” that many individuals have experienced as a result of exposure to WTC dust. Indeed, in recent research conducted by Dr. Lung Chi Chen at NYU in collaboration with the U.S. Environmental Protection Agency (USEPA), it was found that the WTC dust samples can cause airway irritation and reactivity in tests on laboratory animals, and were even more irritating than Mount St. Helens eruption dust. The NYU dust research indicates that it is biologically plausible that human exposures to WTC dust could make heavily exposed persons more reactive to things in the air.

Dr. Paul J. Lioy and his fellow researchers at the Rutgers University affiliated Environmental and Occupational Health Sciences Institute (EOHSI) UMDNJ-NIEHS Center have most recently focused their WTC pollution investigations on a reconstruction of the WTC plume exposures and collaboration with other NIEHS investigators who are studying the potential health effects. The research team of the Computational Chemodynamics Laboratory (CCL) of EOHSI has developed a model characterizing exposures to contaminants released from the fire and collapses at the World Trade Center on 9/11/2001. Over the past year, this effort has been pursued in close coordination with the USEPA-funded WTC plume reconstruction modeling study. Applications of model results to specific health impact characterization studies are currently in close collaboration with other research teams at EOHSI, MSSM, NYU and other Centers.

A recent study conducted by the UNC-NIEHS Center measured nine potentially cancer-causing Polycyclic Aromatic Hydrocarbons (PAHs) in 243 air pollution samples collected at the Ground Zero fence line and at 290 Broadway (about 0.5 km away) during September 23, 2001 through March 27, 2002. Based on time trends of individual PAHs, they differentiated between fire and diesel sources and predicted PAH levels between 3 and 200 days (d) after the disaster. The researchers inferred that these high initial air concentrations resulted from fires that rapidly diminished over 100 days. Diesel sources predominated for the next 100 days, during which time PAH levels declined slowly to background values. Because elevated PAH levels were transient, any elevation in cancer risk from PAH exposure should be very small among non-occupationally exposed residents of NYC.

Further research into the WTC fires “plume” pollution by Dr. George Thurston and collaborators at the NYU-NIEHS Center indicates that the fires’ smoke was very highly concentrated with toxic pollutants, including lead and potentially cancer-causing chlorine compounds. While exposures to this pollution plume were brief in the community (as the plume was hot and generally rose into the air rapidly, and because the fires were extinguished by the end of 2001), the fire pollution exposures were intense. Thus, the possibility exists of adverse health effects from the fires’ pollution among especially susceptible individuals and those working at the WTC site who did not wear adequately protective breathing masks.

Since June 2003, the World Trade Center Environmental Database (WTCECD) has been available to the public at the http://wtc.hs.columbia.edu. The creation of the web site has been a joint effort between the Columbia University and Johns Hopkins University NIEHS Centers. The goal of this effort is to help put WTC contaminant compositions and levels into a New York City historical context. The database currently is comprised of data generated from monitors that were placed in response to the WTC disaster (post 9/11 data), as well as USEPA ambient air pollution data. These include data collected on samples of outdoor air, outdoor bulk
dust, indoor air, and indoor dust wipes specifically in response to the disaster by the USEPA and New York State. Over 300 parameters are present, including particulate matter (PM) mass, volatile organic compounds (VOCs), dioxins, polychlorinated biphenyls (PCBs), metals, asbestos, and air quality data routinely reported to the USEPA’s Aerometric Information Retrieval System (AIRS) data repository from fixed-site air quality monitoring stations run by local, state and federal environmental agencies from 1970 onward. This database is intended for use by individuals interested in having access to raw data in order to explore exposures related to the WTC disaster or general air quality issues in NYC and New Jersey.

Health Effects Among Community Residents in Lower Manhattan

A research team led by Dr. Joan Reibman of the NYU School of Medicine conducted a study to find out if there was an acute or chronic respiratory health impact on the residents of the WTC area. This clinical and epidemiologic study assessed the extent of new respiratory problems after September 11, 2001 among previously healthy persons, as well as in residents of lower Manhattan with pre-existing asthma. Respiratory symptoms were evaluated by questionnaire, and lung function was evaluated in a subset of the study population. Collaborating on this WTC Residents Respiratory Health Study are the New York State Department of Health, NYU School of Medicine/Bellevue Hospital and the Center for Urban Epidemiologic Studies, NYU Downtown Hospital, Governor Health Clinic and the American Lung Association of New York City.

The study focused on residents living in apartment buildings within a 1 mile radius of Ground Zero (approx. 9,500 households) versus “control” residents living in comparison apartment buildings more than 5.5 miles from Ground Zero (2,300 households in upper Manhattan and Queens). Individuals also completed the same questionnaire three months later. Individual interviews and simple pulmonary lung function tests were also performed in order to measure the presence of airway obstruction. In addition, a limited subset of the participants from each group took part in lung function tests at Bellevue Hospital in order to determine if residents nearer the WTC now have different lung airway characteristics than residents living further away.

Residents in the "exposed" and "control" areas returned some 2812 surveys. New respiratory symptoms were reported at a higher rate in previously normal residents in the "exposed area" vs. "control area". Despite increased respiratory symptoms in the WTC pollution exposed group, the study did not detect statistically significant differences in lung function between the “exposed” and “control area” groups. However, an increase in lung hyper-responsiveness to irritants was detected among some "exposed residents" with persistent symptoms.

These results indicate an increased incidence rate of upper and lower respiratory symptoms in a previously healthy population living near the former WTC compared to a control population. In addition, this study suggests that increased lung airway reactivity may be occurring in the exposed, symptomatic community. These data are consistent with more severe effects found in studies of the New York firefighters, and raise concerns about the possibility that Lower Manhattan residents may react strongly to any dusts generated during the planned redevelopment of Ground Zero.

Health Effects Among Pregnant Women and their Infants

The World Trade Center Pregnancy Outcome Study directed by Dr. Trudy Berkowitz of the Mt. Sinai School of Medicine is evaluating the impact of toxic pollutants released from the WTC collapse on September 11, 2001 and associated psychological stress on the health of some 182 pregnant women and their infants. A comparison group consisted of some 2,367 pregnant women not known to have been near the WTC and who delivered their babies at Mount Sinai Hospital during the same time period. Data from detailed questionnaires, as well as blood, urine and breast milk samples were obtained from each exposed woman. Researchers will also ascertain pregnancy outcomes and evaluate infant growth and cognitive and psychomotor development at ages 9 months and 2 years.

The pregnancies have resulted in 177 singleton gestations, 7 sets of twins. No significant differences were found between the WTC and control groups for mean gestational age at birth or mean birth weight. There also were no significant differences in the frequency of preterm births (< 37 weeks of gestation) or incidence of low birth weight. However, the WTC cohort had an increased risk of small-for-gestational age (SGA) infants,
defined as a birth weight below the 10th percentile expected for gestational age, as compared to the control group.

Each WTC mother’s blood has now been analyzed for combustion air pollution products in their blood as PAH-DNA adducts by the NIEHS Center for Environmental Health at Columbia University. PAHs represent potential cancer-causing compounds. An examination of levels by month of blood sample collection indicated that a higher percentage of detectable levels were found among those who donated blood in February and March 2002 (6 to 7 months after the WTC collapse). Given that PAH-DNA adduct levels are reflective of more recent exposures, this higher percentage of detectable levels could be due to WTC-related exposures.

Mt. Sinai NIEHS Center analyses examining the association between PAH-DNA adduct levels and other reported PAH-related exposures are also being conducted, such as to: occupational exposures; home heating characteristics; PAH containing foods; and cigarette smoking. It is planned to also evaluate the effects of DNA adducts on fetal size and gestational age at birth.

Drs. Frederica Perera and Sally Ann Lederman of the Columbia University Center for Children's Environmental Health are leading the WTC Pregnancy Study that is evaluating the possible health effects of exposures to WTC air pollutants on pregnant women and their babies. This study enrolled 329 non-smoking women who delivered after 9/11, almost half of whom lived or worked within 2 miles of the WTC while the remainder lived and worked further away. The study found that women who lived within 2 miles of the WTC delivered infants with significantly lower weight (-149 g) and reduced length (-0.8 cm). Only part of these reductions was due to shortening of gestation duration. Mothers in the first trimester of pregnancy on 9-11 delivered infants and may have implications for the health and development of exposed children. Maternal and fetal blood samples taken at delivery have now been analyzed for potentially toxic compounds by the laboratories of the Centers for Disease Control and Prevention (CDC). Future plans of this research study involve further evaluating relationships of exposures to newborn outcomes and assessing infant growth and mental and motor development annually through 3 years of age.

Investigations of Exposures and Health Effects among Workers at Ground Zero

The greatest health concerns continue to focus on the firefighters and rescue workers who responded to the emergency situation. An ongoing investigation of WTC workers, led by Dr. Stephen Levin of the Mt. Sinai School of Medicine NIEHS Center, has focused on the physical effects in the upper and lower respiratory tracts of the lung, as well as on psychological effects. The key issues being investigated in this study are: What health effects have been seen in rescue and recovery ironworkers, and what factors make it more or less likely for individuals to develop health effects?

As of the spring of 2004, over two hundred ironworkers were evaluated at the Mt. Sinai Center for Occupational and Environmental Medicine. Clinical exams of these iron workers found high rates of symptoms consistent with persistent, irritant-induced rhinitis and sinusitis, suggesting chemical bronchitis and irritant-induced asthma. Reactive Airway Dysfunction Syndrome (RADS).

With regard to lung symptoms, many of the ironworkers reported having a WTC-related (“WTC-initiated” or “WTC-exacerbated”) dry cough that persisted until the month prior to their medical examination at Mt. Sinai. Significant percentages reported persistent WTC-related wet cough, persistent WTC-related loss of exercise tolerance, WTC-related shortness of breath persistent to the prior month, or persistent chest pain on exertion. Upper airway symptoms that began or worsened at Ground Zero and persisted were also reported at high rates.

Lung function testing demonstrated abnormalities in WTC-exposed workers showing evidence of lung airway responsiveness, indicating airway constriction and inflammation. Comparison of rates of persistent respiratory symptoms and lung function abnormalities and significant airway responsiveness between ironworker responders and non-exposed controls are being conducted during 2004, as increased numbers of non-exposed ironworkers undergo examination. The ironworkers information to-date strongly suggest an increased prevalence of irritant-induced upper and lower respiratory abnormalities among WTC ironworkers that are consistent with inhalation exposures to the mix of airborne irritants present at Ground Zero, especially in the early days of rescue and recovery activity following the attacks on the WTC.

Dr. Alison S. Geyh and her colleagues at the Johns Hopkins School of Public Health have conducted a study to investigate exposures of truck drivers to airborne contaminants such as asbestos, particulate matter, volatile organic compounds and metals. Airborne contaminants were monitored at

A view down Liberty Street of the South Tower on the evening of September 13, 2001
Ground Zero at nine different locations. Sixty-seven truck drivers were enlisted in the study to examine their personal exposures to airborne contaminants. This research study concluded that exposure to particles was significantly elevated in the early months following 9/11, but decreased as the site was cleared.

Respiratory health was also assessed in some 183 WTC Ground Zero workers (including but not limited to truck drivers, heavy equipment operators, mechanics, laborers, and carpenters). Respiratory symptoms were assessed using a interviewer-administered questionnaire. Of the 119 workers who began working at the site with no previous history of lower respiratory symptoms, 34% developed a new cough, 24% reported new phlegm production, and 19% reported new wheeze. Of these workers, 45% reported nasal congestion, 35% resorted a sore throat and 39% reported a hoarse throat. Lung function testing demonstrated that only a very small percentage of these workers experienced impairment of lung function.

Continuing work by this group includes a mailed survey (World Trade Center Clean Up and Recovery Worker Health Survey) of approximately 1100 workers from 3 local union and the New York City Department of Sanitation who were involved in the clean up and recovery effort. This survey was designed to provide information about the potential impact of being involved at the disaster site on physical and mental health of these workers. In addition, approximately 250 union workers who were not involved in the clean up and recovery operation were also surveyed. Analysis of the results of this survey are ongoing.

Dr. Rom of the NYU-NIEHS Center has directed a clinical study of the firefighters, and has found that intense, short-term exposure to materials generated during the collapse of the WTC was associated with an increased incidence of lung hyper-responsiveness and with the development of chronic (WTC) cough. In addition, the severity of clinical and physiological effects was related to the intensity of exposure. In the first six months after September 11, 2001, WTC cough occurred in 8% of the firefighters with a high level of exposure, 3% with a moderate level of exposure, and 1% with a low level of exposure. Lung hyper-reactivity and severe cough in the firefighters were also observed.

In this project, Dr. Rom has continued to evaluate NYC firefighters with lung scans, and to compare the findings with lung function differences in the WTC exposed firefighters. Dr. Rom has also obtained blood samples from 372 heavily exposed NYC firefighters at the time of the WTC collapse. Efforts to identify proteins or protein patterns indicative of airway damage in these blood samples are underway.

### WTC COMMUNITY OUTREACH

Community Outreach and Education Programs (COEPs) at each NIEHS Center have sought to share their research results with the public. Members of the various NIEHS-funded Environmental Health Center of Excellence have participated in numerous public forums and WTC advisory panels to help inform the government and the public about the WTC pollution and potential effects. The NYU-NIEHS Center has itself hosted a series of public forums on the health and environmental effects of the WTC disaster since September of 2001. A public forum reporting the latest plans and results of the ongoing studies discussed in this newsletter was held at the NYU Lower Manhattan campus in the Woolworth Building at Barclay Street and Broadway on October 21, 2003, from 6:15-9:00 PM. This followed previous forums that were held at the Manhattan Borough Community College on October 17, 2002 and at the NYU Law School on October 17, 2001. At these Manhattan forums, research results and plans were presented by investigators who are participating in the World Trade Center (WTC) environmental health research grants administered by the National Institute of Environmental Health Sciences (NIEHS). More information on the WTC forums and NYU WTC outreach and research can be found on the web at: http://www.med.nyu.edu/environmental/research/wtc/

The UMDNJ-NIEHS Center also held forums for New
supplement focuses on WTC environmental health research through hands-on activities that integrate science, language arts, math, social studies, technology and health disciplines. Students read a case study about fictional “residents” who are concerned about the potential hazards of the dust in their lower Manhattan building. More information on the UMDNJ ToxRAP™ program can be found at: http://www.eohsi.rutgers.edu/rc/toxrap.html

The Johns Hopkins NIEHS Center’s World Trade Center Clean Up and Recovery Worker Health Survey included a series of questions about mental health. All workers who screened positive for mental health symptoms received outreach follow-up calls to refer them to appropriate services. This referral process was aided by a partnership with Columbia University’s Resiliency Program in NYC. The Resiliency Program provided direct, short-term, mental health services for individuals affected by September 11th, and their children, free of charge.

On July 7, 2004 Johns Hopkins held a workshop at the NewYorkAcademy of Medicine entitled “The Mental Health Consequences of Terrorism and Disaster among Clean Up and Recovery Workers: Where do we go from here?” Attendees included representatives from the labor unions, the New York City Departments of Sanitation and Health and Mental Hygiene, and the Resiliency Project. NIEHS Center members Drs. Frederica Perera (Columbia), Morton Lippmann (NYU), and Paul Lioy (UMDNJ) are serving on the World Trade Center Expert Technical Review Panel advising the USEPA on continuing investigations into human exposures to WTC dust. Dr. George Thurston of the NYU Center also provided testimony to the WTC Lower Manhattan Development Corporation (LMDC) regarding the potential environmental effects of plans to rebuild at Ground Zero.

Highlights of WTC environmental health research conducted by NIEHS Centers and other agencies and environmental health effects of the WTC disaster can be found at: http://eohsi.rutgers.edu/wtc/ehnetwork

The view up West Street of the pedestrian walkway and Marriott Hotel remains on September 13, 2001.
REDEVELOPING THE WORLD TRADE CENTER SITE AND SURROUNDING AREA: AN ENVIRONMENTAL IMPACT UPDATE

By Catherine McVay Hughes of AsthmaMoms

In April 2004, the Lower Manhattan Development Corporation (LMDC) released the final Environmental Impact Statement for the World Trade Center Memorial and Redevelopment Plan. This outlined the potential air quality impacts that will result in Lower Manhattan when redevelopment of the WTC site occurs. The following construction projects have begun to redevelop lower Manhattan after the 9/11 disaster:

- WTC site & Memorial and demolition of Deutsche Bank at 130 Liberty St., due to WTC contamination;
- PATH Terminal (PANYNJ);
- Fulton Street Transportation Center (Metropolitan Transportation Authority/NYC Transit);
- Fiterman Hall (owned by the New York State Dormitory Authority);
- 7 WTC (construction by Silverstein Properties has already begun at this one city block site);
- Route 9A (NYS Department of Transportation);
- South Ferry 1/9 Subway Station (MTA)

Other building projects include the Goldman Sachs headquarters (1/2 large city block) and Sites 5B/C (1/2 large city block), and ongoing road and utility repair.

In the past year, two positive steps have taken place that will improve air quality downtown.

1. **ULSD fuel & retrofit of non-road diesel engines.** A new law is in effect that will reduce air pollution from nonroad diesel engines in NYC by requiring city contractors to use cleaner, ultra low sulfur diesel fuel (ULSD) and the best available retrofit technology to curb particulate matter and smog-forming emissions.

2. **New York Harbor Private Ferry Emissions Reduction Program.** It will cut pollution from the diesel-powered private vessels by identifying and implementing technologies that dramatically reduce harmful emissions. This landmark program is a result of a coalition of State, City and Federal agencies working together with Environmental Defense and Rutgers University.

However, testimony regarding the plan has pointed out that much more can and needs to be done to minimize negative environmental impact on the WTC residents and workers.

**Some possible measures suggested for incorporation into the rebuilding process include the following:**

- **Monitor Air Quality.** Ongoing air monitoring during the years of construction around the WTC related redevelopment projects is essential to insure that proper steps are actually taken to minimize mobile and stationary air pollution sources. This real-time data would aid in determining the extent of the use of available mitigation measures required. Air quality data should be posted on a website and frequently updated. Air monitoring will be especially critical with the 9/11 related demolition of the two large buildings (Deutsche Bank Building at 130 Liberty Street and Fiterman Hall at 30 West Broadway) and clean up of 130 Cedar Street. Measures can be taken to contain the contaminants currently present in the buildings and insure that the buildings are properly sealed with no open areas, such as a protective barrier around the entire building façade prior to demolition.

- **Install HEPA Filters at fresh air inlets in nearby residential and commercial buildings.** It has been suggested that the Federal Transit Administration (FTA) not only consider, but implement what Lower Manhattan Development Corporation (LMDC) proposed in their Final Generic Environmental Impact Statement (FGEIS):

> “...if necessary to avoid exposing residents to short-term exceedances of the PM NAAQS, LM D C will investigate the implementation of location specific measures, such as the installation of HEPA filters at fresh air inlets in hotels and office buildings, and the purchase of air conditioning units with HEPA filters for residences with operable windows, in the immediate vicinity of the project site.”

- **Enforce existing legislation, especially the use of Ultra Low Sulfur Diesel (ULSD) fuel and retrofit for non-road machines,** and the idling law. Since the ambient air quality impact analysis assumed the use of ULSD fuel for certain types of on-site equipment for construction and the implementation of Environmental Performance Commitments (EPCs), this is necessary to avoid violating existing air quality standards. Implement Environmental Defense’s suggestion that there is onsite emissions testing to ensure compliance and post results on a web site. In addition, all construction equipment should be marked with a label or sticker that certifies that they are using ULSD fuel, as well as retrofit technology. The engine of a motor vehicle, including a bus, may not idle longer than three minutes while parking, standing or stopping, according to NYC’s Administrative Code.

- **Retrofit moving diesel vehicles with the best available retrofit technologies (BART).** This is especially important for concrete trucks, debris trucks, tourist and commuting buses.

- **Incorporate offsetting reduction measures anywhere in the impacted areas if there are still exceedances in particle pollution, despite using all mitigation measures.**

How the WTC area gets rebuilt is important to the environmental health of the WTC community, especially since the construction has only just begun and is expected to last for the next decade.
Useful Definitions

Derived from Lungs in Health and Disease from the National Heart, Lung, and Blood Institute and Bronchoscopy: Pulmonary Branch Protocols from the National Institutes of Health, Clinical Center.

- **Asthma**: Respiratory condition marked by recurrent attacks of wheezing, coughing, shortness of breath, and labored breathing caused by narrowing of the airways.
- **Bronchitis**: Inflammation of the bronchi. Acute bronchitis comes on suddenly and usually clears up in a few days. Chronic bronchitis lasts for a long period and recurs over several years.
- **Bronchoscopy**: A routine diagnostic procedure that lets your doctor see inside your lungs and possibly to get tissue to examine. The procedure uses a bronchoscope: a small, narrow, tube with a light and lens at the tip.
- **Chronic**: Of long duration, frequently recurring.
- **DNA**: Deoxyribonucleic acid; a nucleic acid that carries the genetic information in a cell and is capable of self-replication.
- **DNA Adducts**: Bonds between chemical mutagens and DNA. Unless repaired prior to DNA replication, they may lead to chromosome rearrangements.
- **Lung volume**: Amount of air in the lungs. The total volume of air in the lungs is subdivided into compartments (volumes) and capacities (combinations of two or more volumes). In general, lung volumes increase in obstructive lung diseases and decrease in restrictive lung diseases.
- **Obstructive lung diseases**: Disease due to narrowing of any portion of the airways that obstructs airflow; examples are COPD (Chronic Obstructive Pulmonary Disease), cystic fibrosis, and asthma.
- **Pulmonary**: Relating to the lungs.
- **Pulmonary Function Tests**: Procedures used for measuring how well the lungs are working. The most common tests measure the ability of lungs to move air into and out of the lung.
- **PPB**: Parts Per Billion
- **PPM**: Parts Per Million
- **PM**: Particulate Matter. Particles emitted from diesel exhaust, and processes that generate dust such as the burning and collapse of the WTC
- **Reactive Airways Dysfunction Syndrome (RADS)**. This denotes the development of a persistent asthma-like condition with airway hyper-responsiveness developing in a previously healthy asymptomatic individual within 24 hours of a single exposure to concentrated respiratory irritants.
- **Spirometer**: Instrument used to measure lung air volumes and flow rates.
- **ToxFAQs**: Agency for Toxic Substances and Disease Registry (ATSDR) has a terrific series of summaries about hazardous substances at http://www.atsdr.cdc.gov/toxfaq.html
- **VOCs**: Volatile Organic Compounds (e.g. benzene, toluene, ethyl benzene, xylene, and naphthalene).

WTC Web Links

NYU WTC Information Website:
http://www.med.nyu.edu/environmental/research/wtc/

Environmental Health Effects of WTC: Summary of Research
http://ehsi.rutgers.edu/wtc/ehnetwork/effects.shtml

USEPA Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster
http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=54667

Redevelopment Environmental/Plan Review (LMDC)
http://www.renewnyc.com/plan_des_dev/environmental_review.asp

World Trade Center Expert Technical Review Panel
http://www.epa.gov/wtc/panel/

Toxicological Effects of Fine Particulate Matter Derived from the Destruction of the World Trade Center
http://www.epa.gov/nheerl/wtc/WTC_report_7b3l.pdf

http://www.atsdr.cdc.gov/HAC/asbestostoc/asbestostoc.html

Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks
http://tera.org/peer/WTC/welcome.htm

Environmental studies of the World Trade Center area after the September 11, 2001 attack.

World Trade Center Medical Monitoring Program
http://www.wtcexams.org/

World Trade Center Health Registry

A vehicle parked three blocks south of Ground Zero on Rector Street.