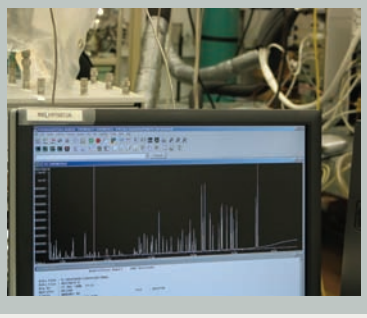
United States Environmental Protection Agency

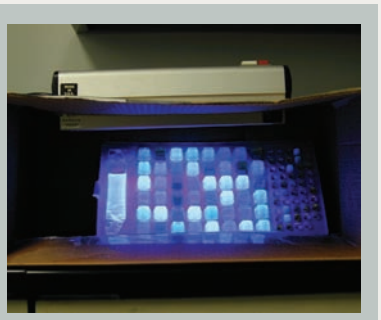
EPA-930-R-09-001

U.S. Environmental Protection Agency
Regional Laboratory System


EPA Regional Laboratories…
Advancing the Agency's Science Agenda



FY 2008 Annual Report

Table of Contents

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Executive Summary

The Regional Laboratory System is an inter-dependent network of the ten regional laboratories of the United States Environmental Protection Agency (EPA). 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.

In FY 2008, 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. The regional laboratories performed over 128,311 analyses in FY 2008, a 27 percent increase over the number of analyses performed in FY 2007.

In addition to increased analytical output, the regional laboratories continued to play an increasing role with regard to EPA's Strategic Plan for Homeland Security. In FY 2008, 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 continued the national effort to improve drinking water laboratory preparedness. 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; and validation of methods contained in EPA's "Standardized Analytical Methods for Use during Homeland Security Events."

The regional laboratories also provided a variety of field analytical support ranging from analyses performed onsite in mobile laboratories to screening techniques performed directly in the field. These services provided real time data to improve the efficiency of field operations and speed environmental decision making. In FY 2008, the regional laboratories performed nearly 11,000 field analyses in support of a variety of regional programs.

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.

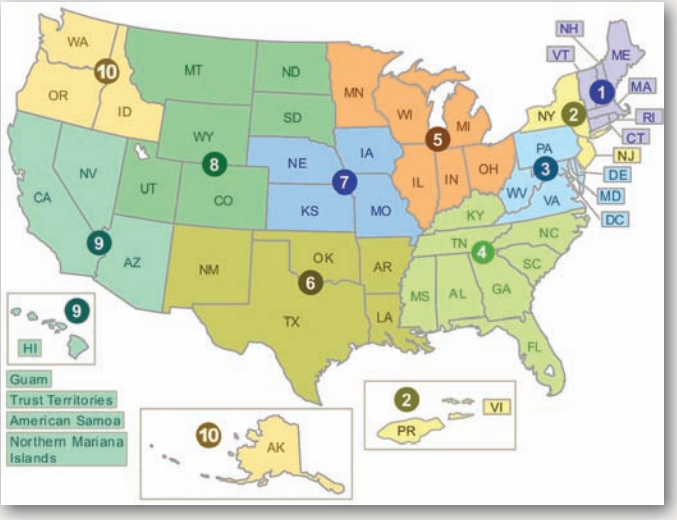
Section III, Progress and Looking to the Future: describes accomplishments associated with various aspects that are fundamental to the operation of the regional laboratories. These include quality systems, environmental management, health and safety, and facilities management. Section III concludes with the identification of future challenges facing the regional laboratories and a discussion of how the regional laboratories will meet them.

Section I - Overview

United States Environmental Protection Agency

Overview

The regional laboratories were primarily established to provide analytical services and technical support to EPA's regional offices. EPA's regional offices are responsible within their states for the execution of the Agency's programs and require ready access to analytical services and technical support for various media program activities and management priorities. Analytical services provided by the regional laboratories include a full spectrum 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 a long list of other core functions, including:

- technical advice and assistance to state and local agencies concerning analytical techniques, methodology and quality control;

- field sampling support;

- expert witness testimony;

- training of program staff and other organizations;

- on-site evaluation of drinking water laboratories;

- audits of states' drinking water certification programs;

- promotion of inter-laboratory communication and emergency preparedness;

- technical support to federal, state and local laboratories;

- technical support to internal and external organizations;

- applied research for regional initiatives;

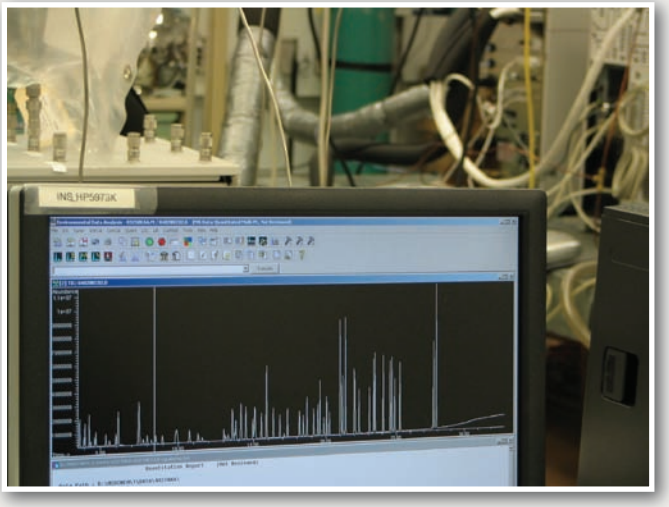
- support national laboratory program initiatives;

- 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 regional laboratories focus on the application of science policies and methods to support regulatory and monitoring programs and 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's program offices, EPA's Office of Research and Development (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:



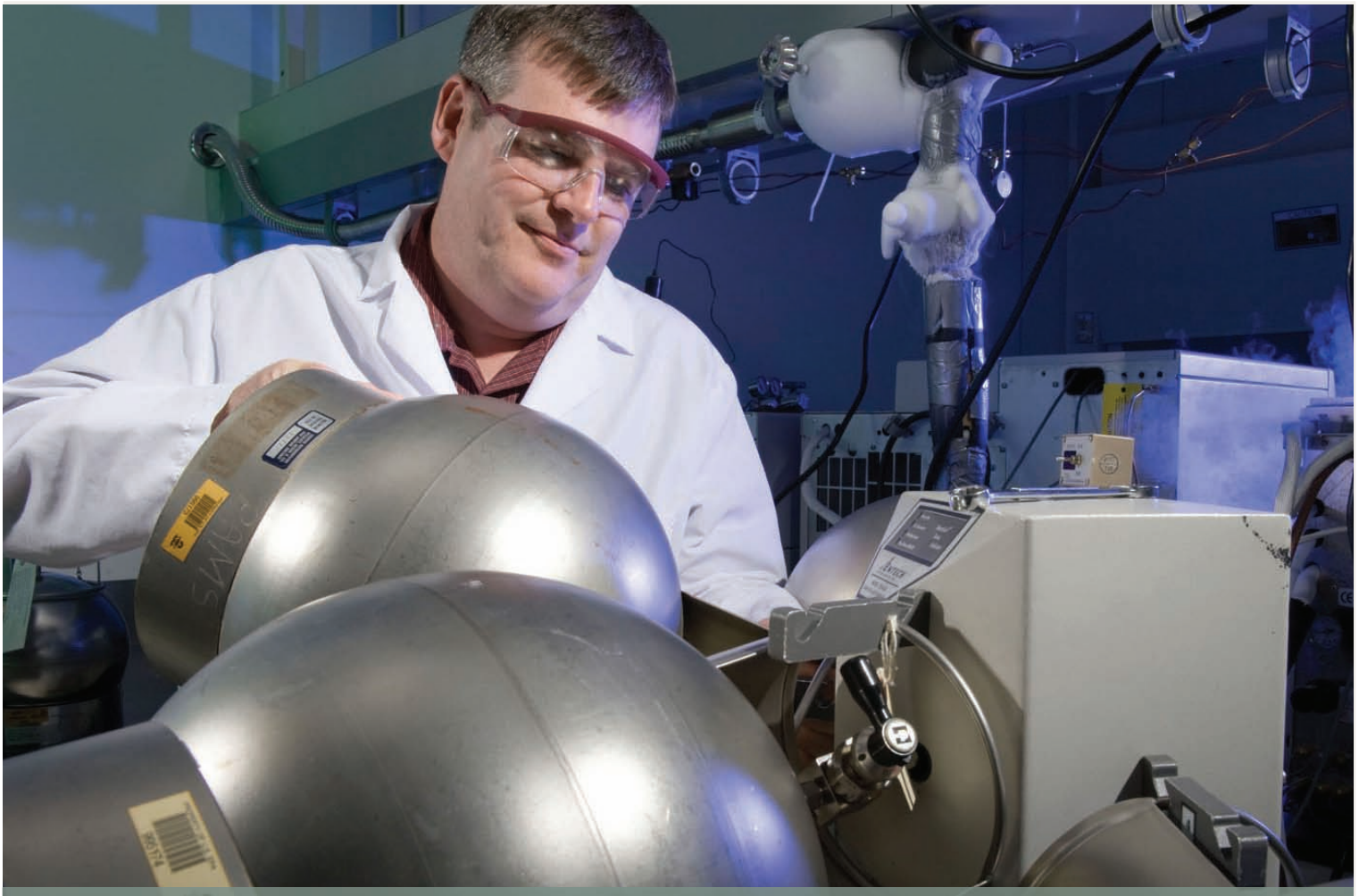
To integrate laboratory activities with those of field and quality assurance partners into a comprehensive, holistic, multi-media approach to solving ecosystem-based environmental problems.

To provide scientific data of known quality to support Agency decisions through partnerships with regional and national 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 crucial decisions are made.



Section II - Support for EPA's Strategic Goals

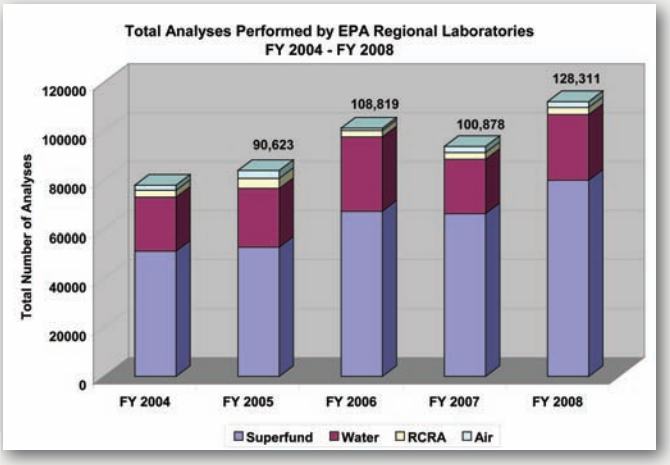
United States Environmental Protection Agency

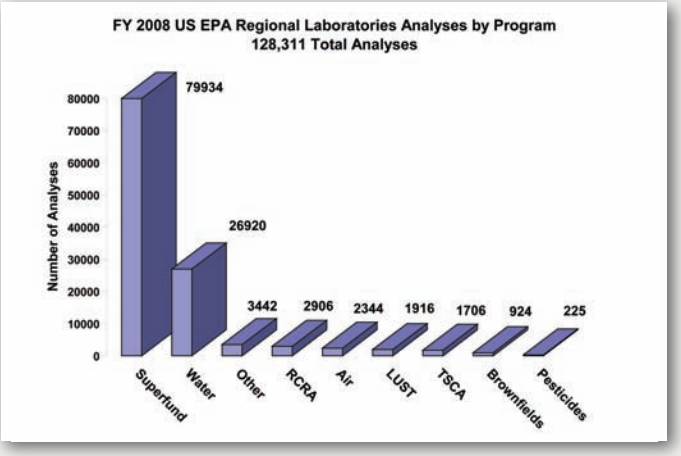
Introduction

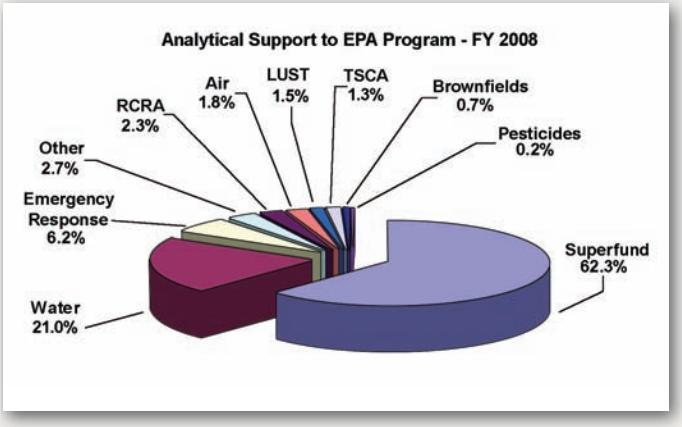
One of the primary functions of the regional laboratories is to supply quality analytical data to the Agency's programs in support of regional initiatives that range from routine monitoring to criminal enforcement. The following charts represent the analyses performed for various EPA programs in FY 2008.

Over 125,000 analyses were performed in support of EPA programs in FY 2008. 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.

Demand for analytical support from EPA's regional laboratories continued to increase in FY 2008 with a 27% increase in analyses performed compared to FY 2007. Over the past five years, the number of analyses performed by the regional laboratories has increased by 52%. As represented in the chart below, this increase is largely due to increased analytical support for the Superfund program.







Introduction - (cont.)

The regional laboratories are also increasingly engaged in the Emergency Response Program. In FY 2008, the regional laboratories provided nearly 8,000 time-critical analyses associated with response to environmental disasters, hazardous materials releases, priority contaminant removals, and inland oil spills that threatened human health and/or the environment.

In addition to fixed laboratory analytical support, the regional laboratories provide significant field sampling and field analytical support. In FY 2008, over 8% (10,851 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.

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.

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. The laboratory component of the program includes particulate matter (PM) filter handling, inspection, equilibration, and weighing; data entry, validation, management and distribution to client Regions; as well as filter archival and data submittal to the Air Quality System (AQS). The PM filter weighing lab is located at the regional lab in Region 4. In FY 2008, the laboratory processed and weighed 986 filters from around the country and validated 931 individual PM2.5 PEP audits for submittal to the national ambient air database. The other regional laboratories also provided support for PEP through performance evaluation audits, quality assurance collocations and PEP audits. In FY 2008, the regional laboratories supported the completion of over 300 PM2.5 PEP audits. Regional laboratory staff also served as trainers at the national training class for the PM2.5 PEP program.

Through-the-Probe Audit System:
The through-the-probe audit system provides performance audits at state and local ambient air monitoring stations. In FY 2008, the regional laboratories supported the completion of over 200 through-the-probe audits. These performance audits ensure the validity of the ambient air quality monitoring data. In addition, as part of an international agreement to provide technical support to Mexico as they build their national air monitoring program, performance audits were completed in various cities in Mexico near the U.S. border.

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.

Goal 1: Clean Air (cont.)

Other Air Projects

Mercury Emissions from a Cement Plant:
At the request of a local air quality management district and one of EPA's regional Air Divisions, the regional laboratory deployed its mercury air monitoring trailer adjacent to an elementary school to monitor levels of airborne mercury. The school is located downwind of a cement plant. The trailer has equipment to collect elemental, reactive and particulate mercury data, as well as concurrent ozone, SO_2, and NO_x and meteorological data. The dataset ultimately includes over 8,000 mercury analyses collected at five minute intervals. The data was used to determine whether airborne mercury levels were approaching the state's safety threshold.

Support to Inter-Tribal Council:
At the request of the regional Air Division, support was provided for an Inter-Tribal Council's air monitoring program. Support included metals analysis on particulate (PM2.5 and PM10) filters, and volatile air toxic samples collected in stainless steel air canisters.

Development of NCore Multi-pollutant Monitoring Network:
A regional laboratory worked with EPA's Office of Air Quality Planning & Standards to assist with a National Performance Audit Program (NPAP) pilot program for "through-the-probe" audits of new trace level monitors that are required at NCore monitoring sites. NCore is a multi-pollutant network that integrates several advanced measurement systems for particles, pollutant gases and meteorology. The NCore Network will address several objectives, including support for long-term health assessments that contribute to ongoing reviews of the National Ambient Air Quality Standards and support to scientific studies ranging across technological, health, and atmospheric process disciplines.

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.

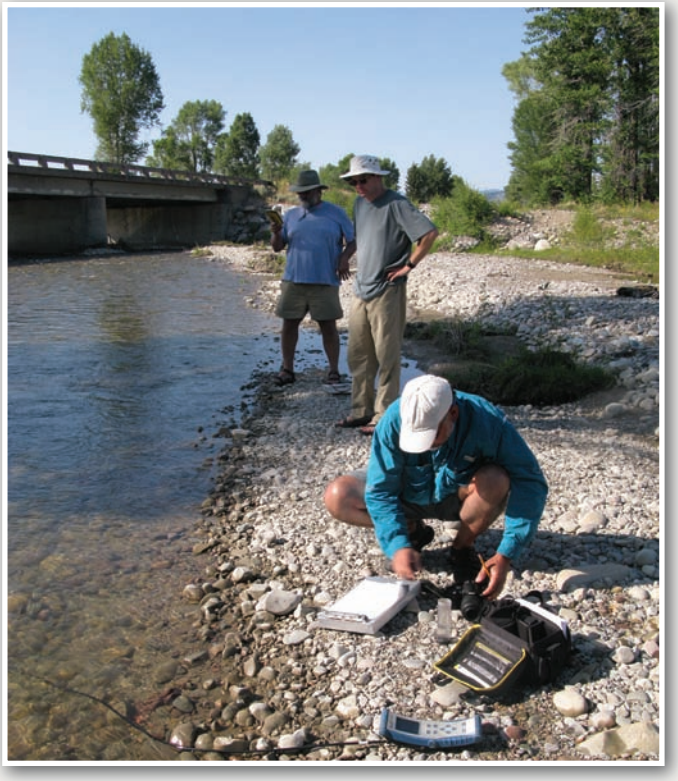
The regional laboratories play an important part in protecting and restoring the nation's water resources by providing key data so that the regions and their partners have the information they need to target actions to protect human health and aquatic ecosystems more efficiently. The regional laboratories 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 for 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. EPA regional laboratory personnel who are trained as laboratory certification officers conduct on-site evaluations of drinking water laboratories operated by states and tribal communities. The regional laboratory certification officers also perform 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 2008, the regional laboratories performed 41 evaluations and audits related to drinking water laboratory certification. These included both on-site evaluations of drinking water laboratories operated by state and tribal communities and on-site audits of states' drinking water certification program.

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

Water quality monitoring and assessment provides information that is crucial for management of our water resources. Water quality data are used to characterize waters, identify trends over time, identify emerging problems, determine whether pollution control programs are working, and to help direct pollution control efforts to where they are most needed.



Goal 2: Clean and Safe Water (cont.)

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 water quality assessments of and TMDL development for water bodies throughout the country.

Yazoo River Basin Study- Phase 3:
The Yazoo River Basin Study was designed to provide water quality chemistry and other data needed for the development of TMDLs on ten priority water bodies impacted by nutrients from a variety of sources including agriculture, point source discharge, and catfish farming. In FY 2008, the regional laboratory continued to provide support to this multi-year project with over 400 analyses of water column samples for long-term biological oxygen demand (BOD) and with numerous nutrient analyses including total Kjeldahl nitrogen, ammonia, nitrate/nitrite, total/dissolved phosphorus, and total/dissolved organic carbon.

Support for National Water Quality Assessments:
Bacterial analyses of nearly 1,500 samples using Polymerase Chain Reaction (PCR) methods were performed as part of the Office of Water's National Lakes Assessment (NLA). Similarly, analyses using PCR methods were performed on 950 samples for the two year Office of Water's National Rivers and Streams Assessment (NRSA). These assessments will provide statistically valid regional and national estimates of the condition of the nation's water resources. The assessments will also help build state and tribal capacity for monitoring and assessment and promote collaboration across jurisdictional boundaries in the assessment of water quality. In addition to analytical support, another regional laboratory provided training and auditor support for the NRSA. Laboratory staff received training on NRSA protocols and then subsequently provided training to samplers affiliated with tribal, federal, and other agencies. Laboratory staff also audited field teams that performed the NRSA protocols.

Special Water Projects in FY 2008

Examples of some activities and projects supporting a variety of water related strategic goals in FY 2008 are listed here.

Urban Stormwater Monitoring:
An urban stormwater monitoring project was conducted to support EPA's water enforcement program. Samples were primarily collected from rivers flowing through a major metropolitan area and analyzed for indicators of sewage contamination. Primary indicators included E. coli, ammonia, surfactants, and optical brighteners. Selected sites were also monitored for BOD, total suspended solids, chlorine, total phosphorus, and Pharmaceutical and Personal Care Products (PPCP). Field test kits were used to evaluate their efficiency at measuring selected pollutants. Sample results were used to track down illegal sewage discharges using a weight of evidence approach, and enforcement actions were taken when warranted. In the course of 14 weeks, EPA collected 700 samples from over 150 locations. This project involved staff from the EPA lab and water enforcement office. In addition to EPA's sample collection, over 500 samples were collected by area urban watershed associations under EPA approved Quality Assurance Project Plans (QAPP).

Cryptosporidium and Giardia Monitoring:
Both the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) address microbial contamination of the Nation's water. The SDWA authorizes EPA to regulate contamination in drinking water and allows for 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

Goal 2: Clean and Safe Water (cont.)

program for a variety of contaminants including protozoan pathogens Cryptosporidium and Giardia in the watershed. The monitoring includes the reservoir system and the streams and tributaries which flow into the reservoir. The regional laboratory provides the specialized analytical support to the monitoring effort of the watershed and the contributing streams.

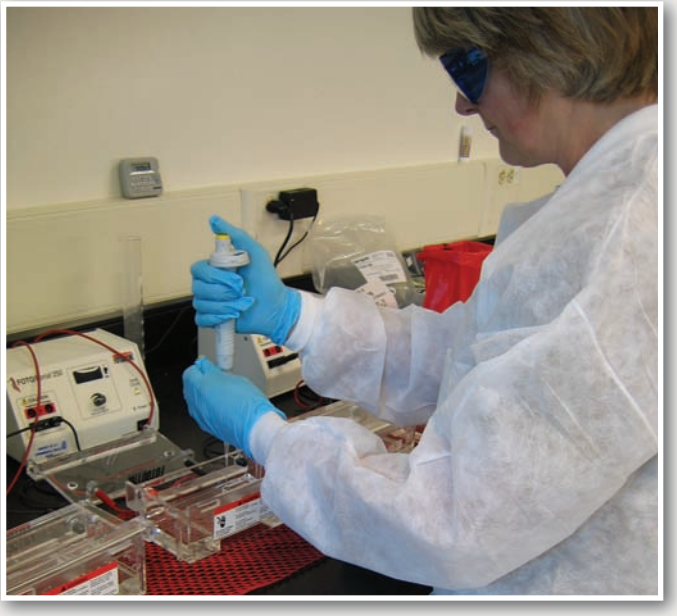
Southeastern Periphyton Nutrient Response Project:
A regional laboratory provided nutrient analyses for the Southeastern Periphyton Nutrient Response Project. This study is designed to investigate the relationship of biological response signals to aquatic nutrient concentrations along a stream network. The project will evaluate the ability of selected field methods, data analyses and monitoring techniques to characterize biological responses to nutrient conditions. Information gained from this effort will assist EPA and state agencies in establishing protective water quality standards for flowing waters.

Water Quality and Stormwater Run-off Management Practices:
Analytical assistance was provided to EPA's Office of Research and Development for an evaluation of stormwater run-off management practices within a midwestern watershed. The regional laboratory provided monthly analysis of creek samples for nitrogen, phosphorus and metals. The water quality data supplied by the laboratory provides important information about the effectiveness of the various stormwater management practices that were under evaluation.

Long Term 2 Enhanced Surface Water Treatment Rule (LT2):
In collaboration with its Drinking Water Program, the regional laboratory provided support for the LT2 rule by assisting with oversight and evaluation of monitoring results from approximately 50 public water systems and laboratories. The purpose of the LT2 rule is to reduce disease incidence associated with Cryptosporidium and other disease-causing microorganisms in drinking water. The rule will supplement existing regulations by targeting additional Cryptosporidium treatment requirements to higher risk systems. The rule contains provisions to reduce risks from uncovered finished water storage facilities and to ensure that systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts. The rule will apply to all systems that use surface water or ground water under the direct influence of surface water. The Schedule 4 portion of the rule involves the monitoring of E. coli data in smaller water systems.

Colorado Lakes Project:
Over 900 field analyses and over 350 laboratory analyses were provided for the Colorado Lakes Project. The data provided by the laboratory will provide assistance for the development of nutrient criteria for lakes in the eastern part of the state.

Application of Microbial Source Tracking:
Microbial source tracking, which was developed by EPA's Office of Research and Development and mobilized by the laboratory two years ago, is now provided as a routine service to regional clients. The technique uses PCR technology to differentiate between human, ruminant and other types of fecal contamination. During the year it was applied to five watershed projects in the analysis of over 200 samples to help investigators fingerprint the origin of fecal contaminants that were exceeding regulatory standards.



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.

In FY 2008, over 60 percent of the analyses performed by the regional laboratories supported 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.

The regional laboratories provided nearly 3,000 analyses to address hazardous and non-hazardous waste issues associated with the RCRA program and over 1,900 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. Analytical procedures are often revised to achieve lower detection limits or to accommodate different and challenging matrices. An example is described below:

Tissue Analyses for Metals at Trace Levels:
At the request of their Superfund Division, the regional laboratory took on several challenging matrices from two Superfund sites. One Superfund project required sample preparation and digestion for metals analysis of geoduck clam samples in the vicinity. Breakdown of the stringy tissue matrix was particularly challenging, requiring extreme pulverization, followed by freeze-drying, then microwave digestion in mixed acids.

Another Superfund project involved refinement of ICP/MS method 200.8 to analyze for lead in songbird blood. The project was particularly challenging due to the low volumes of blood samples that were available, and the extreme levels of cleanliness needed to analyze for lead at part per trillion (ppt) levels in the blood. After satisfactory results were obtained on reference samples, songbird blood samples from the site were successfully analyzed for lead as part of the five year sampling cycle. Another project at the same site involved analysis of large mammal and waterfowl fecal samples. The samples have characteristics of both tissue and soil samples. The samples needed to be pulverized, freeze-dried, and microwave digested. Because of potential coliform contamination, extra precautions needed to be taken to avoid dust from the fecal samples.

Goal 3: Land Preservation and Restoration (cont.)

Superfund and RCRA Projects

Examples of some activities and projects supporting a variety of Superfund and RCRA projects in FY 2008 are listed here.

Supporting Site Decisions:
With the combined effort of its field sampling team, its mobile lab, and its fixed lab, a regional laboratory provided time critical assistance to an EPA Remedial Project Manager and to the state that ultimately led to a more cost effective site remediation strategy. Soil gas sampling followed by Geoprobe® soil borings supported by immediate field analyses lead to the discovery and characterization of a shallow leach field source of chlorinated solvent contamination. Ultimately this portion of the site was remediated by excavation as opposed to soil vapor extraction. Groundwater contamination at the same site is being treated by sodium permanganate injection. The lab's Quality Assurance Unit furnished extensive technical support for designing a monitoring system before the injection of the permanganate and after injection to determine how the in-situ treatment system was working. The lab's field sampling team had a limited amount of time between injection well completion and permanganate injections for collection of samples. Rapid analysis by the fixed laboratory allowed the sodium permanganate injection plan to be modified to place oxidant in locations that had the highest concentrations of contamination. The data generated by the regional lab resulted in decisions to reduce injection volumes at several points and increase injection volumes at the high contaminant locations 70 feet below ground surface. The cost of the sodium permanganate was over $250,000 and thus the better placement of the oxidant meant more cost effective and efficient remediation of the site.

Field Methods and Mobile Laboratory Support:
One region's field screening methods performed by their mobile laboratory have become so important to decision making at removal sites that several times during the year the mobile lab has been stationed at one site while receiving samples from another relatively nearby site. The mobile lab support shortened sample transport times and sped up turnaround times on analytical results allowing real-time guidance on the limits of investigations and excavations. In addition to confirmatory analyses in support of the mobile lab field methods, the same region's fixed laboratory now performs the mobile lab field screening methods in-house to support one day turn around analyses and near real time decision making for sites that the mobile laboratory cannot support.

Monitoring Acid Mine Drainage:
Three water quality monitors (or sondes) have been deployed and are being maintained by the regional laboratory at a Superfund site associated with an abandoned open-pit sulfur mine. The mine is located in the Sierra Nevada Mountains at an elevation of approximately 7,000 feet. Acid drainage from the mine has had negative impacts on valuable nearby water sources.

Goal 3: Land Preservation and Restoration (cont.)

The sondes are placed in creeks emanating from the site and they monitor pH, temperature, oxidation-reduction potential, specific conductance, and depth on an hourly basis. The sondes transmit data hourly via satellite modem to a database accessible to EPA staff and the public. This information is used to investigate how and where mine drainage is generated and ultimately to provide information on options for controlling and treating the problem.

Characterization of Mine Drainage:
At the request of the regional Superfund Federal Facilities Program, the regional laboratory completed two mine dump sampling events and a mine tracer study near an abandoned base and precious metals mine. The project provided information to further characterize how drainage from the mine site impacts water quality in nearby water bodies. Ultimately, the data will be used to determine whether or not to list the abandoned mine as a Superfund site.

Indoor Air and Soil Vapor Intrusion Investigations:
Vapor intrusion is the migration of vapors containing volatile chemicals from buried waste and/or contaminated groundwater through the subsurface soils and into indoor air spaces of overlying buildings. The vapors may accumulate in dwellings or occupied buildings and pose an unacceptable risk of chronic or acute health effects. To address this concern, a regional laboratory's Air Monitoring Team and Chemistry Lab provided support to the Superfund Removal and Remedial Program by performing indoor air and soil vapor intrusion investigations at six sites during FY 2008. The number of buildings/homes selected for a given project was determined based on the contaminated source potential to impact the occupied buildings' indoor air quality. At each building, indoor air samples were collected over a 24-hour period in the basement area and then analyzed by the chemistry lab using a GC/MS. In addition, sub-slab soil gas grab samples were collected and analyzed immediately on-site by the regional mobile laboratory using GC/ECD/PID instrumentation. The combination of field sampling and on- and off-site analysis provided risk assessors with quality-assured data in a timely fashion thus enabling them to effectively evaluate the risk to building occupants and take quick action to remediate risk.

Migration of Groundwater Contaminants to Soil and Air:
Analyses were performed to measure volatile organic compounds (VOCs) in air samples collected at a site contaminated with 1,1-dichloroethene (DCE.) The project was implemented to determine if VOCs in contaminated groundwater were migrating through the soil and posing a health threat to residents living above the contaminated groundwater plume. In addition, the County Health Department and the State Department of Public Health conducted an investigation to evaluate potential petroleum contamination of the drinking water following complaints from residents of gasoline-like odors emanating from their faucets. Initial analytical results indicated high levels of petroleum and solvent contamination. Subsequently, EPA received an emergency request from the State Department of Natural Resources to provide bottled water to 14 residential properties located near the site. Based on concentrations of contaminants in their water supply, residents were immediately notified not to cook with their well water and to limit bathing times.

Scrap Metal Superfund Site:
At the request of the Emergency and Remedial Response Division, Removal Action Branch, analytical services were provided to a Superfund site associated with an inactive car and scrap metal junk yard. Over 200 soil samples were analyzed for the determination of eight toxicity characteristic metals using the Toxicity Characteristic Leaching Procedure (TCLP). The data provided by the lab was used to delineate soil contamination at the site and to assess the volume of contaminated soil for removal and disposal. The analytical support provided by the regional laboratory represented a significant saving to the site's budget. The potential cost for analytical services for this project from a subcontract laboratory would have been over $200,000.

Abandoned Pesticide Manufacturing Facility:
Over 300 routine and non-routine organic and metals

Goal 3: Land Preservation and Restoration (cont.)

analyses were performed at a 15-acre abandoned pesticide manufacturing facility. The bulk of the contaminants of concern are pesticide-related compounds (DDT, chlorobenzilate, and their partial-breakdown compounds.) Contaminants identified in the soil and groundwater originated from production activities at the site.

The contamination has primarily impacted the shallow groundwater aquifer on-site. A relict sinkhole has allowed some impact to the deeper aquifer. The site is located in an area of mixed agricultural, residential and commercial/industrial uses. Areas surrounding the site are experiencing significant development pressure. This site is being addressed through both federal and state actions.

Superfund Site Well Installation and Sampling:
The regional laboratory Environmental Services Assistance Team mobilized the EPA owned 6600 Geoprobe® and a pressure washer/decontamination trailer to a Superfund site to collect core samples and install monitoring wells. During the eight week project a total of 333 soil samples were collected for laboratory analyses. Additionally, 33 “stick-up” and 24 “flush mount” monitoring wells were installed. The project assisted with the evaluation of potential and follow-up remediation actions.

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:

Coal Spill:
Analytical and technical support was provided in association with the 2007 incident in which six CSX railcars, containing an estimated 600 tons of coal, fell into the Anacostia River. DDOE participated in split sampling events with CSX and sent 3 rounds of samples to the regional laboratory for analysis. Because of the unusual circumstances, the samples arrived with minimal notification. The first round consisted of two deliveries of sediment samples, and rounds two and three were water samples. The regional laboratory provided numerous analyses of these samples including: volatile and semi-volatile organic compounds, metals, mercury, cyanide, sulfate, pH, pesticides and PCBs, total organic carbon, total suspended solids, total dissolved solids and hardness. Having independent analytical data to refer to greatly benefited DDOE in their negotiations with CSX.

Mississippi Oil Spill:
Quick turnaround analysis of water associated with the Mississippi Oil Spill was provided in 2008. The spill involved more than 400,000 gallons of fuel oil and required the temporary closure of 98 miles of the Mississippi River. The laboratory provided analytical results within 24 hours after sample receipt which aided responders with the evaluation of the extent of the oil spill.

Hurricane Response:
Despite the fact that they had already lost power and water as a result of Hurricane Ike, a regional laboratory was able to deploy their mobile laboratory to Louisiana to provide analytical assistance in the wake of Hurricane Gustav which hit shortly before Hurricane Ike. The mobile lab provided microbiological analyses of well water samples. The data was used to determine whether to reduce or eliminate the need for a boil-water notice.

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 communities and ecosystems, EPA focuses on the management of environmental risks. Environmental risks include those presented by pesticides and chemicals, threats to the nation's watersheds, and hazards posed by pollutants entering homes, schools, workplaces and neighborhoods.

Key components of this goal include:

Directing risk management effort towards the greatest threats to communities and the most sensitive populations, including children, the elderly, Native Americans, and residents of areas that may be disproportionately exposed to environmental hazards;

Protecting critical ecosystems such as wetlands and estuaries;

Collaborating with states and others on efforts to protect resources such as the Great Lakes, Chesapeake Bay and the Gulf of Mexico.

Communities

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 2008, the regional laboratories performed over 900 analyses in support of the EPA's Brownfields Program.

The regional laboratories also support Agency efforts to address community-based environmental and public health issues including:

Critical Support at High Profile Site:
The Fort Reno Park Site received significant attention from the District of Columbia government, the National-Park Service, and the US Geological Survey, as well as the local DC media and citizenry. EPA played a critical part in determining that there was not a threat due to arsenic in the park. The quick processing and turnaround of the laboratory requests, analysis and data validation for the samples from Fort Reno Park and the two adjacent schools was a major factor in our being able to quickly resolve this situation and assure the public, the DC government, and the National Park Service that there was not a threat to public health due to arsenic in the park.

Goal 4: Healthy Communities and Ecosystems (cont.)

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. Examples of ecosystem related projects supported by the regional laboratories include:

Elizabeth River Project:
The goal of the Elizabeth River Project is to restore the environmental quality of the Elizabeth River, a tributary of the Chesapeake Bay. The EPA regional laboratory provided support for this project by providing analysis of river sediments for grain size and total organic carbon. This analytical work supports the third edition of the Elizabeth River Watershed Action Plan. The ultimate goal of the plan, which was prepared by numerous stakeholders including EPA, is to make the river safe for swimming, fishing and shellfishing by 2020.

PCB Congener Monitoring of the Lake Ontario Watershed:
Analytical support for regular monitoring of tributaries of the Lake Ontario Watershed was provided. The purpose of this 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 are also shared with modelers for use with the Lake Ontario Mass Balance Model, and with the State, who can use it to supplement their ambient data for 303(d) reporting. The regional laboratory provides analysis of all 209 PCB Congeners at the part per quadrillion (ppq) level. The laboratory uses a modified version of EPA Method 1668A, published by the Office of Water in December, 1999. This method uses a High Resolution Gas Chromatograph/Mass Spectrometer and identifies pollutants at the trace levels required by the Lake Ontario Watershed monitoring program.

Delaware Estuary Benthic Survey Initiated:
In FY 2008, the most comprehensive benthic survey ever performed on the Delaware estuary was launched. The Partnership for the Delaware Estuary is the lead organization on this project which involves sampling up to 250 stations at the mouth of the estuary (brackish to fresh waters.) The study involves probabilistic sampling across strata defined by salinity and sediment-type. The regional laboratory provided analysis of 200+ sediment samples for metals, total organic carbon, and grain size.

Anticipated outcomes of the project include:

1) a comprehensive inventory of benthic species, knowledge essential for resource protection and restoration;

2) an assessment of the health of the estuary's benthic communities, providing a baseline for future monitoring and assessment;

3) spatial integration of biological information with bathymetric and sediment distribution mapping.

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 2008, 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.

Investigation of Potential RCRA Violations:
Analytical support was provided for a criminal investigation of a manufacturer suspected of illegally disposing of spent solvents used in its painting operation. The spent solvents were allegedly mixed with sawdust and disposed of as solid rather than hazardous waste. The laboratory provided analysis of samples for volatile organic compounds, metals, Toxicity Characteristic Leaching Procedure (TCLP), and flashpoint. Results from the analyses were used by investigators to determine if the facility had violated RCRA regulations for hazardous waste disposal.

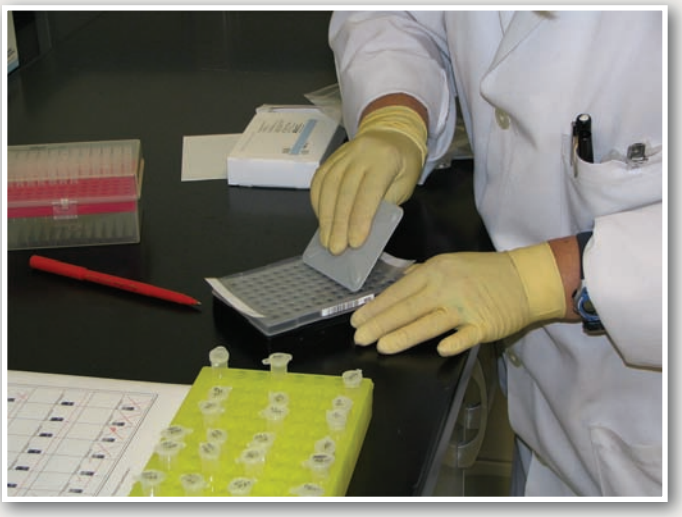
RCRA Enforcement:
In association with a RCRA enforcement investigation at a major steel manufacturing facility, the regional laboratory completed TCLP extractions for metals, mercury, volatile and semi-volatile organic compounds on two dozen waste determination samples.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Enforcement:
The regional laboratory provided analytical support for the investigation of a new commercial pesticide/bactericide with improper labeling of chlorine components. A chlorine concentration study was conducted to determine if a human health hazard existed that needed to be added to a lawsuit against the manufacturers of the product. The chlorine comparison study encompassed more than 130 analyses.

Regional Laboratory Criminal Support Program:
After receiving National Environmental Laboratory Accreditation Conference (NELAC) accreditation and receiving the approval of the local Criminal Investigations Division (CID) and the EPA's National Enforcement Investigations Center (NEIC), a regional laboratory re-established its criminal investigation support program. The lab established an SOP for criminal samples and began accepting samples, supporting two CID investigations in FY2008.

Cross Goal Strategies

Many of EPA's efforts contribute to the 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.



Partnerships (state, local, tribal, etc.)

EPA is committed to strengthening its partnerships with state, tribal, and local governments in order to make progress towards the agency's five strategic goals. Some examples of regional laboratory efforts in this regard include:

Microbial Water Quality Test Using Quantitative Polymerase Chain Reaction (PCR):
In a collaborative partnership with the local New Jersey county health departments and the state of New Jersey, the regional laboratory conducted the first large-scale study using the rapid qPCR method to assess Enterococcus data from marine recreational waters over a wide geographic range. The study involved sampling 20 bathing beaches and bays along the New Jersey coast. The study design allowed for assessment of spatial, temporal, and chemical variability associated with the sampling locations. The purpose of this study was to evaluate the use of qPCR technology as a more rapid recreational water test method for Enterococcus measurements, and to perform a method comparison with existing microbial methods, e.g. Membrane Filtration and Enterolert. It is likely that the results of this study will be used as the basis for initiating routine use of the rapid, real-time qPCR method to monitor Enterococcus in New Jersey marine recreational waters within the next two years. The study results have national application in EPA's establishment of rapid test methods for real-time bacterial water quality assessment of recreational waters, including development of qPCR- based water quality criteria.

2008 Laboratory Technical Information Group (LTIG) Conference:
The Region 8 laboratory hosted the 2008 Laboratory Technical Information Group (LTIG) Conference. There were over 50 attendees, including laboratory scientists from the Regions, Program Offices and the Office of Research and Development. The LTIG was formed in 1998 to create and sustain working relationships among USEPA regional laboratories and other USEPA entities (ORD, NERL, NEIC) to promote a free exchange of technical knowledge and ideas. The LTIG goal is to create a forum for technical discussion where chemists and biologists from all ten regional laboratories and other EPA labs and offices can easily communicate and exchange ideas on analytical methods, instrumentation and common problems. The group has subgroups for a variety of analytical disciplines including organic chemistry, inorganic chemistry, metals and microbiology. Agenda items at the 2008 conference included Application of Lab Data to Mining Remediation, Reducing Solvent Use during Sample Extraction, Criminal Investigations, Validation Study of CWA Analysis by ICP, Food Emergency Response Network, World Trade Center Dust, RCRA Methods, and Pesticide Screening Methods among others.

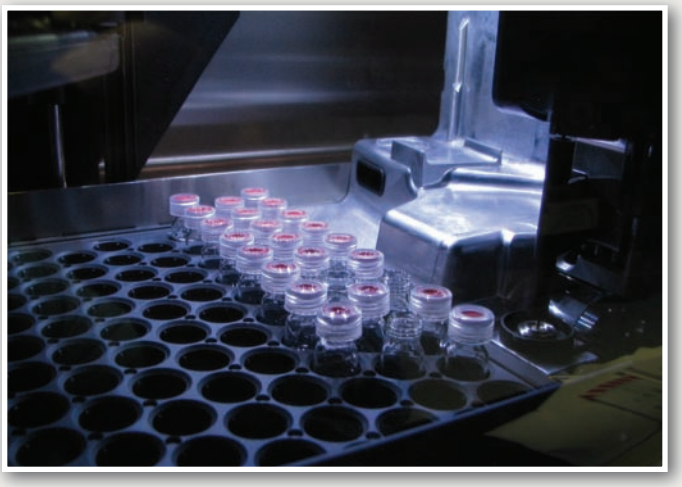
Expanding Scientific Knowledge and Developing New Analytical Capabilities

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.

Evaluation of Immunoassay Techniques:
A Regional Methods Initiative project to evaluate immunoassay test kits for the quantitative determination of

Cross Goal Strategies (cont.)

endocrine disrupting compounds (EDCs) continued in FY 2008. The project is a collaborative effort between EPA Regions III and V, ORD (NRMRL and NERL), USGS and Abraxis, LLC. The primary objective of the project is to determine whether commercially available immunoassays (tests that employ antibodies as analytical agents) are able to accurately and reliably analyze common water samples for selected 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, short analysis time, and cost-effectiveness. Over four weeks, four different types of water samples (DI water, surface water, WWTP influent and effluent) spiked with EDC's were analyzed using both immunoassay (ELISA) test kits and GC-MS, and the results compared. If verified, the immunoassay test kits could be used by EPA, state and local programs as a screening tool, since they are much faster and more cost effective than the conventional GC-MS, HPLC, or LC-MS methods. This verification is being conducted under the auspices of EPA's Environmental Technology Verification Program.



Method 8261A Vacuum Distillation:
A regional laboratory developed the capability to perform EPA SW846 Method 8261A, "Volatile Organic Compounds by Vacuum Distillation in Combination with Gas Chromatography/Mass Spectrometry (VD/GC/MS)." This method is based on a vacuum distillation and cryogenic trapping procedure (Method 5032) followed by gas chromatography/mass spectrometry (GC/MS). The method incorporates internal standard-based matrix correction, where the analysis of multiple internal standards is used to predict matrix effects. The normalization of matrix effects has the impact of making Method 8261 analyses matrix independent and allows multiple matrices to be analyzed within a sample batch. As a result, the calculations involved are specific to this method, and may not be used with data generated by another method. This method is used to determine the concentrations of volatile organic compounds, and some low-boiling semivolatile organic compounds, in a variety of liquid, solid, and oily waste matrices, as well as animal tissues. This method differs from Method 5032/8260 in the use of internal standards to measure matrix effects and compensate for analyte responses for matrix effects. This method is applicable to nearly all types of matrices, including water, soil, sediment, sludge, oil, and animal tissue. This method should be considered for samples where matrix effects are anticipated to severely impact analytical results. The method can be used to quantitate most volatile organic compounds that have a boiling point below 245°C and a water-to-air partition coefficient below 15,000, which includes compounds that are miscible with water. Note that this range includes compounds not normally considered to be volatile analytes (e.g., nitrosamines, aniline, and pyridine). This capability has been applied toward Superfund projects.

Transferability of Drinking Water Liquid Chromatography Mass Spectrometer (LC/MS) Libraries:
The Waters Corporation/EPA LC/MS library protocol was verified through an inter-laboratory study that involved federal, state, and private laboratories. The results demonstrated that the libraries are transferable between the same manufacturer's product lines, and have applicability between manufacturers. The ion ratios within a mass spectrum were different between two

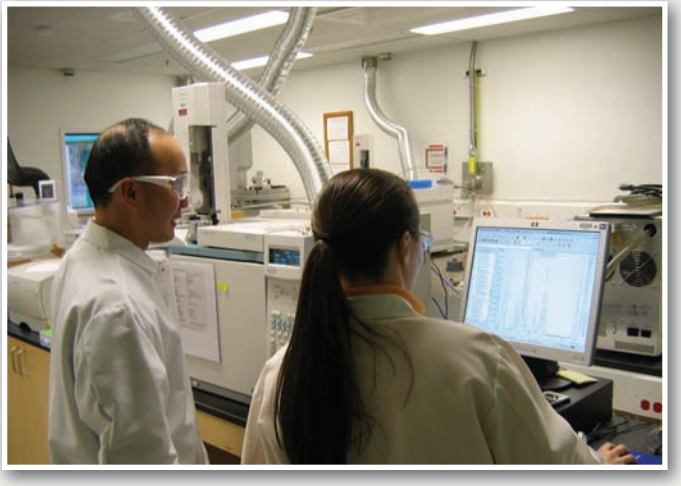
Cross Goal Strategies (cont.)

manufacturers' instruments, but the same product ions were usually observed. Despite the ion ratio differences, the NIST search engine's match probability was 96 percent or greater for 64 out of 67 of the compounds. Through a cooperative research and development agreement (CRADA) between Waters Corporation and the regional laboratory, the libraries and protocol are available free of charge. This allows environmental laboratories to search the LC/MS library to tentatively identify a substance of concern which can be further confirmed using the library protocol to identify product ion spectra (LC/MS/MS). This is a fast screening technique that aids in the identification of substances of concern in drinking water threat situations.

Laboratory Validation of EPA Methods:
Analytical support was provided to the Office of Ground Water and Drinking Water for the second laboratory validation of EPA Method 523, Rev. 2, "Determination of Triazine Pesticides and Their Degradates in Drinking Water by Gas Chromatography/Mass Spectrometry (GC/MS)." Method 523 is an improvement to existing methods for herbicides in drinking water because it includes degradation products. The study included determination of Lowest Concentration Minimum Reporting Level (LCMRL). The LCMRL is defined as the lowest spiking concentration such that the probability of spike recovery in the 50% to 150% range is at least 99%. This determination was accomplished by doing sample preparation and analysis of four replicates each of seven different concentrations in reagent water. This was followed by an assessment of precision and accuracy in real water matrices including three sets of replicates of unfortified and fortified tap water.

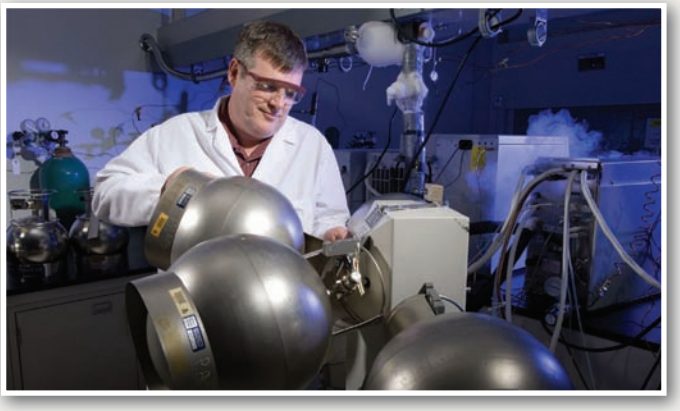
Low Level N-Nitrosodimethylamine and 1,4-Dioxane Analyses:
In response to a request from the regional Superfund Division, the regional laboratory developed the capability to analyze for n-nitrosodimethylamine (NDMA) and 1,4-dioxane in groundwater samples down to reporting limit levels of 10 and 80 ng/L, respectively. A modified version of EPA Method 521 was used for NDMA with solid phase extraction, capillary GC, and chemical ionization mass spectrometer-mass spectrometer (MS-MS). EPA Method 522 was used for the 1,4-dioxane analyses using GC/MS. These capabilities were developed in order to support evaluation of several former Nike missile sites.

Tire Crumb Components in Playgrounds and Synthetic Turf Fields:
In the spring of 2008, national attention was raised concerning exposures to recycled tire crumbs in playgrounds and artificial turf playing fields. An ad-hoc



Agency-wide workgroup was formed to determine if samples could be collected and analyzed to begin assessing the potential environmental risks from exposure to these materials. The cross-Agency workgroup was chaired by the National Exposure Research Laboratory/Office of Research and Development (NERL/ORD) and the Office of Children's Environmental Health Protection and Environmental Education (OCHPEE) and members included Headquarter's program offices, Regional and Headquarter's communications staff and scientists in several Regions.

A very limited scoping study was proposed, designed and recommended by the science workgroup as a means to generate consistently collected data across the country that could be used to help determine if further research was warranted. Most of the sampling and analyses were performed by NERL/ORD. Because NERL/ORD did not have air analytical capabilities, a regional laboratory provide analytical support for the air sampling. The regional laboratory had previously



Cross Goal Strategies (cont.)

participated as partners in the design of the scoping study. The analytical support included analysis of approximately forty samples collected at five locations. Certified canisters, field blanks and National Institute of Standards and Technology (NIST) QC samples were prepared in the laboratory and shipped to NERL/ORD in 4 batches of 11. Samples were analyzed by GC/MS using a TO-15 based method. Concentrations detected were consistent with typical ambient air levels.

The challenges for conducting the study included a short window for sampling, high public scrutiny and no allocated funds for sampling or analysis. Basically, the study had to be done with what ORD and the Regions could offer for the summer/fall 2008. Capabilities of ORD and regional labs were leveraged to produce preliminary data that will guide next steps in investigating an emerging issue.

Achieving Lower Detection Limits:
In order to meet the state drinking water detection level requirements for reporting, the regional laboratory developed the capability to analyze 1,2,3-trichloropropane to 0.005 ug/L. The reduced detection limit was needed because several Superfund sites in the state were required to monitor groundwater to this lower level.

Transmission Electron Microscopy Development:
In order to meet continued demand for asbestos analysis associated with Libby, Montana studies, the regional laboratory began the early stages of establishing a transmission electron microscopy laboratory. In FY 2008, the laboratory processed and analyzed 2518 asbestos samples from Libby, Montana using the polarized light microscopy test method. This is the second year of this environmental project with on-site quality assurance assistance as well as laboratory analyses. The transmission electron microscopy method is a more sensitive method for asbestos.

Analysis for Perchlorate in Milk and Watermelon:
In order to assist the regional Superfund program with an assessment of exposure to perchlorate, the regional laboratory developed the capability to analyze for perchlorate in milk and watermelon samples. The samples were collected from towns where perchlorate was known to be a contaminant based on proximity to former military operations. The method developed was a modified version of an FDA approach with the application of an ion chromatograph/mass spectrometer and improved clean-up techniques. A reporting limit of 0.8 µg/L for perchlorate in milk was achieved.

Homeland Security

The terrorist attacks of September 11, 2001 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 it a high priority to provide accurate environmental data to emergency responders and to participate in OSWER-OEM's Environmental Response Laboratory Network (ERLN) a high priority.

In order to enhance regional capability to respond to emergencies, whether from natural causes or terrorist activity, the regional laboratories are working on four significant development projects:

Evaluating a prototype All Hazard Receipt Facility designed to screen for hazards in unknown or suspicious samples;

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 major contamination event;

Establishment of an ERLN.

Cross Goal Strategies (cont.)

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, and 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 2006, one to a Regional Laboratory and the other to a State Public Health Laboratory. In 2007, the partner federal agencies conducted evaluations of the efficacy of the prototype AHRFs, the testing protocol and associated laboratory equipment. The final evaluation report was completed by ORD National Homeland Security Research Center in early 2008. The conclusion of the evaluation resulted in further adjustments to the screening protocol as suggested by the subject matter experts from EPA, FBI, and DoD. The final protocol revisions were tested with a series of surrogate samples at the EPA test site in the spring of 2008. DHS and EPA accepted comments on the AHRF program and the evaluation of the prototypes during an open session held in June 2008 during the APHL annual meeting. As a result of this session the AHRF protocol was jointly published by EPA and DHS in September 2008 and DHS initiated a follow-on task with DoD to develop tiered guidance for construction of AHRF facilities at fixed laboratories.

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 CWAs in environmental samples, such as soil, debris, and water samples, associated with the clean up of sites contaminated from a terrorist incident.

Cross Goal Strategies (cont.)

In 2006, 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 Phase I pilot sites to establish CWA capability in the northeast. In 2007, DHS and EPA selected four Phase II pilot laboratories (three EPA and one state) in the west and southeast to expand national capacity.

Status: During 2008, the three Phase I pilot laboratories, trained analytical staff to handle agents, received initial shipments of CWA calibration materials, and took steps to complete laboratory preparation for method validation work. The four Phase II laboratories have identified gaps in their laboratories and begun necessary infrastructure, documentation and instrumentation upgrades. Several EPA offices are providing critical technical support to the CWA pilot laboratories. In 2008, EPA's National Homeland Security Research Center (NHSRC) completed a single-laboratory evaluation of microscale extraction procedures for preparation and analysis of aqueous and solid samples containing nerve and blister agent (GF, GB, GD (GD1 and GD2), VX, HD) residues. Single-laboratory evaluation of procedures for wipes and Ottawa sand are underway and should be completed by early 2009. A number of EPA Regional labs are assisting ORD NHSRC with method development for CWA degradation products as a part of the overall effort. Region 5 has developed LCMSMS methods for selected degradation products and Region 7 is performing similar work for other products using ICPMS. As the methods are developed other regions are participating in multi-laboratory validation studies to demonstrate method performance.

Drinking Water Regional Laboratory Response Planning

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

Status: In 2007 a Regional Laboratory Response Plan (RLRP) was developed by each regional laboratory in partnership with state and water utility laboratories. During 2008, Functional Exercises were conducted at each EPA Region to test Regional Laboratory Response Plans (RLRPs).

Eleven separate exercises (ten regions plus an independent test in Hawaii) were conducted between February and September, 2008 involving a total of sixty-four participating laboratories. These exercises focused on testing and evaluating the RLRP and the roles of member laboratories during a potential contamination event impacting a drinking water system.

The goals of the functional exercise program were to:

Reveal procedural weaknesses in each region's RLRP;

Practice and improve coordination between and among RLRP member laboratories;

Identify additional systems and mechanisms needed to provide sample transport, data transfer, and analytical support for a drinking water contamination event;

Define factors associated with analysis including method selection, required level of quality control (QC), and analytical time constraints;

Fine-tune processes associated with data, including reporting, transfer, and compilation.

Cross Goal Strategies (cont.)

ERLN

In 2008 the Office of Solid Waste and Emergency Response launched the Environmental Response Laboratory Network (ERLN). The initial launch of the ERLN included the ten regional laboratories and two state laboratories with unique testing capabilities. In 2009 the network will be expanded to include additional state and commercial laboratories. OSWER established the ERLN as an Agency asset to ensure sufficient analytical capability and capacity to respond to routine accidents as well as nationally significant incidents, such as terrorist attacks involving weapons of mass destruction and for other purposes such as surveillance and monitoring. The ERLN is an Agency-wide, integrated network requiring coordination across offices to cover chemical (including toxic industrial chemicals and chemical warfare agents), biological, and radiological/nuclear agents in drinking water and all other environmental media. It is a scalable network which expands and/or leverages existing laboratory infrastructure and networks, and is designed to implement responsibilities under Homeland Security Presidential Directives 7, 9, 10 and 22. As a charter member of the Integrated Consortium of Laboratory Networks (ICLN), EPA also coordinates externally with other Federal laboratory networks to produce timely, high quality, interpretable data.

Section III - Progress and Looking to the Future

United States Environmental Protection Agency

Section III

Quality Systems

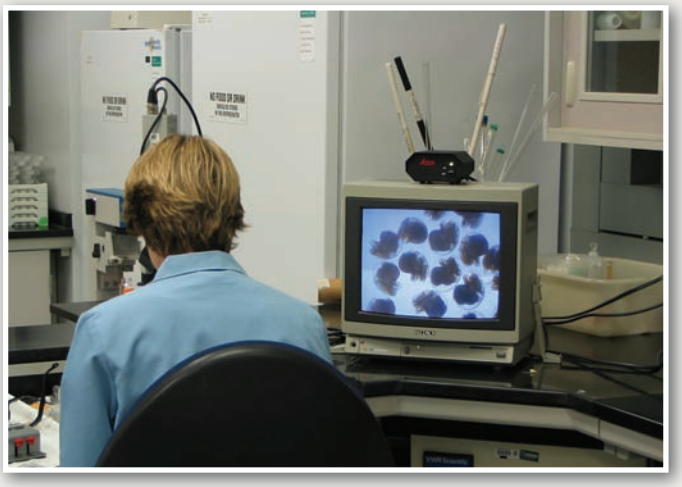
The policy of the regional laboratories is to conduct all business with integrity and in an ethical manner. It is the basic and expected responsibility of each staff member and each manager to adhere to EPA's Principles of Scientific Integrity, dated November 24, 1999. This policy statement has been 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.

Evaluation and accreditation of the regional laboratories is crucial to ensuring the quality of environmental data. In part, as a response to EPA's January 6, 2004 policy directive "Ensuring the Competency of Environmental Protection Laboratories," EPA's regional laboratories are committed to accreditation through the National Environmental Laboratory Accreditation Program (NELAP). NELAP is the program that implements the quality system standards adopted by the National Environmental Laboratory Accreditation Conference (NELAC). Both the NELAC standards and the NELAP program fall under the recently formed NELAC Institute (TNI.) The TNI is a non-profit organization whose mission it is to foster the generation of environmental data of known and documented quality through an open, inclusive, and transparent process that is responsive to the needs of the community.

Nine out of ten of the EPA regional laboratories have received and are currently maintaining accreditation through NELAP for the analysis of samples in one or more of the following matrices: drinking water, non-potable water, solid and chemical materials, and air and emissions. In FY 2008, five regional laboratories were due for biennial on-site re-accreditation assessments. All five laboratories completed their scheduled assessments and were successfully re-accredited by NELAP.

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. In FY 2008, four of the ten regional laboratories completed audits of their QA system either by internal quality assurance programs or state programs.

One notable activity related to quality system improvements is described below:



Improved Management of Laboratory SOPs:
In order to make it easier to keep all SOPs current and in order to assure that all staff members are following only the current SOPs, a regional laboratory is using a Lotus Notes based database as an electronic document control system. The system includes all sampling, analytical, health & safety, quality systems, and facility operations Standard Operating Procedures (SOPs). Write access for entering, editing, and archiving the controlled documents in the database is limited to designated Document Control Contact staff. All staff have read rights and can access the database from anywhere they can access the Lotus Notes system. All staff must read and attest to all SOPs that are relevant to their functions. Attesting can be done electronically in the Lotus Notes database. The system can generate reports showing staff that have attested to a particular document, or which documents have been attested to by a particular staff member. An automated e-mail notification system alerts staff to read and attest to new or updated SOPs and reminds them of annual review requirements. Analytical SOPs in the database are cross-referenced with their LIMS analysis code, and with sample collection and preservation information.

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.

Section III (cont.)

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.

i. Identifying and Maximizing Efficiencies

In FY 2008, 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.

Equipment Replacement:
Existing autoanalyzers for mineral and nutrient colorimetric tests were replaced with a discrete analyzer. On average, per test, the discrete analyzer uses 10 times less reagent per sample, and generates 10 times less waste per sample. It also reduces analyst time through its' multitasking capabilities, allowing up to six different chemical tests to run on a large batch of samples. The former system could only run one or two chemical tests per instrument. The discrete analyzer can also analyze one sample while mixing reagents for subsequent chemical tests on the same sample.

Laboratory Vacuum System Upgrade:
The existing laboratory vacuum system was upgraded and replaced in FY 2008 resulting in an annual water usage reduction of 5,000 gallons.

ii. Environmental Management

EPA continues to move forward to integrate and utilize environmental management systems (EMS) as the framework for enhancing its environmental performance, reducing its environmental footprint, and demonstrating its leadership in environmental stewardship. Likewise, the regional laboratories are committed to employing EMS in order to prevent and reduce environmental impacts and in order to comply with legal and applicable requirements. Most laboratory EMSs were established over three years ago. However, EPA is required to periodically declare that its EMSs conform to the requirements expressed in Executive Order (E.O.) 13423, "Strengthening Federal Environmental, Energy and Transportation Management." In FY 2008, all regional laboratories conducted conformance reviews of their EMSs in preparation for the required triennial declaration of conformance. All ten regional laboratories completed their declaration of conformance by the deadline of December 31, 2008.

In addition, Executive Order (E.O.) 13423 requires all Federal agencies to submit a report summarizing the status of Environmental Management Systems (EMS) implementation at appropriate organizations. EPA's performance in this regard is an integral metric of OMB's annual Environmental Stewardship Scorecard. In FY 2008, 9 out of 10 regional laboratories were rated "green" with regard to their EMS performance.

Other notable environmental management measures implemented at the regional laboratories include:

Regional Office Building - Green Roof:
Rooftop gardens are now a part of the regional office building. The green roof helps reduce stormwater runoff, filter pollutants from stormwater, and contribute to overall sustainability by reducing building energy needs and minimizing urban heat island effects. The regional laboratory supports green roof research and maintains a rooftop weather station for the project.

Facility-wide Recycling:
After the existing recycling service provided by their solid waste vendor was terminated, the regional laboratory established its own facility-wide recycling program. In FY 2008, the new program delivered over 3600 pounds of recyclables (paper, cardboard, plastic, glass, batteries, electronics and aluminum) to a local recycling facility.

Section III (cont.)

iii. 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 Headquarter's Safety, Health and Environmental Management Division;

Regional laboratories have active health and safety 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.

iv. 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.

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 Response Laboratory Network (ERLN); 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.

Section III (cont.)

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 United States Environmental Protection Agency

EPA Regional Laboratories Core Capabilities - FY 2008

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
	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
	Soil/Sediment	Colorimetric		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		X			
	Water	IC	X	X	X	X		X		X	X	X
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
	Soil/Sediment	GFAA	X				X	X				X
	Tissue (Fish &/or plant)	GFAA	X									X
	Waste (oil, drum, etc..)	GFAA	X				X	X				X
Metals (TCLP)	Soil/Waste (oil, drum, etc.)	GFAA	X				X	X				X
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		

EPA Regional Laboratories Core Capabilities - FY 2008

I. Chemistry (continued)

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
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	
	Soil	IC							X		X	
	Water	IC with LC/MS confirmation			X		X					X
	Water, Soil/Sediment	LC/MS			X							X
	Water	LC/MS/MS									X	
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	X						X
	Soil	IC			X							
	Water	Turbidimetric	X	X		X	X	X	X		X	
	Soil	Turbidimetric	X				X				X	
ORGANIC CHEMISTRY:												
Sulfide	Water	Colorimetric		X		X	X		X			X
	Soil	Colorimetric				X	X					
	Water	IC, Turbidimetric						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
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
	Waste (oil, drum, etc..)	GC/ECD; GC/NPD				X			X			X
	Tissue (fish &/or plant)	GC/ECD; GC/NPD							X			

EPA Regional Laboratories Core Capabilities - FY 2008

I. Chemistry (continued)

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
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
	Soil/Sediment	Colorimetric			X				X	X		
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
	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	X
	Soil	Combustion / IR	X	X	X	X	X	X	X	X	X	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

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
Coliform, Fecal	Water, Soil &/or Sludge	Various	X	X	X			X		X	X	X
E. coli	Water, Soil &/or Sludge	Various	X	X	X			X		X	X	X
Toxicity (Acute & Chronic)	Water	Fathead, Ceriodaphnia	X	X	X			X		X	X	

EPA Regional Laboratories Core Capabilities - FY 2008

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
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

APPENDIX B - Abbreviations

United States Environmental Protection Agency

Abbreviations

AHRF	All Hazard Receipt Facility
APEs	Alkylphenol Ethoxylates
APHL	Association of Public Health Laboratories
AQS	Air Quality System
BNA	Base/Neutrals and Acids Extractable Organics
BOD	Biological Oxygen Demand
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CID	Criminal Investigation Division
CDC	Center for Disease Control
COD	Chemical Oxygen Demand
CRADA	Cooperative Research and Development Agreement
CSX	CSX Transportation, Inc.
CVAA	Cold Vapor Atomic Absorption Spectrometry
CWA	Chemical Warfare Agent
CWA	Clean Water Act
DBCP	Dibromochloroproprane
DC	District of Columbia (Washington, DC)
DCE	1-dichloroethene
DDOE	District Department of the Environment
DDT	Dichlorodiphenyltrichloroethane
DHS	Department of Homeland Security
DI	De-ionized
DoD	Department of Defense
EDB	Ethylene dibromide
EDCs	Endocrine Disrupting Compounds
ELISA	Enzyme-Linked Immunosorbent Assay
EMS	Environmental Management Systems
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERLN	Environmental Response Laboratory Network
eLRN	Environmental Response Laboratory Network
FAD	Filtration Avoidance Determination
FBI	Federal Bureau of Investigation
FDA	Federal Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
GB	Chemical Warfare Agent
GC	Gas Chromatography
GC/ECD	GC/Electron Capture Detector
GC/MS	Gas Chromatography-Mass Spectrometry
GC/NPD	GC/Nitrogen - Phosphorus Detector
GC/ECD/PID	Gas Chromatograph/Electron Captured Detector/Photo-Ionization Detector
GD	Chemical Warfare Agent
GF	Chemical Warfare Agent
GFAA	Graphic Furnace Atomic Absorption Spectrometry
HD	Chemical Warfare Agent
HPLC	High Performance Liquid Chromatography
IC	Ion Chromatography
ICLN	Integrated Consortium of Laboratory Networks
ICP	Inductively Coupled Plasma

Abbreviations

ICP/AES	ICP/Atomic Emission Spectrometry
ICPMS	Inductively Coupled Plasma Mass Spectrometry
IR	Infrared
ISE	Ion Selective Electrode
LCMRL	Lowest Concentration Minimum Reporting Level
LC-MS	Liquid Chromatography-Mass Spectrometry
LC/MS/MS	Liquid Chromatography/Dual MS
LEED	Leadership in Energy and Environment Design
LIMS	Laboratory Information Management System
LT2	Long Term 2 Enhanced Surface Water Treatment Rule
LTIG	Laboratory Technical Information Group
LUST	Leaking Underground Storage Tank
mg/L	Milligrams/liter
MS-MS	Mass Spectrometer-Mass Spectrometer
NDMA	N-Nitrosodimethylamine
NEIC	National Enforcement Investigations Division
NELAC	National Environmental Lab Accreditation Conference
NELAP	National Environmental Lab Accreditation Program
NERL	National Exposure Research Laboratory
NHSRC	National Homeland Security Research Center
NIST	National Institute of Standards and Technology
NLA	National Lakes Assessment
NOx	Nitrogen Oxide
NO_3	Nitrate
NO_2	Nitrite
NPAP	National Performance Audit Program
NPDES	National Pollutant Discharge Elimination System
NRMRL	National Risk Management Research Lab
NRSA	National Rivers and Streams Assessment
OCHPEE	Office of Children's Environmental health Protection and Environmental Education
OEM	Office of Emergency Management
OMB	Office of Management & Budget
ORD	Office of Research & Development
OSWER	Office of Solid Waste & Emergency Response
PAHs	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated biphenyl
PCR	Polymerase Chain Reaction
PEP	Performance Evaluation Program
PLM	Polarized Light Microscopy
PM	Particulate Matter
POTW	Publicly Owned Treatment Works
ppq	part per quadrillion
PPCP	Pharmaceutical and Personal Care Products
QA	Quality Assurance
QAPP	Quality Assurance Project Plans
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RLRPs	Regional Laboratory Response Plans
SDWA	Safe Drinking Water Act
SOP	Standard Operating Procedure

Abbreviations

SRP	Standard Reference Photometer
SO2	Sulfur Dioxide
SW	Solid Waste
TCLP	Toxicity Characteristic Leaching Procedure
TMDL	Total Maximum Daily Load
TNI	The NELAC Institute
TOC	Total Organic Carbon
TO-15	Toxic Organic 15
TSCA	Toxic Substances Control Act
ug/L	Micrograms/liter
USGS	United States Geological Service
VD/GC/MS	Vacuum Distillation in Combination with Gas Chromatography/Mass Spectrometry
VOA	Volatile Organic Analytes/Analyses
VOCs	Volatile Organic Compounds
VX	Chemical Warfare Agent (nerve agent)
WSC	Water Security Division
WTC	World Trade Center
WWTP	Wastewater Treatment Plant
303(d)	Clean Water Act Section/ Total Maximum Daily Loads