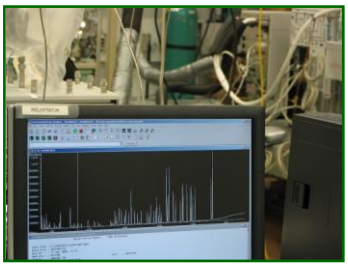
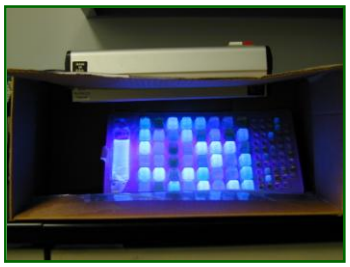
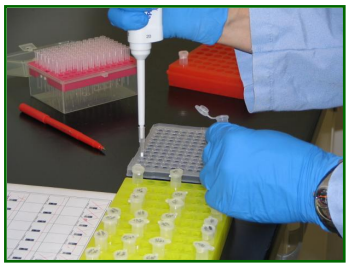
U.S. Environmental Protection Agency
Regional Laboratory System

EPA Regional Laboratories…
Advancing the Agency's Science Agenda

FY 2011 Progress Report

REGIONAL LABORATORY SYSTEM
2011 PROGRESS REPORT

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EXECUTIVE SUMMARY

The Regional Laboratory System is an inter-dependent network of the ten regional laboratories of the United States Environmental Protection Agency (EPA.) These laboratories provide the analytical, technical and programmatic support that is critical to accomplishing the Agency's mission of protecting human health and the environment. The regional laboratories ensure that analytical and technical expertise are available at the regional level and are well positioned to:

- rapidly address specific regional needs, including those of their states and local tribes;
- provide critical support for EPA civil and criminal compliance and enforcement activities;
- develop capabilities necessary to respond to the unique environmental challenges of their Region;
- support development of regional and national laboratory networks capable of responding to regional and national emergencies; and
- maintain direct, well established partnerships with state, local and tribal environmental programs and laboratories.

The EPA Administrator has outlined seven key priorities and themes to focus the work of the Agency. The Agency's priorities are:

- Taking Action on Climate Change
- Improving Air Quality
- Assuring the Safety of Chemicals
- Cleaning up Our Communities; Protecting America's Waters
- Expanding the Conversation on Environmentalism and Working for Environmental Justice; and
- Building Strong State and Tribal Partnerships.

The analytical, technical and programmatic support provided by the regional laboratories is critical to addressing many of these key priorities. The regional laboratories provide a full range of routine and specialized chemical and biological testing of air, water, soil, sediment, tissue and hazardous waste for ambient and compliance monitoring as well as criminal and civil enforcement activities. In FY 2011, the regional laboratories performed nearly 150,000 analyses that supported over 1,300 sites and projects.

Each of the regional laboratories share common responsibilities and roles and provide core analytical capabilities to meet the analytical needs of their individual regions. However, the regional laboratories also operate as an established laboratory network to provide laboratory response to environmental emergencies and incidents; increased laboratory capacity for large scale projects and access to an expanded spectrum of complex analytical techniques.

The regional laboratory community leads by example with regard to environmental management of their facilities. Efforts by the regional laboratories to achieve increased energy efficiency and efforts to reduce solid and hazardous waste are key to reducing greenhouse gas emissions that are associated with climate change.

The regional laboratories continued to play a crucial role in EPA's Strategic Plan for Homeland Security. In FY2011, three regional laboratories made significant progress in their ultra-dilute chemical warfare agent (CWA) analysis programs by receiving and analyzing CWA standards and/or performance test samples for the first time. Furthermore, the Department of Homeland Security began the phased transition of the chemical warfare agent fixed laboratory response capability to the USEPA Office of Emergency Management. The first phase of this transition included three regional laboratories that have completed demonstration of their capability to conduct CWA analyses, in a high throughput manner, under an appropriate quality system.

This progress report is divided into three sections:

- **Section I, Introduction:** provides general information about the Regional Laboratory System and outlines their collective mission statement.
- **Section II, Supporting EPA's Priorities:** summarizes some examples of the support provided by regional laboratories for EPA's national priorities including: Taking Action on Climate Change; Improving Air Quality; Assuring the Safety of Chemicals; Cleaning up Our Communities; Protecting America's Waters; Expanding the Conversation on Environmentalism and Working for Environmental Justice; and Building Strong State and Tribal Partnerships.
- **Section III, Regional Laboratory System Key Accomplishments:** summarizes the analytical capabilities and support provided for EPA's various programs and describes joint regional laboratory projects and Regional Laboratory System efforts related to emergency preparedness. This section also describes accomplishments associated with ensuring the quality of laboratory data.

SECTION I: INTRODUCTION

The regional laboratories were primarily established to provide analytical services and scientific and technical support to EPA's regional and program offices. EPA's regional offices are responsible within their states for the execution of the Agency's programs and need 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 or emerging projects.

The regional laboratories, with their analytical and technical expertise, are uniquely suited at the regional level to rapidly address specific regional needs. In addition, the regional laboratories have direct and longstanding partnerships with state, local and tribal environmental programs and laboratories allowing them to address the needs of states and local tribes.

The regional laboratories also perform a long list of other core functions, including:

- developing capabilities necessary to respond to the unique environmental challenges of their Region;
- providing support for EPA civil and criminal compliance and enforcement activities including providing expert witness testimony;
- providing field sampling support;
- providing training of program staff and staff from other organizations;
- performing on-site evaluation of drinking water laboratories;
- performing audits of states' drinking water certification programs;
- promoting inter-laboratory communication and development of regional and national laboratory networks to respond to emergencies;
- providing technical support to federal, state and local laboratories;
- providing technical support to internal and external organizations;
- supporting national laboratory program initiatives;
- ensuring the quality of laboratory data generated in support of Agency programs;
- providing benchmarks for environmental laboratories in areas such as analysis, pollution prevention and environmental compliance.

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 EPA's program offices, EPA's Office of Research and Development (ORD), state, local and tribal governments, private industry, the academic community and the public. The regional laboratories are crucial to advancing the Agency's science mission, goals and priorities and have embraced the following commitments to achieve this goal:

- integrating laboratory activities with those of field and quality assurance partners into a comprehensive, holistic, multi-media approach to solving ecosystem-based environmental problems;
- providing 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;
- maintaining 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;
- maintaining and enhancing a technically and scientifically skilled, dedicated and diverse staff through the excellence of our recruitment, career development, training, management and leadership; and
- advancing the Agency's science agenda at the point where crucial decisions are made.

SECTION II: SUPPORTING EPA'S PRIORITIES

In 2010, the EPA Administrator outlined seven key priorities and themes to focus the work of the Agency. The analytical, technical, programmatic, and facility management actions accomplished by the regional laboratories are critical to addressing many of these key priorities.

Priority - Taking Action on Climate Change

Across the planet, there is a growing concern about the impacts of climate change on our environment and health. Greater energy efficiency and other technologies hold promise for reducing greenhouse gases and solving this global challenge.

The regional laboratories have historically demonstrated a commitment to leading by example with regard to environmental management of their facilities. This commitment extends to taking measures to reduce greenhouse gas emissions associated with operation of our facilities. Some of the measures taken at the regional laboratories are described below.

Energy Use at the Regional Laboratories

Reducing energy use is one of the best ways to reduce greenhouse gas emissions. There are several actions that regional laboratories have taken to increase energy efficiency and reduce energy consumption.

- **Green Buildings:** 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, three regional laboratory facilities have achieved Gold Certified LEED status. Gold certification is the second highest level of certification under LEED.

- **Green Power:** Purchasing green power and renewable energy is one way to reduce greenhouse gas emissions. In 1999, the first federal government building in the nation to purchase 100 % green power was an EPA regional laboratory. All of EPA's regional

laboratories operate on green power either as a delivered product to their facilities or through the purchase of renewable energy certificates (RECs)

- **Increasing Energy Efficiency:** Regional laboratories continually evaluate energy use and investigate opportunities to implement energy saving measures. Measures implemented in recent years are detailed below.
  - Direct digital controls: Several regional laboratories have installed direct digital controls to monitor the operating condition of the heating, ventilation and air-conditioning (HVAC) system in their facilities. These systems alert building engineers when equipment is not operating optimally and therefore minimizes energy use throughout the facility.
  - Variable Air Volume (VAV) Fume Hoods: The operation of fume hoods account for a large portion of the energy consumed by laboratories. Several regional laboratories have replaced their constant volume fume hood systems with variable air volume (VAV) high-performance fume hoods. Variable air volume fume hoods reduce the amount of air exhausted through the fume hood which translates into significant energy savings.
  - Equipment Use and Replacement: Laboratories use a wide variety of energy consuming equipment including computers, refrigerators, freezers, ovens, autoclaves and analytical instrumentation. At most laboratories, old refrigerators have been replaced with Energy Star units. Some laboratories have reduced the number of printers at their facility by networking multiple user access to printers while other laboratories have replaced single function printers with efficient multi-function printers.

Materials Management at the Regional Laboratories

EPA's regional laboratories are committed to materials management approaches that use and reuse resources productively and sustainably throughout their life cycles, minimizing both the amount of materials involved and the associated environmental impacts. Waste reduction is a component of materials management and is critical for reducing carbon emissions. The regional laboratories have implemented numerous measures to reduce the generation of hazardous and non-hazardous waste.

- **Solvent Recycling:** Most analytical procedures require the use of solvents for the preparation and analysis of environmental samples. Several regional laboratories operate solvent recovery systems to recycle solvent for reuse. Solvent recycling significantly reduces the amount of solvent disposed of as hazardous waste.
- **Materials Recycling and Re-Use:** Most regional laboratories have aggressive recycling programs that may include glass, plastic, paper, aluminum, batteries, cell

phones, toner cartridges, ink jet cartridges, single-use metal gas cylinders and scrap metal. In FY 2011, one regional laboratory achieved an impressive 84 % diversion rate by recycling 56,459 pounds out of 67,359 pounds of municipal waste. Another regional laboratory reduced electronic waste by donating old computers and printers to a non-profit organization that provides education and technology to low-income communities. In FY 2011, this resulted in the diversion of nearly one ton of electronic waste.

- **Composting:** One regional laboratory has a composting program to reduce food waste generated by employees at its facility. Another laboratory arranged for their landscaping service to compost all of the yard waste generated by the facility.
- **Chemical Adoption Programs**: Some regional laboratories have initiated a chemical adoption or sharing program which not only reduces laboratory waste but benefits the academic community. Expired standards and chemicals may be "adopted" by universities, colleges, technical schools, and other educational institutions.
- **Water Reclamation:** A regional laboratory facility reclaims water from HVAC units and uses the water as a make-up supply for the HVAC cooling tower. In summer months, the facility's water usage from the local utility had exceeded 500,000 gallons in one month. The facility reclaims an average of 95,000 gallons of water per month from the HVAC units thereby reducing purchased water usage by as much as 25 %.
- **Paper Usage:** In FY 2011, several regional laboratories implemented a number of strategies to reduce their paper consumption. One regional laboratory began implementation of electronic data review to reduce paper consumption as well as printing costs. Another regional laboratory eliminated paper consumption associated with addressing client requests for copies of sometime voluminous data packages by installing a high speed scanner to provide scanned electronic copies of data packages.

Priority - Improving Air Quality

American communities face serious health and environmental challenges from air pollution. Improved monitoring and assessment is a critical building block for air quality improvement. 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, data validation, data management and distribution to regional clients. The laboratory component of the programs also includes filter archival and data submittal to the Air Quality System (AQS). The PM filter weighing lab is located at the Region 4 Laboratory in Athens, Georgia. In FY 2011, the laboratory processed and weighed 1,815 filters from state agencies, tribal nations and all ten EPA regions. The Region 4 Laboratory also reviewed the data from PM2.5 PEP audits and evaluated individual audits for submittal to EPA's national ambient air database. The other regional laboratories provided support for the PM 2.5 PEP through performance evaluation audits, quality assurance collocations and PEP audits. In FY 2011, the regional laboratories supported the completion of 353 PM2.5 PEP audits and 12 chemical speciation audits.

- **Lead Performance Evaluation Program (PEP):** The national lead monitoring network measures concentrations of lead in the outdoor air, to assess compliance with the lead National Ambient Air Quality Standards. Similar to the PM 2.5 PEP, the goal of the Lead PEP is to evaluate total measurement system bias of the lead monitoring network. The Lead PEP requires extensive laboratory activities, including filter handling, sample extraction, analysis, data entry/management and archival. The Region 9 Laboratory in Richmond, California currently serves as the Lead PEP Laboratory and in FY 2011 performed analysis of 314 particulate samples from around the nation to support this PEP.

- **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 2011, the regional laboratories supported the completion of over 200 through-the-probe audits. These performance audits ensure the validity of the ambient air quality monitoring data.
- **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.

The regional laboratories also provide support for a variety of other air program projects. Some projects supported in FY 2011 include:

- **Field Trials of Hydrogen Sulfide and Methane Detection Device:** Cavity ring-down spectroscopy is an optical spectroscopic technique for evaluating gaseous samples. The technique can potentially provide rapid determination of low levels of contaminants in air. To support their air toxics program, one regional lab provided support for initial field trials of a cavity ring-down detector for hydrogen sulfide and methane. The field trials were conducted in an area with a number of oil wells. The laboratory provided and analyzed air canisters for air samples that were taken in conjunction with data generated by the cavity ring-down detector. The data provided by the laboratory will be compared with data collected by the detector and be used for further development of the technique.

- **Passive Sampling for Atmospheric Ammonia:** Ammonia is the most abundant alkaline gas in the atmosphere. The lack of measurement and long term monitoring data for ammonia has caused a serious gap in understanding the scientific role that ammonia has on the overall reactive atmospheric nitrogen. In 2011, the *Journal of Environmental Monitoring* published a paper on a passive ammonia sampling and analysis study that was supported by a regional laboratory. The study in the Four Corners area and in eastern Oklahoma produced passive monitoring data that added new information on ambient ammonia concentrations in the U.S. that has assisted scientists involved in present and future regional haze modeling exercises. In 2011, the regional laboratory continued to support additional studies using passive sampling devices (PSDs) to identify cost effective methods that can be used for multi-pollutant management of ammonia, ozone, nitrogen oxides, and sulfur oxides. In addition, the regional laboratory participated in the Global Earth Observation System of Systems (GEOSS) project to evaluate a new, state of the art, solar tracking spectrometer at a power plant surface site in

northwest New Mexico. This instrument will provide remote measurements of greenhouse gas, ammonia, and other pollutant gases present in atmospheric columns.

- **Passive Sampling for Volatile Organic Compounds (VOCs):** A method for performing passive air analysis for VOCs was developed with regional laboratory support. The method uses organic vapor monitoring (OVM) badges and allows the region to perform low cost/high volume sampling and analysis for VOCs.
- **Nitrogen Dioxide (NO_2) Near Road Pilot Study**: In February of 2010, EPA promulgated new minimum monitoring requirements for the nitrogen dioxide (NO_2) monitoring network in support of a newly revised 1-hour NO_2 National Ambient Air Quality Standards (NAAQS). In the new monitoring requirements, state and local air monitoring agencies are required to install near-road NO_2 monitoring stations at locations where peak hourly NO_2 concentrations are expected to occur within the near-road environment in our larger urban areas. In FY 2011, one regional laboratory provided sampling and analytical support for the Nitrogen Dioxide Near Road Pilot Study. Using passive NO_2 monitors, the study evaluated the concentration of atmospheric NO_2 at different heights as a function of the distance of the monitor from the roadside. The data produced by this study will be used to develop plans for establishing the new near-road sites.

- **Mercury Trailer Deployment at Big Bear Lake:** At the request of the EPA regional air program and the local air quality management district, regional lab staff transported and deployed the lab's mobile mercury-in-air monitoring trailer at Big Bear Lake in Southern California. Fish in Big Bear Lake contain mercury and the trailer was used in an attempt to identify the source of the mercury. The lake is downwind of a minerals manufacturing facility under Santa Ana wind conditions. The trailer was deployed at the lake for several months and was operated by air quality management district staff following training provided by experienced regional laboratory scientists. The trailer had previously been used to demonstrate elevated levels of ambient mercury downwind of a cement plant.
- **Baseline Reactive Gaseous Mercury Monitoring:** Ambient mercury is a neurotoxin currently listed as a hazardous air pollutant under the Clean Air Act. Gaseous mercury emitted into the air can make its way into aquatic ecosystems where it is transformed into the highly toxic form of methyl mercury. There is a large data gap related to ambient reactive gaseous mercury monitoring and parallel wet deposition mercury monitoring. A study to fill that gap received significant regional laboratory support in 2011. Low cost passive air sampling for reactive gaseous mercury was performed at four monitoring sites that were located downwind of power plants. The sampling took place over a 12 month period. Concurrently, wet deposition monitoring was conducted at one of the four sites. In addition, fish samples of multiple species were taken in area lakes close to the air samplers. A procedure for analyzing fish tissue on a direct mercury analyzer was developed by the regional laboratory. The regional laboratory ultimately analyzed 97 fish samples to support the study.

Priority - Assuring the Safety of Chemicals

One of the Administrator's highest priorities is to assure the safety of chemicals in our products, our environment and our bodies. Essential to addressing this priority is the reauthorization and strengthening of the Toxic Substances Control Act (TSCA).

In 2011, EPA's regional laboratories provided nearly 1,000 analyses to support 23 projects related to TSCA. Many of these projects were related to enforcement of TSCA's polychlorinated biphenyls (commonly known as PCBs) regulations. TSCA prohibits the manufacture of PCBs, controls the phase-out of their existing uses, and sees to their safe disposal. PCBs are the only chemical class specifically named in TSCA because Congress believed that the chemical and toxicological properties of PCBs posed a significant risk to public health and the environment.

- **PCB Aroclors Monitoring of New York City (NYC) Public Schools:** Many schools in the United States built before 1979 may have light ballasts containing PCBs. In 2011, analytical support was provided to evaluate select NYC Schools and assess the level of contamination associated with PCB leakage from old lighting ballasts and fixture components within classrooms. The project included nine schools that were evaluated over a seven week period. The regional laboratory processed over 150 samples for the determination of PCB Aroclors under the TSCA program. Most of these samples were wipe samples that were collected to determine if surfaces were contaminated with PCBs. Preliminary results were provided to each school within 6 days of sampling and final, validated results were provided within 9 days of sampling. The results will be used to support assessment and remediation planning.

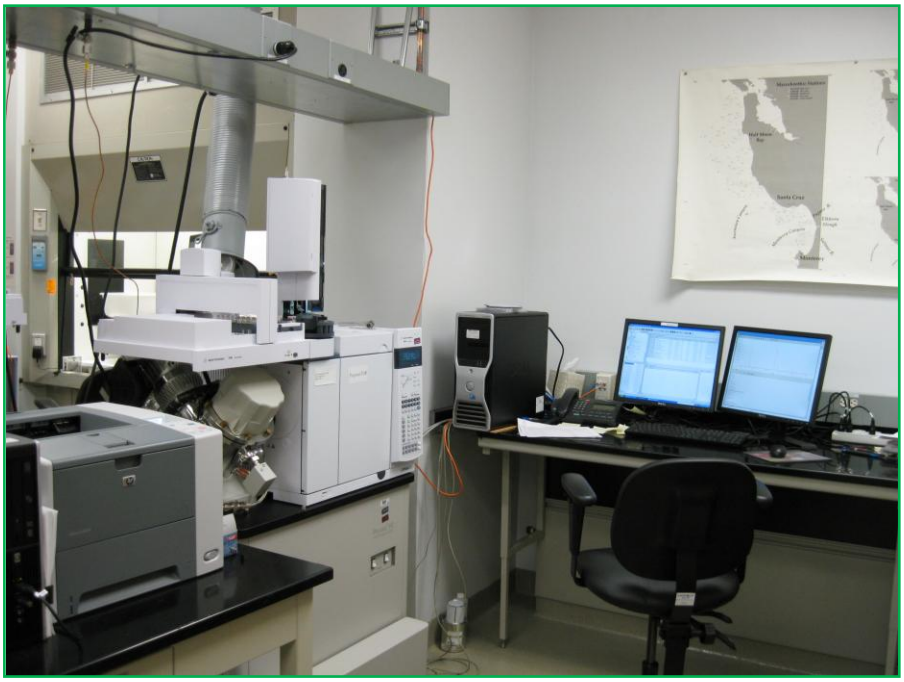
Priority - Cleaning Up Our Communities

In FY 2011, 57 percent of the analyses performed by the regional laboratories supported the cleanup of uncontrolled or abandoned hazardous waste sites associated with the Superfund Program. Another 5,335 analyses (3 percent of total analyses) were preformed to address hazardous and non-hazardous waste issues associated with the Resource Conservation and Recovery Act (RCRA) program, and over 1,500 analyses addressed risks associated with leaking underground storage tanks.

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 2011, the regional laboratories performed nearly 1,800 analyses in support of the EPA's Brownfields Program.

Several projects associated with this priority are described here:

- **Real Time Data to Guide Soil Removals:** Cleanup of contaminated soils requires quick confirmation so excavations can be closed and next steps in restoration initiated. Real time turnaround of data can also help fast track characterization of contamination to guide the actual removal process. In FY2011, one region's mobile and fixed lab assets worked to support two major soil removal operations located over 300 miles apart, one a landfill in an urban setting and the other a former mining site in a rural location.

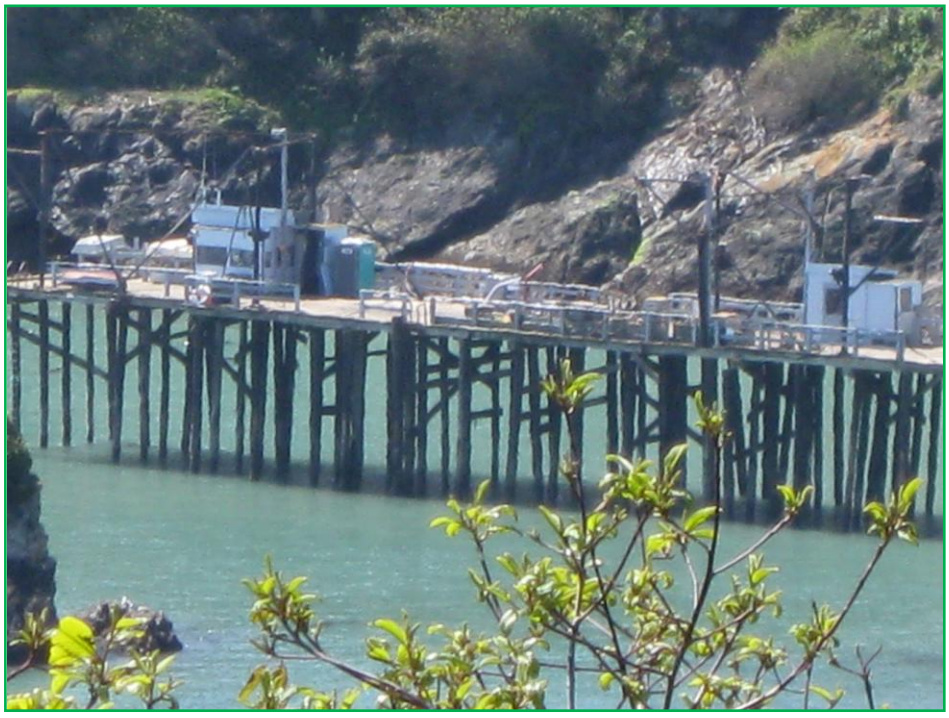


During some months the deployment of the mobile lab alternated between the two sites week by week. The lab's field team was also deployed to the mining site multiple times to help collect soil samples. Between just these two sites the region conducted over 3,200 analyses principally for metals, PCBs and polycyclic aromatic hydrocarbons (PAHs) and helped keep work on track. At the mining site, in particular, penetration of contaminated soils into a

fractured bedrock surface lead to identification of numerous locations that require further excavation to meet cleanup goals.

- **Analytical Support at Former Gold and Silver Mining Site:** The Barite Hill Superfund site is a former gold and silver mine. Mining operations began in 1989 and continued until October 1994 encompassing 135.5 acres. The remaining 659.7 acres served as a buffer zone from surrounding areas. The main pit along with ponds, sediment, surface water and soil are contaminated with arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, zinc, and cyanide. In 2011, the regional laboratory performed over 1,400 analyses as part of the remedial investigation at the site. The laboratory analyzed surface soil samples, surface water samples from streams and seeps, stream sediment samples, and surface water and sediments from the main pit. Analyses have included total metals, total organic carbon, nutrients (total P, TKN), total cyanide, weak acid dissociable cyanide, volatile and semivolatile organic compounds, pesticides, PCBs, filtered metals, anions, acidity, alkalinity, and total dissolved and suspended solids. Laboratory data from these analyses will be used to determine the nature and extent of contamination as well as possible remediation strategies.
- **Groundwater Contamination Associated with a Former Manufacturing Facility:** The Aberdeen NPL site contains a former manufacturing facility which produced machine parts from 1980 until 1995. Trichloroethene (TCE) contamination associated with the site has been detected in numerous private wells, and in two municipal water supply wells near the former facility. Detected levels of TCE have exceeded the federal Safe Drinking Water Act Maximum Contaminant Level (MCL) for TCE of 5 parts per billion. In 2011, the regional laboratory performed over 450 analyses of groundwater samples from this site. In addition to TCE, groundwater samples were analyzed for other volatile organic compounds, pesticides, metals, nitrite, nitrate and chloride. Data from these analyses will be used to assess the extent and magnitude of the contamination and to identify all sources of the groundwater contamination.

- **Communities Impacted by Environmental Cleanups and Remediation:** Regional laboratory support was provided for several community environmental investigations in Texas. Many of these communities are in close proximity to refineries, hazardous waste disposal sites and in one case an abandoned transformer manufacturing site. These communities are impacted by on-going environmental cleanups and remediation. The laboratory provided a full suite of analyses to associated project managers to ensure that the communities were not being impacted by the ongoing work. In addition, data provided by the regional laboratory was used to ensure that remediation levels were achieved.
- **Tribal Community Targeted Brownfields Assessment**: Analytical support was provided for a targeted brownfields assessment in the Cher-Ae Heights Indian Community of Trinidad Rancheria in California. A Targeted Brownfields Assessment is an environmental investigation designed to document environmental conditions at a property under consideration for redevelopment. This brownfields project centers around the cleanup of a 60-year-old pier that includes a mooring field, boat launching, and cleaning and maintenance facilities. The harbor has been designated an "Area of Special Biological Significance" by the state for kelp beds located in the bay. The laboratory performed analysis of water and soil samples for total petroleum hydrocarbons, mercury and metals. When the site is cleaned up, the Trinidad Rancheria plans to build a new pier to provide professional and recreational fishing opportunities for the community.



- **Analyses for Organo-phosphorous Pesticides**: Analytical support was provided to two rural agricultural sites, Hale Dusting and Rogers Delinted Cottonseed facility. Both facilities had a history of pesticide use which resulted in contamination of the groundwater associated with both sites. The project covered a two month period and required analytical development of an extensive list of organo-phosphorous compounds. The lab also performed testing for six additional non-routine organo-chlorine compounds. The groundwater data provided was used to determine whether the migration of contaminated groundwater had stabilized and under control.

Priority - Protecting America's Waters

America's water bodies continue to face incredible perils. Water quality and enforcement programs face complex challenges, from nutrient loadings and stormwater runoff, to invasive species and drinking water contaminants. The Agency continues to implement comprehensive watershed protection programs for the Chesapeake Bay and Great Lakes. Measures are needed to address post-construction runoff, water quality impairment from surface mining, and stronger drinking water protection.

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 assistance and regulatory support to drinking water laboratories, by providing training and expertise 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.

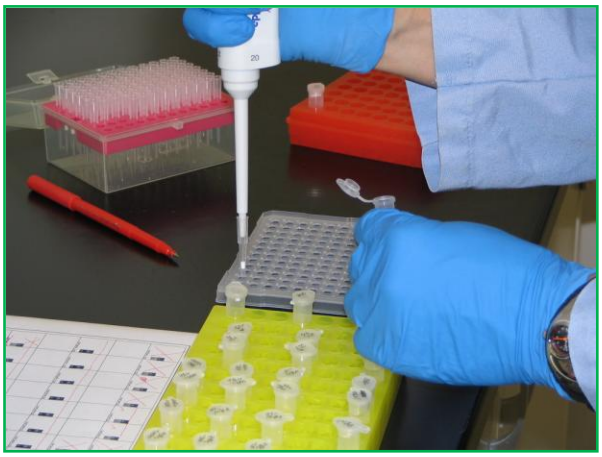
- **Drinking Water Laboratory Certifications**: Laboratories that analyze drinking water samples are required by EPA to be certified by an approved certifying authority. EPA regional laboratory personnel who are trained as drinking water laboratory certification officers conduct on-site evaluations of 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 2011, the regional laboratories performed over 30 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.
- **Lead and Copper Rule:** The purpose of EPA's Lead and Copper Rule is to minimize lead and copper in drinking water. Lead and copper enter drinking water primarily through plumbing materials. Exposure to lead and copper may cause health problems ranging from stomach distress to brain damage. In support of the Lead and Copper Rule and to evaluate sampling procedures, tap water samples from single family homes in the City of Chicago were voluntarily provided at the request of the regional Drinking Water Division. The regional laboratory provided analysis for lead on over 1000 samples that were collected during two rounds of data gathering. Many of these were follow-up samples based on significant lead results found during the first round.

- **Understanding Methylmercury Production:** The Willamette River system in Western Oregon is the 13th largest river in the conterminous United States in terms of total discharge, and the largest of all major rivers in terms of discharge per square kilometer of drainage area. The surrounding watershed supports diverse land use activities such as timber harvest, agriculture, increasing urban development, and a history of mining. These activities, as well as atmospheric mercury deposition have contributed to a well-documented mercury contamination issue that has resulted in fish consumption advisories, and concern regarding impacts of mercury on wildlife health. However, the factors controlling methylmercury production in the Willamette River have been little studied, and the importance of different habitat types to mercury cycling in this system is relatively unknown. The regional laboratory developed the capability to analyze for methylmercury in water matrices, which was applied to hundreds of samples collected from the Willamette River. This project also involved scientists from the Oregon Department of Environmental Quality and the US Geological Survey. The objective of this project is to quantify the differences in mercury production and bioaccumulation among different habitat types across the entire Willamette River landscape and evaluate them in relation to key biogeochemical parameters. The information produced from this project will enhance the understanding of the factors driving mercury risk and will direct the development of targeted management options to reduce methylmercury production.
- **Hexavalent Chromium in Drinking Water:** In 2011, EPA issued guidance recommending enhanced monitoring and sampling programs for hexavalent chromium (chromium-6) in public water systems. The recommendations were in response to emerging scientific evidence that chromium-6 could pose health concerns if consumed over long periods of time. The majority of regional laboratories responded quickly by starting method modification efforts in order to implement a modified version of EPA Method 218.6, "Determination of Dissolved Hexavalent Chromium in Drinking Water, Groundwater and Industrial Wastewater Effluents by Ion Chromatography." With these modifications, the regional laboratories were able to provide detection limits for chromium-6 in drinking water at a concentration of 0.02 micrograms per liter (ppb) or lower. EPA currently has a drinking water standard of 0.1 milligrams per liter for total chromium, which includes all forms of chromium. The quick response by the regional laboratories allowed EPA to provide assistance to state and city laboratories that lacked the capability to achieve lower detection limits.

- **Expert Witness Testimony:** Laboratory staff provided expert testimony for the prosecution of Clean Water Act (CWA) violations in two separate cases during 2011. The first case was a Criminal Investigation Division case conducted in Idaho that was prosecuted jointly by US Department of Justice and EPA attorneys. The criminal case alleged the plaintiff, a cattleman, repeatedly and illegally discharging livestock waste into waters of the US, thereby violating the CWA. The regional microbiologist provided testimony on the public health threat associated with untreated fecal discharges and on the validity of the microbiology data presented in court. The plaintiff was ultimately found guilty and fined with the potential for a prison sentence. In the second case, the regional laboratory microbiologist provided expert witness testimony at an administrative hearing associated with a dairy farmer accused of consistently and illegally discharged dairy waste into the waters of the US. The plaintiff was found guilty and fined.
- **New Sea Urchin Fertilization Toxicity Method:** A marine biologist at one regional laboratory played a critical role in the development, refinement, standardization, evaluation and peer review of a tropical urchin toxicity test which will be incorporated into the second edition of the *USEPA West Coast Marine Toxicity Test Methods Manual* and published by the Office of Research and Development (ORD). Whole effluent toxicity testing is routinely used to assess the toxicity of materials that are discharged into water bodies as permitted through the National Pollutant Discharge Elimination System (NPDES). A sea urchin sperm/fertilization toxicity test has been standardized using native sea urchin species for East and West Coast NPDES permit holders. However, toxicity test methods for NPDES permit holders using indigenous tropical species did not exist. The method will be a valuable tool for monitoring NPDES compliance with water quality standards in Hawaii and the Pacific Island Territories.

- **Rapid Methods Demonstration Project at New Jersey Beaches:** In collaboration with state, county and local government stakeholders, a Rapid Methods Demonstration Project using Real Time Polymerase Chain Reaction (qPCR) was completed by the regional lab. The project covered four bathing beaches in Ocean County, New Jersey during the summer of 2011. This project was the culmination of four years of testing using rapid methods at beaches and embayments in Ocean and Monmouth Counties. The qPCR rapid test method can be used to identify and determine the concentration of certain bacteria, including Enterococcus, present in a water sample. Split samples were collected over a ten week period during the summer. The samples were analyzed for the bacteria Enterococcus using the conventional Membrane Filtration method, which takes approximately 24 hours to obtain results and using the rapid method, qPCR method which takes approximately three hours.

The qPCR results were available before noon on the same day that samples were collected. Results were posted on the State's website soon after data was available and, if warranted, health advisories for qPCR data were posted. Overall there was greater than 85 percent agreement between qPCR and the conventional Membrane Filtration methods with qPCR results available almost a full day ahead of the conventional Membrane Filtration results. This demonstration project will provide valuable information for the anticipated implementation of rapid methods by October 2012 as required by Congress and the revision of the existing water quality regulations for marine pathogens.



- **Microbial Source Tracking to Identify Contamination Sources**: Microbial source tracking continued to be an important tool as our scientists worked with county officials to identify the source of fecal contamination that led to the closure of 4,000 acres of commercial shellfish beds in Puget Sound. This project involved 14 months of regular sample collection resulting in 170 samples for the project. At a public meeting in 2011, EPA's Subject Matter Expert in microbiology presented the results of the data collection which found that all but 11 samples indicated the presence of fecal contamination. Just over 30 percent demonstrated human and/or ruminant contamination. Additional work performed by Oregon State University also identified avian fecal contamination. These data provided the public with a better understanding of the factors contributing to the shellfish bed closure and will help direct future efforts to eliminate sources of fecal contamination.
- **Multi-Agency Rocky Intertidal Network:** A regional laboratory marine biologist worked with the Bureau of Ocean Energy Management, Regulation, and Enforcement and the University of California, Santa Cruz staff to provide assistance with semi-annual rocky intertidal sampling. The project, titled Multi-Agency Rocky Intertidal Network (MARINe), is a collaborative effort of 23 organizations to monitor the rocky intertidal habitats on portions of the Pacific coast. The scientists monitor mussels, sea stars, algae, and other intertidal plants and organisms to keep an inventory of benthic communities in case of catastrophic environmental or natural disasters on the coast. The program is also used to establish marine protected areas on the coast.
- **Evaluation of Effluents from Publicly Owned Treatment Works (POTWs)**: Analytical support was provided to EPA's Office of Research and Development in Cincinnati for studies evaluating influents and effluents associated with POTWs. The regional laboratory analyzed samples from 50 POTWs around the country for alkylphenols and their ethoxylates. Alkylphenol ethoxylates were widely used as surfactants in detergents and cleaning products. Alkylphenol ethoxylates biodegrade to alkylphenols, which persist in the environment and have high toxicity to aquatic organisms and may adversely affect the endocrine system that controls metabolism, reproduction, and growth. In addition, the regional laboratory provided analysis of long chain alkylphenol ethoxylates for an influent/effluent study at a POTW. Analytical data was used to characterize the effluents from wastewater plants and to evaluate removal of these compounds by the plant.

Priority - Expanding the Conversation on Environmentalism and Working for Environmental Justice

EPA has begun a new era of outreach and protection for communities historically underrepresented in EPA decision-making. The Agency is building strong working relationships with Tribes, communities of color, economically distressed cities and towns, young people and others. The protection of vulnerable subpopulations is a top priority, especially with regard to children. Children may be especially vulnerable to environmental exposures because their bodily systems are still developing, they eat more, drink more, and breathe more in proportion to their body size and because their behavior can expose them more to chemicals and organisms. Some of the projects that the regional laboratories have participated in to support this priority are discussed below.

- **Inspiring the Next Generation of Environmental Professionals**: Hoping to inspire the next generation rising into higher education to choose a career in the environmental field, one regional lab presented a multiple day curriculum for the AP Biology and Honors Chemistry students of a local high school that serves an environmental justice community. Lab staff presented an overview of EPA and the regional laboratory's role and capabilities. Students were given presentations on water quality sampling techniques in preparation for their second day which was spent in the field getting hands-on water sampling experience. Lab staff and 18 students collected water samples at three locations including a known outfall discharging to the Shawsheen River which is within walking distance of the high school. Field indicator analyses were conducted and other samples were returned to the lab for bacterial analysis. On the final day of the session, students were given a tour of the lab and participated in hands-on lab demonstrations in the pharmaceuticals and aquatic toxicity testing labs. The students also spent time in the microbiology lab where they were able to see the bacteria determination results associated with the samples they had taken. The sessions ended with "lunch with a scientist" where students could talk to scientists and engineers about careers in environmental protection.

- **Stream Sampling Support for Environmental Justice Community:** Regional laboratory sampling teams had the opportunity to work with high school students while conducting several rounds of stream sampling for the Pequonnock River Monitoring Project and the environmental justice showcase community of Bridgeport, CT. The high school students were interning with Groundwork Bridgeport, a non-profit organization committed to converting blighted areas of the city into gardens, parks, playgrounds, and streetscapes and partner in the river monitoring project. On each sampling round, ten locations along the Pequonnock River in Bridgeport, Trumbull and Monroe were sampled for determination of a variety of water quality parameters. The participating students helped with collection and field analysis of samples.
- **Analytical Support for Environmental Justice Community**: Jacksonville, Florida's Health Zone 1 is one of 10 communities nationwide selected as a national model for EPA's commitment to addressing environmental justice challenges. In FY 2011, fish and other aquatic life were collected from sample sites in two urban streams by the regional Science and Ecosystem Support Division to evaluate chemical contaminant accumulation in edible tissue. Samples were collected using rigorous scientific and quality assurance procedures, and were analyzed by the regional laboratory for pollutants that may have originated from former industrial operations and contaminated runoff from nearby ash dump sites. The data collected was used by Florida's Department of Health (FDOH) to evaluate the potential risks to the community consuming fish and shellfish caught from these waterbodies. As a result of the data collected, fish consumption advisories were issued by FDOH for certain fish species in the two streams.
- **Partnering with the JFK Johnson Rehabilitation Institute**: A regional laboratory became a participating government partner for a Laboratory Assistant Training Program associated with the JFK Johnson Rehabilitation Institute. The program is designed to assist adults with special needs by providing them with the necessary skills to work in a laboratory environment. As part of the partnership, the laboratory provides students with one week internships at the regional laboratory. The internships consist of a basic overview of the key components of laboratory operations and hands-on experience with each of the major departments and disciplines within the laboratory. In FY 2011, the laboratory provided three week-long internships in support of the program.

Priority - Building Strong State and Tribal Partnerships

States and Tribal nations bear important responsibilities for the day-to-day mission of environmental protection, but declining tax revenues and fiscal challenges are pressuring state agencies and Tribal governments to do more with fewer resources. Strong partnerships and accountability are more important than ever. EPA regional laboratories do their part by providing technical assistance, training, expertise and capacity to bolster state and tribal efforts. Some examples of Regional Laboratory efforts to support and bolster state and Tribal efforts include:

- **Supporting State Laboratories during Emergencies:** In 2011, the first floor level of the entire Vermont Department on Environmental Conservation's Waterbury campus was flooded following the heavy rains of Hurricane Irene. Lab operations were brought to a halt. The EPA regional lab immediately stepped in to provide assistance by taking over the analysis of carbonyl samples for the State's air monitoring network as well as the analysis of volatile organics soil and water samples associated with remediation sites. In addition, the lab helped make arrangements for another state laboratory to take over the weighing PM2.5 filters for Vermont's air monitoring responsibilities. The Region will continue to provide volatile organic and carbonyl analyses in 2012 until Vermont can make alternate arrangements.

- **Outreach to Tribes**: Regional laboratory staff held a series of conference calls with the regional Tribes to identify areas where the lab could provide technical, field and laboratory support. The purpose of this outreach was to improve communication with the Tribes, in particular the process for soliciting requests for assistance from the Tribes, and to increase the support provided. Lab staff, including all unit managers and key staff representing quality assurance, chemistry, biology, air and water monitoring, participated in eight calls. On the calls, priority issues for the Tribes were discussed and technical support that the lab could provide was identified. Priority tribal needs included equipment, standard operating procedures for analyses, and training on lab procedures. Efforts to address priority tribal needs will continue.
- **Human Health Risk from Exposure to Contaminated Sediments**: Analytical support was provided for a joint project between the North Carolina Department of Environment and Natural Resources (NCDENR) and EPA. Sediment and fish tissue samples were collected from an approximately 40-mile stretch of the Yadkin River in North Carolina. The samples

were analyzed for PCB Aroclors by the regional laboratory. NCDENR had detected PCBs in fish tissue from Badin Lake, one of four reservoirs on the Yadkin River. In the past, a fish advisory was issued based on the presence of PCBs in fish tissue sampled from the lake. The objective of the current investigation is to determine whether there is human health risk associated with exposure to sediments at swimming locations and boat ramps along the selected stretch of river.

- **Remediation of PCB Contaminated Sediment:** At the request of the State of Wisconsin, laboratory support was provided to evaluate PCBs in sediments from the Fox River. The lower Fox River has the highest concentration of pulp and paper mills in the world. In the past, these mills routinely used PCBs in their operations which ultimately contaminated the river. The State of Wisconsin is in the process of remediating stretches of the river but was concerned about the comparability of PCB data obtained by other labs using different extraction and sample preparation procedures. The regional lab performed a comparability study on sediments supplied by the State, which indicated good agreement with historical data.
- **Developing Shellfish Analysis Methods in Support of Tribal Interests**: Shellfish such as clams are important to Northwest tribes for subsistence and commercial purposes. In 2011, the impact from military waste, wood treatment plants and mining to traditional fishing areas of the Makah and Suquamish Tribes in Washington, and the Kasaan Tribe in Alaska were investigated. The regional laboratory developed analytical procedures for the homogenization, extraction, and analysis of clam samples for polynuclear aromatic hydrocarbons, polychlorinated biphenyls, and heavy metals at trace levels. The regional laboratory applied these methods in analyzing clam samples collected from these areas as part of various Superfund projects which helped the Tribes and the Region assess potential human health impacts.

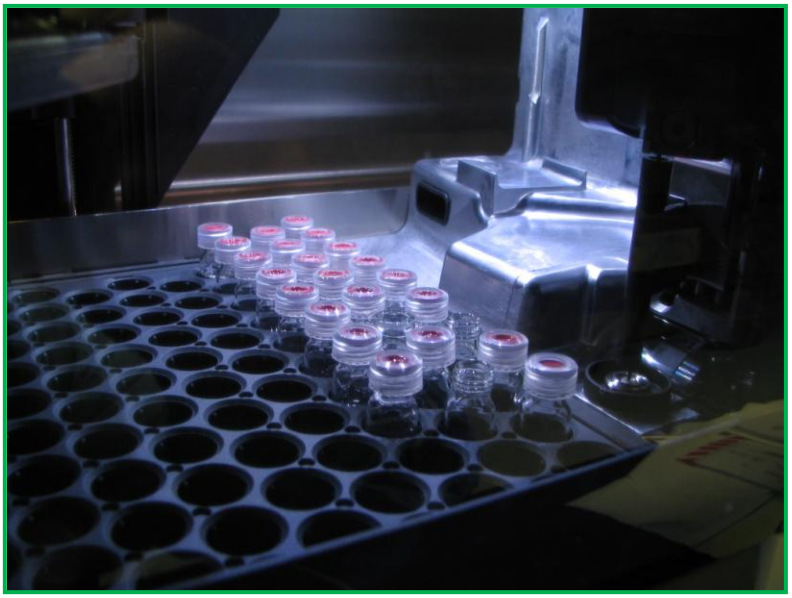
- **Stream Habitat Assessment Training**: Laboratory biologists provided Stream Habitat Assessment Training to representatives from five Indian Tribes including the Choctaw (Mississippi), Porch (Alabama), Cherokee (North Carolina), Miccosukee (Florida) and Seminole (Florida.) Stream habitat assessments provide information about factors influencing the biological condition of a stream and can also be useful as a screening tool for the identification of habitat stressors. Tribal representatives traveled with support from an EPA grant. The training was customized to address the diverse stream habitat types present in the different states and regions associated with the tribal representative. Training was provided on both low and high gradient stream habitat assessments.

- **Technology Transfer to State Department of Fish and Game:** An important aspect of partnerships between EPA and state and tribal governments is the sharing of unique expertise and technology. In 2009, a regional lab deployed and maintained a remote communication-capable water quality data system downstream of Concentrated Animal Feedlot Operations and successfully demonstrated its ability to alert enforcement personnel when potentially unauthorized discharges occur. As a result of this demonstration, the California Department of Fish and Game (CDFG) decided to purchase five systems to monitor likely CAFO discharge areas and construction run-off sites. Regional lab staff assisted CDFG with equipment set-up and testing of the water quality sensors. They also helped the State agency with setting up cell phone telemetry and reception of data at a web hosted data site.

SECTION III: Regional Laboratory System - Key Accomplishments

Regional Laboratory Network

Each of the regional laboratories share common responsibilities and roles and provide core analytical capabilities to meet the analytical needs of their individual regions. The core analytical capabilities of the regional laboratories are outlined in Appendix A. These capabilities include analyses that are in high demand by each of the regions to address their regulatory and monitoring programs. The list of capabilities includes routine and specialized analyses for inorganic chemistry, organic chemistry, biology, microbiology and other common physical determinations associated with a wide range of environmental samples.



Collectively, the ten regional laboratories operate as a laboratory network that broadens the level of analytical and technical support available to the Agency. As a Regional Laboratory Network, the regional laboratories work together to assist one another when either capability or capacity is in demand. In addition, the regional laboratories have either independently or jointly fulfilled the analytical support requested from the regions and the national program offices. The regional laboratories have assisted one another as well as the national program offices in high profile projects such as the National Ocean Vessel Discharge Study and the BP Gulf Oil Spill.

Operating as a network provides several benefits to the Agency including:

- Established communication mechanisms to provide laboratory response to environmental emergencies and incidents on short notice;
- Increased laboratory capacity for large scale projects;
- Availability of a more comprehensive level of expertise to address emerging analytical and technical support needs of the Agency;
- Increased opportunities for exchange and sharing of knowledge, research needs, equipment, and laboratory materials; and
- Access to an expanded spectrum of complex analytical techniques developed by individual regional laboratories to address unique and emerging regional environmental issues.

The availability of an expanded spectrum of analytical techniques results primarily from the fact that each region faces its own individual environmental issues. A regional laboratory often develops specialized and complex analytical capabilities tailored to the special needs of their region. Though often developed to meet high demand analytical needs in an individual region, these capabilities are ultimately available to a wider Agency to address short term analytical capability needs. On a strategic level, ready access to a larger inventory of highly complex analytical techniques are made available without incurring extensive capital investment for the purchase of sophisticated analytical instruments at multiple regional laboratories It also enhances efficiency as the operating costs and staff time required to develop and maintain methods at multiple labs is avoided.

Some of the specialized analytical techniques developed by the regional laboratories are discussed below.

- **Characterization of Lead in Soil**: Lead mining, milling, and smelting activity began in the early 1700s in Southeast Missouri and continued in the mid 1800s in Southwest Missouri and in Southeast Kansas. This activity resulted in hundreds of square miles of mining and smelting impacted lands including thousands of lead contaminated residential properties. In order to fully characterize the potential impact, the Region 7 laboratory collaborated with the Office of Research and Development to develop and deploy the *In Vitro Bioaccessibility Assay* for Lead in Soil, which is used to determine the potential hazard to children from ingestion of lead in the environment. In addition, Region 7 has developed the ability to perform Lead Isotope Ratio analysis which is an environmental forensic technique used to characterize and determine the source of lead contamination that may be impacting public health. These tools, in addition to routine metals analyses, help to better characterize the potential for childhood disease and identify the sources of lead in the environment.

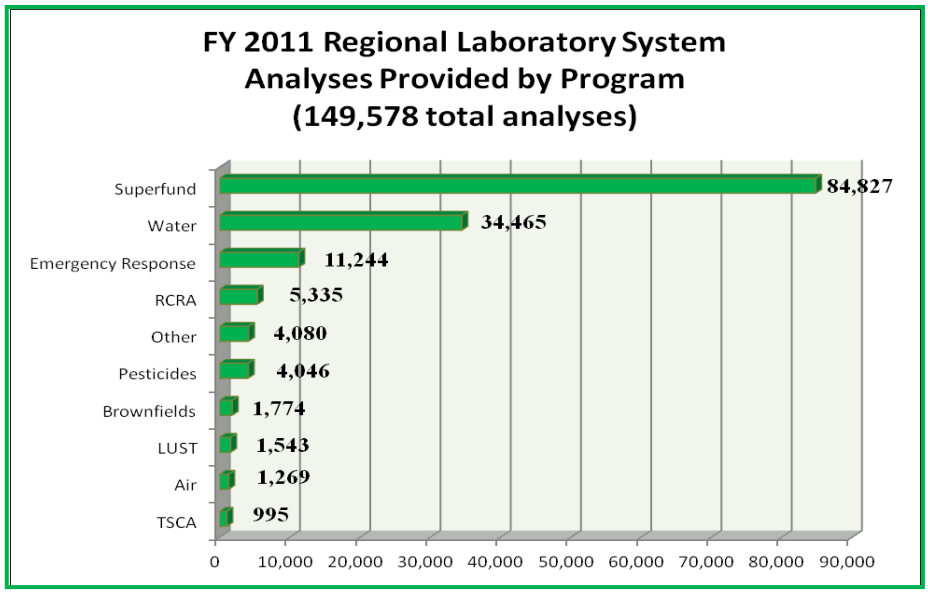
- **Atmospheric Mercury Monitoring**: The Region 9 Laboratory monitors atmospheric mercury by utilizing a mobile trailer platform. The mobile analytical capability includes: elemental gaseous mercury; reactive gaseous mercury; particulate mercury; ozone; nitrogen dioxide, sulfur dioxide, carbon monoxide, and a complete meteorological station. The trailer supports a variety of programs inside and outside the region including Total Maximum Daily Load (TMDL) projects and air monitoring projects related to sources of mercury emissions.

- **Pharmaceuticals and Personal Care Products**: The Region 1 Laboratory has developed a liquid chromatography method that analyzes for a half dozen pharmaceuticals and metabolic products of pharmaceuticals that can be used to help fingerprint illicit discharges of sewage from storm water systems. This analysis is brought to bear in support of field indicators and traditional microbial analyses to prove the source of contamination is human waste not non-point contributions from farm animals and pets or from birds and wildlife.
- **Algae Toxins:** The Region 1 lab has established a method for field estimation of cyanobacteria concentration in surface water bodies and a laboratory-based count method using a hematocytometer and microscope to determine actual microcystis aeruginosa cell densities. The incidence of cyanobacteria in nutrient enriched lakes is a growing public health concern due to the associated toxicity and other detrimental effects these organisms may have on humans and wildlife. Similarly, the Region 9 Laboratory has established a immunoassay method for the analysis of microcystin, a blue-green algae toxin. Summertime blooms of the toxin-producing blue green algae, Microcystis have occurred in lakes within the region and can cause toxin levels over 1,000 times the World Health Organization based health recommendation.

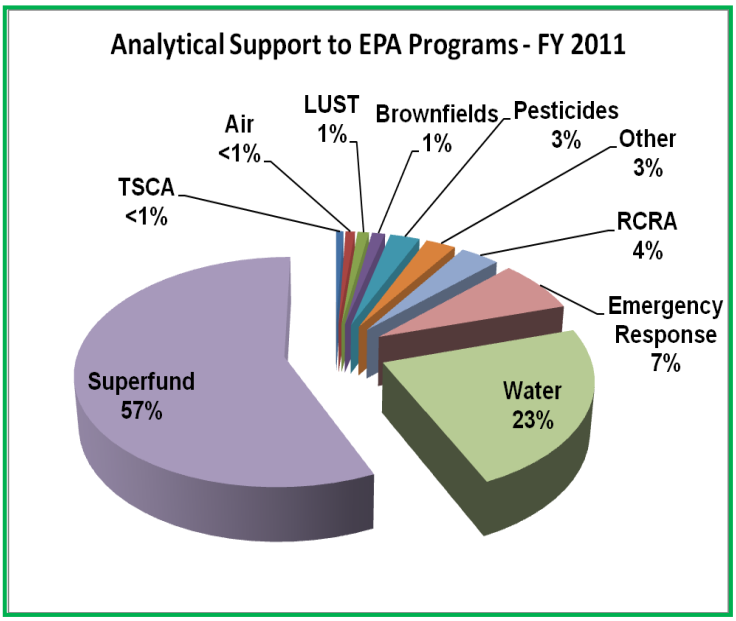
- **Real Time Quantitative Polymerase Chain Reaction (qPCR)**: Quantitative Polymerase Chain Reaction is a laboratory technique used to amplify and quantify targeted DNA molecules. The technique has been useful in quickly identifying sources of microbial contamination in water. Regions 1, 5, 7, 8 and 10 currently have the instrumentation and expertise to perform this technique to address a variety of environmental issues.
- **Toxaphene Congeners and Degradation Products:** During FY11, Region 4 served as the referee laboratory on the third phase of method validation for a Gas Chromatography Electron Capture Negative Ion Mass Spectrometry (GC/EC NIMS) determinative procedure for the analysis of selected toxaphene congeners and degradation products. Toxaphene is an insecticide that was primarily used from 1947 to 1980 in the southern United States on cotton crops. Toxaphene is a persistent, bioacculumative, and toxic (PBT) pollutant targeted by EPA. The work at the Region 4 laboratory supports the validation of EPA Method 8276, "*Toxaphene and Toxaphene Congeners by Gas Chromatography/Negative Ion Mass Spectrometry',* for Resource Conservation and Recovery Act applications related to fish and other marine tissue. The development of Method 8276 also satisfies an Office of Inspector General report directive to develop the GC/EC NIMS technology for use at a Georgia NPL Superfund Site.
- **Asbestos Analysis:** In order to meet continued demand for asbestos analysis associated with Libby, Montana studies, the Region 8 Laboratory is establishing a transmission electron microscopy laboratory. The laboratory typically processes and analyzes over 1000 asbestos samples per year from Libby, Montana using the polarized light microscopy test method. The transmission electron microscopy method is a more sensitive method for analysis and characterization of asbestos.

Analytical Support

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 2011.

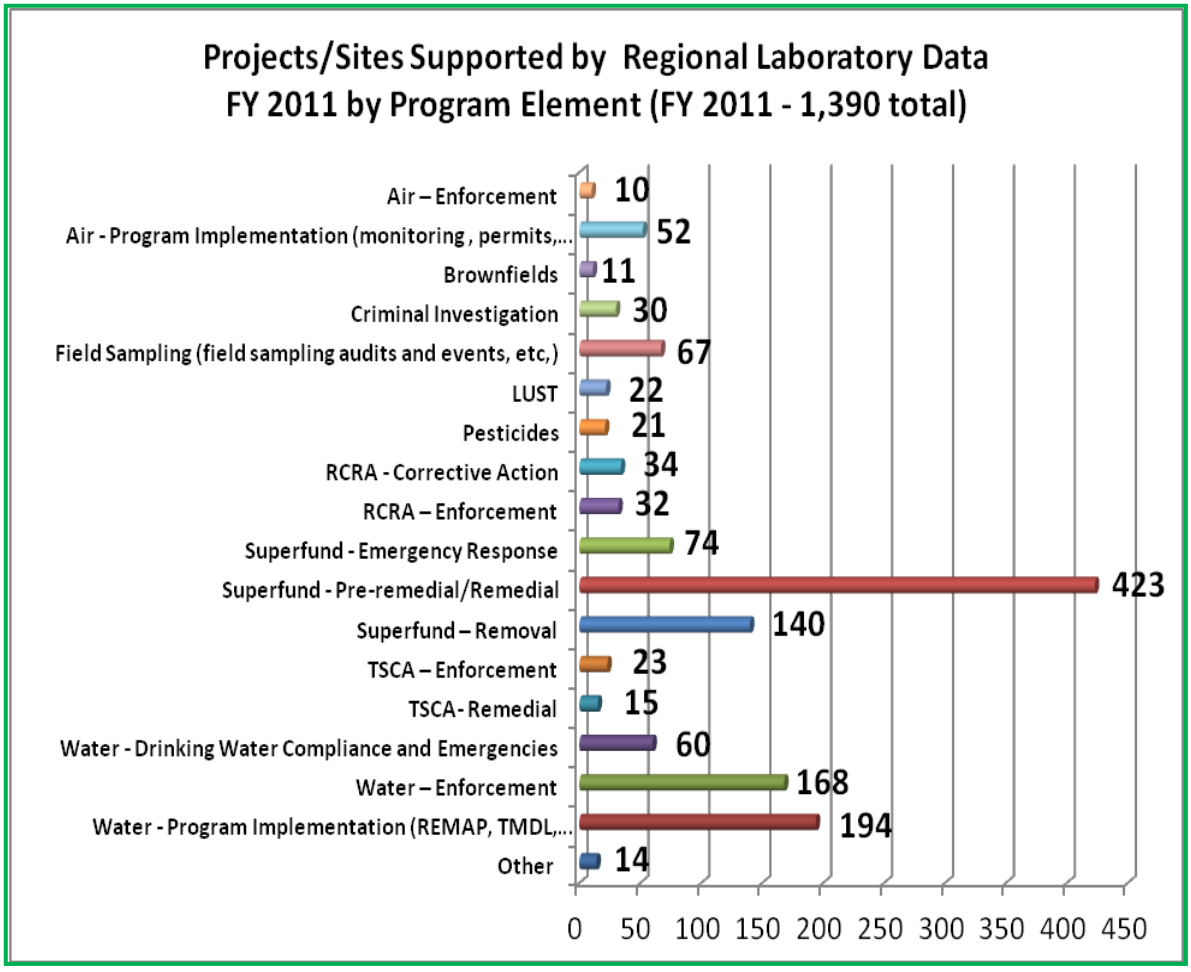


A total of 149,578 analyses were performed in support of EPA programs in FY 2011. An analysis is one analytical test through one instrument. The sample is run through the entire process and results are reported to the customer. For example, an analysis of a sample for 24 metals or for 65 volatile organic compounds is counted as one analysis. An analytical technique that averages 2 or 3 "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% of the laboratories' analytical effort. Analyses identified as "Other" include method validation studies, and support for Office of Research and Development projects.



In addition to fixed laboratory analytical support, the regional laboratories provide significant field sampling and field analytical support. In FY 2011, 4% (5,988 field analyses) of the total number of analyses performed were field analyses in support of a variety of EPA programs. Some of the benefits to providing analyses in the field include 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.

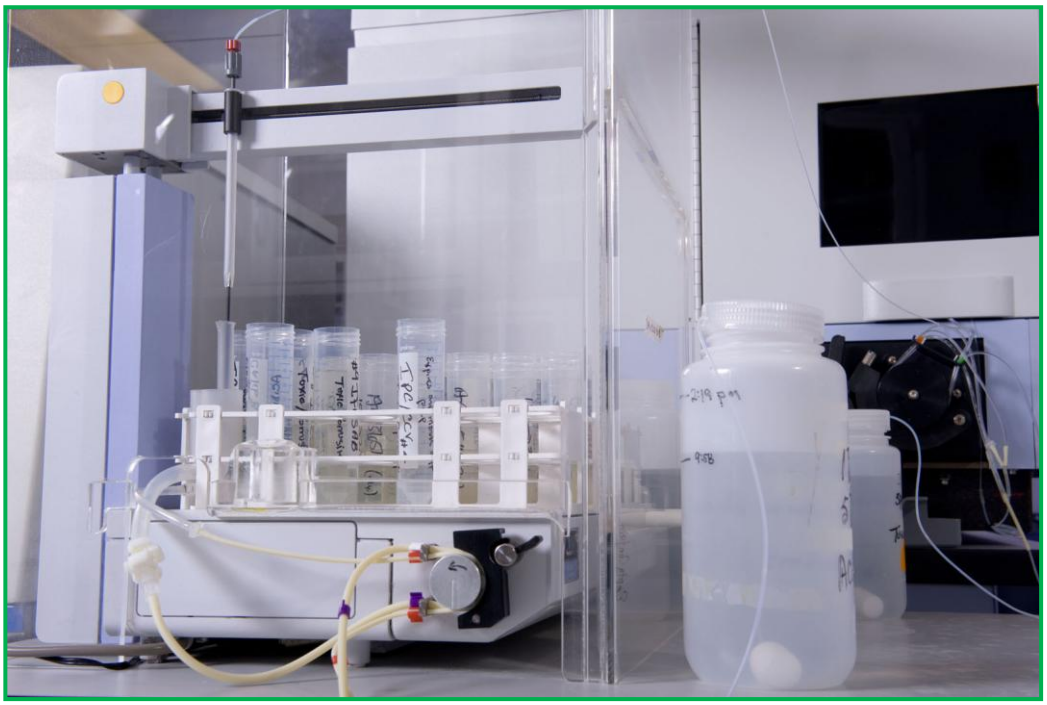
Counting analyses is one way to measure the support that regional laboratories provide to EPA's programs. Another way to evaluate the contributions of regional laboratories to the work of the Agency is to look at the number of projects and/or site evaluations that laboratory data supports. In FY 2011, regional laboratory data was used to support 1,390 sites and projects. 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 those related to the Regional Monitoring and Assessment Program (REMAP) are counted by individual water body. For example, all sampling locations at 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.



Emergency Response

The regional laboratories are increasingly engaged in EPA's Emergency Response Program. In FY 2011, the regional laboratories provided over 11,000 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.

- **Joplin, Missouri Tornado Response**: In 2011, a catastrophic tornado struck Joplin, Missouri, killing more than 150 people and destroying more than 8,000 structures. As part of the region's disaster response efforts, scientists from the regional laboratory provided ambient air monitoring support. Laboratory staff and regional air monitoring staff fielded, operated, quality assured, and reported hourly real-time particulate data that was used to alert the public to potentially unhealthy conditions associated with recovery and demolition activities.
- **Assessment of Flood Water at the American Cyanamid Superfund Site:** In 2011, Hurricane Irene and subsequent rains caused severe flooding of the American Cyanamid Superfund Site. The 575-acre site has a history of industrial pollution dating back to 1915 and was used by prior owners for manufacturing chemicals and disposing of chemical sludge and other wastes. The regional Emergency and Remedial Response Division initiated draining of the main plant flood waters into a tributary to the Raritan River. In order to assess and verify that there was no effect from the discharge of flood waters, the regional laboratory provided analysis of water samples collected upstream and downstream of the discharge site. Samples were collected daily over a seven day period from four different locations on the tributary. Samples were analyzed for a variety of contaminants that are common at the site including volatile organic compounds, semi-volatile organic compounds and metals.



Emergency Preparedness

Regional laboratories play a critical role with regard to ensuring that the nation is prepared for environmental emergencies. The ability to provide consistent analytical capabilities, capacities, and quality data is an important aspect of the EPA's emergency response responsibilities. In order to enhance regional capability to respond to emergencies, whether from natural causes or terrorist activity, the regional laboratories worked on several significant development projects which are described below.

- **Partnership**: The regional lab community always stands ready to provide accurate environmental data in support of EPA's Emergency Response Program. To enhance the accessibility of their services the regional labs have placed a priority on joining the Office of Emergency Management's (OEM) Environmental Response Laboratory Network (ERLN) and within that network also serving as members of the EPA's Water Security Division's (WSD) Water Laboratory Alliance (WLA). Nine out of the ten regional labs have already joined both networks. All ten regional labs helped support the conversion of regional WLA Response Plans into a single national plan and during the past year have been working with OEM and WSD to adapt that plan into an all hazards ERLN response plan. The regional plans provided federal and state environmental and public health laboratories and drinking water utility laboratories with a structure for a systematic and coordinated regional response to a drinking water contamination incident. Within that broadened framework regional labs will preserve their "regional hub" role in working with State and local ERLN labs to coordinate analytical support services in any given region.
- **Advancing Analytical Capability and Capacity for Ultra-Dilute Chemical Warfare Agents** : During FY 2011, three regional laboratories made significant progress in their ultra-dilute chemical warfare agent (CWA) analysis programs by receiving and analyzing CWA standards and/or performance test samples for the first time. Prior to being able to receive agents, each facility required some modification and CWA chemical hygiene programs had to be written and implemented. With the addition of these three Phase 2 CWA Laboratories, EPA now has five regional labs capable of responding to a national incident involving the release of CWAs, either accidental or intentional, under the Agency's Environmental Response

Laboratory Network. Furthermore, in FY 2011, the Department of Homeland Security began the phased transition of the chemical warfare agent fixed laboratory response capability to the USEPA Office of Emergency Management. The first phase of this transition included three regional laboratories that have completed demonstration of their capability to conduct CWA analyses, in a high throughput manner, under an appropriate quality system.

- **Full-Scale Laboratory Exercise**: Good execution requires practice. In 2011, two regional laboratories collaborated to design, coordinate and implement a full-scale exercise to practice a coordinated multi-agency and multi-laboratory response to an environmental and public health incident. The exercise was performed with the cooperation of EPA's Office of Emergency Management, the Centers for Disease Control and Prevention (CDC), the U.S. Food and Drug Administration (FDA), the Federal Bureau of Investigation (FBI), and other state and local agencies. The exercise simulated both field and laboratory responses to actions of multiple drinking water contamination (both chemical and biological) events in Kansas City, MO. The scenario included simulated contamination of a public water supply resulting from tampering with a chemical contaminant; a flooding event resulting in the introduction of a non-select biological agent, and finally intentional contamination with a select agent. A total of 1,200 samples (environmental, clinical and food) associated with these exercise scenarios were analyzed by 32 participating federal, state, municipal and commercial laboratories. The labs represented a number of laboratory response networks including EPA's Water Laboratory Alliance, EPA's Environmental Response Laboratory Network, CDC's Chemical and Biological Laboratory Response Network, and FDA's Food Emergency Response Network.

- **Method Development:** At the request of EPA's National Homeland Security Research Center (NHSRC) and Office of Emergency Management (OEM), one of the regional laboratories developed three methods for the analysis of degradation products associated with chemical warfare agents. Methods for analysis of Thiodiglycol (TDG) in soil and wipe samples were developed and validated by the laboratory. TDG is a degradation product of HD blister agent. The methods were adopted as American Society for Testing and Materials (ASTM) International standards and incorporated into EPA NHSRC's Standardized Analytical Methods for Environmental Restoration Following Homeland Security Events (SAM) compendium. In addition, a method for the analysis organo-phoshanates in soil was developed. Organo-phoshanates are degradation products of nerve agents like VX and Sarin. This method is pending adoption by ASTM.

- **Collaboration with the Food Emergency Response Network (FERN):** At the request of the EPA's Office of Emergency Management, a regional laboratory participated in an exercise sponsored by the Food Emergency Response Network (FERN.) FERN integrates the nation's food-testing laboratories at the local, state, and federal levels into a network that is able to respond to emergencies involving biological, chemical, or radiological contamination of food. The exercise focused on testing the ability of participating laboratories to use similar methods to identify and quantify a toxin distributed in a specific food type. The regional laboratory successfully quantified the compound in the food samples and provided data to the FERN within 24 hours after sample receipt.

Ensuring Quality of Data

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. The primary requirement for a laboratory to become accredited is to have a documented quality management system. All regional laboratories have received and are maintaining externally accredited quality systems. Nine out of ten of the regional laboratories are accredited through the National Environmental Laboratory Accreditation Program (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. NELAP is the program that implements the quality system standards adopted by the National Environmental Laboratory Accreditation Conference (NELAC). One regional laboratory is accredited under the International Organization for Standardization/International Electro technical Commission (ISO/IEC) 17025 which is the primary International Organization for Standardization (ISO) standard used by testing and calibration laboratories. In FY 2011, this regional laboratory underwent its first surveillance visit for its new ISO 17025 accreditation. The scope of the accreditation was expanded to include additional chemical analyses and requirements of the Lab Accreditation Bureau's Forensic Science Accreditation Program (FSLAP) that will support criminal and enforcement programs in the region.

APPENDIX A

Regional Laboratories Core Capabilities

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	X		
Alkalinity	Water	Titrimetric	X	X	X	X	X	X	X	X	X	X
Asbestos	Solids/Bulk material	PLM	X						X	X		X
	Soil/Sediment	PLM	X						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	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			

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
Fluoride (continued)	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
	Tissue (fish &/or plant)	CVAA	X	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
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
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
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

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
Metals, Total (continued)	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		
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 confirm			X		X		X			X
	Water, Soil/Sediment	LC/MS			X							X
	Water	LC/MS/MS	X					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

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
Sulfate	Water	IC		X	X	X			X	X	X	X
	Soil	IC			X	X			X	X	X	
	Water	Turbidimetric	X	X		X	X		X			
	Soil	Turbidimetric	X			X	X					
Sulfide	Water	Colorimetric		X		X	X		X			X
	Soil	Colorimetric				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

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	REGIONAL CAPABILITY									
			1	2	3	4	5	6	7	8	9	10
Herbicides (continued)	Soil/Sediment	GC/ECD; GC/NPD				X		X	X			X
	Waste (oil, drum, etc..)	GC/ECD; GC/NPD				X			X			X
	Tissue (fish &/or plant)	GC/ECD; GC/NPD							X			
Herbicides (TCLP)	Solid/Waste	GC/ECD				X		X	X			X
	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

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

II. PHYSICAL & OTHER DETERMINATIONS

ANALYTE / GROUP NAME	SAMPLE MEDIA	ANALYTICAL TECHNIQUE	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	

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

III. BIOLOGY

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

ABBREVIATIONS

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