EPA United States Environmental Protection Agency

U.S. Environmental Protection Agency Regional Laboratory System

EPA Regional Laboratories
Advancing the Agency's Science Agenda

Annual Report 2009

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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 they are well positioned to rapidly address the ever changing needs of a variety of environmental programs.

In Fiscal Year (FY) 2009, the regional laboratories performed 126,747 analyses which covered a full range of routine and specialized chemical and biological testing of air, water, soil, sediment, tissue and hazardous waste. This analytical work supported activities related to over 1,000 sites and projects associated with a wide range of the Agency's major programs.

The regional laboratories are also increasingly engaged in EPA's Emergency Response Program. In FY 2009, the regional laboratories provided over 10,000 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. This represents a 25 percent increase in analyses performed compared to FY 2008.

The regional laboratories continued to play an increasing role with regard to EPA's Strategic Plan for Homeland Security. In FY 2009, the regional laboratories provided significant support for a number of Homeland Security related efforts including pilot development of fixed laboratory capability for chemical warfare agents (CWA), response exercises and working with states to encourage participation in the Environmental Response Laboratory Network (ERLN). In addition, four methods for CWA degradation compounds and threat agents were developed in FY 2009 by a regional laboratory and are being adopted as standards by the American Society for Testing and Materials (ASTM).

In FY 2009, the laboratories increased their focus on internal and external partnerships. The labs participated in numerous projects with EPA's Office of Research and Development (ORD) both as a result of requests for assistance and through ORD's Regional Methods Program (RMP) and ORD's Regional Applied Research Effort (RARE) Program. The regional labs are also supporting communities through environmental outreach, equipment loan programs and volunteer monitoring efforts.

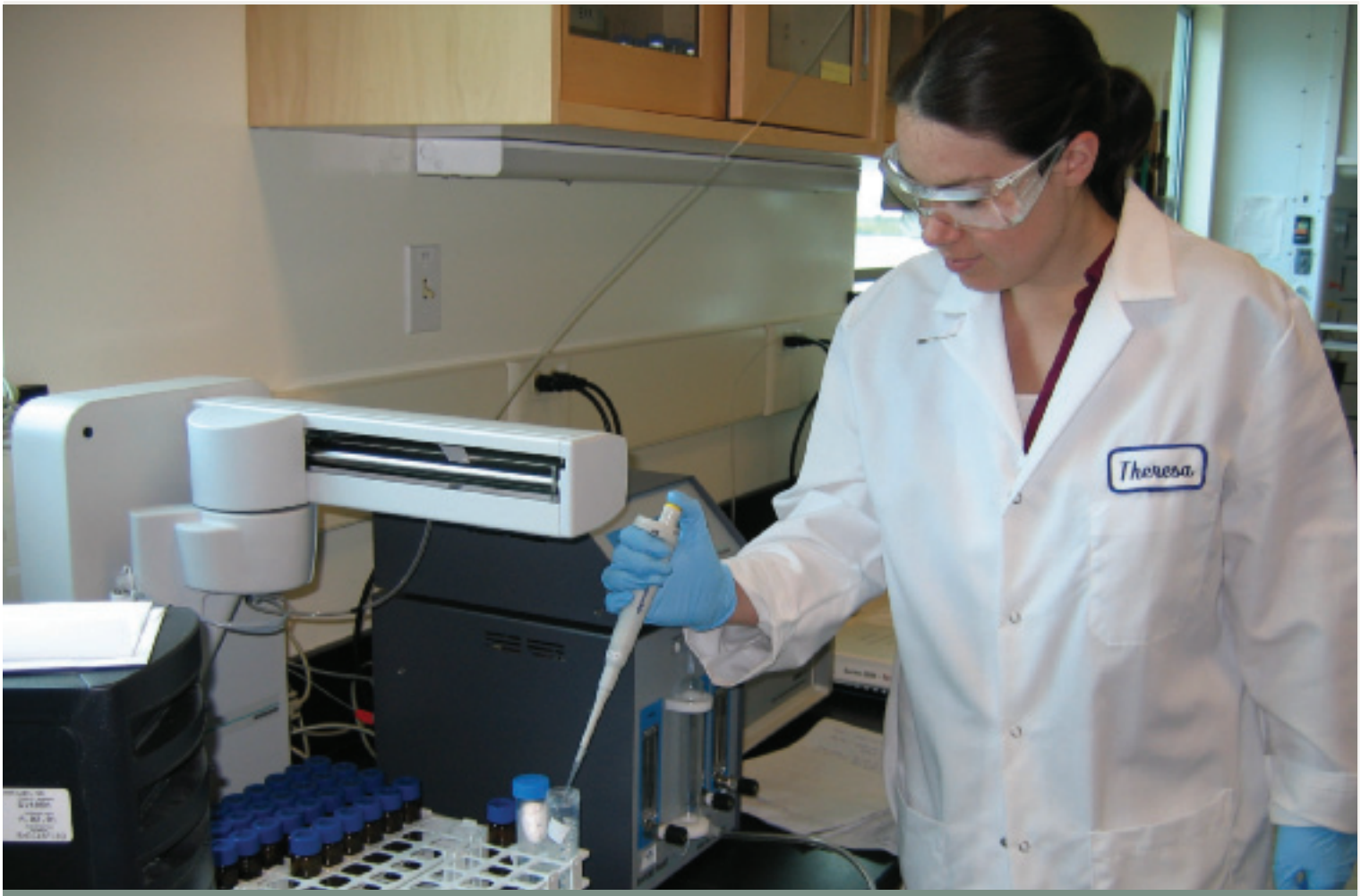
The regional laboratories continued to provide a variety of field analytical support ranging from analyses performed on-site in mobile laboratories to screening techniques performed directly in the field. These services provided real time data to improve the efficiency of field operations and speed environmental decision making. In FY 2009, the regional laboratories performed over 5,000 field analyses in support of 37 projects and sites located throughout the country.

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, Infrastructure 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

EPA 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:

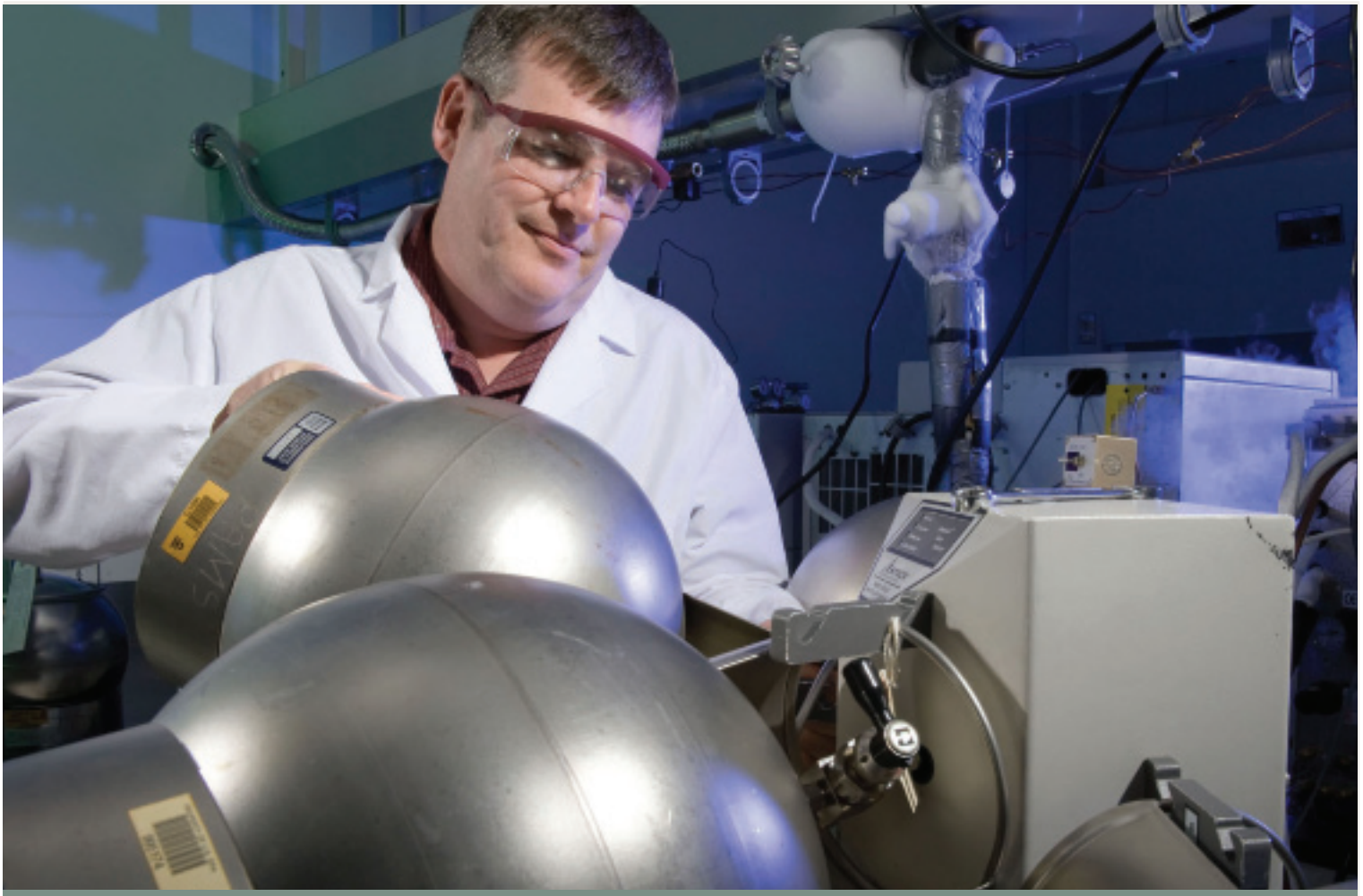
To integrate laboratory activities with those of field and quality assurance partners into a comprehensive, holistic, multi-media approach to solving ecosystem-based environmental problems.

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.

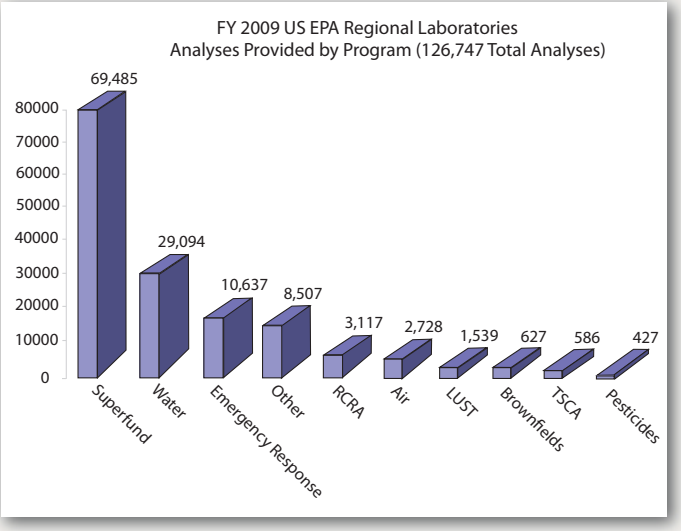


SECTION II - Support for EPA's Strategic Goals

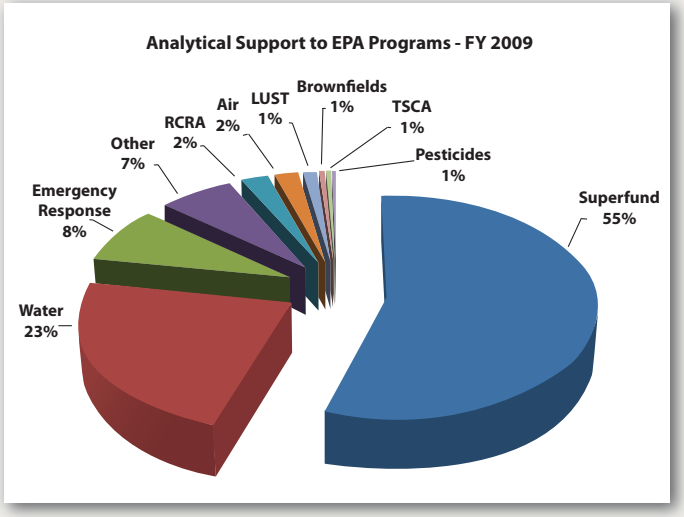
United States Environmental Protection Agency

Introduction

One of the primary functions of the regional laboratories is to supply quality analytical data to the Agency's programs in support of a broad range of regional initiatives that range from routine monitoring to criminal enforcement. The following charts represent the analyses performed for various EPA programs in FY 2009.



A total of 126,747 analyses were performed in support of EPA programs in FY 2009. An analysis is one analytical test through one instrument. The sample is run through the entire process and results are reported to the customer. For example, an analysis of a sample for 24 metals is counted as one analysis. An analysis of a sample for 65 volatile organic compounds also counts as one analysis. An analytical technique that averages two or three "burns" for one result is counted as one analysis. While some of these analyses may take only a few minutes; others may take several hours or days to complete. It should also be noted that the numbers reflected in the charts do not include analyses performed for quality assurance. Analyses for quality assurance purposes comprise an additional 30 percent of the laboratories' analytical effort.



The regional laboratories are also increasingly engaged in the Emergency Response Program. In FY 2009, the regional laboratories provided over 10,000 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 2009, over eight percent (10,851 field analyses) of the total number of analyses performed were field analyses in support of a variety of EPA programs. 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.

Counting analyses is one way to measure the support that regional laboratories provide to EPA's various programs. Another way to look at the contributions of regional laboratories to

Introduction (cont.)

the work of the Agency is to look at the number of projects and/or site evaluations that laboratory data supports. The number of projects and sites supported by analytical data from the regional laboratories are listed in the table below by EPA program element. Multiple rounds of analytical work for the same site represent just one site supported. More than one round of work at the same site for a different purpose or client may be counted as two sites supported. Multiple sample site monitoring projects like Regional Environmental Monitoring and Assessment Program (REMAP) are counted by water body. For example, all the sampling locations in a single lake or stream count as one site, but different lakes or streams count as different sites even though it may support only one project.

Projects and Sites Supported by EPA Regional Laboratories by Program Element

FY 2009

EPA PROGRAM ELEMENT	NUMBER OF PROJECTS/SITES (% OF TOTAL)
Air - Program Implementation (air monitoring, permits, etc.)	32 (3%)
Air – Enforcement	4 (<1%)
Water - Program Implementation (REMAP, TMDL studies, TOXNET, etc)	116 (10%)
Water – Enforcement	145 (13%)
Water - Drinking Water Compliance and Emergencies	115 (10%)
Superfund - Pre-remedial/Remedial	255 (23%)
Superfund – Removal	139 (13%)
Superfund - Emergency Response	61 (6%)
RCRA - Corrective Action	38 (3%)
RCRA - Enforcement	53 (5%)
Brownfields	10 (1%)
LUST	32 (3%)
Pesticides	20 (2%)
TSCA- Remedial	6 (<1%)
TSCA – Enforcement	12 (1%)
Criminal Investigation	24 (2%)
Field Sampling (field sampling audits and events, etc,)	37 (3%)
Other	10 (1%)
TOTAL	1109

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 2009, the laboratory processed and weighed 1,199 filters from three state agencies, one tribal nation and all ten EPA Regions. The lab also reviewed the data for 842 PM2.5 PEP audits and evaluated 829 individual audits for submittal to EPA's 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 2009, the regional laboratories supported the completion of nearly 400 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 (TTP) Audit System:
The Through-The-Probe audit system provides performance audits at state and local ambient air monitoring stations. In FY 2009, the regional laboratories supported the completion of nearly 250 through-the-probe audits. These performance audits ensure the validity of the ambient air quality monitoring data.

Standard Reference Photometer (SRP) Program:
Standard reference photometers (SRPs) are used to ensure that the national network of ozone ambient monitors is accurately measuring ozone concentrations. Eight regional laboratories maintain SRPs and provide verification or certification of primary and transfer ozone standards from state, local and tribal organizations.

Goal 1: Clean Air (cont.)

Other Air Projects

Emissions Testing:
As Clean Air Act (CAA) hazardous air pollutant standards are implemented over time and new source types become subject to regulation, new sampling and analytical challenges arise. In 2009 one regional lab worked with their regional enforcement program to determine how to representatively sample industrial laundry facilities and foam product manufacturers. The lab identified an appropriate analytical method for foam product sampling to determine source potential. Sampling and analysis of foam products is a significant challenge as the emissions from the formed foam product are shape dependent and change as the product cures. As a result, efforts to define source potential require repeated sampling over time for a representative variety of products at any given facility.

Analysis of Air Filters for Metals:
Development of the capability to analyze air filters for metal by Inductively Coupled Plasma/Mass Spectrometry (ICP/MS) was completed in order to meet an Inter-Tribal Council's data quality objectives. Since holding times were not an issue, the entire three year backlog of samples was prepared and analyzed during FY 2009. Two chemists, including one Federal Career Intern and one mass spectroscopy expert were hired and trained to use this instrument. They were able to receive training from the instrument vendor and clear the backlog in less than three months.

Air Response Team:
In FY 2009, staff from one regional laboratory joined regional staff from the Air Program and the Emergency Response Program to create an Air Response Team. This team will provide air expertise and support to On-Scene Coordinators or incident command during a large air release incident. The initial goal of the newly formed team is to develop response coordination protocols and determine the equipment and personnel available in the Region to respond to various kinds of air emergencies. The team will also identify its current strengths and gaps by conducting table-top exercises using different air incident scenarios.

Goal 2: Clean and Safe Water

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

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

The regional laboratories play an important part in protecting and restoring the nation's water resources by providing key data so that the regions and their partners have the information they need to target actions to protect human health and aquatic ecosystems more efficiently. In addition, the regional laboratories support the Agency's water goals by providing technical 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 2009, the regional laboratories performed 43 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.

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

Goal 2: Clean and Safe Water (cont.)

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.

Remote Sensing Survey of Lakes:
Fifty-five lakes were overflown by the National Aeronautics and Space Administration (NASA) remote sensing aircraft in a collaborative effort between NASA and scientists from an EPA regional laboratory and ORD. The flyover was part of a larger effort looking into the effects of nitrogen and phosphorus nutrient loading to aquatic systems across large geographic areas. Monitoring of these nutrients is critical for tracking and managing suspect accelerated eutrophication, potentially toxic harmful algal blooms (HABs), decreasing biodiversity, and overall waterbody condition. Overflights were simultaneously ground-truthed by state and citizen volunteers with the collection of water samples for comparing hyperspectral signatures to levels of chlorophyll-a, current lake trophic status, presence of microcystin (potentially toxic algae), water transparency, and nutrient loading. These efforts are helping to establish aircraft and site-based remote sensing technology as efficient and cost-effective water quality monitoring tools that are useful over broad geographic areas.

Lake Attitash Case Study:
As part of a regionwide lakes and ponds project, this unique lake was selected as a testing ground for the development of new field monitoring methods. This project is also an example of how collaborative networking can succeed, and a showcase for the importance of understanding ecosystem services and how they affect the well-being of a community. A holistic approach was undertaken by laboratory staff to collaborate with all stakeholders to address the many issues associated with this lake. Scientists from the regional laboratory conducted fish population and planktonic surveys to determine trophic balance and ecosystem health. The lake has been recognized within the region as a hotspot for mercury deposition and bioaccumulation in fish tissue. The lake is a secondary public water supply and in 2009 suffered its first harmful algal bloom of toxic cyanobacteria at levels almost four times the state health advisory threshold. Lakeshore development and agricultural sources appeared to be likely sources of contamination. Laboratory field staff worked with homeowners and farmers to mitigate discharges into the waterbody through best management practices and new technologies. The lake suffers from excessive aquatic plant growth and encroaching invasive plants, with water transparency being less than half a meter.

Lab scientists employed low frequency sonar technology to map bottom plant species distributions and depths of nutrient enriched sediments. This new technological information will be used to determine treatment feasibility options for the lake. Public outreach efforts through town meetings and lake association presentations have motivated people to take a more active role in protecting and enhancing the aquatic resources in their communities.

Ocean Dredged Material Disposal Site (ODMDS) Survey:
Significant analytical support was provided for the Ocean Dredged Material Disposal Site (ODMDS) Survey including analyses for polychlorinated biphenyls (PCBs), pesticides, semi-volatile organics, and metals for both sediment and water samples. This project was conducted off the Florida coast in order to characterize the chemical, physical, and biological status of sediment and the water column within, and surrounding the ODMDS. Most of the dredged material is deposited at sites EPA specifically designates under Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA). All ocean dumping sites are required to have a site management and monitoring plan (SMMP). Appropriate monitoring of ocean dumping sites is aimed at assuring that disposal activities will not unreasonably degrade or endanger human health, welfare, or the marine environment. The data from this survey will be used to evaluate changes in environmental conditions

Goal 2: Clean and Safe Water (cont.)

and will allow evaluation of specific pollutant concentrations at the site.

TMDL Support:
Support for the development of mercury, pesticide and nutrient TMDLs was provided at ten water bodies within a single water basin. Lab staff collected sediment and water samples at multiple locations to provide data to support TMDL listings and modeling. Lab staff also trained representatives from the Regional Water Division and the Regional Water Quality Control Board on a variety of sampling procedures.

Special Water Projects in FY 2009

Examples of some activities and projects supporting a variety of water related strategic goals in FY 2009 are listed here.

River Dye Studies:
The regional lab conducts several dye tracer studies annually to support the National Pollutant Discharge Elimination System (NPDES) Program, as well as the states' shellfish management programs. Four major dye studies were conducted in 2009. In April, regional lab staff joined representatives from the state and the U.S. Food and Drug Administration to conduct a dye study at a wastewater treatment plant (WWTP). The purpose of the study was to determine how the effluent from the wastewater treatment plant flows into a nearby water body. Crews were able to obtain data for NPDES permitting as well as shellfish waters closures. Another study was conducted in May for the beaches and shellfish programs in a second state in the region to determine the extent and effect of flows on a nearby state park. Additional dye studies were conducted to provide data for NPDES permitting and shellfish water classification. Some of this data will be used to determine if moving the outfall associated with a WWTP is practical.

EPA Study of Discharges from Commercial Fishing Vessels and Other Non-recreational Vessels:
The EPA was mandated by Congress to conduct a study of discharges of effluent from marine engines, discharges of laundry, shower, and galley sink wastes, and other discharges incidental to the normal operation of vessels, to evaluate the potential effects of the discharges, including whether the discharges posed a risk to human health, welfare, or the environment, and the nature of those risks and the benefits of reducing those discharges. The vessels, located throughout the United States, included commercial fishing vessels and other non-recreational vessels less than 79 feet in length.

Three regional laboratories assisted EPA's Office of Water by analyzing samples from these vessels. Because of their unique diverse capability and depth of capacity the regional laboratories were well positioned to accommodate the significant analytical demand of this project. In addition to analytical support, the regional laboratories provided critical technical guidance with regards to sample volume, method selection and reporting limits. A total of 15 analytical parameters were measured to characterize the vessel discharge. These included microbiological contaminants, volatile and semi-volatile organics, endocrine disrupting alkylphenols, metals, nutrients, and other physicochemical parameters. Target contaminants varied based on the vessel class and the type of discharge within that class. Over 1500 analyses were required to meet the objectives of this project.

Advanced Integrated Wastewater Pond System Study:
Regional laboratory staff provided sampling and analytical support for the evaluation of an Advanced Integrated Wastewater Pond System. Advanced Integrated Wastewater Pond Systems (AIWPS) use a series of ponds for domestic wastewater treatment. AIWPS have numerous benefits including design and operational simplicity, low energy use and low maintenance because of limited mechanical equipment and minimal sludge production. Over a three week period, the regional lab collected and analyzed samples for organics: biological oxygen demand (BOD), total dissolved solids/total suspended solids, nutrients, chlorophyll, coliform bacteria (total & E. coli), and other physical/water quality measurements. The study was conducted in order to provide up-to-date performance data for this method for treating domestic wastewater.

Goal 2: Clean and Safe Water (cont.)

Additionally, the data will be used to evaluate the feasibility of using the AIWPS to treat wastewater in treatment plants along the U.S.-Mexico border.

Adverse Health Effects Associated With River Use:
For well over a decade, windsurfers on one major river in the Pacific Northwest have noted adverse health effects after river exposure, including congested sinuses and chronic runny nose, ear and eye infections, sore throats, skin rashes, prolonged healing of wounds, burning, red, and itchy eyes, diarrhea, and fever. The riverkeeper organization collaborated with EPA to test water quality for potential causes of these symptoms. These tests provided a baseline of biological and chemical contaminants present in the river gorge. In conjunction with this effort, the regional laboratory analyzed over 400 samples from 29 recreational sites for microbiological and organic contaminants. Results indicate that some of the contaminants detected in the river may cause one or more of the symptoms described as "river nose"; however, more tests are needed to define their distribution and their relationships to the health of river users.

Monitoring at a National Marine Sanctuary:
Laboratory staff provided support to the Wetlands Program by collecting and analyzing sediment samples at a national marine sanctuary. The project provided monitoring of the marine benthic biological community and sediment chemistry in areas of grey whale feeding grounds. The laboratory prepared all marine macroinvertebrate specimens for taxonomic analysis. The primary regional laboratory provided analysis of sediments for metals, mercury, organo-chloride pesticides, polyaromatic hydrocarbons, and PCB Aroclors. A second regional laboratory provided analysis for total organic carbon.

Algal Nutrient Utilization Study:
The regional lab analyzed over 500 river water samples during the summer for microcystin, a blue-green algae toxin. Summertime blooms of the toxin-producing blue green algae Microcystis can produce toxin levels over 1,000 times the World Health Organization (WHO)-based health recommendation for human contact. Results from the analyses are being used by decision makers to support public health postings along the river. In addition to analyzing river samples for the toxin, microcystin, the lab is supporting research efforts to define the limiting nutrients critical to algae growth in the system.

Concentrated Animal Feedlot Operations (CAFO) Enforcement:
In support of the Water Program, the regional lab deployed and maintained a remote communication-capable water quality data system downstream of concentrated animal feedlot operations. The water quality monitoring system measures pH, nitrate, ammonia, chloride, turbidity, temperature, oxidation-reduction potential, specific conductance, and depth on an hourly basis. The system provides water quality data via a cell phone modem that was available on the internet to CAFO enforcement personnel. f the system detects changes in water quality parameters, consistent with an unauthorized discharge, personnel are deployed to establish the source of the discharge and to collect addi-

Goal 2: Clean and Safe Water (cont.)

tional confirmatory samples. Since the system monitors continuously, this deployment is designed as a proof of concept for enhancing EPA's ability to detect and act upon such discharge events. In fact, less than 24 hours after the system was deployed, a discharge was detected and lab staff informed the appropriate enforcement agency who confirmed that an illegal discharge was in progress.

Study of Mercury and PCBs in Seafood:
The Office of Research and Development joined a regional laboratory to sponsor a study to assess mercury and PCB congener levels in composite samples from seafood species most commonly consumed by residents. The fish market that was selected for sample collection receives fish from all over the world and is the largest seafood distributor to retailers in the United States. The regional laboratory processed nearly 300 samples for mercury and nearly 50 samples for PCB congeners. The laboratory tested and incorporated changes to their sample preparation procedures in order to enhance accuracy for both the required analytes in fish tissue. Traditional environmental methods for fish tissue typically yield accuracy levels of 50 to 75 percent. The modifications resulted in accuracy levels of approximately 90 percent for both mercury and PCB congeners.

Ocean Survey Support on the West Coast:
EPA's Ocean Survey Vessel BOLD spent most of the year 2008 monitoring and assessing the health of our oceans and West Coast waters. The work on the BOLD focused on performing the required periodic assessment of open-water dredged material disposal sites to ensure their consistency with regulatory requirements. The crew supported by regional laboratory staff, conducted sonar surveys and took numerous samples of water and mud from the bottom of disposal sites. In addition, the crew investigated low levels of dissolved oxygen that have been reported in waters on the West Coast. In 2009, two regional laboratories conducted several hundred sample analyses of the samples collected during the voyage. Samples were analyzed for mercury, trace metal contaminants, semi-volatile organics, butyl tins, pesticides, and total organic carbon. In addition, marine organisms were identified and counted to see if their numbers and diversity indicate a healthy bottom habitat.

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.

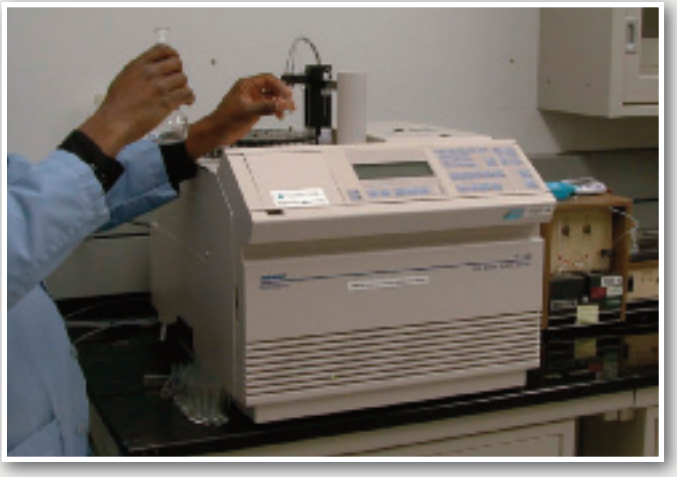
In FY 2009, over 55 percent of the analyses performed by the regional laboratories supported the cleanup of uncontrolled or abandoned hazardous waste sites associated with the Superfund program. While EPA's Contract Laboratory Program performs many of the routine analyses associated with the Superfund program, the regional laboratories focus on more specialized analyses and provide a variety of field support and mobile lab support to the program.

In addition, the regional laboratories provided nearly 3,000 analyses to address hazardous and non-hazardous waste issues associated with the RCRA program and over 1,500 analyses to address risks associated with leaking underground storage tanks.

Applied Research and Method Development

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

Passive Diffusion Sampling of Volatiles in Groundwater:
Regional labs help spread the use of new methods and technologies - bridging the gap between research and commercial availability. One region provides unique expertise in passive diffusion sampling of volatiles in groundwater. A passive diffusion sampler consists of a volume of de-ionized (DI) water sealed in a permeable membrane that is deployed in a well for at least two weeks to equilibrate with ambient water quality by diffusion of contaminants across the membrane. After retrieval the sampler is cut open and the sample is carefully decanted into normal volatile organic analytes (VOA) vials and analyzed by EPA method 8260. This technique is an alternative to the traditional method that requires purging water from a well prior to sampling. This sample technique allows the deployment of multiple samplers in a single well to provide a vertical profile of the groundwater. In 2009, regional laboratory staff provided support to allow for the use of this technique at two Superfund sites. Use of this technique assisted with defining the complicated groundwater flow regimes at the two sites.



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 2009 are:

Superfund Sites Targeted for Federal Stimulus Funds:
In 2009, EPA announced that $528 million in federal economic stimulus funding would be used to help clean up the sites in 28 states. In association with the clean-up of these sites, the regional laboratories have conducted numerous organic and inorganic analyses of soil and groundwater to provide crucial data to site program officers. One example is a 15 acre site in a rural area where the primary sources of drinking water are private and community wells. From 1970 to 1995, the owner of the site pumped residential, commercial and industrial septic wastes and sludges; installed and repaired septic tanks; and provided a variety of industrial waste removal services. Eight to ten unlined lagoons were used to hold the septic wastes. The lagoon sludges were excavated and piled adjacent to the lagoon area. The site's affected media are soil and ground water. Vanadium is the most significant soil contaminant. Ground water contaminants above the maximum contaminant level in the monitoring wells are arsenic, manganese, iron, vanadium and 1,4 dichlorobenzene.

Analysis for PCBs Associated with Electrical Transformer Manufacturing:
Unusually quick turn-around was provided for a large number of samples from a Superfund site associated with an abandoned electrical transformer manufacturing, recycling and repair facility. It was determined that soils to a depth of 15 feet were contaminated with PCBs at levels potentially harmful to human health. Over a two month period, approximately 2000 soil samples were analyzed with preliminary results available in 24 hours and final, reviewed results available in seven days. The rapid turnaround was critical for verifying that residential areas had been cleaned up to appropriate safe levels while the remediation contractor was still on site. The ability to get quick confirmation that the clean up goals had been met resulted in significant savings to the Superfund program.

Post-Remedial Monitoring of Marine Sediment Associated with a Superfund Site:
Support was provided for post-remedial monitoring at a Superfund site. The site was previously used to process and package pesticides with Dichlorodiphenyltrichloroethane (DDT) accounting for the majority of its operations. These activities resulted in the contamination of upland soils and marine sediment in the adjacent waterways. Water samples were collected using the regional lab's pontoon boat and samples were sent to researchers at The Massachusetts Institute of Technology for DDT analysis. In addition, transplanted mussels and semi-permeable membrane samplers were deployed at nine stations throughout the adjacent harbor to characterize pollutant flux and provide composite modeling of water column pollutant loads.

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:

Drinking Water Contamination Associated with Electroplating Facility:
For multiple sampling events, a regional laboratory provided 72 hour turnaround for volatile compound analyses in private drinking water well samples. The wells are near a former electroplating facility which operated from the late 1950s to the mid 1980s. The chemical compound trichloroethene (TCE) was used at the facility to clean and/or degrease metal objects prior to electroplating. The analyses showed TCE levels in some wells were above the Safe Drinking Water Act maximum contaminant level for TCE and triggered EPA's Emergency Response Program to provide bottled water to affected residents.

Goal 3: Land Preservation and Restoration (cont.)

Elevated Arsenic and Lead in Drinking Water:
As part of an investigation of soil and water contamination associated with a former fruit orchard, EPA conducted extensive sampling and analysis of soil and groundwater around the site. Elevated levels of arsenic and lead in soil and drinking water had been observed. The regional laboratory provided analyses of 410 samples to support the removal action at this site. The lab provided data that was crucial to this effort within a short turnaround time of 96 hours.

Liquid Fertilizer Spill:
Analytical support was provided in the aftermath of the collapse of a storage tank at a petroleum and petroleum products facility. The storage tank collapse resulted in a two million gallon spill of liquid fertilizer some of which made its way to a nearby river and a nearby bay. Preliminary analytical results were provided within three to 48 hours of sample receipt. The rapid turnaround allowed on-scene coordinators to clear residences quickly, allowing displaced homeowners to return to their homes.

Coal Ash Spill:
The regional laboratory provided 48 hour turnaround for metals analyses of public and private drinking water samples from a location near the site of a massive coal ash spill from a surface water impoundment at a coal fired power plant. Officials estimated that about 5.4 million cubic yards of ash escaped from the site. This ash and water spread over a half square mile area adjacent to the plant. Some flowed into a nearby river associated with a water reservoir. Ash also covered portions of nearby roads and the railroad tracks which supplied coal to the plant. Laboratory testing indicated that the regulated metals were not above the maximum contaminant levels for drinking water specified in the Safe Drinking Water Act.

Emergency Response Exercise:
An emergency response exercise was conducted by a regional office and included participation by state and local agencies along with EPA staff from the regional lab and the Superfund and Drinking Water programs. The regional mobile laboratory was deployed for this exercise and performed field testing on samples collected for total coliforms (by Colilert), volatile organic compounds (by Gas Chromatography-Mass Spectrometry), metals (by x-ray fluorescence), and pH. A new field-portable Laboratory Information Management System (LIMS) database was tested to provide electronic as well as hardcopy reports to the Environmental Unit (EU) Coordinator and other field staff. The field portable LIMS database was also instrumental in porting the data back to the primary LIMS database at the fixed laboratory. Coordination of various units in the Incident Command System (ICS) was tested as well as various forms of communication (cell, satellite, and email).

RadNet Deployment Training and Exercise:
RadNet is a national network of both fixed and deployable monitors for the collection of air, precipitation, drinking water, and milk samples for analysis of radioactivity. In FY 2009, refresher training for Regional On-Scene Coordinators and Regional Support Corps members was hosted by a regional laboratory. The focus of the training was deployment of portable radiation sensors provided by EPA's Office of Radiation and Indoor Air. Participants practiced assembly of the portable devices and participated in an exercise in which the campus around the regional lab was used to practice the application of deployment protocols for the evaluation of potential sites. This training provided essential practice to the Regional Support Corps who would be responsible for deploying these monitors in case of a radiological release.

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 2009, 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:

Testing of Soils for Lead and Arsenic in Communities:
Surface soil contamination around older homes, caused by the historical use of lead based paints and arsenic based pesticides, is a common problem, but is not a well characterized problem in any given neighborhood. One region has put their fixed lab and field x-ray fluorescence (XRF) capability at the disposal of a number of community groups and a program run by a state university to test soil for planned and existing community and residential gardens. In 2009 the region tested over 400 soil samples for this purpose.

Water Quality Monitoring Equipment Loan Program:
Two regional laboratories currently operate water quality equipment loan programs for citizen volunteer organizations in their Regions. The equipment loaned to community groups is used to measure water flow, dissolved oxygen, pH, temperature, salinity, macro invertebrate communities, and positioning data for map-making. The loans empower citizen monitoring organizations to collect defensible data for monitoring water quality using high quality equipment.

Goal 4: Healthy Communities and Ecosystems (cont.)

Volunteer water monitors use the data to help government agencies identify and restore water quality and become advocates for their watersheds.

Volunteer and Citizen Monitoring Support:
Regional laboratories often provide analytical support to volunteer and citizen monitoring groups. For example, support was provided to citizen monitoring groups for the analysis of water samples for total coliforms, *E. coli*, and *Enterococcus*. During dry and rainy seasons, volunteers collect weekly samples for five weeks from up to ten sites per creek or watershed. The regional lab provides data to the citizen monitoring groups who compare results to state or federal water quality standards for bacteria. The results have shown that sewage leaks or spills are readily apparent from *E. coli* analyses. Absence of bacteria has also led to detection of residual chlorine from drinking water leaks. Bacterial data have allowed volunteers in several communities to work closely with local governments to mitigate sewer leaks or inform the public about bacterial contamination in their watersheds.

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. One example of an ecosystem related project is described below.

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.

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 addition, regional labs support RCRA site investigations for both corrective action and enforcement programs. In 2009, the regional laboratories provided analyses of over 1,200 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.

RCRA Enforcement Support:
Verifying compliance at a commercial hazardous waste treatment, storage, and disposal facility requires representative sampling of widely varied waste streams for a broad spectrum of target analytes, often contained in difficult matrices. During 2009 two regional labs and EPA's National Enforcement Investigations Center (NEIC) teamed together to develop a sampling and analysis plan and assemble a field sampling team to collect and analyze samples from just such a facility. In order to protect the health and safety of the field team and in order to pick the right sample locations out of the array of waste tanks and containers, field air monitoring was conducted to target potential leaks. Potential for unknowns meant that a significant fraction of sampling had to be conducted with level B personal protective equipment (PPE) and all sampling activities were in at least level C PPE. Ten tanks, two roll-off containers, 40 containers and a storm water discharge were sampled at the site and analyses for toxicity characteristic leaching procedure (TCLP), volatile organics, metals, pesticides, pH and flashpoint were provided by the regional lab. Sample matrices included soils, aqueous mixtures, oil based mixtures, and paints.

Criminal Investigation Support:
Regional laboratories often work closely with Criminal Investigation Division (CID) agents to coordinate and facilitate sample collection, sample arrival, sample analysis, and sample reporting. In FY 2009, a regional laboratory analyzed 161 samples in support of criminal investigations with preliminary results often reported in a matter of days. In another region, a regional laboratory microbiologist provided testimony in a criminal case against a business owner that had been injecting surface water suspected of containing microbiological contaminants into a ground water aquifer. The business owner conducted activity during the rainy season in order to recharge the aquifer and thereby potentially contaminated the groundwater source.

Cross Goal Strategies

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

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 partnership efforts include:

Sharing Analytical Capabilities and Capacity:
One of the most important partnerships amongst regional and state labs is sharing unique expertise where and when needed. In 2009, regional labs continued to turn to each other when capability limitations or lack of sample capacity became an obstacle to providing support for a variety of projects. One regional lab shared their capability to analyze for perchlorate by liquid chromotography/dual mass spectrometry (LC/MS/MS) for samples from a former Air Force base in another region. PCB congener analysis not available in one region was provided by another region with the relevant capability. In other cases, regional laboratories regularly provide analytical assistance to each other when an instrument breakdown at one lab prevents completion of a scheduled analysis.

Outreach to Youth and Schools:
Regional laboratories are often the destination for field trips from a variety of schools in communities near the lab facilities. Laboratory staff provide lab tours, lab demonstrations and career advice for numerous students. The students get the opportunity to explore how the labs support the Agency's mission through demonstrations, by EPA lab staff, in microbiology, marine invertebrate toxicity, and chemical analysis.

Support to Tribes:
The regional laboratory provided a number of analyses for nutrients, total organic carbon (TOC), total phosphorus, dissolved ortho-phosphorous, chlorophyll a, and algal growth potential for a project with the Eastern Band of Cherokee Indians (EBCI). Regional personnel conducted field sampling and measurement activities on EBCI tribal lands. The sampling and analyses were associated with a baseline water quality study to assess the viability of the fishery on tribal lands. This study included field measurement of temperature, pH, dissolved oxygen (DO), and Secchi depth along with the chemical and biological analyses.

World Water Monitoring Day:
Each year, several regions and regional labs join citizen volunteers, students and teachers from around the world to celebrate citizen monitoring and collect water quality data on International Water Monitoring Day. EPA lab scientists conduct training exercises with the public and students to teach them about water quality parameters. Actual samples are collected and in many cases analyzed by the regional lab for bacteria, nutrients, and pesticides. In one instance, the laboratory results were used to help isolate various land uses and help a small city better target its efforts to clean up creeks that had consistent toxicity.

Collaboration with EPA's Office of Pesticides Program:
Regional lab staff worked with the Office of Pesticides' Analytical Chemistry Branch to develop a more cost effective method for the detection of nanosilver in water. Currently, the methods available worldwide to characterize the size of silver nano particles require the use of an electron microscope which is very costly. The project is focusing on the use of inductively coupled plasma/mass spectrometer (ICP/MS) for this determination.

2009 Laboratory Technical Information Group (LTIG) Conference:
The Region 10 laboratory hosted the 2009 Laboratory Technical Information Group (LTIG) Conference. There were about 30 attendees, including laboratory scientists from the Regions, Program Offices, Headquarters, NEIC, and the US Fish and Wildlife Service. The LTIG was formed in 1998 to create and sustain working relationships among USEPA regional laboratories and other EPA entities (ORD, NERL, NEIC) to promote a free exchange of technical knowledge and ideas. The LTIG

Cross Goal Strategies (cont.)

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 2009 conference included presentations of analytical data use at the Bunker Hill Superfund site, asbestos analyses, description of ordnance pollution and data needs for a former military site, laboratory information management systems, application of newer organic methods that result in solvent reduction use, waste characterization leaching methods, arsenic speciation method validation, and liquid chromatograph/tandem mass spectrometry methods, among others.

Partnership with Hospitals:
Heavy metals can be common ingredients in many traditional medicines, toys and household items. As a follow on to participation in a major study of ayurvedic medicines, one regional laboratory continues to partner with regional hospitals on an as needed basis to conduct XRF analysis of traditional medicines, toys, and other items to support forensic investigations into the source of heavy metal poisonings. In 2009, at the request of local hospitals, the lab analyzed samples for two different poisoning cases. One case traced back to ingestion of lead paint and the other case was traced back to the use of a folk remedy for the treatment of alcoholism which contained antimony.

Invited Speaker at Ireland Conference:
A regional laboratory chemist was invited to the International Ion Chromatography Symposium in Dublin, Ireland to speak on recent achievements in IC/MS/MS methodology. The papers presented were "Trace Analysis of Amines by IC/MS/MS" and "Green Analysis - Bridging the Gap for Environmental Samples using IC/MS/MS and LC/MS/MS". The first paper highlighted innovative ways to test for CWA degradation products, specifically amine compounds, using new state of the art equipment. The second focused on innovative ideas for reducing chemical waste in the laboratory.

Regional Methods Program:
The Regional Methods Program (RMP) is a mechanism used by of the Office of Research and Development (ORD) to respond to high-priority, near-term methods development needs of EPA's regional offices. The program also serves to enhance interactions between regional staff and ORD scientists; and to improve ORD's capacity to bring science to bear on practical environmental issues such as those faced by Regions.

There were several ongoing RMP projects in 2009 involving work by the regional labs. These include:

Developing a method using hydrogen carrier gas in GC/MS organic semi- volatile analysis.

Developing methods for dynamic headspace and pulsed vacuum extraction to measure polar volatile organic compounds.

Verification of commercially available, cost-effective, enzyme-linked immunosorbent assay (ELISA) test kits for the quantitative determination of endocrine disrupting compounds (EDCs) associated with waterways impacted by poultry, swine, and dairy animal feeding operations.

Testing of a Lake Macroinvertebrate Integrity Index (LMII) for Mid-Atlantic lakes and reservoirs.

Developing a standardized testing procedure for the identification and quantification of *Cryptosporidium parvum* and *Cryptosporidium hominis* Oocysts using real-time polymerase chain reaction assay.

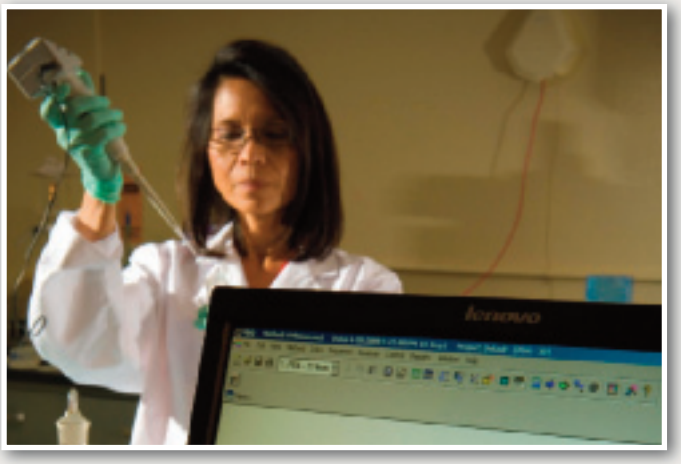
Expanding Scientific Knowledge and Developing New Analytical Capabilities

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

Cross Goal Strategies (cont.)

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 in the following paragraphs.

Asbestos Analysis and The NELAC Institute (TNI) Certification:
In 2009, a regional laboratory became National Environmental Lab Accreditation Conference (NELAC) accredited for the analysis of bulk asbestos containing building materials and is also capable of conducting analysis of other matrices, including bulk soil, sediment, and vermiculite products. The lab supports asbestos analysis for EPA's Enforcement and Superfund Programs, and also serves as a quality assurance (QA) reference lab for asbestos work. Qualitative analysis is conducted using a polarized light microscope (PLM) to observe characteristic optical properties to identify different types of asbestos, and is complemented by other analytical techniques, including x-ray diffraction (XRD), and scanning electron microscopy (SEM) equipped with energy dispersive spectroscopy (EDS). These methods provide verification of asbestos mineral type based on crystal structure by XRD and element composition by EDS. In addition, the SEM enables the analyst to document the morphology of fine fibrils that are too thin to be resolved by PLM. Quantitative analysis is typically conducted using a combination of gravimetric matrix reduction and asbestos point counting by PLM. During the year, the regional lab was given lead responsibility for working with the Idaho National Laboratory to develop a technique that uses a fluidized bed to segregate low concentrations of asbestos from samples of soil and sediment. Currently, this project is evaluating the precision and sensitivity of the fluidized bed asbestos segregator.



Metals Speciation:
Metals chemists at a regional laboratory are working on expanding their analytical capabilities to include speciation. Speciation analysis is the separation and quantification of chemical forms of a particular element. In the past, the determination of total element concentrations was considered to be sufficient for environmental considerations. Although it is still useful to know the total concentration of an element and it is essential in many areas, the determination of each species is more relevant in determining toxicity levels. A new inductively coupled plasma-mass spectrometer (ICP-MS) with a high-performance liquid chromatography (HPLC) separation system has become an essential analytical tool for determinations of trace levels of speciated elements such as arsenic, selenium, and chromium. The lab plans to expand their capabilities to include analysis of speciated metals in water, soil and tissues.

American Society of Testing Materials (ASTM) Standards:
Regional lab staff completed the process for getting two additional endocrine disruptor methods accepted as ASTM standards. Both a low level liquid chromatography – mass spectrometry method for nonylphenols and their ethoxylates and a separate method for low level bisphenol A were accepted as ASTM standards in 2009. In addition, the same regional laboratory has completed four chemical warfare agent degradation product identification methods in drinking/surface water using LC/MS/MS. All four methods were submitted to ASTM for consideration as standard test methods.

Multi-Increment Sampling:
For a site investigation of a former Navy firing range site, a new sample compositing technique called "multi-increment sampling" (MIS) was applied. This site was known to be polluted with bullets or ammunition fragments over many years. No removal of these materials had occurred at the site, and there had been no estimates made for the amount of lead present. Surface soil samples were collected to characterize potential surface contamination using MIS which is an advanced technique for collecting samples that represent a specific area or population (decision unit). Many increments of soil were systematically collected in each decision unit to form composites that represented the compositional and distributional heterogeneity. The samples, which were submitted for lead and ordnance compounds (nitroaromatics, nitroamines, and nitrate

Cross Goal Strategies (cont.)

esters) analyses, were homogenized at the regional laboratory per EPA Method 8330B by using a ring mill (or puck grinder) to reduce the particle size. The ground material was then sub-sampled applying the MIS technique prior to analyses for lead, other metals, and the ordnance compounds. This sample compositing technique is much more effective at characterizing decision unit contamination, while significantly reducing the number of required analyses.

Trace Analysis of Pesticides and Pesticide Degradates:
Regional laboratory chemists have recently developed a method for trace (10 to 50 parts per trillion) analysis of pesticides and pesticide degradates in water. The analysis employs liquid chromatography/mass spectrometry techniques. The method has several advantages over conventional extraction & analysis methods including: no need for field preservation; small field sample size; minimal sample preparation before analysis; and, increased sample throughput. For emergency response situations, preliminary analysis results can be available within 24 hours of receipt. In 2009, this method was used to analyze over 280 water samples.

Trace Metals Analysis in Field Mice that Potentially Contain Hantavirus:
After receiving a request to analyze for trace metals in field mice collected from a legacy mining site, the regional lab's health and safety officer determined that as many as 25 percent of the mice collected during the summer months might contain Hantavirus. This mining site has been responsible for contaminating over 20 square miles of land from their smelter and mine tailings. Because of the potential for personnel exposure during the grinding of these tissues, EPA contacted the Center for Disease Control and Prevention (CDC) to identify a suitable means to inactivate the virus without jeopardizing analyte recoveries. The final method, which required oven heating the rodents for a period of four hours at 60 degrees celsius, was confirmed to have acceptable recoveries for lead on virus-free mice, and then applied the preparation technique to over 110 samples that were subsequently analyzed using ICP/MS.

Analysis of Toxaphene Congeners:
Regional scientists are working with the Office of Resource Conservation and Recovery on the Phase II validation of the draft SW-846 method 8276 for the analysis of toxaphene congeners and break down products. Toxaphene is an agricultural pesticide that was one of the most heavily used insecticides in the United States until it was banned by EPA in 1990. As a result of its wide spread application, the mixture and its breakdown products remain pollutants of concern at many locations in the U.S.

Toxaphene is not a single compound but a mixture of more than 670 closely related compounds, known as congeners. In the environment, the mixture breaks down as a result of weathering processes. These breakdown products form a mixture different from the original toxaphene, resulting in an altered chemical residue. As a result, measuring toxaphene accurately and at low levels has been a challenge using traditional gas chromatography (GC) techniques such as Method 8081. Method 8276 is a gas chromatography/negative ion mass spectrometry (GC/NIMS) method which employs mass spectral identification of toxaphene constituents. The Phase II method validation will evaluate the method for reproducibility, linearity, accuracy and precision across a variety of real world test matrices (i.e. soil, sludge, and fish tissue). Following Phase II validation testing, a statistical evaluation of the data will be performed in order to establish method precision and bias. The final version of Method 8276 will be modified based on the results of the Phase II validation study.

Cross Goal Strategies (cont.)

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 the Office of Solid Waste and Emergency Response (OSWER)-Office of Emergency Management's (OEM) 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 several significant development projects:

Developing capability to analyze environmental samples for chemical warfare agents and their environmental degradation products.

Developing and testing response plans with state and other stakeholders to enable a coordinated multi-laboratory response to a major contamination event.

Expanding membership in the ERLN.

Chemical Warfare Agent Method Validation Study

In the wake of 9/11, the federal government initiated several high level studies to investigate vulnerabilities to recover from credible weapons of mass destruction (WMD) attack scenarios. The study revealed that EPA and its federal and state partners had the capability to address the release of toxic industrial chemicals but that little capability was available at any level of government to address the release of the most toxic chemical warfare agents. To address this issue the Science and Technology Directorate of the newly formed Department of Homeland Security (DHS) partnered with EPA's Office of Emergency Management to address this national vulnerability and develop the laboratory capability and capacity to support decontamination and recovery from a terrorist event using chemical warfare agents (CWA). Many different efforts are underway that contribute to this goal, but a primary scientific task is the development and demonstration of analytical methods to detect chemical warfare agents in environmental media.

The initial method development was performed by contractors managed out of ORD's National Homeland Security Research Center with input from supporting regional labs. This produced a modified version of EPA method 8270 believed capable of supporting the analysis of four nerve agents and one blister agent in environmental samples. Validation of the method, teasing out operational issues, providing performance data, and ensuring that the method could reliably detect the target agents in environmental samples with the throughput required to sustain the anticipated workload fell to a small team of chemists at two regional laboratories.

In 2009 this team achieved several very substantial milestones in the development of CWA methods. At the start of the year a Phase 1 Method Validation Study was conducted in both regions. Both Regions ran the same protocol. They each encountered problems with running the method, some the same and some different. During the validation study they each independently developed solutions to these problems. For example, Phase 1 had to solve a number of basic procedural issues key to maintaining health and safety requirements and the strict accountability for use of CWA agents. Tracking systems were developed that accounted for material usage down to microliter quantities; a screening procedure was developed using the AP2Ce detector to screen shipping containers and verify shipment was not compromised before opening was developed; and ergonomically efficient procedures were developed for making analysis standards under 100 percent engineering control.

Cross Goal Strategies (cont.)

The outcome of this work was brought back to the larger workgroup involved with the overall project. Method modifications were discussed and deliberated and by mid-year a proficiency test was being run that tested the comparability of the labs. In early September the labs began Phase 2 of the Method Validation Study. Phase 1 and 2 provided several substantive findings including:

Shaking rather than vortexing water samples provides better recovery of target analytes.

Selected Ion Mode (SIM) calibration standards are not stable for an extended period and a new aliquot has to be used for each 24 hour analytical period.

The SIM technique for wipes and the analysis of VX (chemical warfare nerve agent) will require further refinement to correct persistent problems.

Material used in analysis and CWA decontamination requirements trigger additional operation & maintenance requirements (e.g. glassware has to be scrupulously cleaned after decontamination by bleaching to remove all traces of bleach, and, to prevent standard degradation, the GC injector port must be maintained at the beginning of every analytical run).

As a result of the milestones reached:

The EPA Regional laboratories have demonstrated, for the first time ever, a civilian capability to test for CWA residuals in environmental media.

The multi-lab studies conducted to validate the CWA test method demonstrated the feasibility of the pilot project initiated by DHS and EPA.

The work completed leads the way to further advances in CWA method development and the eventual technical transfer of capability to other ERLN laboratories.

Full Scale Exercise

Several regional labs participated in a multi-region full-scale exercise (FSE) that was designed to exercise and evaluate the Water Laboratory Alliance Response Plan (WLA-RP) and other Environmental Response Laboratory Network (ERLN) and Laboratory Response Network (LRN) emergency response procedures, and identify opportunities for enhancement and improvement of collaboration, communication and coordination. The full-scale exercise assessed the effectiveness of response to a combined chemical and biological warfare agent attack. The FSE was divided into the following three major components:

Chemical Warfare Agent (CWA) and Toxic Industrial Chemical (TIC) Environmental – A light aircraft, operated by a terrorist, sprays a large, fully-occupied sports arena with the chemical warfare agent mustard-lewisite. Shortly after the attack, the airplane collides with an industrial building in which toxic industrial chemicals (TICs) are stored, resulting in a fire and explosion.

CWA Clinical – As a result of the chemical warfare agent attack, many people are exposed to chemical warfare agents and are seeking care in their local hospitals. Patient specimens are sent to state public health laboratories for analyses.

Select Biological Agent Environmental – A bacterial select agent is introduced directly into a metropolitan drinking water distribution system by the same terrorist cell responsible for the CWA attack on the stadium.

The exercise design for each component consisted of an Exercise Design Team, Participant Team, and Evaluator Team, who were supported and guided by EPA and contractor staff to develop and implement the exercise. The CWA and TIC Environmental Scenario was conducted by EPA. The CWA Clinical and Select Biological Agent Environmental Scenarios were run by state public health labs in partnership with CDC.

The FSE involved participants from EPA Regions, EPA headquarters (HQ), CDC, Federal Bureau of Investigation (FBI), state public health and state environmental laboratories, drinking water utilities, and federal, state,

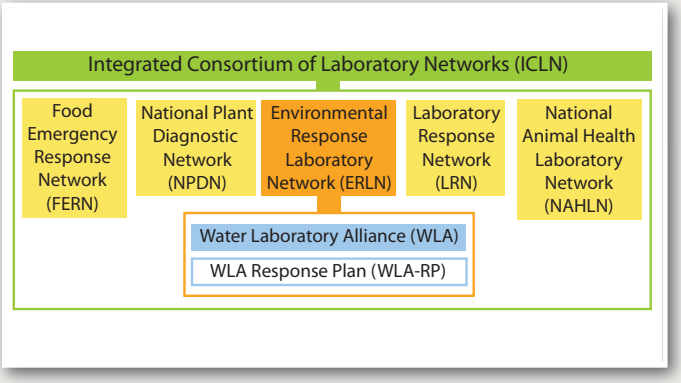
Cross Goal Strategies (cont.)

and local first responders and law enforcement. This multi-region exercise provided a venue for participants to practice procedures related to providing support to an environmental and public health incident that included actual sample analyses, communication, coordination, and data reporting. Many of the steps and issues covered in the scenario were taken from lessons learned and corrections to plans and procedures derived from functional exercises held in each EPA Region during 2008 and from the findings of the May 13-14, 2008 EPA New England Homeland Security Environmental Summit.

The FSE took place over an eight-day period starting on a Friday (Day 1) and ending on the following Friday (Day 8). As each participating group completed their exercise activities, they were given the opportunity to meet and discuss their exercise activities through a half-hour debriefing. Following the exercise hot washes were conducted for each scenario to allow the participants to discuss and share their findings with the other participants in their group.

For the CWA and TICs Environmental Scenario, the incident command (IC), Regional environmental unit (EU), and field team were located at one Regional Laboratory. EPA Headquarters Emergency Operations Center (EOC) and the EPA Water Desk participated in the exercise and tested components of the ICLN Network Coordinating Group (NCG) standard operating procedure. State laboratory participants in the CWA and TIC Environmental portion of the exercise were primarily from one region, while state laboratories from a second Region provided overflow capacity. Additional laboratories from other Regions also participated. All samples for the exercise were shipped in advance to the lead Regional Laboratory. The exercise Field Team developed the sample documentation and packed and shipped the samples to the various participating laboratories during the week of the exercise. This allowed testing of coordination of analytical services, sample packing, shipping, and sample receipt, sample analysis, quality assurance/quality control (QA/QC), generation of electronic data deliverables, and data management.

Participants in the FSE rated the exercise as successful and stated that they enjoyed the interaction between the laboratories and with an Incident Command, implementation of the draft response plans, and the opportunity to work with real samples. The exercise identified necessary improvements to existing and draft plans and to coordination and communication across regions and agencies. Needed refinements to sample management, QA/QC, data reporting and data management expectations and plans were also identified. In addition to identifying improvements to plans and procedures across organizations, each participating organization leveraged the exercise to practice and enhance their own internal operating procedures.

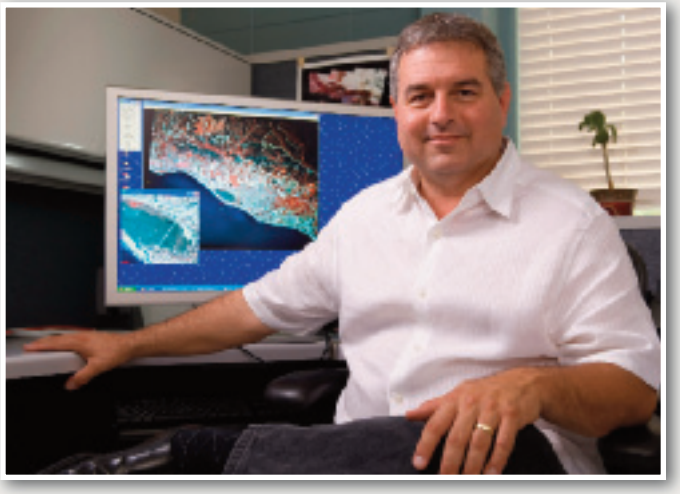


ERLN

In 2008 the Office of Solid Waste and Emergency Response (OSWER) 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 regional laboratories worked with OSWER to expand the network 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.

Cross Goal Strategies (cont.)

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 - Infrastructure and Looking to the Future

EPA United States Environmental Protection Agency

Section III

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.

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 NELAC Institute (TNI). 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 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 2009, all regional laboratories that had re-assessments scheduled were successfully re-accredited by NELAP.

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.

i. Identifying and Maximizing Efficiencies

In FY 2009, 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 evaluate strategic sourcing options. For example:

Leadership in Energy and Environmental Design: Leadership in Energy and Environmental Design (LEED) is an internationally recognized green building certification system for high-performance, low impact buildings. LEED provides third-party verification that a building is designed, built and operated using strategies aimed at improving performance related to energy savings, water efficiency, CO_2 emissions reduction, improved indoor environmental quality, stewardship of resources and sensitivity to their impacts. Currently, two regional laboratory facilities have achieved Gold Certified LEED status. A third regional laboratory facility has now registered to gain LEED certification by 2011. The regional laboratory has assembled a cross-divisional team that includes lab staff. In 2009, work began on gathering data related to energy use, site management, water use efficiency, indoor air quality, green purchasing, solid waste management and green cleaning that will be needed for LEED certification.

Section III (cont.)

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. Notable environmental management measures implemented in 2009 include:

Strive for 45 Recycling Rally:
The Strive for 45 Recycling Rally was a six month recycling competition among EPA offices and laboratories that ran from January to June of 2009. The goal of the Rally was to infuse a spirit of friendly competition into EPA waste reduction initiatives including a goal to achieve a 45 percent Agency-wide waste diversion rate. Eighteen EPA facilities participated in the Rally including four regional laboratories. Office and labs quickly demonstrated considerable waste diversion prowess. In the end, the participating facilities diverted more than 918 tons of materials from EPA's waste stream in only six months.

Solvent Reduction:
Solvent reduction under the EMS program at one regional laboratory allowed the laboratory to be reclassified as a Conditionally Exempt Small Quantity Generator (less than 220 pounds of hazardous waste per month) for the first time in the lab's history.

Analytical Procedural Change:
A regional laboratory changed its analytical techniques for the automated analysis of inorganic constituents to a technique that uses discrete analyzer (DA) technology. This technology uses 100 times less sample, generates at least 10 times less waste and can run up to seven tests in one run compared to the previous technique which ran one at a time.

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. Efforts related to health and safety include:

Medical monitoring programs to evaluate and track the health of those employees with a significant possibility of workplace exposure to hazardous compounds.

Periodic, comprehensive audit of safety, health, environmental compliance and internal controls by the EPA Headquarters.

Health and safety committees with representation from laboratory employees to provide a forum for discussing safety and health issues, and assist the safety officer in planning training activities and organizing safety inspections.

Annual refresher health and safety training.

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.

Section III (cont.)

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) or similar programs.

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 the 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.

Conducting business as usual while some regional laboratories undergo renovation.

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 2009

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	Titrimetric		X	X	X	X			X		
Alkalinity	Water	Titrimetric	X	X	X	X	X	X	X	X	X	X
Asbestos	Solids/Bulk material	PLM	X						X	X	X	X
	Soil/Sediment	PLM	X							X		X
Chloride	Water	Colorimetric							X			
	Water	IC	X	X	X	X	X	X	X	X	X	X
	Water	Titrimetric		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	X
Hardness	Water	Colorimetric										X
	Water	Titrimetric		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		X
	Tissue (Fish &/or plant)	ICP/MS		X	X	X			X	X	X	X
	Waste (oil, drum, etc..)	ICP/MS			X	X		X	X	X		
Metals (TCLP)	Soil/Waste (oil, drum, etc..)	ICP/MS				X		X	X	X		

EPA Regional Laboratories Core Capabilities - FY 2009

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	X
	Soil	IC	X		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			X
Perchlorate	Water	IC					X		X		X	
	Soil	IC							X		X	
	Water	IC with LC/MS confirmation			X		X		X			X
	Water, Soil/Sediment	LC/MS			X							X
	Water	LC/MS/MS	X							X	X	
Phosphorus, Ortho	Water	Colorimetric	X	X		X		X	X	X		X
	Water	IC	X	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	X	X
	Soil	IC			X	X			X	X	X	
	Water	Turbidimetric	X	X		X	X	X	X		X	
	Soil	Turbidimetric	X			X	X				X	
Sulfide	Water	Colorimetric		X		X	X		X			X
	Soil	Colorimetric				X	X					
	Water	IC, Turbidimetric						X				
	Water	Titrimetric		X			X				X	X
ORGANIC CHEMISTRY:												
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			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 2009

I. Chemistry (continued)

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECH-NIQUE	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
	Soil	Combustion / IR		X	X	X	X		X	X	X	X
	Water	Combustion/Oxidation								X		
	Water	UV/Persulfate			X		X	X		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	
	Air	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
	Water	GC				X						X
	Soil/Sediment	GC				X						X
	Waste (oil, drum, etc..)	GC	X		X	X	X					X
VOA (TCLP)	Solid/Waste	GC/MS		X		X		X	X	X		
VOA (TPH)	Water	GC/MS or GC				X	X		X	X	X	X
	Soil/Sediment	GC/MS or GC				X	X		X	X	X	X

II. Physical & Other Determinations

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

EPA Regional Laboratories Core Capabilities - FY 2009

II. Physical & Other Determinations (continued)

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

III. Biology

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

APPENDIX B - Abbreviations

United States Environmental Protection Agency

Abbreviations

AIWPS	Advanced Integrated Wastewater Pond System
APEs	Alkylphenol Ethoxylates
AQS	Air Quality System
ASTM	American Society for Testing and Materials
BNA	Base/Neutrals and Acids Extractable Organics
BOD	Biological Oxygen Demand
CAFOs	Concentrated Animal Feeding Operations
CDC	Centers for Disease Control & Prevention
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CID	Criminal Investigation Division
CO_2	Carbon Dioxide
COD	Chemical Oxygen Demand
CVAA	Cold Vapor Atomic Absorption Spectrometry
CWA	Chemical Warfare Agent
CWA	Clean Water Act
DA	Discrete Analyzer
DBCP	Dibromochloroproprane
DDT	Dichlorodiphenyltrichloroethane
DHS	Department of Homeland Security
DI	De-ionized
DO	Dissolved Oxygen
EBCI	Eastern Band of Cherokee Indians
EDB	Ethylene Dibromide
EDCs	Endocrine Disrupting Compounds
EDS	Energy Dispersive Spectroscopy
ELISA	Enzyme-Linked Immunosorbent Assay
EMS	Environmental Management Systems
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ERLN	Environmental Response Laboratory Network
EU	Environmental Unit
FBI	Federal Bureau of Investigation
FERN	Food Emergency Response Network
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FSE	Full Scale Exercise
FY	Fiscal Year
GC	Gas Chromatography
GC/ECD/PID	Gas Chromatograph/Electron Capture Detector/Photo-Ionization Detector
GC/MS	Gas Chromatography-Mass Spectrometry
GC/NIMS	Gas Chromatography/Negative Ion Mass Spectrometry
GC/NPD	Gas Chromatography/Nitrogen-Phosphorous Detector
GFAA	Graphic Furnace Atomic Absorption Spectrometry
HABs	Harmful Algal Blooms
HPLC	High Performance Liquid Chromatography
HQ	EPA Headquarters
IC	Ion Chromatography
ICLN	Integrated Consortium of Laboratory Networks
ICP	Inductively Coupled (Argon) Plasma
ICP/AES	Inductively Coupled Plasma/Atomic Emission Spectrometry
ICPMS	Inductively Coupled Plasma Mass Spectrometry

Abbreviations

ICS	Incident Command System
IR	Infrared
ISE	Ion Selective Electrode
LC-MS	Liquid Chromatography-Mass Spectrometry
LC/MS/MS	Liquid Chromatography/Dual Mass Spectrometry
LEED	Leadership in Energy and Environment Design
LIMS	Laboratory Information Management System
LMII	Lake Macroinvertebrate Integrity Index
LRN	Laboratory Response Network
LTIG	Laboratory Technical Information Group
LUST	Leaking Underground Storage Tank
MIS	Multi-Increment Sampling
mg/L	Milligrams/liter
MPRSA	Marine Protection, Research, and Sanctuaries Act
MS-MS	Mass Spectrometer-Mass Spectrometer
NAHLN	National Animal Health Laboratory Network
NASA	National Aeronautics and Space Administration
NCG	Network Coordinating Group (ICLN)
NDMA	N-Nitrosodimethylamine
NEIC	National Enforcement Investigations Center
NELAC	National Environmental Lab Accreditation Conference
NELAP	National Environmental Lab Accreditation Program
NERL	National Exposure Research Laboratory
NO_3	Nitrate
NO_2	Nitrite
NO_x	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NPDN	National Plant Diagnostic Network
ODMDS	Ocean Dredged Material Disposal Site
OEM	Office of Emergency Management
ORD	Office of Research & Development
OSWER	Office of Solid Waste & Emergency Response
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCR	Polymerase Chain Reaction
PEP	Performance Evaluation Program
PLM	Polarized Light Microscopy
PM	Particulate Matter
PPE	Personal Protective Equipment
ppq	part per quadrillion
QA	Quality Assurance
QC	Quality Control
RARE	Regional Applied Research Effort
REMAP	Regional Environmental Monitoring and Assessment Program
RMP	Regional Methods Program
RCRA	Resource Conservation and Recovery Act
SDWA	Safe Drinking Water Act
SEM	Scanning Electron Microscopy
SIM	Selected Ion Mode

Abbreviations

SMMP	Site Management and Monitoring Plan
SRP	Standard Reference Photometer
SO_2	Sulfur Dioxide
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Toxic Industrial Chemical
TMDL	Total Maximum Daily Load
TNI	The NELAC Institute
TOC	Total Organic Carbon
TOXNET	Toxicology and Environmental Information
TSCA	Toxic Substances Control Act
TTP	Through-The-Probe
ug/L	Micrograms/liter
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)
WHO	World Health Organization
WLA	Water Laboratory Alliance
WLA-RP	Water Laboratory Alliance Response Plan
WMD	Weapons of Mass Destruction
WSC	Water Security Division
WWTP	Wastewater Treatment Plant
XRD	X-ray Diffraction
XRF	X-ray Flourescence
303(d)	Clean Water Act Section/ Total Maximum Daily Loads