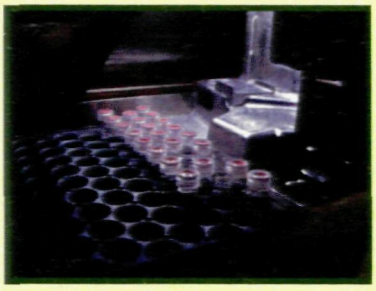
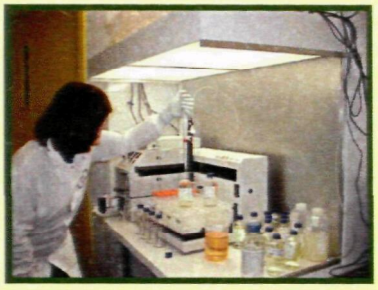
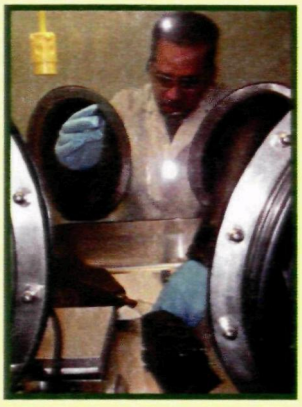
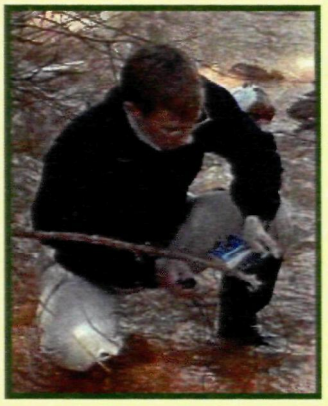
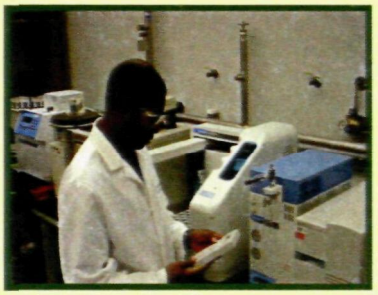
Regional Laboratory System FY 2007 Annual Report




EPA Regional Laboratories…Advancing the Agency's Science Agenda

U.S. Environmental Protection Agency

REGIONAL LABORATORY SYSTEM
2007 ANNUAL REPORT

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US EPA REGIONAL LABORATORIES

Region 1:

New England Regional Laboratory
Robert Maxfield, Director
maxfield.robert@epa.gov
11 Technology Drive
N. Chelmsford, MA 01863-2431
Phone: 617-918-8311
FAX: 617-918-8540

Region 2:

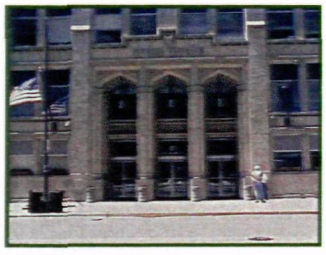
Division of Environmental Science and
Assessment Laboratory Branch
Deb Szaro, Director
szaro.deb@epa.gov
2890 Woodbridge Ave.
Edison, NJ 08837
Phone: 732-.321-6706
Fax: 732-321-6165

Region 3:

Environmental Science Center
Cynthia Metzger, Director
metzger.cynthia@epa.gov
701 Mapes Road
Ft. Meade, MD 20755-5350
Phone: 410-305-2659
Fax: 410-305-2666

Region 4:

Analytical Support Branch
Gary Bennett, Director
bennett.gary@epa.gov
980 College Station Road
Athens, GA 30605-2720
Phone: 706-355-8551
Fax: 706-355-8803



Region 5:

USEPA Region 5 Lab, Central Regional Lab
Dennis Wesolowski, Director
wesolowski.dennis@epa.gov
536 S. Clark Street
Chicago, IL 60605
Phone: 312-353-9084
Fax: 312-886-2591

US EPA REGIONAL LABORATORIES

Region 6:

Environmental Services Branch
Houston Laboratory
David Neleigh, Director
neleigh.david@epa.gov
10625 Fallstone Rd.
Houston, TX 77099
Phone: 281-983-2100
Fax: 281-983-2124

Region 7:

Regional Science & Technology Center
Michael Davis, Director,
Regional Laboratory
davis.michael@epa.gov
300 Minnesota Ave.
Kansas City, KS 66101
Phone: 913-551-5042
Fax: 913-551-8752

Region 8:

USEPA Region 8 Lab
Tony Medrano, Acting Director
medrano.tony@epa.gov
16194 West 45th Dr.
Golden, CO 80403
Phone: 303-312-7700
Fax: 303-312-7800

Region 9:

USEPA Region 9 Lab
Brenda Bettencourt, Director
bettencourt.brenda@epa.gov
1337 S. 46th Street, Bldg. 201
Richmond, CA 94804-4698
Phone: 510-412-2300
Fax: 510-412-2302

Region 10:

Manchester Environmental Laboratory
Barry Pepich, Director
pepich.barry@epa.gov
7411 Beach Drive East
Port Orchard, WA 98366
Phone: 360-871-8701
Fax: 360-871-8747

EXECUTIVE SUMMARY

The Regional Laboratory System is an inter-dependent network of the ten regional laboratories of the United States Environmental Protection Agency. These laboratories provide the analytical, technical and programmatic support that is critical to accomplishing the Agency's mission of protecting human health and the environment. The regional laboratories ensure that analytical and technical expertise are available at the regional level and are well positioned to rapidly address the ever changing needs of a variety of environmental programs.

The terrorist attacks of September 11, 2001 have caused EPA to reevaluate the types of events which might result in environmental emergencies and require laboratory support. As a result, the role of the regional laboratories in relation to EPA's Strategic Plan for Homeland Security has continued to increase. In FY 2007, the Regional Laboratory System expended significant effort to enhance regional response capability in order to respond to emergencies. With support from the Water Security Division, the ten regional laboratories lead a national effort to improve drinking water laboratory preparedness. In addition, the regional laboratories provided significant support for a number of other Homeland Security related efforts including pilot development of fixed laboratory capability for chemical warfare agents (CWA); development of an All Hazards Receipt Facility; assistance in the development and deployment of the Portable High Throughput Integrated Lab Identification System (PHILIS); and validation of methods contained in EPA's "Standardized Analytical Methods for Use during Homeland Security Events."

In addition to increased support for Homeland Security related efforts, the demand for laboratory analytical services remained high in FY 2007. The regional laboratories continued to provide a full range of routine and specialized chemical and biological testing of air, water, soil, sediment, tissue and hazardous waste for ambient and compliance monitoring as well as criminal and civil enforcement activities. In FY 2007, the regional laboratories performed over 100,000 analyses. The Superfund program was the largest client for laboratory analytical services, accounting for almost 66% of the total analytical throughput of the laboratories. The regional laboratories' analytical capacity is enhanced by the Environmental Services Assistance Teams, an on-site contract that provides analytical and data management support to the Regions' Superfund programs.

The regional laboratories also provide a variety of field analytical support ranging from analyses performed in mobile laboratories on-site to screening techniques performed directly in the field. These services provide real time data to improve the efficiency of field operations and speed environmental decision making. In FY 2007, the regional laboratories performed 9,133 field analyses in support of a variety of regional programs.

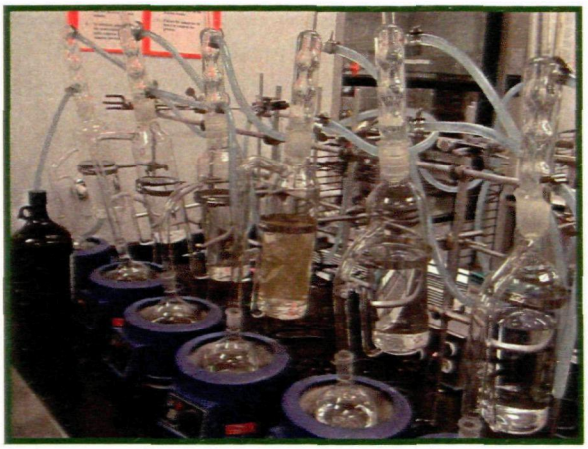
In FY 2007, the regional laboratories also continued to provide an invaluable resource for international, national and local organizations. Technical support, training and outreach

are routinely provided to partners in other countries; other federal agencies; state, local and tribal governments; academia; and the private sector.

This annual report is divided into three sections.

- **Section I, Overview:** provides general information about the regional laboratories and outlines the mission statement of the Regional Laboratory System.
- **Section II, Support for EPA's Strategic Goals:** summarizes the analyses provided for EPA's programs. This section also provides examples of support provided for each of the agency's strategic goals including Clean Air; Clean and Safe Water; Land Preservation and Restoration; Healthy Communities and Ecosystems; Compliance and Environmental Stewardship; and various Cross Goal Strategies including Homeland Security.
- **Section III, Progress and Looking to the Future:** describes accomplishments associated with various aspects that are fundamental to the operation of the regional laboratories. These include quality systems, environmental management, health and safety and facilities management. Section III concludes with the identification of future challenges facing the regional laboratories and a discussion of how the regional laboratories will meet them.

SECTION I: OVERVIEW



The EPA regional laboratories were created at the inception of the Environmental Protection Agency in 1970. Established to furnish analytical support, the regional laboratories also provide advice and assistance to state and local agencies concerning analytical techniques, methodology and quality control.

The regional laboratories provide a full range of routine and special chemical and biological testing in support of regional and national programs including:

- air,
- water,
- pesticides,
- toxics,
- hazardous waste,
- ambient monitoring,
- compliance monitoring,
- criminal and civil enforcement,
- and, special projects.

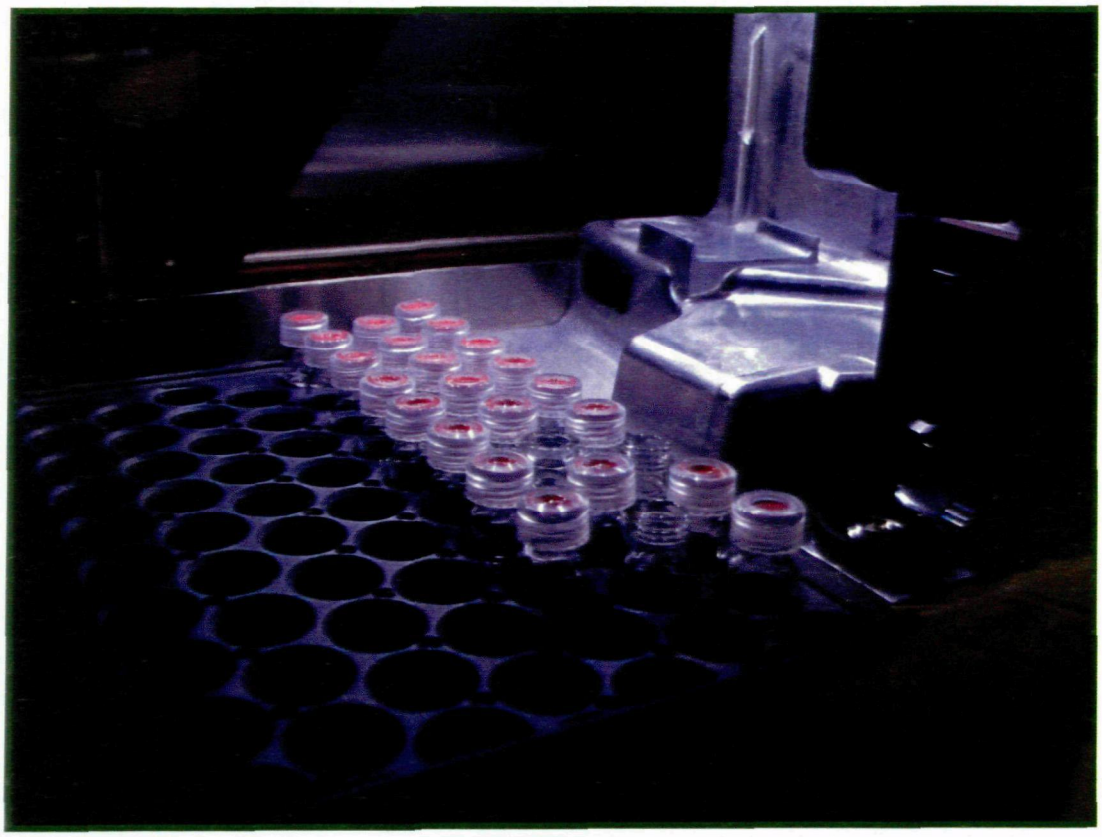
The regional laboratories also perform other core functions, including:

- expert witness testimony;
- training of program staff and other organizations;
- audits of other laboratories;
- policy guidance;
- technical support to federal, state and local laboratories;
- technical support to internal and external organizations;
- conduct applied research for regional initiatives;
- support national laboratory program initiatives;
- ensure the quality of laboratory data generated in support of Agency programs;
- provide benchmarks for environmental laboratories in areas such as analysis, pollution prevention and environmental compliance.

Mission Statement

The focus of the regional laboratories is on the application of science policies and methods in support of regulatory and monitoring programs as well as special projects. This is done through direct implementation and through partnerships with a variety of groups including state, local and tribal governments, private industry, the academic community, EPA program offices, ORD and the public. The regional laboratories are crucial to advancing the Agency's science agenda and have embraced the following commitments to achieve this goal:

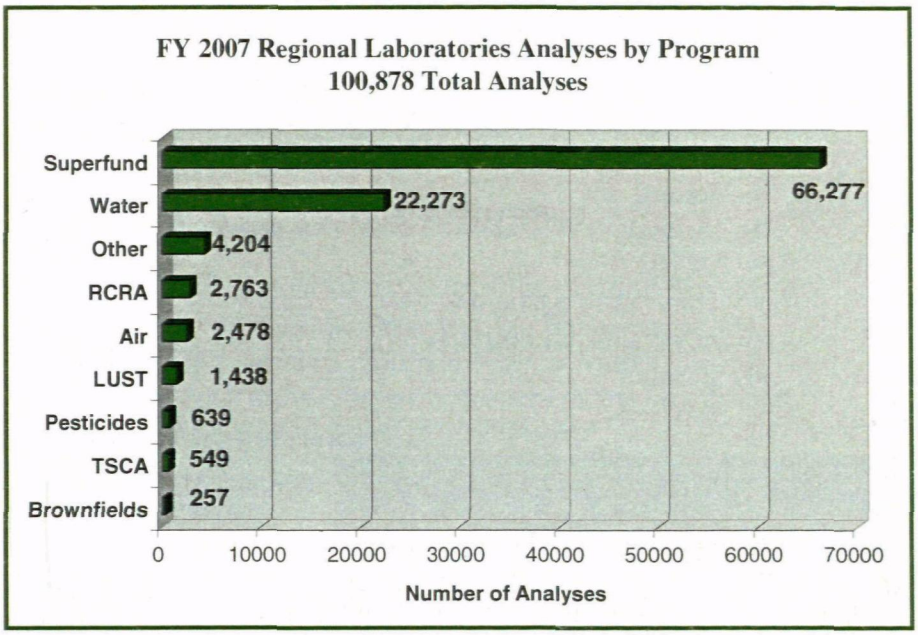
- To integrate laboratory activities with those of field and quality assurance partners into a comprehensive, holistic, multi-media approach to solving ecosystem-based environmental problems.
- To provide scientific data of known quality to support Agency decisions through partnerships with regional and national media program offices, state, local and tribal governments, academia, the private sector and the public.
- To maintain a fully equipped laboratory to produce physical, chemical and biological data of known quality to be used for environmental decision-making at all levels of government.
- To maintain and enhance a technically and scientifically skilled, dedicated and diverse staff through the excellence of our recruitment, career development, training, management and leadership.
- To advance the Agency's science agenda at the point where decisions are made.



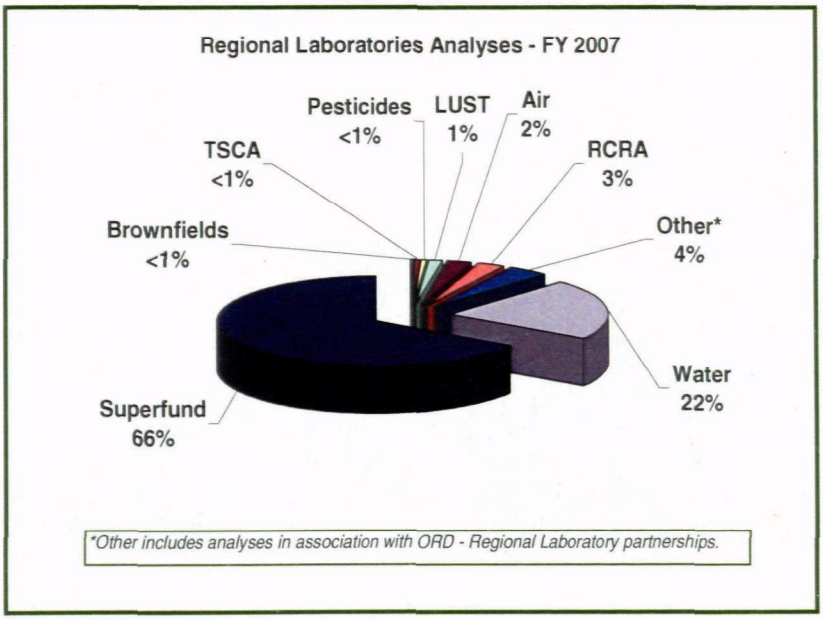
SECTION II: SUPPORT FOR EPA'S STRATEGIC GOALS

Introduction

One of the primary functions of the regional laboratories is to supply quality analytical data to the Agency's programs in support of a broad range of regional initiatives that range from routine monitoring to criminal enforcement. The following charts represent the analyses performed for the various EPA programs in FY 2007.



Over 100,000 analyses were performed in support of EPA programs in FY 2007. However, counting analyses does not completely capture the level of effort necessary to provide the wide range of analytical capability represented by the regional laboratories. While some analyses may take only a few minutes; others may take several hours or days to complete. Also, the charts do not include analyses performed for quality assurance, which comprise an additional 30% of the laboratories' analytical effort.

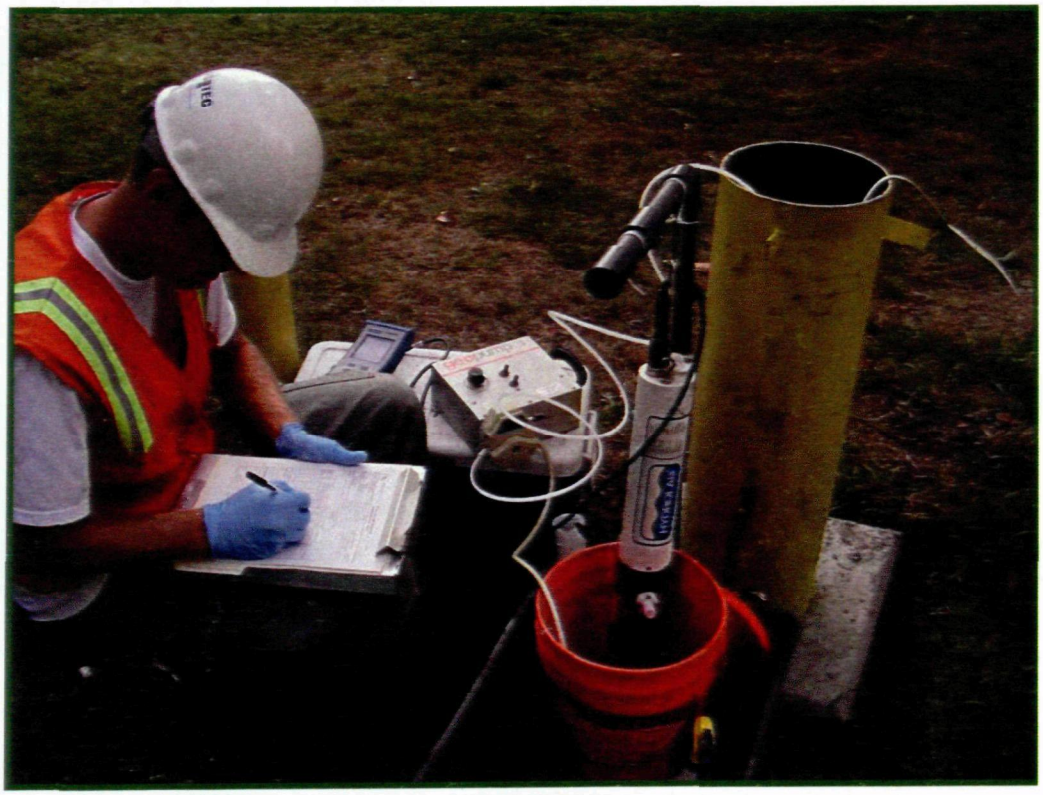


In addition to fixed laboratory analytical support, the regional laboratories provide significant field sampling and field analytical support. In FY 2007, nearly 10% (9,133 field analyses) of the total number of analyses performed were field analyses. There are many benefits to providing analyses in the field including quicker turnaround time for sample processing, real-time interaction between the analyst and the field staff for data interpretation, and acceleration of environmental decisions at the site.

Field analytical methodologies cover a range of capabilities including analysis for:

- volatile organic analytes,
- polycyclic aromatic hydrocarbons,
- total petroleum hydrocarbons,
- chlorinated volatiles,
- freons,
- dinoseb,
- PCBs,
- chlorinated pesticides,
- hexavalent chromium,
- metals,
- asbestos.

Sampling capability includes air, soil, sediment and surface waters as well as subsurface soil and water sampling.



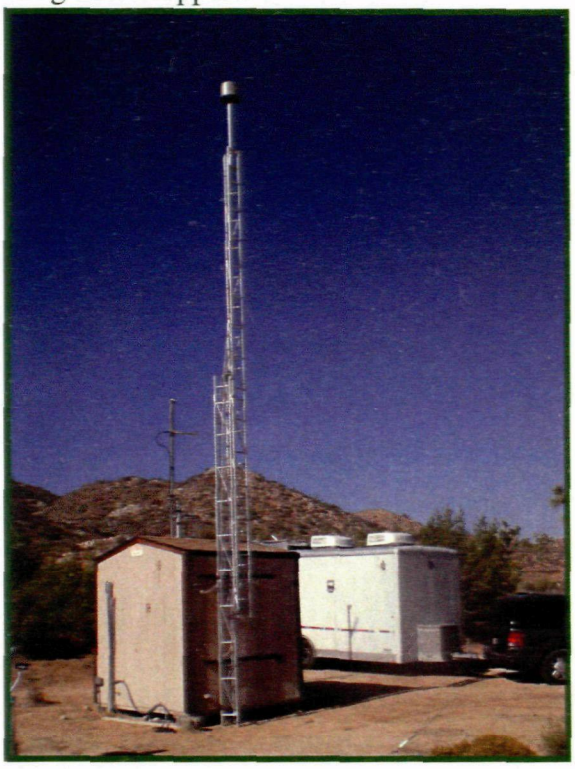
Goal 1: Clean Air

Protect and improve the air so it is healthy to breathe and risks to human health and the environment are reduced. Reduce greenhouse gas intensity by enhancing partnerships with businesses and other sectors.

The regional laboratories actively support the objectives of the Agency's air goals through a variety of activities. These activities include technical support and training, support for air monitoring and air monitoring quality assurance, laboratory support for various air toxics assessments, laboratory support for numerous other local projects that address specific community risks, and method development. Some of these activities are described below.

▫Support for Ambient Air Monitoring Quality Assurance

EPA has a number of programs in place to ensure that ambient air monitoring data are of a quality that meets the requirements for informed decision making. The regional labs support the following air monitoring quality assurance programs by providing management and technical oversight of contractors, lab space for equipment storage and calibration, field and laboratory work and audits, and logistical support.



- **PM 2.5 Performance Evaluation Program (PEP):** The goal of the PEP is to evaluate total measurement system bias of the PM 2.5 monitoring network. A particulate matter (PM) filter weighing lab is located at the regional lab in Region 4. In 2007, the laboratory weighed more than 1,100 particulate matter filters from the EPA regions. The regional laboratories also provided support for performance evaluation audits, quality assurance collocations and PEP audits.
- **Through-the-Probe Audit System**: The through-the-probe audit system provides performance audits at state and local ambient air monitoring stations. These performance audits ensure the validity of the ambient air quality monitoring data.
- **Standard Reference Photometer (SRP) Program**: Standard reference photometers (SRPs) are used to ensure that the national network of ozone ambient monitors is accurately measuring ozone concentrations. Eight regional laboratories maintain SRPs and provide verification or certification of primary and transfer ozone standards from state, local and tribal organizations.

▫Other Air Projects

- **Emissions from Biological Treatment Units:** A bioreactor is an instrument that is used in environmental applications to determine the fraction of a compound, or compounds, biodegraded in a biological treatment unit. A regional lab has initiated a project to evaluate emissions from biological treatment units at petroleum refineries. However, the project has wider implications than the measurement of the efficacy of the organisms in a treatment unit. When coupled with appropriately configured treatment models, the data produced can effectively define a plant's emission inventory.
- **Ambient Ammonia Monitoring:** High ammonia concentrations can have a variety of effects on the environment including acidification, eutrophication, loss of biodiversity, and impacts on regional haze and visibility. Technical support for the evaluation of passive sampling devices for the measurement of ambient gaseous ammonia was expanded in FY 2007. Sites monitored in FY 2007 resulted in the analysis of 438 samples. In addition, the regional laboratory began participation in a nationwide study of passive monitoring for ammonia.

Goal 2: Clean and Safe Water

Ensure drinking water is safe. Restore and maintain oceans, watersheds, and their aquatic ecosystems to protect human health, support economic and recreational activities, and provide healthy habitat for fish, plants, and wildlife.

EPA's goals for water comprise a variety of strategic targets that include increasing compliance with drinking water standards, reducing pollution in waters with fish advisories, restoring polluted waters to allow for safe swimming, improving the quality of rivers, lakes, and streams on a watershed basis, improving coastal and ocean water quality and strengthening water quality monitoring and assessment.

The regional laboratories play an important part in protecting and restoring the nation's water resources by providing key data so that the regions and their partners have the information they need to target actions to protect human health and aquatic ecosystems more efficiently. In addition, the regional laboratories support the agency's water goals by providing technical support and regulatory support to drinking water laboratories; by providing training and support for water quality monitoring efforts, and by providing analytical support for various projects across the country. Some of the areas where the regional laboratories provide support to the agency's water goals are described below.

Drinking Water Laboratory Certification

Laboratories that analyze drinking water samples are required by EPA to be certified by an approved certifying authority. In FY 2007, EPA regional laboratory personnel who are trained as laboratory certification officers conducted on-site evaluations of drinking water laboratories operated by states and tribal communities. The regional laboratory certification officers also performed audits of states' certification programs to ensure that all laboratories analyzing drinking water samples are following approved methods as mandated by EPA's National Primary Drinking Water Regulations. Ultimately the effort of the laboratory certification officers ensures that public drinking water is free from harmful contaminants.

In FY 2007, the regional laboratories performed 18 on-site evaluations of drinking water laboratories operated by state and tribal communities. In addition, 6 audits of states' drinking water certification programs were performed in FY 2007. Laboratory staff at one regional laboratory provided a hands-on training class on various organic and inorganic drinking water methods to state Drinking Water Certification Officers (DWCOs). The purpose of this training was to improve the ability of state DWCOs to perform their own drinking water laboratory audits.

▫ Water Quality Assessment and Total Maximum Daily Load (TMDL) Program Support

Total Maximum Daily Load (TMDL) is a tool for implementing water quality standards and is based on the relationship between pollution sources and in-stream water quality conditions. Water quality standards are set by States, Territories, and Tribes. They identify the uses for each body of water, for example, drinking water supply, contact recreation (swimming), and aquatic life support (fishing), and the scientific criteria to support that use. The TMDL establishes the allowable loadings or other quantifiable parameters for a body of water and thereby provides the basis to establish water quality-based controls. Regional laboratories provide substantial analytical support for TMDL development for water bodies throughout the country.

- **PCB Congener Analysis:** Analysis of over 40 water and semi-permeable membrane device (SPMD) samples was provided to support a Total Maximum Daily Load (TMDL) study of the Roanoke River. The analyses provided results for 209 different PCB Congeners. This is a more extensive analysis than the better known PCB Aroclor analysis which does not provide analysis of each individual component of a PCB Aroclor mixture.
- **Yazoo River Basin, Mississippi –** The Yazoo study was designed to provide water quality chemistry and other data needed for the development of TMDLs on 10 priority water bodies impacted by nutrients from a variety of sources including agriculture, point source discharge, and catfish farming. Regional laboratory support to this project included analyses of water column samples for long-term BOD (including 34 point nutrient sub-sampling) and nutrient analyses including TKN, ammonia, nitrate/nitrite, total/dissolved phosphorus, and total/dissolved organic carbon. In addition, the laboratory provided the necessary nitrogen and phosphorus analyses to allow for determination of sediment nutrient fluxes.

Special Water Projects in FY 2007

Examples of some activities and projects supporting a variety of water related strategic goals in FY 2007 are listed here.

- **New England Beaches Initiative:** Field and lab analytical support was provided for the Region's Beaches Initiative using newly developed methods for detecting optical brighteners (i.e., fluorescent whitening agents added to detergents which are indicators of possible presence of human fecal contamination), Polymerase Chain Reaction (PCR) genetic techniques, and traditional microbiological analyses. The regional lab collaborated with the regional water program on sanitary surveys, source tracking studies, assessment of storm drains, and other projects. The collaboration employed a variety of microbial source tracking tools to quantify and identify human fecal pollution sources. Samples were analyzed for numerous source-tracking markers, including optical brighteners and fluorescent whitening agents, caffeine, pharmaceuticals (e.g., acetaminophen), and bacteria, such as *Bacteroides*, *E. coli* and *Enterococcus*. The results helped the region zero in on the possible sources of the contamination.

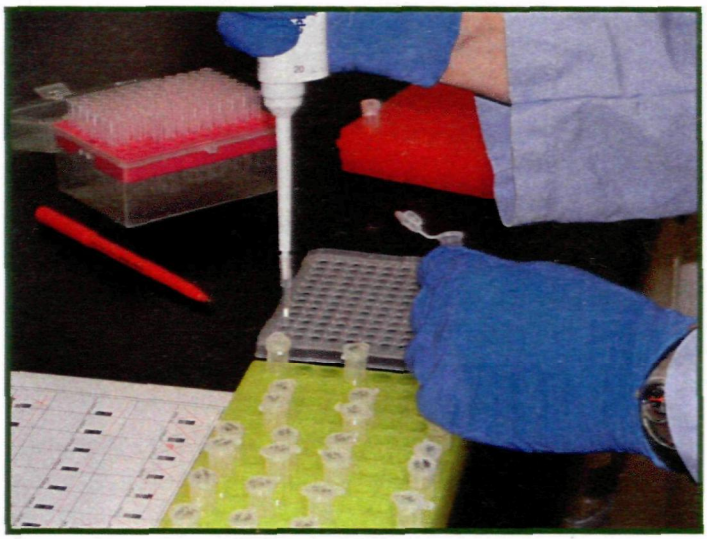
- **Children's Health Initiative - Lead Monitoring of Drinking Water Sources in Public Schools:** Analytical support was provided for the monitoring of lead in drinking water sources for schools in New York and New Jersey. The monitoring was required to ensure compliance with the Lead Contamination Control Act, designed to identify and reduce lead in drinking water sources in schools. The laboratory processed over 500 samples for lead analysis from drinking water sources in FY 2007.
- ***Cryptosporidium* and *Giardia* Monitoring of the New York City Watershed:** The Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) address microbial contamination of the nation's water. The SDWA enables regulation of finished drinking water and protection of source waters. In accordance with this authority, the EPA released a Filtration Avoidance Determination (FAD) to New York City for the water supplies that form a significant component of the New York City Watershed. The Region conducts an oversight monitoring program for a variety of contaminants including protozoan pathogens *Cryptosporidium* and *Giardia* in the watershed. The regional laboratory provides the specialized analytical support necessary to effectively monitor the watershed and the perennial streams and tributaries which flow into the reservoir.

- **Investigation of Fish Kills in the Potomac and Shenandoah River Systems:** In response to continuing episodes of fish kills on two large river systems, regional lab biologists coordinated data gathering with the States, and facilitated the use of the Causal Analysis/Diagnosis Decision Information System (CADDIS) stressor identification process to analyze the data, define data gaps, and work through candidate causes. Lab biologists also participated in the response to fish kill incidents in an attempt to document effects and identify potential causes. In addition, the regional toxicity testing lab performed chronic testing of sites of known fish kills in conjunction with Virginia's TMDL program. They followed up with further testing later in the season to see if seasonal affects were creating conditions conducive to stresses on the fish.

- **Ambient Fish Tissue Monitoring:** A regional lab continued to provide support for the Regional Ambient Fish Tissue (RAFT) Monitoring program by preparing fish samples for analysis and by analyzing the fish tissue for pesticides, percent lipids, and total metals including mercury. Over 800 sample analyses were performed on fish tissue samples delivered for analysis during 2007. The data have a number of uses including the state issuance of fish consumption warnings for specific lakes and rivers.
- **Microcystin Toxin Analysis**: In response to the emergence of blue-green algae blooms on the Klamath River, the regional laboratory developed the capability to analyze water samples for microcystin toxin by immunoassay. Blooms of blue-green algae occurring in lakes and rivers can produce a range of cyclic peptides known as microcystins which can pose a significant public health concern. Data from this analysis was used to determine the need for issuing public health advisories.
- **National Lakes Study:** Regional laboratories provided technical support, training, and coordination for the National Lakes Study. Lab staff assisted with the development of the national study design, trained state participants, and provided quality assurance oversight. In addition, they sampled all the reference lakes for the study. The outcome of the survey is a comprehensive inventory of the condition of all the lakes in the Region

and nation. It is another component of the Office of Water's efforts to assess the condition of all the nation's water resources. The Lakes Study is the second phase of the overall survey, following the wadeable streams survey in 2006, and preceding the non-wadeable stream survey scheduled for 2009.

- **Urban Stream Study**: Over 1000 sample analyses were performed in FY 2007 to one region's Urban Stream Study project. The purpose of the project is to assess the impact of urbanization on aquatic life, determine if urban streams are in compliance with water quality standards, and to identify potential causes of impairment. Water and sediment samples were analyzed for a wide array of pesticides, herbicides, semi-volatile and volatile organic compounds, metals including mercury, plus a host of general chemistry parameters including ammonia, total Kjeldahl nitrogen, nitrate/nitrite, total phosphorous, chemical oxygen demand, total organic carbon, and alkalinity among others.
- **Bedrock Microscopic Particulate Analysis Project:** Microscopic Particulate Analysis (MPA) was provided to a state Bedrock Microscopic Particulate Analysis Project during the summer and fall of 2007. Under the federal Surface Water Treatment Rule, states are required to determine which ground water sources are under the direct influence of surface water (GWUDI). MPA is a labor intensive, highly technical microscopic analysis that has historically been used to make a final decision on GWUDI systems.
- **Microbial Source Tracking:** Polymerase Chain Reaction (PCR) methods provided by EPA's Office of Research and Development (ORD) were adapted to existing equipment to support seven Microbial Source Tracking (MST) projects in the State of Washington. These projects analyzed samples collected at numerous sites over an extended period of time. The purpose of these projects is to assist the lead agency in characterization of the sources of fecal coliform resulting in microbial detriments to water quality. The existing water quality issues varied from project to project, but included closure of commercial shellfish beds, failure to meet TMDL standards and failure to meet recreational water standards.



- **Evaluation of New Drinking Water Source:** One regional laboratory participated in a study with a major university to evaluate a new source of drinking water. The regional laboratory analyzed 52 samples for volatiles, metals, mercury, nitrate, nitrite, fluoride, and cyanide. The results of study showed that the drinking water contained levels of these contaminants below the maximum contamination levels.

Goal 3: Land Preservation and Restoration

Preserve and restore the land by using innovative waste management practices and cleaning up contaminated properties to reduce risks posed by releases of harmful substances.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) and the Resource Conservation and Recovery Act (RCRA) provide the legal basis for EPA's efforts to preserve and restore land using the most effective waste management and cleanup methods available.

Nearly 66% (66,277) of the analyses performed by the regional laboratories support the cleanup of uncontrolled or abandoned hazardous waste sites associated with the Superfund program. While EPA's Contract Laboratory Program performs many of the routine analyses associated with the Superfund program, the regional laboratories focus on more specialized analyses and provide a variety of field support and mobile lab support to the program.

In FY 2007, the regional laboratories provided 2,763 analyses to address hazardous and non-hazardous waste issues associated with the RCRA program. In addition, the regional laboratories provided over 1,400 analyses to address risks associated with leaking underground storage tanks.

Applied Research and Method Development

The regional laboratories are in a unique position to meet the ever changing analytical needs of the Superfund and RCRA programs. Oftentimes, the regional laboratories are called upon to develop or refine methods to meet project specific Data Quality Objectives. Methods are often refined or enhanced to include new pollutants of concern. In addition, analytical procedures are often revised to achieve lower detection limits or to accommodate different and challenging matrices.

- **Toxaphene Congener Method:** At the request of its Superfund Division, a regional laboratory began development of a Gas Chromatography Electron Capture Negative Ion Mass Spectrometry (GC/ECNI/MS) determinative procedure for the analysis of selected toxaphene congeners and degradation products in environmental samples. This technique was identified in an Office of Inspector General report as the most promising analytical technique for use at the Hercules 009 Landfill Superfund Site in Brunswick, GA. Target analytes under consideration for this method include those

toxaphene congeners and degradation products known to be environmentally persistent and identified in fish and shell fish. Regional personnel are working collaboratively with the SW-846 Organic Methods Workgroup to draft EPA Method 8276 for GC/NIMS.

Superfund and RCRA Projects

Examples of some activities and projects supporting a variety of Superfund and RCRA projects in FY 2007 are listed here.

- **RCRA Compliance Sampling and Analysis:** Field sampling support was provided for a major RCRA inspection at a hazardous waste treatment, storage, and disposal facility (TSD). EPA laboratory field staff collected representative waste samples from storage containers (roll-offs, tanks, drums, tanker trucks) using solids sampling devices, drum thieves and bailers. The field team also conducted container Leak Detection and Repair Monitoring in-situ for VOCs in air using a toxic vapor analyzer (TVA 1000). Solid and liquid waste samples were analyzed by the regional laboratory for waste characteristics, RCRA metals and VOCs. The inspection reports, on-site monitoring and laboratory data were used to assist enforcement staff in evaluating facility compliance with TSD RCRA regulations and its operating permit.

- **Perchlorate in Food Products:** A regional laboratory continued development of the capability to analyze food products for perchlorate. Previously watermelon samples were analyzed in support of Superfund site assessments involving former military bombing ranges. It was suspected that there was a direct relationship between agricultural methods and perchlorate in groundwater and crops. In FY 2007, an analytical method for perchlorate in milk was developed. This milk method meets the requirements of the Food and Drug Administration analytical procedures and uses an ion chromatograph/mass spectrometer system. Perchlorate analysis of foods is expected to be an area of continued development in support of the Superfund program's efforts to assess these former military sites.
- **Arsenic Contaminated Soil Remedial Action:** Support was provided for remedial action (RA) efforts at the Taylor Lumber and Treating (TLT) Superfund site. The site RA was removal of arsenic-contaminated soil with concentrations greater than 159 ppm. Field x-ray fluorescence analyzer (XRF) results were to be utilized to direct

soil removal operations. The regional laboratory support occurred in two phases. During phase one, a site specific study was conducted to compare field XRF results to fixed laboratory results. During phase two, laboratory staff performed on-site sample analysis for arsenic by field XRF with a subset of the samples shipped back to the laboratory for confirmation. Over the span of more than three months laboratory staff, collected and analyzed over 2700 samples for arsenic by field XRF with approximately 70 being shipped back to the laboratory for confirmation.

Emergency Response

The U.S. Environmental Protection Agency plays a leadership role in the national system to respond to environmental disasters, hazardous materials releases, time-critical removals, and inland oil spills that threaten human health and/or the environment. The regional laboratories have provided valuable analytical support to a variety of emergency response projects including:

- **Chemical Plant Explosion:** On November 22, 2006, the night before Thanksgiving, the CAI, Inc. chemical plant exploded, damaging or destroying nearly 90 homes in a residential neighborhood in Danvers, Massachusetts. The immediate public health and environmental concerns of emergency responders included air quality and the impact of run-off from the fire suppression activities on a nearby river. Within hours, air and water samples were collected and sent to the regional laboratory for analysis of volatile (VOC), semi-volatile (SVOC) organics, alcohols, air toxics, and metals. With chemists working into the early hours of Thanksgiving, analysis results were provided to the EPA's On-Scene Coordinators within eight hours of receipt. Using this data, the responders were able to assess air quality and water runoff concerns. On November 29, the incident command was transferred from the local Fire Chief to EPA in order to begin recovery activities. Throughout the two month removal action, EPA conducted air sampling along the perimeter of the site and in the surrounding residential areas. The Agency for Toxic Substances and Disease Register and the Massachusetts Department of Public Health used the analytical results generated by EPA's regional laboratory to insure public safety and provide regular press reports for the concerned public. At the conclusion of removal operations, the regional laboratory analyzed soil samples from the site to confirm that

cleanup criteria had been achieved. The support provided by the regional laboratory ultimately allowed the emergency responders and health officials to reduce public anxiety and ensure a thorough cleanup.

- **Chemical Distribution Facility Explosion:** In February, 2007 multiple explosions at a Kansas City, Missouri chemical distribution facility produced a plume of dark smoke that covered much of the downtown area and prompted the evacuation of nearby schools, homes and businesses. A large-scale response was lead by EPA's regional On-Scene Coordinators. The regional laboratory provide critical data to support this response by providing rapid turn-around analysis of air and ash samples for a variety of constituents including volatile organic compounds, semi-volatile organic compounds, mercury, metals, and dioxins.
- **Natural Disasters:** In May, 2007, a tornado all but leveled the city of Greensburg, Kansas. EPA's regional On-Scene Coordinators responded by assisting with cleanup of fuel releases, chlorine cylinders, anhydrous ammonia tanks, propane tanks, electrical transformers, household hazardous waste items, and white goods. The regional laboratory provided support for the cleanup efforts with analyses for volatile organic compounds, semi-volatile organic compounds, herbicides, pesticides, PCBs, total petroleum hydrocarbons, metals and mercury. In June and July, 2007; heavy rains lead to flooding of the city of Coffeyville, Kansas and the release of 90,000 gallons of crude oil from the Coffeyville Resources Refinery. Again, the regional laboratory provided support for the cleanup efforts with analyses for volatile organic compounds, semi-volatile organic compounds, pesticides, PCBs, total petroleum hydrocarbons, metals and mercury. Nearly 100 sample analyses were performed per month during the clean-up which is expected to last for one year. A second regional laboratory provided support for response efforts downstream of the oil spill in Oklahoma. The second regional laboratory was called upon on the July 4th holiday to analyze water samples for fecal coliform and total coliform during the holiday. Data was provided to the on-scene coordinators within 48 hours.

- **Diesel Oil Spill:** An oil spill threatened to delay the start of school at a nearby middle school and high school in Pennsylvania. The 5,000 to 6,000 gallons diesel fuel oil spill was caused by a puncture in an underground pipeline connected to an underground tank. The regional laboratory provided support by rapidly deploying stainless steel air sampling canisters. In addition, the regional lab provided rapid analysis of volatile organic compounds in air. The results of the analyses were used to confirm the safety of the indoor air, permitting the reopening of the schools.

Goal 4: Healthy Communities and Ecosystems

Protect, sustain, or restore the health of people, communities and ecosystems using integrated and comprehensive approaches and partnerships

To protect, sustain, and restore the health of people, communities and ecosystems the EPA must develop strong partnerships with federal, state, tribal and local governments and adopt a cross-media approach. Some key components of this goal include:

- encouraging community involvement and development through the Brownfields Program, and
- protecting a variety of ecosystems including the nation's most significant water bodies in the country.

Brownfields Program

EPA estimates that there are more than 450,000 Brownfields in the United States. Brownfields include abandoned industrial and commercial properties, former mining sites and sites contaminated with a hazardous substance or pollutant of concern. EPA's Brownfields Program is designed to empower states, communities, and other stakeholders to inventory, assess, clean up, and redevelop potentially contaminated lands in order to recreate these lands into vital, functioning parts of their communities.

In FY 2007, the regional laboratories performed nearly 300 analyses in support of the EPA's Brownfields Program.

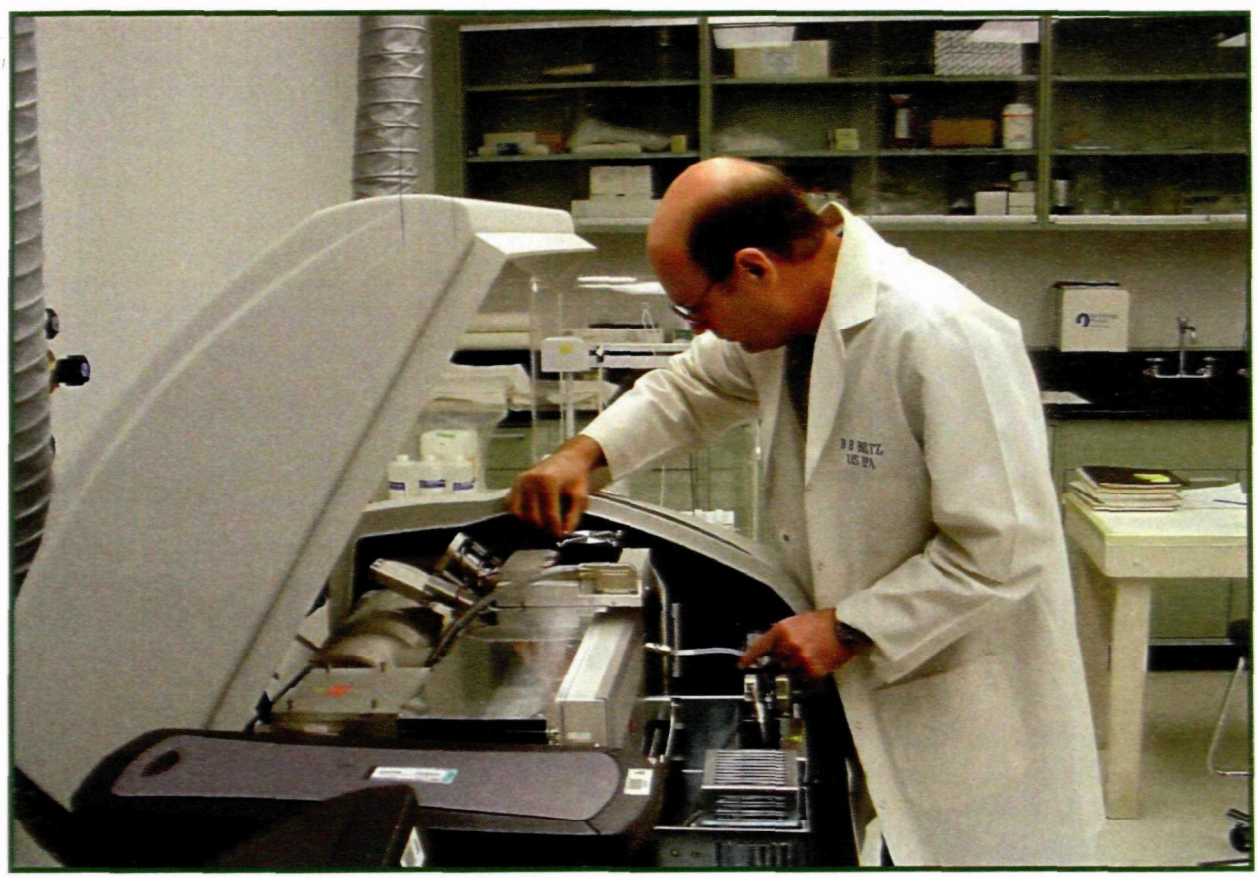
Ecosystems

EPA's strategies to protect, sustain, and restore the health of natural habitats and ecosystems include identifying and evaluating problem areas and developing tools to address these problems. In FY 2007, the regional laboratories participated in several projects to support efforts to evaluate ecosystems. These include:

- **Ocean Dredged Material Disposal Site ODMDS Survey:** This project was conducted off the Florida coast in order to characterize the chemical, physical, and biological status of sediment and the water column within and surrounding the Ocean Dredged Material Disposal Site (ODMDS). The data from this survey will be used to evaluate changes in environmental conditions occurring since a baseline study conducted in 1986 and will allow evaluation of potential

elevations in specific pollutant concentrations at the site. The regional laboratory provided significant analytical support to this project including analyses for PCBs, pesticides, semi-volatile organics, and metals of both sediment and water samples. In addition, several tissue samples were analyzed for a concurrent project, CFLARE, aimed at comparison of benthic pollutant bioaccumulation of dredged material versus reference material.

- **PCB Congener Monitoring of the Lake Ontario Watershed:** A regional laboratory provided support for the regular monitoring of tributaries of the Lake Ontario Watershed for critical pollutants. The purpose of the monitoring program is to develop reliable estimates of loadings of critical pollutants to the Lake in order to provide accurate information for updates of the Lake-wide Management Plan. Data from the program was also shared with modelers for use with the Lake Ontario Mass Balance Model. The regional laboratory provided analysis for 209 PCB congeners at the part per quadrillion (ppq) levels. The method used employs a High Resolution Gas Chromatograph/Mass Spectrometer in order to get the trace level detection limits required by Lake Ontario Watershed monitoring program.



Goal 5: Compliance and Environmental Stewardship

Improve environmental performance through compliance with environmental requirements, preventing pollution, and promoting environmental stewardship. Protect human health and the environment by encouraging innovation and providing incentives for governments, businesses, and the public that promote environmental stewardship.

Compliance with and enforcement of environmental laws are key elements of EPA's goal to improve environmental performance. The regional laboratories provide significant technical and analytical support to both regional and national civil enforcement cases including the National Pollutant Discharge Elimination System (NPDES) permit program. In 2007, the regional laboratories provided analyses of over 900 samples to support a variety of criminal enforcement actions. Some of the highlights of regional laboratory support for compliance assistance, civil enforcement and criminal enforcement are listed below.

- **Southern California Oil Platforms**: In conjunction with the US Department of Interior, Minerals Management Service (MMS), regional laboratory staff collected production water effluent samples from oil platforms off the shore of southern California. The platforms were reached by both boat and helicopter. Samples were analyzed by the regional laboratory for metals, cyanide, sulfide, ammonia, volatile and semi-volatile organic compounds and toxicity. The sampling and analyses supported National Pollutant Discharge Elimination System (NPDES) compliance.

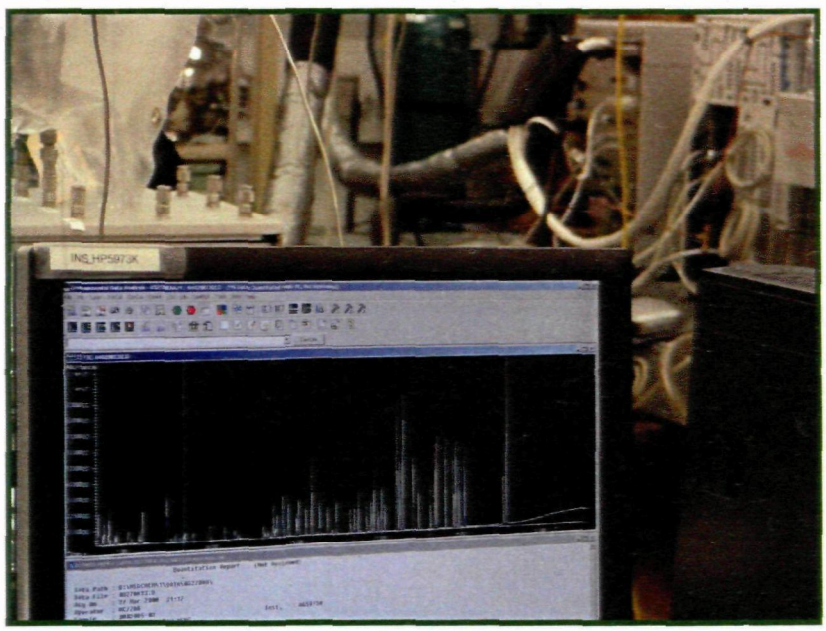
- **TSCA Enforcement Investigations:** Analytical support was provided for two TSCA enforcement investigations into PCB contamination in natural gas distribution lines for the NICOR and AMEREN companies in Illinois. Soil, wipe and oil samples were analyzed to determine presence and concentration of Aroclor mixtures near residential gas meters and furnaces. Fast turnaround was required in order to determine the extent of the problem and to protect residents.
- **Criminal Investigation -** The regional laboratory provided analytical support to the Criminal Investigations Division during the investigation of a manufacturing plant in Atlanta, GA. Analyses provided include volatile and semi-volatile compounds, pesticides, Toxicity Characteristic Leaching Procedure (TCLP) and flash point. Based on the results of the investigation the company pleaded guilty to a violation of the Clean Water Act. Per the terms of the plea agreement, a U.S. District Judge imposed a sentence of three years of probation and a fine of $3.8 million.

Cross Goal Strategies

Many of EPA's efforts contribute to progress toward all five of the aforementioned goals. These efforts include strengthening partnerships with states and tribes; expanding scientific knowledge and supporting homeland security activities. Some examples of how the regional laboratories have contributed to these cross-agency and cross-media efforts are discussed below.

Expanding Scientific Knowledge and Developing New Analytical Capabilities

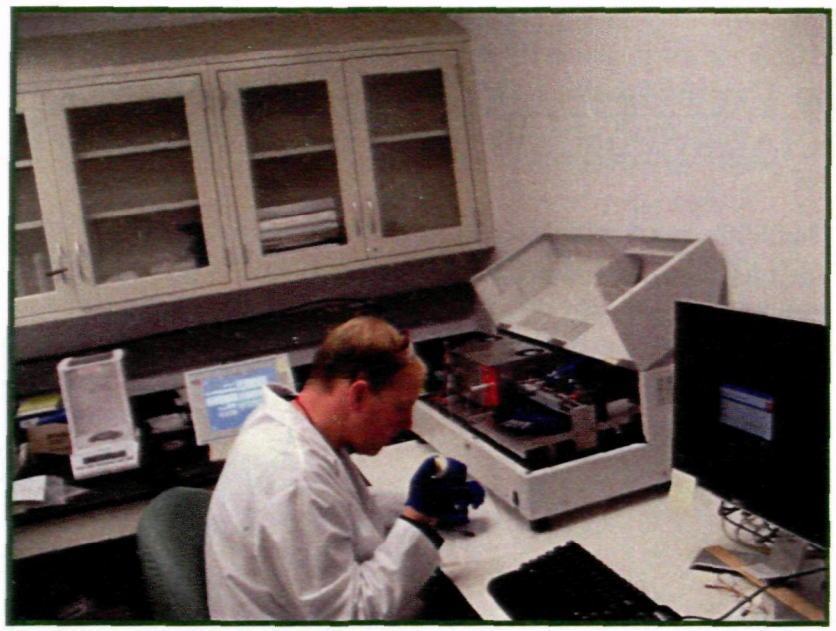
Scientific knowledge and technical information are critical elements in the process of understanding and addressing complex environmental problems. Furthermore, better analytical capabilities are fundamental to meeting the agency's goals. Better scientific knowledge and analytical capabilities mean improved assessment, better identification of data and research needs, greater ability to track implementation of specific solutions and more meaningful evaluation of implementation results. Regional laboratories play a unique and critical role in enhancing EPA's ability to respond to varied and technical challenges such as those presented by emerging pollutants, complex environmental matrices, and the demands for lower detection. Some examples of these efforts are described below.



- **Analytical Methods for Alkylphenol Ethoxylates**: Alkylphenol ethoxylates (APEs) are synthetic surfactants used in some detergents and cleaning products. These chemicals degrade into octylphenol and nonylphenol and their short chain ethoxylate and carboxylate products. Some of these degradation products act as endocrine disruptors. In FY 2007, analytical methods for alkyl phenols and alkyl ethoxylates that had been developed and validated by two regional laboratories were published by the American Society for Testing and Materials as ASTM D4252-89(2003) Standard Test Methods for Chemical Analysis of Alcohol Ethoxylates and Alkylphenol

Ethoxylates. This method has been used in numerous studies to characterize APEs in ambient waters and waste water discharges.

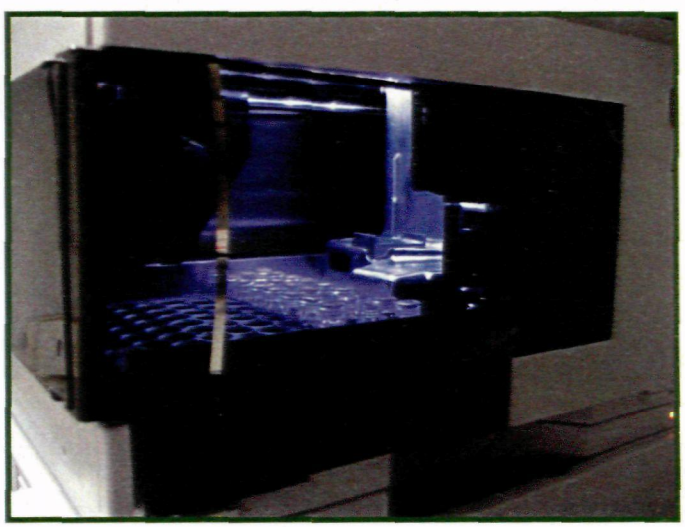
- **Mercury Contamination in Biota and Habitat**: To address a growing regional need to measure mercury contamination in biota and habitat, the regional laboratory established a separate laboratory equipped with a Direct Mercury Analyzer. The mercury analyzer has the capacity to quickly measure very low concentrations of mercury from very small sample aliquots with little sample preparation and no waste. For this reason it is an ideal instrument to measure biota, including insects and arachnids, vegetation, animal hair and feathers, blood, eggs, as well as plankton, fish tissue plugs, and exotic samples such as ayurvedic medicines (folk remedies from India). The methodology has already been used to support research focused on mercury contamination in wetland ecosystems (the Nyanza Superfund site/RARE study, the Parker River National Wildlife Refuge Study, and the Peregrine Falcon Egg Study) and aquatic ecosystems (Rhode Island Fish Study and the New England Lakes and Ponds REMAP Study). The lab has also provided analytical support to states and tribes, especially for fish tissue.



- **Microbial Water Quality Test Using Quantitative Polymerase Chain Reaction (PCR):** A study was initiated to assess the sensitivity, accuracy and precision of the quantitative Polymerase Chain Reaction (qPCR) method, as well as the ability of qPCR to measure ambient concentrations of *Enterococcus* at varying levels in the marine environment compared to the results obtained using the traditional methods - Membrane Filtration and DST®/Enterolert®. Ocean and bay samples with varying levels of expected microbial densities were sampled over a 10 week period. One county laboratory performed analysis for *Enterococcus* sp. using the traditional Membrane Filtration (MF) technique; a second county laboratory performed analysis for *Enterococcus* sp. using the DST®/Enterolert® technique; and the regional laboratory performed analysis for *Enterococcus sp.* using the qPCR technique (USEPA Draft Method 1607). The goal of the study is to assess the latest technology that provides a more rapid assessment protocol for recreational water quality.
- **Evaluation of Immunoassay Test Kits for Detection of Endocrine Disrupting Compounds:** Two regional labs, EPA's Office of Research and Development (ORD), United States Geological Service (USGS) and a private vendor joined in a

collaborative regional methods project (RMI) to evaluate immunoassay test kits for the quantitative determination of endocrine disrupting compounds (EDCs). Currently, high performance liquid chromatography (HPLC), gas chromatography-mass spectrometry (GC/MS), or liquid chromatography-mass spectrometry (LC/MS) are the primary methods used to detect EDCs; however, immunoassay techniques, particularly enzyme-linked immunosorbent assay (ELISA), are becoming increasingly popular due to their sensitivity, ease of use, short analysis time, and cost-effectiveness. Issues persist, however, regarding reproducibility and accuracy when complex environmental samples are analyzed. The primary objective of this research is to evaluate whether commercially available ELISA kits are able to accurately and reliably analyze common environmental samples for selected EDCs. The round robin laboratory evaluation is being done in four phases, each focusing on a different type of water sample (clean water, surface water, WWTP effluent, and WWTP influent) spiked with EDCs.

- **Cancer Research Study:** Regional lab staff participated in a study with the University of Texas, M.D. Anderson Cancer Center Department of Molecular Pathology to evaluate various mechanisms to regulate transport of biometals as anti-tumor agents in cultured cells. Intercellular concentrations of metals (cadmium, copper, platinum, and zinc) were measured in the treated cells. The lab was required to acid digest the test cells into a clear solution prior to ICP-MS analysis. The digestion procedure was complicated and time consuming. The Lab received a total of four sets of cell lines containing a total of 141 samples. The results of the project will be published.
- **Perchlorate in Water by Liquid Chromatography/Mass Spectrometry (LC/MS):** One regional laboratory developed the capability to perform a more definitive analysis for the determination of perchlorate in water by liquid chromatography/mass spectrometry (LC/MS). This analytical technique provides confirmatory results for perchlorate and will eliminate the potential for false positives that limit the usefulness of the current analytical technique.



- **Bromide Interferences in ICP-MS**: A regional laboratory scientist conducted research on bromide interferences in ICP-MS analyses. Most interferences are well documented and predictable, however, bromide interferences on arsenic and selenium measurements are not well documented in published environmental analytical methods. The analyst found that environmental labs were largely unaware of the existence of bromine interferences and the magnitude of the problem. Several presentations on the subject were given with the intent of publicizing and increasing awareness of the problem among environmental labs.

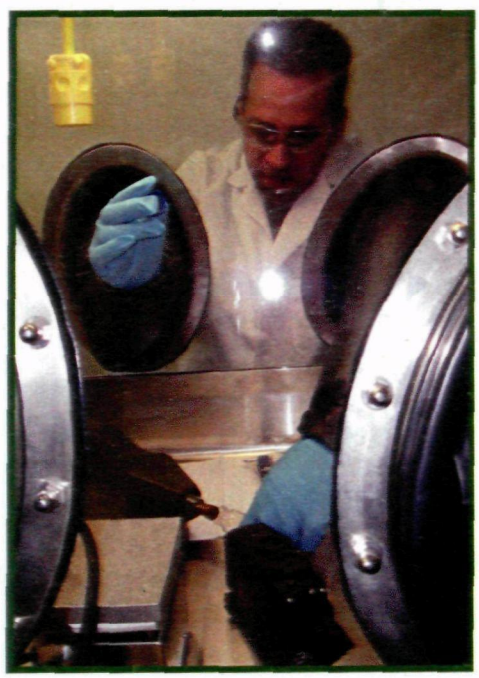
Homeland Security

The terrorist attacks of September 11, 2001 have caused EPA to reevaluate the types of events which might result in environmental emergencies and require laboratory support. The ability to analyze samples for chemicals that might be used in terrorist incidents is an important aspect of the EPA's emergency response responsibilities. The ten Regional Laboratories have consequently made providing accurate environmental data to emergency responders and participation in OSWER-OEM's Environmental Response Laboratory Network (ELRN) a high priority.

To enhance regional response capability to respond to emergencies, whether from natural causes or terrorist activity, the regional laboratories are working on three significant development projects:

- Evaluating a prototype All Hazard Receipt Facility designed to screen unknown or suspicious samples for various hazards;
- Developing capability to analyze environmental samples for chemical warfare agents and their environmental degradation products;
- Developing and testing Regional Laboratory Response Plans (RLRPs) with State and Utility laboratories and other stakeholders to enable a coordinated multi-laboratory response to a suspected drinking water contamination incident.

All Hazard Receipt Facility (AHRF)



Following September 11, 2001 and the subsequent anthrax release, the public health and environmental laboratory community requested that the federal government develop a standardized approach to sample receipt and screening under conditions designed to protect laboratory facilities and staff. The federal response is the development of the prototype AHRF and the All Hazards Screening Protocol. The AHRF and All Hazards Screening Protocol (the Protocol) were designed to assess explosive, chemical and radiological hazards that might be associated with an unknown or suspicious sample, to assist laboratory managers in making safe and appropriate decisions about sample acceptance and further laboratory analysis.

EPA and the Department of Homeland Security (DHS), in collaboration with the Department of Defense (DoD), Federal Bureau of Investigation (FBI), Center for Disease Control (CDC), are evaluating the efficacy of the AHRF and Protocol as critical steps toward building an environmental laboratory network capable of responding to terrorist incidents. Evaluation of the prototype AHRF will result in a standard describing critical laboratory design and engineering criteria and a robust unknown sample screening

protocol which can be flexibly integrated into public health and environmental laboratories requiring the capability to screen unknown samples throughout the country.

Status: Two prototype AHRFs were delivered in late 2007, one to a Regional Laboratory and the other to a State Public Health Laboratory. In June and again in September 2007, the partnering federal agencies conducted evaluations of the efficacy of the AHRF, the Protocol and associated test equipment at the test sites. In these evaluations, EPA regional staff processed test samples, while being observed over video feed by experts from EPA, FBI, and DoD. The second round three-day exercise in September included testing of 18 samples containing radiological, chemical and explosive constituents, including surrogates for chemical warfare agents. The presentation of the samples included complex scenarios including 'white powder' letters, leaking containers, multi-sample packages.

The assessment will conclude with an ORD-NHSRC report slated for release in Spring, 2008. The report will summarize findings and offer recommendations to improve the analytical testing procedure and the AHRF laboratory. Based on assessment findings, EPA and DHS intend to publish a standard for laboratory design, and a protocol which can be used by environmental and public health laboratories nationwide to improve safety and enhance preparedness to deal with unknown or suspicious samples.

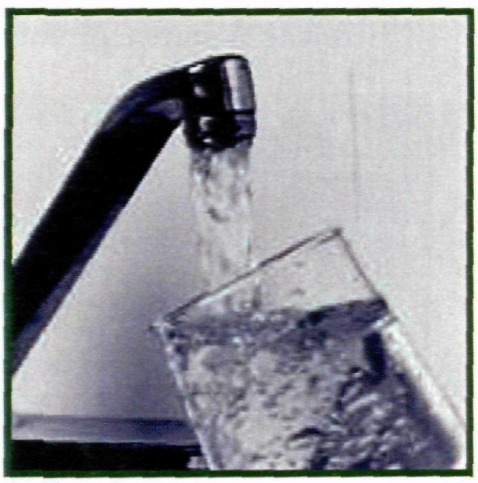
Chemical Warfare Agent (CWA) Fixed Laboratory Pilot Project

Five regional and two state laboratories are participating in a DHS/OSWER-funded project to develop an ability to analyze samples for specialized chemicals that might be used in terrorist incidents. This new EPA regional laboratory capability will allow confirmation of low levels of CWAs in environmental samples, such as soil, debris, and water samples, associated with the clean up of sites contaminated from a terrorist incident.

In 2007, in response to the findings of the White House Chemical End to End Assessment, DHS launched an effort to address a critical national vulnerability by substantially increasing the laboratory capacity for analysis of chemical warfare agents (CWA) in environmental samples. DHS and EPA selected two EPA regional laboratories and one state laboratory as the initial pilot sites to establish CWA capability in the northeast. In 2007, DHS and EPA selected four additional laboratories (three EPA and one state) pilot laboratories in the west and southeast.

Status: In 2007, the three Phase I pilot laboratories received initial funding from DHS and are identifying needed improvements to laboratory infrastructure, health and safety, chemical accountability, and security programs. The four Phase II laboratories, only recently identified, have begun the process to identify gaps in their infrastructure. Meanwhile, various EPA offices are providing critical technical support for the seven pilot laboratories. EPA's National Homeland Security Research Center (NHSRC) is heavily engaged in method development work to provide the laboratories with procedures for use in analysis of environmental samples for CWA agents. Two EPA Regional and one State Laboratory are assisting ORD with method development for CWA degradation products as a part of the overall effort. EPA's Office of Emergency Management (OEM) is working to establish an ultra dilute CWA calibration agent distribution and accountability system and a proficiency testing program with assistance from NHSRC. OEM is also working with all project parties to maintain a project roadmap documenting project elements, anticipated work schedule, and dates for key deliverables and ultimately for establishment of testing capability. EPA's National Enforcement Investigations Center recently joined the CWA pilot project team and announced its intention to establish environmental forensic capability to complement the capability of the seven pilot confirmatory laboratories.

Drinking Water Regional Laboratory Response Planning



The EPA Water Security Division (WSD) is sponsoring a nationwide project to increase laboratory cooperation for response to drinking water emergencies. This effort, the Drinking Water Laboratory Response Preparedness Project, is designed to improve intra-regional laboratory preparedness for response to actual or suspected water contamination incidents. The project, which was developed in partnership with EPA regional, drinking water utility and state laboratories, responds to Homeland Security Presidential Directive 9, which charges EPA to develop a comprehensive, nationwide surveillance program for water quality and a laboratory network to support such a program.

Status: In collaboration with representatives from public health and environmental labs, water utilities, and other stakeholders, each region lead by the EPA regional laboratory has developed a Regional Laboratory Response Plan (RLRP) and completed a table top exercise of the plan in 2007. The regional laboratories are currently engaged with WSD in developing a Practical Exercise involving actual test samples that will be run in each region during 2008. Each Practical Exercise will involve as many as 7 laboratories working together to address a water contamination incident involving both a chemical and biological "contaminant". Following this exercise the work groups will again review their RLRP plans to further refine strategies and approaches to improve multi-laboratory response.

Additional Support for Homeland Security

In addition to the three projects discussed above, the regional laboratories provided support for other projects related EPA's Strategic Plan for Homeland Security. Some examples of the activities undertaken by the regional laboratories include:

- **Portable High-Throughput Integrated Laboratory Identification System (PHILIS):** PHILIS is a mobile system that can be rapidly deployed in the field and is capable of analyzing a large volume of samples daily in order to characterize/clear areas contaminated with selected toxic industrial chemicals or chemical warfare agents. This is a self-contained mobile system able to execute, for various matrices (surface wipes, water, soil, and air), analytical protocols consistent with EPA standards. PHILIS provides the capability to rapidly determine the extent of chemical contamination and to follow the progress of decontamination activities toward site restoration, up to, and including clearance. PHILIS will utilize EPA-approved analytical methods. In June, a prototype PHILIS unit was transported to the Region 2 Edison Facility.

- **Standard Analytical Protocol for Chemical Weapons Agents**: Several regional labs are participating in method validation studies to support EPA's Office of Research and Development's National Homeland Security Research Center (NHSRC) efforts to provide standard methods for agents related to homeland security incidents. For example, one regional lab continues to cooperate with NHSRC on the verification and validation of the Standard Analytical Protocol (SAP) for metals by inductively coupled plasma (ICP) techniques. The SAP will be used for the analysis of chemical weapons agents during events of national significance.

  Another regional laboratory completed an inter-laboratory validation study of the liquid chromatography/mass spectrometry (LC/MS) library for 107 compounds including pesticides and a variety of chemical weapon agent (CWA) degradation products. The purpose of the study was to evaluate a rapid drinking water screening tool for chemicals that cannot be analyzed by other techniques during drinking water threat incidents. In addition, the laboratory completed the preparation of four new LC/MS methods for "*Standardized Analytical Methods for Environmental Restoration following Homeland Security Events*" (SAM.) They are to be used to analyze for 15 CWA degradation products.

SECTION III: PROGRESS AND LOOKING TO THE FUTURE

Quality Systems

The policy of the regional laboratories is to conduct all business with integrity and in an ethical manner. It is the basic and expected responsibility of each staff member and each manager to adhere to EPA's Principles of Scientific Integrity, dated November 24, 1999. This policy statement has been incorporated into the quality management plans of all the regional laboratories. It provides the foundation for the inclusion of ethics and ethics training into the quality systems to insure the production of data that is scientifically sound and defensible.

In order to maintain and improve the regional laboratory quality systems, regional laboratories regularly conduct internal audits, participate in performance evaluation studies, and review and revise quality management plans and standard operating procedures as necessary.

Regional laboratories are committed to accreditation under the National Environmental Laboratory Accreditation Conference (NELAC) quality system standards, in part, as a response to EPA's January 6, 2004 policy directive "Ensuring the Competency of Environmental Protection Laboratories". Eight out of ten of the regional laboratories have received and are currently maintaining accreditation under NELAC for analysis of samples in one or more of the following matrices: drinking water, non-potable water, solid and chemical materials, and air and emissions.

Sustainability

Sustainability covers a variety of elements that are essential to effective laboratory operation. These include environmental management, health and safety, and facilities management. In recent years, identifying and implementing long-term efficiencies and cost saving opportunities within the regional laboratory network has become another key sustainability issue.

While supporting the EPA goals is the primary mission of the regional laboratories, they also strive to be good environmental stewards and to provide a healthy and safe working environment for their employees. The reputation of the regional laboratory is judged by the quality of science it offers to regional and national programs. Far less visible, but no less important, is the diligence and commitment of laboratory management and staff to supporting the infrastructure required to deliver the science.

• Identifying and Maximizing Efficiencies

In FY 2007, the ten regional laboratories continued their efforts to identify and implement long-term efficiencies and cost saving opportunities within the regional

laboratory network. These efforts included investigating opportunities to reduce individual laboratory costs, improve energy and water conservation, and evaluating strategic sourcing options. A few notable examples of these efforts are described here.

- **Strategic Sourcing Initiative:** In FY 2007, as part of the Office of Management and Budget's (OMB) strategic sourcing initiative, a Laboratory Supplies Commodity Team was established to develop, implement and assist in the management of strategic sourcing for laboratory supplies. Strategic sourcing is a collaborative and structured process of critically analyzing an organization's spending and then making business decisions about how to acquire selected commodities and services more effectively and efficiently. The Laboratory Supplies Commodity Team includes a regional laboratory representative. During the profile step, the laboratory supplies commodity was divided into categories, e.g., glassware, plastic ware, consumables, reagents, standards, acids, solvents, gases, etc. The Team decided that all categories of laboratory supplies, except for gases, could be strategically sourced. After much consideration of all acquisition options, the Laboratory Supplies Commodity Team recommended the solicitation be awarded as a Blanket Purchase Agreement (BPA). The BPA will cover a five year period for the procurement of approximately $5 million of laboratory supplies each year. It is expected the use of this process will result in approximately $1 million of savings each year.

- **Laboratory Infrastructure Study – Near Term Study:** In 2007, EPA embarked upon a review of its laboratory capabilities and operations. The review consists of two components: a long-term external study and a near-term internal study. EPA completed the internal review, which highlighted efficiency and effectiveness actions that are being implemented across EPA's laboratory network. The efforts culminated in the drafting of a report entitled, "Commonsense Actions and Best Practices that Improve Laboratory Efficiency & Effectiveness". Regional labs are prominently featured in the 500+ best practices identified in the report.

  Some examples of energy and other cost saving measures included in the report are:

  - **Replacement of Laboratory Refrigerators**: One regional laboratory performed an energy study on existing laboratory sample storage

refrigerators. Kilowatt usage was directly measured. An evaluation of needs and ways to reduce the overall refrigeration "footprint" was also performed. The recommendations to replace all current laboratory refrigerators with new, energy efficient (Energy Star) units will result in a reduction of energy use over the lifetime of the new refrigerators. Improved maintenance costs will also be realized. Over twenty laboratory refrigerators were replaced with Energy Star rated units in FY'07.

- **Reduced Fume Hood Air Flow:** A regional laboratory replaced six low-flow fume hoods with models that reduce air flow by approximately 25%, while maintaining adequate capture and user safety. As laboratory areas are renovated, hoods are replaced with the reduced air flow units. Replacement of these hoods has reduced air exhausted from the laboratory by approximately 800 CFM. The estimated energy savings based on the use of these hoods, mostly from the energy needed to condition the replacement air, is approximately 920 MBTU per year and $19,200 per year in energy costs. An additional five fume hoods will be replaced under this program over the next two years, with an additional projected savings of 800 MBTU per year and $17,300 per year in energy costs.

- **Chemical Adoption Program (ChemShare):** A cooperative program between collocated regional and HQ laboratories was established to help reduce the amount of chemicals purchased and ultimately disposed of by the facility. The ChemShare program assists the scientists by identifying all surplus chemicals in the facility and making them available for ownership transfer before new materials are purchased. If a suitable chemical is not transferred internally prior to expiration, they are then offered to area public high schools for external adoption. The first set of ChemShare donations, with approximately $1,900 worth of surplus chemicals, was provided to two area public high schools. Not only did these donations reduce disposal costs for expired chemicals, they provided procurement savings for schools and promoted environmental management awareness.

• Environmental Management

In 2007, all ten regional laboratories made progress toward integrating and utilizing Environmental Management Systems (EMS) to effectively manage environmental initiatives and compliance requirements of Executive Order 13148, "Greening the Government through Leadership in Environmental Management." In FY 2007, EPA's performance in this regard was an integral metric of OMB's annual Environmental Stewardship Scorecard. For 2007, 90 % of the regional laboratories were rated "green" with regard to their EMS performance, up from 50% in FY 2006.

In addition, in FY 2007 the regional laboratories continued to provide significant input to EPA Headquarters as they developed Agency-wide EMS Targets and Objectives for EPA laboratories. Of particular relevance to Agency wide EMS chemical management objectives and targets are the broad goals of this Executive Order which identify specific obligations for federal agency chemical use reductions. In FY 2007, a chemical management technical working group was established with representatives from the regional laboratories. The purpose of the group is to identify and coordinate implementation of pollution prevention best practices across the laboratories.

Another notable environmental management measure is described below.

- **Construction of a Rain Garden**: A regional laboratory Environmental Management System (EMS) team completed construction of a rain garden. A rain garden is designed to absorb rainwater runoff from areas like roofs, driveways, walkways, and compacted lawn areas. This reduces rain runoff by allowing storm water to soak into the ground instead of flowing into storm drains and surface waters. This reduces the amount pollution reaching creeks and streams. The project was a cooperative effort between the EMS team, facility management staff, and employees on site. The groundbreaking for the rain garden was held at an Earth Day event and educational materials were developed to answer some of the myths and issues that can surround a rain garden installation.

• Health and Safety

The health and safety of laboratory personnel is the most important laboratory management imperative. The usage of glassware, fire and heat, high-pressure compressed gases or liquefied gases, solvents and contaminated samples combine to increase the probability for accidents and creates safety concerns that make laboratories inherently more risky than office environments. All of the EPA's laboratories have invested heavily in their health and safety programs and have an excellent safety record

as proof of their efforts. Highlights of health and safety activities for the past year include:

- All laboratories have medical monitoring programs to evaluate and track the health of those employees with a significant possibility of workplace exposure to hazardous compounds.
- All regional laboratories undergo a periodic, comprehensive audit of safety, health, environmental compliance and internal controls by the Headquarters Safety, Health and Environmental Management Division. Several laboratories completed such audits in FY 2007.
- Regional laboratories have active Safety and Health Committees that are well represented by laboratory employees. These committees provide a forum for discussing safety and health issues, and assist the safety officer in planning training activities and organizing safety inspections.
- All laboratories conduct annual refresher health and safety training. New employees receive 24-hour course training in health and safety.

• Facilities Management

EPA regional laboratories are housed in various types of facilities; from converted World War I buildings to the latest architectural designs which incorporate energy efficiency and make use of alternative fuel sources. While some facilities are U.S. Government owned, most are operated under lease agreements through the General Services Administration. The regional laboratories are home to fixed laboratory functions, field investigation functions, and mobile laboratories. Facilities management involves not only day-to-day oversight activities for proper maintenance, but the planning, budgeting, and construction of needed modifications such as building expansions and upgrades of servicing equipment.

In FY 2007, the regional laboratories continued to focus a great deal of effort on energy conservation. In part, because of Executive Order 13148 "Greening the Government through Leadership in Environmental Management", most regional laboratories are evaluating ways to reduce energy consumption. Energy saving activities will be conducted in the context of the best practices identified in EPA's near term study described above.

Future Challenges

Each regional laboratory is a center of applied scientific support that meets the unique needs of its geographical region, states and tribes. As environmental analytical laboratories, all ten organizations share many long-term and short-term challenges to meeting their goals. The following challenges represent a summary of those needs identified by the regional laboratories.

- Ability to meet customer needs as the demand for quicker turnaround times for analytical results continue to be the trend in Superfund removal actions and emergency response;
- Ability to balance increasing demands for scientific support with static or decreasing staffing levels and loss of expertise due to retirement of senior scientists;
- Ability to maintain and expand capacity to provide analytical services in a cost-effective and efficient manner;
- Ability to remain flexible and cultivate the necessary foresight to meet changing analytical needs and to address emerging pollutants and contaminants of concern;
- Maintenance of accreditation under the National Environmental Laboratory Accreditation Conference (NELAC);
- Expansion of collaborative efforts with the scientific community in order to advance the science of environmental monitoring and analysis;
- Involvement in a variety of efforts to support Homeland Security including establishment of an intergovernmental environmental laboratory response network (eLRN); development of analytical capabilities to give appropriate analytical support in emergency situations; and acquisition of necessary training for the identification and measurement of unknown threat agents.

Meeting the Challenge

The regional laboratories play a key role in supporting the agency's strategic goals and provide significant scientific foundations to meet these goals. In addition to supporting national laboratory program initiatives, the laboratories provide strong science and laboratory capabilities for the regions. The laboratories are a crucial part of the integrated

analytical capacity needed to meet specific environmental objectives on a global, national, regional and local basis. As EPA moves into the future, the regional laboratories will take on a variety of challenges in order to continue their support for the mission of the agency. The regional laboratories intend to meet these challenges by, among other activities:

- Identifying and addressing priorities;
- Identifying and implementing additional long-term efficiencies and cost saving opportunities
- Maintaining highly skilled laboratory staff through training, employee development, scientific collaborations, and technology and information transfer;
- Updating laboratory equipment in order to increase analytical capabilities;
- Identifying opportunities for regional laboratories to pool their efforts in order to address high priority projects;
- Staying current with technology and science issues relating to analytical methodology, instrumentation and emerging pollutants of concern.
- Exploring opportunities for alternative/additional mechanisms for financial support;
- Improved marketing of services and capabilities;
- Enhancing communication and coordination with programs;
- Intra-regional networking with other governmental and private sector laboratories to improve communications, coordinate development efforts and provide mutual support.

APPENDIX A

Regional Laboratories Core Capabilities

EPA REGIONAL LABORATORIES CORE CAPABILITIES – FY 2007

I. CHEMISTRY

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
INORGANIC CHEMISTRY:												
Acidity	Water	Titrametric		X	X	X	X			X		
Alkalinity	Water	Titrametric	X	X	X	X	X	X	X	X	X	X
Asbestos	Solids/Bulk material	PLM	X				X		X		X	X
	Soil/Sediment	PLM	X									X
Chloride	Water	Colorimetric							X			
	Water	IC	X	X	X	X	X	X		X	X	X
	Water	Titrametric		X	X							
Chromium, Hexavalent (Cr+6)	Water	Colorimetric		X	X	X		X	X			X
	Soil/Sediment	Colorimetric		X	X	X						X
	Water	IC			X		X				X	
	Soil/Sediment	IC			X		X					
Cyanide, Amenable	Water	Colorimetric	X	X		X	X	X	X	X	X	X
	Soil/Sediment	Colorimetric	X	X		X		X	X	X		X
Cyanide, Total	Water	Colorimetric	X	X	X	X	X	X	X	X	X	X
	Soil/Sediment	Colorimetric	X	X	X	X	X	X	X	X		X
	Waste	Colorimetric	X	X	X	X	X	X		X		X
Fluoride	Water	ISE	X	X		X			X			
	Water	IC	X	X	X	X	X	X		X	X	X

EPA REGIONAL LABORATORIES CORE CAPABILITIES – FY 2007

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
Hardness	Water	Colorimetric										X
	Water	Titrametric		X	X			X			X	
	Water	ICP/Calculation	X	X	X	X	X	X	X	X	X	X
Mercury, Total	Water	CVAA	X	X	X	X	X	X		X	X	X
	Soil/Sediment	CVAA	X	X	X	X	X	X		X	X	X
Mercury, Total	Tissue (fish &/or plant)	CVAA	X	X	X	X				X	X	X
	Waste (oil, drum, etc..)	CVAA	X	X	X	X	X	X		X	X	X
Mercury (TCLP)	Soil/Waste (oil, drum, etc..)	CVAA	X	X	X	X	X	X		X	X	X
Metals, Total	Water	ICP /AES	X	X	X	X	X	X	X	X	X	X
	Soil /Sediment	ICP /AES	X	X	X	X	X	X	X	X	X	X
	Tissue (fish &/or plant)	ICP /AES	X	X	X	X			X	X	X	X
	Waste (oil, drum, etc..)	ICP /AES	X	X	X	X	X	X	X	X	X	X
Metals (TCLP)	Soil/Waste (oil, drum, etc..)	ICP /AES	X	X	X	X	X	X	X	X	X	X
Metals, Total	Water	GFAA	X		X		X	X	X			X
	Soil/Sediment	GFAA	X		X		X	X	X			X
	Tissue (Fish &/or plant)	GFAA	X		X							X
	Waste (oil, drum, etc..)	GFAA	X		X		X	X				X
Metals (TCLP)	Soil/Waste (oil, drum, etc.)	GFAA	X		X		X	X				X

EPA REGIONAL LABORATORIES CORE CAPABILITIES – FY 2007

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
Metals, Total	Water	ICP/MS	X	X	X	X	X	X	X	X	X	X
	Soil/Sediment	ICP/MS	X	X	X	X		X		X		X
	Tissue (Fish &/or plant)	ICP/MS		X	X	X				X	X	X
	Waste (oil, drum, etc..)	ICP/MS			X	X		X		X		
Metals (TCLP)	Soil/Waste (oil, drum, etc..)	ICP/MS				X		X		X		
Nitrogen (Ammonia)	Water	Colorimetric		X	X	X	X	X	X	X	X	X
	Soil/Sediment	Colorimetric			X	X	X					X
	Water	Electrode		X								
Nitrogen (NO3 &/or NO2)	Water	Colorimetric		X	X	X	X	X	X	X	X	X
	Soil	Colorimetric				X	X		X			X
	Water	IC	X	X	X	X	X			X	X	X
	Soil	IC	X		X	X	X				X	
Nitrogen, Total Kjeldahl	Water	Colorimetric		X	X	X	X	X	X		X	X
	Soil	Colorimetric			X	X	X	X				X
Perchlorate	Water	IC					X		X		X	X
	Soil	IC							X		X	
	Water	IC with LC/MS confirmation										X
	Water, Soil/Sediment	LC/MS			X							
	Water	LC/MS/MS									X	

EPA REGIONAL LABORATORIES CORE CAPABILITIES – FY 2007

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
Phosphorus, Ortho	Water	Colorimetric	X	X		X		X	X	X		X
	Water	IC	X	X	X	X	X			X	X	X
Phosphorus, Total	Water	Colorimetric	X	X	X	X	X	X	X	X	X	X
	Soil	Colorimetric	X		X	X	X					X
Sulfate	Water	IC			X	X						
	Soil	IC			X							
	Water	Turbidimetric	X	X		X	X	X	X		X	X
	Soil	Turbidimetric	X				X				X	
ORGANIC CHEMISTRY:												
Sulfide	Water	Colorimetric		X	X	X	X		X			X
	Soil	Colorimetric				X	X					X
	Water	IC, Turbidimetric			X			X				
	Water	Titrimetric		X			X				X	X
BNA	Water	GC/MS	X	X	X	X	X	X	X	X	X	X
	Soil/Sediment	GC/MS	X	X	X	X	X	X	X	X	X	X
	Waste (oil, drum, etc..)	GC/MS	X	X	X	X		X	X	X	X	X
	Tissue (fish &/or plant)	GC/MS				X						X
BNA (TCLP)	Solid/Waste	GC/MS	X	X	X	X	X	X	X	X	X	X
BNA (TPH)	Water	GC/MS or GC			X	X		X	X	X	X	X
	Soil/Sediment	GC/MS or GC			X	X		X	X	X	X	X

EPA REGIONAL LABORATORIES CORE CAPABILITIES – FY 2007

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
BOD	Water	Membrane Electrode		X	X	X	X	X	X	X	X	X
COD	Water	Photometric						X				
	Water	Colorimetric		X	X		X		X	X		
EDB & DBCP	Water	GC/ECD	X			X	X	X	X	X	X	X
Herbicides	Water	GC/ECD; GC/NPD		X		X		X	X			X
	Soil/Sediment	GC/ECD; GC/NPD				X		X	X			X
	Waste (oil, drum, etc..)	GC/ECD; GC/NPD				X			X			X
	Tissue (fish &/or plant)	GC/ECD; GC/NPD							X			
Herbicides (TCLP)	Solid/Waste	GC/ECD		X		X		X	X			X
	Solid/Waste	HPLC/UV Detection			X							
Oil & Grease	Water	Gravimetric		X	X	X	X	X	X			X
	Soil/Sediment	Gravimetric		X			X		X	X		
Pesticides / PCBs	Water	GC/ECD	X	X	X	X	X	X	X	X	X	X
	Soil/Sediment	GC/ECD	X	X	X	X	X	X	X	X	X	X
	Waste (oil, drum, etc..)	GC/ECD	X	X	X	X	X	X	X	X	X	X
	Tissue (fish &/or plant)	GC/ECD	X	X		X			X	X		X
Pesticides (TCLP)	Solid/Waste	GC/ECD	X	X	X	X	X	X	X	X	X	X
Phenolics	Water	Colorimetric		X	X	X	X		X	X		X
	Soil/Sediment	Colorimetric			X		X		X	X		

EPA REGIONAL LABORATORIES CORE CAPABILITIES – FY 2007

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
PAHs	Water	GC/MS	X	X	X	X	X	X	X	X	X	X
	Soil/Sediment	GC/MS	X	X	X	X	X	X	X	X	X	X
	Air	GC/MS	X		X	X			X			X
	Tissue (fish &/or plant)	GC/MS	X			X			X			X
	Waste (oil, drum, etc..)	GC/MS	X	X	X	X		X	X	X		X
TOC	Water	Combustion / IR	X	X	X	X	X		X	X	X	X
	Soil	Combustion / IR	X	X	X	X	X		X	X	X	X
	Water	Combustion/Oxidation			X							
	Water	UV/Persulfate						X		X	X	
VOA	Water	GC/MS	X	X	X	X	X	X	X	X	X	X
	Soil/Sediment	GC/MS	X	X	X	X	X	X	X	X	X	X
	Air	GC/MS	X	X	X	X	X	X	X		X	
	Waste (oil, drum, etc..)	GC/MS	X	X	X	X		X	X	X	X	X
	Water	GC				X				X		X
	Soil/Sediment	GC				X				X		X
	Waste (oil, drum, etc..)	GC	X			X				X		X
VOA (TCLP)	Solid/Waste	GC/MS		X	X	X	X	X	X	X		X
VOA (TPH)	Water	GC/MS or GC				X			X	X	X	X
	Soil/Sediment	GC/MS or GC				X			X	X	X	X

EPA REGIONAL LABORATORIES CORE CAPABILITIES – FY 2007

II. BIOLOGY

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
Coliform, Total	Water, Soil &/or Sludge	Various	X	X	X		X	X		X	X	X
Coliform, Fecal	Water, Soil &/or Sludge	Various	X	X	X		X	X		X	X	X
E. coli	Water, Soil &/or Sludge	Various	X	X	X		X	X		X	X	X
Toxicity (Acute & Chronic)	Water	Fathead, Ceriodaphnia	X	X	X		X	X		X	X	

III. PHYSICAL & OTHER DETERMINATIONS

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
Aqueous/Liquid	Waste (oil, drum, etc.)	Pensky-Marten or Seta	X	X	X	X		X	X			X
Conductivity	Water	Specific Conductance	X	X	X	X	X	X	X	X	X	X
Ignitability	Soil/Sediment	Pensky-Marten or Seta Closed Cup	X	X		X	X	X			X	X
	Waste (oil, drum, etc..)	Pensky-Marten or Seta Closed Cup	X	X	X	X	X	X	X	X	X	X

EPA REGIONAL LABORATORIES CORE CAPABILITIES – FY 2007

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
pH	Water	Electrometric	X	X	X	X	X	X	X	X	X	X
	Soil/Sediment	Electrometric	X	X	X	X	X	X	X	X	X	X
	Waste (oil, drum, etc..)	Electrometric	X	X	X	X	X	X	X	X	X	X
Solids, Non-Filterable	Water	Gravimetric	X	X	X	X	X	X	X	X	X	X
Solids, Percent	Soil/Sediment	Gravimetric	X	X	X	X	X	X	X	X	X	X
Solids, Total	Water	Gravimetric	X	X	X	X	X	X	X	X	X	X
Solids, Total Dissolved	Water	Gravimetric	X	X	X	X	X	X	X	X	X	X
Solids, Total Volatile	Water	Gravimetric	X	X		X	X	X	X	X	X	X
Turbidity	Water	Nephelometric	X	X	X	X		X	X	X	X	X

EPA REGIONAL LABORATORIES CORE CAPABILITIES – FY 2007

ABBREVIATIONS

BNA	Base/Neutrals and Acids Extractable Organics
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
CVAA	Cold Vapor Atomic Absorption Spectrometry
DBCP	Dibromochloropropane
EDB	Ethylene dibromide
GC	Gas Chromatography
GC/ECD	GC/Electron Capture Detector
GC/NPD	GC/Nitrogen - Phosphorus Detector
GC/MS	GC/Mass Spectrometry
GFAA	Graphic Furnace Atomic Absorption Spectrometry
IC	Ion Chromatography
ICP	Inductively Coupled (Argon) Plasma
ICP/AES	ICP/Atomic Emission Spectrometry
ICP/MS	ICP/Mass Spectrometry
IR	Infrared
ISE	Ion Selective Electrode
LC/MS	Liquid Chromatography/Mass Spectrometry
LC/MS/MS	Liquid Chromatography/Dual MS
NO_3	Nitrate
NO_2	Nitrite
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated biphenyls
PLM	Polarized Light Microscopy
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
VOA	Volatile Organic Analytes/Analyses